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Beverly Hills, CA 90211

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JULIAN K. QUATTLEBAUM, III
JAMIE T. HALL *
CHARLES J. McLURKIN

Writer's Direct Line: (310) 982-1760
jamie.hall@channellawgroup.com

*ALSO Admitted in Texas

November 21, 2020

VIA ELECTRONIC MAIL

City of Los Angeles
200 North Spring Street
Los Angeles, California 90012
Keyonna.Kidd@lacity.org

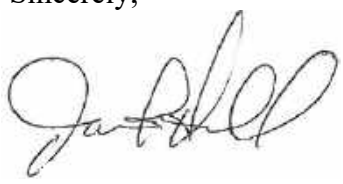
Re: CEQA Appeal for 11472 West Laurelcrest Drive, Los Angeles, California; CF 19-1134

Dear Council President Martinez and Councilmembers:

This firm represents Sunshine Hill Residence Association ("Appellant" or "Association"). Appellant has cited to a variety of reference materials in the letters submitted to the City thus far. This letter is intended to provide the City with copies of the cited source documents to ensure that are made part of the Administrative Record. See Exhibits 1-21.

I may be contacted at 310-982-1760 or at jamie.hall@channellawgroup.com if you have any questions, comments or concerns.

Sincerely,



Jamie T. Hall

Exhibit 1

FRANK T. MARTINEZ
City Clerk

KAREN E. KALFAYAN
Executive Officer

When making inquiries relative to this matter refer to File No.

CITY OF LOS ANGELES
CALIFORNIA

ANTONIO R. VILLARAIGOSA
MAYOR

Office of the
CITY CLERK
Council and Public Services
Room 395, City Hall
Los Angeles, CA 90012
Council File Information - (213) 978-1044
General Information - (213) 978-1133
Fax: (213) 978-1040

CLAUDIA M. DUNN
Chief, Council and Public Services Division

03-1459
03-1459-S1

March 16, 2006

Councilmember Zine
Councilmember Reyes
Councilmember Garcetti
Chief Legislative Analyst
City Administrative Officer

City Attorney
City Planning Department,
Attn: Mark Lopez
Director of Planning

RE: AMENDING THE LOS ANGELES MUNICIPAL CODE TO ADD CERTAIN NATIVE TREES TO THE CLASS OF "PROTECTED TREE" (FORMERLY SOLELY OAK TREE), REDUCES THE SIZE PROTECTED, ELIMINATES THE MINIMUM LOT SIZE, EXPANDS THE UNIVERSE OF PEOPLE WHO CAN PERFORM TREE REPORTS, AND CLARIFIES AND ENHANCES THE ENFORCEMENT PROVISIONS

At the meeting of the Council held February 28, 2006, the following action was taken:

Attached motion (Zine - Reyes) adopted as amended	X
Attached motion (Reyes - Zine) adopted	X
Attached motions (Garcetti - Zine - Reyes) adopted	X
To The Mayor FORTHWITH	X
Ordinance adopted	X
Ordinance number	177404
Posted date	03-14-06
Effective date	04-23-06
Mayor approved	03-13-06
Findings adopted	X
Exemption approved	X

PLACE IN FILES

MAR 2 0 2006

DEPUTY

Frank T. Martinez

City Clerk
cr

ff

OFFICE OF THE MAYOR
RECEIVED

Mayor's Time Stamp

2006 MAR -1 PM 2:06

CITY OF LOS ANGELES

TIME LIMIT FILES
ORDINANCES

FORTHWITH

RECEIVED
CITY CLERK'S OFFICE
City Clerk's Time Stamp

2006 MAR -1 PM 12:01

CITY CLERK

BY _____ DEPUTY

COUNCIL FILE NUMBER 03-1459 & 03-1459-S1 COUNCIL DISTRICT _____

COUNCIL APPROVAL DATE FEBRUARY 28, 2006 LAST DAY FOR MAYOR TO AC MAR 13 2006

ORDINANCE TYPE: ___ Ord of Intent ___ Zoning ___ Personnel ___ General

___ Improvement __X__ LAMC ____ LAAC __ CU or Var Appeals - CPC No 2004-2290 CA

SUBJECT MATTER: AMENDING THE LOS ANGELES MUNICIPAL CODE TO ADD CERTAIN NATIVE TREES TO THE CLASS OF "PROTECTED TREE" (FORMERLY SOLELY OAK TREE), REDUCES THE SIZE PROTECTED, ELIMINATES THE MINIMUM LOT SIZE, EXPANDS THE UNIVERSE OF PEOPLE WHO CAN PERFORM TREE REPORTS, AND CLARIFIES AND ENHANCES THE ENFORCEMENT PROVISIONS

	APPROVED	DISAPPROVED
CITY ATTORNEY	X	____
CITY ADMINISTRATIVE OFFICER	____	____
OTHER	____	____

RECEIVED
CITY CLERK'S OFFICE
2006 MAR 13 PM 3:58
CITY CLERK
BY _____ DEPUTY

MAR 13 2006

DATE OF MAYOR APPROVAL, DEEMED APPROVED OR *VETO: _____

*VETOED ORDINANCES MUST BE ACCOMPANIED WITH OBJECTIONS IN WRITING PURSUANT TO CHARTER SEC. 250(b)(c)

(CITY CLERK USE ONLY PLEASE DO NOT WRITE BELOW THIS LINE)

DATE RECEIVED FROM MAYOR MAR 13 2006 ORDINANCE NO. **177404**

DATE PUBLISHED _____ DATE POSTED MAR 14 2006 EFFECTIVE DATE APR 23 2006

ORD OF INTENT: HEARING DATE _____ ASSESSMENT CONFIRMATION _____

ORDINANCE FOR DISTRIBUTION: Yes [] No []

MAR 14 2006

\lagend\031459.ord

ORDINANCE NO. 177404

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subdivision 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. Protected Tree Relocation and Replacement. All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph to read:

Protected Tree - Any of the following Southern California native tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. The term "Tree Expert" set forth in Section 17.02 of the Los Angeles Municipal Code is amended to read:

Tree Expert - A person with at least four years of experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R of this Code. Provided, however, that in no event shall the reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in this article or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth in Subdivision 3 of this subsection, when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency, in consultation with the City's Chief Forester, determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the

determination, the protected tree's removal would be permissible; or

(iii) A building permit has been issued for the property upon which the protected tree is located, the permit is still in effect, and the removal or relocation is not prohibited by the permit.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters that cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report required pursuant to Section 17.06 C, acceptable to the Advisory Agency and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of the tree; or

(v) It has no apparent aesthetic value, which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at the location.

2. Supplemental Authority. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of the tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In that event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, except as to Subdivision 1(b)(iii) above, shall require retention of a protected tree at its existing location, if the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within the property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this article, except where the protected tree is relocated pursuant to Subdivision 2(a) above. The size of each replacement tree shall be a 15-gallon, or larger, specimen, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in a manner to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that the trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of the bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree that is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of the trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision where a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation of the tree. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06 B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any protected tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving the tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel where a protected tree is located shall be considered complete unless it includes a report pertaining to preserving the tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness in preserving the tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is amended to read:

I. When a protected tree exists on a proposed parcel, the preservation of the tree at its existing location, its relocation for preservation purposes, or the removal of the tree shall be regulated in the same manner as that provided under subdivision

regulations set forth in this chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or this article. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where the protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of

Public Works or its designated officer or employee, except as otherwise provided in this section.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed that may affect the protected tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where the Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory Agency pursuant to Article 7 of Chapter I of this Code; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the determination the protected tree's removal would be permissible; or

3. A building permit has been issued for any property and is still in effect with respect to the property under consideration and its implementation would necessitate the removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided in this section or unless the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if the Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters, which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at the location prevents the reasonable development of the subject property; or,

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the

protected tree, the tree is in danger of falling, notwithstanding the tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) Additional Authority. The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace the tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. In size, each replacement tree shall be at least a 15-gallon, or larger, specimen, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In that event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of the new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article, which permits the removal of one or more protected trees. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. WITHHOLDING OR REVOCATION OF BUILDING PERMITS FOR ILLEGAL REMOVAL OR RELOCATION OF PROTECTED TREES.

(a) The Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this section, shall have the authority to request the Superintendent of Building to withhold issuance of building permits, except for permits that are necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of ten years as requested by the Bureau and to revoke

any building permit issued for which construction has not commenced with respect to any property on which any protected tree has been removed or relocated in violation of Section 46.00 of this Code.

The request shall be made in writing by the Director of the Bureau of Street Services or his/her designee and shall specifically state the start date and end date of the period of time the Bureau, or the Board of Public Works on appeal, have deemed necessary pursuant to Subsection (c) of this section. The period shall commence on the date the Bureau first becomes aware of the removal of the tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection (b) of this section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of the notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in the property as revealed by a title search with respect to the property. A copy of the notice shall also be recorded by the Bureau with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection (b) above. At the hearing, if the facts indicate, the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal or relocation of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection (b) above. In the event the Bureau finds that a protected tree was removed or relocated in violation of Section 46.00 of this Code, it shall specify to the Superintendent of Building the length of time the issuance of building permits shall be withheld and whether building permits for which construction has not commenced shall be revoked. In making its determination, the Bureau shall consider the following factors: the number of trees removed or relocated, the size and age of the trees removed or relocated, the knowledge and intent of the owners of the property with respect to the removal or relocation and prior violations of law with respect to removal or relocation of protected trees. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days of the hearing.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to request the Superintendent of Building to revoke or withhold issuance of building permits, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, any action by the Department of Building and Safety resulting from any of the provisions of this section, including building permit revocation, shall not be appealable to the Board of

Building and Safety Commissioners.

(e) Any final determination of the Bureau or the Board of Public Works on appeal, to request the Superintendent of Building to withhold issuance of building permits or to revoke a building permit, shall be forwarded to the Superintendent within ten days of the Bureau or Board's determination and shall also be set forth in an affidavit, which shall be recorded by the Bureau with the County Recorder within ten days of the Bureau or Board's determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this section, the definition of "protected tree" set forth in Section 46.01 this Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify this information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of this Code for establishing fees.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of FEB 28 2006.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved MAR 13 2006

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By _____
KEITH W. PRITSKER
Deputy City Attorney

Date: Feb. 8, 2006

Pursuant to Charter Section 559, I approve this ordinance on behalf of the City Planning Commission and recommend it be adopted . . . . . .

FEB 8, 2006

see attached report.

_____
Mark Winogrond
Interim Director of Planning

File Nos. 03-1459 and 03-1459-S1

#116278

DECLARATION OF POSTING ORDINANCE

I, MARIA C. RICO, state as follows: I am, and was at all times hereinafter mentioned, a resident of the State of California, over the age of eighteen years, and a Deputy City Clerk of the City of Los Angeles, California.

Ordinance No. **177404** - **Amending various provisions of Articles 2 and 7 of Chapter 1 and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees** - a copy of which is hereto attached, was finally adopted by the Los Angeles City Council on **February 28, 2006**, and under the direction of said City Council and the City Clerk, pursuant to Section 251 of the Charter of the City of Los Angeles and Ordinance No. 172959, on **March 14, 2006**, I posted a true copy of said ordinance at each of three public places located in the City of Los Angeles, California, as follows: 1) one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; 2) one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; 3) one copy on the bulletin board located at the Temple Street entrance to the Hall of Records of the County of Los Angeles.

Copies of said ordinance were posted conspicuously beginning on **March 14, 2006** and will be continuously posted for ten or more days.

I declare under penalty of perjury that the foregoing is true and correct.

Signed this **14th** day of **March 2006** at Los Angeles, California.

Maria C. Rico

Maria C. Rico, Deputy City Clerk

Ordinance Effective Date: **April 23, 2006** **Council File No.** **03-1459 & S1**

Rev. (2/21/06)

VERBAL MOTION

I HEREBY MOVE that Council ADOPT the following recommendation of the City Planning Commission (Item No. 37, CF 03-1459 & 03-1459-S1) relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" formerly solely oak tree), SUBJECT TO THE APPROVAL OF THE MAYOR:

1. FIND that this action is exempt from California Environmental Quality Act, pursuant to Article II, Section 2(m) of the City's Guidelines.

2. ADOPT the January 18, 2006 Findings of the City Planning Commission as the Findings of the Council.

3. PRESENT and ADOPT the accompanying ORDINANCE, approved by the Interim Director of Planning (on behalf of the City Planning Commission) amending the LAMC to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions. CPC 2004-2290 CA

   Fiscal Impact Statement: None submitted by the Planning Department. Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

(Planning and Land Use Management Committee waived consideration of the above matter)

PRESENTED BY _____
DENNIS P. ZINE
Councilmember, 3rd District

SECONDED BY _____
ED P. REYES
Councilmember, 1st District

February 28, 2006

CF 03-1459 & 03-1459-S1

Motion
ADOPTED
FEB 28 2006
* As Amended
LOS ANGELES CITY COUNCIL
See Attached Motion
TO THE MAYOR FOR HIS WITH
Findings + Ord Adopted
Exemption - approved

O:\Docs\Council Agendas\mk\03-1459.1.mot.wpd

VERBAL MOTION

I HEREBY MOVE that Council AMEND the recommendation of the City Planning Commission (Item No. 37, CF 03-1459 & 03-1459-S1) relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" formerly solely oak tree) to include an additional recommendation to DIRECT the Department of Building and Safety, Bureau of Street Services to report to the Planning and Land Use Management Committee to quantify the number of permits.

PRESENTED BY _____
ED P. REYES
Councilmember, 1st District

SECONDED BY _____
DENNIS P. ZINE
Councilmember, 3rd District

February 28, 2006

CF 03-1459 & 03-1459-S1

motion
ADOPTED
FEB 28 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

O:\Docs\Council Agendas\mk\03-1459.mot.wpd

37 A

MOTION

I **MOVE** that the matter of EXEMPTION, COMMUNICATION FROM THE CITY PLANNING COMMISSION and ORDINANCE FIRST CONSIDERATION relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" (formerly solely oak tree), Item 37 (CF 03-1459 and CF 03-1459-S1) on today's Council Agenda, Tuesday, February 28, 2006, be AMENDED to ADOPT the following ADDITIONAL RECOMMENDATIONS:

1. DIRECT the Bureau of Street Services to report on a quarterly basis on the number of violations of the City's Protected Trees Ordinance, as codified in the Los Angeles Municipal Code (LAMC), and the nature of those violations occurring at but not limited to, small lot, multi-family, and large developments, the number of violations occurring per Council District, permits issued for removal, and the number of trees illegally removed.

2. DIRECT the Bureau of Street Services and the City Administrative Officer (CAO), to report on a quarterly basis on the resources needed to properly enforce the City's Protected Trees Ordinance.

PRESENTED BY _____
Eric Garcetti
Councilmember, 13th District

PRESENTED BY _____
Dennis P. Zine
Councilman, 3rd District

SECONDED BY _____

ADOPTED

FEB 2 8 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

FEB 2 8 2006

EG

37 B

MOTION

I MOVE that the matter of EXEMPTION, COMMUNICATION FROM THE CITY PLANNING COMMISSION and ORDINANCE FIRST CONSIDERATION relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" (formerly solely oak tree), Item 37 (CF 03-1459 and CF 03-1459-S1) on today's Council Agenda, Tuesday, February 28, 2006, be AMENDED to ADOPT the following ADDITIONAL RECOMMENDATION:

DIRECT the Bureau of Street Services, with the assistance of the Department of Water and Power (LADWP) and the Los Angeles Fire Department (LAFD), to coordinate outreach efforts to educate the public through LAFD and LADWP mailers about the City's Protected Trees Ordinance and all city tree programs generally.

PRESENTED BY _____
Eric Garcetti
Councilmember, 13th District

PRESENTED BY _____
Dennis P. Zine
Councilman, 3rd District

SECONDED BY _____

ADOPTED

FEB 2 8 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

FEB 2 8 2006

EG

COUNCIL VOTE

Feb 28, 2006 12:51:09 PM, #11

ITEM NO. (37)
Voting on Item(s): 37
Roll Call

CARDENAS	Yes
GREUEL	Yes
HAHN	Yes
HUIZAR	Yes
LABONGE	Absent
PADILLA	Yes
PARKS	Yes
PERRY	Yes
REYES	Yes
ROSENDAHL	Yes
SMITH	Yes
WEISS	Absent
WESSON	Yes
ZINE	Yes
*GARCETTI	Yes

Present: 13, Yes: 13 No: 0

CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-06

Council File No., Agenda Item, or Case No.: PLC 37

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (✓) Against proposal ( ) General comments

Name: VINCENT ANTONINO

Business or Organization Affiliation: EAGLE ROCK NC

Address: 1269 UPTON PLACE (Street) LA (City) CA (State) 90041 (Zip)

Business phone: 213-217-6494 Representing: STAKEHOLDERS

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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7

CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 37

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (X) Against proposal ( ) General comments

Name: DR. PAULA BAGASAO Native Tree/OAK Tree Ordinance #37

Business or Organization Affiliation: Property Owner + Member, PRHA-LA

Address: 642 MOULTON AVE W-9 LA CA 90031
Street City State Zip

Business phone: 323-221-3359 Representing:

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Street City State Zip

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7 –

CITY OF LOS ANGELES SPEAKER CARD

Date 2.28.06

Council File No., Agenda Item or Case No.
#37 03-1459
03-1459-S1

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (X) Against proposal ( ) General comments

Name: TOMAS OSINSKI

Business or Organization Affiliation:

Address: 4240 GLENMUIR AVE
Street City State Zip

Business phone: 323 226 0576 Representing:

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-06

Council File No., Agenda Item, or Case No: 57 03-1459 03-1459

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda?
( ) For proposal
(X) Against proposal
( ) General comments

Name: RICHARD HAGA

Business or Organization Affiliation:

Address: 4117 PANA AVE (Street) LOS ANGELES (City) CA (State) 90027 (Zip)

Business phone: 323 664 1225 Representing:

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-06

Council File No., Agenda Item, or Case No.: 08-1459-51 #37

I wish to speak before the City Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: Gordon Murley

Business or Organization Affiliation: Woodland Hills Homeowners Org - Sherman Oaks Valley Estates

Address: 4128 Morro Dr Woodland Hills CA 91364
Street City State Zip

Business phone: (818) 346-5842 Representing: Above

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Street City State Zip

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6

CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-06

Council File No., Agenda Item, or Case No.: #37

I wish to speak before the City Council

Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal ( ) General comments

Name: JOAN LUCAS

Business or Organization Affiliation: Cahuenga Pass Neigh./Hillside Federation

Address: 3389 Canal Dr LA 90068
Street City State Zip

Business phone: (213 368-6120) Representing: Hillside Federation

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Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 28 Feb 2006

Council File No., Agenda Item, or Case No: 37

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal
( ) Against proposal
~~( ) General comments~~

Name: RALPH KROY

Business or Organization Affiliation: MEMBER OF ABOR SOCIETY

Address: 12901 TITAN AVE GRANADA HILLS CA 91344
Street City State Zip

Business phone: _____ Representing: _____

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Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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7

CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-2006

Council File No., Agenda Item, or Case No.: 03-1459/145951 ITEM 37

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: CLARE MARER KENYON

Business or Organization Affiliation: COMMUNITY FOREST ADVISORY COMMITTEE

Address: MS 465
Street City State Zip

Business phone: _____ Representing: CFAC - LA PUBLIC

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Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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on

CITY OF LOS ANGELES SPEAKER CARD

Date: Feb. 28, 2006

Council File No. / Agenda Item or Case No.: 37

I wish to speak before the City Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: Barbara Goldenberg

Business or Organization Affiliation: Community Forest Advisory Committee

Address: 12938 Evanston St. (Street) LA (City) CA (State) 90049 (Zip)

Business phone: 310/393-7774 Representing: CFAC

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Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/07

Council File No., Agenda Item, or Case No.: 37

I wish to speak before the: CD

Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda?
( ) For proposal
(X) Against proposal
( ) General comments

Name: MARCO GARCIA

Business or Organization Affiliation: ODA-LA

Address: 1250 N. SAN FERNANDO Rd LA CA 90065
Street City State Zip

Business phone: (213) 305-1030 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: [ ]

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD 37

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 03-1459

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: SCOTT WILSON

Business or Organization Affiliation: NORTH EAST TREES

Address: 4701 OLSON ST. (Street) LA (City) CA. (State) 90041 (Zip)

Business phone: _____ Representing: LFAC

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Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 8/28/04

Council File No., Agenda Item, or Case No.: 37

I wish to speak before the Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (X) Against proposal ( ) General comments

Name: Tony Butta

Business or Organization Affiliation:

Address: 1042 Mountain Ave #W9 (Street) LA (City) (State) 90031 (Zip)

Business phone: 323 791 7367 Representing: SEIU

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Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 37

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (X) Against proposal ( ) General comments

Name: TONY BUTKA (Rep: PAULA Y. BAGASAO)

Business or Organization Affiliation: Property Owner 90065; Resident 90031

Address: 642 MOULTON AVE #9 LA 90031
Street City State Zip

Business phone: 323-791-1367 Representing: DR BAGASAO Rep TONY BUTKA

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 37

I wish to speak before the City Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: Becky Bendiksen

Business or Organization Affiliation:

Address: 12655 McLennan Ave. (Street) Granada Hills (City) CA (State) 91344 (Zip)

~~Business~~ phone: 818/360-7113 Representing:

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Client Name: Phone #:

Client Address: (Street) (City) (State) (Zip)

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CITY OF LOS ANGELES SPEAKER CARD

Date: 2-28-2006

Council File No., Agenda Item, or Case No.: Item #37, CF 03-1459

I wish to speak before the City Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: Peter Lassen

Business or Organization Affiliation: LA Community Forest Advisory Committee

Address: MM/Stop 465, City Hall
Street City State Zip

Business phone: 323/221-0793 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address:
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 28 Feb 2006

Council File No., Agenda Item, or Case No.: 35/36

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal (✓) General comments

Name: RALPH KROY

Business or Organization Affiliation:

Address: 12901 TITAN AVE GRANADA HILLS CA 91344
Street City State Zip

Business phone: Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: [ ]

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 35+36

I wish to speak before the City Council
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal (X) General comments

Name: Becky Bendikson

Business or Organization Affiliation:

Address: 12655 McLennan Ave. Granada Hills CA 91344
Street City State Zip

Business phone: 818/360-7113 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: [ ]

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

Date: 2/28/06

Council File No., Agenda Item, or Case No.: 35 & 36

I wish to speak before the CITY COUNCIL
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda?
( ) For proposal
( ) Against proposal
(X) General comments

Name: WAYDE HUNTER

Business or Organization Affiliation: NORTH VALLEY COALITION

Address: 11862 BALBOA BLVD BOX 172 GRANADA HILLS 91344
Street City State Zip

Business phone: _____ Representing: _____

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: [ ]

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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RECEIVED
FEB 28 2006

#37

Tony Butka
642 Moulton Ave #W-9
Los Angeles CA 90031
(323) 221-3357

February 28, 2006

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles CA 90012

VIA HAND

Council File(s): 03-1459 and 03-1459-S1
(Supplemental Agenda Item #37)

Honorable Members:

I am at a complete loss to understand why the entire City Council, its PLUM Committee, and its Planning Commission, as well as the rest of the bureaucracy, are incapable of uttering three little phrases;

Southern California Black Walnut
Western Sycamore
California Bay

I am still researching the history of these proposed ordinances, but so far, going back to their genesis in 2003, I am unable to find references to these trees in any publicly noticed hearing or meeting. This includes the tapes of some recent PLUM and Planning Commission meetings. Instead, the only captions I can find during the entire process until mid-January refers to amendments to the "Oak Tree Ordinance".

The Items before you today aren't about Oak Trees. They never have been. They are about three new trees, none of which is a protected species, and

about hijacking the Oak Tree ordinance in order to block peoples right to build homes on their property.

It was not until my wife and others filed formal complaints over Brown Act violations that anything happened. And even then, we received a masterpiece of obfuscation from the City Attorney denying relief and kinda' sorta' defending the captioning practices of the City.

Even the caption of your Items today is technical and unclear - read it for yourselves. And, I would submit, even this modest change in captioning is only after some taxpayers cried foul that the very core purpose of the Brown Act (to let citizens know clearly and in plain language the business of the government before action is taken) is being deliberately subverted. (The supporting documents are attached).

As further evidence of the manipulative manner which marks the movement of these Items, I was under the impression that the next step in the process after recommendation by the City Planning Commission was to go to the PLUM Committee. This is seemingly reflected in the transmittal letter from the Planning Commission dated January 18, 2006, which is addressed to Barbara Greaves, Legislative Analyst for the PLUM Committee. I had even ascertained that there was a tentative date of March 7 for the Items to be on the PLUM Committee Agends.

Suddenly, we discovered late Friday afternoon that the PLUM Committee is being bypassed, and the Items show up on a Supplemental Council Agenda with virtually no notice to those who are not insiders. And on that Supplemental Agenda, there is a note that "Planning and Land Use Committee waived consideration of the above matter". With no public meeting, with no notice, and with no vote, how on earth can the PLUM committee waive consideration of the matter?

I urge the Council to act in the spirit of open and transparent government, instead of at best marginally technically legal persiflage, and to defeat this proposed ordinance. There are no endangered species at stake here, start over and do the process right.

Thank you for your time and consideration in this matter. Unfortunately I cannot attend today's meeting because these last minute scheduling changes make it virtually impossible for those of us who work to change everything at the drop of a hat to attempt to attend government meetings. Therefore this letter.

Sincerely,

Tony Butka

Paula Y. Bagasao, PhD
642 Moulton Avenue-W-9
LA, CA 90031

January 19, 2006

By Fax-213.978.8787 & Mail
Total Pages - 5

Mr. Dion O'Connell
CITY OF LOS ANGELES, Deputy City Attorney
800 City Hall East 8th Floor
200 North Main Street, Los Angeles, CA 90012

RE: Brown Act Violations and Support for PROH-LA Complaint

Dear Mr. O'Connell:

I am writing this letter to support the formal objection letter (attached) filed with your office by PROH-LA regarding a Brown Act Violation (Planning Commission Meeting 1/12/06 Item #4) and to expand information about other potential violations of the Act.

1. Planning Commission Meeting. I attended the Planning Commission meeting on January 12, 2006. To my recollection, during the brief discussion/deliberation period on this item, there was no mention or reference to any other trees but Oak Trees by either the speakers or the Commissioners or Planning Department staff members present. However, the Oak Trees Ordinance and Oak Trees were referred to constantly during the meeting. Others attending the meeting [the public] for other items would not at all be clear about the proposed inclusion of three trees in the Oak Tree Ordinance based on the limited public hearing discussion, the public notices issued or based on the Commission agenda handed out. We have ordered a copy of the Commission's taped minutes for review, in this regard.

2. Other Violations of the Brown Act by City Agencies/Committees? I also want to alert you to the probability that these same Brown Act violations (also described in PROH-LA's letter) also apply to the discussions/decisions/actions taken by several other City Charter-related organizations/agencies, among them, the City Planning Committee, the City Community Forestry Advisory Committee and the Neighborhood Councils in Northeast LA.

   - *City Planning Committee*. What about the various meetings of the Planning Committee? The agenda items and public announcements, I gather, have referenced "The Oak Tree Ordinance Changes." I have not yet seen a public announcement or an agenda-title with the words – California Walnut trees, Sycamore, or California bay trees (what is this tree?).

   - *City Community Forestry Advisory Committee*. Its last three agendas posted online as public notices name the "Native Tree Protection Ordinance" on their agenda, and the Chair of the Committee as the reporter on the topic. I wanted to know more about this native tree protection ordinance. So, I visited the City's online ordinance archives. I found no reference to either an existing or a pending "Native Tree Protection Ordinance." This is curious because much of the proposed Oak Tree Ordinance changes originated in this City advisory

committee and its advisory members have heavily lobbied for the Oak Tree Ordinance changes, and this is particularly true in our neighborhoods in NELA. This Forestry Committee is proposed to play a significant role in the proposed Ordinance changes.

Here is one further concern about the Forestry Committee and its activities. Recently, a member of the City Community Forestry Advisory Committee publicly admonished (in a Yahoo group email system) PROH-LA for voicing its opinion about and reasons for its opposition to the proposed changes to the Oak Tree Ordinance. This advisory committee member further asked for Yahoo group email readers *not to sign the PROH-LA online opposition petition.* Said Forestry Committee member used the bottom of one her Yahoo email messages in this regard to remind readers that she was a member of and held the leadership role in the City's Community Forestry Advisory Committee.

Was this member acting on behalf of the City of Los Angeles to discourage public comment and prevent PROH-LA from collecting signatures?

- *GPNC (the Glassell Park Neighborhood Council).* Public notices about GPNC meeting discussions on the Oak Tree Ordinance do not name the other trees being considered under proposed changes. In an area where Walnut trees are prevalent, how would GPNC stakeholders know about the pending changes regarding the three other trees being considered for strict protection? According to the GPNC posted minutes for its GPNC Land Use Committee meeting in late Fall 2005, a decision to support the Ordinance changes may have been made without a quorum. According the minutes, very stakeholders were in attendance and the vote to support the Oak Tree Ordinance changes was made without discussion. The City Attorney's office provided NCs with guidance as to who are NC stakeholders according to the City Charter (residents, workers and property owners). Regarding property owners, NCs cannot include some but not all property owners. In other words, NCs cannot exclude vacant landowners as "official stakeholders."

I encourage the City Attorney to review the information and questions raised here and in the PROH-LA letter about "improper process" and therefore "improper outcomes" relative to the Brown Act and the proposed Oak Tree Ordinance changes. I agree with PROH-LA and its call for starting the policy discussion over again, requiring open and fair public discourse coupled with advance and broad notification of public meetings and opportunities to attend.

And, furthermore, the Attorney's office should publicly clarify and ensure that property owners of vacant land are protected equally under the City Charter, the State of California Brown Act and the work of the Neighborhood Councils as well as other Citizen advisory committees.

In Northeast LA, we continue to have our land rights high-jacked to a "silent process." Things are consistently *not transparent* in NELA when it comes to land use issues. Why? Is there is a pattern here in NELA of denying open public debate on land use issues? A review of recent ordinance legislation and the level and adequacy of public discourse is in order.

It may be the case that nearly 50% of vacant landowners have Spanish or Asian surnames (quick review of 2004-05 list of owners-titles). Many low-income, working class and immigrant reside in NELA and they have not been included in land use ordinance discussions. Shouldn't they?

What kind of open and transparent public debate took place for these policies?

- 2005 Retaining Wall Ordinance (passed March 2005)
- The proposed NELA Open Space Hillside ICO (in process. 2004-present)
- The proposed Oak Tree Ordinance changes (in process, 2003-present)
- Also, much of NELA vacant land was rezoned to RE-20 and RE-40, as we have learned from affected vacant landowners, without their participation in the zoning changes and without advance notice?

I look forward to hearing back from your office on these issues. Perhaps, the City needs to start the policy formulation discussion on the proposed Oak Tree Ordinance over again. If this course were to take place, I further recommend that the proposed inclusion of the additional three trees be dropped from the Oak Tree Ordinance discussions and considerations. They do not match the status of the well-know oak tree and should not be treated in the same manner. There is much debate to be held on this given the opportunity for public scrutiny.

If it would help in your review of these matters, I would be happy to provide you with documentation.

Regards.

Dr. Paula Y. Bagasao

323-221-3357; gksinc@aol.com
Property Owner, Northeast LA
Vacant Land Owner, Northeast LA
LA City Voter
Member, PROH-LA
Stakeholder, GPNC, LHNC
Advocate, Fair and Open Public Policy
Member, Northeast LA Democratic Club (For ID only)
Member and Officer, PALAD (Pilipino American LA Democrats) (For Identification Only)
Former President, PALAD (Pilipino American La County Democrats) (For ID only)
Former Board Member, LA League of Women Voters & LWVLA Education Fund (For ID only)

Cc: HONORABLE Mayor Antonio Villaraigosa
COUNCILMEMBERS, DISTRICTS 1 – 15
GAIL GOLDBERG, Planning Director
MARK WINOGROND, Interim Planning Director
JANE ELLISON USHER, CPC President

Attached: Copy of January 2006 PROH-LA Letter, Brown Act Violation

PROH-LA

Protecting the Rights of Owners in Hillsides - Los Angeles

VIA FACSIMILE 213.978.8787 & HAND DELIVERY

January 13, 2006

MR. DION O'CONNELL
CITY OF LOS ANGELES
Deputy City Attorney
800 City Hall East 8th Floor
200 North Main Street
Los Angeles, CA 90012

RE: **Brown Act Violation**
(Planning Commission Meeting 1/12/06 Item #4)

Dear Deputy O'Connell,

I would like to lodge a formal complaint that the Planning Commission violated the Brown Act on January 12, 2006 when it approved a new revision to the ordinance regarding "Oak Trees." Government Code Section 54954.2 ("Brown Act") requires that a "brief general description of each item of business to be transacted or discussed at the meeting" be posted 72 hours before the meeting.

For this meeting Item #4's description did not adequately provide the public notice of the business to be transacted. Specifically, the Agenda description alerts the public that the commission would be reviewing amendments to the municipal code regarding Oak Trees. What it fails to mention, and consequently fails to notice the public, is that the new ordinance would go beyond Oak Trees to include other species of trees (Southern California Black Walnut, Western Sycamore, and California Bay). This omission, in my opinion, invalidates the vote taken on regulating the species of trees beyond the scope of the noticed agenda.

The exact language found on the January 12th Committee Agenda reads:

Proposed draft Ordinance (Appendix A), amending Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Los Angeles Municipal Code, to bring provisions of the Code regarding Oak Trees in conformance with revisions to Section 46 (Oak Tree Regulations) and Section 96.303.5 of the Municipal Code.

The agenda should have included in its description that the ordinance:

1. expands the number of species protected from one to four, preferably listing the specific species,
2. eliminates the minimal lot size for effected parcels,
3. decreases the size of protected trees from eight to four inches in diameter and includes multi-trunk trees measuring "cumulative diameter",
4. allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed,
5. the ordinance more narrowly defines who may be considered a tree expert under the municipal code, and lastly
6. requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

As you know, a major objective of the Brown Act is to facilitate public participation in all phases of local government decision making and to curb misuse of democratic process by secret legislation by public bodies. (Sacramento Newspaper Guild vs. Sacramento County Bd. of Suprs. (1968) 263 Cal. App. 2d 41. 50 [69 Cal. Rptr. 480].) When the agenda item only lists Oak Trees as the subject matter it relegates the other species and items in the ordinance to being part of "secret legislation."

I would appreciate if you would advise the planning department and planning commission that it is a disservice to the people of Los Angeles to continue to list this item as "Oak Tree Regulations." The actions of the commission need to be declared null and void and the process needs to start over with an accurate description regarding the changes this new ordinance proposes.

Furthermore, I would request that public hearings be scheduled throughout the City advising the public that the City is considering protecting Southern California Black Walnut trees, Western Sycamore trees and California Bay trees just as they do Oak Trees.

I look forward to hearing from you and expect that the Commission's actions will be considered invalid.

Respectfully,

Bradley.
Concerned Stakeholder
PROH-LA Representative

CC: **HONORABLE MAYOR ANTONIO VILLARAIGOSA**
COUNCILMEMBERS, DISTRICTS 1 – 15
GAIL GOLDBERG, Planning Director
MARK WINOGROND, Interim Planning Director
JANE ELLISON USHER, CPC President

323.871.8597 WWW.PROH-LA.COM P. O. Box 41109 Highland Park, California 90041

Office of the Los Angeles City Attorney

GOVERNMENT COUNSEL DIVISION
800 City Hall East, 200 North Main Street
Los Angeles, California 90012-4130

Rockard J. Delgadillo
Office of the City Attorney

FACSIMILE COVER SHEET

TO: Paula Y. Bagasao, PhD
323-343-1140

FROM: Dion O'Connell
GOVERNMENT COUNSEL DIVISION
800 City Hall East, 200 North Main Street
Los Angeles, California 90012-4130 (213) 978-8787

DATE: February 8, 2006

NUMBER OF PAGES (including this one): 2

MESSAGE:



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FEB-8-2006 13:13 FROM:CITY ATTY 213 978 8787 TO:9132334311 P:1/3

Writer's Direct Dial: (213) 978-7188
Facsimile: (213) 978-8787

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED
& VIA FACSIMILE TO 323-343-1140

February 8, 2006

Paula Y. Bagasao, PhD
642 Moulton Avenue W-9
Los Angeles, CA 90031

Re: Response to Allegations of Brown Act Violations

Dear Dr. Bagasao:

This office has received your correspondence faxed January 19, 2006, in which you request the City to correct alleged violations of the Brown Act during the City Planning Commission (CPC)'s meeting that took place on January 12, 2006. You, and several other individuals whose letters were written in substantially the same format as yours, allege that Agenda Item No. 4's description did not adequately provide the public notice of the business to be transacted. The agenda description at issue read as follows, in pertinent part:

CPC-2004-2290-CA
CEQA: ENV-2004-2291-CE
Plan: Citywide
Community Impact Statement: Yes.
Silver Lake Neighborhood Council in support.
Continued from 11-10-05
PUBLIC HEARING CLOSED

Proposed draft Ordinance (Appendix A), amending Sections 12.21A12, 17.02, 17.05H7, 17.05R, 17.06B13, 17.06C, 17.51 I of the Los Angeles Municipal Code, to bring provisions of the Code regarding Oak Trees in conformance with revisions to Section 46 (Oak Tree Regulations) and Section 96.303.5 of the Los Angeles Municipal Code.

FEB-8-2006 13:13 FROM:CITY ATTY 213 978 8787 TO:9132334311 40 P:2/3

This office has reviewed the allegations and the relief sought. After researching the matter and after discussion with our attorneys who regularly staff the CPC meetings, our office has determined that there is no basis for the relief that you seek. Government Code section 54954.2(a) provides, in pertinent part:

> "At least 72 hours before a regular meeting, the legislative body of the local agency ... shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting ... A brief general description of an item generally need not exceed 20 words. ..."

The brief general description set forth in Agenda Item No. 4 of the City Planning Commission's meeting held January 12, 2006, satisfied the requirements set forth in the Brown Act in that it sufficiently informed interested members of the public about the subject matter under consideration so that they could determine whether to monitor or participate in the meeting.

Finally, please note that the ordinance will be considered, with public comment, in an upcoming meeting of the City Council's Planning and Land Use Management Committee. The agenda description will be modified to reflect that the ordinance now relates to protected trees instead of simply oak trees, and thereafter the matter will be placed on a future agenda for a meeting of the full City Council. Thank you.

Sincerely,

D. JAMES O'CONNELL
Deputy City Attorney

DO:ac(119492)

cc: Gail Goldberg, City Planning Director
Mark Winogrond, Interim Planning Director
Jane Ellison Usher, CPC President

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

VIA FACSIMILE TO 323-343-1140

February 24, 2006

Paula Y. Bagasao, PhD

Re: Response to Allegations of Brown Act Violations

Dear Dr. Bagasao:

This letter is a follow-up to the letter sent to you on February 8, 2006 by Dion O'Connell, of this Office, on the above referenced subject. Please be advised that the item you referenced in your correspondence is set for a hearing before the City Council on Tuesday, February 28, 2006.

Sincerely,

KEITH W. PRITSKER
Deputy City Attorney

KWP:dc

Los Angeles City Planning Commission

200 North Spring Street, Room 532, City Hall, Los Angeles, CA 90012
www.cityofla.org/PLN/index.htm

January 18, 2006

Los Angeles City Council
City Hall, Room 395
Los Angeles, CA 90012

ATTN: Barbara Greaves, Legislative Analyst
Planning and Land Use Management Committee

CITY PLAN CASE NO. 2004-2290 CA

Transmitted herewith is an ordinance (Appendix A), which amends the Los Angeles Municipal Code to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions.

On January 12, following a public hearing, the City Planning Commission adopted the Planning Department staff report and findings, and **approved the proposed ordinance (Appendix A) with recommendations**. The recommendations included that the City Attorney ensure that the penalty for illegal removal of protected trees run with the land, that building permits are withheld as part of the enforcement procedure, that the enforcement language be clarified if possible, and that a maintenance fee for trees planted as a mitigation be included in the Public Works section of the Municipal Code. The Commission also requested staff to develop guidelines to assist applicants in understanding the requirements and procedures.

This action was taken by the following vote:

Moved:	Usher
Seconded:	Freer
Ayes:	Cardoso, Hughes, Kay, Kezios, Roschen, Woo
Absent:	Iriando

Vote: 6-0

G. Williams

Gabriele Williams, Commission Executive Assistant II
City Planning Commission

Attachments: Findings, Appendix A (Ordinance)

cc: Keith Pritsker, Deputy City Attorney

FINDINGS

That the City Council:

Adopt the staff report of November 10, 2005, as its report on the subject;

Adopt the findings in the staff report dated November 10, 2005.

The City Planning Department recommends that the City Council, in accordance with Charter Section 558, find that the attached, proposed ordinance (Appendix A) is:

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species. RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

APPENDIX A

PROPOSED ORDINANCE FOR DISCUSSION

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the twenty-sixth unnumbered paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph after the thirtieth unnumbered paragraph defining "Problem Areas":

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the forty-fifth unnumbered paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. **Protected Tree Regulations.** No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04.to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected

tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety.Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00.of this Code. Said request shall be made I writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County

Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Section 96.303.5 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department of Public Works to verify such information by entry upon the subject property.

Sec. . The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the Main Street entrance to the City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that the foregoing ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

Pursuant to Charter Section 559, I approve this ordinance and recommend its adoption on behalf of the City Planning Commission . . . . . see attached report.

_____
Mark Winogrond
Interim, Director of Planning

_____
Rockard J. Delgadillo, City Attorney

By _____
Deputy City Attorney

File No. _____

(posting1)

Please fill this form out before you leave. It will be picked up from this table after the discussion. Thank you, Staff

SPEAKER LIST

DATE: 2/28/06 ITEM #: 37

NAME	DEPT.	POSITION
Dave LARA	LAPD	Asst. Dep. Supt of Bldg II
Keith Pritzker	City Attorney	Deputy City Attorney
George Gonzalez	BSS	Chief Forester

37

PLEASE SCHEDULE FOR COUNCIL ON FEBRUARY 28, 2006

BLURB

03-1459
03-1459-S1

EXEMPTION, COMMUNICATION FROM CITY PLANNING COMMISSION and ORDINANCE FIRST CONSIDERATION amending the Los Angeles Municipal Code to add certain native trees to the class of "protected tree" (formerly solely oak tree).

Recommendations for Council action, SUBJECT TO THE APPROVAL OF THE MAYOR:

1. FIND that this action is exempt from California Environmental Quality Act, pursuant to Article II, Section 2(m) of the City's Guidelines.

2. ADOPT the January 18, 2006 Findings of City Planning Commission as the Findings of the Council.

3. PRESENT and ADOPT the accompanying ORDINANCE, approved by the Interim Director of Planning (on behalf of the City Planning Commission) amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions.

CPC2004-2290 CA

(The Planning and Land Use Management Committee waived consideration of the above matter.)

Fiscal Impact Statement: None submitted by the Planning Department. Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

#01459blb

PLANNING AND LAND USE MANAGEMENT COMMITTEE
SUGGESTED NOTIFICATION OF COUNCIL ACTION

Council File No. _____ sign

	Applicant/Appellant/Owner	Representative
		See attached

- ✓ Council Member(s) _____
- ✓ Office of the Mayor (w/file) - Section _____
- ✓ City Attorney (w/blue slip) - Attn:
- ✓ City Administrative Officer (CAO)
- ✓ Chief Legislative Analyst (CLA)
- ✓ City Planning Department - Attn: Mark Lopez (w/copy of Ordinance)
  - ✓ Director of Planning
  - ___ Office of Zoning Administration
  - ___ Advisory Agency
  - ___ Geographic Information Section - Attn: Fae Tsukamoto
- ___ Information Technology Agency - (large projects)
- ✓ Bureau of Engineering, Land Development & Mapping Division - (generally most cases)
- ✓ Department of Transportation, Traffic/Planning Sections - (generally most cases)
- ✓ Department of Building & Safety c/o Zoning Coordinator - (generally most cases)
- ✓ Residential Inspection Unit - Mail Stop 115 - (SPE; HE; CU; ICO; ZC; generally most cases)
- ___ Bureau of Street Lighting, "B" Permit Section - (all zoning cases)
- ✓ Department of Water and Power - (DB & large projects)
- ✓ Fire Department - (all zoning & hillside cases)
- ✓ Police Department - (beer & wine; adult entertainment, revocations)
- ___ Community Development Department
- ___ Los Angeles County Assessor - (CU appeals & large projects)
- ___ Cultural Affairs Department
- ✓ Community Redevelopment Agency
- ✓ Dept Public Works - all Bureaus
- ✓ Dept Building + Safety
- ___

10/05

From: Barbara Greaves
To: Jolaine Harkless
Subject: Re: CF 03-1459 Protected Tree Ordinance

Also, for this recommendation, make sure the attorney in attendance/or Chair makes this recommendation in Committee.

>>> Jolaine Harkless 02/21 8:24 PM >>>
Barbara, I've heard that this ordinance is scheduled for City Council on Feb. 28th. If so, I want to make sure that the Council agenda indicates, among other things, that the City Council should adopt the Findings of the City Planning Commission in its communication dated January 18, 2006 as the Findings of the Council. If you're not the correct person to discuss this with, can you refer me to the correct person. Thank you.
>>> Barbara Greaves 02/10/06 11:56 AM >>>
Everything accounted for in your note below except for the staff report dated 11-10-05. I do not have the CPC file here.

I see everything on the file you noted below, but the staff report from 11-10-05. I will check 03-1459-S1 for that report and let you know.

>>> Michael O'Brien 02/10 6:57 AM >>>
Received a call from Jolaine Harkless. Does the CF contain the CPC action on this item (1-18-06), the staff report of 1-12-06, and the staff report of 11-10-05?

Michael O'Brien
Department of City Planning
201 N. Figueroa St., 4th Floor
Los Angeles, CA 90012
213-482-7077

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****

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R06-0042

FEB 08 2006

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Management Committee for further action. Moreover, on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance that might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use

FEB 09 2006
PLANNING & LAND
USE MANAGEMENT

03-1459

RECEIVED
CITY CLERK'S OFFICE

2006 FEB -9 AM 8:29

CITY CLERK

BY _____ DEPUTY

Management Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff. PLUM met on October 3, 2005, to consider additional modifications to the draft ordinance. The matter was then referred to the City's Planning Commission, which met on this matter in December 18, 2005, and January 13, 2006. The Commission issued a report to the City Council on January 18, 2006, seeking additional clarifications. There are two items in the Planning Commission's action that are not included in this ordinance. The first relates to a procedural matter of the Department of Building and Safety. Inasmuch as that can be handled by the Department and does not need ordinance authority, we have not included that in the ordinance. The second issue regards a fee to ensure maintenance of relocated or replaced protected trees. This matter is still the subject of discussion with the departments. In order to bring this ordinance forward for Council action as soon as possible, we bring you the attached draft. If, with further discussion, the remainder of the issues needs to be addressed by ordinance, we will transmit another draft ordinance to you.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years on parcels where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the Municipal Code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their comments have been incorporated into the language of the current draft ordinance.

California Environmental Quality Act (CEQA)

This ordinance is exempt from the requirements of CEQA under the general exemption found in the City CEQA Guidelines Article 2, Section 1 because there is no possibility of it having a significant adverse effect on the environment. Consequently,

should the Council approve the ordinance it should also find that it is exempt from CEQA pursuant to the City Guidelines.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By Claudia culling
CLAUDIA CULLING
Senior Assistant City Attorney

CC:KP:fa (#105209)

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subdivision 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. Protected Tree Relocation and Replacement. All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph to read:

Protected Tree - Any of the following Southern California native tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. The term "Tree Expert" set forth in Section 17.02 of the Los Angeles Municipal Code is amended to read:

Tree Expert - A person with at least four years of experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R of this Code. Provided, however, that in no event shall the reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in this article or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth in Subdivision 3 of this subsection, when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency, in consultation with the City's Chief Forester, determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect; and pursuant to the

determination, the protected tree's removal would be permissible; or

(iii) A building permit has been issued for the property upon which the protected tree is located, the permit is still in effect, and the removal or relocation is not prohibited by the permit.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters that cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report required pursuant to Section 17.06 C, acceptable to the Advisory Agency and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of the tree; or

(v) It has no apparent aesthetic value, which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at the location.

2. Supplemental Authority. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of the tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In that event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, except as to Subdivision 1(b)(iii) above, shall require retention of a protected tree at its existing location, if the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within the property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this article, except where the protected tree is relocated pursuant to Subdivision 2(a) above. The size of each replacement tree shall be a 15-gallon, or larger, specimen, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in a manner to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that the trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08 G as its procedural guide in satisfaction of the bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree that is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of the trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision where a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation of the tree. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06 B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any protected tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving the tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel where a protected tree is located shall be considered complete unless it includes a report pertaining to preserving the tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness in preserving the tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is amended to read:

I. When a protected tree exists on a proposed parcel, the preservation of the tree at its existing location, its relocation for preservation purposes, or the removal of the tree shall be regulated in the same manner as that provided under subdivision

regulations set forth in this chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or this article. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where the protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of

Public Works or its designated officer or employee, except as otherwise provided in this section.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed that may affect the protected tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where the Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory Agency pursuant to Article 7 of Chapter I of this Code; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the determination the protected tree's removal would be permissible; or

3. A building permit has been issued for any property and is still in effect with respect to the property under consideration and its implementation would necessitate the removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided in this section or unless the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if the Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters, which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at the location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the

protected tree, the tree is in danger of falling, notwithstanding the tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) Additional Authority. The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace the tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. In size, each replacement tree shall be at least a 15-gallon, or larger, specimen, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In that event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of the new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article, which permits the removal of one or more protected trees. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. WITHHOLDING OR REVOCATION OF BUILDING PERMITS FOR ILLEGAL REMOVAL OR RELOCATION OF PROTECTED TREES.

(a) The Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this section, shall have the authority to request the Superintendent of Building to withhold issuance of building permits, except for permits that are necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of ten years as requested by the Bureau and to revoke

any building permit issued for which construction has not commenced with respect to any property on which any protected tree has been removed or relocated in violation of Section 46.00 of this Code.

The request shall be made in writing by the Director of the Bureau of Street Services or his/her designee and shall specifically state the start date and end date of the period of time the Bureau, or the Board of Public Works on appeal, have deemed necessary pursuant to Subsection (c) of this section. The period shall commence on the date the Bureau first becomes aware of the removal of the tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection (b) of this section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter; the hearing to be held on a date specified in the notice. A copy of the notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in the property as revealed by a title search with respect to the property. A copy of the notice shall also be recorded by the Bureau with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection (b) above. At the hearing, if the facts indicate, the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal or relocation of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection (b) above. In the event the Bureau finds that a protected tree was removed or relocated in violation of Section 46.00 of this Code, it shall specify to the Superintendent of Building the length of time the issuance of building permits shall be withheld and whether building permits for which construction has not commenced shall be revoked. In making its determination, the Bureau shall consider the following factors: the number of trees removed or relocated, the size and age of the trees removed or relocated, the knowledge and intent of the owners of the property with respect to the removal or relocation and prior violations of law with respect to removal or relocation of protected trees. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days of the hearing.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to request the Superintendent of Building to revoke or withhold issuance of building permits, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, any action by the Department of Building and Safety resulting from any of the provisions of this section, including building permit revocation, shall not be appealable to the Board of

Building and Safety Commissioners.

(e) Any final determination of the Bureau or the Board of Public Works on appeal, to request the Superintendent of Building to withhold issuance of building permits or to revoke a building permit, shall be forwarded to the Superintendent within ten days of the Bureau or Board's determination and shall also be set forth in an affidavit, which shall be recorded by the Bureau with the County Recorder within ten days of the Bureau or Board's determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this section, the definition of "protected tree" set forth in Section 46.01 this Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify this information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of this Code for establishing fees.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Feb. 8, 2006

Pursuant to Charter Section 559, I approve this ordinance on behalf of the City Planning Commission and recommend it be adopted . . . . . .

FEB 8, 2006

see attached report.

Mark Winogrond
Interim Director of Planning

File Nos. 03-1459 and 03-1459-S1

#116278

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R06-0042

FEB 08 2006

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Management Committee for further action. Moreover, on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance that might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use

Management Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff. PLUM met on October 3, 2005, to consider additional modifications to the draft ordinance. The matter was then referred to the City's Planning Commission, which met on this matter in December 18, 2005, and January 13, 2006. The Commission issued a report to the City Council on January 18, 2006, seeking additional clarifications. There are two items in the Planning Commission's action that are not included in this ordinance. The first relates to a procedural matter of the Department of Building and Safety. Inasmuch as that can be handled by the Department and does not need ordinance authority, we have not included that in the ordinance. The second issue regards a fee to ensure maintenance of relocated or replaced protected trees. This matter is still the subject of discussion with the departments. In order to bring this ordinance forward for Council action as soon as possible, we bring you the attached draft. If, with further discussion, the remainder of the issues needs to be addressed by ordinance, we will transmit another draft ordinance to you.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years on parcels where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the Municipal Code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their comments have been incorporated into the language of the current draft ordinance.

California Environmental Quality Act (CEQA)

This ordinance is exempt from the requirements of CEQA under the general exemption found in the City CEQA Guidelines Article 2, Section 1 because there is no possibility of it having a significant adverse effect on the environment. Consequently,

should the Council approve the ordinance it should also find that it is exempt from CEQA pursuant to the City Guidelines.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By Claudia culling
CLAUDIA CULLING
Senior Assistant City Attorney

CC:KP:fa (#105209)

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subdivision 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. Protected Tree Relocation and Replacement. All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph to read:

Protected Tree - Any of the following Southern California native tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. The term "Tree Expert" set forth in Section 17.02 of the Los Angeles Municipal Code is amended to read:

Tree Expert - A person with at least four years of experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R of this Code. Provided, however, that in no event shall the reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in this article or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth in Subdivision 3 of this subsection, when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency, in consultation with the City's Chief Forester, determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the

determination, the protected tree's removal would be permissible; or

(iii) A building permit has been issued for the property upon which the protected tree is located, the permit is still in effect, and the removal or relocation is not prohibited by the permit.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters that cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report required pursuant to Section 17.06 C, acceptable to the Advisory Agency and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of the tree; or

(v) It has no apparent aesthetic value, which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at the location.

2. Supplemental Authority. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of the tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In that event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, except as to Subdivision 1(b)(iii) above, shall require retention of a protected tree at its existing location, if the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within the property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this article, except where the protected tree is relocated pursuant to Subdivision 2(a) above. The size of each replacement tree shall be a 15-gallon, or larger, specimen, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in a manner to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that the trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08 G as its procedural guide in satisfaction of the bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree that is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of the trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision where a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation of the tree. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06 B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any protected tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving the tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel where a protected tree is located shall be considered complete unless it includes a report pertaining to preserving the tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness in preserving the tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is amended to read:

I. When a protected tree exists on a proposed parcel, the preservation of the tree at its existing location, its relocation for preservation purposes, or the removal of the tree shall be regulated in the same manner as that provided under subdivision

regulations set forth in this chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or this article. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where the protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of

Public Works or its designated officer or employee, except as otherwise provided in this section.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed that may affect the protected tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where the Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory Agency pursuant to Article 7 of Chapter I of this Code; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the determination the protected tree's removal would be permissible; or

3. A building permit has been issued for any property and is still in effect with respect to the property under consideration and its implementation would necessitate the removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided in this section or unless the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if the Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters, which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at the location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the

protected tree, the tree is in danger of falling, notwithstanding the tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) Additional Authority. The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace the tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. In size, each replacement tree shall be at least a 15-gallon, or larger, specimen, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In that event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of the new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article, which permits the removal of one or more protected trees. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. WITHHOLDING OR REVOCATION OF BUILDING PERMITS FOR ILLEGAL REMOVAL OR RELOCATION OF PROTECTED TREES.

(a) The Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this section, shall have the authority to request the Superintendent of Building to withhold issuance of building permits, except for permits that are necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of ten years as requested by the Bureau and to revoke

any building permit issued for which construction has not commenced with respect to any property on which any protected tree has been removed or relocated in violation of Section 46.00 of this Code.

The request shall be made in writing by the Director of the Bureau of Street Services or his/her designee and shall specifically state the start date and end date of the period of time the Bureau, or the Board of Public Works on appeal, have deemed necessary pursuant to Subsection (c) of this section. The period shall commence on the date the Bureau first becomes aware of the removal of the tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection (b) of this section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of the notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in the property as revealed by a title search with respect to the property. A copy of the notice shall also be recorded by the Bureau with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection (b) above. At the hearing, if the facts indicate, the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal or relocation of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection (b) above. In the event the Bureau finds that a protected tree was removed or relocated in violation of Section 46.00 of this Code, it shall specify to the Superintendent of Building the length of time the issuance of building permits shall be withheld and whether building permits for which construction has not commenced shall be revoked. In making its determination, the Bureau shall consider the following factors: the number of trees removed or relocated, the size and age of the trees removed or relocated, the knowledge and intent of the owners of the property with respect to the removal or relocation and prior violations of law with respect to removal or relocation of protected trees. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days of the hearing.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to request the Superintendent of Building to revoke or withhold issuance of building permits, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, any action by the Department of Building and Safety resulting from any of the provisions of this section, including building permit revocation, shall not be appealable to the Board of

Building and Safety Commissioners.

(e) Any final determination of the Bureau or the Board of Public Works on appeal, to request the Superintendent of Building to withhold issuance of building permits or to revoke a building permit, shall be forwarded to the Superintendent within ten days of the Bureau or Board's determination and shall also be set forth in an affidavit, which shall be recorded by the Bureau with the County Recorder within ten days of the Bureau or Board's determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this section, the definition of "protected tree" set forth in Section 46.01 this Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify this information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of this Code for establishing fees.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Feb. 8, 2006

Pursuant to Charter Section 559, I approve this ordinance on behalf of the City Planning Commission and recommend it be adopted . . . .

FEB. 8, 2006

see attached report

Mark Winogrond
Interim Director of Planning

File Nos. 03-1459 and 03-1459-S1

#116278

Los Angeles City Planning Commission

200 North Spring Street, Room 532, City Hall, Los Angeles, CA 90012
www.cityofla.org/PLN/index.htm

January 18, 2006

Los Angeles City Council
City Hall, Room 395
Los Angeles, CA 90012

ATTN: Barbara Greaves, Legislative Analyst
Planning and Land Use Management Committee

CITY PLAN CASE NO. 2004-2290 CA

Transmitted herewith is an ordinance (Appendix A), which amends the Los Angeles Municipal Code to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions.

On January 12, following a public hearing, the City Planning Commission adopted the Planning Department staff report and findings, and **approved the proposed ordinance (Appendix A) with recommendations**. The recommendations included that the City Attorney ensure that the penalty for illegal removal of protected trees run with the land, that building permits are withheld as part of the enforcement procedure, that the enforcement language be clarified if possible, and that a maintenance fee for trees planted as a mitigation be included in the Public Works section of the Municipal Code. The Commission also requested staff to develop guidelines to assist applicants in understanding the requirements and procedures.

This action was taken by the following vote:

Moved:	Usher
Seconded:	Freer
Ayes:	Cardoso, Hughes, Kay, Kezios, Roschen, Woo
Absent:	Irlando

Vote: 8-0

JAN 2 0 2006

Gabriele Williams, Commission Executive Assistant II
City Planning Commission

PLANNING & LAND USE MANAGEMENT

Attachments: Findings, Appendix A (Ordinance)

cc: Keith Pritsker, Deputy City Attorney

RECEIVED
CITY CLERK'S OFFICE

2016 JAN 20 AM 11: 07

CITY CLERK

BY _____ DEPUTY

FINDINGS

That the City Council:

Adopt the staff report of November 10, 2005, as its report on the subject;

Adopt the findings in the staff report dated November 10, 2005.

The City Planning Department recommends that the City Council, in accordance with Charter Section 558, find that the attached, proposed ordinance (Appendix A) is:

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species, RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. in accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

APPENDIX A

PROPOSED ORDINANCE FOR DISCUSSION

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of; and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the twenty-sixth unnumbered paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph after the thirtieth unnumbered paragraph defining "Problem Areas":

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the forty-fifth unnumbered paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 he Los Angeles Municipal Code is an ded to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authorit, .** The Board of Public Works may gra .. a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected

tree was removed or relo_ ed in violation of Section 46.00 of this e. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made I writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed; the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County

Recorder. No such affi[illegible]t shall be recorded, however, until an[illegible]gal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Section 96.303.5 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department of Public Works to verify such information by entry upon the subject property.

Sec. . The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the Main Street entrance to the City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that the foregoing ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

Pursuant to Charter Section 559, I approve this ordinance and recommend its adoption on behalf of the City Planning Commission . . . . . .

see attached report.

_____
Rockard J. Delgadillo, City Attorney

_____
Mark Winogrond
Interim, Director of Planning

By _____
Deputy City Attorney

File No. _____

(posting1)

FILE COPY

Los Angeles City Planning Department
RECOMMENDATION REPORT

CITY PLANNING COMMISSION	CASE NO:	CPC-2004-2290-CA
	CEQA:	ENV-2004-2201-CE
	LOCATION:	Citywide
DATE: January 12, 2006	COUNCIL DISTRICTS:	All
TIME: after 8:30a.m. *	PLAN AREAS:	All
PLACE: Room 1010 City Hall 200 North Spring St., Los Angeles, CA 90012	RELATED FILES:	n/a

PUBLIC HEARING REQUIRED—CONTINUED FROM MEETING OF NOVEMBER 10, 2005

REQUEST: Continued consideration of staff report and proposed amendments to the Zoning Code first heard November 10, 2005, regarding amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Los Angeles Municipal Code.

SUMMARY: The proposed amendments to the Zoning Code will bring the provisions of the Code regarding Oak Trees in conformance with revisions to Section 46 (Oak Tree Regulations) and 96.303.5 of the Municipal Code.

RECOMMENDATION:

1. Adopt the staff report as its report on the subject.
2. Adopt the attached findings.
3. Approve the proposed amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, and 17.52 I (Appendix A) and recommend their adoption by the City Council.

CONTACT INFORMATION: Michael O'Brien, City Planning Associate, 213-482-7077

Table of Contents

		Page
I	Summary	2
II	Findings	2
III	Staff Report	4
	Request	4
	Discussion	4
	Conclusion	5

Appendix A—Staff report and proposed Amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I, and 46.00 through 46.06, and 96.303.5 of the Municipal Code from November 10, 2005.

ADVICE TO PUBLIC: *The exact time this report will be considered during the meeting is uncertain since there may be several other items on the agenda. Written communications may be mailed to the Commission Secretariat, 200 North Main Street, Room 532, Los Angeles, CA 90012 (Phone No.213/978-1300). While all written communications are given to the Commission for consideration, the initial packets are sent the week prior to the Commission's meeting date. If you challenge these agenda items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence on these matters delivered to this agency at or prior to the public hearing. As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability, and upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices, or other auxiliary aids and/or other services may be provided upon request. To ensure availability of services, please make your request no later than three working days (72 hours) prior to the meeting by calling the Commission Secretariat at 213/978-1300.

SUMMARY

On November 10, 2005, the Commission considered a staff report and proposed ordinance amending Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code. These Sections need to be revised to be consistent with the revisions proposed for Sections 46.00 through 46.06 and 96.303.5 of the Los Angeles Municipal Code under the Authority of the Board of Public Works and the Department of Building and Safety. These latter sections contain the City's oak tree regulations (proposed to be changed to the "protected tree regulations") and are not under the purview of the Department of City Planning nor the City Planning Commission.

Considerable testimony was given at the Commission meeting. The commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

This report addresses the issues raised at the November 10 meeting and recommends adoption of the attached ordinance, Appendix A.

FINDINGS

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species, RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's

CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

MARK WINOGROND
Interim Director of Planning

APPROVED BY:

Jane Blumenfeld
Principal City Planner

PREPARED BY:

Michael O'Brien
City Planning Associate

STAFF REPORT

REQUEST

On November 10, 2005, the Commission considered the staff report and proposed ordinance to add protections to certain trees (in addition to oak trees) and to revise the existing protections to oak trees. The ordinance amends Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code, all of which make reference to oak trees. The Commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

DISCUSSION

Species to be protected. The task force during its deliberations in 2003 considered all local species of native trees for possible protection. The task force settled on the addition of only three trees to the list of protected trees, because these three trees, the Southern California Black Walnut (Juglans californica var. californica), the Western Sycamore (Platanus racemosa), and the California Bay (Umbellularia californica), formed a suite of trees diagnostic of the Southern California environment. Only in Southern California do these three trees grow together. Other trees considered have a greater natural range and are not typical solely of Southern California. In addition, the Southern California Black Walnut is already protected under the Mt. Washington Specific Plan, and it is listed as a species of concern whose existence on a project should be considered under the California Environmental Quality Act.

Size. The committee recognized that protecting only trees 8" or more in diameter have the result of protecting only large trees, and would be purely aesthetic in nature. In order to ensure continuing existence of these trees in the area, smaller sizes need to be protected. Four inches was arrived at by considering the case of the Southern California Black Walnut, which typically grows as a multi-trunk tree after fires. Establishing a diameter size of four inches would protect walnuts; a larger size would miss almost all walnuts that survived after fires.

Hardships accruing to developers. Developers are already familiar with the current requirements to survey trees eight inches or more in diameter. The proposed amendment would merely mandate a slightly longer report. For a typical single family residence, which usually would have only one protected tree on the property, a consultant's report would cost less than $200.00, which is only a fraction of building fees and typical project costs.

Status of trees on adjoining properties. Since adjoining properties are not typically surveyed for development purposes, trees on adjoining properties would not be required to be identified as a part of the development application package for any property. Development on a property may require a neighboring tree to be pruned, ground to be cut or filled, etc. In such a case, the property owner has the general legal right to prune both above ground and below ground parts of a tree that extend over and under his property, to cut and fill ground, etc., provided that these actions do not cause the tree to die. Section 46 defines "removed" or "removal" as "any act which will cause a protected tree to

die." If a property owner wished to undertake such extensive pruning, grading, etc., that would cause a protected tree to die, then that property owner would need a permit to undertake such an action. The property owner might also be liable to the adjacent property owner for destruction of a tree on the neighboring property.

Oversight of the regulations and enforcement of the regulations. The Street Tree Division of the Board of Public Works is responsible for oversight of the regulations. Enforcement comes in several ways. One, applicants for building permits are required to list protected trees on their site plans. Two, as part of any required environmental review, a plot plan of the site showing all trees must be submitted, and a mitigation for removal of any protected trees is required, in accordance with Code requirements. Three, citizen complaints to the Street Tree Division may cause the Street Tree Division itself to survey the trees on an affected parcel. Building permits will be withheld until the applicant evidences compliance with the protected tree regulations—usually, a sign-off from the Street Tree Division.

Enforcement is ultimately under the purview of both the Board of Public Works and the Department of Building and Safety. The Board can request the Department to withhold building permits on a property for violation of the protected tree regulations, or revoke a permit issued for which construction has not commenced, after a public hearing on the matter. This penalty can be for up to ten years, depending on the severity of violation of the protected tree regulations.

Urgency of adopting the proposed regulations. The proposed regulations are not urgently required to prevent an imminent threat to any particular tree or group of trees. However, the regulations should be adopted as soon as possible, in order to dovetail with the Mayor's "million trees" initiative.

Options for "replacement" of trees. The remover of trees can replace the trees on the site from which the trees were removed, provided that there is enough space on the site for them to be planted. If there is not enough space, the remover can purchase replacement trees and donate them to the Street Tree Division, which will plant them in available, appropriate, places. Alternatively, as a policy matter, the Street Tree Division will accept a monetary donation that approximates the value of the trees removed.

Whether a citation for non-permitted removal of protected trees continues with a change of ownership. Section 46.06 states that "the authority of the Bureau to act [to request that Building and Safety withhold or revoke building permits] shall not apply to a purchaser... who in good faith and for valuable consideration has acquired title subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent [of the Bureau to act.]"

CONCLUSION

The proposed ordinance (included in Appendix A) provides technical corrections to the "Oak Tree" (now "Protected Tree") provisions of the Zoning Code, to bring them into consistency with the amended provisions of Section 46 of the Municipal Code.

ENVIRONMENTAL IMPACT

The attached proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City of Los

Angeles CEQA Guidelines (ordinances which have no negative impact on the physical environment). Individual projects will continue to undergo specific environmental review at the time of their proposal.

APPENDIX A

PROPOSED ORDINANCE FOR DISCUSSION

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the twenty-sixth unnumbered paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph after the thirtieth unnumbered paragraph defining "Problem Areas":

Protected Tree : Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the

forty-fifth unnumbered paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. **Protected Tree Regulations.** No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the

appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the

City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a

report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

NOTE: The following Sections are for the Commission's reference, and not part of the Staff request for Commission adoption.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip

line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property,

provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made I writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act

pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal.. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Section 96.303.5 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department of Public Works to verify such information by entry upon the subject property.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

FRANK T. MARTINEZ
City Clerk

KAREN E. KALFAYAN
Executive Officer

When making inquiries relative to this matter refer to File No.

ITY OF LOS ANGELE
CALIFORNIA

ANTONIO R. VILLARAIGOSA
MAYOR

Office of the
CITY CLERK
Council and Public Services
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Los Angeles, CA 90012
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General Information - (213) 978-1133
Fax: (213) 978-1040

HELEN GINSBURG
Chief, Council and Public Services Division

CFs 03-1459
03-1459-S1

October 5, 2005

Mark Winogrond, Interim Director of Planning
Planning Department
Room 525, City Hall
Attn: Gabriele Williams

REFER TO STAFF

At its Special Meeting held October 3, 2005 (continued from November 5, 2003 and May 12, 2004 meetings), the Planning and Land Use Management Committee considered the following:

CF 03-1459 — Report from the City Attorney and revised draft Ordinance relative to amending various provisions of Articles 2 and 7 of Chapter I, and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees; and reports from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), as initiated by Motion (LaBonge - Garcetti).

CF 03-1459-S1 — Reports from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), pursuant to Motion (Garcetti - LaBonge).

The Committee instructed that the Motions be referred for consideration by the Planning Department and City Planning Commission, and that recommendations be forwarded to City Council.

Barbara Greaves
Legislative Assistant
Planning and Land Use
Management Committee, 213-978-1068

attachment:

cc: City Attorney
Attn: Keith Pritsker

#031459ltrA

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0288

AUG 16 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

Recyclable and made from recycled waste

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations**. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to

a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required

shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip

line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of the ordinance that amends this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of the ordinance that amends this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of the ordinance that amends this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is hereby amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit

pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify such information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board at the Main Street entrance to Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Aug 10, 2005

File No. 03-1459 and 03-1459-S1

#101794

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EXECUTIVE OFFICER

June 28, 2005

Honorable Rockard J. Delgadillo
City Attorney
7th Floor, City Hall East

Attention: Keith W. Pritsker
Deputy City Attorney

Council File Numbers: 03-1459 and 03-1459-S1

RULE 38 RESPONSE FOR A DRAFT ORDINANCE AMENDING OAK TREE CODE PROVISIONS

The latest version of the draft ordinance submitted for review (second review) does not include the comments made by the Department of Building and Safety in response (first review) to the City Attorney's letter of August 11, 2004, and therefore, pursuant to Council Rule 38, the Department of Building and Safety (LADBS) has again reviewed the proposed draft ordinance amending the oak tree code provisions and have the following comments:

Page 1, Section 1 of the ordinance. Currently, the permit application does not have a "reverse side" where a plot plan is shown. Please remove the phrase "on the reverse side of any" and replace it with "attached to the" since the automation of building permits, all plot plans are now attached to the building permits.

Page 1, Section 1 of the ordinance. It is not clear how the City's Chief Forester (George Gonzalez) is to notify the Department of Building and Safety prior to the issuance of a Certificate of Occupancy. To be assured that all the conditions set forth by the Advisory Agency are met and that the Department of Building and Safety is able to issue the Certificate of Occupancy, please replace the last sentence of the paragraph in Subsection 12 of Section 12.21 A with the following procedure:

> A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtain from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the

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construction, a written document signed certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Page 2, Section 3 of the ordinance. The proper name in accordance with the California Department of Pesticide Regulation is "Agricultural Pest Control Advisor," therefore, please add the word "control" between the words "pest" and "advisor" so that, the definition of the term "Tree Expert" reads: "A person ....who holds a valid California license as an Agricultural Pest Control Advisor or ..."

Page 2, Section 5 of the ordinance. For clarity since both terms are used in this subsection, please add the word "removed" to the second sentence of the first paragraph, so that it reads:

> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 2, Section 5 of the ordinance. The title of the first numbered paragraph "Required Determinations" of Subsection R should be in bold text.

Page 3, Section 5 of the ordinance. Please replace the upper case (I) with lower case (i) in two places on this page and fix the format of the first (i) paragraph on the page to be consistent with the other paragraphs.

Page 3, Section 5 of the ordinance. Items (i), (ii) and (iii) of Subdivision 1 (a) of Subsection R of Section 17.05 refers to "effective date of this Code Section." Please clarify the "effective date" between the effective date of the ordinance of 6/14/62, which added the Code Section 17.05, and the effective date of the ordinance of 4/12/80, which added the Subsection R of Section 17.05 (regarding oak trees). In either case, you may want to replace the term "effective date of this Code Section" with one of the dates, so long as the intent is clear.

Page 3, Subdivision 1 (b) of Section 5 of the ordinance. The first paragraph refers to "The removal of the protected tree would not result in an undesirable, irreversible soil erosion ...which cannot be mitigated to the satisfaction of the City..." It is not clear as to who in the "City" needs to be satisfied. Is there a specific department of the City? Chief Forester? Inspector from LADBS? Please indicate the intent, by specifying who in the "City" needs to be satisfied.

Page 4, Subdivision 3 of Section 5 of the ordinance. Is the word "accept" the correct term? What is the intent of the phrase "accept as to Subsection R1(b) (iii) above," mean? Is the intent to keep the existing protected tree where it is if it is a Historical Monument, unless the tree "is in danger of falling due to an existing and irreversible condition"? If so, than please reword the sentence to convey the intent.

Page 4, Subdivision 3 of Section 5 of the ordinance. Please explain the difference between a protected tree "officially designated as an Historical Monument" (Subsection R3) versus a protected tree "subject to historical preservation requirements" (Subsection R1)? Please explain the logic between the first sentence of Subsections R1 and R3, these two subsections seems to

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January 30, 2004

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Attn: Barbara Greaves, Office of the City Clerk

CF 03-1459 AND 03-1459-S1– PROPOSED AMENDMENTS TO THE OAK TREE ORDINANCE (ORDINANCE 153,478) - REVISED

Dear Councilmember Reyes:

RECOMMENDATIONS

In response to motions 03-1459 (LaBonge/Garcetti) and 03-1459-S1 (Garcetti/LaBonge), the Department of Public Works, Environmental Affairs Department, and Community Forestry Advisory Committee recommend that the City Council instruct the City Attorney to prepare the following revisions to the City's Oak Tree Ordinance No. 153,478 in order to more adequately protect our remnant native woodlands, one of the City's most valuable natural resources. The recommended revisions are as follows:

1. Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Protected Trees".

2. Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

3. Require a permit for protected tree removal/relocation on all property within the City boundaries regardless of property lot size.

4. Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at four and one-half feet above ground level.

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5. Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

6. Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

7. Increase the monetary fine for violating the ordinance.

8. Include civil penalties, such as prohibiting development of property if protected trees are removed without a permit.

9. Require a tree pruning permit for all protected tree pruning in the City of Los Angeles.

FISCAL IMPACT STATEMENT

The number of permits that will be required to be issued will increase due to the larger number of trees that are protected and the need for a permit to be issued for all protected trees to be pruned. As there is a fee for the issuance of these permits, the program will be self-supporting and have no impact to the General Fund.

DISCUSSION

The City of Los Angeles enacted the Oak tree ordinance (Ordinance 153,478) in 1980 to protect its remaining native Oak tree woodlands. In spite of this ordinance, the City continues to suffer a decline to its native Oak tree woodlands due to development, disease, and other factors. With even fewer native trees and woodlands remaining, the time has come to strengthen the oak tree ordinance, giving protection to a wider range of native trees as well as smaller trees that have not yet reached maturity. A stronger, more inclusive ordinance would give the Department of Public Works greater abilities to protect our native trees and preserve this important part of the City's natural history.

Staff from the Department of Public Works' Street Tree Division and the Departments of Environmental Affairs and City Planning met with representatives from the Community Forest Advisory Committee in January and February of 2003 to discuss the current tree protection ordinances and how they could be revised to better protect and preserve the City's remaining native trees and woodlands.

Item #1: Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Protected Trees".

Oaks are not the only native trees that inhabit the City of Los Angeles. Other Southern California native tree species include the Southern California Black Walnut, Western Sycamore, and California Bay. These species are currently without any legal protection from development and other urban pressures even though they also are an important part of the City's natural history. Urbanization is considered such a severe threat to Southern California walnut woodlands that the State of California

and the Nature Conservancy are working together to acquire vegetative/habitat data on these woodlands, and the California Native Plant Society is evaluating the Southern California Black Walnut for inclusion on their watch list for plants with limited distribution. The Western Sycamore and California Bay both occur in riparian habitats, which are key habitats for reducing the impact of upland sources of pollution to water bodies and as wildlife habitats. Protection of these additional species of native trees is warranted, and their inclusion necessitates the change of the ordinance title to "Protected Trees" to more properly represent the scope and contents of the newly revised ordinance.

Item #2: Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

The definition of a tree expert currently includes only someone who holds a valid California license as an agricultural pest control advisor or landscape architect. Although there are individuals in both categories that have the necessary expertise to assess oak and other trees and prepare reports on them, Registered Consulting Arborists (American Society of Consulting Arborists) are also very well qualified to determine the health and condition of trees and should, therefore, be included in the definition of tree expert.

Item #3: Require a permit for protected tree removal/relocation on all property within the City boundaries regardless of property lot size.

The current Oak Tree Ordinance applies only to trees located on lots larger than one acre in size. This severely limits the applicability of this ordinance due to the highly subdivided and built-out nature of our City. Although new developments generally fall into this category of lot size, many of these trees are on smaller lots, and these native trees should be protected regardless of the size of the lot on which they live.

Item #4: Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at four and one-half feet above ground level.

The definition of an oak tree in the current City ordinance includes only those specimens whose trunks measure eight inches in diameter four and one-half feet above ground level. Some of the other native trees, specifically the Southern California Black Walnut, exhibit different growth habits and quite often have multiple trunks rather than a single one. To ensure that the ordinance protects these trees as well as smaller single-trunk trees, we recommend that the tree definition be changed to include all specimens that have a trunk or trunks that cumulatively measure two inches in diameter at a level of four and one-half feet above the ground.

Item #5: Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

When oak trees are allowed to be removed under the current ordinance, they are replaced on a one-for-one basis. This leaves a deficit in the amount of benefits that the City obtains from this tree for many years as oaks are slow-growing trees and the environmental benefits afforded by a mature tree are much greater than those of a small tree. Therefore, the ordinance should be revised to take a more balanced approach based on a calculation utilizing a trunk volume or canopy coverage formula. For example, to mitigate the removal of a tree with an eight-inch diameter trunk, eight trees each with a trunk diameter of one inch would be required. For Southern California Black Walnuts planted as seeds, the trunk diameter of the replacement tree will be calculated as that of a five year old tree.

Item #6: Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

Replacement trees allowed under the current ordinance must be a minimum of 15-gallons in size. Although this is a good approach for many species, some of the native species, especially the Southern California Black Walnut, do not grow well in nursery containers. Because of this, they are generally not available in nursery-size containers and even if they were, the individuals would be unlikely to mature to healthy trees due to improperly developed roots. To account for these growth requirements, the ordinance needs to allow for smaller trees, or in the case of the Southern California Black Walnut, tree seeds to be used as replacements if this would afford a greater chance of long-term survival than the use of larger size trees. Benefits derive from these replacement trees only if they survive long term! To increase the probability of survival, replacement trees would need to be maintained and monitored for an establishment period of at least five years. Any replacement trees failing to survive this five-year establishment period should be replaced. Survival of sprouts from seeds and small stock may require frequent monitoring and cages or other devices to facilitate long-term survival.

Item #7: Increase the monetary fine for violating the ordinance.

Item #8: Include civil penalties, such as prohibiting development of property if protected trees are removed without a permit.

The current ordinance lacks adequate enforcement mechanisms. Often, a developer will pay the small fines involved in illegally removing an oak tree as this is economically advantageous over preserving the trees. There is also little to prevent a developer's "scorched earth" approach of removing everything from a property prior to applying for development permits so they can then say that nothing currently exists on the property at the time of application. By increasing the monetary fine and including civil penalties, such as prohibiting development of property by withholding building and occupancy permits for a specified period of time if a "Protected Tree" is removed without a permit, the trees will be better protected.

Item #9: Require a tree pruning permit for all protected tree pruning in the City of Los Angeles.

The final recommended change would require a tree pruning permit for all protected tree pruning in the City of Los Angeles regardless of where that tree is located. This will help to ensure that oaks are trimmed at the proper time of year, which is during the dry season from mid- to late-summer, according to ISA standards, by properly trained and reputable tree trimmers. This will lead to healthier, longer-lived trees, which will provide greater environmental benefits to the City. This protection of all of the protected trees within the City will help to preserve the last remnants of our native woodlands.

If you have any questions, please contact George Gonzalez, Chief Forester, Street Tree Division, at (213) 485-5675 or Melinda Bartlett, Division Director, Water and Natural Resources Division at (213) 978-0858.

Sincerely,

William A. Robertson, Director
Bureau of Street Services

Detrich B. Allen, General Manager
Environmental Affairs Department

contradict each other.

Page 4, Subdivision 4(a) of Section 5 of the ordinance. The property is to replace one protected tree with "at least two protected trees..." The definition of the term "protected tree" states in part "...native tree species which measures four inches or more ...four and one-half feet above the ground..." and the second sentence states, "Each replacement tree shall be ...one inch or more in diameter at a point one foot above the base..."seem to be in conflict.

Page 4, Subdivision 4 (b) of Section 5 of the ordinance. Does the convenant and agreement (C/A) have to be approved by the Advisory Agency or someone from City Planning, prior to recording the C/A? If so, then should it be mentioned in the ordinance? Also, is the C/A on a form provided by either Advisory Agency or City Planning? If so, then should that be mentioned as well?

Page 5, Section 6 of the ordinance. Why is it necessary to show the location of "large trees"? Is there a definition of what is considered a "large tree"?

Page 6, Section 8 of the ordinance. For clarity, the term "removed" should be added to the last sentence of paragraph, so that it reads:

> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 6, Section 10 of the ordinance. Please clarify what type of permit is referenced in Section 46.02 by amending the title of Section 46.02 to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMIT TO RELOCATE OR REMOVE PROTECTED TREES.

Page 6, Section 10 of the ordinance. Is the last sentence of the second paragraph referring to a plan which shows all the grading work in compliance with Division 70 of Article 1 of Chapter IX of this Code being proposed to obtain from LADBS a permit to do grading work? If so, then please provide a definition of the term "grading permit plan."

Page 8, Section 11 of the ordinance. This amendment to Section 46.04 appears to increase the fees by applying the fees of Section 12.37 I.1 to include three other variety of trees, besides the oak tree. This amendment would require a fiscal impact report and may require this ordinance to be heard in Budget and Finance Committee, if it is to remain.

Pages 8 and 9, Section 12 of the ordinance. Please replace the misspell word "Superintendant" with "Superintendent of Building" and remove "of the Department of Building and Safety."

Pages 8 and 9, Section 12 of the ordinance. Please make the following changes to Subsections A and D of Section 46.06 as shown below. It would be very difficult to effectively enforce the intent of this ordinance unless the following changes are made to the procedure of these

Subsections. The changes are shown in underline/strikeout format (underline text is new language and strikeout shows text to be removed).

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

A. The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Chief of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections B and C of this Section, shall have the authority to request ~~recommend~~ to the ~~Superintendant~~ Superintendent of Building ~~of the Department of Building and Safety~~ to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued ~~unless expired, for which rights have not been obtained~~ which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection C of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection B of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

D. The applicant or permittee may appeal to the Board of Public Works any determination ~~recommendation~~ by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination ~~recommendation~~ as provided for in Subsection C above. Further, that any action by the Department of Building and Safety resulting from any of the provision of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

Page 9, Section 12 of the ordinance. Please delete the last sentence of Subsection B of Section

4606, because it is impossible for anyone, especially LADBS, to be aware not to issue a building permit for the "period **preceding**"(?) the hearing, determination or appeal, since no one can predict the future.

Page 9, Section 12 of the ordinance. Please delete the third sentence of Subsection C of Section 4606, because it is redundant with Subsection A of this Section.

Page 9, Section 12 of the ordinance. In Subsection E of Section 4606, it refers to an affidavit to be recorded with the County Recorder. What is the purpose of the affidavit? Would the affidavit state that the "Bureau recommends to refuse to issue Public Works permit for the relocation or removal of Protected Trees"? Or, does the affidavit state that the owner will not obtain a building permit to construct a building on the lot for the next 10 years from year "one" to year "ten" as described in Subsection A of this section? If this affidavit is recorded, then is there a method in which LADBS will be either given a copy of the recorded affidavit or somehow notified by the Bureau of its "final action"? Please remove the last sentence of this subsection, since the issuance of the building permit is already mentioned in Subsection A of this Section.

Page 10, Section 13 of the ordinance. To effectively enforce this provision a "Tree expert" such as someone from the Bureau of Street Services, Street Trees should do the verification inspection. Please replace the word "Department" with "Bureau of Street Services, Department of Public Works" in the third sentence of Item 5 of Section 96.303 and modify the last sentence by removing the phrase "as specified in Section 98.0412 (a) of the Municipal Code" and "by the Department" so the sentence will read:

> A fee shall be collected for any inspection required to verify the declaration.

Please contact me at (213) 482-0440 or Steve Ikkanda at (213) 482-6715 should you have any questions regarding this letter.

ANDREW A. ADELMAN, P.E.
General Manager

NICOLINO G. DELLI QUADRI, Chief
Engineering Bureau

NDQ:SSI

C: City Council
Andrew Adelman
Ray Chan

PLANNING and LAND USE MGT.

MOTION

JUL 0 8 2003

The City of Los Angeles continues to suffer a decrease in its Oak tree and native tree species woodland habitat due to disease, development and other factors. The City's Oak Tree ordinances were first adopted on April 12, 1980 in order to establish clear standards for the preservation of these beautiful and culturally significant living monuments.

There are various other provisions that require updating. For example, the current tree replacement requirement, a minimum fifteen gallon Oak tree replacement per removal, does not adequately mitigate the loss of Oak tree woodlands. Additionally, the current definition of "Tree Expert," a licensed pest control advisor or landscape architect, needs to be updated to allow for the most knowledgeable Oak tree professionals and Consulting Arborists to be included.

Preservation of Oak trees targets signature trees of only one of the City's native plant communities, and other species should be considered for enhanced protections along the lines of the City's Oak Tree ordinances.

Regulations to preserve trees have significantly changed and progressed, both in California and across the country, due to increased scientific knowledge of trees and public awareness of the importance of native tree species. An opportunity exists to update City laws pertaining to Oak trees to better protect our remaining stock of these historic treasures to ensure that future generations can take part in their legacy.

I THEREFORE MOVE that the departments of Public Works, City Planning and Environmental Affairs be instructed to work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that share common ecosystems while maintaining a more diverse species base.

PRESENTED BY _____
TOM LABONGE
Councilmember, 4th District

SECONDED BY _____
ERIC GARCETTI
Councilmember, 13th District

July 8, 2003

am

From: John White
To: Greaves, Barbara
Date: 10/04/2005 8:32:43 AM
Subject: Fwd: Native Tree Ordinance October 3, PLUM Committee File 03-1459

more trees, and more to follow.

John A. White
Legislative Assistant
Housing, Community, and Economic Development Committee
213-978-1080

>>> Clare MK <clare_mk@yahoo.com> 09/29/2005 9:07:09 PM >>>

City of Los Angeles, Community Forest Advisory Committee
MS 465, 200 N. Spring Street, Los Angeles, CA 90012

The Honorable Ed Reyes, Chair
Planning and Land Use Management Committee
City of Los Angeles
200 N. Spring Street
Los Angeles, CA 90012

September 29, 2005

File 03-1459

Dear Councilmember Reyes,

We have continued to follow the progress of this Ordinance to become the City's "Native Tree Protection Ordinance" now that it is proposed to include four species of native trees. We are in full support of the initiative put forward by Council Members Labonge and Garcetti to increase existing protection for the oak species and to give similar protection to other native trees in our City.

The City's Community Forest Advisory Committee (CFAC) convened a Task Force in 2003 to initiate a review of the City's Oak Tree Ordinance and to make recommendations as to possible amendments to it. In May, last year, we were pleased to support the proposed revisions to the Ordinance when the matter came to the PLUM Committee.

The City is prepared to educate the public who may be affected by the amendments to this ordinance, as recommended by the PLUM Committee. This is a reasonable ordinance that does not place a hardship on developers. There is a requirement for documentation of trees; for permits to remove them; and, for replacement of any tree that is given a permit to be removed.

The reasons that we need to protect other native tree species today are the same reasons that convinced us of the need to protect oaks almost 25 years ago. During the past twenty-five years we have lost innumerable trees that give us our unique Southern Californian identity. Our Southern California black walnut trees are unique, existing in four counties of Southern California and nowhere else in the world. They are highly threatened as a plant community, according

to the Department of Fish and Game, yet thousands of individual walnut trees are axed every brush clearance season.

We thank those who have worked to bring these amendments this far. We ask you to recognize the great value of our plant communities and the habitat they provide and to preserve them for future generations to enjoy, while we still have the opportunity to do so and to move this motion forward.

Yours truly,

Clare Marter Kenyon, Chair
Community Forest Advisory Committee

Cc

Councilmember T. Cardenas
Councilmember J. Weiss

Councilmember T. LaBonge
Councilmember E. Garcetti
Mayor A. Villaraigosa

September 29, 2005

The Honorable Ed Reyes, Chair
Planning and Land Use Management Committee
200 N. Spring Street
Los Angeles, CA 90012

Dear Ed Reyes and Honorable Members of the PLUM Committee,

I am writing this letter to express my personal support of the proposed ordinance submitted to you by the LA Community Forest Advisory Committee. During my experiences as a community activist I have had occasion to feel the inadequacies of the current Los Angeles Tree Protection Ordinance. I have looked to neighboring cities such as Sierra Madre with appreciation for their comprehensive tree guidelines. I think it is about time that the City of Los Angeles caught up with its neighbors by incorporating a thorough ordinance to help promote and protect our green environment, that will benefit all of our citizens in the long run. I appreciate the hard work that must have gone into these proposed guidelines, and I hope you will honor us all by supporting it.

Alisa Smith
Glassell Park Community Activist

From: John White
To: Greaves, Barbara
Date: 10/04/2005 8:36:00 AM
Subject: Fwd: support for CFAC Oak Ordinance

John A. White
Legislative Assistant
Housing, Community, and Economic Development Committee
213-978-1080

>>> christopher howard <am161@lafn.org> 09/30/2005 6:45:26 PM >>>

September 29, 2005

The Honorable Ed Reyes, Chair
Planning and Land Use Management Committee
200 N. Spring Street
Los Angeles, CA 90012

Dear Councilmember Reyes,

We are writing to urge you to approve the proposed ordinance that the City's Community Forest Advisory Committee has put forward, in support of greater protection for our native oaks as well as for expanding the list or protections to include the Juglans Californica; the Western Sycamore, Platanus Racemosa; and the California Bay, Umbellularia Californica in the city of Los Angeles.

For some time, the City of Los Angeles has protected native oaks on parcels of an acre or more in size. Recently, the Community Forest Advisory Committee convened a task force of interested parties to recommend changes to the City's oak tree protection ordinance.

We are losing natural habitat at an alarming rate and, of course, there is a commensurate loss of wildlife. In fact, the California black walnuts, with a world-wide distribution of four counties in southern California, are being destroyed faster than they can be inventoried.

Thank you for the good work you do.

Sincerely,

Melanie Penny
Chris Howard

438 Crane Blvd.
Los Angeles, CA 90065

From: John White
To: Greaves, Barbara
Date: 10/04/2005 8:37:15 AM
Subject: Fwd: Fw: Protectection of native oaks

John A. White
Legislative Assistant
Housing, Community, and Economic Development Committee
213-978-1080

>>> "John Rand" <johnrand@mindspring.com> 10/03/2005 8:58:49 AM >>>

----- Original Message ----- From: John Rand
To: ggubatan@council.lacity.org
Sent: Monday, October 03, 2005 8:55 AM
Subject: Protectection of native oaks

Dear Honorable Ed Reyes:

I am writing in regard to the proposed ordinance for the protection of native oak trees. I urge you to ratify it; and in any possible way- increase it. As a long time residence of Mount Washington, I have directly observed illegal cutting of the protected native oaks on properties directly adjacent to my home. The penalties were insignificant and the perpetrators have continued excessive over building.

Again, please approve this ordinance and strengthen it.

Thank you.

Sincerely,

JOHN
RAND
443 Quail Drive
Los Angeles, CA 90065-5033
(323)227-9906

SL
RA
SILVE. .AKE RESIDENTS ASSOCI ON
Post Office Box 39587, Griffith Station, Los Angeles, CA 90039
SLRA Hotline: 323-668-2643, FAX: 323-665-2125
www.silverlake.org

October 3, 2005

The Honorable Ed Reyes, Chair
Planning and Land Use Management Committee
200 N. Spring Street
Los Angeles, CA 90012

Re: Oak Tree Ordinance

Dear Councilmember Reyes:

We are in support of the expansion of the Oak Tree Ordinance to include other species. We are thrilled that the ordinance now includes parcels, regardless of size.

But, we continue to have great concern that the ordinance doesn't include other than SFR zoning. We urge you to include properties that are multi-family zoned. There continue to be parcels, both large and small, in our established neighborhoods that developers are trying to max out the number of units. Usually, there are trees "in the way". Developers continue to view trees as obstructions and liabilities rather than assets.

We also are concerned that developers will work around the tree protection by manipulating the zoning.

If the protection extends to all zoning, there will be no question that the City wants developers to maintain the established trees that this ordinance covers. The message will be clear and not complicated.

Illegal Removal:

We are thrilled with the provision of 10 year moratorium on development if a "protected tree" is removed illegally. But, it sounds too good to be true and wonder if the Department of Building and Safety will have the courage to enforce this provision. We are also concerned that a developer will remove the trees and then leave it to Building & Safety to "discover" the violation. We already have the experience with a developer presenting a site plan with no trees indicated—yet there are dozens of these protected trees on this site. Only community diligence and knowledge of the site caught him. There is not a provision for the City to proactively inventory these trees.

Communities continue to be skeptical about developers promises without significant punishment. In about 1982, the City imposed and the developer

agreed to keep over mature and rare trees on the known as Hathaway Hills. The day after he received a building pe....it to build about 35 houses on these R3 lots, he removed EVERY tree. His punishment, nothing. Granted, in the years since this experience the rules have changed, but the community's lesson was to never believe what developer's say. Not being able to develop sites for 10 years sounds very good to us. But, how can we be assured that a developer won't cry "hardship" causing the City to relent. Hathaway Hill continues to be virtually treeless and continues to be a sore thumb in a community rich in tree canopy.

Moving Trees:
The Theodore Payne Foundation did a study on the success, or lack of success, in moving mature trees. 89% of moved trees die within 2 years. Not good enough to use as an alternative. Seems to us like an easy way to get around this ordinance. Developers will obey the letter of the rule, but not the spirit.

Until developers embrace the idea that trees are assets, the City of Los Angeles must do what other cities have done, write strong protection into the ordinances and then have the courage to enforce them and severely punish offenders.

Sincerely,

MaryAnn Kuk

MaryAnn Kuk, President
323 665 4145

Cc: Councilmembers Garcetti & LaBonge
Silver Lake Neighborhood Council

CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
10/3/05	2

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal (✓) General comments

Name: Molly Rysman

Business or Organization Affiliation: CD 13

Address: _____
Street City State Zip

Business phone: _____ Representing: CM Garcetti

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Client Address: _____
Street City State Zip

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2+3

CITY OF LOS ANGELES SPEAKER CARD

Date: 10/3/05

Council File No., Agenda Item, or Case No.: [redacted] 03-1459
03-1459 S1

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: DIANE EDWARDSON

Business or Organization Affiliation: [redacted] COMMUNITY RESIDENTS ASSOC. FOR PARKS

Address: 2630 CORRALITAS DR (Street) LA (City) CA (State) 90039 (Zip)

Business phone: 213 910 9826 Representing:

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CITY OF LOS ANGELES SPEAKER CARD

Date: 10-3-05

Council File No., Agenda Item, or Case No.: 03-1459

03-1459 S1

I wish to speak before the PLUM

Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: MARYANN KUK (pro Cook)

Business or Organization Affiliation: Silver Lake Residents Assn

Address: 2011 W Silverlake Dr LA CA 90039
Street City State Zip

Business phone: 323 665 4145 Representing: SLRA

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Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
10/3/05	Items 1+2

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

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Name: Lulu Hizmay

Business or Organization Affiliation:

Address: 8307 Foothill Blvd Sunland CA. 91040
Street City State Zip

Business phone: (213) 448-0654 Representing: Myself.

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Street City State Zip

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CITY ◯ LOS ANGELES SPEAKER ◯RD

Date		Council File No., Agenda Item, or Case No.
10/3/05	Don't speak	Items 1+2 2+3

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓ For proposal
( ) Against proposal
( ) General comments

Name: Youn, Il Youn (JEAN)

Business or Organization Affiliation: Elite Realty & American Finance Network, Inc

Address: 3700 Wilshire Blvd #456 Los Angeles CA 90010
Street City State Zip

Business phone: 213-384-7500 Representing: Self

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Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date		Council File No., Agenda Item, or Case No.
10/3/05	Don't speak.	Items 1+2+3

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal
( ) Against proposal
( ) General comments

Name: Sung Ja Ahn & John

Business or Organization Affiliation: ALL STAR

Address: 116 S. Towne LA Ca 90021
Street City State Zip

Business phone: (213) 629-4411 Representing: Self

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CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
10/3/05	Items 1+2+3

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: ANDREW DANUI

Business or Organization Affiliation: REAL ESTATE

Address: 3156 FOOTHILL BLVD LC 91214
Street City State Zip

Business phone: 818 4723243 Representing: SELF INTEREST

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐ NOT SPEAKING

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
	03-1459

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal
( ) Against proposal
( ) General comments

Name: SCOTT WILSON

Business or Organization Affiliation: C.F.A.L.

Address: KTOO
Street City State Zip

Business phone: 323-255-4863 Representing:

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Client Name: Phone #:

Client Address:
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date: 10-03-2005

Council File No., Agenda Item, or Case No.: CF 03-1459

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: CLARE MARTER KENYON

Business or Organization Affiliation: COMMUNITY FOREST ADVISORY CMTE

Address: 505 W. AVE 44 (Street) L.A. (City) CA (State) 90065 (Zip)

Business phone: 323 227 6491 Representing: CFAC, L.A.

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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C◯ OF LOS ANGELES SPEAK◯ CARD

Date: 10-3-05

Council File No., Agenda Item, or Case No.: 03-1459 #51 #2 #3

I wish to speak before the _ PLUM

Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal (✓) General comments

Name: GORDON MURLEY

Business or Organization Affiliation: WOODLAND HILLS HOMEOWNERS ORG. - SAN FERNANDO VALLEY FED

Address: 4128 MORRO DR WOODLAND HILLS CA 91364
Street City State Zip

Business phone: (818) 346-5842 Representing: AROUK

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

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CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
10/3/05	Items #2 & 3

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: PAUL SAUER

Business or Organization Affiliation:

Address: 11153 MORRISON ST NO. HOLLYWOOD CA 91601
Street City State Zip

Business phone: 818 238-9242 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

9.20

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0288

AUG 16 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and, Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

AUG 17 2005

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CITY CLERK

BY _____ DEPUTY

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the municipal code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their early comments were incorporated into the language of the current draft ordinance. They have been asked by this office's most recent letter to make their comments directly to the Council's Planning and Land Use Committee.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By
DAVID MICHAELSON
Chief Assistant City Attorney

DM:KP (#105209)

Enclosure

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to

a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required

shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip

line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of the ordinance that amends this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of the ordinance that amends this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of the ordinance that amends this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is hereby amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit

pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify such information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board at the Main Street entrance to Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Aug. 10, 2005

File No. 03-1459 and 03-1459-S1

#101794

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

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DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

ANDREW A. ADELMAN, P.E.
GENERAL MANAGER

RAYMOND CHAN
EXECUTIVE OFFICER

June 28, 2005

Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Numbers: 03-1459 and 03-1459-S1

RULE 38 RESPONSE FOR A DRAFT ORDINANCE AMENDING OAK TREE CODE PROVISIONS

The latest version of the draft ordinance submitted for review (second review) does not include the comments made by the Department of Building and Safety in response (first review) to the City Attorney's letter of August 11, 2004, and therefore, pursuant to Council Rule 38, the Department of Building and Safety (LADBS) has again reviewed the proposed draft ordinance amending the oak tree code provisions and have the following comments:

Page 1, Section 1 of the ordinance. Currently, the permit application does not have a "reverse side" where a plot plan is shown. Please remove the phrase "on the reverse side of any" and replace it with "attached to the" since the automation of building permits, all plot plans are now attached to the building permits.

Page 1, Section 1 of the ordinance. It is not clear how the City's Chief Forester (George Gonzalez) is to notify the Department of Building and Safety prior to the issuance of a Certificate of Occupancy. To be assured that all the conditions set forth by the Advisory Agency are met and that the Department of Building and Safety is able to issue the Certificate of Occupancy, please replace the last sentence of the paragraph in Subsection 12 of Section 12.21 A with the following procedure:

> A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtain from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the

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PLAN & LAND USE MGT.

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER

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BY _____ DEPUTY

construction, a written document signed certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Page 2, Section 3 of the ordinance. The proper name in accordance with the California Department of Pesticide Regulation is "Agricultural Pest Control Advisor," therefore, please add the word "control" between the words "pest" and "advisor" so that, the definition of the term "Tree Expert" reads: "A person ....who holds a valid California license as an Agricultural Pest Control Advisor or ..."

Page 2, Section 5 of the ordinance. For clarity since both terms are used in this subsection, please add the word "removed" to the second sentence of the first paragraph, so that it reads:

The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 2, Section 5 of the ordinance. The title of the first numbered paragraph "Required Determinations" of Subsection R should be in bold text.

Page 3, Section 5 of the ordinance. Please replace the upper case (I) with lower case (i) in two places on this page and fix the format of the first (i) paragraph on the page to be consistent with the other paragraphs.

Page 3, Section 5 of the ordinance. Items (i), (ii) and (iii) of Subdivision 1 (a) of Subsection R of Section 17.05 refers to "effective date of this Code Section." Please clarify the "effective date" between the effective date of the ordinance of 6/14/62, which added the Code Section 17.05, and the effective date of the ordinance of 4/12/80, which added the Subsection R of Section 17.05 (regarding oak trees). In either case, you may want to replace the term "effective date of this Code Section" with one of the dates, so long as the intent is clear.

Page 3, Subdivision 1 (b) of Section 5 of the ordinance. The first paragraph refers to "The removal of the protected tree would not result in an undesirable, irreversible soil erosion ...which cannot be mitigated to the satisfaction of the City..." It is not clear as to who in the "City" needs to be satisfied. Is there a specific department of the City? Chief Forester? Inspector from LADBS? Please indicate the intent, by specifying who in the "City" needs to be satisfied.

Page 4, Subdivision 3 of Section 5 of the ordinance. Is the word "accept" the correct term? What is the intent of the phrase "accept as to Subsection R1(b) (iii) above," mean? Is the intent to keep the existing protected tree where it is if it is a Historical Monument, unless the tree "is in danger of falling due to an existing and irreversible condition"? If so, than please reword the sentence to convey the intent.

Page 4, Subdivision 3 of Section 5 of the ordinance. Please explain the difference between a protected tree "officially designated as an Historical Monument" (Subsection R3) versus a protected tree "subject to historical preservation requirements" (Subsection R1)? Please explain the logic between the first sentence of Subsections R1 and R3, these two subsections seems to

contradict each other.

Page 4, Subdivision 4(a) of Section 5 of the ordinance. The property is to replace one protected tree with "at least two protected trees..." The definition of the term "protected tree" states in part "...native tree species which measures four inches or more ...four and one-half feet above the ground..." and the second sentence states, "Each replacement tree shall be ...one inch or more in diameter at a point one foot above the base..." seem to be in conflict.

Page 4, Subdivision 4 (b) of Section 5 of the ordinance. Does the convenant and agreement (C/A) have to be approved by the Advisory Agency or someone from City Planning, prior to recording the C/A? If so, then should it be mentioned in the ordinance? Also, is the C/A on a form provided by either Advisory Agency or City Planning? If so, then should that be mentioned as well?

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> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 6, Section 10 of the ordinance. Please clarify what type of permit is referenced in Section 46.02 by amending the title of Section 46.02 to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMIT TO RELOCATE OR REMOVE PROTECTED TREES.

Page 6, Section 10 of the ordinance. Is the last sentence of the second paragraph referring to a plan which shows all the grading work in compliance with Division 70 of Article 1 of Chapter IX of this Code being proposed to obtain from LADBS a permit to do grading work? If so, then please provide a definition of the term "grading permit plan."

Page 8, Section 11 of the ordinance. This amendment to Section 46.04 appears to increase the fees by applying the fees of Section 12.37 I.1 to include three other variety of trees, besides the oak tree. This amendment would require a fiscal impact report and may require this ordinance to be heard in Budget and Finance Committee, if it is to remain.

Pages 8 and 9, Section 12 of the ordinance. Please replace the misspell word "Superintendant" with "Superintendent of Building" and remove "of the Department of Building and Safety."

Pages 8 and 9, Section 12 of the ordinance. Please make the following changes to Subsections A and D of Section 46.06 as shown below. It would be very difficult to effectively enforce the intent of this ordinance unless the following changes are made to the procedure of these

Subsections. The changes are shown in underline/strikeout format (underline text is new language and strikeout shows text to be removed).

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

A. The, Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Chief of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections B and C of this Section, shall have the authority to request ~~recommend~~ to the ~~Superintendant~~ Superintendent of Building ~~of the Department of Building and Safety~~ to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued ~~unless expired~~, for ~~which rights have not been obtained~~ which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection C of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection B of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

D. The applicant or permittee may appeal to the Board of Public Works any determination ~~recommendation~~ by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination ~~recommendation~~ as provided for in Subsection C above. Further, that any action by the Department of Building and Safety resulting from any of the provision of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

Page 9, Section 12 of the ordinance. Please delete the last sentence of Subsection B of Section

4606, because it is impossible for anyone, especially LADBS, to be aware not to issue a building permit for the "period **preceding**"(?) the hearing, determination or appeal, since no one can predict the future.

Page 9, Section 12 of the ordinance. Please delete the third sentence of Subsection C of Section 4606, because it is redundant with Subsection A of this Section.

Page 9, Section 12 of the ordinance. In Subsection E of Section 4606, it refers to an affidavit to be recorded with the County Recorder. What is the purpose of the affidavit? Would the affidavit state that the "Bureau recommends to refuse to issue Public Works permit for the relocation or removal of Protected Trees"? Or, does the affidavit state that the owner will not obtain a building permit to construct a building on the lot for the next 10 years from year "one" to year "ten" as described in Subsection A of this section? If this affidavit is recorded, then is there a method in which LADBS will be either given a copy of the recorded affidavit or somehow notified by the Bureau of its "final action"? Please remove the last sentence of this subsection, since the issuance of the building permit is already mentioned in Subsection A of this Section.

Page 10, Section 13 of the ordinance. To effectively enforce this provision a "Tree expert" such as someone from the Bureau of Street Services, Street Trees should do the verification inspection. Please replace the word "Department" with "Bureau of Street Services, Department of Public Works" in the third sentence of Item 5 of Section 96.303 and modify the last sentence by removing the phrase "as specified in Section 98.0412 (a) of the Municipal Code" and "by the Department" so the sentence will read:

> A fee shall be collected for any inspection required to verify the declaration.

Please contact me at (213) 482-0440 or Steve Ikkanda at (213) 482-6715 should you have any questions regarding this letter.

ANDREW A. ADELMAN, P.E.
General Manager



NICOLINO G. DELLI QUADRI, Chief
Engineering Bureau

NDQ:SSI

C: Keith Pritsker, Deputy City Attorney
Andrew Adelman
Ray Chan

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LOS ANGELES, CA 90012

ANDREW A. ADELMAN, P.E.
GENERAL MANAGER

RAYMOND CHAN
EXECUTIVE OFFICER

June 28, 2005

Honorable Rockard J. Delgadillo
City Attorney
7th Floor, City Hall East

Attention: Keith W. Pritsker
Deputy City Attorney

Council File Numbers: 03-1459 and 03-1459-S1

RULE 38 RESPONSE FOR A DRAFT ORDINANCE AMENDING OAK TREE CODE PROVISIONS

The latest version of the draft ordinance submitted for review (second review) does not include the comments made by the Department of Building and Safety in response (first review) to the City Attorney's letter of August 11, 2004, and therefore, pursuant to Council Rule 38, the Department of Building and Safety (LADBS) has again reviewed the proposed draft ordinance amending the oak tree code provisions and have the following comments:

Page 1, Section 1 of the ordinance. Currently, the permit application does not have a "reverse side" where a plot plan is shown. Please remove the phrase "on the reverse side of any" and replace it with "attached to the" since the automation of building permits, all plot plans are now attached to the building permits.

Page 1, Section 1 of the ordinance. It is not clear how the City's Chief Forester (George Gonzalez) is to notify the Department of Building and Safety prior to the issuance of a Certificate of Occupancy. To be assured that all the conditions set forth by the Advisory Agency are met and that the Department of Building and Safety is able to issue the Certificate of Occupancy, please replace the last sentence of the paragraph in Subsection 12 of Section 12.21 A with the following procedure:

> A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtain from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the

JUL 0 5 2005
PLAN & LAND USE MGT.

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER

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BY _____ DEPUTY

construction, a written document signed certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Page 2, Section 3 of the ordinance. The proper name in accordance with the California Department of Pesticide Regulation is "Agricultural Pest Control Advisor," therefore, please add the word "control" between the words "pest" and "advisor" so that, the definition of the term "Tree Expert" reads: "A person ....who holds a valid California license as an Agricultural Pest Control Advisor or ..."

Page 2, Section 5 of the ordinance. For clarity, since both terms are used in this subsection, please add the word "removed" to the second sentence of the first paragraph, so that it reads:

> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 2, Section 5 of the ordinance. The title of the first numbered paragraph "Required Determinations" of Subsection R should be in bold text.

Page 3, Section 5 of the ordinance. Please replace the upper case (I) with lower case (i) in two places on this page and fix the format of the first (i) paragraph on the page to be consistent with the other paragraphs.

Page 3, Section 5 of the ordinance. Items (i), (ii) and (iii) of Subdivision 1 (a) of Subsection R of Section 17.05 refers to "effective date of this Code Section." Please clarify the "effective date" between the effective date of the ordinance of 6/14/62, which added the Code Section 17.05, and the effective date of the ordinance of 4/12/80, which added the Subsection R of Section 17.05 (regarding oak trees). In either case, you may want to replace the term "effective date of this Code Section" with one of the dates, so long as the intent is clear.

Page 3, Subdivision 1 (b) of Section 5 of the ordinance. The first paragraph refers to "The removal of the protected tree would not result in an undesirable, irreversible soil erosion ...which cannot be mitigated to the satisfaction of the City..." It is not clear as to who in the "City" needs to be satisfied. Is there a specific department of the City? Chief Forester? Inspector from LADBS? Please indicate the intent, by specifying who in the "City" needs to be satisfied.

Page 4, Subdivision 3 of Section 5 of the ordinance. Is the word "accept" the correct term? What is the intent of the phrase "accept as to Subsection R1(b) (iii) above;" mean? Is the intent to keep the existing protected tree where it is if it is a Historical Monument, unless the tree "is in danger of falling due to an existing and irreversible condition"? If so, than please reword the sentence to convey the intent.

Page 4, Subdivision 3 of Section 5 of the ordinance. Please explain the difference between a protected tree "officially designated as an Historical Monument" (Subsection R3) versus a protected tree "subject to historical preservation requirements" (Subsection R1)? Please explain the logic between the first sentence of Subsections R1 and R3, these two subsections seems to

contradict each other.

Page 4, Subdivision 4(a) of Section 5 of the ordinance. The property is to replace one protected tree with "at least two protected trees..." The definition of the term "protected tree" states in part "...native tree species which measures four inches or more ...four and one-half feet above the ground..." and the second sentence states, "Each replacement tree shall be ...one inch or more in diameter at a point one foot above the base..."seem to be in conflict.

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Subsections. The changes are shown in underline/strikeout format (underline text is new language and strikeout shows text to be removed).

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The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

D. The applicant or permittee may appeal to the Board of Public Works any determination ~~recommendation~~ by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination ~~recommendation~~ as provided for in Subsection C above. Further, that any action by the Department of Building and Safety resulting from any of the provision of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

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> A fee shall be collected for any inspection required to verify the declaration.

Please contact me at (213) 482-0440 or Steve Ikkanda at (213) 482-6715 should you have any questions regarding this letter.

ANDREW A. ADELMAN, P.E.
General Manager

NICOLINO G. DELLI QUADRI, Chief
Engineering Bureau

NDQ:SSI

C: City Council
Andrew Adelman
Ray Chan

CF 03-1459

Cheryl Rietveld
281 Wells Lane
West Hills CA 91304

June 14, 2005

Michael O'Brien
Department of City Planning
201 N. Figueroa Street
4th Floor
Los Angeles CA 90012

Dear Mr. O'Brien,

I was just writing to say that I support the proposed amendment of the Oak Tree Ordinance. I truly believe that we are not doing a good enough job protecting these amazing trees. Way too often I see the destruction and removal of these oak trees and there seems to be little, if any, retribution from the offender. We definitely need stronger laws and enforcement tools.

Sincerely,

Cheryl Rietveld

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R04-0219

MAY 10 2004

REPORT RE:

AN ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES.

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BY _____
DEPUTY

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File No.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees. The Departments of Building and Safety, Planning, Public Works and Environmental Affairs have received copies of this ordinance and will be providing their comments directly to you.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

Terree A. Bowers

TERREE A. BOWERS
Chief Deputy City Attorney

PLAN & LAND USE MGT.

Enclosure
102157

MAY 9 - 2004

ORDINANCE NO. _____

An Ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Article 2 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 12.21A.12. to read:

12. **Protected Tree Relocation and Replacement.**

All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan shown on the reverse side of any building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy will not be issued unless the conditions set forth by the Advisory Agency relative to protected trees are met.

Sec. 2. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by deleting the definition of "Oak Tree" in Section 17.02 and adding the following definition:

Protected Tree - Any of the following Southern California native tree species which measures eight inches or more in diameter, four and one-half feet above the ground level at the base of the tree:

a. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

b. Southern California Black Walnut (Juglans californica var. californica)

c. Western Sycamore (Platanus racemosa)

d. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

old and revised 6-21-05

Sec. 3. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.05H.7. to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 4. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.05R to read:

R. Protected Tree Regulations.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of this Code Section; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and

pursuant thereto the oak tree's removal would be permissible; or (Phrase Amended by Ord. No. 173,268, Eff. 7/1/00, Oper. 7/1/00.)

(iii) A building permit has been issued prior to the effective date of this Code Section, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition; or

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of said tree; or

(v) It has no apparent aesthetic value which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at said location.

2. Supplemental Authority. In the event the Advisory Agency determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree.

Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, accept as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two protected trees of a variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section

17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency and shall also consult the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 5. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.06B.13. to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 6. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.06C. to read:

C. Protected Tree Reports.

No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 7. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 8. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.01 to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures eight inches or more in diameter, four and one-half feet above the ground level at the base of the tree:

a. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

b. Southern California Black Walnut (Juglans californica var. californica)

c. Western Sycamore (Platanus racemosa)

d. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 9. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.02 to read:

SEC. 46.02. REQUIREMENTS FOR PERMITS.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise

provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or the Board of Zoning Appeals prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone; or

4. The presence of the protected tree interferes with utility services and roadways within or without the subject property and the only reasonable alternative to the interference is the removal of the tree; or

5. It has no apparent aesthetic value which will contribute to the appearance and design of the surrounding properties, or is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at said location.

(c) Additional Authority. The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal or relocation of five or less protected trees. Any permit for the removal or relocation of more than five such trees shall require an additional fee for each additional unit of five or fewer trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I, 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 11. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by adding Section 46.06 thereto, said Section to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

A. The Bureau of Street Services shall have the authority, after notice and hearing, to withhold issuance of a building permit for a period of time up to 10 years and to revoke any permit issued, unless expired, for which rights have not been obtained with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who is good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection B of this Section.

B. The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder. No building permit shall be issued during the period preceding the hearing and determination by the Department and any appeal therefrom.

C. The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. In conducting such hearing, the procedural rules set forth in Division 3 of Article 8 of Chapter IX of the Los Angeles Municipal Code shall apply. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall determine the length of time the issuance of a building permit shall be withheld. I so determining, the Bureau shall consider the following factors: the

number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days thereafter.

D. The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit. The appeal must be filed with the Board within 30 days of the date of mailing of the notice of determination as provided for in Subsection C above.

E. Any final determination of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall beset forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 12. Section 96.303(5) of the Los Angeles Municipal Code is hereby amended to read as follows:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department to verify such information by entry upon the subject property. A fee, as specified in Section 98.0412(a) of the Municipal Code shall be collected by the Department for any inspection required to verify the declaration.

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Sec. 13. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

J. MICHAEL CAREY, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By _____
KEITH W. PRITSKER
Deputy City Attorney

Date: May 6, 2004

File No. _____

101794

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0212

JUN 21 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background:

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

JUN 23 2005
PLAN & LAND USE MGT.

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CITY CLERK

BY _____ DEPUTY

Summary of Ordinance Provisions:

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the municipal code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral:

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their early comments were incorporated into the language of the current draft ordinance. They have been asked by this office's most recent letter to make their comments directly to the Council's Planning and Land Use Committee.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By
DAVID MICHAELSON
Chief Assistant City Attorney

DM:KP:fa (#105209)

Transmittal

ORDINANCE NO. _____

An Ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Article 2 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 12.21A.12. to read:

12. **Protected Tree Relocation and Replacement.**

All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan shown on the reverse side of any building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy will not be issued unless the conditions set forth by the Advisory Agency relative to protected trees are met.

Sec. 2. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by deleting the definition of "Oak Tree" in Section 17.02 and adding the following definition:

Protected Tree - Any of the following Southern California native tree species which measures eight inches or more in diameter, four and one-half feet above the ground level at the base of the tree:

a. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

b. Southern California Black Walnut (Juglans californica var. californica)

c. Western Sycamore (Platanus racemosa)

d. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.05H.7. to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 4. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.05R to read:

R. Protected Tree Regulations.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of this Code Section; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and

pursuant thereto the oak tree's removal would be permissible; or (Phrase Amended by Ord. No. 173,268, Eff. 7/1/00, Oper. 7/1/00.)

(iii) A building permit has been issued prior to the effective date of this Code Section, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition; or

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of said tree; or

(v) It has no apparent aesthetic value which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at said location.

2. Supplemental Authority. In the event the Advisory Agency determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree.

Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, accept as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two protected trees of a variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section

17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency and shall also consult the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 5. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.06B.13. to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 6. Article 7 of Chapter I of the Los Angeles Municipal Code is hereby amended by modifying Section 17.06C. to read:

C. Protected Tree Reports.

No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 7. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 8. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.01 to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures eight inches or more in diameter, four and one-half feet above the ground level at the base of the tree:

a. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

b. Southern California Black Walnut (Juglans californica var. californica)

c. Western Sycamore (Platanus racemosa)

d. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 9. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.02 to read:

SEC. 46.02. REQUIREMENTS FOR PERMITS.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise

provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or the Board of Zoning Appeals prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone; or

4. The presence of the protected tree interferes with utility services and roadways within or without the subject property and the only reasonable alternative to the interference is the removal of the tree; or

5. It has no apparent aesthetic value which will contribute to the appearance and design of the surrounding properties, or is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at said location.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal or relocation of five or less protected trees. Any permit for the removal or relocation of more than five such trees shall require an additional fee for each additional unit of five or fewer trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I, 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 11. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by adding Section 46.06 thereto, said Section to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

A. The Bureau of Street Services shall have the authority, after notice and hearing, to withhold issuance of a building permit for a period of time up to 10 years and to revoke any permit issued, unless expired, for which rights have not been obtained with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who is good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection B of this Section.

B. The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder. No building permit shall be issued during the period preceding the hearing and determination by the Department and any appeal therefrom.

C. The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. In conducting such hearing, the procedural rules set forth in Division 3 of Article 8 of Chapter IX of the Los Angeles Municipal Code shall apply. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall determine the length of time the issuance of a building permit shall be withheld. I so determining, the Bureau shall consider the following factors: the

number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days thereafter.

D. The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit. The appeal must be filed with the Board within 30 days of the date of mailing of the notice of determination as provided for in Subsection C above.

E. Any final determination of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall beset forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 12. Section 96.303(5) of the Los Angeles Municipal Code is hereby amended to read as follows:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department to verify such information by entry upon the subject property. A fee, as specified in Section 98.0412(a) of the Municipal Code shall be collected by the Department for any inspection required to verify the declaration.

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Sec. 13. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

J. MICHAEL CAREY, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: May 6, 2004

File No. _____

101794

(10)

03-2496
CD 9

Motion (Perry - Parks) requesting the Planning and Land Use Management Committee to review the plans for a rooftop helistop or helicopter landing pad for the new California Department of Transportation (Caltrans) District 7 Headquarters at the corner of First Street and Main Street, and make recommendations for City Council approval of such plans, by Resolution, as required under Section 21661.5 of the California Public Utilities Code.

Fiscal Impact Statement Submitted: No

DISPOSITION _____

(11)

04-0390
CD 15

Letter from Councilmember Hahn requesting that Motion (Hahn - Reyes), referred to the Planning and Land Use Management Committee on March 2, 2004, be amended to request the Planning Department with the assistance of the Transportation Department to prepare a downgrade of the street classification for 7th Street from Harbor Boulevard to Pacific Avenue, from a secondary highway to a collector street on the General Plan and on the San Pedro Community Plan.

Fiscal Impact Statement Submitted: No

DISPOSITION _____

(12)

CONTINUED FROM 11-5-03 MEETING

03-1459

Reports from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), and Motion (LaBonge - Garcetti) directing the Departments of Public Works, City Planning and Environmental Affairs, to work with the City Attorney's Office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that are common ecosystems while maintaining a more diverse species base.

Fiscal Impact Statement Submitted: No

DISPOSITION cont 30 days to address issues raised in Cmte.

(13)

CONTINUED FROM 11-5-03 MEETING

03-1459-S1

Report from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), and Motion (Garcetti - LaBonge) requesting the Building and Safety Department with the assistance of the City Attorney and the Department of Public Works to report to the Planning and Land Use Management Committee on possible draft revisions to the Oak Protection Ordinance (No.153478), that will change the penalties for violations of its provisions to civil penalties, that might include withholding of development permits for periods of time.

Fiscal Impact Statement Submitted: No

DISPOSITION _____

(7)

TIME LIMIT AND LAST DAY FOR COUNCIL ACTION: 6-2-04

04-0414
APCNV 2002-5233
ZC
CD 7

Report from the NVAPC and Ordinance effecting a zone change, incident to Tentative Tract 53836, from RA-1 to (T)(Q)RS-1 for the proposed subdivision of a maximum new 7-lot single-family residential development on a 2.34 net acre site located at 11476 W. Kagel Canyon Street.

Applicant: Nick Eftekhari

Commission Vote: 3-0 MND

Fiscal Impact Statement Submitted: Yes, by Commission

DISPOSITION

(8)

TIME LIMIT FILE: 6-14-04; LAST DAY FOR COUNCIL ACTION: 6-11-04

04-0487
APCNV 2002-3986
ZC ZAA

Report from the NVAPC and Ordinance effecting a zone change from RA-1 to (T)RS-1 and (T)(Q)RD4-1, to facilitate the proposed construction of three condominiums with eight parking spaces on the rear lot, and to allow the second lot to retain a single-family residence with a reduced rear yard setback in lieu of the required 20-feet in the RS-1 zone for property located at 9136 North Willis Avenue.

Applicant: Adolfo and Graciela Altuve

Commission Vote: 3-0 MND

Fiscal Impact Statement Submitted: Yes, by Commission

DISPOSITION

(9)

CONTINUED FROM 10-29-03 MEETING

03-0238

Reports from the City Planning Commission, Chief Zoning Administrator and proposed Ordinance amending Section 12.21 and 12.24 of the Los Angeles Municipal Code to provide height limitations for retaining walls in hillside areas, in response to Motion (Weiss - Reyes), requesting that the Planning Department, City Attorney, Department of Building and Safety, and the Office of the Chief Legislative Analyst, along with Council Offices representing hillside areas, form a working group to develop recommendations for legislation to limit the height, size, and visual impact of retaining walls and to present it findings to the Planning and Land Use Management Committee within sixty days.

Fiscal Impact Statement Submitted: No

DISPOSITION

12

CITY OF LOS ANGELES
CALIFORNIA

SILVER LAKE NEIGHBORHOOD COUNCIL
OFFICERS

Jason Lyon, Rusty Millar
CO-CHAIRS
Salvador Sanchez
VICE-CHAIR
Charles R. Wiggington
TREASURER
Martin Hittelman
SECRETARY

SILVER LAKE NEIGHBORHOOD COUNCIL
c/o Dept. of Neighborhood Empowerment
3516 N. Broadway
Los Angeles, CA 90031
TELEPHONE (866) LA-HELPS
FAX: (323) 224-2312

SLNC TELEPHONE: (323) 663-3998
FAX: (323) 663-3311

Silver Lake Neighborhood Council

May 5, 2004

Community Forest Advisory Committee
c/o Chairperson, Clare Mater Kenyon
505 W. Avenue 44
Los Angeles, CA 90065

Dear Chairperson Kenyon:

It has come to our attention that your committee has developed a plan to revise the City of Los Angeles' Oak Tree Ordinance. We understand that such a revision would increase the number and types of trees to be protected and would include Walnut, Sycamore and Bay trees, also native to Southern California.

The Silver Lake Neighborhood Council would like to offer our support for this plan and urge its passage as soon as possible to better protect these native trees in a time of rampant development.

Very truly yours,

Jason Lyon, Co-Chair Rusty Millar, Co-Chair Martin Hittelman, Secretary

Silver Lake Neighborhood Council Governing Board

cc: Council Member Tom LaBonge, 4th Council District
Council Member Eric Garcetti, 13th Council District

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JAMES K. HAHN
MAYOR

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PUBLIC WORKS
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STREET SERVICES
WILLIAM A. ROBERTSON, DIRECTOR
600 SOUTH SPRING STREET
SUITE 1200
LOS ANGELES, CA 90014

REQUESTS FOR SERVICE (213) 473-8410
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#12

January 30, 2004

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Los Angeles City Council
Room 410, City Hall
Los Angeles, CA 90012

Attn: Barbara Greaves, Office of the City Clerk

CF 03-1459 AND 03-1459-S1– PROPOSED AMENDMENTS TO THE OAK TREE ORDINANCE (ORDINANCE 153,478) - REVISED

Dear Councilmember Reyes:

RECOMMENDATIONS

In response to motions 03-1459 (LaBonge/Garcetti) and 03-1459-S1 (Garcetti/LaBonge), the Department of Public Works, Environmental Affairs Department, and Community Forestry Advisory Committee recommend that the City Council instruct the City Attorney to prepare the following revisions to the City's Oak Tree Ordinance No. 153,478 in order to more adequately protect our remnant native woodlands, one of the City's most valuable natural resources. The recommended revisions are as follows:

1. Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Protected Trees".

2. Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

3. Require a permit for protected tree removal/relocation on all property within the City boundaries regardless of property lot size.

4. Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at four and one-half feet above ground level.

PLAN & LAND USE MGT.
FEB 12 2004

5. Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

6. Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

7. Increase the monetary fine for violating the ordinance.

8. Include civil penalties, such as prohibiting development of property if protected trees are removed without a permit.

9. Require a tree pruning permit for all protected tree pruning in the City of Los Angeles.

FISCAL IMPACT STATEMENT

The number of permits that will be required to be issued will increase due to the larger number of trees that are protected and the need for a permit to be issued for all protected trees to be pruned. As there is a fee for the issuance of these permits, the program will be self-supporting and have no impact to the General Fund.

DISCUSSION

The City of Los Angeles enacted the Oak tree ordinance (Ordinance 153,478) in 1980 to protect its remaining native Oak tree woodlands. In spite of this ordinance, the City continues to suffer a decline to its native Oak tree woodlands due to development, disease, and other factors. With even fewer native trees and woodlands remaining, the time has come to strengthen the oak tree ordinance, giving protection to a wider range of native trees as well as smaller trees that have not yet reached maturity. A stronger, more inclusive ordinance would give the Department of Public Works greater abilities to protect our native trees and preserve this important part of the City's natural history.

Staff from the Department of Public Works' Street Tree Division and the Departments of Environmental Affairs and City Planning met with representatives from the Community Forest Advisory Committee in January and February of 2003 to discuss the current tree protection ordinances and how they could be revised to better protect and preserve the City's remaining native trees and woodlands.

Item #1: Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Protected Trees".

Oaks are not the only native trees that inhabit the City of Los Angeles. Other Southern California native tree species include the Southern California Black Walnut, Western Sycamore, and California Bay. These species are currently without any legal protection from development and other urban pressures even though they also are an important part of the City's natural history. Urbanization is considered such a severe threat to Southern California walnut woodlands that the State of California

and the Nature Conservancy are working together to acquire vegetative/habitat data on these woodlands, and the California Native Plant Society is evaluating the Southern California Black Walnut for inclusion on their watch list for plants with limited distribution. The Western Sycamore and California Bay both occur in riparian habitats, which are key habitats for reducing the impact of upland sources of pollution to water bodies and as wildlife habitats. Protection of these additional species of native trees is warranted, and their inclusion necessitates the change of the ordinance title to "Protected Trees" to more properly represent the scope and contents of the newly revised ordinance.

Item #2: Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

The definition of a tree expert currently includes only someone who holds a valid California license as an agricultural pest control advisor or landscape architect. Although there are individuals in both categories that have the necessary expertise to assess oak and other trees and prepare reports on them, Registered Consulting Arborists (American Society of Consulting Arborists) are also very well qualified to determine the health and condition of trees and should, therefore, be included in the definition of tree expert.

Item #3: Require a permit for protected tree removal/relocation on all property within the City boundaries regardless of property lot size.

The current Oak Tree Ordinance applies only to trees located on lots larger than one acre in size. This severely limits the applicability of this ordinance due to the highly subdivided and built-out nature of our City. Although new developments generally fall into this category of lot size, many of these trees are on smaller lots, and these native trees should be protected regardless of the size of the lot on which they live.

Item #4: Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at four and one-half feet above ground level.

The definition of an oak tree in the current City ordinance includes only those specimens whose trunks measure eight inches in diameter four and one-half feet above ground level. Some of the other native trees, specifically the Southern California Black Walnut, exhibit different growth habits and quite often have multiple trunks rather than a single one. To ensure that the ordinance protects these trees as well as smaller single-trunk trees, we recommend that the tree definition be changed to include all specimens that have a trunk or trunks that cumulatively measure two inches in diameter at a level of four and one-half feet above the ground.

Item #5: Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

When oak trees are allowed to be removed under the current ordinance, they are replaced on a one-for-one basis. This leaves a deficit in the amount of benefits that the City obtains from this tree for many years as oaks are slow-growing trees and the environmental benefits afforded by a mature tree are much greater than those of a small tree. Therefore, the ordinance should be revised to take a more balanced approach based on a calculation utilizing a trunk volume or canopy coverage formula. For example, to mitigate the removal of a tree with an eight-inch diameter trunk, eight trees each with a trunk diameter of one inch would be required. For Southern California Black Walnuts planted as seeds, the trunk diameter of the replacement tree will be calculated as that of a five year old tree.

Item #6: Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

Replacement trees allowed under the current ordinance must be a minimum of 15-gallons in size. Although this is a good approach for many species, some of the native species, especially the Southern California Black Walnut, do not grow well in nursery containers. Because of this, they are generally not available in nursery-size containers and even if they were, the individuals would be unlikely to mature to healthy trees due to improperly developed roots. To account for these growth requirements, the ordinance needs to allow for smaller trees, or in the case of the Southern California Black Walnut, tree seeds to be used as replacements if this would afford a greater chance of long-term survival than the use of larger size trees. Benefits derive from these replacement trees only if they survive long term. To increase the probability of survival, replacement trees would need to be maintained and monitored for an establishment period of at least five years. Any replacement trees failing to survive this five-year establishment period should be replaced. Survival of sprouts from seeds and small stock may require frequent monitoring and cages or other devices to facilitate long-term survival.

Item #7: Increase the monetary fine for violating the ordinance.

Item #8: Include civil penalties, such as prohibiting development of property if protected trees are removed without a permit.

The current ordinance lacks adequate enforcement mechanisms. Often, a developer will pay the small fines involved in illegally removing an oak tree as this is economically advantageous over preserving the trees. There is also little to prevent a developer's "scorched earth" approach of removing everything from a property prior to applying for development permits so they can then say that nothing currently exists on the property at the time of application. By increasing the monetary fine and including civil penalties, such as prohibiting development of property by withholding building and occupancy permits for a specified period of time if a "Protected Tree" is removed without a permit, the trees will be better protected.

Item #9: Require a tree pruning permit for all protected tree pruning in the City of Los Angeles.

The final recommended change would require a tree pruning permit for all protected tree pruning in the City of Los Angeles regardless of where that tree is located. This will help to ensure that oaks are trimmed at the proper time of year, which is during the dry season from mid- to late-summer, according to ISA standards, by properly trained and reputable tree trimmers. This will lead to healthier, longer-lived trees, which will provide greater environmental benefits to the City. This protection of all of the protected trees within the City will help to preserve the last remnants of our native woodlands.

If you have any questions, please contact George Gonzalez, Chief Forester, Street Tree Division, at (213) 485-5675 or Melinda Bartlett, Division Director, Water and Natural Resources Division at (213) 978-0858.

Sincerely,

William A. Robertson, Director
Bureau of Street Services

Detrich B. Allen, General Manager
Environmental Affairs Department

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January 13, 2004

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Los Angeles City Council
Room 410, City Hall
Los Angeles, CA 90012

Attn: Barbara Greaves, Office of the City Clerk

SUBJECT: CF:03-1459 – PROPOSED AMENDMENTS TO THE OAK TREE ORDINANCE (ORDINANCE 153.478)

RECOMMENDATIONS

The Department of Public Works, Environmental Affairs Department, and Community Forest Advisory Committee recommend that the City Council instruct the City Attorney to prepare revisions to the City's Oak Tree Ordinance in order to more adequately protect our remnant native woodlands, one of the City's most valuable natural resources. The recommended revisions are as follows:

Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Preserved Trees".

Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

Require a permit for preserved tree removal/relocation on all property within the City boundaries regardless of property lot size.

PLAN & LAND USE MGT.

JAN 14 2004

Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at three and one-half feet above ground level.

Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

Increase the monetary fine for violating the ordinance.

Include civil penalties, such as prohibiting development of property if Oak trees are removed without a permit.

Require a tree pruning permit for all Oak tree pruning in the City of Los Angeles.

FISCAL IMPACT STATEMENT

The number of permits that will be required to be issued will increase due to the larger number of trees that are protected and the need for a permit to be issued for all oak trees to be pruned. As there is a fee for the issuance of these permits, the program will be self-supporting and have no impact to the General Fund.

DISCUSSION

The City of Los Angeles enacted the Oak tree ordinance (Ordinance 153,478) in 1980 to protect its remaining native Oak tree woodlands. In spite of this ordinance, the City continues to suffer a decline to its native Oak tree woodlands due to development, disease, and other factors. With even fewer native trees and woodlands remaining, the time has come to strengthen the oak tree ordinance, giving protection to a wider range of native trees as well as smaller trees that have not yet reached maturity. A stronger, more inclusive ordinance would give the Department of Public Works greater abilities to protect our native trees and preserve this important part of the City's natural history.

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The definition of a tree expert currently includes only someone who holds a valid California license as an agricultural pest control advisor or landscape architect. Although there are individuals in both categories that have the necessary expertise to assess oak trees and prepare oak tree reports, Registered Consulting Arborists (American Society of Consulting Arborists) are most qualified to determine the health and condition of trees and should, therefore, be included in the definition of tree expert.

Item #3: Require a permit for preserved tree removal/relocation on all property within the City boundaries regardless of property lot size.

The current Oak Tree Ordinance applies only to trees located on lots larger than one acre in size. This severely limits the applicability of this ordinance due to the highly urbanized and fragmented nature of our City. Although new developments generally fall into this category of lot size, all remaining native trees should be protected regardless of the size of the lot on which they live.

Item #4: Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at three and one-half feet above ground level.

The current definition of an oak tree includes only those specimens whose trunks measure eight inches in diameter four and one-half feet above ground level. Some of the other native trees, specifically the Southern California Black Walnut, exhibit different growth habits and quite often have multiple trunks rather than a single one. To ensure that the ordinance protects these trees as well as smaller single-trunk trees, we recommend that the tree definitive be changed to include all specimens that have a trunk or trunks that cumulatively measure two inches at a level of three and one-half feet above the ground.

Item #5: Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

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Replacement trees allowed under the current ordinance must be a minimum of 15-gallons in size. Although this is a good approach for many species, some of the native species do not grow well in nursery containers. Because of this, they are generally not available in nursery-size containers and even if they were, the individuals would be unlikely to mature to healthy trees due to improperly developed roots.

To account for these growth requirements, the ordinance needs to allow for smaller trees, or in some cases tree seeds, to be used as replacements if this would afford a greater chance of long-term survival than the use of larger size trees.

Item #7: Increase the monetary fine for violating the ordinance.
Item #8: Include civil penalties, such as prohibiting development of property if Oak trees are removed without a permit.

The current ordinance lacks adequate enforcement mechanisms. Often, a developer will pay the small fines involved in illegally removing an oak tree as this is economically advantageous over preserving the trees. By increasing the monetary fine and including civil penalties, such as prohibiting development of property if Oak trees are removed without a permit, the preserved trees will be better protected.

Item #9: Require a tree pruning permit for all Oak tree pruning in the City of Los Angeles.

The final recommended change would require a tree pruning permit for all Oak tree pruning in the City of Los Angeles regardless of where that tree is located. This will help to ensure that oaks are trimmed at the proper time of year, according to ISA standards, by properly trained and reputable tree trimmers. This protection of all of the oaks within the City will help to preserve the last remnants of our native woodlands.

If you have any questions, please contact the undersigned, or George Gonzalez, Chief Forester, Street Tree Division, at (213) 485-5675.

Sincerely,

WILLIAM A. ROBERTSON, Director
Bureau of Street Services

WAR:RL:rl:pyp

S:Documents/Plum Oak Tree Response

J. MICHAEL CAREY
City Clerk

FRANK T. MARTINEZ
Executive Officer

When making inquiries relative to this matter refer to File No.

CF 03-1459

TY OF LOS ANGELE.
CALIFORNIA

JAMES K. HAHN
MAYOR

Office of the
CITY CLERK
Council and Public Services
Room 395, City Hall
Los Angeles, CA 90012
Council File Information - (213) 978-1043
General Information - (213) 978-1133
Fax: (213) 978-1040

HELEN GINSBURG
Chief, Council and Public Services Division

November 13, 2003

Con Howe, Director of Planning
Planning Department

REQUEST FOR APPROPRIATE REVISIONS TO THE CITY'S OAK TREE ORDINANCES

At its meeting held November 5, 2003, the Chair of the Planning and Land Use Management Committee considered the attached Motion (LaBonge - Garcetti) directing the Department of Public Works and the Planning and Environmental Affairs Departments, in conjunction with the City Attorney's Office, to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that are common ecosystems while maintaining a more diverse species base.

Please transmit your report to the Planning and Land Use Management Committee in 45 days, in care of the City Clerk's Office, Room 395, City Hall.

Barbara Greaves
Legislative Assistant
Planning and Land Use
Management Committee, 213-978-1068

attachment:

cc: Department of Public Works
Bureau of Street Services
William A. Robertson, Director
Department of Environmental Affairs
Detrich B, Allen, General Manager
City Attorney,
Attn: Jeri Burge

#031459 ltr.wpd

PLANNING and LAND USE MGT.

JUL 08 2003

MOTION

The City of Los Angeles continues to suffer a decrease in its Oak tree and native tree species woodland habitat due to disease, development and other factors. The City's Oak Tree ordinances were first adopted on April 12, 1980 in order to establish clear standards for the preservation of these beautiful and culturally significant living monuments.

There are various other provisions that require updating. For example, the current tree replacement requirement, a minimum fifteen gallon Oak tree replacement per removal, does not adequately mitigate the loss of Oak tree woodlands. Additionally, the current definition of "Tree Expert," a licensed pest control advisor or landscape architect, needs to be updated to allow for the most knowledgeable Oak tree professionals and Consulting Arborists to be included.

Preservation of Oak trees targets signature trees of only one of the City's native plant communities, and other species should be considered for enhanced protections along the lines of the City's Oak Tree ordinances.

Regulations to preserve trees have significantly changed and progressed, both in California and across the country, due to increased scientific knowledge of trees and public awareness of the importance of native tree species. An opportunity exists to update City laws pertaining to Oak trees to better protect our remaining stock of these historic treasures to ensure that future generations can take part in their legacy.

I THEREFORE MOVE that the departments of Public Works, City Planning and Environmental Affairs be instructed to work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that share common ecosystems while maintaining a more diverse species base.

PRESENTED BY _____
TOM LABONGE
Councilmember, 4th District

SECONDED BY _____
ERIC GARCETTI
Councilmember, 13th District

July 8, 2003

am

CITY OF LOS ANGELES SPEAKER CARD

Date: 5/12/04

Council File No., Agenda Item, or Case No.: 12 & 13

I wish to speak before the Planning and Land Use Management Committee
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (X) For proposal ( ) Against proposal ( ) General comments

Name: Dr. Travis Longcore

Business or Organization Affiliation: The Urban Wildlands Group

Address: P.O. Box 24020 Los Angeles, CA 90024
Street City State Zip

Business phone: 310-247-9719 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

Date: 5/13/04

Council File No., Agenda Item, or Case No.: 12, 13

I wish to speak before the PLUM Committee
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal (✓) General comments

Name: MARIANNE KING / TOM HENRY

Business or Organization Affiliation: CD3

Address: _____
Street City State Zip

Business phone: _____ Representing: COUNCILMAN ZINE

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

A 12

Date	Council File No., Agenda Item, or Case No.
	04-0390

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal ( ) General comments

Name: Scott Wilson

Business or Organization Affiliation: NET CFAC. CA.U.F.C.

Address: 4701 Olson St. L.A. CA. 90041
Street City State Zip

Business phone: 323) 255-4863 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

Date	Council File No., Agenda Item, or Case No.
5-12-04	03-1459 #2

I wish to speak before the PLUM
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal ( ) Against proposal (4) General comments

Name: GORDON MURLEY

Business or Organization Affiliation: WOODLAND HILLS HOMEOWNERS - SAN FERNANDO VALLEY FED

Address: 4128 MARED DR WOODLAND HILLS CA 91364
Street City State Zip

Business phone: (818) 346-5842 Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address:
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

PLEASE COULD YOU CALL ME AFTER MR. G. GONZALES? THANK YOU.

(12)

CITY OF LOS ANGELES SPEAKER CARD

Date: 5-12-04

Council File No., Agenda Item, or Case No.: 03-1459-S1

I wish to speak before the P.L.U.M
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? (✓) For proposal ( ) Against proposal ( ) General comments

Name: CLARE MARTER KENYON

Business or Organization Affiliation: COMMUNITY FOREST ADVISORY COMMITTEE

Address: MS 465 (Street) 200 N. SPRING ST (City) L.A. (State) CA (Zip) 90012

Business phone: _____ Representing: CFAC

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: _____ Phone #: _____

Client Address: _____
Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

CITY OF LOS ANGELES SPEAKER CARD

Date: 10/12/2004 WSP.

Council File No., Agenda Item, or Case No.: #12

I wish to speak before the Planning + Land Use Management
Name of City Agency, Department, Committee or Council

Do you wish to provide general public comment, or to speak for or against a proposal on the agenda? ( ) For proposal (•) Against proposal ( ) General comments

Name: MS. SYLVIA LYNNE HAWKINS

Business or Organization Affiliation:

Address: Street City State Zip

Business phone: Representing:

CHECK HERE IF YOU ARE A PAID SPEAKER AND PROVIDE CLIENT INFORMATION BELOW: ☐

Client Name: Phone #:

Client Address: Street City State Zip

Please see reverse of card for important information and submit this entire card to the presiding officer or chairperson.

#3+4

STATE OF CALIFORNIA--THE RESOURCES AGENCY GRAY DAVIS, Governor

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207

November 5, 2003

VIA FACSIMILE

Hon. Ed Reyes and Committee Members
Planning and Land Use Management Committee
City of Los Angeles
200 North Spring Street
Los Angeles, California 90012

Conservancy Support of Proposed Oak Tree Ordinance Revisions
Council File Nos. 03-1459 and 03-1459-S1

Dear Chairperson Reyes and Members:

The Santa Monica Mountains Conservancy is in full support of the two above referenced motions on today's Planning and Land Use Management Committee agenda (items 3 and 4). The proposed expansion of the City's Oak Tree ordinances to include other native tree species is solidly grounded both ecologically and aesthetically. The proposal to allow for the civil prosecution of violators of the Oak Protection Ordinance, including a penalty of delaying development permits, is a timely and much needed revision. Each of these proposals will result in significant, lasting benefit to the City. I can be reached at the above address and at (310) 589-3200 ext. 128. Please do not hesitate to call on our staff for any assistance in these matters.

Sincerely,

PAUL EDELMAN
Deputy Director
Natural Resources and Planning

STATE OF CALIFORNIA–THE RESOURCES AGENCY GRAY DAVIS, Governor

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200 FAX (310) 589-3207

VIA FACSIMILE

DATE: 11-5-03

TO: BARBARA GREAVES

FAX #: 213-978-1079

FROM: PAUL EDELMAN

RE: Item 3.4 PLUM Agenda 11-5-03

Number of pages to follow: 1

In case of error, please call (310) 589-3200

BG Please distribute at today's PLUM meeting. Thanks for all.

PE

This message is intended only for the use of the individual or entity to which it is addressed, and may contain information that is privileged, confidential or exempt from disclosure under applicable law. Unauthorized use, disclosure or copying is strictly prohibited. If you have received this communication in error, please immediately notify the sender.

Mulholland Scenic Parkway Design Review Board
Lynette Berg Robe, Chair
12711 Ventura Blvd., Suite 450
Studio City, California 91604
(818) 980-9964
Fax (818) 980-7141

VIA FAX

PLUM AGENDA 2, 3, 4

November 5, 2003

Planning and Land Use Management Committee:

The Honorable Ed P. Reyes, Chair
1st Council District
200 N. Spring Street, Room 410
Los Angeles, CA 90012

The Honorable Tony Cardenas
Sixth Council District
200 N. Spring Street, Room 455
Los Angeles, CA 90012

The Honorable Jack Weiss
City Council, Fifth District
Room 440
City Hall
200 North Spring Street
Los Angeles, California 90012

Re: Oak Tree Ordinance, November 5, 2003 Agenda, Items #2, # 3 and 4.

Dear Members of the Planning and Land Use Management Committee:

I am writing in regard to today's agenda and items numbers 2, 3 and 4.

The Mulholland Design Review Board is in favor of Item #4 and creating more stringent penalties for violations of the City's Oak Protection Ordinance. We have seen too many projects where the applicants come to the Board with projects where all of the oak and other native trees have mysteriously been cut down. The current penalties are too trivial to discourage such behavior. We ask you to put some real "teeth" into this ordinance in order to protect our precious oak trees. The benefits of oak trees to our hillsides are well known. The deep root systems hold the hillsides and act like giant sponges to absorb rain and runoff. They are drought tolerant and slow burning in the event of fires. Please help to save our oak trees.

I do not completely understand item # 3. On the surface, it too appears to be a good proposal. My only question would be in the way that "native tree species" is defined. The trees should be "native" to the area and ecosystem. For example, there may be some native palm trees from the desert areas, but palm trees are not native to the Santa Monica Mountains. In fact, palm trees are a prohibited tree to be planted in the Mulholland Scenic Parkway, although many exist there from prior to 1992 and from having been illegally planted since 1992. So, in drafting revisions to this ordinance, it should be emphasized that we should seek to preserve native tree species that are native to the particular ecosystem involved.

Finally, item # 2 also appears to be an excellent proposal. Water is going to become more scarce in the coming decades. Our City's Landscape Ordinance should be encouraging the use of native plants wherever possible. Projects such as the Tree People's Sun Valley project with Public Works, where trees are being planted for flood control should be encouraged and replicated all over the city. We would also be in favor of this motion.

Thank you for voting to approve these three motions.

Yours truly,

Lynette Berg Robe

Lynette Berg Robe
Chairperson, Mulholland Scenic Parkway Design Review Board

Mulholland Scenic Parkway Design Review Board

Lynette Berg Robe, Chair
12711 Ventura Blvd., Suite 450
Studio City, California 91604
(818) 980-9964
Fax (818) 980-7141
Portia1000@aol.com
September 23, 2003

George Gonzalez
Street Tree Division
Department of Public Works
10th Floor
600 S. Spring Street
Los Angeles, CA 90014

Re: Cutting of Oak Trees on 3593 Multiview Drive

Dear Mr Gonzalez:

I am writing on behalf of the Mulholland Scenic Parkway Design Review Board, asking you to prosecute the owner of 3593 Multiview Drive, Steve Hiyoshi, to the fullest extent of the law for the unlawful cutting, mutilation, and removal of oak trees on the site. The owner violated Los Angeles Municipal Code Section 4600, the Oak Tree Ordinance, and he should be held accountable.

There is no way to mitigate the damage done to the oaks trees. Even the planting of new ones in a two to one ratio will take years to reach the size of the ones removed. We ask that you urge the City Attorney to go forward and prosecute the owner. Time after time, projects come to us where "someone," but never the applicant, has cut or removed precious oak trees from the site. People continue to violate the Oak Tree Ordinance in this way because it is so easy to escape accountability. We ask that you help to make an example in this case so that future owners of hillside property will be deterred from mutilating oak trees in this manner.

Thank you for your kind assistance.

Yours truly,

Lynette Berg Robe
Chair, Mulholland Scenic Parkway Design Review Board

November 4, 2003

Los Angeles City Council

Re: Oak Tree Protection Ordinance

Dear City Representatives,

The undersigned would like to voice our strong support of implementing tougher restrictions and penalities as part of the Oak Tree Protection Ordinance. Recently in our neighborhood a developer who did not own the property at 3593 Multiview Drive, destroyed some 30 oaks, illegally, permanently scarring the land. The sale ultimately did not go through and the developer was cited for this egregious act

However, this is a loss to the city that can not be replaced. A small fine and six months in jail is a slap on the hand to someone who has done irreparable harm. This has impacted our area in many ways including opening up the hillside to possible landslide damage, diminishing the already squeezed wildlife habitat and damaging the aesthetic of our community, which is the reason we live in this part of Los Angeles.

When will the leaders of the City of Los Angeles recognize that its precious natural resources are a benefit to the community and that this type of land misuse costs more in the long run? Tougher restrictions and penalties should be levied against those with clearly no regard for its value. In addition, a developer that has demonstrated this utter lack of regard should not be licensed to practice in Los Angeles, let alone in California.

Our heritage is being threatened by those whose only motive is profit. We should not have to explain to future generations why we took no action to save what was left in the already overgrown Los Angeles area.

Thank you for your consideration.

Dorrit Ragosine
3855 Fredonia Drive
(323) 969-9822

Patricia Marlatt
3863 Fredonia Drive
(323) 874-2818

PLANNING and LAND USE MGT.

JUL 0 8 2003

MOTION

The City of Los Angeles continues to suffer a decrease in its Oak tree and native tree species woodland habitat due to disease, development and other factors. The City's Oak Tree ordinances were first adopted on April 12, 1980 in order to establish clear standards for the preservation of these beautiful and culturally significant living monuments.

There are various other provisions that require updating. For example, the current tree replacement requirement, a minimum fifteen gallon Oak tree replacement per removal, does not adequately mitigate the loss of Oak tree woodlands. Additionally, the current definition of "Tree Expert," a licensed pest control advisor or landscape architect, needs to be updated to allow for the most knowledgeable Oak tree professionals and Consulting Arborists to be included.

Preservation of Oak trees targets signature trees of only one of the City's native plant communities, and other species should be considered for enhanced protections along the lines of the City's Oak Tree ordinances.

Regulations to preserve trees have significantly changed and progressed, both in California and across the country, due to increased scientific knowledge of trees and public awareness of the importance of native tree species. An opportunity exists to update City laws pertaining to Oak trees to better protect our remaining stock of these historic treasures to ensure that future generations can take part in their legacy.

I THEREFORE MOVE that the departments of Public Works, City Planning and Environmental Affairs be instructed to work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that share common ecosystems while maintaining a more diverse species base.

PRESENTED BY _____
TOM LABONGE
Councilmember, 4th District

SECONDED BY _____
ERIC GARCETTI
Councilmember, 13th District

July 8, 2003

am

>> Back to Results | >> Search Again

File Number
82-0967

Last Changed Date
1/1/75

Title
82-0967

Initiated By
Planning

Subject
Tree Expert As Defined in **Oak Tree Ord** 153,478 SEE Old CF 77-1145

Date Received
5/26/82

Department
PLanning

File History
5-26-82 - For Ccl
5-27-82 - Ref to P&E Comt
5-28-82 - File to Finn Chrmn
6-8-82 - File to Aram
7-27-82 - P&E Comt Report Adopted Rec - Atty instructed to prepare and present **Ord** amending Sec 17 02 of LAMC **Oak Tree Ord** 153478 to also include a licensed Landscaped Architect as one qualified to sumit a Tree Report
8-2-82 - File to Atty
6-3-83 - File to Finn for **Ord** OK
6-8-83 - File to Cal Clk
6-17-83 - Atty - **Ord** adopted and findings - amdg LAMC to modify the definition contained therein for **tree** expert - general exemption approved
6-22-83 - file to Mayor for signature
6-24-83 - File in file
4-23-85 - This Days Ccl Session - Bernson - Mo - Rec that the City Atty be instructed to draft an **Ord** Amending **the Oak Tree** Protection **Ord** which will impose a fine of $1,000 and or 6 months in jail for the wanton - willful destruction of **Oak Trees** as protected in **Ord** 153478 & Disobeying of this **Ord** will result in a penalty that the property effected will have a 10 year prohibition on the issuance of a building permit for any use
4-23-85 - Motion adopted
4-26-85 - File to Atty
4-22-86 - File sent to Bd of B&S Comsnrs thru City Atty
12-21-87 - File to Atty
5-3-90 - File, **Ord**. & Atty R90 0275 transmittal re. **Ord** amending Chapter IX of LAMC to pose additional regulations relating to **preservation** of **Oak Trees** - to P&LUM (formerly P&E) Comt Clk for rept
5-23-90 - File to City Atty - Attn Henry G Morris - per P&LUM Comt Clk ltr
3-21-91 - File, **Ord** & Atty R91-0137 transmittal re **Ord** amending Chapter IX of LAMC to impose additional regulations for the **preservation** of **oak trees** to P&LUM Comt Clk
3-22-91 - File & Final **Ord** to Bernson for **Ord** OK
3-26-91 - File to Cal Clk
4-5-91 - **Ord** ADOPTED amending Chapter IX of the LAMC to impose additional regulations regarding the **preservation** of **oak trees**, including fees - Gen Exempt APPROVED
4-9-91 - File to Mayor for signature
4-15-91 - File to P&LUM Comt Clk OK
4-17-91 - File in files
ORD
166905 (4-5-91 Adopted, 5-18-91 - Effective)

>> Back to Results | >> Search Again

CF 03-1459
Sylva Blackstone
1867 North Avenue 51
Los Angeles, CA 90042

CF 03-1459
Florence Blecher
3310 Adiva Dr.
Los Angeles, CA 90008

CF 03-1459
Joan Luchs
3309 Carse Dr
Los Angeles, CA 90068

CF 03-1459
Peter Lassen
1448 N. Boylston St.
Los Angeles, CA 90012

CF 03-1459
Jim McQuiston
6212 Yucca St.
Los Angeles, CA 90018

CF 03-1459
John Quigley
16321 Pacific Coast Hwy., #118
Los Angeles, CA 90272

MAILED 5-12-04 PELLUM
AGENDA ON 5-7
mp (6)

CF 03-1459
Jerome Buckmelter Assoc.
23534 Aetna Street
Woodland Hills, CA 91367

1 2

CITY OF LOS ANGELES
CALIFORNIA

SILVER LAKE NEIGHBORHOOD COUNCIL
OFFICERS

Jason Lyon, Rusty Millar
CO-CHAIRS
Salvador Sanchez
VICE-CHAIR
Charles R. Wiggington
TREASURER
Martin Hittelman
SECRETARY

SILVER LAKE NEIGHBORHOOD COUNCIL
c/o Dept. of Neighborhood Empowerment
3516 N. Broadway
Los Angeles, CA 90031
TELEPHONE: (866) LA-HELPS
FAX: (323) 224-2312
SLNC TELEPHONE: (323) 663-3996
FAX: (323) 663-3311

Silver Lake Neighborhood Council

May 5, 2004

Community Forest Advisory Committee
c/o Chairperson, Clare Mater Kenyon
505 W. Avenue 44
Los Angeles, CA 90065

Dear Chairperson Kenyon:

It has come to our attention that your committee has developed a plan to revise the City of Los Angeles' Oak Tree Ordinance. We understand that such a revision would increase the number and types of trees to be protected and would include Walnut, Sycamore and Bay trees, also native to Southern California.

The Silver Lake Neighborhood Council would like to offer our support for this plan and urge its passage as soon as possible to better protect these native trees in a time of rampant development.

Very truly yours,

Jason Lyon, Co-Chair Rusty Millar, Co-Chair Martin Hittelman, Secretary

Silver Lake Neighborhood Council Governing Board

cc: Council Member Tom LaBonge, 4th Council District
Council Member Eric Garcetti, 13th Council District

#3+4

STATE OF CALIFORNIA--THE RESOURCES AGENCY GRAY DAVIS, Governor

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207

November 5, 2003

VIA FACSIMILE

Hon. Ed Reyes and Committee Members
Planning and Land Use Management Committee
City of Los Angeles
200 North Spring Street
Los Angeles, California 90012

Conservancy Support of Proposed Oak Tree Ordinance Revisions
Council File Nos. 03-1459 and 03-1459-S1

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Sincerely,

PAUL EDELMAN
Deputy Director
Natural Resources and Planning

Los Angeles City Planning Commission

200 North Spring Street, Room 532; City Hall, Los Angeles, CA 90012
www.cityofla.org/PLN/index.htm

January 18, 2006

Los Angeles City Council
City Hall, Room 395
Los Angeles, CA 90012

ATTN: Barbara Greaves, Legislative Analyst
Planning and Land Use Management Committee

CITY PLAN CASE NO. 2004-2290 CA

Transmitted herewith is an ordinance (Appendix A), which amends the Los Angeles Municipal Code to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions.

On January 12, following a public hearing, the City Planning Commission adopted the Planning Department staff report and findings, and **approved the proposed ordinance (Appendix A) with recommendations**. The recommendations included that the City Attorney ensure that the penalty for illegal removal of protected trees run with the land, that building permits are withheld as part of the enforcement procedure, that the enforcement language be clarified if possible, and that a maintenance fee for trees planted as a mitigation be included in the Public Works section of the Municipal Code. The Commission also requested staff to develop guidelines to assist applicants in understanding the requirements and procedures.

This action was taken by the following vote:

Moved: Usher
Seconded: Freer
Ayes: Cardoso, Hughes, Kay, Kezios, Roschen, Woo
Absent: Irlando

Vote: 8-0

Gabriele Williams, Commission Executive Assistant II
City Planning Commission

Attachments: Findings, Appendix A (Ordinance)

cc: Keith Pritsker, Deputy City Attorney

FINDINGS

That the City Council:

Adopt the staff report of November 10, 2005, as its report on the subject;

Adopt the findings in the staff report dated November 10, 2005.

The City Planning Department recommends that the City Council, in accordance with Charter Section 558, find that the attached, proposed ordinance (Appendix A) is:

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species, RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. in accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

APPENDIX A

PROPOSED ORDINANCE FOR DISCUSSION

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the twenty-sixth unnumbered paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph after the thirtieth unnumbered paragraph defining "Problem Areas":

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the forty-fifth unnumbered paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected

tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. . Said request shall be made I writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County

Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Section 96.303.5 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department of Public Works to verify such information by entry upon the subject property.

Sec. . The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the Main Street entrance to the City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that the foregoing ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

Pursuant to Charter Section 559, I approve this ordinance and recommend its adoption on behalf of the City Planning Commission.

see attached report.

_____
Rockard J. Delgadillo, City Attorney

_____
Mark Winogrond
Interim, Director of Planning

By _____
Deputy City Attorney

File No. _____

(posting1)

FILE COPY

Los Angeles City Planning Department
RECOMMENDATION REPORT

CITY PLANNING COMMISSION		CASE NO:	CPC-2004-2290-CA
		CEQA:	ENV-2004-2201-CE
		LOCATION:	Citywide
DATE: January 12, 2006		COUNCIL DISTRICTS:	All
TIME: after 8:30a.m.		PLAN AREAS:	All
PLACE: Room 1010 City Hall 200 North Spring St. Los Angeles, CA 90012		RELATED FILES:	n/a

PUBLIC HEARING REQUIRED—CONTINUED FROM MEETING OF NOVEMBER 10, 2005

REQUEST: Continued consideration of staff report and proposed amendments to the Zoning Code first heard November 10, 2005, regarding amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Los Angeles Municipal Code.

SUMMARY: The proposed amendments to the Zoning Code will bring the provisions of the Code regarding Oak Trees in conformance with revisions to Section 46 (Oak Tree Regulations) and 96.303.5 of the Municipal Code.

RECOMMENDATION:

1. Adopt the staff report as its report on the subject.
2. Adopt the attached findings.
3. Approve the proposed amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, and 17.52 I (Appendix A) and recommend their adoption by the City Council.

CONTACT INFORMATION: Michael O'Brien, City Planning Associate, 213-482-7077

Table of Contents

		Page
I	Summary	2
II	Findings	2
III	Staff Report	4
	Request	4
	Discussion	4
	Conclusion	5

Appendix A—Staff report and proposed Amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I, and 46.00 through 46.06, and 96.303.5 of the Municipal Code from November 10, 2005.

ADVICE TO PUBLIC: The exact time this report will be considered during the meeting is uncertain since there may be several other items on the agenda. Written communications may be mailed to the Commission Secretariat, 200 North Main Street, Room 532, Los Angeles, CA 90012 (Phone No.213/978-1300). While all written communications are given to the Commission for consideration, the initial packets are sent the week prior to the Commission's meeting date. If you challenge these agenda items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence on these matters delivered to this agency at or prior to the public hearing. As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability, and upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices, or other auxiliary aids and/or other services may be provided upon request. To ensure availability of services, please make your request no later than three working days (72 hours) prior to the meeting by calling the Commission Secretariat at 213/978-1300.

SUMMARY

On November 10, 2005, the Commission considered a staff report and proposed ordinance amending Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code. These Sections need to be revised to be consistent with the revisions proposed for Sections 46.00 through 46.06 and 96.303.5 of the Los Angeles Municipal Code under the Authority of the Board of Public Works and the Department of Building and Safety. These latter sections contain the City's oak tree regulations (proposed to be changed to the "protected tree regulations") and are not under the purview of the Department of City Planning nor the City Planning Commission.

Considerable testimony was given at the Commission meeting. The commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

This report addresses the issues raised at the November 10 meeting and recommends adoption of the attached ordinance, Appendix A.

FINDINGS

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species, RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's

CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

MARK WINOGROND
Interim Director of Planning

APPROVED BY:

Jane Blumenfeld
Principal City Planner

PREPARED BY:

Michael O'Brien
City Planning Associate

STAFF REPORT

REQUEST

On November 10, 2005, the Commission considered the staff report and proposed ordinance to add protections to certain trees (in addition to oak trees) and to revise the existing protections to oak trees. The ordinance amends Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code, all of which make reference to oak trees. The Commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

DISCUSSION

Species to be protected. The task force during its deliberations in 2003 considered all local species of native trees for possible protection. The task force settled on the addition of only three trees to the list of protected trees, because these three trees, the Southern California Black Walnut (Juglans californica var. californica), the Western Sycamore (Platanus racemosa), and the California Bay (Umbellularia californica), formed a suite of trees diagnostic of the Southern California environment. Only in Southern California do these three trees grow together. Other trees considered have a greater natural range and are not typical solely of Southern California. In addition, the Southern California Black Walnut is already protected under the Mt. Washington Specific Plan, and it is listed as a species of concern whose existence on a project should be considered under the California Environmental Quality Act.

Size. The committee recognized that protecting only trees 8" or more in diameter have the result of protecting only large trees, and would be purely aesthetic in nature. In order to ensure continuing existence of these trees in the area, smaller sizes need to be protected. Four inches was arrived at by considering the case of the Southern California Black Walnut, which typically grows as a multi-trunk tree after fires. Establishing a diameter size of four inches would protect walnuts; a larger size would miss almost all walnuts that survived after fires.

Hardships accruing to developers. Developers are already familiar with the current requirements to survey trees eight inches or more in diameter. The proposed amendment would merely mandate a slightly longer report. For a typical single family residence, which usually would have only one protected tree on the property, a consultant's report would cost less than $200.00, which is only a fraction of building fees and typical project costs.

Status of trees on adjoining properties. Since adjoining properties are not typically surveyed for development purposes, trees on adjoining properties would not be required to be identified as a part of the development application package for any property. Development on a property may require a neighboring tree to be pruned, ground to be cut or filled, etc. In such a case, the property owner has the general legal right to prune both above ground and below ground parts of a tree that extend over and under his property, to cut and fill ground, etc., provided that these actions do not cause the tree to die. Section 46 defines "removed" or "removal" as "any act which will cause a protected tree to

die." If a property owner wished to undertake such extensive pruning, grading, etc., that would cause a protected tree to die, then that property owner would need a permit to undertake such an action. The property owner might also be liable to the adjacent property owner for destruction of a tree on the neighboring property.

Oversight of the regulations and enforcement of the regulations. The Street Tree Division of the Board of Public Works is responsible for oversight of the regulations. Enforcement comes in several ways. One, applicants for building permits are required to list protected trees on their site plans. Two, as part of any required environmental review, a plot plan of the site showing all trees must be submitted, and a mitigation for removal of any protected trees is required, in accordance with Code requirements. Three, citizen complaints to the Street Tree Division may cause the Street Tree Division itself to survey the trees on an affected parcel. Building permits will be withheld until the applicant evidences compliance with the protected tree regulations—usually, a sign-off from the Street Tree Division.

Enforcement is ultimately under the purview of both the Board of Public Works and the Department of Building and Safety. The Board can request the Department to withhold building permits on a property for violation of the protected tree regulations, or revoke a permit issued for which construction has not commenced, after a public hearing on the matter. This penalty can be for up to ten years, depending on the severity of violation of the protected tree regulations.

Urgency of adopting the proposed regulations. The proposed regulations are not urgently required to prevent an imminent threat to any particular tree or group of trees. However, the regulations should be adopted as soon as possible, in order to dovetail with the Mayor's "million trees" initiative.

Options for "replacement" of trees. The remover of trees can replace the trees on the site from which the trees were removed, provided that there is enough space on the site for them to be planted. If there is not enough space, the remover can purchase replacement trees and donate them to the Street Tree Division, which will plant them in available, appropriate, places. Alternatively, as a policy matter, the Street Tree Division will accept a monetary donation that approximates the value of the trees removed.

Whether a citation for non-permitted removal of protected trees continues with a change of ownership. Section 46.06 states that "the authority of the Bureau to act [to request that Building and Safety withhold or revoke building permits] shall not apply to a purchaser...who in good faith and for valuable consideration has acquired title subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent [of the Bureau to act.]".

CONCLUSION

The proposed ordinance (included in Appendix A) provides technical corrections to the "Oak Tree" (now "Protected Tree") provisions of the Zoning Code, to bring them into consistency with the amended provisions of Section 46 of the Municipal Code.

ENVIRONMENTAL IMPACT

The attached proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City of Los

Angeles CEQA Guidelines (ordinances which have no negative impact on the physical environment). Individual projects will continue to undergo specific environmental review at the time of their proposal.

APPENDIX A

PROPOSED ORDINANCE FOR DISCUSSION

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the twenty-sixth unnumbered paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph after the thirtieth unnumbered paragraph defining "Problem Areas":

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica).

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the

forty-fifth unnumbered paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the

appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the

City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a

report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

NOTE: The following Sections are for the Commission's reference, and not part of the Staff request for Commission adoption.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip

line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and,

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property,

provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by modifying Section 46.04 to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made I writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property, subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act

pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending; the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Section 96.303.5 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department of Public Works to verify such information by entry upon the subject property.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan shown on the reverse side of any building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy will not be issued unless the conditions set forth by the Advisory Agency in consultation with the City's Chief Forester relative to protected trees are met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph in its appropriate alphabetic location:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

OLD

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations**. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to

a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements**. In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required

shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip

line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of the ordinance that amends this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of the ordinance that amends this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of the ordinance that amends this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is hereby amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit

pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify such information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board at the Main Street entrance to Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Aug. 10, 2005

File No. 03-1459 and 03-1459-S1

#101794

FRANK T. MARTINEZ
City Clerk

KAREN E. KALFAYAN
Executive Officer

When making inquiries relative to this matter refer to File No.

CITY OF LOS ANGELES
CALIFORNIA

ANTONIO R. VILLARAIGOSA
MAYOR

Office of the
CITY CLERK
Council and Public Services
Room 395, City Hall
Los Angeles, CA 90012
Council File Information - (213) 978-1043
General Information - (213) 978-1133
Fax: (213) 978-1040

HELEN GINSBURG
Chief, Council and Public Services Division

CFs 03-1459
03-1459-S1

October 5, 2005

Mark Winogrond, Interim Director of Planning
Planning Department
Room 525, City Hall
Attn: Gabriele Williams

REFER TO STAFF

At its Special Meeting held October 3, 2005 (continued from November 5, 2003 and May 12, 2004 meetings), the Planning and Land Use Management Committee considered the following:

CF 03-1459	Report from the City Attorney and revised draft Ordinance relative to amending various provisions of Articles 2 and 7 of Chapter I, and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees; and reports from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), as initiated by Motion (LaBonge - Garcetti).
CF 03-1459-S1	Reports from the Department of Public Works, Bureau of Street Services and Environmental Affairs Department relative to proposed amendments to the Oak Tree Ordinance (153478), pursuant to Motion (Garcetti - LaBonge).

The Committee instructed that the Motions be referred for consideration by the Planning Department and City Planning Commission, and that recommendations be forwarded to City Council.

Barbara Greaves
Legislative Assistant
Planning and Land Use
Management Committee, 213-978-1068

attachment:

cc: City Attorney
Attn: Keith Pritsker

#031459ltrA

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R06-0042

FEB 08 2006

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Management Committee for further action. Moreover, on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance that might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use

Management Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff. PLUM met on October 3, 2005, to consider additional modifications to the draft ordinance. The matter was then referred to the City's Planning Commission, which met on this matter in December 18, 2005, and January 13, 2006. The Commission issued a report to the City Council on January 18, 2006, seeking additional clarifications. There are two items in the Planning Commission's action that are not included in this ordinance. The first relates to a procedural matter of the Department of Building and Safety. Inasmuch as that can be handled by the Department and does not need ordinance authority, we have not included that in the ordinance. The second issue regards a fee to ensure maintenance of relocated or replaced protected trees. This matter is still the subject of discussion with the departments. In order to bring this ordinance forward for Council action as soon as possible, we bring you the attached draft. If, with further discussion, the remainder of the issues needs to be addressed by ordinance, we will transmit another draft ordinance to you.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years on parcels where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the Municipal Code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their comments have been incorporated into the language of the current draft ordinance.

California Environmental Quality Act (CEQA)

This ordinance is exempt from the requirements of CEQA under the general exemption found in the City CEQA Guidelines Article 2, Section 1 because there is no possibility of it having a significant adverse effect on the environment. Consequently,

should the Council approve the ordinance it should also find that it is exempt from CEQA pursuant to the City Guidelines.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By Claudia Culling
CLAUDIA CULLING
Senior Assistant City Attorney

CC:KP:fa (#105209)

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subdivision 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. Protected Tree Relocation and Replacement. All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph to read:

Protected Tree - Any of the following Southern California native tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. The term "Tree Expert" set forth in Section 17.02 of the Los Angeles Municipal Code is amended to read:

Tree Expert - A person with at least four years of experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R of this Code. Provided, however, that in no event shall the reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in this article or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations.** Subject to historical preservation requirements set forth in Subdivision 3 of this subsection, when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency, in consultation with the City's Chief Forester, determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the

determination, the protected tree's removal would be permissible; or

(iii) A building permit has been issued for the property upon which the protected tree is located, the permit is still in effect, and the removal or relocation is not prohibited by the permit.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters that cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report required pursuant to Section 17.06 C, acceptable to the Advisory Agency and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of the tree; or

(v) It has no apparent aesthetic value, which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at the location.

2. Supplemental Authority. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of the tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In that event, the Advisory Agency may require a greater number of replacement trees.

3. Historical Monuments. The Advisory Agency, except as to Subdivision 1(b)(iii) above, shall require retention of a protected tree at its existing location, if the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. Requirements. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within the property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this article, except where the protected tree is relocated pursuant to Subdivision 2(a) above. The size of each replacement tree shall be a 15-gallon, or larger, specimen, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in a manner to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that the trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08 G as its procedural guide in satisfaction of the bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree that is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of the trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision where a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation of the tree. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06 B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any protected tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving the tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel where a protected tree is located shall be considered complete unless it includes a report pertaining to preserving the tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal; replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness in preserving the tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is amended to read:

I. When a protected tree exists on a proposed parcel, the preservation of the tree at its existing location, its relocation for preservation purposes, or the removal of the tree shall be regulated in the same manner as that provided under subdivision

regulations set forth in this chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or this article. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where the protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of

Public Works or its designated officer or employee, except as otherwise provided in this section.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed that may affect the protected tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where the Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory Agency pursuant to Article 7 of Chapter I of this Code; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the determination the protected tree's removal would be permissible; or

3. A building permit has been issued for any property and is still in effect with respect to the property under consideration and its implementation would necessitate the removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided in this section or unless the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if the Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters, which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at the location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the

protected tree, the tree is in danger of falling, notwithstanding the tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) Additional Authority. The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace the tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. In size, each replacement tree shall be at least a 15-gallon, or larger, specimen, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In that event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of the new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article, which permits the removal of one or more protected trees. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. WITHHOLDING OR REVOCATION OF BUILDING PERMITS FOR ILLEGAL REMOVAL OR RELOCATION OF PROTECTED TREES.

(a) The Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this section, shall have the authority to request the Superintendent of Building to withhold issuance of building permits, except for permits that are necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of ten years as requested by the Bureau and to revoke

any building permit issued for which construction has not commenced with respect to any property on which any protected tree has been removed or relocated in violation of Section 46.00 of this Code.

The request shall be made in writing by the Director of the Bureau of Street Services or his/her designee and shall specifically state the start date and end date of the period of time the Bureau, or the Board of Public Works on appeal, have deemed necessary pursuant to Subsection (c) of this section. The period shall commence on the date the Bureau first becomes aware of the removal of the tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection (b) of this section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of the notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in the property as revealed by a title search with respect to the property. A copy of the notice shall also be recorded by the Bureau with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection (b) above. At the hearing, if the facts indicate, the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal or relocation of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection (b) above. In the event the Bureau finds that a protected tree was removed or relocated in violation of Section 46.00 of this Code, it shall specify to the Superintendent of Building the length of time the issuance of building permits shall be withheld and whether building permits for which construction has not commenced shall be revoked. In making its determination, the Bureau shall consider the following factors: the number of trees removed or relocated, the size and age of the trees removed or relocated, the knowledge and intent of the owners of the property with respect to the removal or relocation and prior violations of law with respect to removal or relocation of protected trees. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days of the hearing.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to request the Superintendent of Building to revoke or withhold issuance of building permits, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, any action by the Department of Building and Safety resulting from any of the provisions of this section, including building permit revocation, shall not be appealable to the Board of

Building and Safety Commissioners.

(e) Any final determination of the Bureau or the Board of Public Works on appeal, to request the Superintendent of Building to withhold issuance of building permits or to revoke a building permit, shall be forwarded to the Superintendent within ten days of the Bureau or Board's determination and shall also be set forth in an affidavit, which shall be recorded by the Bureau with the County Recorder within ten days of the Bureau or Board's determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this section, the definition of "protected tree" set forth in Section 46.01 this Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify this information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of this Code for establishing fees.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Feb. 8, 2006

Pursuant to Charter Section 559, I approve this ordinance on behalf of the City Planning Commission and recommend it be adopted BB·8, 2006

see attached report.

Mark Winogrond
Interim Director of Planning

File Nos. 03-1459 and 03-1459-S1

#116278

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R06-0044

FEB 08 2006

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Management Committee for further action. Moreover, on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance that might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use

Management Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff. PLUM met on October 3, 2005, to consider additional modifications to the draft ordinance. The matter was then referred to the City's Planning Commission, which met on this matter in December 18, 2005, and January 13, 2006. The Commission issued a report to the City Council on January 18, 2006, seeking additional clarifications. There are two items in the Planning Commission's action that are not included in this ordinance. The first relates to a procedural matter of the Department of Building and Safety. Inasmuch as that can be handled by the Department and does not need ordinance authority, we have not included that in the ordinance. The second issue regards a fee to ensure maintenance of relocated or replaced protected trees. This matter is still the subject of discussion with the departments. In order to bring this ordinance forward for Council action as soon as possible, we bring you the attached draft. If, with further discussion, the remainder of the issues needs to be addressed by ordinance, we will transmit another draft ordinance to you.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years on parcels where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the Municipal Code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their comments have been incorporated into the language of the current draft ordinance.

California Environmental Quality Act (CEQA)

This ordinance is exempt from the requirements of CEQA under the general exemption found in the City CEQA Guidelines Article 2, Section 1 because there is no possibility of it having a significant adverse effect on the environment. Consequently,

should the Council approve the ordinance it should also find that it is exempt from CEQA pursuant to the City Guidelines.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By Claudia Culling
CLAUDIA CULLING
Senior Assistant City Attorney

CC:KP:fa (#105209)

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV and Section 96.303.5 of the Los Angeles Municipal Code to assure the protection of, and to further regulate the removal of, protected trees

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subdivision 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. Protected Tree Relocation and Replacement. All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph to read:

Protected Tree - Any of the following Southern California native tree species, which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. The term "Tree Expert" set forth in Section 17.02 of the Los Angeles Municipal Code is amended to read:

Tree Expert - A person with at least four years of experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.05 R of this Code. Provided, however, that in no event shall the reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in this article or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. Required Determinations. Subject to historical preservation requirements set forth in Subdivision 3 of this subsection, when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency, in consultation with the City's Chief Forester, determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator, or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the

determination, the protected tree's removal would be permissible; or

(iii) A building permit has been issued for the property upon which the protected tree is located, the permit is still in effect, and the removal or relocation is not prohibited by the permit.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters that cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report required pursuant to Section 17.06 C, acceptable to the Advisory Agency and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

(iv) Its continued presence at its existing location interferes with proposed utility services or roadways within or without the subject property, and the only reasonable alternative to the interference is the removal of the tree; or

(v) It has no apparent aesthetic value, which will contribute to the appearance and design of the proposed subdivision; or it is not located with reference to other trees or monuments in such a way as to acquire a distinctive significance at the location.

2. Supplemental Authority. In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of the tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In that event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subdivision 1(b)(iii) above, shall require retention of a protected tree at its existing location, if the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency, in consultation with the City's Chief Forester, determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within the property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this article, except where the protected tree is relocated pursuant to Subdivision 2(a) above. The size of each replacement tree shall be a 15-gallon, or larger, specimen, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in a manner to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that the trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08 G as its procedural guide in satisfaction of the bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree that is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. Grading. The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of the trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision where a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation of the tree. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06 B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any protected tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving the tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel where a protected tree is located shall be considered complete unless it includes a report pertaining to preserving the tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness in preserving the tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is amended to read:

I. When a protected tree exists on a proposed parcel, the preservation of the tree at its existing location, its relocation for preservation purposes, or the removal of the tree shall be regulated in the same manner as that provided under subdivision

regulations set forth in this chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or this article. The term "removed" or "removal" shall include any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa):

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where the protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of

Public Works or its designated officer or employee, except as otherwise provided in this section.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed that may affect the protected tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) Exemptions. The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where the Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory Agency pursuant to Article 7 of Chapter I of this Code; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission, the appeal period established by this Code with respect to the determination has expired, the determination is still in effect, and pursuant to the determination the protected tree's removal would be permissible; or

3. A building permit has been issued for any property and is still in effect with respect to the property under consideration and its implementation would necessitate the removal or relocation.

(b) Board Authority. The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided in this section or unless the tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if the Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters, which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at the location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the

protected tree, the tree is in danger of falling, notwithstanding the tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) Additional Authority. The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace the tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. In size, each replacement tree shall be at least a 15-gallon, or larger, specimen, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In that event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of the new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article, which permits the removal of one or more protected trees. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. WITHHOLDING OR REVOCATION OF BUILDING PERMITS FOR ILLEGAL REMOVAL OR RELOCATION OF PROTECTED TREES.

(a) The Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this section, shall have the authority to request the Superintendent of Building to withhold issuance of building permits, except for permits that are necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of ten years as requested by the Bureau and to revoke

any building permit issued for which construction has not commenced with respect to any property on which any protected tree has been removed or relocated in violation of Section 46.00 of this Code.

The request shall be made in writing by the Director of the Bureau of Street Services or his/her designee and shall specifically state the start date and end date of the period of time the Bureau, or the Board of Public Works on appeal, have deemed necessary pursuant to Subsection (c) of this section. The period shall commence on the date the Bureau first becomes aware of the removal of the tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection (b) of this section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of the notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in the property as revealed by a title search with respect to the property. A copy of the notice shall also be recorded by the Bureau with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection (b) above. At the hearing, if the facts indicate, the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal or relocation of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection (b) above. In the event the Bureau finds that a protected tree was removed or relocated in violation of Section 46.00 of this Code, it shall specify to the Superintendent of Building the length of time the issuance of building permits shall be withheld and whether building permits for which construction has not commenced shall be revoked. In making its determination, the Bureau shall consider the following factors: the number of trees removed or relocated; the size and age of the trees removed or relocated, the knowledge and intent of the owners of the property with respect to the removal or relocation and prior violations of law with respect to removal or relocation of protected trees. The applicant or permittee shall be notified in writing of the Bureau's determination within 30 days of the hearing.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to request the Superintendent of Building to revoke or withhold issuance of building permits, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, any action by the Department of Building and Safety resulting from any of the provisions of this section, including building permit revocation, shall not be appealable to the Board of

Building and Safety Commissioners.

(e) Any final determination of the Bureau or the Board of Public Works on appeal; to request the Superintendent of Building to withhold issuance of building permits, or to revoke a building permit, shall be forwarded to the Superintendent within ten days of the Bureau or Board's determination and shall also be set forth in an affidavit, which shall be recorded by the Bureau with the County Recorder within ten days of the Bureau or Board's determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this section, the definition of "protected tree" set forth in Section 46.01 this Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify this information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration. The fee shall be determined and adopted in the same manner as provided in Section 12.37 I.1 of this Code for establishing fees.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Feb. 8, 2006

Pursuant to Charter Section 559, I approve this ordinance on behalf of the City Planning Commission and recommend it be adopted . . . .

BB·S, 2006

see attached report

Mark Winogrond
Interim Director of Planning

File Nos. 03-1459 and 03-1459-S1

#116278.

Mulholland Scenic Parkway Design Review Board
Lynette Berg Robe, Chair
12711 Ventura Blvd., Suite 450
Studio City, California 91604
(818) 980-9964
Fax (818) 980-7141
Portia1000@aol.com
September 23, 2003

George Gonzalez
Street Tree Division
Department of Public Works
10th Floor
600 S. Spring Street
Los Angeles, CA 90014

Re: Cutting of Oak Trees on 3593 Multivew Drive

Dear Mr Gonzalez:

I am writing on behalf of the Mulholland Scenic Parkway Design Review Board, asking you to prosecute the owner of 3593 Multiview Drive, Steve Hiyoshi, to the fullest extent of the law for the unlawful cutting, mutiliation, and removal of oak trees on the site. The owner violated Los Angeles Municipal Code Section 4600, the Oak Tree Ordinance, and he should be held accountable.

There is no way to mitigate the damage done to the oaks trees. Even the planting of new ones in a two to one ratio will take years to reach the size of the ones removed. We ask that you urge the City Attorney to go forward and prosecute the owner. Time after time, projects come to us where "someone," but never the applicant, has cut or removed precious oak trees from the site. People continue to violate the Oak Tree Ordinance in this way because it is so easy to escape accountability. We ask that you help to make an example in this case so that future owners of hillside property will be deterred from mutilating oak trees in this manner.

Thank you for your kind assistance.

Yours truly,

Lynette Berg Robe
Chair, Mulholland Scenic Parkway Design Review Board

November 4, 2003

Los Angeles City Council

Re: Oak Tree Protection Ordinance

Dear City Representatives,

The undersigned would like to voice our strong support of implementing tougher restrictions and penalities as part of the Oak Tree Protection Ordinance. Recently in our neighborhood a developer who did not own the property at 3593 Multiview Drive, destroyed some 30 oaks, illegally, permanently scarring the land. The sale ultimately did not go through and the developer was cited for this egregious act

However, this is a loss to the city that can not be replaced. A small fine and six months in jail is a slap on the hand to someone who has done irreparable harm. This has impacted our area in many ways including opening up the hillside to possible landslide damage, diminishing the already squeezed wildlife habitat and damaging the aesthetic of our community, which is the reason we live in this part of Los Angeles.

When will the leaders of the City of Los Angeles recognize that its precious natural resources are a benefit to the community and that this type of land misuse costs more in the long run? Tougher restrictions and penalties should be levied against those with clearly no regard for its value. In addition, a developer that has demonstrated this utter lack of regard should not be licensed to practice in Los Angeles, let alone in California.

Our heritage is being threatened by those whose only motive is profit. We should not have to explain to future generations why we took no action to save what was left in the already overgrown Los Angeles area.

Thank you for your consideration.

Dorrit Ragosine
3855 Fredonia Drive
(323) 969-9822

Patricia Marlatt
3863 Fredonia Drive
(323) 874-2818

PLANNING and LAND USE MGT.

MOTION

JUL 0 8 2003

The City of Los Angeles continues to suffer a decrease in its Oak tree and native tree species woodland habitat due to disease, development and other factors. The City's Oak Tree ordinances were first adopted on April 12, 1980 in order to establish clear standards for the preservation of these beautiful and culturally significant living monuments.

There are various other provisions that require updating. For example, the current tree replacement requirement, a minimum fifteen gallon Oak tree replacement per removal, does not adequately mitigate the loss of Oak tree woodlands. Additionally, the current definition of "Tree Expert," a licensed pest control advisor or landscape architect, needs to be updated to allow for the most knowledgeable Oak tree professionals and Consulting Arborists to be included.

Preservation of Oak trees targets signature trees of only one of the City's native plant communities, and other species should be considered for enhanced protections along the lines of the City's Oak Tree ordinances.

Regulations to preserve trees have significantly changed and progressed, both in California and across the country, due to increased scientific knowledge of trees and public awareness of the importance of native tree species. An opportunity exists to update City laws pertaining to Oak trees to better protect our remaining stock of these historic treasures to ensure that future generations can take part in their legacy.

I THEREFORE MOVE that the departments of Public Works, City Planning and Environmental Affairs be instructed to work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City arborists to preserve native tree species that share common ecosystems while maintaining a more diverse species base.

PRESENTED BY _____
TOM LABONGE
Councilmember, 4th District

SECONDED BY _____
ERIC GARCETTI
Councilmember, 13th District

July 8, 2003

am

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0212

JUN 21 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background:

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

Summary of Ordinance Provisions:

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the municipal code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral:

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their early comments were incorporated into the language of the current draft ordinance. They have been asked by this office's most recent letter to make their comments directly to the Council's Planning and Land Use Committee.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By
DAVID MICHAELSON
Chief Assistant City Attorney

DM:KP:fa (#105209)

Transmittal

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan shown on the reverse side of any building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy will not be issued unless the conditions set forth by the Advisory Agency in consultation with the City's Chief Forester relative to protected trees are met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph in its appropriate alphabetic location:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations**. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of this Code Section; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this Code Section, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, accept as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two protected trees of a variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National

Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PERMITS.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two protected trees of a variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I.1. of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to recommend to the Superintendent of the Department of Building and Safety, after notice and hearing, to withhold issuance of a building permit for a period of time up to 10 years and to revoke any permit issued, unless expired, for which rights have not been obtained with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection B of this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder. No building permit shall be issued during the period preceding the hearing and determination by the Bureau and any appeal therefrom.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of the Department of Building and Safety the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any recommendation by the Bureau to revoke or withhold issuance of a building permit. The appeal must be filed with the Board within 30 days of the date of mailing of the notice of recommendation as provided for in Subsection C above.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination. No building permit may be issued contrary to any such recommendation and any such permit issued shall be revoked for which rights have not been obtained.

Sec. 15. Subsection 5 of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Department to verify such information by entry upon the subject property. A fee, as specified in Section 98.0412(a) of the Municipal Code shall be collected by the Department for any inspection required to verify the declaration.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney

By _____
KEITH W. PRITSKER
Deputy City Attorney

Date: June 15, 2005

File No. 03-1459 and 03-1459-S1

#101794

BOARD OF PUBLIC WORKS
MEMBERS

VALERIE LYNNE SHAW
PRESIDENT

ELLEN STEIN
VICE PRESIDENT

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CALIFORNIA

JAMES K. HAHN
MAYOR

DEPARTMENT OF
PUBLIC WORKS
BUREAU OF
STREET SERVICES
WILLIAM A. ROBERTSON, DIRECTOR
800 SOUTH SPRING STREET
SUITE 1200
LOS ANGELES, CA 90014

REQUESTS FOR SERVICE (213) 473-8410
Or (800) 996-CITY
TDD: (213) 473-6600
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January 13, 2004

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Los Angeles City Council
Room 410, City Hall
Los Angeles, CA 90012

Attn: Barbara Greaves, Office of the City Clerk

SUBJECT: CF:03-1459 – PROPOSED AMENDMENTS TO THE OAK TREE ORDINANCE (ORDINANCE 153,478)

RECOMMENDATIONS

The Department of Public Works, Environmental Affairs Department, and Community Forest Advisory Committee recommend that the City Council instruct the City Attorney to prepare revisions to the City's Oak Tree Ordinance in order to more adequately protect our remnant native woodlands, one of the City's most valuable natural resources. The recommended revisions are as follows:

Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbellularia californica) in the ordinance and change the ordinance title to "Preserved Trees".

Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

Require a permit for preserved tree removal/relocation on all property within the City boundaries regardless of property lot size.

PLAN & LAND USE MGT.

JAN 14 2004

Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at three and one-half feet above ground level.

Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

Increase the monetary fine for violating the ordinance.

Include civil penalties, such as prohibiting development of property if Oak trees are removed without a permit.

Require a tree pruning permit for all Oak tree pruning in the City of Los Angeles.

FISCAL IMPACT STATEMENT

The number of permits that will be required to be issued will increase due to the larger number of trees that are protected and the need for a permit to be issued for all oak trees to be pruned. As there is a fee for the issuance of these permits, the program will be self-supporting and have no impact to the General Fund.

DISCUSSION

The City of Los Angeles enacted the Oak tree ordinance (Ordinance 153.478) in 1980 to protect its remaining native Oak tree woodlands. In spite of this ordinance, the City continues to suffer a decline to its native Oak tree woodlands due to development, disease, and other factors. With even fewer native trees and woodlands remaining, the time has come to strengthen the oak tree ordinance, giving protection to a wider range of native trees as well as smaller trees that have not yet reached maturity. A stronger, more inclusive ordinance would give the Department of Public Works greater abilities to protect our native trees and preserve this important part of the City's natural history.

Staff from the Department of Public Works' Street Tree Division and the Departments of Environmental Affairs and City Planning met with representatives from the Community Forest Advisory Committee in January and February of 2003 to discuss the current tree protection ordinances and how they could be revised to better protect and preserve the City's remaining native trees and woodlands.

Item #1: Include other Southern California native tree species, including Southern California Black Walnut (Juglans californica var. californica), Western Sycamore (Platanus racemosa), and California Bay (Umbe llularia californica) in the ordinance and change the ordinance title to "Preserved Trees".

Oaks are not the only native trees that inhabit City of Los Angeles. Other Southern California native tree species include the Southern California Black Walnut, Western Sycamore, and California Bay. These species are currently without any legal protection from development and other urban pressures even though they also are an important part of the City's natural history. The inclusion of these trees

necessitates the change of the ordinance title to "Preserved Trees" to more properly represent the scope and contents of the newly revised ordinance.

Item #2: Include Registered Consulting Arborists (American Society of Consulting Arborists) in the definition of "Tree Expert".

The definition of a tree expert currently includes only someone who holds a valid California license as an agricultural pest control advisor or landscape architect. Although there are individuals in both categories that have the necessary expertise to assess oak trees and prepare oak tree reports, Registered Consulting Arborists (American Society of Consulting Arborists) are most qualified to determine the health and condition of trees and should, therefore, be included in the definition of tree expert.

Item #3: Require a permit for preserved tree removal/relocation on all property within the City boundaries regardless of property lot size.

The current Oak Tree Ordinance applies only to trees located on lots larger than one acre in size. This severely limits the applicability of this ordinance due to the highly urbanized and fragmented nature of our City. Although new developments generally fall into this category of lot size, all remaining native trees should be protected regardless of the size of the lot on which they live.

Item #4: Reduce the threshold of eight inches of trunk diameter measured at four and one-half feet to two inches cumulative trunk diameter measured at three and one-half feet above ground level.

The current definition of an oak tree includes only those specimens whose trunks measure eight inches in diameter four and one-half feet above ground level. Some of the other native trees, specifically the Southern California Black Walnut, exhibit different growth habits and quite often have multiple trunks rather than a single one. To ensure that the ordinance protects these trees as well as smaller single-trunk trees, we recommend that the tree definitive be changed to include all specimens that have a trunk or trunks that cumulatively measure two inches at a level of three and one-half feet above the ground.

Item #5: Calculate the tree replacement mitigation utilizing a trunk volume or canopy coverage formula.

When oak trees are allowed to be removed under the current ordinance, they are replaced on a one-for-one basis. This leaves a deficit in the amount of benefits that the City obtains from this tree for many years as oaks are slow-growing trees and the environmental benefits afforded by a mature tree are much greater than those of small tree. Therefore, the ordinance should be revised to take a more balanced approach based on a calculation utilizing a trunk volume or canopy coverage formula.

Item #6: Allow trees smaller than 15-gallons in size or seeds as replacements if the smaller sizes or seeds will have a greater chance of survival than larger sizes.

Replacement trees allowed under the current ordinance must be a minimum of 15-gallons in size. Although this is a good approach for many species, some of the native species do not grow well in nursery containers. Because of this, they are generally not available in nursery-size containers and even if they were, the individuals would be unlikely to mature to healthy trees due to improperly developed roots.

To account for these growth requirements, the ordinance needs to allow for smaller trees, or in some cases tree seeds, to be used as replacements if this would afford a greater chance of long-term survival than the use of larger size trees.

Item #7: Increase the monetary fine for violating the ordinance.
Item #8: Include civil penalties, such as prohibiting development of property if Oak trees are removed without a permit.

The current ordinance lacks adequate enforcement mechanisms. Often, a developer will pay the small fines involved in illegally removing an oak tree as this is economically advantageous over preserving the trees. By increasing the monetary fine and including civil penalties, such as prohibiting development of property if Oak trees are removed without a permit, the preserved trees will be better protected.

Item #9: Require a tree pruning permit for all Oak tree pruning in the City of Los Angeles.

The final recommended change would require a tree pruning permit for all Oak tree pruning in the City of Los Angeles regardless of where that tree is located. This will help to ensure that oaks are trimmed at the proper time of year, according to ISA standards, by properly trained and reputable tree trimmers. This protection of all of the oaks within the City will help to preserve the last remnants of our native woodlands.

If you have any questions, please contact the undersigned, or George Gonzalez, Chief Forester, Street Tree Division, at (213) 485-5675.

Sincerely,

WILLIAM A. ROBERTSON, Director
Bureau of Street Services

WAR:RL:rl:pyp

S:Documents/Plum Oak Tree Response

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0288

AUG 16 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

Recyclable and made from recycled waste.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the municipal code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their early comments were incorporated into the language of the current draft ordinance. They have been asked by this office's most recent letter to make their comments directly to the Council's Planning and Land Use Committee.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By

DAVID MICHAELSON
Chief Assistant City Attorney

DM:KP (#105209)

Enclosure

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations**. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to

a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required

shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip

line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of the ordinance that amends this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of the ordinance that amends this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of the ordinance that amends this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

OFFICE OF THE CITY ATTORNEY
ROCKARD J. DELGADILLO
CITY ATTORNEY

REPORT NO. R05-0288

AUG 16 2005

REPORT RE:

DRAFT ORDINANCE AMENDING VARIOUS PROVISIONS OF ARTICLES 2 AND 7 OF CHAPTER I AND ARTICLE 6 OF CHAPTER IV OF THE LOS ANGELES MUNICIPAL CODE AND SECTION 96.303.5 TO ASSURE THE PROTECTION OF, AND TO FURTHER REGULATE THE REMOVAL OF PROTECTED TREES

The Honorable City Council
of the City of Los Angeles
Room 395, City Hall
200 North Spring Street
Los Angeles, CA 90012

Council File Nos.: 03-1459 and 03-1459-S1

Honorable Members:

This Office has prepared and now transmits for your action the attached draft ordinance, approved as to form and legality. This draft ordinance revises the provisions of the Los Angeles Municipal Code to provide for additional protections of certain native trees.

Background

On July 8, 2003, the Council adopted a motion which instructed the Departments of Public Works, Planning and Environmental Affairs to "work with the City Attorney's office to investigate appropriate revisions to the City's Oak Tree ordinances to enable City Arborists to preserve native species that share common ecosystems while maintaining a more diverse species base." The motion was referred to the Council's Planning and Land Use Committee for further action. Moreover on September 19, 2003, the Council adopted a motion directing the Public Works and Building and Safety Departments with the assistance of the Office of the City Attorney to report to the Council's Planning and Land Use Committee on possible revisions to the Oak Tree Protection Ordinance which might include withholding of development permits for periods of time. On May 10, 2004, the Council's Planning and Land Use Committee (PLUM) met to consider various modifications to existing ordinances as directed by these motions. Both matters were continued for additional modifications by staff.

Summary of Ordinance Provisions

The new ordinance expands the number of species protected from one to four. It eliminates the minimal lot size provision for effected parcels. The ordinance decreases the size of protected trees from eight to four inches in diameter and includes multitrunk trees by measuring "cumulative diameter." It allows for the non-issuance or revocation of building permits for up to ten years where a protected tree has been removed or destroyed. The ordinance more narrowly defines who may be considered a tree expert under the municipal code. Lastly, it requires the City's Advisory Agency to consult with the City's Chief Forester before making determinations that relate to protected trees.

Council Rule 38 Referral

A copy of the draft ordinance was sent twice, pursuant to Council Rule 38, to the Departments of Building and Safety, Environmental Affairs, Planning and Public Works. Their early comments were incorporated into the language of the current draft ordinance. They have been asked by this office's most recent letter to make their comments directly to the Council's Planning and Land Use Committee.

If you have any questions, please contact Deputy City Attorney Keith Pritsker at (213) 978-8141. Either he or another member of this Office will be available when you consider this matter to answer any questions that you may have.

Sincerely,

ROCKARD J. DELGADILLO, City Attorney

By
DAVID MICHAELSON
Chief Assistant City Attorney

DM:KP (#105209)

Enclosure

ORDINANCE NO. _____

An ordinance amending various provisions of Articles 2 and 7 of Chapter I and Article 6 of Chapter IV of the Los Angeles Municipal Code and Section 96.303.5 to assure the protection of, and to further regulate the removal of protected trees.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Subsection 12 of Subsection A of Section 12.21 of the Los Angeles Municipal Code is amended to read:

12. **Protected Tree Relocation and Replacement.** All existing protected trees and relocation and replacement trees specified by the Advisory Agency in accordance with Sections 17.02, 17.05, 17.06, 17.51 and 17.52 of this Code shall be indicated on a plot plan attached to the building permit issued pursuant to this Code. In addition, the trees shall be identified and described by map and documentation as required by the Advisory Agency. A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtains from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the construction, a written or electronic document certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Sec. 2. Section 17.02 of the Los Angeles Municipal Code is amended by deleting the paragraph defining "Oak Tree" in Section 17.02 and adding the following paragraph:

Protected Tree - Any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

(a) Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

(b) Southern California Black Walnut (Juglans californica var. californica)

(c) Western Sycamore (Platanus racemosa)

(d) California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 3. Section 17.02 of the Los Angeles Municipal Code is amended by replacing the paragraph defining "Tree Expert" in Section 17.02 with the following paragraph:

Tree Expert - A person with at least four years experience in the business of transplanting, moving, caring for and maintaining trees and who is (a) a certified arborist with the International Society of Arboriculture and who holds a valid California license as an agricultural pest control advisor or (b) a landscape architect or (c) a registered consulting arborist with the American Society of Consulting Arborists.

Sec. 4. Subdivision 7 of Subsection H of Section 17.05 of the Los Angeles Municipal Code is amended to read:

7. Where the Advisory Agency finds the project is consistent with the dwelling unit density permitted by the General Plan, and that the public health, safety or welfare and good subdivision design will be promoted by the preservation of protected trees, the Advisory Agency may permit the required area of one or more of the lots in a subdivision in an "RA," "RE," "RS" or "R1" Zone to be reduced by an amount sufficient to provide for protected tree preservation in accordance with Section 17.06 R. of this Code. Provided, however, that in no event shall such a reduction exceed 50 percent of the required lot area; no "RA" or "RE" lot shall be reduced below 50 feet in width; no "RS" or "R1" lot shall be reduced below 40 feet in width; and no lot in a designated "K" Horsekeeping District shall be reduced below 17,500 square feet.

Sec. 5. Subsection R of Section 17.05 of the Los Angeles Municipal Code is amended to read:

R. Protected Tree Regulations. No protected tree may be relocated or removed except as provided in Article 7 of Chapter I or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

1. **Required Determinations**. Subject to historical preservation requirements set forth herein at Subdivision 3 when a protected tree exists within a proposed subdivision, the tree may be relocated or removed if the Advisory Agency in consultation with the City's Chief Forester determines the existence of either (a) or (b) below:

(a) There has been prior applicable government action in which:

(i) The removal of the tree had been approved by the Advisory Agency prior to the effective date of the ordinance that amends this subsection of the Code; or

(ii) The property upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the Area Planning Commission, the City Council, a Zoning Administrator, or the Appeal Board prior to the effective date of the ordinance that amends this subsection of the Code, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the oak tree's removal would be permissible; or

(iii) A building permit has been issued prior to the effective date of this subsection of the Code, for the property upon which the protected tree is located, the permit is still in effect, and such removal or relocation is not prohibited thereby.

(b) The removal of the protected tree would not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City's Chief Forester, and the physical condition or location of the tree is such that:

(i) Its continued presence in its existing location prevents the reasonable development of the property; or

(ii) According to a report, required pursuant to Section 17.06-C, acceptable to the Advisory Agency, and prepared by a tree expert, there is a substantial decline from a condition of normal health and vigor of the tree, and its restoration through appropriate and economically reasonable preservation procedures and practices is not advisable; or

(iii) It is in danger of falling due to an existing and irreversible condition.

2. **Supplemental Authority.** In the event the Advisory Agency in consultation with the City's Chief Forester determines, pursuant to Subdivision 1(b) above, that a protected tree may be removed or relocated, the Advisory Agency may:

(a) Require relocation elsewhere on the same property where a protected tree has been approved for removal, and where the relocation is economically reasonable and favorable to the survival of said tree. Relocation to

a site other than upon the same property may be permitted where there is no available or appropriate location on the property and the owner of the proposed off-site relocation site consents to the placement of a tree thereon. In the event of relocation, the Advisory Agency may designate measures to be taken to mitigate adverse effects on the tree.

(b) Permit protected trees of a lesser size, or trees of a different species, to be planted as replacement trees for protected trees permitted by this Code to be removed or relocated, if replacement trees required pursuant to this Code are not available. In such event, the Advisory Agency may require a greater number of replacement trees.

3. **Historical Monuments.** The Advisory Agency, except as to Subsection R1(b)(iii) above, shall require retention of a protected tree at its existing location, if said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone.

4. **Requirements.** In the event the Advisory Agency in consultation with the City's Chief Forester determines pursuant to Subdivision 1(b) above that a protected tree may be removed or relocated, the Advisory Agency shall require that:

(a) The protected tree be replaced within said property by at least two trees of a protected variety included within the definition set forth in Section 17.02 of this Code, except where the protected tree is relocated pursuant to Section 17.05-R2(a). Each replacement tree shall be a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter at a point one foot above the base, and not less than seven feet in height, measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

(b) The subdivider record those covenants and agreements approved by the Advisory Agency necessary to assure compliance with conditions imposed by the Advisory Agency and to assure protected tree preservation.

(c) The subdivider provide protected tree maintenance information to purchasers of lots within the proposed subdivision.

(d) The subdivider post a bond or other assurance acceptable to the City Engineer to guarantee the survival of trees required to be replaced or permitted or required to be relocated, in such a fashion as to assure the existence of continuously living trees at the approved replacement or relocation site for three years from the date that such trees are replaced or relocated. The City Engineer shall use the provisions of Section 17.08-G as its procedural guide in satisfaction of said bond requirements and processing. Any bond required

shall be in a sum estimated by the City Engineer to be equal to the dollar value of the replacement tree or of the tree which is to be relocated. In determining value for these purposes, the City Engineer shall consult with the Advisory Agency, the City's Chief Forester, the evaluation of trees guidelines approved and adopted for professional plantsmen by the International Society of Arboriculture, the American Society of Consulting Arborists, the National Arborists Association and the American Association of Nurserymen, and other available, local information or guidelines.

5. **Grading.** The Advisory Agency is authorized to prohibit grading or other construction activity within the drip line of a protected tree.

Sec. 6. Subdivision 13 of Subsection B of Section 17.06 of the Los Angeles Municipal Code is amended to read:

13. The approximate location and general description of any large or historically significant trees and of any protected trees and an indication as to the proposed retention or destruction of such trees.

Sec. 7. Subsection C of Section 17.06 of the Los Angeles Municipal Code is amended to read:

C. Protected Tree Reports for Tentative Tract Maps. No application for a tentative tract map approval for a subdivision wherein a protected tree is located shall be considered complete unless it includes a report, in a form acceptable to the Advisory Agency and the City's Chief Forester, which pertains to preserving the tree and evaluates the subdivider's proposals for the preservation, removal, replacement or relocation thereof. The report shall be prepared by a tree expert and shall include all protected trees identified pursuant to Section 17.06-B 13 of this Code.

In the event the subdivider proposes any grading, land movement, or other activity within the drip line of a protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and their anticipated effectiveness in preserving such tree.

Sec. 8. Subsection D of Section 17.51 of the Los Angeles Municipal Code is hereby amended to read:

D. Protected Tree Reports for Parcel Maps. No application for a preliminary parcel map approval for a parcel wherein a protected tree is located shall be considered complete unless it includes a report pertaining to preserving said tree. The report shall be prepared by a tree expert and shall evaluate the subdivider's proposals for protected tree preservation, removal, replacement and/or relocation. In the event the subdivider proposes any grading, land movement, or other activity within the drip

line of any protected tree referred to in the report, or proposes to relocate or remove any such tree, the report shall also evaluate any mitigation measures proposed by the subdivider and the anticipated effectiveness thereof in preserving such tree.

Sec. 9. Subsection I of Section 17.52 of the Los Angeles Municipal Code is hereby amended to read:

I. When a protected tree exists on a proposed parcel, the preservation thereof at its existing location, its relocation for preservation purposes, or the removal of said tree shall be regulated in the same manner as that provided under subdivision regulations set forth in this Chapter.

Sec. 10. Article 6 of Chapter IV of the Los Angeles Municipal Code is hereby amended by amending the title and Section 46.00 to read:

ARTICLE 6

PRESERVATION OF PROTECTED TREES

SEC. 46.00. PROTECTED TREE REGULATIONS.

No protected tree may be relocated or removed except as provided in Article 7 of Chapter 1 or Article 6 of Chapter IV of this Code. The term "removed" or "removal" shall include any act which will cause a protected tree to die, including but not limited to acts which inflict damage upon the root system or other part of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

Sec. 11. Section 46.01 of the Los Angeles Municipal Code is amended to read:

SEC. 46.01. DEFINITION.

"PROTECTED TREE" means any of the following Southern California native tree species which measures four inches or more in cumulative diameter, four and one-half feet above the ground level at the base of the tree:

1. Oak tree including Valley Oak (Quercus lobata) and California Live Oak (Quercus agrifolia), or any other tree of the oak genus indigenous to California but excluding the Scrub Oak (Quercus dumosa).

2. Southern California Black Walnut (Juglans californica var. californica)

3. Western Sycamore (Platanus racemosa)

4. California Bay (Umbellularia californica)

This definition shall not include any tree grown or held for sale by a licensed nursery, or trees planted or grown as a part of a tree planting program.

Sec. 12. Section 46.02 of the Los Angeles Municipal Code is amended to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMITS TO RELOCATE OR REMOVE PROTECTED TREES.

No person shall relocate or remove any protected tree, as that term is defined in Section 46.01, where said protected tree is not regulated pursuant to Article 7 of Chapter I of this Code, without first having applied for and obtained a permit from the Board of Public Works or its designated officer or employee, except as otherwise provided herein.

An application for a permit shall indicate, in a manner acceptable to the Board of Public Works, by number on a plot plan, the location of each protected tree, and shall identify each protected tree proposed to be retained, relocated or removed. If any grading is proposed which may affect such a tree, a copy of the grading permit plan in compliance with Division 70 of Article 1 of Chapter IX of this Code shall be submitted with the application.

(a) **Exemptions.** The Board of Public Works shall exempt from and not require issuance of a permit for the relocation or removal of a protected tree where said Board is satisfied that:

1. The proposed relocation or removal of the protected tree has been approved by the Advisory agency pursuant to Article 7 of Chapter I of this Code, or has been approved by the Advisory Agency prior to the effective date of the ordinance that amends this Code Section; or

2. The land upon which the protected tree is located has been the subject of a determination by the City Planning Commission, the City Council, a Zoning Administrator or an Area Planning Commission prior to the effective date of the ordinance that amends this Code Section, the appeal period established by this Code with respect to said determination has expired, the determination is still in effect, and pursuant thereto the protected tree's removal would be permissible; or

3. A building permit has been issued for any property prior to the effective date of the ordinance that amends this Code Section and is still in effect with respect to the property under consideration and its implementation would necessitate such removal or relocation.

(b) **Board Authority.** The Board of Public Works may grant a permit for the relocation or removal of a protected tree, unless otherwise provided herein or unless said tree is officially designated as an Historical Monument or as part of an Historic Preservation Overlay Zone, if said Board determines that the removal of the protected tree will not result in an undesirable, irreversible soil erosion through diversion or increased flow of surface waters which cannot be mitigated to the satisfaction of the City; and

1. It is necessary to remove the protected tree because its continued existence at said location prevents the reasonable development of the subject property; or

2. The protected tree shows a substantial decline from a condition of normal health and vigor, and restoration, through appropriate and economically reasonable preservation procedures and practices, is not advisable; or

3. Because of an existing and irreversible adverse condition of the protected tree, the tree is in danger of falling, notwithstanding said tree having been designated an Historical Monument or as part of an Historic Preservation Overlay Zone.

(c) **Additional Authority.** The Board of Public Works or its authorized officer or employee may:

1. Require as a condition of a grant of permit for the relocation or removal of a protected tree, that the permittee replace said tree within the same property boundaries by at least two trees of a protected variety included within the definition set forth in Section 46.01 of this Code, in a manner acceptable to the Board. Each replacement tree shall be at least a 15-gallon, or larger, specimen in size, measuring one inch or more in diameter one foot above the base, and be not less than seven feet in height measured from the base. The size and number of replacement trees shall approximate the value of the tree to be replaced.

2. Permit protected trees of a lesser size or trees of a different species to be planted as replacement trees, if replacement trees of the size and species otherwise required pursuant to this Code are not available. In such event, a greater number of replacement trees may be required.

3. Permit a protected tree to be moved to another location on the property, provided that the environmental conditions of said new location are favorable to the survival of the tree and there is a reasonable probability that the tree will survive.

Sec. 13. Section 46.04 of the Los Angeles Municipal Code is hereby amended to read:

SEC. 46.04. FEES.

A fee shall be charged for issuance of any permit pursuant to this article which permits the removal of one or more protected trees.

The fees herein shall be determined and adopted in the same manner as provided in Section 12.37 I. 1 of the Los Angeles Municipal Code for establishing fees.

Sec. 14. A new Section 46.06 is added to the Los Angeles Municipal Code to read:

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

(a) The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Director of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections (b) and (c) of this Section, shall have the authority to request to the Superintendent of Building to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued, for which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection (c) of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in subsection (b) of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit

pursuant to this Section.

(b) The Bureau shall notify the applicant or permittee in writing of its intent to act pursuant to this section. The notice shall state that the applicant or permittee may submit any evidence it deems relevant on this matter, the hearing to be held on a date specified in the notice. A copy of such notice shall also be mailed to the owner of the property, if different from the applicant or permittee, as shown on the last equalized assessment roll, and to any person holding a deed of trust, mortgage or other security interest in said property as revealed by a title search with respect thereto. A copy of said notice shall also be recorded with the County Recorder.

(c) The Bureau hearing shall be set on a date no earlier than 20 days after the date of the mailing of the notice provided for in Subsection B above. At said hearing the Bureau shall make a finding that the applicant or permittee is not a purchaser in good faith and for valuable consideration who acquired title to the property subsequent to the illegal removal of the protected tree and prior to the recordation of the notice of intent as provided for in Subsection B above. In the event the Bureau finds that a protected tree was removed in violation of Section 46.00 of this Code, it shall recommend to the Superintendent of Building the length of time the issuance of a building permit shall be withheld. In so recommending, the Bureau shall consider the following factors: the number of trees removed, the size and age of the trees removed, the knowledge and intent of the owners of the property with respect to such removal and prior violations of law with respect to protected trees removal. The applicant or permittee shall be notified in writing of the Bureau's recommendation within 30 days thereafter.

(d) The applicant or permittee may appeal to the Board of Public Works any determination by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination as provided for in Subsection (c) above. Further, that any action by the Department of Building and Safety resulting from any of the provisions of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

(e) Any final recommendation of the Bureau, or the Board on appeal, to refuse to issue a permit or revoke a permit shall be set forth in an affidavit which shall be recorded with the County Recorder. No such affidavit shall be recorded, however, until any legal challenge to the Bureau's or Board's action has been concluded and then only in a manner consistent with any final legal determination.

Sec. 15. Subsection 5. of Section 96.303 of the Los Angeles Municipal Code is amended to read:

5. The owner must also provide a declaration under penalty of perjury that he or she has inspected the property for the existence of protected trees and the number of protected trees, if any, located on the subject property. For the purposes of this Section, the definition of "protected tree" set forth in Section 46.01 of the Los Angeles Municipal Code shall apply. The declaration shall also authorize the Bureau of Street Services within the Department of Public Works to verify such information by entry upon the subject property. A fee may be collected for any inspection required to verify the declaration.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board at the Main Street entrance to Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
Mayor

Approved as to Form and Legality

ROCKARD J. DELGADILLO, City Attorney.

By Keith W. Pritsker
KEITH W. PRITSKER
Deputy City Attorney

Date: Aug. 10, 2005

File No. 03-1459 and 03-1459-S1

#101794

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June 28, 2005

Honorable Rockard J. Delgadillo
City Attorney
7th Floor, City Hall East

Attention: Keith W. Pritsker
Deputy City Attorney

Council File Numbers: 03-1459 and 03-1459-S1

RULE 38 RESPONSE FOR A DRAFT ORDINANCE AMENDING OAK TREE CODE PROVISIONS

The latest version of the draft ordinance submitted for review (second review) does not include the comments made by the Department of Building and Safety in response (first review) to the City Attorney's letter of August 11, 2004, and therefore, pursuant to Council Rule 38, the Department of Building and Safety (LADBS) has again reviewed the proposed draft ordinance amending the oak tree code provisions and have the following comments:

Page 1, Section 1 of the ordinance. Currently, the permit application does not have a "reverse side" where a plot plan is shown. Please remove the phrase "on the reverse side of any" and replace it with "attached to the" since the automation of building permits, all plot plans are now attached to the building permits.

Page 1, Section 1 of the ordinance. It is not clear how the City's Chief Forester (George Gonzalez) is to notify the Department of Building and Safety prior to the issuance of a Certificate of Occupancy. To be assured that all the conditions set forth by the Advisory Agency are met and that the Department of Building and Safety is able to issue the Certificate of Occupancy, please replace the last sentence of the paragraph in Subsection 12 of Section 12.21 A with the following procedure:

> A Certificate of Occupancy may be issued by the Department of Building and Safety, provided the owner of the property or authorized person representing the owner of the property (licensed contractor) obtain from the Advisory Agency in consultation with the City's Chief Forester, prior to the final inspection for the

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construction, a written document signed certifying that all the conditions set forth by the Advisory Agency relative to protected trees have been met.

Page 2, Section 3 of the ordinance. The proper name in accordance with the California Department of Pesticide Regulation is "Agricultural Pest Control Advisor," therefore, please add the word "control" between the words "pest" and "advisor" so that, the definition of the term "Tree Expert" reads: "A person ....who holds a valid California license as an Agricultural Pest Control Advisor or ..."

Page 2, Section 5 of the ordinance. For clarity since both terms are used in this subsection, please add the word "removed" to the second sentence of the first paragraph, so that it reads:

> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 2, Section 5 of the ordinance. The title of the first numbered paragraph "Required Determinations" of Subsection R should be in bold text.

Page 3, Section 5 of the ordinance. Please replace the upper case (I) with lower case (i) in two places on this page and fix the format of the first (i) paragraph on the page to be consistent with the other paragraphs.

Page 3, Section 5 of the ordinance. Items (i), (ii) and (iii) of Subdivision 1 (a) of Subsection R of Section 17.05 refers to "effective date of this Code Section." Please clarify the "effective date" between the effective date of the ordinance of 6/14/62, which added the Code Section 17.05, and the effective date of the ordinance of 4/12/80, which added the Subsection R of Section 17.05 (regarding oak trees). In either case, you may want to replace the term "effective date of this Code Section" with one of the dates, so long as the intent is clear.

Page 3, Subdivision 1 (b) of Section 5 of the ordinance. The first paragraph refers to "The removal of the protected tree would not result in an undesirable, irreversible soil erosion ...which cannot be mitigated to the satisfaction of the City..." It is not clear as to who in the "City" needs to be satisfied. Is there a specific department of the City? Chief Forester? Inspector from LADBS? Please indicate the intent, by specifying who in the "City" needs to be satisfied.

Page 4, Subdivision 3 of Section 5 of the ordinance. Is the word "accept" the correct term? What is the intent of the phrase "accept as to Subsection R1(b) (iii) above," mean? Is the intent to keep the existing protected tree where it is if it is a Historical Monument, unless the tree "is in danger of falling due to an existing and irreversible condition"? If so, than please reword the sentence to convey the intent.

Page 4, Subdivision 3 of Section 5 of the ordinance. Please explain the difference between a protected tree "officially designated as an Historical Monument" (Subsection R3) versus a protected tree "subject to historical preservation requirements" (Subsection R1)? Please explain the logic between the first sentence of Subsections R1 and R3, these two subsections seems to

contradict each other.

Page 4, Subdivision 4(a) of Section 5 of the ordinance. The property is to replace one protected tree with "at least two protected trees..." The definition of the term "protected tree" states in part "...native tree species which measures four inches or more ...four and one-half feet above the ground..." and the second sentence states, "Each replacement tree shall be ...one inch or more in diameter at a point one foot above the base..."seem to be in conflict.

Page 4, Subdivision 4 (b) of Section 5 of the ordinance. Does the convenant and agreement (C/A) have to be approved by the Advisory Agency or someone from City Planning, prior to recording the C/A? If so, then should it be mentioned in the ordinance? Also, is the C/A on a form provided by either Advisory Agency or City Planning? If so, then should that be mentioned as well?

Page 5, Section 6 of the ordinance. Why is it necessary to show the location of "large trees"? Is there a definition of what is considered a "large tree"?

Page 6, Section 8 of the ordinance. For clarity, the term "removed" should be added to the last sentence of paragraph, so that it reads:

> The terms "removed" or "removal" shall include any act which will cause a protected tree to die ....

Page 6, Section 10 of the ordinance. Please clarify what type of permit is referenced in Section 46.02 by amending the title of Section 46.02 to read:

SEC. 46.02. REQUIREMENTS FOR PUBLIC WORKS PERMIT TO RELOCATE OR REMOVE PROTECTED TREES.

Page 6, Section 10 of the ordinance. Is the last sentence of the second paragraph referring to a plan which shows all the grading work in compliance with Division 70 of Article 1 of Chapter IX of this Code being proposed to obtain from LADBS a permit to do grading work? If so, then please provide a definition of the term "grading permit plan."

Page 8, Section 11 of the ordinance. This amendment to Section 46.04 appears to increase the fees by applying the fees of Section 12.37 I.1 to include three other variety of trees, besides the oak tree. This amendment would require a fiscal impact report and may require this ordinance to be heard in Budget and Finance Committee, if it is to remain.

Pages 8 and 9, Section 12 of the ordinance. Please replace the misspell word "Superintendant" with "Superintendent of Building" and remove "of the Department of Building and Safety."

Pages 8 and 9, Section 12 of the ordinance. Please make the following changes to Subsections A and D of Section 46.06 as shown below. It would be very difficult to effectively enforce the intent of this ordinance unless the following changes are made to the procedure of these

Subsections. The changes are shown in underline/strikeout format (underline text is new language and strikeout shows text to be removed).

SEC. 46.06. NON-ISSUANCE OR REVOCATION OF BUILDING PERMIT FOR ILLEGAL REMOVAL OR DESTRUCTION OF PROTECTED TREES.

A. The Bureau of Street Services shall have the authority to request the Superintendent of Building to withhold a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, if the Bureau determines that a protected tree was removed or relocated in violation of Section 46.00 of this Code. Said request shall be made in writing from the Chief of the Bureau of Street Services or his/her designee and shall specify the start date and end date of the period for which a building permit is withheld in accordance with this Section.

Further, the Bureau of Street Services, after notice and hearing pursuant to Subsections B and C of this Section, shall have the authority to request ~~recommend~~ to the ~~Superintendant~~ Superintendent of Building ~~of the Department of Building and Safety~~ to withhold issuance of a building permit, except for permits which are required by law or necessary to comply with a Department of Building and Safety Order, for a period of time up to a maximum of 10 years as requested by the Bureau and to revoke any building permit issued ~~unless expired, for which rights have not been obtained~~ which construction has not commenced with respect to any property on which any protected tree has been removed in violation of Section 46.00 of this Code. Said request shall be made in writing by the Bureau Chief or his/her designee and shall specifically state the period of time the Bureau or the Board on appeal, have deemed necessary pursuant to Subsection C of this Section. Such period shall commence on the date the Bureau first becomes aware of the removal of such tree. Provided, however, the authority of the Bureau to act shall not apply to a purchaser, or to his or her agent, who in good faith and for valuable consideration has acquired title to the property subsequent to the illegal removal of any protected trees and prior to the recordation of the notice of intent as provided for in Subsection B of this Section.

The Board of Building and Safety Commissioners does not have the authority to hear appeals regarding the withholding of any building permit pursuant to this Section.

D. The applicant or permittee may appeal to the Board of Public Works any determination ~~recommendation~~ by the Bureau to revoke or withhold issuance of a building permit, including the length of time imposed. The appeal must be filed with the Board of Public Works within 30 days of the date of mailing of the notice of determination ~~recommendation~~ as provided for in Subsection C above. Further, that any action by the Department of Building and Safety resulting from any of the provision of this Section, including building permit revocation, shall not be appealable to the Board of Building and Safety Commissioners.

Page 9, Section 12 of the ordinance. Please delete the last sentence of Subsection B of Section

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City Hall East, Seventh Floor
Mail Stop 140

CITY OF LOS ANGELES SPEAKER CARD

#3

Date: 11-5-03

Council File No., Agenda Item, or Case No.: CF 03-1459

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Name of City Agency, Department, Committee or Council

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(X) For proposal
( ) Against proposal
( ) General comments

Name: SYLVA BLACKSTONE

Business or Organization Affiliation: CERTIFIED ARBORIST / LOS ANGELES TREE COALITION

Address: 1867 NORTH AVENUE 51 LOS ANGELES CA 90042
Street City State Zip

Business phone: 323-255-1983 Representing:

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CITY OF LOS ANGELES SPEAKER CARD

#3

Date: 11/5/03

Council File No., Agenda Item, or Case No.: ~~00-1091~~ 03-1459-S1 03-1459

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Exhibit 2

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CONTENTS

Distribution and Environmental Relations of California Black Walnut (*Juglans californica*) in the Eastern Santa Susana Mountains, Los Angeles County
Don P. Mullally 1

Comparison of Annual and Perennial *Eschscholzia californica* (Papaveraceae) at the Antelope Valley California Poppy Reserve
Curtis Clark and Nancy A. Charest 19

Book Review 27

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Distribution and Environmental Relations of California Black Walnut (*Juglans californica*) in the Eastern Santa Susana Mountains, Los Angeles County

Don P. Mullally

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One of the largest remaining populations of southern California's native walnut, *Juglans californica*, is found in the Santa Susana Mountains of Los Angeles County. The trees are found in some unusual vegetation types. This paper describes those associations as well as the general distribution and ecology of the species in that region.

Virtually no technical biological or ecological studies, descriptive or otherwise, have been published about the eastern part of the Santa Susana Mountains. This range, one of the Transverse ranges, is situated directly west of the San Gabriel Mountains. In many respects it is biologically intermediate between the San Gabriel and Santa Monica mountains. Animals which occur in the San Gabriel and Santa Susana mountains, but not in the Santa Monica Mountains, include Stellar's Jay (*Cyanocitta stelleri*) and Merriam chipmunk (*Eutamias merriami*). Trees with similar distribution include canyon live oak (see Table 1 for scientific names), big cone Douglas fir, and interior live oak. Since 1976, this part of the mountain range has been included in Significant Ecological Area 20 of Los Angeles County.

The study area is located between the San Fernando Valley to the south and the Santa Clarita Valley to the north. The western edge is marked by Oat Mountain, a portion of Towsley Canyon, and Brown's Canyon, the eastern edge being Interstate 5 in Weldon Canyon and San Fernando Road.

The core of the Los Angeles County portion of the Santa Susana Mountains is privately owned, and access has been denied to the public. It has been used as open cattle range since at least 1930. The Orcutt Ranch comprises a major part, and it includes most of the crest of the range within the study area. For the past five years, grazing has been minimal outside the Orcutt Ranch; about fifteen wild cattle have been

observed. Presently, the former ranch is a loose union of individual land owners whose objective seems to be securing profits by sales of land to developers or other interested parties.

Recently, lower portions of Towsley Canyon have been acquired by the Santa Monica Mountains Conservancy. Most of the remainder of the study area on the north-facing slope has also been favorably evaluated by the California Department of Parks and Recreation and the Santa Monica Mountains Conservancy for the creation of an eight thousand acre state park tentatively referred to as the Santa Clarita Woodlands State Park.

California walnut woodlands have been seriously diminished by developments in southern California. Many scientists consider it an endangered community. However, the species itself does not have endangered classification and accordant protection.

Methods

Observations were made of the California black walnut and associated vegetation in conjunction with employment by the City of Los Angeles at O'Melveny City Park. O'Melveny Park, 291 ha in size, is primarily a wilderness park and is situated in Granada Hills at the southeastern corner of the mountain range. Further studies were made to facilitate studies required by the state park agencies. Emphasis has been placed on the distribution of California black walnut and its position in major vegetation types. The information in this descriptive report is considered to be introductory to further investigations involving quantitative methods.

The methods basically involved finding routes which penetrate this rugged land, exploring, making observations, keeping notes and photographing vegetation types. To measure the sizes of stands, distances were determined by pacing and lines and angles by using a compass.

During 1991 and 1992, Dr. Todd Keeler-Wolf, Vegetation Ecologist for the Natural Diversity Data Base, California Department of Fish and Games requested information concerning the vegetation types. Eventually a preliminary map was made of the vegetation types of the north slope. Much of the relevant information has been incorporated into the data base. Dr. Keeler-Wolf has also examined part of the area. The results of this study and the vegetation mapping are complementary.

Results

Results are presented in two sections. The first describes the distribution and habitats of California black walnut and associated vegetation types on the southern and northern aspects of the mountain ranges. The second describes the principal vegetation types which include walnuts, as well as other aspects of the ecology of this tree.

Ecology and Distribution On the South and East Slopes

The California black walnut sparsely populates the warm and relatively dry south slope facing the San Fernando Valley. Ground cover and understory usually consist of non-native grasslands or coastal sage scrub. Chaparral communities are scarce and have been found only in Brown's Canyon and a portion of Limekiln Canyon within the Aliso Gas Field owned by the Southern California Gas Company.

Laurel sumac and walnut frequently occur together in draws and on alluvium at the base of hills and in canyons. The sumac matures to an arborescent shrub, and the walnut frequently exists as a shrubby tree. The major stems of both species are killed by fire, and both regenerate vigorously. Following fire, however, the sumac demonstrates ad advantage by reproducing vigorously under walnut trees through seedlings. The reverse does not occur.

Laurel sumac is confined to the southern exposure by minimum temperatures. At 639 m, a freeze killed some sumac on a ridge above Sunshine Canyon. The survivors resprouted from their crowns.

Walnut trees and woodland are common along the borders of the more permanent intermittent streams. The woodlands are composed of walnut and coast live oak, arroyo willow, flowering ash, toyon, and Mexican elderberry. Ash is usually confined to dry upslope perimeters. Western sycamores are occasional, and big leaf maples are scarce. The canopy is a mixture of the tree species of the stream bed, the banks, and the riparian zone.

The California walnuts are interspersed in the woodlands and on the borders of stands of oaks or willows. These patterns of distribution are found along Bee Canyon Creek in the northern half of O'Melveny City Park and along Limekiln Canyon Creek within the Aliso Gas Field. They are also repeated on the north slope of the range.

Occasionally a walnut tree is found growing down to within one or two vertical meters of stream beds; however, the beds change elevation frequently by at least 1 m due to erosion and deposition. When rooted near the beds of the wetter intermittent streams, native walnuts not only

acquire sufficient moisture but apparently avoid root immersion and fungal disease by sending roots upslope into drier soil. Similarly, walnuts which exist on the periphery of park lawns usually thrive. At O'Melveny Park, mature native walnuts which were left to exist in irrigated lawns died within 10 years.

The density of walnut woodlands increases in the drier intermittent streams and canyons which channelize rainwater only during major rainstorms. With the exception of Mexican elderberry, other tree species are scarce in this environment. Essentially pure stands of walnut woodland frequently occupy such canyons. This pattern is represented along Bull Creek above Neon Way in O'Melveny Park, above Bull Creek, and in canyons west of the buildings and lawns in the park.

In arid locations on mountainsides, even relatively small canyons or ravines have more California walnuts than the surrounding slopes. The species seems to be particularly well adapted to relatively dry canyons.

On the south slope, the trees are relatively abundant in small canyons with one side facing to some degree east. They occur in small woodlands and savannas. These patterns may be observed in portions of the Aliso Gas Field and in O'Melveny City Park.

Though populations of walnuts are sparse on south and west slopes, *Juglans californica* is the principal tree species on these slopes. Mexican elderberry is usually the only other tree present. The ecological requirements of the California walnut seem to be more similar to those of Mexican elderberry and flowering ash than to any other species of local trees.

The north slopes of east-west canyons frequently support dense vegetation, including walnuts, scattered coast live oak, toyon, poison oak, hollyleaf redberry, and coastal sage scrub.

Along intermittent streams, California walnut and associated plants tolerate high salinity and alkalinity throughout the dry season. The salinity becomes evident as intermittent stream beds become white with evaporite salts as surface water disappears. The salts are derived from marine sedimentary rocks Miocene in age or younger which form these mountains. Locally the most common substrates are soft shale, sandstone, and mudstone.

No mature California walnut trees were observed to die from brush fires or the severe drought of 1986-1991 in O'Melveny or Limekiln city parks. Though fire frequently killed all the stems, new stems invariably grew from the crowns. Following the Limekiln fire, a riparian tree

developed new stems up to 4.5 m long during the following growing season.

Ecology and Distribution on the North Slope

East of Oat Mountain, the north slope of the Santa Susana Mountains holds one of the largest and most unusual hardwood forests in southern California. Big cone Douglas fir is abundant and a member of these mixed evergreen forests in the higher parts of major canyons. According to the environmental impact report for Sunshine Canyon (Ultrasystems, 1989-90), 577 ha located in Sunshine Canyon support at least 7,742 Coast live oaks, 2,700 Canyon live oaks, and 1,300 big cone Douglas firs. A similar report for the Towsley canyon drainage, 1062 ha in size, lists 20,854 valley oaks, 5,801 canyon live oaks, 28,467 coast live oaks, 9,670 big cone Douglas firs, and 1,410 western sycamores (McClelland Consultants, 1990). Most of the trees exist in the southern (upper) one third of the canyon. Species of trees not counted in the Towsley report are California black walnut, interior live oak, scrub oak, flowering ash, big leaf maple, Mexican elderberry, toyon, and arroyo willow. All of these are also common.

Between Sunshine and Towsley canyons, a much larger number of trees of these species exist principally within Rice, East, Wiley, and upper Bee canyons. Black cottonwood occurs on the north side of The Old Road near the Weldon overpass on Interstate 5. White alder and hollyleaf cherry are notable for their absence from the study area.

On the north slope, walnut is primarily a member of open woodlands of various types, including riparian, and grasslands. It is frequent in coastal sage scrub on north, west, and east slopes but very scarce in chaparral. Walnuts are found within or on the borders of coastal sage scrub in East and Rice Canyons, along San Fernando Road, and in the lower parts of Towsley Canyon. South facing slopes of scrub located on this side of the range are nearly devoid of walnut except near canyon bottoms; walnuts are more abundant on west than south slopes.

Mature coast live and valley oak woodlands commonly have a thin understory which may include young trees such as oaks, Mexican elderberry, toyon and flowering ash. Understory shrubs often include poison oak, hillside gooseberry, hollyleaf redberry, snowberry, white nightshade, and purple nightshade. With sufficient sunlight, bush monkey flower, California sagebrush, and hairy leaf ceanothus may be present. A correspondence seems to exist between availability of soil moisture and the quantity of understory. Openings in the woodland

frequently support, in addition to the above, California buckwheat, yerba santa, white sage, chaparral yucca, and heart-leaved penstemon.

California walnut trees and woodland usually have little understory vegetation other than grasses. Scrub vegetation is common between widely separated walnuts but is replaced beneath them by grasses. Shrubs are more abundant near walnuts with increased soil moisture; that is, near streams, springs, and slopes with high levels of underground moisture.

Fire seems to be important to the establishment of large populations of *Juglans californica*. The species recovers faster following fire than does coastal sage scrub. Following fires, scrub is often replaced by grasses which require less water. In woodland, fires kill many young trees and shrubs, lessening competition. Fires also cause local "hot spots" wherein mature oaks and other trees are destroyed. Opening are thus created in the forest which are ideal for colonization by California walnut.

One conclusion resulting from this study is that repeated fires have opened large areas of woodland in the headwaters of Rice Canyon for colonization by walnut. As a result, this tree is found in association with most of the dominant forest trees of these mountains. Some of these associations are unusual if not unique and are described later in this paper. The results of fire are also evident in other canyons and on the north-northeast side of Oat Mountain. The situation on Oat Mountain is particularly unusual because fire enable the development of a unique, extensive community of snowberry chaparral. Walnut, young oaks, and other trees are numerous in this chaparral and are converting this chaparral, which is evidently a seral stage, back to woodland. Major fires burned through the study area in 1937 and 1970. Localized fires occur much more frequently.

Fires have promoted colonization by walnuts and otherwise affected the vegetation on the steep north slope just south of the Weldon Overpass on Interstate 5. Evidence of fires includes occasional charred logs and tree bark, old fire scars on mature oaks, standing dead large *Pseudotsuga*, ramets of walnut and toyon, and abundant poison oak.

Gaps in the woodland near Weldon Overpass are usually occupied by walnut trees and stands. Under the canopy, seedlings of walnut, coast live oak, and toyon are unusually abundant for the study area as a whole. Cattle have seldom grazed these steep slopes, perhaps accounting for the abundance of seedlings.

A shortage of old oaks near the Weldon Overpass may constitute evidence of purposeful removal of oaks from this accessible location. It

is a matter of record that Mission San Fernando had great need of oak and harvested throughout northwestern San Fernando Valley. The foothills of the San Gabriel and Santa Susana Mountains were probably major sources.

Community Patterns

Stands of California black walnut—These include pure stands and stands which include a very few trees of other species, namely flowering ash, coast live oak, and Mexican elderberry. Understory is usually herbaceous, dominated by annual grass, and less often by shrubs and sub-shrubs. Some of the stands have over 80% canopy and are sufficiently dense to be described as forest.

Walnut savannas are particularly characteristic of south and west slopes; woodland exist in relatively dry canyons on the south slope of the range. On the northern exposure of the range, larger stands of walnut woodland and forest are located at intervals throughout the area: Oat Mountain at 900-1100 m, Bee Canyon at 480-700 m, Rice Canyon at 600-840 m, East Canyon at 500-660 m, Wiley Canyon at 540-690 m, and lower Towsley Canyon at 390-700 m. Several large woodlands are located in Towsley Canyon near Interstate 5 and the park. Two of them are approximately 3.3 and 2.5 ha in size. Large stands of walnut are also located in upper Rice Canyon, one being at the head of the canyon west of the intersection of the Oat Mountain Motorway and the Corral Sunshine Motorway.

Walnut woodlands and forest seldom exceed 2 ha in size. They are usually surrounded by savanna, grasslands, or coastal sage scrub. Having been through fires, nearly all the trees grow as ramets.

Within the life spans of the trees, there is no evidence to indicate that relatively dry stands of walnut are successional stages or precursors of oak or other woodlands. Under such conditions, large stands of California black walnut are climax vegetation. If stems are killed by fire, the walnuts regenerate as ramets. On mesic north-facing slopes, pure stands of walnut woodland and forest may include a few seedling or sapling coast live oaks. These stands may evolve into woodlands composed of both walnut and oak.

On the north slope of Oat Mountain and again 1.8 km to the east and 100 m north of Oat Mountain Motorway, walnuts exist within an unusual chaparral dominated by snowberry. Western chokecherry is a component of the chaparral, and this species has not been observed elsewhere in this range.

Above about 900 m, walnut trees are smaller than those growing in the foothills. Reduced size may result from a shortened growing season and reduced average temperatures during the growing season. Mexican elderberry shows similar stunting.

Cold winters and considerable snow characterize elevations above 800 m. However, there is no evidence that sub-freezing temperatures have destroyed tissues of sizable walnut trees. The effect on seedlings is unknown.

The largest and probably the oldest tree trunks are genets located to the east and west of the Nature Center in the lower portion of Towsley Canyon, elevation 450 m. Genets of large size also exist on the relatively broad bottom of Rice and East Canyons (45-490 m). In these locations, oak woodlands seem to have sheltered many walnut trees from the worst effects of fire. In addition, the trees are sheltered from upslope firestorms. Ramets predominate on the surrounding hillsides. In the study area many more walnut trees exist in mixed associations of trees than in pure stands.

Occurrence with coast live oak—Woodland dominated by coast live oak and California black walnut is one of the most common vegetation types in the Santa Susana Mountains. It is best developed in canyons and on the north slope of the range occurring as intervals from the base of the mountains to at least 790 m. Occasionally this vegetation type is in the riparian zone.

One of the better accessible examples is located on the north slope near the Weldon Canyon Overpass on Interstate 5. Few of these woodlands are even mixtures. Usually they are weighted toward either walnut or oak. Furthermore, flowering ash is usually present as an important member of the woodland, introducing an unusual configuration to the community.

A few woodlands of coast live oak have essentially full canopies and do not admit sufficient sunlight to support walnuts. Technically they are forests. Examples are located at the confluence of East and Rice canyons, in upper Bee Canyon, lower Leaming Canyon, Sunshine Canyon and in a small tributary of Towsley Canyon situated one ridge to the west of Wiley Canyon.

In oak-walnut woodlands, *Juglans californica* commonly creates a pattern which may be termed an edge effect: Walnuts exist beside or surround a tree or small stand of another species, most commonly Coast live oak. However, the edge effect has also been noted in conjunction with valley and canyon oaks, California bay laurel and big cone Douglas fir. For the edge effect to be expressed, an opening for walnuts must

exist in the woodland with sufficient sunlight. The borders of woodland communities are particularly favorable.

In open or unforested locations, young specimens of both walnut and coast live oak are abundant on the banks of streams. Small meadows in woodland and the banks of roads are also excellent habitat for oak and walnut seedlings.

Young oaks are also common beneath the canopy of mature oaks and several meters in the open beyond the canopy. Apparently much germination of this species occurs close to seed trees, resulting in the enlargement of stands as well as replacement of trees that have died. This process seems to be most effective in small stands or groves.

However, walnut seedlings and saplings are rare under oaks, and they do not seem to grow beyond sapling size unless an oak succumbs. Young walnuts are frequent peripheral to the canopies of mature oak and walnut trees which are located in openings in the riparian zone near the bottoms of canyons and on slopes with abundant subsurface moisture.

In drier woodlands, the origin of stands of walnut is obscured by the relative absence of seedlings and young trees. This study coincided with the severe drought of 1986-1991. It is possible, perhaps probable, that the drought was responsible for the scarcity of seedlings. In O'Melveny City Park, seedling walnuts were noted near seed trees during the summer following the fire of December, 1988. They had disappeared by November. Predators, of course, cannot be ruled out. Preliminary observations indicate increases in numbers of seedlings this year. If this finding is substantiated, the increase is probably due to the heavy rains of January to April, 1991.

Walnut and oaks frequently establish as seedlings only a few meters apart. The walnuts remain on the outer margin of enlarging oaks by being faster growing and by sending forth long stems which are more horizontal than vertical. Thus an edge effect is maintained. No dead large walnut trees which obviously died from inadequate light have been found beneath large oaks.

From September, 1991, to February, 1992, large numbers of walnut seeds were observed on the surface of a thatch of dead, horizontal non-native annual grasses some 7-12 cm deep. Heavy rains had failed to dislodge most of the seeds or cause their burial in thatch or soil. This thatch factor may be partially responsible for poor recruitment of *Juglans californica*.

Occurrence with valley oak—The valley oak tends to form pure stands of savanna and woodland. A few stands 0.5-1.0 ha in size are

sufficiently dense to be termed forest. Most of the stands are located on the summit of the axis of the range and on low angle north slopes above 700m. The species is also commonly a constituent of old growth woodlands on low angle north slopes at similar elevations. These include canyon and coast live oaks, big cone Douglas fir, and other trees.

California walnuts rarely exist within stands of valley oak woodland and forest. However, they are frequent on edges, including road banks, and in woodland bordering intermittent streams which traverse stands of oaks.

In the western headwaters of Rice Canyon located 1 km northeast of the intersection of the Oat Mountain Motorway and the fire road, mixed hardwood woodlands exist adjacent to valley oak woodlands. Dominant trees include valley, coast live, and canyon oaks, California black walnut, flowering ash, and California bay laurel. The understory includes young trees, poison oak, snowberry, hollyleaf redberry, and hillside gooseberry. Extensive understory rarely exists beneath pure stands of valley oaks within these mountains.

Woodlands of the type described above are rare. A few mature valley oaks are embedded in walnut-ash woodlands located beside the East Canyon Motorway near the top of that canyon. Along the Corral Sunshine Motorway located on the ridge south of Bee Canyon, walnuts border valley oaks and form stands in grasslands surrounded by oak woodlands. Similar vegetation occurs west of the junction of the Sunshine and Oat Mountain motorways.

It is evident that past fires have created large openings in oak woodlands enabling colonization by walnuts and other trees. The scarcity of walnut and understory in many stands of valley oak is attributed to marginal soil moisture during dry weather, aggravated by competition with oaks for soil moisture.

With the exception of the north slope, Oat Mountain at 1034-1094 m holds woodland and savanna composed of valley oak and California lack walnut, with the oak more abundant.

Occurrence in the big cone Douglas fir-canyon live oak-coast live oak forest—This vegetation type forms dense forests on steep slopes at the heads of canyons and in narrow canyons with permanent streams. Examples are at the heads of Sunshine, East and Wiley canyons and at several locations in the large Rice Canyon drainage and in Bee Canyon. California bay laurel and big leaf maple are frequently present in the community. Apparently California walnut is excluded due to

insufficient sunlight. However, walnuts exist in ecotones on the borders of the community which receive more sunlight.

Pseudotsuga-oak woodlands which have been severely damaged by fire have openings which occasionally have been colonized by walnuts. Though such locations are scarce, an excellent example is present near the crest of the north slope located south of the Weldon Overpass on Interstate 5.

Occurrence with flowering ash—Flowering ash locally attains an unusually large size. Trees of 30 cm DBH and approximate heights of 14 m are not unusual. Ash trees are distributed throughout the study area at elevations of 420-1000 m. However, optimal growth occurs on the north slope at 480-660 m. Ashes seem to be more tolerant than walnuts to low soil moisture and tend to be located on drier slopes than walnut. They are scarce on south slopes. However, ashes may be peripheral to the riparian zone along streams.

Woodlands dominated by walnut and ash exist on easterly and northerly slopes in East Canyon at 500-600 m, on northerly and westerly slopes at the head of Leaming Canyon at 547-665 m, on two northerly slopes in the middle of Rice Canyon at 500-630 m, in upper Rice Canyon at 699-851 m, and on two northerly slopes in Towsley Canyon near the old oil field at 517-669 m. The woodlands in Towsley are approximately 2.3 and 3.5 ha in size. Other such woodlands occur in O'Melveny Park. Coast live oak and toyon are frequently minor elements in the woodlands. Small groves of walnut or ash are frequently embedded in the middle of the larger stands of walnut-ash woodland.

All of the walnut trees in walnut-ash woodlands exist in ramet form. The trunks of ash trees seem to survive fire better than those of walnut. Fire possibly had an important role in community formation by eliminating previously existing forms of vegetation. This community seems to be unique and confined to this part of the Santa Susana Mountains.

Occurrence with California bay-laurel—Bay-laurel is found near sufficient soil moisture in all of the major canyons and is particularly abundant near springs, permanent water, and the more reliable intermittent streams. It is usually in association with canyon, coast live, and valley oaks, big leaf maple, and big cone Douglas fir. Occasionally, however, it forms vegetation types with California black walnut, floering ash, and walnut-coast live oak. Small areas (½ ha or less) of this association are embedded in the walnut-ash woodlands in Towsley and East and Rice canyons and on the north and west slopes of Oat Mountain. However, it is more extensive and distinct along streams in

the central and western portions of the headwaters of Rice Canyon Creek, at 700-850 m. The woodlands are surrounded by valley and coast live oak savanna and woodlands and mixed hardwood woodlands. Bay laurel forms ramets following fire. Flowering ash and California bay laurel also frequently form groves or pure stands one hectare or less in size.

Discussion

It has been established that *Juglans californica* can be locally dominant in woodlands of coastal southern California (Swanson, 1967; Leskinen, 1972; Griffin and Critchfield, 1972; Griffin, 1977; Campbell, 1980; Keeley, 1990). These woodlands have been classified as "the coast live oak phase" (Griffin, 1977) of the "southern oak woodland" (Munz and Keck, 1959). The present study has revealed that California black walnut also exists as a co-dominant in valley oak woodlands and mixed evergreen forests which have been opened by fires. Trees of the mixed evergreen forest include *Pseudotsuga macrocarpa*, *Quercus chrysolepis*, *Umbellularia californica*, and *Acer macrophyllum*.

From his studies, Quinn (1989) states that the walnut is the only tree present in many stands located in the San Jose and Puente Hills, and that the stands attain a vegetative cover of 100%. He calls such stands forests and notes that the Natural Diversity Data Base (Holland, 1986) includes the category California Walnut Forest. Walnut forests were also observed in the Santa Susana Mountains. They are usually less than two hectares in size and rarely have understory other than grasses and other herbaceous plants.

All of the walnut forests and woodland situated in the eastern Santa Susana Mountains have experience fires, and most of the trees have multiple trunks. Keeley (1990) has suggested that at Mount Washington, closed canopies constitute evidence of a fire-free environment.

Sizable California walnut trees with single trunks (genets) were found to be most abundant in relatively broad canyon bottoms. Quinn (1989) concluded that walnuts in canyon bottoms have a fewer number of trunks than hillside trees.

Quinn (1989) also emphasized that burned walnuts invariably resprout to form new trees with multiple trunks. The results of this study agree with those conclusions.

Walnut woodlands develop optimally on northern exposures in soil derived from Tertiary (Miocene-Pliocene) marine shales (Leskinen, 1972; Keeley, 1990). This study is in agreement but also stresses the

occurrence of woodland on east slopes and in canyons with intermittent streams draining in easterly directions. The woodlands may be almost pure stands or mixed hardwood stands.

During the drought of 1986-1990, seedlings and saplings were most common on stream banks and in the riparian zone. They were practically absent on drier slopes supporting oak and walnut woodlands. The lack of seedlings at Brea (Swanson, 1967) was attributed to low precipitation in that region. Keeley (1990) attributed gaps in age classes of walnut trees to annual variations in recruitment and mortality due to precipitation. Thus, it is evident that years of insufficient precipitation and droughts interfere with the ability of *Juglans californica* to form seeds, or with the ability of the seedlings to grow deep roots reaching sufficient moisture to survive the first dry season.

Some of the ecological requirements of California black walnut are characteristic of other species in the genus. As described, *Juglans californica* is a prominent tree in the riparian zone as well as on dry slopes. *Juglans hindsii* of central California always occurs on moist valley soils (Jepson, 1917). Peattie (1990) states that the tree is confined to the banks of rivers and streams. In the southwest, *Juglans major* and *J. rupestris* grow on the banks of streams and in bottom lands, washes, and draws (Peattie, 1990; Vines, 1960). These species also form groves (stands), and *J. rupestris* is frequently the only tree in dry washes (Peattie, 1990). Along the Flambeau River of Wisconsin, *Juglans cinerea* is part of the streamside community (Braun, 1950).

Thus many species in *Juglans* are adapted to conditions along rivers and stream which course through canyons, draws, and bottom lands. *Juglans californica* is no exception to this general rule even though it may be scarce along rivers which course through broad valleys. However, it is exceptional to the degree that it successfully exists on dry hillsides and uplands as pure stands, single trees and as a constituent of woodland communities.

Axelrod (1937) concluded from his studies of the Pliocene Mt. Eden beds that ancestral *Juglans californica*, though abundant, was confined to the banks and edges of streams, marshes and lakes. Ancestral walnuts most likely existed in washes, along stream banks, and in the riparian zone. Evidence now indicates that since Mt. Eden times, this walnut has evolved to tolerate dry summers and exist upon dry slopes presently characteristic of the hills of cismontane southern California.

The characteristic of forming pure stands seems to have existed in the ancestor of *J. californica, J. rupestris,* and *J. major.* These species exist in arid southwestern climates, grow best in full sun, reproduce

poorly or sporadically from seeds, and are capable of developing multiple stems (Peattie, 1990).

In the Santa Susana Mountains, deposits of limestone are frequent and are favorable to growth of *J. californica*. [Editor's note: This is also true in the San Jose Hills west of Pomona.] *Juglans rupestris* is confined to streams in limestone regions (Peattie, 1990).

Ancestral flowering ash was also present at Mt. Eden (Axelrod, 1937). However, Axelrod does not indicate that this tree existed near water in association with walnut trees. It may be that in the Pliocene ash was already adapted to exist in chaparral or woodland communities.

Summary

California black walnut is abundant in the Santa Susana Mountains within Los Angeles County. The species is thinly distributed on arid and hot slopes on the southern side of the range. In the canyons, however, walnuts are relatively abundant along intermittent streams and small canyons which conduct runoff during major rainstorms. During the dry season, the species tolerates high alkalinity and salinity.

On the north slope, the tree is a component of one of the largest and most unusual mixed evergreen and hardwood forests in southern California. Pure and nearly pure woodlands and forests of California black walnut are common. It grows in woodland and savanna with *Quercus agrifolia*, *Q. lobata*, *Fraxinus dipetala*, and *Umbellularia californica*. Walnut also borders other vegetation types including chaparral, arroyo willow, coast live oak forest, dense valley oak woodland and forest and big cone Douglas fir-canyon oak forest. Following fire or other disturbance, walnut colonizes openings in these vegetation types. Walnuts are particularly well adapted to existing in openings and on the edges of other plant communities.

Vegetation types dominated by combinations of California black walnut, flowering ash, and California bay laurel are considered to be very rare, perhaps even confined to the Santa Susana Mountains. All of these species also segregate to form pure stands.

Walnut woodlands are also common on east slopes and in canyons with intermittent streams draining in easterly directions. The woodlands may be almost pure stands or walnut-oak stands.

Though walnuts are common on dry hillsides and occasionally form pure stands, they are also a component of riparian woodlands. They exist down to within 2 m of the beds of major intermittent streams. Conditions of marginal soil moisture during the dry season are

considered to usually preclude the existence of walnuts in valley oak woodlands.

Fires have created openings in oak and big cone Douglas fir woodlands, coastal sage scrub, and chaparral. These openings facilitate colonization by California black walnut. All of the walnut woodlands have experienced fire, and the trees resprout following the fire.

Large pure stands are not destroyed by fire, and stands occurring on relatively dry slopes apparently are not sites for the germination of other species of trees or the process of succession. Stands are climax vegetation for at least the life span of the trees. On mesic north slopes, coast live oaks may develop within mature walnut woodland. Genets are common on the broad bottoms of major canyons. Because of fires, ramets are predominate on hills and canyon walls.

During the drought of 1986-1991, seedlings were most abundant in riparian zones. In this zone large numbers were observed near the periphery of the canopies of mature walnuts and *Quercus agrifolia*. On arid hillsides, seedlings were very scarce near these trees. Insufficient precipitation and droughts seems to be major causes for years of poor recruitment in *Juglans californica*.

Locally walnut trees rarely exist within stands of chaparral dominated by *Adenostema*, *Ceanothus*, and *Arctostaphylos*. Near the summit of Oat Mountain, they are common in chaparral composed of *Symphoricarpos mollis*.

In common with *Juglans major* and *J. rupestris* of the southwest, *Juglans californica* exists in streamside and riparian environments. These species are also similar in that they can form essentially pure stands. Of the three species, *Juglans californica* is the only one that exists on dry hillsides as stands and as a dominant and co-dominant component of woodland communities.

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Table 1. List of species mentioned in text with their scientific names.

Arroyo willow	*Salix lasiolepis*
Big cone Douglas fir	*Pseudotsuga macrocarpa*
Big leaf maple	*Acer macrophyllum*
Black cottonwood	*Populus trichocarpa*
Blue oak	*Quercus douglasii*
Bush monkey flower	*Mimulus longiflorus*
California bay-laurel	*Umbellularia californica*
California buckwheat	*Eriogonum fasciculatum*
California sagebrush	*Artemisia californica*
Canyon live oak	*Quercus chrysolepis*
Chaparral yucca	*Yucca whipplei*
Coast live oak	*Quercus agrifolia*
Flowering ash	*Fraxinus dipetala*
Hairy leaf ceanothus	*Ceanothus oliganthus*
Heart-leaved penstemon	*Keckiella cordifolia*
Hillside gooseberry	*Ribes californicum*
Hollyleaf cherry	*Prunus ilicifolia*
Hollyleaf redberry	*Rhamnus illicifolia*
Interior live oak	*Quercus wislizenii*
Laurel sumac	*Rhus laurina*
Mexican elderberry	*Sambucus mexicana*
Poison oak	*Toxicodendron diversilobum*
Purple nightshade	*Solanum xantii*
Scrub oak	*Quercus berberidifolia*
Snowberry	*Symphoricarpus mollis*
Toyon	*Heteromeles arbutifolia*
Valley oak	*Quercus lobata*
Western chokecherry	*Prunus virginiana*
Western sycamore	*Platanus racemosa*
White alder	*Alnus rhombifolia*
White nightshade	*Solanum douglasii*
White sage	*Salvia apiana*
Yerba santa	*Eriodictyon crassifolium*

Exhibit 3

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF FISH AND WILDLIFE

DATE: March 20, 2018

TABLE OF CONTENTS

1. INTRODUCTION AND PURPOSE 1
2. BOTANICAL FIELD SURVEYS 4
3. REPORTING AND DATA COLLECTION 7
4. BOTANICAL FIELD SURVEYOR QUALIFICATIONS 11
5. SUGGESTED REFERENCES 11

1. INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as sensitive natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to botanical field surveys and assessments of special status plants and sensitive natural communities so that reliable information is produced and the potential for locating special status plants and sensitive natural communities is maximized. These protocols may also help those who prepare and review environmental documents determine when botanical field surveys are needed, how botanical field surveys may be conducted, what information to include in a botanical survey report, and what qualifications to consider for botanical field surveyors. These protocols are meant to help people meet California Environmental Quality Act (CEQA)[1] requirements for adequate disclosure of potential impacts to plants and sensitive natural communities. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[2] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[3].

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1 Available at: http://resources.ca.gov/ceqa
2 Available at: http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/techbio.aspx
3 U.S. Fish and Wildlife Service Survey Guidelines: https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/

Department of Fish and Wildlife Trustee and Responsible Agency Mission

The mission of the California Department of Fish and Wildlife (CDFW) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. CDFW has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish & G. Code, § 1802). CDFW, as trustee agency under CEQA Guidelines section 15386, provides expertise in reviewing and commenting on environmental documents and provides protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA) provide additional protections for such species, including take prohibitions (Fish & G. Code, § 2050 *et seq.*; Fish & G. Code, § 1908). As a responsible agency, CDFW has the authority to issue permits for the take of species listed under CESA and NPPA if the take is incidental to an otherwise lawful activity; CDFW has determined that the impacts of the take have been minimized and fully mitigated; and the take would not jeopardize the continued existence of the species (Fish & G. Code, § 2081, subd. (b); Cal. Code Regs., tit. 14 § 786.9, subd. (b)). Botanical field surveys are one of the preliminary steps to detect special status plant species and sensitive natural communities that may be impacted by a project.

Definitions

Botanical field surveys provide information used to determine the potential environmental effects of proposed projects on special status plants and sensitive natural communities as required by law (e.g., CEQA, CESA, and federal Endangered Species Act (ESA)).

Special status plants, for the purposes of this document, include all plants that meet one or more of the following criteria:

- Listed or proposed for listing as threatened or endangered under the ESA or candidates for possible future listing as threatened or endangered under the ESA (50 C.F.R., § 17.12).
- Listed or candidates for listing by the State of California as threatened or endangered under CESA (Fish & G. Code, § 2050 et seq.)[4]. In CESA, “endangered species” means a native species or subspecies of plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (Fish & G. Code, § 2062). “Threatened species” means a native species or subspecies of plant that,

[4] Refer to current online published lists available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109390&inline

although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by CESA (Fish & G. Code, § 2067). "Candidate species" means a native species or subspecies of plant that the California Fish and Game Commission has formally noticed as being under review by CDFW for addition to either the list of endangered species or the list of threatened species, or a species for which the California Fish and Game Commission has published a notice of proposed regulation to add the species to either list (Fish & G. Code, § 2068).

- Listed as rare under the California Native Plant Protection Act (Fish & G. Code, § 1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish & G. Code, § 1901).
- Meet the definition of rare or endangered under CEQA Guidelines section 15380, subdivisions (b) and (d), including:
    - Plants considered by CDFW to be "rare, threatened or endangered in California." This includes plants tracked by the California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS) as California Rare Plant Rank (CRPR) 1 or 2[5];
    - Plants that may warrant consideration on the basis of declining trends, recent taxonomic information, or other factors. This may include plants tracked by the CNDDB and CNPS as CRPR 3 or 4[6].
- Considered locally significant plants, that is, plants that are not rare from a statewide perspective but are rare or uncommon in a local context such as within a county or region (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include plants that are at the outer limits of their known geographic range or plants occurring on an atypical soil type.

Sensitive natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status plants or their

[5] See CNDDB's Special Vascular Plants, Bryophytes, and Lichens List for plant taxa with a CRPR of 1 or 2: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline

[6] CRPR 3 plants (plants about which more information is needed) and CRPR 4 plants (plants of limited distribution) may warrant consideration under CEQA Guidelines section 15380. Impacts to CRPR 3 plants may warrant consideration under CEQA if sufficient information is available to assess potential impacts to such plants. Impacts to CRPR 4 plants may warrant consideration under CEQA if cumulative impacts to such plants are significant enough to affect their overall rarity. Data on CRPR 3 and 4 plants should be submitted to CNDDB. Such data aids in determining and revising the CRPR of plants. See CNDDB's Special Vascular Plants, Bryophytes, and Lichens List for plant taxa with a CRPR of 3 or 4: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline

habitat. CDFW's *List of California Terrestrial Natural Communities*[7] is based on the best available information, and indicates which natural communities are considered sensitive at the current stage of the California vegetation classification effort. See the Vegetation Classification and Mapping Program (VegCAMP) website for additional information on natural communities and vegetation classification[8].

2. BOTANICAL FIELD SURVEYS

Evaluate the need for botanical field surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs in an area that may be directly or indirectly affected by a project (project area), and it is unknown whether or not special status plants or sensitive natural communities occur in the project area;
- Special status plants or sensitive natural communities have historically been identified in a project area; or
- Special status plants or sensitive natural communities occur in areas with similar physical and biological properties as a project area.

Survey Objectives

Conduct botanical field surveys in a manner which maximizes the likelihood of locating special status plants and sensitive natural communities that may be present. Botanical field surveys should be floristic in nature, meaning that every plant taxon that occurs in the project area is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status plants or that are restricted to lists of likely potential special status plants are not considered floristic in nature and are not adequate to identify all plants in a project area to the level necessary to determine if they are special status plants.

For each botanical field survey conducted, include a list of all plants and natural communities detected in the project area. More than one field visit is usually necessary to adequately capture the floristic diversity of a project area. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the special status plants and sensitive natural communities in the project area is also useful to assess the significance of a particular plant population or natural community.

Survey Preparation

Before botanical field surveys are conducted, the botanical field surveyors should compile relevant botanical information in the general project area to provide a regional

[7] Available at: https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities#natural%20communities%20lists

[8] Available at: https://www.wildlife.ca.gov/Data/VegCAMP

context. Consult the CNDDB[9] and BIOS[10] for known occurrences of special status plants and sensitive natural communities in the project area prior to botanical field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties (e.g. soils) of the project area and surrounding ecoregion[11]. Then, develop a list of special status plants and sensitive natural communities with the potential to occur within the vegetation and habitat types identified. The list of special status plants with the potential to occur in the project area can be created with the help of the CNDDB QuickView Tool[12] which allows the user to generate lists of CNDDB-tracked elements that occur within a particular U.S. Geological Survey 7.5' topographic quad, surrounding quads, and counties within California. Resulting lists should only be used as a tool to facilitate the use of reference sites, with the understanding that special status plants and sensitive natural communities in a project area may not be limited to those on the list. Botanical field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on a list. Include in the botanical survey report the list of potential special status plants and sensitive natural communities that was created, and the list of references used to compile the background botanical information for the project area.

Survey Extent

Botanical field surveys should be comprehensive over the entire project area, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects could occur, such as those from fuel modification, herbicide application, invasive species, and altered hydrology. Surveys restricted to known locations of special status plants may not identify all special status plants and sensitive natural communities present, and therefore do not provide a sufficient level of information to determine potential impacts.

Field Survey Method

Conduct botanical field surveys using systematic field techniques in all habitats of the project area to ensure thorough coverage. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct botanical field surveys by traversing the entire project area to ensure thorough coverage, documenting all plant taxa observed. Parallel survey transects may be necessary to ensure thorough survey coverage in some habitats. The level of effort should be sufficient to provide comprehensive reporting. Additional time should be allocated for plant identification in the field.

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9 Available at: https://www.wildlife.ca.gov/Data/CNDDB

10 Available at: https://www.wildlife.ca.gov/Data/BIOS

11 Ecological Subregions of the United States, available at: http://www.fs.fed.us/land/pubs/ecoregions/toc.html

12 Available at: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data. When creating a list of special status plants with the potential to occur in a project area, special care should be taken to search all quads with similar geology, habitats, and vegetation to those found in the project area.

Timing and Number of Visits

Conduct botanical field surveys in the field at the times of year when plants will be both evident and identifiable. Usually this is during flowering or fruiting. Space botanical field survey visits throughout the growing season to accurately determine what plants exist in the project area. This usually involves multiple visits to the project area (e.g. in early, mid, and late-season) to capture the floristic diversity at a level necessary to determine if special status plants are present[13]. The timing and number of visits necessary to determine if special status plants are present is determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which botanical field surveys are conducted.

Reference Sites

When special status plants are known to occur in the type(s) of habitat present in a project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those special status plants are identifiable at the times of year the botanical field surveys take place and to obtain a visual image of the special status plants, associated habitat, and associated natural communities.

Use of Existing Surveys

For some project areas, floristic inventories or botanical survey reports may already exist. Additional botanical field surveys may be necessary for one or more of the following reasons:

- Botanical field surveys are not current[14];
- Botanical field surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems);
- Botanical field surveys did not cover the entire project area;
- Botanical field surveys did not occur at the appropriate times of year;
- Botanical field surveys were not conducted for a sufficient number of years to detect plants that are not evident and identifiable every year (e.g. geophytes, annuals and some short-lived plants);

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13 U.S. Fish and Wildlife Service Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants available at: https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/

14 Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to “Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations”, available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=116396&inline

- Botanical field surveys did not identify all plants in the project area to the taxonomic level necessary to determine rarity and listing status;
- Fire history, land use, or the physical or climatic conditions of the project area have changed since the last botanical field survey was conducted;
- Changes in vegetation or plant distribution have occurred since the last botanical field surveys were conducted, such as those related to habitat alteration, fluctuations in abundance, invasive species, seed bank dynamics, or other factors; or
- Recent taxonomic studies, status reviews or other scientific information has resulted in a revised understanding of the special status plants with potential to occur in the project area.

Negative Surveys

Adverse conditions from yearly weather patterns may prevent botanical field surveyor from determining the presence of, or accurately identifying, some special status plants in the project area. Disease, drought, predation, fire, herbivory or other disturbance may also preclude the presence or identification of special status plants in any given year. Discuss all adverse conditions in the botanical survey report[15].

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that the plant occurrence no longer exists at a location, particularly if adverse conditions are present. For example, botanical field surveys over a number of years may be necessary if the special status plant is an annual or short-lived plant having a persistent, long-lived seed bank and populations of the plant are known to not germinate every year. Visiting the project area in more than one year increases the likelihood of detecting special status plants, particularly if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may help ensure that the timing of botanical field surveys was appropriate.

3. REPORTING AND DATA COLLECTION

Adequate information about special status plants and sensitive natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants and sensitive natural communities and will guide the development of avoidance, minimization, and mitigation measures. The information necessary to assess impacts to special status plants and sensitive natural communities is described below. For comprehensive, systematic botanical field surveys where no special status plants or sensitive natural communities were found, reporting

and data collection responsibilities for botanical field surveyor remain as described

[15] U.S. Fish and Wildlife Service Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants available at: https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/

below, excluding specific occurrence information.

Special Status Plant and Sensitive Natural Community Observations

Record the following information for locations of each special status plant and sensitive natural community detected during a botanical field survey of a project area.

- The specific geographic locations where the special status plants and sensitive natural communities were found. Preferably this will be done by use of global positioning system (GPS) and include the datum[16] in which the spatial data was collected and any uncertainty or error associated with the data. If GPS is not available, a detailed map (1:24,000 or larger) showing locations and boundaries of each special status plant population and sensitive natural community in relation to the project area is acceptable. Mark occurrences and boundaries as accurately as possible;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If a special status plant is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of each special status plant in each life stage such as seedling, vegetative, flowering and fruiting;
- The density of special status plants, identifying areas of relatively high, medium and low density of each special status plant in the project area; and
- Digital images of special status plants and sensitive natural communities in the project area, with diagnostic features.

Special Status Plant and Sensitive Natural Community Documentation

When a special status plant is located, data must be submitted to the CNDDB. Data may be submitted in a variety of formats depending on the amount and type of data that is collected[17]. The most common way to submit data is the Online CNDDB Field Survey Form[18], or equivalent written report, accompanied by geographic locality information (GPS coordinates, GIS shapefiles, KML files, topographic map, etc.). Data submitted in digital form must include the datum[19] in which it was collected.

If a sensitive natural community is found in a project area, document it with a Combined

16 NAD83, NAD27 or WGS84

17 See https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data for information on acceptable data submission formats.

18 Available at: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data

19 NAD83, NAD27 or WGS84

Vegetation Rapid Assessment and Relevé Field Form[20] and submit the form to VegCAMP[21].

Voucher Collection

Voucher specimens provide verifiable documentation of special status plant presence and identification and a scientific record. This information is vital to conservation efforts and valuable for scientific research. Collection of voucher specimens should be conducted in a manner that is consistent with conservation ethics, and in accordance with applicable state and federal permit requirements (e.g. scientific, educational, or management permits pursuant to Fish & G. Code, § 2081, subd. (a)). Voucher collections of special status plants (or possible special status plants) should only be made when such actions would not jeopardize the continued existence of the population. A plant voucher collecting permit[22] is required from CDFW prior to the take or possession of a state-listed plant for voucher collection purposes, and the permittee must comply with all permit conditions.

Voucher specimens should be deposited in herbaria that are members of the Consortium of California Herbaria[23] no later than 120 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant collector names and permit numbers on specimen labels (if applicable).

Botanical Survey Reports

Botanical survey reports provide an important record of botanical field survey results and project area conditions. Botanical survey reports containing the following information should be prepared whenever botanical field surveys take place, and should also be submitted with project environmental documents:

Project and location description

- A description of the proposed project;
- A detailed map of the project area that identifies topographic and landscape features and includes a north arrow and bar scale;
- A vegetation map of the project area using Survey of California Vegetation Classification and Mapping Standards[24] at a thematic and spatial scale that allows the display of all sensitive natural communities;
- A soil map of the project area; and

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20 Available at: https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/Submit

21 Combined Vegetation Rapid Assessment and Releve Field Forms can be emailed to VegCAMP staff. Contact information available at: https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/Other-Info

22 Applications available at: https://www.wildlife.ca.gov/Conservation/Plants/Permits

23 A list of Consortium of California Herbaria participants is available at: http://ucjeps.berkeley.edu/consortium/participants.html

24 Available at: https://www.wildlife.ca.gov/data/vegcamp/publications-and-protocols

- A written description of the biological setting, including all natural communities; geological and hydrological characteristics; and land use or management history.

Detailed description of survey methodology and results

- Names and qualifications of botanical field surveyor(s);
- Dates of botanical field surveys (indicating the botanical field surveyor(s) that surveyed each area on each survey date), and total person-hours spent;
- A discussion of the survey preparation methodology;
- A list of special status plants and sensitive natural communities with potential to occur in the region;
- Description(s) of reference site(s), if visited, and the phenological development of special status plant(s) at those reference sites;
- A description and map of the area surveyed relative to the project area;
- A list of all plant taxa occurring in the project area, with all taxa identified to the taxonomic level necessary to determine whether or not they are a special status plant;
- Detailed data and maps for all special status plants and sensitive natural communities detected. Information specified above under the headings “Special Status Plant and Sensitive Natural Community Observations,” and “Special Status Plant and Sensitive Natural Community Documentation,” should be provided for the locations of each special status plant and sensitive natural community detected. Copies of all California Native Species Field Survey Forms and Combined Vegetation Rapid Assessment and Relevé Field Forms should be sent to the CNDDB and VegCAMP, respectively, and included in the project environmental document as an Appendix[25];
- A discussion of the potential for a false negative botanical field survey;
- A discussion of how climatic conditions may have affected the botanical field survey results;
- A discussion of how the timing of botanical field surveys may affect the comprehensiveness of botanical field surveys;
- Any use of existing botanical field surveys and a discussion of their applicability to the project;
- The deposition locations of voucher specimens, if collected; and
- A list of references used, including persons contacted and herbaria visited.

[25] It is not necessary to submit entire environmental documents to the CNDDB

Assessment of potential project impacts

- A discussion of the significance of special status plant populations in the project area considering nearby populations and total range and distribution;
- A discussion of the significance of sensitive natural communities in the project area considering nearby occurrences and natural community distribution;
- A discussion of project related direct, indirect, and cumulative impacts to special status plants and sensitive natural communities;
- A discussion of the degree and immediacy of all threats to special status plants and sensitive natural communities, including those from invasive species;
- A discussion of the degree of impact, if any, of the project on unoccupied, potential habitat for special status plants; and
- Recommended measures to avoid, minimize, or mitigate impacts to special status plants and sensitive natural communities.

4. BOTANICAL FIELD SURVEYOR QUALIFICATIONS

Botanical field surveyors should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with plants of the region, including special status plants;
- Familiarity with natural communities of the region, including sensitive natural communities;
- Experience with the CNDDB, BIOS, and Survey of California Vegetation Classification and Mapping Standards;
- Experience conducting floristic botanical field surveys as described in this document, or experience conducting such botanical field surveys under the direction of an experienced botanical field surveyor;
- Familiarity with federal, state, and local statutes and regulations related to plants and plant collecting; and
- Experience analyzing the impacts of projects on native plant species and sensitive natural communities.

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This document is available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline

Exhibit 4

L.A. CEQA THRESHOLDS GUIDE

Your Resource for Preparing
CEQA Analyses in Los Angeles

City of Los Angeles
2006

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L.A. CEQA THRESHOLDS GUIDE:

Your Resource for Preparing CEQA Analyses in Los Angeles

2006

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities.

This Thresholds Guide is intended to provide general information about CEQA. It should not be used as a substitute for professional or legal advice. The reader should refer to the CEQA Statutes and Guidelines and consult with the appropriate City departments, as necessary.

TABLE OF CONTENTS

Executive Summary i

Introduction 1

Cross-Referencing Index 13

List of Abbreviations/Acronyms 32

Glossary 37

A. Aesthetics and Visual Resources
   Introduction A-1
   1. Aesthetics A.1-1
   2. Obstruction of Views A.2-1
   3. Shading A.3-1
   4. Nighttime Illumination A.4-1

B. Air Quality
   Introduction B-1
   1. Construction Emissions B.1-1
   2. Operational Emissions B.2-1
   3. Toxic Air Contaminants B.3-1

C. Biological Resources C-1

D. Cultural Resources
   1. Paleontological Resources D.1-1
   2. Archaeological Resources D.2-1
   3. Historical Resources D.3-1

E. Geology
   1. Geologic Hazards E.1-1
   2. Sedimentation and Erosion E.2-1
   3. Landform Alteration E.3-1
   4. Mineral Resources E.4-1

F. Hazards
   1. Risk of Upset/Emergency Preparedness F.1-1
   2. Human Health Hazards F.2-1

G. Water Resources
   1. Surface Water Hydrology G.1-1
   2. Surface Water Quality G.2-1
   3. Groundwater Level G.3-1
   4. Groundwater Quality G.4-1

TABLE OF CONTENTS, continued

H. Land Use
1. Land Use Consistency H.1-1
2. Land Use Compatibility H.2-1

I. Noise
1. Construction Noise I.1-1
2. Operational Noise I.2-1
3. Railroad Noise I.3-1
4. Airport Noise I.4-1

J. Population and Housing
1. Population and Housing Growth J.1-1
2. Population and Housing Displacement J.2-1

K. Public Services
1. Police Protection K.1-1
2. Fire Protection & Emergency Medical Services K.2-1
3. Public Schools K.3-1
4. Recreation and Parks K.4-1
5. Libraries K.5-1

L. Transportation
Introduction L-1
1. Intersection Capacity L.1-1
2. Street Segment Capacity L.2-1
3. Freeway Capacity L.3-1
4. Neighborhood Intrusion Impacts L.4-1
5. Project Access L.5-1
6. Transit System Capacity L.6-1
7. Parking L.7-1
8. In-Street Construction Impacts L.8-1

M. Public Utilities
1. Water M.1-1
2. Wastewater M.2-1
3. Solid Waste M.3-1
4. Energy M.4-1

INTRODUCTION

PREFACE

The *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles (Thresholds Guide)* is a guidance document that draws together practical information useful to City staff, project proponents, and the public involved in the environmental review of projects subject to the California Environmental Quality Act (CEQA). The *Thresholds Guide* is a resource available to provide information to those interested in the CEQA process.

The *Thresholds Guide* provides assistance in evaluating the significance of project impacts on 46 of the most common environmental issues in the City of Los Angeles. This guidance is supplemented by an introduction to each issue area, a recommended analysis method for project impacts, guidance for environmental setting and cumulative impact sections, sample mitigation measures, and references. The *Thresholds Guide* is geared toward readers familiar with the CEQA process. For additional information on the terminology and requirements of CEQA, please refer to the Glossary to the *Thresholds Guide*, The Los Angeles City CEQA Guidelines (City CEQA Guidelines), the State Guidelines for Implementation of the California Environmental Quality Act (State CEQA Guidelines) or the City's Guide to Understanding CEQA in the City of Los Angeles.

The preparation of the *Thresholds Guide* was initiated as part of the City's Development Reform efforts to streamline the City's permit and development processes. It is a tool that compiles information that is useful in the preparation of environmental documents. This information can be used to improve the level of consistency, predictability, and objectivity of the City's environmental documents, while reducing costs and time delays in the environmental review process.

CEQA requires the analysis of discretionary projects to disclose their potential effects on the environment and to allow public participation in the environmental review process. Central to the implementation of CEQA is the identification of "significant" or "potentially significant" impacts that would occur as a result of a proposed project, as this determines the level of review required and the need for mitigation measures to reduce or eliminate project impacts. For projects needing discretionary approval from the City of Los Angeles, the department granting the approval generally acts as the lead agency on behalf of the City and is known as the lead City agency.

The *Thresholds Guide* applies only to those non-exempt projects subject to CEQA that require an Initial Study, negative declaration, mitigated negative declaration, or EIR. It applies both to public and private projects, including residential, commercial, institutional, industrial, and infrastructure projects. Most screening criteria and significance thresholds also apply to Master planned developments, specific plans, zone changes, and other "plan" level proposals.

The *Thresholds Guide* does not impact the existing discretionary authority of decision-makers, although the guidance contained in it could provide more complete information to these decision-makers. The *Thresholds Guide* does not replace or invalidate the City's CEQA Guidelines, as it addresses the content of environmental documents as opposed to procedural requirements. It has no effect on the City's list of projects exempt from the CEQA process (see Article X of the City CEQA Guidelines, which lists project types eligible for categorical exemptions). The *Thresholds Guide* can be used as a complement to existing department procedures for processing CEQA documents, by building on the information in the CEQA Guidelines and providing technical assistance for the environmental analysis and determination of significance. The *Thresholds Guide* does not change the authority of the lead agency, as identified in the State CEQA Guidelines, to determine significance thresholds on a case-by-case basis dependent upon unique environments, evolving regulatory requirements, and the nature of projects encountered by each lead agency.

The guidance in the *Thresholds Guide* does not substitute for the use of independent judgment to determine significance or the evaluation of the evidence in the record, but is intended to provide sufficient flexibility to use the most appropriate criteria for a particular project. CEQA includes additional topics and requirements that are not addressed in the *Thresholds Guide*. The project evaluator and lead agency are still responsible for all CEQA requirements, whether or not they are discussed in the *Thresholds Guide*. The City CEQA Guidelines, the State CEQA Guidelines, and other references describe all of the requirements of the CEQA process and should be consulted if additional assistance is required.

As noted above, the fundamental purpose of CEQA is to publicly disclose and evaluate potential environmental impacts associated with proposed projects. As such, CEQA contains specific public notification and participation requirements. In addition, City policy in the General Plan Framework Element and a similar policy in the Transportation Element is to "assure that (sic) fair treatment of people of all races, cultures, incomes and education levels with respect to the development, implementation and enforcement of environmental laws, regulations, and policies, including affirmative efforts to inform and involve environmental groups, especially environmental justice groups, in early planning stages through notification

and two-way communication.[1]" This assurance may involve efforts to identify and reach affected populations, including low-income communities and communities of color.

CONTENT AND USE

The *Thresholds Guide* presents two sets of criteria to evaluate project impacts: the screening and significance criteria. The screening criteria provide assistance in responding to Initial Study Checklist questions, and can help determine when further study is needed to decide whether a significant impact could potentially occur. Additional study (either in the context of an expanded Initial Study, negative declaration, or EIR) will assist project evaluators in determining whether the project impact falls above or below the significance threshold. The significance threshold identifies the level of impact over which mitigation (or a Statement of Overriding Considerations, if mitigation is not feasible) is required.

By defining screening criteria and significance thresholds, the *Thresholds Guide* provides guidance in determining the appropriate environmental document required for a project within the City of Los Angeles – negative declaration, mitigated negative declaration, or environmental impact report (EIR) – and whether a project's impacts would be presumed significant under normal circumstances, and therefore, require mitigation. The existence of screening criteria and significance thresholds may also encourage project proponents to incorporate impact-reducing measures into project designs, prior to submitting project applications to the City, to reduce potential impacts below the significance level.

The screening criteria and significance thresholds presented in the *Thresholds Guide* are based on a variety of factors, including existing local, state, and federal regulations, administrative practices of other public agencies, and commonly accepted professional standards (common practice). Each threshold was then reviewed with respect to meeting the following goals: objectivity and applicability, defensibility, practicality, nexus between impacts and mitigation, and legal liability. This document, therefore, represents a compilation of existing information and practices and does not introduce new evaluation methods, nor does it diminish the value of independent judgment on the part of the project evaluator. However, the guidance provided in the *Thresholds Guide* can simplify the CEQA process by providing a consistent set of criteria applicable to most discretionary projects in the City. Because evaluation practices continue to evolve due to changing regulations, scientific methods, and court decisions, the project evaluator and lead City agency should always use the best information and evaluation methods available, including those from sources other than the *Thresholds Guide*.

1 *City of Los Angeles, General Plan Framework Element, Policy 3.1.9, page 3-8.*

There are three types of significance thresholds identified in the *Thresholds Guide*: quantitative, qualitative, and case-by-case (also called factors for consideration). Quantitative thresholds provide a measurable criterion with which to compare one or more characteristics of the proposed project, such as "the vehicle-to-capacity ratio increase at a study intersection is greater than 0.020." A qualitative threshold requires comparison to non-numerical criteria, such as "interference with a wildlife movement corridor." For some issue areas, a definitive threshold could not be established, either because the significance of impacts is specific to site conditions or project operations, or because there is no consistent technical guidance available. For these issues, the case-by-case thresholds provide factors for the project evaluator to consider, in light of specific project circumstances, in the determination of significance.

The *Thresholds Guide* does not identify thresholds for all issues found in the State's Initial Study Checklist, but focuses on those that are most commonly of concern throughout the City. In addition, the *Thresholds Guide* provides information on the topic of Shading, which is not listed in the Initial Study Checklist. It also provides expanded information on transportation issues, consistent with the City Department of Transportation's traffic study policies and procedures.

The impact resulting from a particular action depends on the project setting, design, and operational components. Therefore, the use of the *Thresholds Guide* may be appropriate for projects located within City boundaries under "normal" conditions, but there may be circumstances in which another set of criteria better applies to the proposed action or setting, and should be used for the determination of significance. For City-sponsored projects located outside City boundaries, City departments conducting CEQA review must consider the local environmental setting, as well as applicable regulations and policies, and determine if another set of criteria applies or is more appropriate.

Since conditions may vary depending upon the type of project and/or approval that is required, the lead City agency responsible for the implementation of CEQA for a particular project may develop internal departmental direction (e.g., thresholds), not inconsistent with the guidance in the *Thresholds Guide,* to address issues that commonly arise within the jurisdiction of that department. Project applicants should consult with the lead City department regarding any additional or further defined screening criteria or significance thresholds that may apply.

The case study and flowcharts in Exhibits 1-4 illustrate the process of using the screening criteria and significance thresholds, and how their use relates to the Initial Study Checklist and the impact evaluation process. The exhibits all assume that a project is not exempt from CEQA

requirements. The case study (Exhibit 1) assesses operational noise impacts for four project types by posing a series of questions about each "project." This exercise concludes with an Initial Study evaluation and a determination of the type of CEQA document appropriate for that project. The flowcharts (Exhibits 2-4) describe the steps in conceptual terms, focusing on three phases of the CEQA process: 1) the Initial Study Checklist Process (using the screening and significance criteria to determine which boxes to check on the Checklist); 2) the Initial Study Determination (what type of CEQA document to prepare); and 3) the Impact Evaluation and Mitigation Process. The impact from a particular project may fall (a) below the screening criteria, (b) between the screening criteria and the significance threshold, or (c) above the significance threshold.

Exhibit 1
CASE STUDY: OPERATIONAL NOISE

Initial Study Checklist Questions

X.a): Would the proposal result in increases in existing noise levels?
X.b): Would the proposal result in exposure of people to severe noise levels?

Initial Study Screening Criteria

- Would the proposed project introduce a stationary noise source that is likely to be audible beyond the property line of the project site?
- Would the project include 75 or more dwelling units or 100,000 square feet (sf) or greater of nonresidential development, or have the potential to generate 1,000 or more average daily vehicle trips (ADT)?

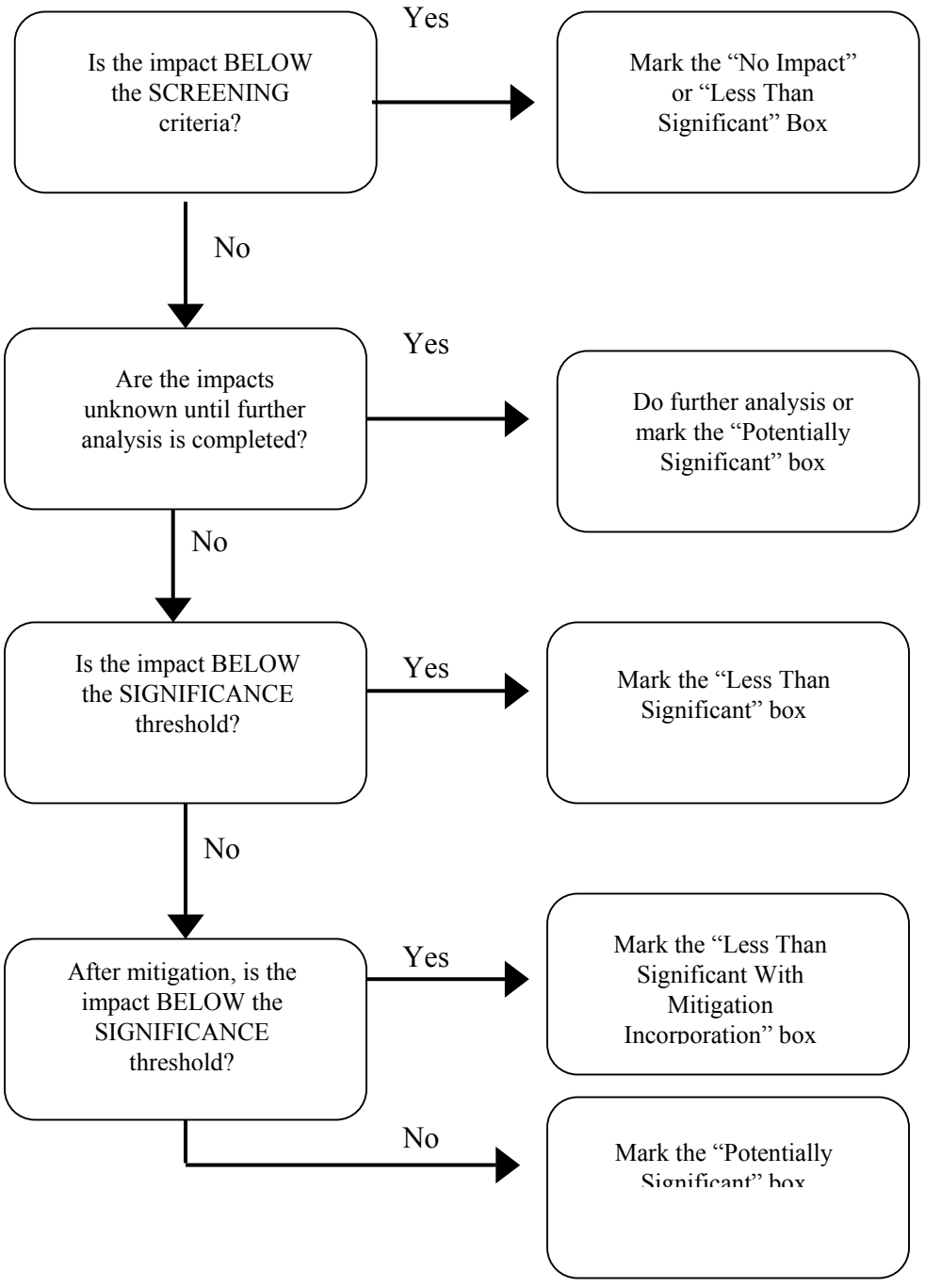
Significance Threshold

A project would normally have a significant impact on noise levels from project operation if the project causes the ambient noise level measured at the property line of an affected use to increase by 3 decibels (dBA) or more in community noise equivalency level (CNEL) to or within the "normally unacceptable" or "clearly unacceptable" category of the noise exposure chart prepared by the California Department of Health Services (DHS), or any 5 dBA or greater noise increase.

Case	Introduce Stationary Source with Noise Emissions Audible Beyond Property Line?	Include more than 75 du, 100,000 sf nonresidential, or 1,000 ADT?	Increase in Ambient Level?	Increase Remaining After Mitigation	Initial Study Evaluation	Results/ Document Prepared
1	No	No	-	-	No Impact	Neg Dec
2	No	Yes	2 dBA	-	Less Than Significant Impact	Neg Dec
3	Yes	No	5 dBA	2.5 dBA	Potentially Significant Unless Mitigation Incorporated	Mitigated Neg Dec
4	Yes	Yes	7 dBA	5 dBA	Potentially Significant Impact	EIR

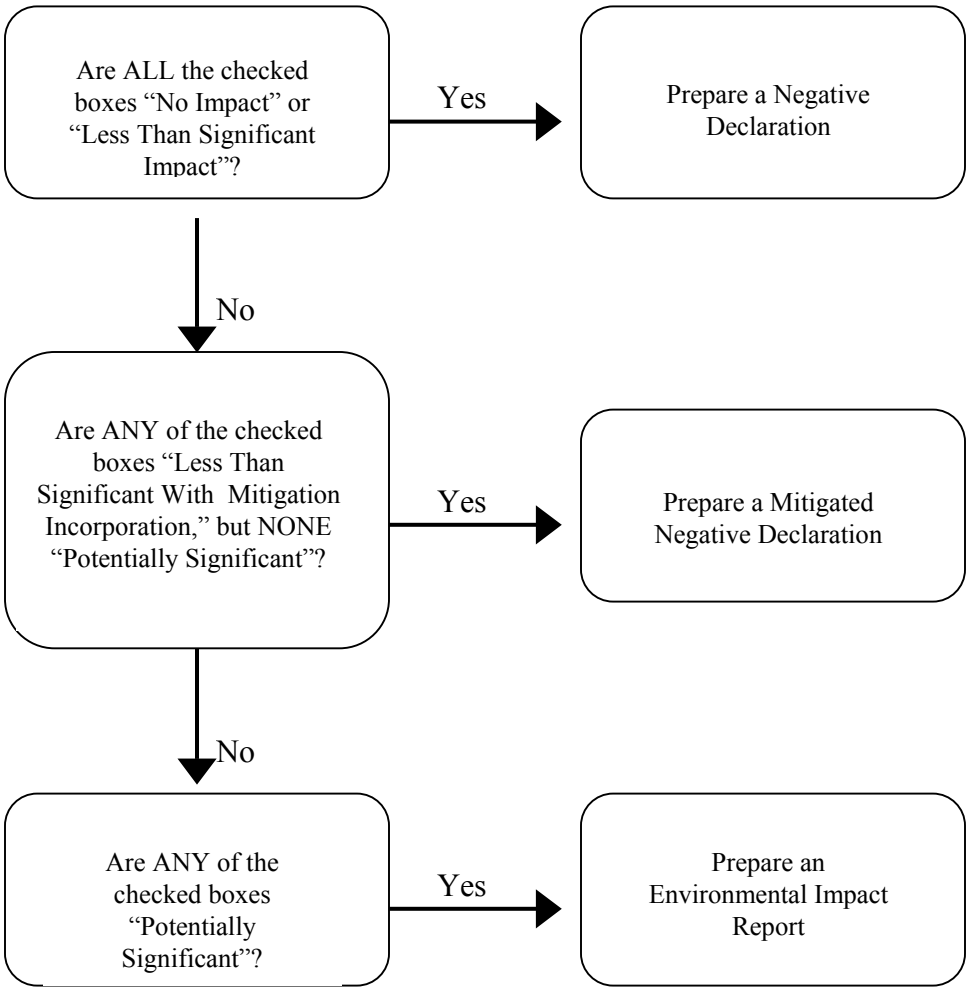
Notes: Assumes project is not exempt under CEQA.
The noise exposure chart prepared by the DHS is reproduced in the *Thresholds Guide.*
If the noise level before and/or after mitigation is not known or cannot be determined, additional analysis could be undertaken prior to completing the Initial Study Evaluation or within an EIR.

Exhibit 2
INITIAL STUDY CHECKLIST PROCESS*



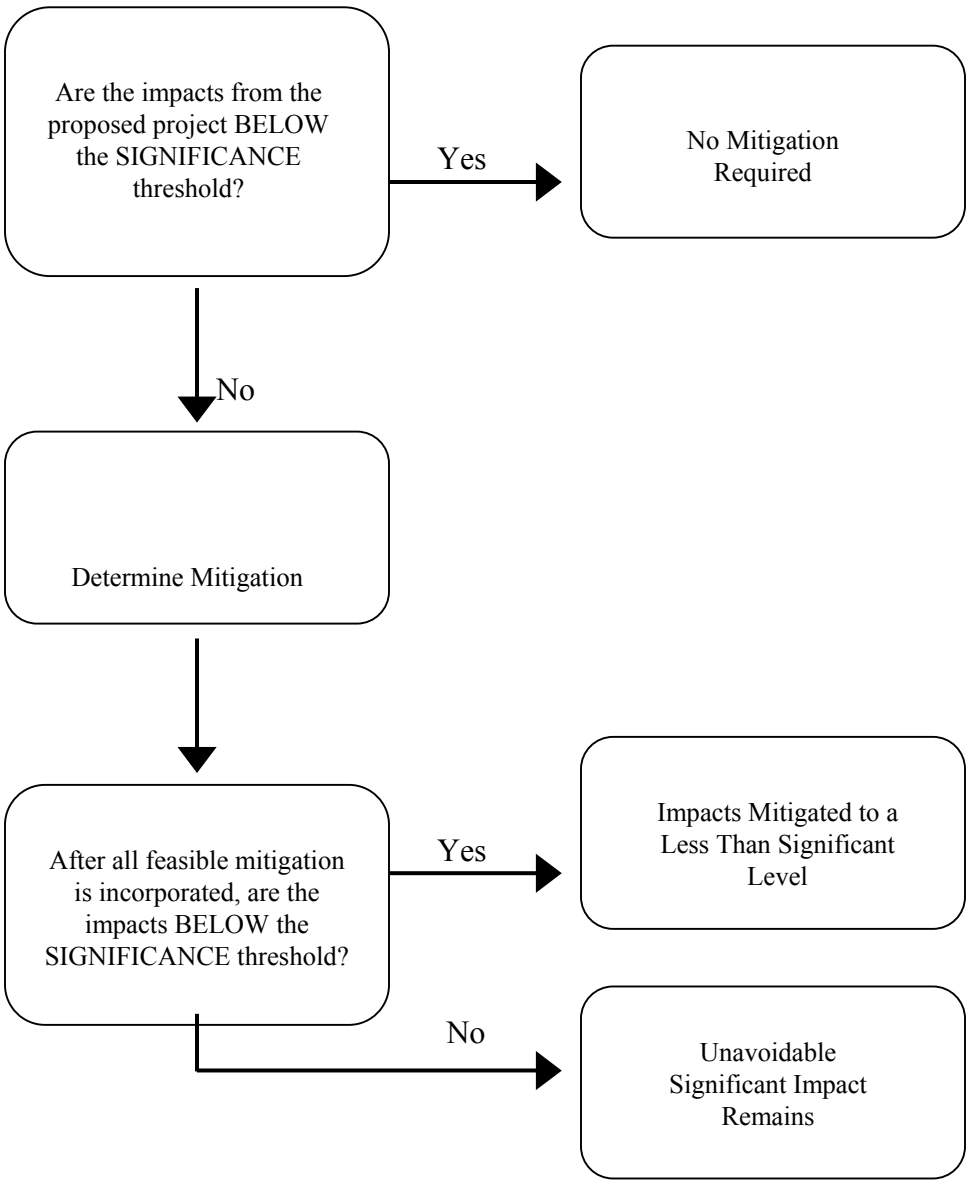
* *Assumes the project has had no previous review and is not exempt under CEQA.*

Exhibit 3
INITIAL STUDY DETERMINATION*



* *Assumes the project is not exempt under CEQA.*

Exhibit 4
IMPACT EVALUATION AND MITIGATION PROCESS



Note: If a project would result in one or more significant impacts, the lead agency, prior to project approval, must adopt certain findings as stated in CEQA Section 21081. Additional requirements related to mitigation measures are described in Section 21081.6.

DOCUMENT STRUCTURE

The *Los Angeles CEQA Thresholds Guide* is arranged by issue area, generally in the same order in which the issues appear in the State's Initial Study Checklist. The major environmental categories covered in the document are as follows:

- Air Quality
- Biological Resources
- Cultural Resources
- Geology
- Hazards
- Land Use
- Noise
- Population and Housing
- Public Services
- Public Utilities
- Transportation
- Visual Resources
- Water Resources

For each environmental issue area, the following information is provided:

1. Initial Study Screening Process

Initial Study Checklist Question: This lists the question(s) from the State's Initial Study Checklist addressed within this issue area.

Introduction: The introduction provides a brief description of the issue area, including what types of project activities could be expected to have an impact, how the resource/issue would be affected, and important regulatory agencies and/or regulations.

Screening Criteria: The screening criteria assist in deciding when further study (additional review) is needed to determine whether a project impact could be significant. It assumes that the project is not exempt from CEQA requirements. Criteria are phrased as yes/no questions. For many issue areas, further study is recommended when one or more questions are answered with a "yes." A "no" response to all questions indicates that further study is not required, and there would normally be no significant impact from the proposed project on the subject issue.

Evaluation of Screening Criteria: This section contains any additional information needed to apply the screening criteria and identifies references that may be used in the evaluation.

2. Determination of Significance

Significance Threshold: The significance threshold provides guidance in determining whether or not a project impact would be significant. The threshold assumes that a project

exceeds the screening criteria. The quantitative and qualitative thresholds are phrased in the positive, so that if the project meets one or more of the criteria listed (a "yes" response), it would normally be considered to have a significant impact on the environment. Where a definitive threshold is not available, the *Thresholds Guide* provides case-by-case thresholds which consist of a list of conditions or criteria to be considered for an individual determination of significance.

Environmental Setting: This section identifies the type of information that is appropriate for a project setting or background section.

Project Impacts: This section provides a recommended methodology with which to analyze the proposed project, including the identification and evaluation of direct and indirect impacts, as appropriate, that may occur during construction or operation. It also identifies sources of relevant information and technical resources, and provides the basic steps to follow in the analysis. Impact methodologies are assumed to apply to both project level and plan level analyses unless otherwise specified. Other analysis methods may be appropriate, depending on project circumstances.

Cumulative Impacts: This section presents a method to evaluate cumulative impacts, based on either a related projects list or a planned development approach (the amount of overall growth expected for the project area, according to planning documents or forecasts, by the time of project completion). The methodology describes only the type of analysis that is appropriate and does not address the size or location of related projects to consider in the analysis. In cases where the methodology is the same as that for project impacts, the project impact section is referenced rather than repeating the information.

Sample Mitigation Measures: This section provides a sample list of measures that may be used to reduce project impacts. It does not address specific mitigation measures for certain project types, nor does it recommend or prioritize mitigation measures. Consideration of alternative projects (e.g., smaller scale, different uses) to reduce impacts is assumed to be part of the project alternatives analysis required in an EIR and is not included in the sample mitigation measures listed in the *Thresholds Guide*.

3. Data, Resources, and References

This section provides additional information related to the environmental issue. It may contain references to agencies or others with expertise in the subject area, reference documents, and selected legislation. For references that do not identify an agency or author, the entry refers to the City of Los Angeles. Several sections also provide exhibits and/or supplemental background information that illustrates or further explains concepts addressed in the section.

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INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE

INITIAL STUDY CHECKLIST QUESTION	THRESHOLDS GUIDE SECTION
I. AESTHETICS: *Would the project:*	
a) Have a substantial adverse effect on a scenic vista?	A.1 Aesthetics A.2 Obstruction of Views
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	A.1 Aesthetics E.3 Landform Alterations
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	A.1 Aesthetics A.3 Shading
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	(Glare Not Addressed) A.4 Nighttime Illumination

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

INITIAL STUDY CHECKLIST QUESTION	THRESHOLDS GUIDE SECTION
II. AGRICULTURE RESOURCES: *In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and famland. Would the project:*	(Agriculture Not Addressed)
III. AIR QUALITY: *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:*	
a) Conflict with or obstruct implementation of the applicable air quality plan?	B.1 Construction Emissions B.2 Operational Emissions B.3 Toxic Air Contaminants
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	B.1 Construction Emissions B.2 Operational Emissions B.3 Toxic Air Contaminants

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

INITIAL STUDY CHECKLIST QUESTION	THRESHOLDS GUIDE SECTION
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	B.1 Construction Emissions B.2 Operational Emissions
d) Expose sensitive receptors to substantial pollutant concentrations?	B.1 Construction Emissions B.2 Operational Emissions B.3 Toxic Air Contaminants
e) Create objectionable odors affecting a substantial number of people?	B.2 Operational Emissions
IV. BIOLOGICAL RESOURCES: *Would the project:*	
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by California Department of Fish and Game or U.S. Fish and Wildlife Service?	C. Biological Resources

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

INITIAL STUDY CHECKLIST QUESTION	THRESHOLDS GUIDE SECTION
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	C. Biological Resources
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal	C. Biological Resources
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	C. Biological Resources
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	C. Biological Resources
f) Conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	C. Biological Resources

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

V. CULTURAL RESOURCES: *Would the project:*		
a) Cause a substantial adverse change in the significance of a historical resource as defined in'15064.5?	D.3	Historical Resources
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?	D.2	Archaeological Resources
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	D.1	Paleontological Resources
	E.3	Landform Alterations
d) Disturb any human remains, including those interred outside of formal cemeteries?	D.2	Archaeological Resources

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

VI.	**GEOLOGIC PROBLEMS:** *Would the project:*		
a)	Expose people to potential substantial adverse effects, including the risk of loss, injury, or death involving:		
i)	Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publications 42.	E.1	Geologic Hazards
ii)	Strong seismic ground shaking?	E.1	Geologic Hazards
iii)	Seismic-related ground failure, including liquefaction?	E.1	Geologic Hazards
iv)	Landslides?	E.1	Geologic Hazards
b)	Result in substantial soil erosion or the loss of topsoil?	E.2	Sedimentation and Erosion
c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	E.1	Geologic Hazards

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks of life or property?	Not Addressed	
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	E.3	Landform Alteration
VII. HAZARDS AND HAZARDOUS MATERIALS:	*Would the project:*		
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	F.1 F.2	Risk of Upset/Emergency Preparedness Human Health Hazards
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	F.1 F.2	Risk of Upset/Emergency Preparedness Human Health Hazards
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	F.2	Human Health Hazards

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?	F.2	Human Health Hazards
e)	For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	F.1 K.2	Risk of Upset/Emergency Preparedness Fire Protection & Emergency Medical Services
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working within the project area?	F.1 K.2	Risk of Upset/Emergency Preparedness Fire Protection & Emergency Medical Services
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	F.1 K.2	Risk of Upset/Emergency Preparedness Fire Protection & Emergency Medical Services
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	K.2	Fire Protection & Emergency Medical Services

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

VIII. HYDROLOGY AND WATER QUALITY: *Would the project:*			
a)	Violate any water quality standards or waste discharge requirements?	G.2	Surface Water Quality
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	G.2 G.3	Surface Water Quality Groundwater Level
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	G.1 G.2	Surface Water Hydrology Surface Water Quality
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	G.1	Surface Water Hydrology

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	G.1	Surface Water Hydrology
f)	Otherwise substantially degrade water quality?	G.3	Groundwater Level
g)	Place housing within a 100-year flood hazard area as mapped on a federal flood hazard Boundary or flood Insurance Rate Map or other flood hazard delineation map?	G.1 G.2 G.3 G.4	Surface Water Hydrology Surface Water Quality Groundwater Level Groundwater Quality
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	G.4	Groundwater Quality
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	G.1 G.3	Surface Water Hydrology Groundwater Level
j)	Inundation by seiche, tsunami, or mudflow?	E.1 G.3	Geologic Hazards Groundwater Level

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

IX.	**LAND USE AND PLANNING:** *Would the project:*		
a)	Physically divide an established community?	H.2	Land Use Compatibility
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding mitigating an environmental effect?	H.1 H.2	Land Use Consistency Land Use Compatibility
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	H.1 H.2	Land Use Consistency Land Use Compatibility
X.	**MINERAL RESOURCES:** *Would the project:*		
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	E.4	Mineral Resources
b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, general plan, or other land use plan?	E.4	Mineral Resources

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

XI. NOISE: *Would the project result in:*		
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	I.1 I.2 I.3 I.4	Construction Noise Operational Noise Railroad Noise Airport Noise
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	I.1 I.2 I.3 I.4	Construction Noise Operational Noise Railroad Noise Airport Noise
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	I.2 I.3 I.4	Operational Noise Railroad Noise Airport Noise
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above the existing without the project?	I.1 I.2 I.3 I.4	Construction Noise Operational Noise Railroad Noise Airport Noise

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	I.1 I.2 I.4	Construction Noise Operational Noise Airport Noise
f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	I.1 I.2 I.4	Construction Noise Operational Noise Airport Noise
XII.	**POPULATION AND HOUSING:** *Would the project:*		
a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	J.1	Population and Housing Growth
b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	J.1 J.2	Population and Housing Growth Population and Housing Displacement
c)	Displace substantial numbers of existing people, necessitating the construction of replacement housing elsewhere	J.2	Population and Housing Displacement

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

XIII. PUBLIC SERVICES: *Would the project:*			
a)	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the above public services:	K.1	Police Protection
i)	Fire protection?	K.2	Fire Protection & Emergency Medical Services
ii)	Police protection	K.1	Police Protection
iii)	Schools?	K.3	Public Schools
iv)	Parks?	K.4	Recreation and Parks
v)	Other public facilities?	K.5	Libraries

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

XIV. RECREATION:			
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the family would occur or be accelerated?	K.4	Recreation and Parks
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	K.4	Recreation and Parks
XV. TRANSPORTATION/TRAFFIC: *Would the project:*			
a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?	L.1 L.2 L.3 L.4 L.8	Intersection Capacity Street Segment Capacity Freeway Capacity Neighborhood Intrusion Impacts In-Street Construction Impacts
b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	L.1 L.2 L.3	Intersection Capacity Street Segment Capacity Freeway Capacity

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	Not Addressed	
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Not Addressed	
e)	Result in inadequate emergency access?	L.5	Project Access
f)	Result in inadequate parking capacity?	L.7	Parking
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	L.6	Transit System Capacity
XVI. UTILITIES AND SERVICE SYSTEMS: *Would the project:*			
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	M.2	Wastewater
b)	Require or result in the construction of new water or wastewater treatment facilities, the construction of which could cause significant environmental effects?	G.1 M.1 M.2	Surface Water Hydrology Water Wastewater

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	G.1 M.2	Surface Water Hydrology Wastewater
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	M.1	Water
e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	K.2	Wastewater
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	K.3	Solid Waste
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	M.3	Solid Waste

INITIAL STUDY CHECKLIST QUESTIONS AND RELATED SECTIONS IN L.A. CEQA THRESHOLDS GUIDE, continued

XVII. MANDATORY FINDINGS OF SIGNIFICANCE: *Does the project:*	
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	All sections, particularly: C. Biological Resources D.1 Paleontological Resources D.2 Archaeological Resources D.3 Historical Resources
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	All Sections
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Not addressed specifically, each section addresses indirectly

LIST OF ABBREVIATIONS/ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACEC	Areas of Critical Concern
ACM	asbestos-containing material
ACOE	United States Army Corps of Engineers
ADT	average daily traffic
AEM	Area Equivalent Method
AEP	Association of Environmental Professionals
AF	acre feet
AQMP	Air Quality Management Plan
AQ-TAN	Air Quality Technical Analysis Note
ARMR	Archaeological Resource Management Reports
ASTM	American Society of Testing Methods
ATSAC	Automated Traffic Surveillance and Control
AVORS	Additional Valley Outfall Relief Sewer
AVR	average vehicle ridership
BACM	Best Available Control Measures
BACT	Best Available Control Technologies
Basin	South Coast Air Basin
BLM	Bureau of Land Management
BMP	best management practices
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAC	California Administrative Code
CAL3QHC	air quality model
California Register	California Register of Historical Resources
CALINE/4	air quality model
CalOSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAP	Clean Air Program
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBD	Central Business District
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCSCE	Center for the Continuing Study of the California Economy
CDD	Community Development Department
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGC	California Government Code
CHAS	Comprehensive Housing Affordability Study
CHC	Cultural Heritage Commission
CIP	Capital Improvement Program
CIS	Coastal Interceptor Sewer

List of Abbreviations/Acronyms, continued

CiSWMPP	City Solid Waste Management Policy Plan
CIWMB	California Integrated Waste Management Board
CMA	Critical Movement Analysis
CMP	Congestion Management Program
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
COS	Central Outfall Sewer
CRA	Community Redevelopment Agency
CRV	California Redemption Value
cu.yd.	cubic yards
CWA	Clean Water Act
CWC	California Water Code
D/C	demand to capacity
dB	decibel
dBA	A-weighted decibel scale
DFO	Designated Federal Official
DHS	Department of Health Services
DMV	California Department of Motor Vehicles
DOF	Department of Finance
DOT	United States Department of Transportation
DWP	Department of Water and Power
DWR	Department of Water Resources
EAD	Environmental Affairs Department
EDI	City of Los Angeles Environmental Data Index
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMFAC	emission factors
EPA	U.S. Environmental Protection Agency
ERCs	Emission Reduction Credits
EVIS	East Valley Interceptor Sewer
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FLMPA	Federal Land Management and Policy Act of 1976
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
Gr.sq.ft.	gross square feet
gsf	gross square feet
HABS	Historic American Building Survey
HAPs	Hazardous Air Pollutants
HI	hazard index

List of Abbreviations/Acronyms, continued

HNM	Helicopter Noise Model
HOV	high occupancy vehicles
HPOZ	Historic Preservation Overlay Zone
HRA	health risk assessment
HSC	Health and Safety Code
HTP	Hyperion Treatment Plant
HUD	Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
ICO	interim control ordinance
INM	Integrated Noise Model
ISWM	Integrated Solid Waste Management
ISWMO	Integrated Solid Waste Management Office
ITE	Institute of Transportation Engineers
IWG	Interagency Working Group
L.A.	Los Angeles
LACMTA	Los Angeles County Metropolitan Transportation Authority
LADOT	Los Angeles Department of Transportation
LAFD	Los Angeles Fire Department
LAGWRP	Los Angeles-Glendale Water Reclamation Plant
LAMC	Los Angeles Municipal Code
LAPD	Los Angeles Police Department
LAPL	Los Angeles Public Library
LARWQCB	Los Angeles Regional Water Quality Control Board
LAUSD	Los Angeles Unified School District
LAX	Los Angeles International Airport
Ldn	Day-Night Sound Level
LEQV2	noise model
LGC	Local Government Commission
LOS	level of service
LUPAMS	Land Use Planning and Mapping System
LUST	leaking underground storage tank
MAAQI	Mobile Assessment for Air Quality Impacts
MACT	Maximum Achievable Control Technology
MFI	Median Family Income
mgd	million gallons per day
MOU	Memorandum of Understanding
mph	miles per hour
MPO	Metropolitan Planning Organization
MRZ	Mineral Resource Zone
MUTCD	Manual on Uniform Traffic Control Devices
MWD	Metropolitan Water District of Southern California
NAAQS	National Ambient Air Quality Standard
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
National Register	National Register of Historic Places
NCHRP	National Cooperative Highway Research Program
NCOS-NOS	North Central Outfall Sewer-North Outfall Sewer

List of Abbreviations/Acronyms, continued

NEJAC	National Environmental Justice Advisory Council
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NORS	North Outfall Replacement Sewer
NOS	North Outfall Sewer
NOS-LCSFVRS	North Outfall Sewer-La Cienega, San Fernando Valley Relief Sewer
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NSPS	New Source Performance Standard
NSR	New Source Review
OEJ	Office of Environmental Justice
OHP	California Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
Pb	lead
PM	particulate matter
PM_{10}	coarse particulates
$PM_{2.5}$	fine particulates
POD	Pedestrian Oriented District
PRC	Public Resources Code
RACM	Reasonably Available Control Measures
RCP&G	Regional Comprehensive Plan and Guide
RD	Reporting District
RECLAIM	Regional Clean Air Incentives Market
ROG	Reactive Organic Gas
ROW	right-of-way
RTCs	RECLAIM Trading Credits
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SEA	Significant Ecological Area
sf	square feet
SIP	State Implementation Plan
SMGB	State Mining and Geology Board
SO_2	sulfur dioxide
SOCAB	South Coast Air Basin
SOUND32	noise model
SOV	single occupant vehicle
SO_x	sulfur oxides
sq.ft.	square feet

List of Abbreviations/Acronyms, continued

SRRE	Source Reduction and Recycling Element
TDM	Transportation Demand Management
The Gas Company	Southern California Gas Company
TIA	Transportation Impact Assessment
TITP	Terminal Island Treatment Plant
TOD	Transit Oriented District
TRB	Transportation Research Board
TSM	Transportation System Management
TSP	Transportation Specific Plan
TWRP	Donald C. Tillman Water Reclamation Plant
U.S.	United States
UCLA	University of California at Los Angeles
ULARA	Upper Los Angeles River Area
ULI	Urban Land Institute
USAF	United States Air Force
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V/C	Volume to Capacity
VOC	Volatile Organic Compound
WDR	Waste Discharge Requirements
ZI	Zoning Information

GLOSSARY

Alternatives - A range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain the project's objectives but would avoid or substantially lessen any of the significant effects of the project. The comparative merits of the alternatives are evaluated in an EIR or EIS.

Applicant - A legal entity or person who proposes to carry out a project and needs a lease, permit, license, certificate, or other entitlement for use, or who is requesting financial assistance from one or more public agencies to carry out a project.

Approval - The action by a decision-making body, which commits the City to a definite course of action with regard to a project, intended to be carried out by any person.

California Environmental Quality Act (CEQA) - Statute enacted by the California legislature contained in the California Public Resources Code, Section 21000 et seq. The *Thresholds Guide* provides guidance on the determination of significant impacts, one provision of CEQA.

California Law – California Law consists of 29 codes, covering various subject areas, the State Constitution and Statutes. Codes included the following: Business and Professions Code, Civil Code, Code of Civil Procedure, Commercial Code, Corporations Code, Education code, Election Code, Evidence Code, Family Code, Financial Code, Fish and Game Code, Food and Agricultural Code, Government Code, Harbors and Navigation Code, Health and Safety Code, Insurance Code, Labor Code, Military and Veterans Code, Penal Code, Probate Code, Public Contract Code, Public Resources Code, Public Utilities Code, Revenue and Taxation Code, Streets and Highways Code, Unemployment Insurance Code, Vehicle Code, Water Code, and Welfare and Institutions Code.

Categorical Exemption - An exemption from the requirements of CEQA based on a finding by the Secretary For Resources and the Los Angeles City Council that certain types of projects do not have a significant effect on the environment.

CEQA Guidelines - The CEQA Guidelines provide agencies with criteria and procedures for the evaluation of projects and the preparation of environmental documents. The State CEQA Guidelines are contained in Title 14, Division 6 of the California Administrative Code. The Los Angeles City CEQA Guidelines are adopted by ordinance of the City Council.

Code of Federal Regulations (CFR) - is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The CFR is divided into 50 titles, which represent broad areas subject to Federal regulation. Each title is divided into chapters, which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas. Large parts may be subdivided into subparts.

Community Plan – A portion of the General Plan that focuses on the setting and

needs of a particular area. It supports the policies of the General Plan. Los Angeles has 35 Community Planning Areas. The 35 Community Plans make up the City's Land Use Element.

Decision-Making Body - A group or individual having project approval authority.

Discretionary Project - An activity defined as a project which requires the exercise of judgment, deliberation, or a decision on the part of the public agency or body in the process of approving or disapproving a particular activity, as distinguished from activities where the public agency or body merely has to determine whether there has been compliance with applicable statutes, ordinances, or regulations.

Entitlement - Used to describe discretionary land use approval granted by the Planning Department. Includes Zone Variances, Zone Changes, Conditional Use Permits, General Plan Amendments, Specific Plan Exceptions, Subdivisions, Parcel Maps, and Site Plan Review.

Environment - Environment, for the purposes of implementing CEQA, is the physical conditions which exist within the area which will be affected by a proposed project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Environmental and Public Facilities Maps - Show the location of and describe various environmental features and public facilities. The City Planning Department Citywide Division prepared the 42 maps in 1996.

Environmental Assessment Form (EAF) - An environmental form submitted to the Environmental Review Section of the City Planning Department which provides the necessary information to determine the recommended environmental clearance for projects requiring any discretionary action.

Environmental Data Index (EDI) – The EDI is a citywide tabular report describing the geographical distribution of a wide array of environmental characteristics on a census tract basis. Data for 30 environmental elements are included. The City Planning Department prepared the EDI in 1978.

Environmental Documents- Environmental documents, according to CEQA, include Initial Study, Negative Declaration, draft and final EIR, Joint EIR/EIS, Notice of Preparation and General Exemption, Notice of Completion, Notice of Determination, and Notice of Exemption.

Environmental Impact Report (EIR) - An Environmental Impact Report is a concise statement setting forth the environmental effects and considerations pertaining to a project as specified in Section 21100 of CEQA.

Environmental Impact Statement (EIS) - An Environmental Impact Statement may be required pursuant to the National Environmental Policy Act (NEPA) if a federal agency or funding is involved. Like an EIR, an EIS describes the environmental impacts of a proposed project and its alternatives.

Feasible - Feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

Federal Register – The Federal Register is the official daily publication for Rules, Proposed rules, and Notices of Federal agencies and organizations, as well as Executive Orders and other Presidential Documents.

Framework Element – This strategy for long-term growth sets a citywide context to guide the update of the Community Plans and citywide elements of the General Plan. The Framework Element refines adopted City policy and updates and supersedes Concept Los Angeles, a strategy to preserve residential neighborhoods by focusing growth into centers. Approved by City Council in December 1996.

General Exemption - An exemption from the requirements of CEQA is granted if it can be seen with reasonable certainty that the project in question could not possibly have a significant effect on the environment.

General Plan – A "blueprint" for future development with a long-term outlook. Required by State law to be prepared by each county and city and include seven elements: land use, circulation, housing, conservation, open space, noise, and safety. May also include optional elements. Includes policies, goals, objectives, and programs. Development must not only meet specific zoning requirements, but also the broader policies, goals and objectives set forth in the General Plan. The City's General Plan is organized into the following Elements: Framework; Land Use; Air Quality; Transportation; Housing; Infrastructure Systems; Open Space and Conservation; Noise; Public Facilities and Services; Historic Preservation and Cultural Resources; Safety; and Urban Form and Neighborhood Design.

Initial Study - A comprehensive analysis of those aspects of the environment, which could potentially affect a project or be affected by a project conducted to determine whether a project may have a significant effect on the environment.

Lead Agency - The public agency which has the principal responsibility for carrying out or approving a project. The Lead Agency will prepare the environmental documents for the project either directly or by contract.

Lead City Agency - A Lead City Agency is the City department, bureau, division, section, office, or agency which has the principal responsibility of carrying out a project which is subject to the provisions of CEQA, or has the principal responsibility for processing the application for a lease, permit, license, or other entitlement for use for a project which is subject to the provisions of CEQA. If more than one City Agency meets the Lead City Agency criteria, the Lead City Agency shall be the City Agency that normally acts first on such projects.

Ministerial Project - Activities undertaken by public agencies pursuant to a statute, ordinance, or regulation that sets forth the conditions upon which the undertaking must or must not be granted. A ministerial decision involves only the use of fixed standards or objective measurements without professional judgment.

Mitigated Negative Declaration (MND) - When significant impacts may occur as a result of the implementation of a project, but mitigation and/or project modification reduce impacts to a less than significant level, then a Mitigated Negative Declaration

is issued with discussion and conditions attached.

Mitigation - Mitigation includes avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the impacted environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

National Environmental Policy Act (NEPA) - The National Environmental Policy Act is the federal law requiring an environmental assessment for federal actions that involve impacts on the environment. NEPA is set forth in 42 U.S.C.A. 4321 et seq.

Negative Declaration (ND) - A statement by the Lead Agency briefly setting forth the reasons why the project, although not otherwise exempt, will not have a significant effect on the environment and therefore does not require the preparation of an EIR.

Notice of Completion (NOC) - A brief notice filed with the State Clearinghouse in the Governor's Office of Planning and Research by a Lead Agency as soon as it has completed a draft EIR and is prepared to send out copies for review.

Notice of Determination (NOD) - A public notice filed with the City and County Clerk by the Lead City Agency after a project subject to the provisions of CEQA and involving a Negative Declaration, Mitigated Negative Declaration or an EIR has been approved.

Notice of Exemption (NOE) - A public notice which may be filed with the City and County Clerk by a Lead City Agency after the decision-making body has approved a project and has determined that it is a ministerial, categorically exempt, or emergency project, or is otherwise exempted pursuant to the provisions of Section 21080 (b) of the California Public Resources Code.

Notice of Preparation (NOP) - A brief notice sent by a Lead City Agency to notify Responsible Agencies and interested parties that the Lead City Agency plans to prepare an EIR for a proposed project.

Office of Planning and Research (OPR) - Assists in the understanding and implementation of CEQA by (1) preparing and updating the State CEQA Guidelines; (2) evaluating Categorical Exemptions; (3) distributing documents to state agencies through the State Clearinghouse; (4) coordinating between other public agencies; and (5) preparing and distributing publications related to the understanding and use of CEQA.

Participating City Agency - A City department, bureau, division, section, office, officer, or agency, which is required by Charter or action of the City Council to review a particular class of projects and make comments or recommendations to the Lead City Agency.

Responsible Agency - A public agency, such as a city or county, which proposes to carry out or has approval power over a project, but is not the Lead Agency for the project.

Significant Effect - A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the proposed activity including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. This *Thresholds Guide* is intended to assist in the determination of significant effects.

Specific Plan – describes the allowable land uses, identifies open space, and details infrastructure availability and financing for a portion of a community. Specific plans implement, but are not technically a part of the General Plan. Los Angeles has various specific plans throughout the City, such as West Los Angeles, Warner Center, etc.

State Clearinghouse - In the Governor's Office of Planning and Research. Responsible for distributing environmental documents to state agencies, departments, boards, and commissions for review and comment. Coordinates the responses to ensure accurate and consistent responses from the state.

Statement of Overriding Considerations - A statement with findings identifying public objectives that, in the opinion of the decision-making body, warrant approval of a project notwithstanding its significant adverse impact(s) on the environment.

Statutory Exemption - Exemption from the requirements of CEQA based on the determination by the California Legislature that a specific type of project should be exempt from CEQA.

Zoning – The purpose of zoning regulations is to implement the policies of the General Plan. Zoning lists the kinds of uses allowed on a parcel and sets standards such as minimum lot size, maximum building height, and minimum front yard depth. Zoning must comply with the general plan, is adopted by ordinance, and carries the weight of local law. The City's Zoning is found in Chapter 1 of the Los Angeles Municipal Code (LAMC).

Exhibit 5

VERBAL MOTION

I HEREBY MOVE that Council ADOPT the following recommendation of the City Planning Commission (Item No. 37, CF 03-1459 & 03-1459-S1) relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" formerly solely oak tree), SUBJECT TO THE APPROVAL OF THE MAYOR:

1. FIND that this action is exempt from California Environmental Quality Act, pursuant to Article II, Section 2(m) of the City's Guidelines.

2. ADOPT the January 18, 2006 Findings of the City Planning Commission as the Findings of the Council.

3. PRESENT and ADOPT the accompanying ORDINANCE, approved by the Interim Director of Planning (on behalf of the City Planning Commission) amending the LAMC to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions. CPC 2004-2290 CA

   Fiscal Impact Statement: None submitted by the Planning Department. Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

(Planning and Land Use Management Committee waived consideration of the above matter)

PRESENTED BY _____
DENNIS P. ZINE
Councilmember, 3rd District

SECONDED BY _____
ED P. REYES
Councilmember, 1st District

February 28, 2006

CF 03-1459 & 03-1459-S1

Motion
ADOPTED
FEB 28 2006
* As Amended
LOS ANGELES CITY COUNCIL
See Attached Motion
TO THE MAYOR FOR HIS WITH
Findings + Ord Adopted
Exemption - approved

O:\Docs\Council Agendas\mk\03-1459.1.mot.wpd

VERBAL MOTION

I HEREBY MOVE that Council AMEND the recommendation of the City Planning Commission (Item No. 37, CF 03-1459 & 03-1459-S1) relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" formerly solely oak tree) to include an additional recommendation to DIRECT the Department of Building and Safety, Bureau of Street Services to report to the Planning and Land Use Management Committee to quantify the number of permits.

PRESENTED BY _____
ED P. REYES
Councilmember, 1st District

SECONDED BY _____
DENNIS P. ZINE
Councilmember, 3rd District

February 28, 2006

CF 03-1459 & 03-1459-S1

motion
ADOPTED
FEB 28 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

O:\Docs\Council Agendas\mk\03-1459.mot.wpd

37 A

MOTION

I **MOVE** that the matter of EXEMPTION, COMMUNICATION FROM THE CITY PLANNING COMMISSION and ORDINANCE FIRST CONSIDERATION relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" (formerly solely oak tree), Item 37 (CF 03-1459 and CF 03-1459-S1) on today's Council Agenda, Tuesday, February 28, 2006, be AMENDED to ADOPT the following ADDITIONAL RECOMMENDATIONS:

1. DIRECT the Bureau of Street Services to report on a quarterly basis on the number of violations of the City's Protected Trees Ordinance, as codified in the Los Angeles Municipal Code (LAMC), and the nature of those violations occurring at but not limited to, small lot, multi-family, and large developments, the number of violations occurring per Council District, permits issued for removal, and the number of trees illegally removed.

2. DIRECT the Bureau of Street Services and the City Administrative Officer (CAO), to report on a quarterly basis on the resources needed to properly enforce the City's Protected Trees Ordinance.

PRESENTED BY _____
Eric Garcetti
Councilmember, 13th District

PRESENTED BY _____
Dennis P. Zine
Councilman, 3rd District

SECONDED BY _____

ADOPTED

FEB 2 8 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

FEB 2 8 2006

EG

37 B

MOTION

I MOVE that the matter of EXEMPTION, COMMUNICATION FROM THE CITY PLANNING COMMISSION and ORDINANCE FIRST CONSIDERATION relative to amending the Los Angeles Municipal Code (LAMC) to add certain native trees to the class of "protected tree" (formerly solely oak tree), Item 37 (CF 03-1459 and CF 03-1459-S1) on today's Council Agenda, Tuesday, February 28, 2006, be AMENDED to ADOPT the following ADDITIONAL RECOMMENDATION:

DIRECT the Bureau of Street Services, with the assistance of the Department of Water and Power (LADWP) and the Los Angeles Fire Department (LAFD), to coordinate outreach efforts to educate the public through LAFD and LADWP mailers about the City's Protected Trees Ordinance and all city tree programs generally.

PRESENTED BY _____
Eric Garcetti
Councilmember, 13th District

PRESENTED BY _____
Dennis P. Zine
Councilman, 3rd District

SECONDED BY _____

ADOPTED

FEB 2 8 2006

LOS ANGELES CITY COUNCIL

FORTHWITH

FEB 2 8 2006

EG

COUNCIL VOTE

Feb 28, 2006 12:51:09 PM, #11

ITEM NO. (37)
Voting on Item(s): 37
Roll Call

CARDENAS	Yes
GREUEL	Yes
HAHN	Yes
HUIZAR	Yes
LABONGE	Absent
PADILLA	Yes
PARKS	Yes
PERRY	Yes
REYES	Yes
ROSENDAHL	Yes
SMITH	Yes
WEISS	Absent
WESSON	Yes
ZINE	Yes
*GARCETTI	Yes

Present: 13, Yes: 13 No: 0

Exhibit 6

BIRDS OF CONSERVATION CONCERN 2008

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
Arlington, Virginia

December 2008

BIRDS OF CONSERVATION CONCERN 2008

Prepared by

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
Arlington, Virginia

Suggested citation:
U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at <http://www.fws.gov/migratorybirds/>]

TABLE OF CONTENTS

TABLE OF CONTENTS i

LIST OF ACRONYMS ii

EXECUTIVE SUMMARY iii

ACKNOWLEDGMENTS iv

INTRODUCTION 1

BACKGROUND 3
- Why Did We Create Lists at Different Geographic Scales? 3
  - Bird Conservation Regions (BCRs) 3
  - USFWS Regions 4
  - National 4
- What Bird Species Did We Consider? 5
- What Sources of Information Did We Use? 5
  - PIF Assessment Scores 5
  - USSCP Assessment Scores 6
  - NAWCP Assessment Scores 6
- What Selection Criteria Did We Use for *Birds of Conservation Concern 2008* Lists? 7
  - BCR Criteria 7
  - USFWS Region Criteria 9
  - National Criteria 9

THE *BIRDS OF CONSERVATION CONCERN 2008* LISTS 10
- BCR Lists 10
- USFWS Region Lists 10
- National List 11

DISCUSSION 11

LITERATURE CITED 13

APPENDIX A 17
- Figure 1 18
- Tables 1-48 19

APPENDIX B 68

APPENDIX C 81

LIST OF ACRONYMS

AI	Area Importance (an assessment factor)
ABC	American Bird Conservancy
BBS	Breeding Bird Survey
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BD	Breeding Distribution
CCS	Continental Combined Score
DPS	Distinct Population Segment
ESA	Endangered Species Act
FWCA	Fish and Wildlife Conservation Act
MBTA	Migratory Bird Treaty Act
NABCI	North American Bird Conservation Initiative
NAWCP	North American Waterbird Conservation Plan
ND	Non-breeding Distribution
NWR	National Wildlife Refuge
PIF	Partners in Flight
PS	Population Size
PT	Population Trend
RD	Relative Density
TB	Threats in the Breeding Season
TN	Threats in the Non-breeding season
USFWS	U.S. Fish and Wildlife Service
USSCP	United States Shorebird Conservation Plan

EXECUTIVE SUMMARY

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service (USFWS) to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." *Birds of Conservation Concern 2008* (*BCC 2008*) is the most recent effort to carry out this mandate. The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities. The geographic scope of this endeavor is the United States in its entirety, including island "territories" in the Pacific and Caribbean. *BCC 2008* encompasses three distinct geographic scales—North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), USFWS Regions, and National—and is primarily derived from assessment scores from three major bird conservation plans: the Partners in Flight North American Landbird Conservation Plan, the United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan.

Bird species considered for inclusion on lists in this report include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska; and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. Assessment scores from all three bird conservation plans are based on several factors, including population trends, threats, distribution, abundance, and relative density. These assessment scores serve as the foundation on which we built the *BCC 2008* lists. Although the different bird conservation plans use somewhat different methods for determining the highest priority species, the scores from each represent true conservation priorities for each of the three species groups (landbirds, shorebirds, and waterbirds). We therefore view the conservation priorities within each plan as approximately equivalent. After creating BCR lists, we developed specific criteria for including species on USFWS Region and National lists. The various BCR lists contain 10 to 53 species, USFWS Region lists contain 27 to 78 species, and the National list contains 147 species. On average, priority species make up about 10 to 15 percent of the native bird species in any given geographic unit.

While all of the bird species included in *BCC 2008* are priorities for conservation action, this list makes no finding with regard to whether they warrant consideration for ESA listing. Our goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. We recommend that these lists be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." This report should also be used to develop research, monitoring, and management initiatives. *BCC 2008* is intended to stimulate coordinated and collaborative proactive conservation actions among Federal, State, Tribal, and private partners. We hope that, by focusing attention on these highest-priority species, this report will promote greater study and protection of the habitats and ecological communities upon which these species depend, thereby contributing to healthy avian populations and communities.

ACKNOWLEDGMENTS

This document was the result of close collaboration between staff in all regions of the U.S. Fish and Wildlife Service's Migratory Bird Program. The primary collaborators were Mila Plavsic, Jeff Shenot, and Marie Strassburger (Region 9); the initiative coordinators, Brad Andres (U.S. Shorebird Conservation Plan; USSCP), Jennifer Wheeler (North American Waterbird Conservation Plan; NAWCP) and Terry Rich (Partners in Flight; PIF); and the Regional Coordinators: Tara Zimmerman, Mike Green, Nanette Seto, Sue Thomas, and Maura Naughton (Region 1), Bill Howe and Dave Krueper (Region 2), Steve Lewis, Tom Will, and Bob Russell (Region 3), Dean Demarest, Chuck Hunter, Jaime Collazo, and Stefani Melvin (Region 4), Randy Dettmers (Region 5), Stephanie Jones, Suzanne Fellows, and Kevin Kritz (Region 6), Kent Wohl, Steve Matsuoka, and Richard Lanctot (Region 7). All were involved in developing selection criteria, compiling and finalizing BCR and USFWS Region lists, and reviewing and commenting on several drafts of this report.

The basis of this list is the work that many people have done to reach true avian priorities, and we have based this document on their work. We are particularly grateful for all of the work the initiatives (USSCP, NAWCP, and PIF) have done completing prioritization scores and methods. We thank Arvind Panjabi (Rocky Mountain Bird Observatory) for making available the PIF database and for responding to our many questions.

This edition of the *BCC 2008* is dedicated to John L. Trapp, who retired from USFWS in 2007 after 33 years of outstanding contributions to bird conservation. John had an extensive ornithological knowledge and passion for birds, and he oversaw almost all of the previous editions of the Birds of Conservation Concern.

INTRODUCTION

The purpose of this document is to identify migratory and non-migratory birds of the United States and its territories that are of conservation concern so as to stimulate coordinated and proactive conservation actions among Federal, State, Tribal, and private partners. The conservation concerns may be the result of population declines, naturally or human-caused small ranges or population sizes, threats to habitat, or other factors. The primary statutory authority for *Birds of Conservation Concern 2008* (*BCC 2008*) is the Fish and Wildlife Conservation Act of 1980 (FWCA), as amended; other authorities include the Endangered Species Act (ESA) of 1973, the Fish and Wildlife Act of 1956, and 16 U.S.C. § 701. The 1988 amendment (Public Law 100-653, Title VIII) to the FWCA requires the Secretary of the Interior, through the United States Fish and Wildlife Service (USFWS), to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." *BCC 2008* is the most recent effort by the USFWS to carry out this proactive conservation mandate and update *Birds of Conservation Concern 2002* (USFWS 2002). The overall goal of this report is to accurately identify those species (beyond those already federally listed as threatened or endangered) in greatest need of conservation action at three different geographic scales.

A primary goal of the USFWS is to conserve avian diversity in North America (USFWS 1990, 2004). This goal includes reducing or removing threats that may necessitate that a species be considered for listing under the ESA. The Birds of Conservation Concern are largely a subset of a larger list known as the Birds of Management Concern (BMC). The BMC is a subset of all species protected by the Migratory Bird Treaty Act (MBTA, see 50 CFR 10.13), and includes those which pose special management challenges due to a variety of factors (e.g., too few, too many, conflicts with human interests, or societal demands) (USFWS 2004). The BMC includes both game birds below their desired condition and nongame birds. As indicated in its strategic plan (USFWS 2004), the Migratory Bird Program places priority emphasis on these birds in its activities.

The philosophy underlying this report is that proactive bird conservation is necessary at a time when human impacts are at an all-time high. We strongly believe that a well-designed program that addresses resource-management issues up front will prevent or remove the need to consider listing species as threatened or endangered, and will promote and conserve long-term avian diversity in the United States. In addition, proactive conservation clearly is more cost-effective than the extensive recovery efforts required once a species is federally listed under the ESA. Our intent is for *BCC 2008* to stimulate coordinated efforts to develop and implement comprehensive and integrated approaches for the study, management, and protection of "non-ESA listed" bird species deemed to be in the most need of additional conservation actions. It should also be noted that, while the inclusion of native species not listed under the MBTA is beyond the scope of the FWCA, the USFWS has an incentive to encourage proactive management of these species by State agencies and other partners to prevent the need for listing them as endangered or threatened.

Bird species assemblages, guilds, or communities have recently been promoted as indicators of ecological integrity in a variety of habitats (Bradford et al. 1998, O'Connell et al. 2000, Canterbury et al. 2000, Venier and Pearce 2007), and at-risk bird species are good measures of ecosystem threats (Beissinger et al. 1996). Setting priorities in conservation is crucial because resources are limited. Many systems for setting wildlife-conservation priorities have been proposed. Some have focused heavily on identifying and quantifying threats to endangered or rare species (Master 1991, Wilcove et al. 1998). Others have focused on highlighting species that deserve attention due to threats to their populations, widespread or long-term declines, or low potential for population recovery (Millsap et al. 1990). The Canadian Wildlife Service developed a priority ranking system that focuses on conservation concerns and agency responsibilities to assist in setting conservation priorities for landbird species (Dunn 1997, Dunn et al. 1999). The mandate of the 1988 FWCA amendment requires a more proactive approach.

BCC 2008 uses current conservation assessment scores from three bird conservation plans: Partners in Flight North American Landbird Conservation Plan (PIF; Rich et al. 2004), the United States Shorebird Conservation Plan (USSCP; Brown et al. 2001, USSCP 2004), and the North American Waterbird Conservation Plan (NAWCP, Kushlan et al. 2002). Waterfowl game species covered by the North American Waterfowl Management Plan (Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretario de Medio Ambiente y Recursos Naturales, 2004) are specifically excluded from the BCC list in accordance with the FWCA of 1980. Species in need of additional conservation attention are identified at three distinct geographic scales: North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs; U.S. NABCI Committee 2000a, 2000b, 2000c), USFWS Regions, and National.

Assessment scores are based on several parameters including population trend, threats, distribution, abundance, and the importance of an area to a species. Partners in Flight, a coalition of Federal and State government agencies, non-governmental organizations, and private interests, developed species assessment scores out of concern for the sharp declines in many North American landbirds (Rich et al. 2004). The PIF approach (Carter et al. 2000, Rich et al. 2004) has been peer-reviewed by an independent body of avian biologists (Beissinger et al. 2000). Similar coalitions have prepared and reviewed conservation assessment scores for shorebirds at the National scale (Brown et al. 2000, USSCP 2004), and in step-down regional shorebird conservation plans (see http://www.fws.gov/shorebirdplan) and for waterbirds at the continental scale (Kushlan et al. 2002) and in step-down regional waterbird conservation plans (see http://www.waterbirdconservation.org). Additionally, we found it necessary to develop conservation assessment scores for species not yet evaluated by any of the bird conservation plans, such as Pacific Island birds. Taken together, these assessment scores can be used to develop a comprehensive set of integrated bird conservation priorities; this represents a unique conservation effort unmatched in any other major group of organisms in North America.

BACKGROUND

Why Did We Create Lists at Different Geographic Scales?

Listing birds of conservation concern at three geographic scales maximizes the utility of the lists for a variety of partner agencies and organizations. The different geographic scales, from smallest to largest, are as follows:

Bird Conservation Regions (BCRs). We have adopted BCRs as the smallest of our geographic scales. BCRs have been endorsed by the North American Bird Conservation Initiative (NABCI, U.S. NABCI Committee 2000a, 2000b, 2000c) as the basic units within which all-bird conservation efforts will be planned and evaluated (Fig. 1). The NABCI is an endeavor to increase the effectiveness of bird conservation at the continental level and currently includes the United States, Canada, and Mexico. Its goal is to deliver "the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships" (U.S. NABCI Committee 2000a). A published map of BCRs and accompanying written descriptions of each are available (U.S. NABCI Committee 2000b, 2000c). The BCR lists will be most useful to Federal land-managing agencies and their partners in their efforts to abide by the bird conservation principles embodied in the MBTA and Executive Order 13186, "Responsibilities of Federal agencies to protect migratory birds" (Clinton 2001). The NABCI has recognized 35 BCRs that cover the contiguous 48 States, Alaska, and Hawaii, numbered 1 to 5, 9 to 37, and 67 (Hawaii) (U.S. NABCI Committee 2000a, 2000b, 2000c, http://www.nabci-us.org/bcrs.html). For purposes of this report, we created two additional BCRs to encompass island "territories" of the United States,[1] "Other U.S. Pacific Islands" (i.e., excluding Hawaii) and "U.S. Caribbean Islands." In the *BCC 2002* report, these two BCRs were referred to as BCR 68 for the Pacific Ocean and BCR 69 for the Caribbean, but those designations were changed for *BCC 2008* because NAWCP uses those numbers to refer to marine areas ("pelagic" BCRs). Although *BCC*

[1] Island "territories" and other affiliations of the United States considered in this document include (a) *American Samoa*—an unincorporated and unorganized territory; (b) *Baker Island*—an unincorporated territory administered by the USFWS as a National Wildlife Refuge (NWR); (c) *Commonwealth of the Northern Marianas Islands*—aligned through a covenant of "political union"; (d) *Guam*—an unincorporated organized territory; (e) *Howland Island*—an unincorporated territory administered by the USFWS as a NWR; (f) *Jarvis Island*—an unincorporated territory administered by the USFWS as a NWR; (g) *Johnston Atoll*—an unincorporated and unorganized territory under joint operational control of the Department of Defense and USFWS (and administered as a NWR); (h) *Kingman Reef*—an unincorporated territory administered by the USFWS as a NWR; (i) *Midway Atoll*—an unincorporated territory administered by the USFWS as a NWR; (j) *Navassa Island*—administered by the USFWS as a NWR; *(k) Palmyra Atoll*—an incorporated territory that is partially privately owned and partially administered by USFWS as an NWR; (l) *Commonwealth of Puerto Rico*—a commonwealth; (m) *U.S. Virgin Islands*—an unincorporated organized territory; and (n) *Wake Island*—an unincorporated territory administered by the Department of the Interior (Central Intelligence Agency 2001).

2008 does not adopt the pelagic BCR system, it recognizes that some BCC species occur in the U.S. primarily or only at sea. These species are listed under the adjacent terrestrial BCR. Thus, there are 37 BCR lists of priority species.

USFWS Regions. BCC lists are presented in this document for 8 USFWS Regions.[2] The USFWS Region lists will be useful to USFWS administrators and biologists, other Federal and State agencies within a Region, and their partners and cooperators.

National. The National list encompasses the United States in its entirety, including island "territories" in the Caribbean and the Pacific. The National list should be viewed as a barometer of the status of U.S. bird populations, providing an "early warning" of birds that may decline to levels requiring ESA protection unless additional conservation measures are taken. The National list will be most useful as an outreach tool for educating the public about the precarious status of bird species in the U.S. It will also be useful for National bird conservation planning. The National list should not be used to foster bird conservation at smaller geographic scales; that is the purpose of the BCR and USFWS Region lists.

Although there are other lists of this nature, such as the National Audubon Society/American Bird Conservancy 2007 WatchList (Butcher et al. 2007), *BCC 2008* is the only list that meets USFWS mandates for the conservation of migratory nongame birds. Conservation organizations create lists of concern that reflect their unique missions, and it is important to keep this in mind when comparing lists. With regard to birds, the USFWS focuses on its trust responsibilities as defined by the Code of Federal Regulations, which excludes, for example, gallinaceous birds (resident game birds) unless they are listed as threatened or endangered under the Endangered Species Act (ESA). Similarly, the *Birds of Conservation Concern*, as mandated by Congressional legislation, excludes birds regulated as hunted species and birds listed under the ESA. Nongovernmental organizations like American Bird Conservancy (ABC) or National Audubon are not limited by these legal distinctions, and as a result they can provide lists that are more inclusive. The USFWS *Birds of Conservation Concern*, the ABC/Audubon Watch List, and a number of other lists share a common base: they are all reliant on the conservation assessments of the major bird partner initiatives and the surveys upon which those initiative assessments are grounded. National Audubon, American Bird Conservancy, and the USFWS are all partners, among others, in participating in the assessments of those initiatives.

[2] The Pacific Region (Region 1) includes Idaho, Oregon, Washington, Hawaii, and the Pacific Islands. The Southwest Region (Region 2) includes Arizona, New Mexico, Oklahoma, and Texas. The Great Lakes-Big Rivers Region (Region 3) includes Illinois, Indiana, Iowa, Michigan, Missouri, Minnesota, Ohio, and Wisconsin. The Southeast Region (Region 4) includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico/Virgin Islands, South Carolina, and Tennessee. The Northeast Region (Region 5) includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. The Mountain-Prairie Region (Region 6) includes Colorado, Kansas, Montana, North Dakota, Nebraska, South Dakota, Utah, and Wyoming.
The Alaska Region (Region 7) consists of the state of Alaska. The California and Nevada Region (Region 8) consists of the states of California and Nevada.

What Bird Species Did We Consider?

The various species groups considered for inclusion in *BCC 2008* are described in Table 1 and include nongame birds; gamebirds without hunting seasons; subsistence-hunted nongame birds in Alaska; and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. The major groups of species not considered in this assessment are (1) migratory gamebirds for which hunting regulations are established (i.e., cooperatively managed by Federal-State flyway councils); (2) species that are peripheral to the U.S. (i.e., population fragments within U.S. jurisdiction are too small to be managed capably); (3) species, subspecies, and populations of federally-endangered or -threatened birds (i.e., those subject to the provisions of the ESA); (4) resident gamebirds (i.e., managed by State wildlife agencies), unless listed as a federal ESA candidate; and (5) non-native species.

Because the assessments of the three bird conservation initiatives that we use here are all species-based, assessment scores were available only for full species. However, where appropriate, subspecies and populations are included in this assessment based on geographic range, federal candidate status, or available local data. Such subspecies and populations are noted on lists at all three geographic scales.

In the spirit of all-bird conservation, we include native species not specifically covered by the MBTA when they are deemed to be conservation priorities, as long as they are not part of one the groups excluded from consideration (see above). To avoid confusion, we clearly differentiate between those species that are and are not protected by the MBTA. A list of species protected by the MBTA is found in Title 50, Part 10, of the *Code of Federal Regulations*.

What Sources of Information Did We Use?

The methods used to assess and prioritize species differ between PIF, the USSCP, and the NAWCP. These differences relate to geographic scope, factor thresholds, and treatment of uncertainty. Although the methods for determining the highest-priority species are somewhat different among the different initiatives, scoring reflects state-of-the-art conservation assessments for each of the three species groups (landbirds, shorebirds, and waterbirds); we therefore view the conservation priorities within the three conservation plans as approximately equivalent.

PIF Assessment Scores. We used assessment scores from the PIF Species Assessment Database (version 2005, with unpublished 2007 updates) housed at the Rocky Mountain Bird Observatory, which we believe were the best available data at the time this report was prepared. In this database a panel of bird species experts has assigned each landbird species in North America scores ranging from 1 (lowest priority or degree of concern) to 5 (highest priority or degree of concern) for each of six factors, assessing aspects of future vulnerability at the range-wide scale: Population Size (PS), Breeding Distribution (BD), Non-breeding Distribution (ND), Threats in the Breeding Season (TB), Threats in the Non-breeding season (TN), and Population Trend (PT) (Panjabi et al. 2005). These factors are then used to calculate a Continental Combined Score

(CCS): PS + max(BD, ND) + max(TB, TN) + PT. The threats scores and the distribution scores are highly correlated so PIF used this score rather than a simple total. Thus, CCS ranges from 4 for a widespread and increasing species which is expected to face even more favorable conditions in the future, to 20 for a species of the very highest future conservation concern. The CCS was used to develop the landbird portion of the National BCC list.

Partners in Flight also assesses species at the BCR level. That assessment includes two additional criteria, Relative Density (RD) and Percent of Population, which reflect the importance of a particular BCR to each species. The global scores for TB, TN, and PT are also adjusted using BCR-specific data. These BCR scores informed the selection of landbirds for the *BCC 2008* BCR lists.

All of these factors are defined and discussed in detail in Panjabi et al. (2005). Both PIF breeding and wintering (non-breeding) scores, where available, were used in assessing species for inclusion in the *BCC 2008* report. In consultation with experts, the USFWS prepared scores for landbirds of Hawaii and Pacific island "territories" using the PIF process.

USSCP Assessment Scores. For shorebird species, we started with the updated assessment scores from the USSCP (USSCP 2004), which were built on original plan assessments (Brown et al. 2000, Brown et al. 2001). We incorporated new information on shorebird population trends and sizes published by Morrison et al. (2006) and Bart et al. (2007). Information on population sizes were ranked according to the PIF criteria. We also included updates in breeding and nonbreeding threats provided by regional shorebird working groups. The USSCP assessment process uses most of the same factor scores (with slightly different criteria) as PIF, but priorities were derived using a categorical (rather than a summation) approach (Brown et al. 2001). A prioritization protocol for shorebirds (in Brown et al. 2001) describes prioritization categories and their relationship to factor scores.

NAWCP Assessment Scores. Like USSCP, the NAWCP assessment process also uses most of the same factor scores (with slightly different criteria) as PIF and derives priorities using a categorical approach (Kushlan et al. 2002). For all three scales used in the BCC, we referred to the continental-scale assessment results documented in the NAWCP plan (Kushlan et al. 2002) and subsequent analyses (i.e., for non-colonial waterbirds, documented at http://www.waterbirdconservation.org), which we considered to be the best available data for waterbirds and seabirds. For *BCC 2008* BCR lists, we also referred to assessments in regional waterbird conservation plans or documents that most closely resemble regional waterbird conservation plans, where available (see www.waterbirdconservation.org.) These regional-scale status assessments are, in general, based on the continental-scale assessment, though regional planning groups made adjustments based on BCR-scale needs and values.

What Selection Criteria Did We Use For *Birds of Conservation Concern 2008* Lists?

The following are the criteria used to select species for consideration and inclusion on BCR, USFWS Region, and National lists. At each scale, USFWS expertise and discretion refined the

pool of species under consideration from the three bird conservation initiatives—as well as those selected for priority lists—to comply with the FWCA amendment of 1988. The same criteria were used for all subspecies and populations considered separately for inclusion.

There may be additions to the lists over the next several years. Newly designated Federal candidate species, species proposed for listing, and species removed from the list of endangered and threatened species will automatically be considered to be on the appropriate BCC list(s), effective the day of their designation or delisting as published in the *Federal Register*.

General criteria (rule-sets) for placing species on any BCC list

1. Begin with list from appropriate bird conservation initiative.

2. Follow criteria below for appropriate bird groups (see Panjabi et al. 2005 for explanation of terms).

3. Add non-breeding species if the species occurs at significant Relative Density scores and/or has moderate or high threat levels (based on expert opinion or data) in non-breeding season, if not already included due to breeding population (indicate with "nb").

4. Consider subspecies and populations where appropriate and where information on their status is available (e.g., Dickinson 2003).

5. Remove sport-hunted species (including their non-hunted populations) and federally-listed threatened or endangered populations (retaining non-listed populations with notation).

6. Add any recently ESA de-listed, candidate, or proposed species not already included.

7. In very limited circumstances, add or remove species (and document rationale) when Service expertise, supplemental information, or local data indicates a much greater or lesser degree of concern than that reflected by bird conservation initiative scoring.

Criteria for placing species on BCR lists

***LANDBIRD* criteria for *BCR* lists (see Panjabi 2005 for explanation of terms)**:

1. Include species meeting the PIF criteria for Species of Regional Importance – Continental Concern (U.S. and Canada), EXCEPT

   a) if Regional Combined Score <15 and Action Code = "Planning and Responsibility"

   b) in BCRs shared with Canada and Mexico, those with Relative Density ≥1 in the *U.S.* portion of the BCR (consult state population data).

c) for species shared with Latin America and the Caribbean (LAC), remove species with core ranges outside the U.S. and its territories if <1% of population or range-wide distribution is in the U.S. and threats in LAC are low. However, if conservation action for a species is warranted in the U.S. due to high threats in LAC, then it could be included in the appropriate U.S. BCR lists.

2. Include species meeting the PIF criteria for Species of Regional Importance – Regional Concern IF:

   a) Regional Combined Score ≥15 and Action Code = "Critical Recovery" or "Immediate Management"

   b) Regional Combined Score ≥ 17 and Action Code = "Management Attention"

3. Rank species in Hawaii and Pacific island territories using latest PIF criteria and above criteria as appropriate.

***SHOREBIRD* criteria for *BCR* lists:**

1. Include all species, subspecies, and populations meeting criteria for National BCC List if >1% of taxon occurs anytime during annual cycle in the BCR (i.e., Relative Density ≥1 in the BCR). The criteria for National BCC List are:

   a) population is undergoing a strong decline (Population Trend = 5), regardless of population size; OR
   b) population is declining or stable (Population Trend = 4 or 3) and populations are small, distributions are limited and threats are high (Population Size + Breeding Distribution + Non-breeding Distribution + Threats to Breeding + Threats to Non-breeding ≥ 18).

***WATERBIRD* criteria for *BCR* lists:**

1. Initially identify species of greatest concern from each BCR using the regional waterbird conservation plans or similar documentation (e.g., Joint Venture implementation plans). Depending on BCR-scale approaches, include species regionally assessed as High or Highest/Highly Imperiled, as Tier I (if the PIF approach was used), or priority species for BCR-scale partnership.

2. Remove species from BCR lists if U.S. populations are considered unmanageable (e.g., Relative Density <1).

3. Identify and retain only those species of greatest conservation concern, as some regional-plan species lists were designed to maximize support for a wide range of conservation activities by partners or identify species around which partnerships could operate.

Criteria for placing species on USFWS Regional lists

1. Include species from the BCC BCR lists if the species has the equivalent of a RD >1 or a manageable population in 50% or more of the BCRs in which it occurs within a USFWS region.

Criteria for placing species on BCC National list

***LANDBIRD* criteria for *National* list:**

1. Include all PIF "Continental Watchlist" (which includes the U.S. and Canada) species and U.S. island territories' species that meet PIF Continental Watchlist criteria EXCEPT,

   a) species without manageable populations in the U.S. or its territories; however, if conservation action is warranted in the U.S. due to high threats elsewhere, then such species could be included;

   b) species that are not listed on any BCC BCR list.

***SHOREBIRD* criteria for *National* list:**

1. Include species (or subspecies/population designations where supported by USSCP Conservation Assessment [2000] or more recent work) that meet any ONE of the following criteria:

   a) population is undergoing a strong decline (Population Trend = 5), regardless of population size; OR
   b) population is declining or unknown (Population Trend = 4 or 3) and populations are small, distributions are limited and threats are high (Population Size + Breeding Distribution + Non-breeding Distribution + Threats to Breeding + Threats to Non-breeding ≥ 18).

Scores have been revised and reflect the best science to date and are under review (Andres unpubl.).

WATERBIRD criteria for *National* list:

1. Include species ranked "Highly Imperiled" in the NAWCP continental-scale assessment unless not occurring on any BCR list.

2. Consider all species ranked "High" in the NAWCP continental-scale assessment (unless not

occurring on any BCR list) and include those with global population size (PS) factor score of 5, 4, 3 or 2. Populations at PS = 2 are included if they are at the lower end of the range in this category (i.e., 69,200) and experiencing steep declines.

THE *BIRDS OF CONSERVATION CONCERN 2008* LISTS

To maximize the usefulness of this report to multiple partners, the *BCC 2008* lists are presented in 46 separate tables, comprising 37 BCR lists (Tables 2 to 38), 8 USFWS Region lists (Tables 39 to 47) and 1 National list (Table 48). Summaries of the status of each species at each of the three distinct geographic scales are provided in Appendix B, and a list of scientific names of all species mentioned is found in Appendix C. The BCR lists range from 10 to 53 species, USFWS Region lists range from 27 to 78 species, and the National list consists of 147 species. The number of priority species represents roughly 10 to 15 percent of all bird species of any given geographic unit.

BCR Lists

The number of species on individual BCR lists (Tables 2 to 38) ranges from 10 to 53, averaging about 27. Lists are generally larger for BCRs in the southern United States, reflecting greater species diversity at lower latitudes and the importance of these regions for wintering migrants. Island birds are at increased risk of becoming endangered. Thus, the "Other U.S. Pacific Islands" BCR and "U.S. Caribbean Islands" BCR have relatively high proportions of their native species represented as birds of conservation concern. Roughly ten percent of the bird species native to Hawaii (BCR 67) are identified as birds of conservation concern, but that region also has a disproportionately large number of bird species listed as either endangered or threatened under the ESA; combining birds of conservation concern with endangered or threatened species, about 25 percent of the native Hawaiian avifauna is at risk.

USFWS Region Lists

The number of species on individual USFWS Region lists (Tables 39 to 47) ranges from 27 to 78, averaging about 50. Following the trend seen in BCRs, USFWS Region lists of priority species are larger in the southern United States, although this is partially attributed by the disparities in area covered by each of the Regions. The birds on the USFWS Region lists generally represent about 10 percent of the species native to the respective Regions.

National List

The National list (Table 48) is comprised of 147 species, and includes disproportionately larger numbers of species from the orders Procellariformes (albatrosses, petrels, shearwaters, and storm-petrels), Charadriiformes (shorebirds, gulls, terns, and auks), and Piciformes (woodpeckers). Within the Charadriiformes, the families Charadriidae (plovers), Haematopodidae (oystercatchers), Scolopacidae (sandpipers), and Alcidae (murres, murrelets,

and auklets) are represented on the list by greater numbers of species than expected. Among the Passeriformes—a large and diverse order of perching birds—the families Parulidae (wood-warblers) and Emberizidae (sparrows) and the subfamily Drepanidinae (Hawaiian honeycreepers) dominate the list in terms of both actual and relative numbers.

DISCUSSION

BCC 2008 is the latest update in a continuing effort to assess and prioritize bird species for conservation purposes (USFWS 1982, 1987, 1995, 2002; and U.S. Department of the Interior 1990). It is difficult to make meaningful comparisons among the lists because of differences in the way each succeeding report was prepared. In chronological order, these previous lists contained 28, 30, 77, 124, and 131 species of conservation concern at a National scale in 1982, 1987, 1990, 1995, and 2002 respectively; by comparison, *BCC 2008* includes 147 species at the National scale.

Do these figures reflect an actual decline in the conservation status of the Nation's birdlife, or do they merely reflect improvements in our ability to accurately identify and characterize species in real need of conservation attention? The truth probably lies somewhere in between. The preparation of prioritized species lists should be viewed as an evolving process, improving as our knowledge base increases, with each list reflecting the best available information at the time of its publication. The three bird conservation initiatives update their own assessments and scoring as new data or analyses become available. The data from these initiatives—which form the basis of *BCC 2008*—incorporate a great deal of input from many bird experts and have wide acceptance among members of avian conservation and scientific communities. We are confident that the methods used in *BCC 2008* are the best available for identifying avian conservation priorities as directed by the FWCA amendment of 1988.

Of the 131 species on the *BCC 2002* National list, 103 were retained on the current 2008 list and 28 were deleted due to a lack of convincing evidence that continued elevated concern is warranted. Forty-four species were added to the National list, resulting in a net gain of sixteen species for a current total of 147 species.

Of the 211 species on the Audubon WatchList (Butcher et al. 2007) that are not also a) endangered or threatened or b) hunted, 106 are on the *BCC 2008* National list and an additional 8 are on USFWS Region or BCR lists.

The selection criteria that we used identified 10 to 15 percent of all species at each geographic scale to be in need of additional conservation attention. Nongame migratory birds protected by the MBTA, the primary focus of this effort, make up an overwhelming proportion of the species on the *BCC 2008* lists. However, the proportional representation of non-MBTA species increases progressively at larger scales, reflecting the vulnerability of the island-endemic species that form the bulk of this group. The proportional representation of ESA candidate species also increases progressively at larger scales. ESA-delisted and ESA-proposed species make up a progressively smaller proportion of the species at larger scales.

BCC 2008 can be used as a barometer of the condition of our country's avifauna. Although there are general patterns that can be inferred from this report, there is no single reason why any species was placed on any one of these lists; some are relatively common but are undergoing sharp declines in population numbers, others are rare but may actually be increasing in numbers in certain locations, and others may be both rare and declining. However, habitat loss due to alteration or destruction continues to be the major reason for the declines of many species (Askins et al. 1990, USFWS 1995, Samson et al. 1998, Askins 2000). Birds included in the *BCC 2008* lists are deemed priorities for conservation actions, and the lists will be consulted for actions taken on Federal lands in accordance with Executive Order 13186, "Responsibilities of Federal agencies to protect migratory birds" (Clinton 2001). BCC species will also receive priority attention in the USFWS when allocating research, monitoring, and management funding. Our hope is that *BCC 2008* will stimulate coordinated, collaborative proactive conservation actions among Federal, State, and private partners.

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APPENDIX A

Figure 1 Map of the Bird Conservation Regions (BCRs) of the United States [3]



3 The figure does not show BCR 67 (Hawaii) or two other Bird Conservation Regions from the report that included islands in the Pacific and Caribbean which are either U.S. Territories or other affiliates.

Table 1 Eligibility of Various Species Groups for *BCC 2008* Consideration.

Applicable Federal Authority	Eligible	Not Eligible
Migratory Bird Treaty Act	"Nongame" and "other" species (as variously defined by bilateral migratory bird conventions with Canada, Mexico, Japan, and Russia)	Species peripheral to the U.S. (e.g., population fragments too small to be managed capably)
	"Gamebirds" (as defined by 50 CFR 20.11) for which hunting seasons have not recently been established (e.g., most shorebirds)	"Gamebirds" (as defined by 50 CFR 20.11) for which sport hunting seasons are established
	All subsistence-hunted species in Alaska (except "gamebirds" with established sport hunting seasons)	
Endangered Species Act	Candidates, including "resident gamebirds" (see below), or proposed Endangered or Threatened	Species, subspecies, and populations designated as Endangered or Threatened (as listed at 50 CFR 17.11)
	Non-listed subspecies and populations of otherwise Endangered or Threatened species (e.g., *occidentalis* ssp. of Spotted Owl)	
	Recently delisted MBTA species (e.g., Peregrine Falcon)	
	Other MBTA species delisted in the future	
None	Endemic Hawaiian honeycreepers of the subfamily Drepanididae (e.g., Hawai`i `Amakihi)	"Resident gamebirds" (generally hunted and managed by State wildlife agencies), unless listed as ESA Candidate (see above)
	Other island endemics (e.g., Fiji Shrikebill)	Non-native species

Table 2 BCR 1 (Aleutian/Bering Sea Islands) *BCC 2008* list[4]

Laysan Albatross (nb)
Black-footed Albatross (nb)
Red-faced Cormorant
Pelagic Cormorant
Black Oystercatcher
Rock Sandpiper (*ptilocnemis* ssp.)
Red-legged Kittiwake
Aleutian Tern
Arctic Tern
Marbled Murrelet (c)
Kittlitz's Murrelet (a)
Whiskered Auklet
McKay's Bunting

4 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 3 BCR 2 (Western Alaska) *BCC 2008* list[5]

Red-throated Loon
Yellow-billed Loon
Red-faced Cormorant
Pelagic Cormorant
Peregrine Falcon (b)
Black Oystercatcher
Solitary Sandpiper
Lesser Yellowlegs
Whimbrel
Bristle-thighed Curlew
Hudsonian Godwit
Bar-tailed Godwit
Marbled Godwit
Red Knot (*roselaari* ssp.)
Rock Sandpiper (*ptilocnemis* ssp.) (nb)
Dunlin (*arcticola* ssp.) (nb)
Short-billed Dowitcher
Aleutian Tern
Arctic Tern
Marbled Murrelet (c)
Kittlitz's Murrelet (a)
McKay's Bunting (nb)

5 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 4 BCR 3 (Arctic Plains and Mountains U.S. portion only) *BCC 2008* list.[6]

Red-throated Loon
Yellow-billed Loon
Peregrine Falcon (b)
Whimbrel
Bar-tailed Godwit
Red Knot (*roselaari* ssp.)
Dunlin (*arcticola* ssp.)
Buff-breasted Sandpiper
Arctic Tern
Smith's Longspur

6 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 5 BCR 4 (Northwestern Interior Forest U.S. portion only) *BCC 2008* list.[7]

Horned Grebe
Peregrine Falcon (b)
Solitary Sandpiper
Lesser Yellowlegs
Upland Sandpiper
Whimbrel
Bristle-thighed Curlew
Hudsonian Godwit
Red Knot (*roselaari* ssp.)
Rock Sandpiper (*ptilocnemis* ssp.) (nb)
Short-billed Dowitcher
Olive-sided Flycatcher
Smith's Longspur
Rusty Blackbird

7 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 6 BCR 5 (Northern Pacific Forest U.S. portions only) *BCC 2008* list.[8]

Yellow-billed Loon (nb)
Western Grebe (nb)
Laysan Albatross (nb)
Black-footed Albatross (nb)
Pink-footed Shearwater (nb)
Red-faced Cormorant
Pelagic Cormorant (*pelagicus* ssp.)
Bald Eagle (b)
Northern Goshawk (*laingi* ssp.)
Peregrine Falcon (b)
Black Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Whimbrel (nb)
Long-billed Curlew (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Short-billed Dowitcher (nb)
Aleutian Tern
Caspian Tern
Arctic Tern
Marbled Murrelet (c)
Kittlitz's Murrelet (a)
Black Swift
Rufous Hummingbird
Allen's Hummingbird
Olive-sided Flycatcher
Willow Flycatcher (c)
Horned Lark (*strigata* ssp.) (a)
Oregon Vesper Sparrow (*affinis* ssp.)
Purple Finch

8 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 7 BCR 9 (Great Basin) *BCC 2008* list.[9]

Greater Sage-Grouse (Columbia Basin DPS) (a)
Eared Grebe (nb)
Bald Eagle (b)
Ferruginous Hawk
Golden Eagle
Peregrine Falcon (b)
Yellow Rail
Snowy Plover (c)
Long-billed Curlew
Marbled Godwit (nb)
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Black Swift
Calliope Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
White-headed Woodpecker
Willow Flycatcher (c)
Loggerhead Shrike
Pinyon Jay
Sage Thrasher
Virginia's Warbler
Green-tailed Towhee
Brewer's Sparrow
Black-chinned Sparrow
Sage Sparrow
Tricolored Blackbird
Black Rosy-Finch

9 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 8 BCR 10 (Northern Rockies U.S. portion only) *BCC 2008* list.[10]

Bald Eagle (b)
Swainson's Hawk
Ferruginous Hawk
Peregrine Falcon (b)
Upland Sandpiper
Long-billed Curlew
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Black Swift
Calliope Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
White-headed Woodpecker
Olive-sided Flycatcher
Willow Flycatcher (c)
Loggerhead Shrike
Sage Thrasher
Brewer's Sparrow
Sage Sparrow
McCown's Longspur
Black Rosy-Finch
Cassin's Finch

10 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 9 BCR 11 (Prairie Potholes U.S. portion only) *BCC 2008* list.[11]

Horned Grebe
American Bittern
Least Bittern
Bald Eagle (b)
Swainson's Hawk
Peregrine Falcon (b)
Yellow Rail
Mountain Plover
Solitary Sandpiper (nb)
Upland Sandpiper
Long-billed Curlew
Hudsonian Godwit (nb)
Marbled Godwit
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black Tern
Black-billed Cuckoo
Short-eared Owl
Red-headed Woodpecker
Sprague's Pipit
Grasshopper Sparrow
Baird's Sparrow
Nelson's Sharp-tailed Sparrow
McCown's Longspur
Smith's Longspur (nb)
Chestnut-collared Longspur
Dickcissel

11 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 10 BCR 12 (Boreal Hardwood Transition U.S. portion only) *BCC 2008* list.[12]

Pied-billed Grebe
Horned Grebe (nb)
American Bittern
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail
Solitary Sandpiper (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black Tern
Common Tern
Red-headed Woodpecker
Olive-sided Flycatcher
Wood Thrush
Golden-winged Warbler
Canada Warbler
Henslow's Sparrow
Rusty Blackbird

12 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 11 BCR 13 (Lower Great Lakes/St. Lawrence Plain U.S. portion only) *BCC 2008* list.[13]

Pied-billed Grebe
Horned Grebe (nb)
American Bittern
Least Bittern
Black-crowned Night-Heron
Bald Eagle (b)
Peregrine Falcon (b)
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Buff-breasted Sandpiper (nb)
Black Tern
Common Tern
Black-billed Cuckoo
Short-eared Owl (nb)
Red-headed Woodpecker
Wood Thrush
Blue-winged Warbler
Golden-winged Warbler
Cerulean Warbler
Canada Warbler
Henslow's Sparrow

13 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 12 BCR 14 (Atlantic Northern Forests U.S. portion only) *BCC 2008* list.[14]

Red-throated Loon (nb)
Pied-billed Grebe
Horned Grebe (nb)
Greater Shearwater (nb)
Great Cormorant (nb)
American Bittern
Least Bittern
Snowy Egret
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Purple Sandpiper (nb)
Arctic Tern
Olive-sided Flycatcher
Bicknell's Thrush
Wood Thrush
Blue-winged Warbler
Bay-breasted Warbler
Canada Warbler
Nelson's Sharp-tailed Sparrow
Saltmarsh Sharp-tailed Sparrow
Rusty Blackbird

14 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 13 BCR 15 (Sierra Nevada) *BCC 2008* list.[15]

Bald Eagle (b)
Peregrine Falcon (b)
Flammulated Owl
Spotted Owl (*occidentalis* ssp.) (c)
Black Swift
Calliope Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
Olive-sided Flycatcher
Willow Flycatcher (c)
Cassin's Finch

15 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 14 BCR 16 (Southern Rockies/Colorado Plateau) *BCC 2008* list.[16]

Gunnison Sage Grouse
American Bittern
Bald Eagle (b)
Ferruginous Hawk
Golden Eagle
Peregrine Falcon (b)
Prairie Falcon
Snowy Plover (c)
Mountain Plover
Long-billed Curlew
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Burrowing Owl
Lewis's Woodpecker
Willow Flycatcher (c)
Gray Vireo
Pinyon Jay
Juniper Titmouse
Veery
Bendire's Thrasher
Grace's Warbler
Brewer's Sparrow
Grasshopper Sparrow
Chestnut-collared Longspur (nb)
Black Rosy-Finch
Brown-capped Rosy-Finch
Cassin's Finch

16 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 15 BCR 17 (Badlands and Prairies) *BCC 2008* list.[17]

Horned Grebe
American Bittern
Bald Eagle (b)
Ferruginous Hawk
Golden Eagle
Peregrine Falcon (b)
Prairie Falcon
Yellow Rail
Mountain Plover
Upland Sandpiper
Long-billed Curlew
Marbled Godwit
Black-billed Cuckoo
Burrowing Owl
Short-eared Owl
Lewis's Woodpecker
Red-headed Woodpecker
Loggerhead Shrike
Pinyon Jay
Sage Thrasher
Sprague's Pipit
Brewer's Sparrow
Sage Sparrow
Grasshopper Sparrow
Baird's Sparrow
McCown's Longspur
Chestnut-collared Longspur
Dickcissel

17 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 16 BCR 18 (Shortgrass Prairie) *BCC 2008* list.[18]

Lesser Prairie-Chicken (a)
Bald Eagle (b)
Golden Eagle
Prairie Falcon
Snowy Plover (c)
Mountain Plover
Upland Sandpiper
Long-billed Curlew
Burrowing Owl
Lewis's Woodpecker
Willow Flycatcher (c)
Bell's Vireo (c)
Sprague's Pipit (nb)
Lark Bunting
McCown's Longspur
Chestnut-collared Longspur

18 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 17 BCR 19 (Central Mixed-Grass Prairie) *BCC 2008* list.[19]

Lesser Prairie-Chicken (a)
Little Blue Heron
Mississippi Kite
Bald Eagle (b)
Swainson's Hawk
Black Rail
Snowy Plover (c)
Mountain Plover (nb)
Solitary Sandpiper (nb)
Upland Sandpiper
Long-billed Curlew
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Red-headed Woodpecker
Scissor-tailed Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Sprague's Pipit (nb)
Cassin's Sparrow
Lark Bunting
Henslow's Sparrow
Harris's Sparrow (nb)
McCown's Longspur (nb)
Smith's Longspur (nb)
Chestnut-collared Longspur (nb)

19 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 18 BCR 20 (Edwards Plateau) *BCC 2008* list.[20]

Bald Eagle (b)
Peregrine Falcon (b)
Mountain Plover (nb)
Upland Sandpiper (nb)
Long-billed Curlew (nb)
Gray Vireo
Rufous-crowned Sparrow
Harris's Sparrow (nb)
McCown's Longspur (nb)
Chestnut-collared Longspur (nb)
Orchard Oriole

20 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 19 BCR 21 (Oaks and Prairies) *BCC 2008* list.[21]

Little Blue Heron
Swallow-tailed Kite
Bald Eagle (b)
Peregrine Falcon (b)
Black Rail (nb)
Upland Sandpiper
Long-billed Curlew (nb)
Hudsonian Godwit (nb)
Buff-breasted Sandpiper (nb)
Red-headed Woodpecker
Scissor-tailed Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Sprague's Pipit (nb)
Swainson's Warbler
Henslow's Sparrow (nb)
Harris's Sparrow (nb)
Smith's Longspur (nb)
Orchard Oriole

21 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 20 BCR 22 (Eastern Tallgrass Prairie) *BCC 2008* list.[22]

Pied-billed Grebe
Horned Grebe (nb)
American Bittern
Least Bittern
Black-crowned Night-Heron
Bald Eagle (b)
Peregrine Falcon (b)
Black Rail
Solitary Sandpiper (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black Tern
Common Tern
Black-billed Cuckoo
Short-eared Owl (nb)
Whip-poor-will
Red-headed Woodpecker
Northern Flicker
Acadian Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Bewick's Wren (*bewickii* ssp.)
Wood Thrush
Blue-winged Warbler
Cerulean Warbler
Prothonotary Warbler
Kentucky Warbler
Field Sparrow
Grasshopper Sparrow
Henslow's Sparrow
Smith's Longspur (nb)
Dickcissel
Rusty Blackbird (nb)

22 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 21 BCR 23 (Prairie Hardwood Transition) *BCC 2008* list.[23]

Pied-billed Grebe
Horned Grebe (nb)
American Bittern
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail
Solitary Sandpiper (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*roselaar*i ssp.) (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black Tern
Common Tern
Black-billed Cuckoo
Short-eared Owl (nb)
Red-headed Woodpecker
Willow Flycatcher (c)
Marsh Wren
Brown Thrasher
Blue-winged Warbler
Golden-winged Warbler
Cerulean Warbler
Henslow's Sparrow
Dickcissel
Bobolink
Rusty Blackbird (nb)

23 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 22 BCR 24 (Central Hardwoods) *BCC 2008* list.[24]

Bald Eagle (b)
Peregrine Falcon (b)
Black Rail
Solitary Sandpiper (nb)
Buff-breasted Sandpiper (nb)
Short-eared Owl (nb)
Whip-poor-will
Red-headed Woodpecker
Loggerhead Shrike
Bell's Vireo (c)
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
Sedge Wren
Wood Thrush
Blue-winged Warbler
Prairie Warbler
Cerulean Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Bachman's Sparrow
Henslow's Sparrow
LeConte's Sparrow (nb)
Smith's Longspur (nb)
Painted Bunting
Rusty Blackbird (nb)

24 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 23 BCR 25 (West Gulf Coastal Plain/Ouachitas) *BCC 2008* list.[25]

Least Bittern
Little Blue Heron
Swallow-tailed Kite
Bald Eagle (b)
American Kestrel (*paulus* ssp.)
Yellow Rail (nb)
Solitary Sandpiper (nb)
Hudsonian Godwit (nb)
Buff-breasted Sandpiper (nb)
Chuck-will's-widow
Red-headed Woodpecker
Loggerhead Shrike
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
Wood Thrush
Sprague's Pipit (nb)
Prairie Warbler
Cerulean Warbler
Prothonotary Warbler
Worm-eating Warbler
Swainson's Warbler
Louisiana Waterthrush
Kentucky Warbler
Bachman's Sparrow
Henslow's Sparrow (nb)
Smith's Longspur (nb)
Painted Bunting
Orchard Oriole

25 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 24 BCR 26 (Mississippi Alluvial Valley) *BCC 2008* list.[26]

American Bittern (nb)
Least Bittern
Swallow-tailed Kite
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail (nb)
Black Rail
Solitary Sandpiper (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Short-eared Owl (nb)
Red-headed Woodpecker
Sedge Wren (nb)
Wood Thrush
Cerulean Warbler
Prothonotary Warbler
Swainson's Warbler
Kentucky Warbler
Henslow's Sparrow (nb)
LeConte's Sparrow (nb)
Painted Bunting
Dickcissel
Rusty Blackbird (nb)
Orchard Oriole

26 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 25 BCR 27 (Southeastern Coastal Plain) *BCC 2008* list.[27]

Red-throated Loon
Black-capped Petrel (nb)
Audubon's Shearwater (nb)
American Bittern (nb)
Least Bittern
Roseate Spoonbill (nb)
Swallow-tailed Kite
Bald Eagle (b)
American Kestrel (*paulus* ssp.)
Peregrine Falcon (b)
Yellow Rail (nb)
Black Rail
Limpkin
Snowy Plover (c)
Wilson's Plover
American Oystercatcher
Solitary Sandpiper (nb)
Upland Sandpiper (nb)
Whimbrel (nb)
Long-billed Curlew (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Gull-billed Tern
Sandwich Tern
Black Skimmer
Common Ground-Dove
Chuck-will's-widow
Whip-poor-will
Red-headed Woodpecker
Loggerhead Shrike
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
Sedge Wren (nb)
Wood Thrush
Blue-winged Warbler
Black-throated Green Warbler
Prairie Warbler
Cerulean Warbler
Prothonotary Warbler
Swainson's Warbler
Kentucky Warbler
Bachman's Sparrow
Henslow's Sparrow
LeConte's Sparrow (nb)
Nelson's Sharp-tailed Sparrow (nb)
Saltmarsh Sharp-tailed Sparrow (nb)
Seaside Sparrow (c)
Painted Bunting
Rusty Blackbird (nb)

27 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 26 BCR 28 (Appalachian Mountains) *BCC 2008* list.[28]

Bald Eagle (b)
Peregrine Falcon (b)
Upland Sandpiper
Northern Saw-whet Owl (S. Appalachian breeding pop.)
Whip-poor-will
Red-headed Woodpecker
Yellow-bellied Sapsucker (S. Appalachian breeding pop.)
Olive-sided Flycatcher
Loggerhead Shrike
Black-capped Chickadee (S. Appalachian pop.)
Bewick's Wren (*bewickii* ssp.)
Sedge Wren (nb)
Wood Thrush
Blue-winged Warbler
Golden-winged Warbler
Prairie Warbler
Cerulean Warbler
Worm-eating Warbler
Swainson's Warbler
Louisiana Waterthrush
Kentucky Warbler
Canada Warbler
Henslow's Sparrow
Rusty Blackbird (nb)
Red Crossbill (S. Appalachian pop.)

28 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 27 BCR 29 (Piedmont) *BCC 2008* list.[29]

Bald Eagle (b)
Peregrine Falcon (b)
Black Rail
Short-eared Owl (nb)
Whip-poor-will
Loggerhead Shrike
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
Sedge Wren
Wood Thrush
Blue-winged Warbler
Prairie Warbler
Cerulean Warbler
Swainson's Warbler
Kentucky Warbler
Bachman's Sparrow
Henslow's Sparrow
Rusty Blackbird (nb)

29 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 28 BCR 30 (New England/Mid-Atlantic Coast) *BCC 2008* list.[30]

Red-throated Loon (nb)
Pied-billed Grebe
Horned Grebe (nb)
Greater Shearwater (nb)
Audubon's Shearwater (nb)
American Bittern
Least Bittern
Snowy Egret
Bald Eagle (b)
Peregrine Falcon (b)
Black Rail
Wilson's Plover
American Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Purple Sandpiper (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Gull-billed Tern
Black Skimmer
Short-eared Owl (nb)
Whip-poor-will
Red-headed Woodpecker
Loggerhead Shrike
Brown-headed Nuthatch
Sedge Wren
Wood Thrush
Blue-winged Warbler
Golden-winged Warbler
Prairie Warbler
Cerulean Warbler
Worm-eating Warbler
Kentucky Warbler
Henslow's Sparrow
Nelson's Sharp-tailed Sparrow
Saltmarsh Sharp-tailed Sparrow
Seaside Sparrow (c)
Rusty Blackbird (nb)

30 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 29 BCR 31 (Peninsular Florida) *BCC 2008* list.[31]

Black-capped Petrel (nb)
Audubon's Shearwater (nb)
Brown Booby (nb)
Magnificent Frigatebird
American Bittern (nb)
Least Bittern
Reddish Egret
Roseate Spoonbill
Swallow-tailed Kite
Bald Eagle (b)
Short-tailed Hawk
American Kestrel (*paulus* ssp.)
Peregrine Falcon (b)
Yellow Rail (nb)
Black Rail
Limpkin
Snowy Plover (c)
Wilson's Plover
American Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Whimbrel (nb)
Long-billed Curlew (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Black Skimmer
White-crowned Pigeon
Common Ground-Dove
Mangrove Cuckoo
Smooth-billed Ani
Chuck-will's-widow
Red-headed Woodpecker
Loggerhead Shrike
Black-whiskered Vireo
Brown-headed Nuthatch
Yellow Warbler (*gundlachi* ssp.)
Prairie Warbler
Prothonotary Warbler
Bachman's Sparrow
Grasshopper Sparrow
Henslow's Sparrow (nb)
Nelson's Sharp-tailed Sparrow (nb)
Saltmarsh Sharp-tailed Sparrow (nb)
Seaside Sparrow (c)
Painted Bunting (nb)

31 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 30 BCR 32 (Coastal California U.S. portion only) *BCC 2008* list.[32]

Black-footed Albatross (nb)
Pink-footed Shearwater (nb)
Black-vented Shearwater (nb)
Ashy Storm-Petrel
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail (nb)
Black Rail
Snowy Plover (c)
Mountain Plover (nb)
Black Oystercatcher
Whimbrel (nb)
Long-billed Curlew (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Short-billed Dowitcher (nb)
Gull-billed Tern
Black Skimmer
Xantus's Murrelet (a)
Cassin's Auklet
Yellow-billed Cuckoo (w. US DPS) (a)
Flammulated Owl
Burrowing Owl
Spotted Owl (*occidentalis* ssp.) (c)
Black Swift
Costa's Hummingbird
Allen's Hummingbird
Lewis's Woodpecker
Nuttall's Woodpecker
White-headed Woodpecker
Loggerhead Shrike
Island Scrub-Jay
Yellow-billed Magpie
Oak Titmouse
Cactus Wren
LeConte's Thrasher
Yellow Warbler (*brewsteri*ssp.)
Common Yellowthroat (*sinuosa* ssp.)
Spotted Towhee (*clementae* ssp.)
Black-chinned Sparrow
Song Sparrow (*graminea* ssp.)
Song Sparrow (*maxillaris* ssp.)
Song Sparrow (*pusillula* ssp.)
Song Sparrow (*samuelis* ssp.)
Tricolored Blackbird
Lawrence's Goldfinch

32 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 31 BCR 33 (Sonoran and Mojave Deserts U.S. portion only) *BCC 2008* list.[33]

Least Bittern
Bald Eagle (b)
Peregrine Falcon (b)
Prairie Falcon
Black Rail
Snowy Plover (c)
Mountain Plover (nb)
Whimbrel (nb)
Long-billed Curlew (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Gull-billed Tern
Black Skimmer
Yellow-billed Cuckoo (w. US DPS) (a)
Elf Owl
Burrowing Owl
Costa's Hummingbird
Gila Woodpecker
Gilded Flicker
Bell's Vireo (c)
Gray Vireo
Bendire's Thrasher
LeConte's Thrasher
Lucy's Warbler
Yellow Warbler (*sonorana* ssp.)
Rufous-winged Sparrow
Black-chinned Sparrow
Lawrence's Goldfinch

33 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 32 BCR 34 (Sierra Madre Occidental U.S. portion only) *BCC 2008* list.[34]

Bald Eagle (b)
Common Black-Hawk
Peregrine Falcon (b)
Mountain Plover (nb)
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Elf Owl
Blue-throated Hummingbird
Elegant Trogon
Lewis's Woodpecker
Arizona Woodpecker
Northern Beardless-Tyrannulet
Buff-breasted Flycatcher
Rose-throated Becard
Bell's Vireo (c)
Gray Vireo
Pinyon Jay
Bendire's Thrasher
Sprague's Pipit (nb)
Phainopepla
Olive Warbler
Lucy's Warbler
Yellow Warbler (*sonorana* ssp.)
Black-throated Gray Warbler
Grace's Warbler
Red-faced Warbler
Canyon Towhee
Rufous-winged Sparrow
Botteri's Sparrow
Five-striped Sparrow
Black-chinned Sparrow
Lark Bunting (nb)
Grasshopper Sparrow (nb)
Grasshopper Sparrow (*ammolegus* ssp.)
Baird's Sparrow (nb)
Chestnut-collared Longspur (nb)
Varied Bunting

34 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 33 BCR 35 (Chihuahuan Desert U.S. portion only) *BCC 2008* lists.[35]

Bald Eagle (b)
Common Black-Hawk
Ferruginous Hawk (nb)
Golden Eagle
Peregrine Falcon (b)
Snowy Plover (c)
Mountain Plover
Long-billed Curlew (nb)
Yellow-billed Cuckoo (w. US DPS) (a)
Flammulated Owl
Elf Owl
Burrowing Owl
Lucifer Hummingbird
Loggerhead Shrike
Bell's Vireo (c)
Gray Vireo
Bendire's Thrasher
Sprague's Pipit (nb)
Virginia's Warbler
Colima Warbler
Yellow Warbler (*sonorana* ssp.)
Grace's Warbler
Red-faced Warbler
Cassin's Sparrow
Black-chinned Sparrow
Lark Bunting (nb)
Baird's Sparrow (nb)
McCown's Longspur (nb)
Chestnut-collared Longspur (nb)
Varied Bunting
Painted Bunting

35 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 34 BCR 36 (Tamaulipan Brushlands U.S. portion only) *BCC 2008* list.[36]

Harris's Hawk
Swainson's Hawk
Snowy Plover (c)
Mountain Plover (nb)
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Long-billed Curlew (nb)
Gull-billed Tern
Red-billed Pigeon
Green Parakeet (d)
Red-crowned Parrot (d)
Elf Owl
Burrowing Owl
Buff-bellied Hummingbird
Northern Beardless-Tyrannulet
Rose-throated Becard
Bell's Vireo (c)
Verdin
Curve-billed Thrasher
Sprague's Pipit (nb)
Tropical Parula
Summer Tanager
White-collared Seedeater
Cassin's Sparrow
Lark Bunting (nb)
Chestnut-collared Longspur (nb)
Varied Bunting
Painted Bunting
Dickcissel
Hooded Oriole
Altamira Oriole
Audubon's Oriole

36 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 35 BCR 37 (Gulf Coastal Prairie U.S. portion only) *BCC 2008* list.[37]

Audubon's Shearwater (nb)
Band-rumped Storm-Petrel (nb)
American Bittern
Least Bittern
Reddish Egret
Swallow-tailed Kite
Bald Eagle (b)
White-tailed Hawk
Peregrine Falcon (b) (nb)
Yellow Rail (nb)
Black Rail
Snowy Plover (c)
Wilson's Plover
Mountain Plover (nb)
American Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper (nb)
Whimbrel (nb)
Long-billed Curlew
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Gull-billed Tern
Sandwich Tern
Black Skimmer
Short-eared Owl (nb)
Loggerhead Shrike
Sedge Wren (nb)
Sprague's Pipit (nb)
Prothonotary Warbler
Swainson's Warbler
Botteri's Sparrow
Grasshopper Sparrow
Henslow's Sparrow (nb)
LeConte's Sparrow (nb)
Nelson's Sharp-tailed Sparrow (nb)
Seaside Sparrow (c)
Painted Bunting
Dickcissel

37 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 36 BCR 67 (Hawaii) *BCC 2008* list.[38]

Laysan Albatross
Black-footed Albatross
Christmas Shearwater
Band-rumped Storm-Petrel (a)
Tristram's Storm-Petrel
Bristle-thighed Curlew (nb)
Short-eared Owl
`Elepaio (d)
`Oma`o
Hawai`i `Amakihi (d)
Oahu `Amakihi (d)
Kaua`i `Amakihi (d)
`Anianiau (d)
`Akikiki (a,d)
Maui `Alauahio (d)
`Akeke`e (d)
`I`iwi (d)
`Apapane (d)

38 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 37 Other U.S. Pacific Islands *BCC 2008* list.[39]

Laysan Albatross
Black-footed Albatross
Herald Petrel
Tahiti Petrel (d)
Phoenix Petrel (d)
Christmas Shearwater
Audubon's Shearwater
Polynesian Storm-Petrel (d)
Spotless Crake (American Samoa pop.) (a,d)
Purple Swamphen
Bristle-thighed Curlew (nb)
Friendly Ground-Dove (American Samoa DPS) (a,d)
Micronesian Myzomela (d)
Rufous Fantail (*mariae* ssp.) (d)
Rufous Fantail (*saipanensis* ssp.) (d)
Fiji Shrikebill (d)
Tinian Monarch (d)
Bridled White-eye (*saypani* ssp.) (c,d)
Golden White-eye (d)
Micronesian Starling (*guami* ssp.) (d)
Polynesian Starling (d)

39 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 38 U.S. Caribbean Islands (Puerto Rico and U.S. Virgin Islands) *BCC 2008* list.[40]

West Indian Whistling-Duck
White-cheeked Pintail
Masked Duck
Ruddy Duck (*jamaicensis* ssp.)
Audubon's Shearwater
Masked Booby
Brown Booby
Red-footed Booby
Magnificent Frigatebird
Least Bittern
American Flamingo
Black Rail
Yellow-breasted Crake
Caribbean Coot
Limpkin
Snowy Plover (c)
Wilson's Plover
American Oystercatcher
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
White-crowned Pigeon
Bridled Quail-Dove
Antillean Mango (d)
Loggerhead Kingbird
Puerto Rican Vireo
Elfin-woods Warbler (a)
Greater Antillean Oriole

40 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 39 USFWS Region 1 (Pacific Region) *BCC 2008* list.[41]

Greater Sage-Grouse (Columbia Basin DPS)(a)
Black-footed Albatross
Herald Petrel
Tahiti Petrel (d)
Phoenix Petrel (d)
Pink-footed Shearwater (nb)
Polynesian Storm-Petrel (d)
Band-rumped Storm-Petrel (a)
Tristram's Storm-Petrel
Bald Eagle (b)
Swainson's Hawk
Ferruginous Hawk
Peregrine Falcon (b)
Yellow Rail
Spotless Crake (American Samoa pop.) (a,d)
Purple Swamphen
Snowy Plover (c)
Black Oystercatcher
Whimbrel (nb)
Bristle-thighed Curlew (nb)
Long-billed Curlew
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Short-billed Dowitcher (nb)
Friendly Ground-Dove (American Samoa DPS) (a,d)
Yellow-billed Cuckoo (w. US DPS) (a)
Flammulated Owl
Short-eared Owl
Black Swift
Calliope Hummingbird
Rufous Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
White-headed Woodpecker
Olive-sided Flycatcher
Willow Flycatcher (c)
Loggerhead Shrike
Pinyon Jay
Rufous Fantail (*mariae* ssp.) (d)
`Elepaio (d)
Tinian Monarch (d)
Horned Lark (*strigata* ssp.) (a)
`Oma`o
Golden White-eye (d)
Sage Thrasher
Virginia's Warbler
Green-tailed Towhee
Brewer's Sparrow
Oregon Vesper Sparrow (*affinis* ssp.)
Sage Sparrow
Black Rosy-Finch
Cassin's Finch
Hawai`i `Amakihi (d)
Oahu `Amakihi (d)
Kaua`i` `Amakihi (d)
`Anianiau (d)
`Akikiki (a,d)
Maui `Alauahio (d)
`Akeke`e (d)
`I`iwi (d)
`Apapane (d)

41 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 40 USFWS Region 2 (Southwest Region) *BCC 2008* list.[42]

Lesser Prairie-Chicken (a)
Reddish Egret
Swallow-tailed Kite
Bald Eagle (b)
Common Black-Hawk
White-tailed Hawk
Golden Eagle
Peregrine Falcon (b)
Yellow Rail (nb)
Black Rail
Snowy Plover (c)
Wilson's Plover
Mountain Plover
American Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper
Whimbrel (nb)
Long-billed Curlew
Hudsonian Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Gull-billed Tern
Sandwich Tern
Black Skimmer
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Elf Owl
Burrowing Owl
Lucifer Hummingbird
Costa's Hummingbird
Lewis's Woodpecker
Red-headed Woodpecker
Gilded Flicker
Northern Beardless-Tyrannulet
Buff-breasted Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Gray Vireo
Pinyon Jay
Brown-headed Nuthatch
Sedge Wren (nb)
Wood Thrush
Bendire's Thrasher
LeConte's Thrasher
Sprague's Pipit (nb)
Olive Warbler
Colima Warbler
Lucy's Warbler
Yellow Warbler (*sonorana* ssp.)
Grace's Warbler
Prairie Warbler
Cerulean Warbler
Prothonotary Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Red-faced Warbler
Rufous-winged Sparrow
Bachman's Sparrow
Botteri's Sparrow
Five-striped Sparrow
Black-chinned Sparrow
Lark Bunting
Grasshopper Sparrow (*ammolegus* ssp.)
Baird's Sparrow (nb)
Henslow's Sparrow (nb)
LeConte's Sparrow (nb)
Nelson's Sharp-tailed Sparrow (nb)
Seaside Sparrow (c)
Harris's Sparrow (nb)
McCown's Longspur (nb)
Smith's Longspur (nb)
Chestnut-collared Longspur (nb)
Varied Bunting
Painted Bunting
Rusty Blackbird (nb)
Audubon's Oriole

42 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 41 USFWS Region 3 (Great Lakes-Big Rivers Region) *BCC 2008* list.[43]

Pied-billed Grebe
Horned Grebe (nb)
American Bittern
Least Bittern
Bald Eagle (b)
Swainson's Hawk
Peregrine Falcon (b)
Yellow Rail
Black Rail
Solitary Sandpiper (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit
Red Knot (*roselaari* ssp.) (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black Tern
Common Tern
Black-billed Cuckoo
Short-eared Owl (nb)
Whip-poor-will
Red-headed Woodpecker
Olive-sided Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Bewick's Wren (*bewickii* ssp.)
Wood Thrush
Blue-winged Warbler
Golden-winged Warbler
Prairie Warbler
Cerulean Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Canada Warbler
Bachman's Sparrow
Henslow's Sparrow
Nelson's Sharp-tailed Sparrow
Smith's Longspur (nb)
Chestnut-collared Longspur
Dickcissel
Rusty Blackbird

43 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 42 USFWS Region 4 (Southeast Region) mainland *BCC 2008* list.[44]

Red-throated Loon
Black-capped Petrel
Audubon's Shearwater
Band-rumped Storm-Petrel (a) (Hawaii DPS is candidate; Atlantic pop. is not)
American Bittern
Least Bittern
Reddish Egret
Swallow-tailed Kite
Bald Eagle (b)
Short-tailed Hawk
American Kestrel (*paulus* ssp.)
Peregrine Falcon (b)
Yellow Rail
Black Rail
Limpkin
Snowy Plover (c)
Wilson's Plover
American Oystercatcher
Solitary Sandpiper (nb)
Whimbrel (nb)
Long-billed Curlew (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Gull-billed Tern
Black Skimmer
White-crowned Pigeon
Mangrove Cuckoo
Smooth-billed Ani
Short-eared Owl
Chuck-will's-widow
Red-headed Woodpecker
Olive-sided Flycatcher
Loggerhead Shrike
Black-whiskered Vireo
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
Sedge Wren
Wood Thrush
Sprague's Pipit
Blue-winged Warbler
Golden-winged Warbler
Prairie Warbler
Cerulean Warbler
Prothonotary Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Canada Warbler
Bachman's Sparrow
Henslow's Sparrow
LeConte's Sparrow
Nelson's Sharp-tailed Sparrow
Saltmarsh Sharp-tailed Sparrow
Seaside Sparrow (c)
Smith's Longspur
Painted Bunting
Rusty Blackbird

44 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 43 USFWS Region 4 (Puerto Rico and U.S. Virgin Islands) *BCC 2008* list.[45]

West Indian Whistling-Duck
White-cheeked Pintail
Masked Duck
Ruddy Duck (*jamaicensis* ssp. only)
Audubon's Shearwater
Masked Booby
Brown Booby
Red-footed Booby
Magnificent Frigatebird
Least Bittern
American Flamingo
Black Rail
Yellow-breasted Crake
Caribbean Coot
Limpkin
Snowy Plover (c)
Wilson's Plover
American Oystercatcher
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
White-crowned Pigeon
Bridled Quail-Dove
Antillean Mango (d)
Loggerhead Kingbird
Puerto Rican Vireo
Elfin-woods Warbler (a)
Greater Antillean Oriole

45 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 44 USFWS Region 5 (Northeast Region) *BCC 2008* list.[46]

Red-throated Loon (nb)
Pied-billed Grebe
Horned Grebe (nb)
Greater Shearwater (nb)
Audubon's Shearwater (nb)
American Bittern
Least Bittern
Snowy Egret
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail
Black Rail
Wilson's Plover
American Oystercatcher
Solitary Sandpiper (nb)
Lesser Yellowlegs (nb)
Upland Sandpiper
Whimbrel (nb)
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Purple Sandpiper (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Least Tern (c)
Gull-billed Tern
Arctic Tern
Black Skimmer
Short-eared Owl (nb)
Whip-poor-will
Red-headed Woodpecker
Olive-sided Flycatcher
Loggerhead Shrike
Bewick's Wren (*bewickii* ssp.)
Sedge Wren
Bicknell's Thrush
Wood Thrush
Blue-winged Warbler
Golden-winged Warbler
Prairie Warbler
Bay-breasted Warbler
Cerulean Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Canada Warbler
Henslow's Sparrow
Nelson's Sharp-tailed Sparrow
Saltmarsh Sharp-tailed Sparrow
Seaside Sparrow (c)
Rusty Blackbird

46 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 45 USFWS Region 6 (Mountain-Prairie Region) *BCC 2008* list.[47]

Gunnison Sage-Grouse
Lesser Prairie-Chicken (a)
Horned Grebe
American Bittern
Least Bittern
Bald Eagle (b)
Ferruginous Hawk
Golden Eagle
Peregrine Falcon (b)
Prairie Falcon
Yellow Rail
Black Rail
Snowy Plover (c)
Mountain Plover
Upland Sandpiper
Long-billed Curlew
Hudsonian Godwit (nb)
Marbled Godwit
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Black-billed Cuckoo
Flammulated Owl
Burrowing Owl
Short-eared Owl
Lewis's Woodpecker
Red-headed Woodpecker
Willow Flycatcher (c)
Loggerhead Shrike
Bell's Vireo (c)
Gray Vireo
Pinyon Jay
Bewick's Wren (*bewickii* ssp.)
Sage Thrasher
Sprague's Pipit
Sage Sparrow
Grasshopper Sparrow
Baird's Sparrow
Henslow's Sparrow
Nelson's Sharp-tailed Sparrow
McCown's Longspur
Smith's Longspur
Chestnut-collared Longspur
Black Rosy-Finch
Brown-capped Rosy-Finch
Cassin's Finch

47 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 46 USFWS Region 7 (Alaska Region) *BCC 2008* list.[48]

Red-throated Loon
Yellow-billed Loon
Horned Grebe
Laysan Albatross
Black-footed Albatross
Red-faced Cormorant
Pelagic Cormorant
Northern Goshawk (*laingi* ssp.)
Peregrine Falcon (b)
Black Oystercatcher
Solitary Sandpiper
Lesser Yellowlegs
Whimbrel
Bristle-thighed Curlew
Hudsonian Godwit
Bar-tailed Godwit
Marbled Godwit
Red Knot (*roselaari* ssp.)
Rock Sandpiper (*ptilocnemis* spp.)
Dunlin (*arcticola* ssp.)
Buff-breasted Sandpiper
Short-billed Dowitcher
Red-legged Kittiwake
Aleutian Tern
Arctic Tern
Marbled Murrelet (c)
Kittlitz's Murrelet (a)
Whiskered Auklet
Rufous Hummingbird
Olive-sided Flycatcher
Smith's Longspur
McKay's Bunting
Rusty Blackbird

48 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 47 USFWS Region 8 (California and Nevada) *BCC 2008* list.[49]

Black-footed Albatross
Pink-footed Shearwater (nb)
Ashy Storm-Petrel
Bald Eagle (b)
Peregrine Falcon (b)
Yellow Rail
Black Rail
Snowy Plover (c)
Mountain Plover (nb)
Black Oystercatcher
Whimbrel (nb)
Long-billed Curlew (nb)
Marbled Godwit (nb)
Red Knot (*roselaari* ssp.) (nb)
Short-billed Dowitcher (nb)
Gull-billed Tern
Black Skimmer
Xantus's Murrelet (a)
Yellow-billed Cuckoo (w. US DPS) (a)
Flammulated Owl
Burrowing Owl
Spotted Owl (*occidentalis* ssp.) (c)
Black Swift
Costa's Hummingbird
Calliope Hummingbird
Allen's Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
Olive-sided Flycatcher
Willow Flycatcher (c)
Loggerhead Shrike
Bell's Vireo (c)
Gray Vireo
Island Scrub-Jay
Pinyon Jay
Yellow-billed Magpie
Oak Titmouse
Cactus Wren
Sage Thrasher
LeConte's Thrasher
Virginia's Warbler
Yellow Warbler (*brewsteri* ssp.)
Yellow Warbler (*sonorana* ssp.)
Common Yellowthroat (*sinuosa* ssp.)
Green-tailed Towhee
Spotted Towhee (*clementae* ssp.)
Brewer's Sparrow
Black-chinned Sparrow
Sage Sparrow
Song Sparrow (*graminea* ssp.)
Song Sparrow (*maxillaris* ssp.)
Song Sparrow (*pusillula* ssp.)
Song Sparrow (*samuelis* ssp.)
Tricolored Blackbird
Lawrence's Goldfinch

49 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Table 48 National (including Caribbean and Pacific Island "Territories") *BCC 2008* list.[50]

West Indian Whistling-Duck
Greater Sage-Grouse (Colum. Basin DPS) (a)
Gunnison Sage-Grouse
Lesser Prairie-Chicken (a)
Yellow-billed Loon
Black-footed Albatross
Tahiti Petrel (d)
Phoenix Petrel (d)
Black-capped Petrel
Pink-footed Shearwater
Christmas Shearwater
Audubon's Shearwater
Polynesian Storm-Petrel (d)
Ashy Storm-Petrel
Band-rumped Storm-Petrel (a) (Hawaii DPS is candidate; Atlantic pop. is not)
Reddish Egret
Swallow-tailed Kite
Bald Eagle (b)
Swainson's Hawk
Peregrine Falcon (b)
Yellow Rail
Black Rail
Spotless Crake (Am. Samoa pop.) (a, d)
Caribbean Coot
Limpkin
Snowy Plover (c)
Wilson's Plover
Mountain Plover
American Oystercatcher
Black Oystercatcher
Solitary Sandpiper
Lesser Yellowlegs
Upland Sandpiper
Whimbrel
Bristle-thighed Curlew
Long-billed Curlew
Hudsonian Godwit
Bar-tailed Godwit
Marbled Godwit
Red Knot (*roselaari* ssp.)
Red Knot (*rufa* ssp.) (a) (nb)
Semipalmated Sandpiper (Eastern) (nb)
Purple Sandpiper (nb)
Rock Sandpiper (*ptilocnemis* ssp.)
Dunlin (*arcticola* spp.)
Buff-breasted Sandpiper
Short-billed Dowitcher
Red-legged Kittiwake
Aleutian Tern
Least Tern (c)
Gull-billed Tern
Black Skimmer
Marbled Murrelet (c)
Kittlitz's Murrelet (a)
Xantus's Murrelet (a)
White-crowned Pigeon
Friendly Ground-Dove (Am. Samoa) (a,d)
Green Parakeet (d)
Red-crowned Parrot (d)
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Mangrove Cuckoo
Flammulated Owl
Elf Owl
Spotted Owl (*occidentalis* ssp.) (c)
Short-eared Owl
Black Swift
Costa's Hummingbird
Calliope Hummingbird
Rufous Hummingbird
Allen's Hummingbird
Elegant Trogon
Lewis's Woodpecker
Red-headed Woodpecker
Table 48 Continued

50 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

Nuttall’s Woodpecker
Arizona Woodpecker
White-headed Woodpecker
Olive-sided Flycatcher
Willow Flycatcher (c)
Loggerhead Shrike
Puerto Rican Vireo
Bell's Vireo (c)
Gray Vireo
Island Scrub-Jay
Pinyon Jay
Yellow-billed Magpie
Rufous Fantail (*mariae* ssp.) (d)
`Elepaio (d)
Tinian Monarch (d)
Horned Lark (*strigata* ssp.) (a)
Oak Titmouse
Brown-headed Nuthatch
Bewick's Wren (*bewickii* ssp.)
`Omao
Bicknell's Thrush
Wood Thrush
Golden White-eye (d)
Bendire's Thrasher
LeConte's Thrasher
Sprague's Pipit
Blue-winged Warbler
Golden-winged Warbler
Virginia’s Warbler
Colima Warbler
Lucy's Warbler
Grace's Warbler
Prairie Warbler
Bay-breasted Warbler
Cerulean Warbler
Elfin-woods Warbler (a)
Prothonotary Warbler
Worm-eating Warbler
Swainson's Warbler
Kentucky Warbler
Canada Warbler
Red-faced Warbler

Rufous-winged Sparrow
Bachman's Sparrow
Five-striped Sparrow
Brewer's Sparrow
Black-chinned Sparrow
Baird's Sparrow
Henslow's Sparrow
Nelson's Sharp-tailed Sparrow
Saltmarsh Sharp-tailed Sparrow
Seaside Sparrow (c)
Harris's Sparrow
McCown's Longspur
Smith's Longspur
McKay's Bunting
Varied Bunting
Painted Bunting
Dickcissel
Tricolored Blackbird
Rusty Blackbird
Audubon's Oriole
Black Rosy-Finch
Brown-capped Rosy-Finch
Lawrence's Goldfinch
Hawai`i `Amakihi (d)
Oahu `Amakihi (d)
Kaua`i `Amakihi (d)
`Anianiau (d)
`Akikiki (a,d)
Maui `Alauahio (d)
`Akek`ee (d)
`I`iwi (d)
`Apapane (d)

Appendix B

Matrix of Species on BCR, USFWS Region, and National Lists in *BCC 2008*, Arranged Taxonomically (according to American Ornithologists' Union 48th Checklist) [51]

51 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of threatened or endangered species, (d) MBTA protection uncertain or lacking

	Bird Conservation Regions																																	USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
West Indian Whistling-Duck																																					x					+				+
White-cheeked Pintail																																					x					+				
Masked Duck																																					x					+				
Ruddy Duck (*jamaicensis* ssp. only)																																					x					+				
Greater Sage-Grouse (Columbia Basin DPS)(a)						x																																+								+
Gunnison Sage-Grouse													x																													+				+
Lesser Prairie-Chicken (a)															x	x																							+			+				+
Red-throated Loon		x	x								nb													nb			nb													+		+			+	
Yellow-billed Loon		x	x		nb																																									+	+
Pied-billed Grebe									x	x	x								x	x							x														+		+			
Horned Grebe				x				x	nb	nb	nb			x					nb	nb							nb														+		+	+	+	
Eared Grebe						nb																																								
Western Grebe					nb																																									
Laysan Albatross	nb				nb																														x	x							+		
Black-footed Albatross	nb				nb																							nb						x	x		+					+	+	+
Herald Petrel																																			x		+								
Tahiti Petrel (d)																																			x		+								+
Phoenix Petrel (d)																																			x		+								+
Black-capped Petrel																								nb				nb													+				+
Pink-footed Shearwater					nb																								nb									+					+	+
Greater Shearwater											nb																nb														+				
Christmas Shearwater																																			x	x									+
Black-vented Shearwater																													nb																
Audubon's Shearwater																								nb			nb	nb					nb		x	x				+	+	+			+
Polynesian Storm-Petrel (d)																																			x		+								+
Ashy Storm-Petrel																													x															+	+

	Bird Conservation Regions																																	USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Band-rumped Storm-Petrel (a) (Hawaii DPS is candidate; Atlantic pop. is not)																																	nb	x			+			+					+
Tristram's Storm-Petrel																																		x			+								
Masked Booby																																				x					+					
Brown Booby																												nb								x					+					
Red-footed Booby																																				x					+					
Great Cormorant											nb																																		
Red-faced Cormorant	x	x			x																																						+		
Pelagic Cormorant (*pelagicus* ssp.)	x	x			x																																						+		
Magnificent Frigatebird																												x								x					+					
American Bittern								x	x	x	x		x	x					x	x			nb	nb			x	nb						x						+	+	+	+		
Least Bittern								x		x	x								x			x	x	x			x	x		x				x						+	+	+	+	+	
Snowy Egret											x																	x															+			
Little Blue Heron																x		x				x																							
Reddish Egret																												x						x						+					+
Black-crowned Night-Heron										x									x																										
Roseate Spoonbill																								nb				x																
American Flamingo																																				x					+					
Swallow-tailed Kite																		x				x	x	x				x						x						+					+
Mississippi Kite																x																													
Bald Eagle (b)					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x						+	+	+	+		+	+		+	+
Northern Goshawk (*laingi* ssp.)					x																																						+		
Common Black-Hawk																															x	x							+						
Harris's Hawk																																	x												
Short-tailed Hawk																												x														+			
Swainson's Hawk							x	x								x																	x					+		+					+

	Bird Conservation Regions																																	USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
White-tailed Hawk																																		x					+								
Ferruginous Hawk						x	x						x	x																		nb						+					+			
Golden Eagle						x							x	x	x																	x						+					+			
American Kestrel (*paulus* ssp.)																						x		x				x														+				
Peregrine Falcon (b)		x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	x	x	x		x	x	x	x	x	x	x	x	x		nb					+	+	+	+		+	+	+	+	+
Prairie Falcon													x	x	x															x													+				
Yellow Rail						x		x	x		x			x							x		nb	nb	nb				nb	nb					nb				+	+	+	+		+	+		+	+
Black Rail																x		nb	x		x		x	x		x	x	x	x	x					x			x		+	+	+	+	+	+		+	+
Spotless Crake (American Samoa pop.) (a,d)																																			x			+									+
Yellow-breasted Crake																																				x					+						+
Purple Swamphen																																			x			+									
Caribbean Coot																																				x					+						+
Limpkin																								x				x								x					+	+					+
Snowy Plover (c)						x							x		x	x								x				x	x	x		x	x	x		x		+	+		+	+		+		+	+
Wilson's Plover																								x			x	x						x			x			+		+	+	+				+
Mountain Plover								x					x	x	x	nb	nb												nb	nb	nb	x	nb	nb				+					+		+	+
American Oystercatcher																								x			x	x						x			x			+		+	+	+				+
Black Oystercatcher	x	x			x																								x									+						+	+	+
Solitary Sandpiper		x		x	nb			nb	nb	nb	nb					nb			nb	nb	nb	nb	nb	nb			nb	nb					nb	nb				+	+	+		+		+		+
Lesser Yellowlegs		x		x	nb					nb	nb																nb	nb					nb	nb				+				+		+		+
Upland Sandpiper				x			x	x	x	x	x			x	x	x	nb	x	x	x				nb	x		x							nb				+	+			+	+	+		+
Whimbrel		x	x	x	nb				nb	nb	nb								nb	nb				nb			nb	nb	nb	nb				nb				+	+	+	+		+		+	+	+
Bristle-thighed Curlew		x		x																															nb	nb		+							+		+

	Bird Conservation Regions																																	USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Long-billed Curlew					nb	x	x	x					x	x	x	x	nb	nb						nb			nb	nb	nb		nb	nb	x				+	+		+			+		+	+
Hudsonian Godwit		x		x	nb			nb	nb	nb	nb					nb		nb	nb	nb		nb	nb				nb						nb					+	+	+		+	+	+		+
Bar-tailed Godwit		x	x																																									+		+
Marbled Godwit		x			nb	nb		x	nb	nb				x		nb			nb	nb			nb	nb			nb	nb	nb	nb				nb				+		+	+		+	+	+	+	+
Red Knot (*roselaari* ssp.)		x	x	x	nb														nb	nb									nb	nb				nb					+	+	+				+	+	+
Red Knot (*rufa* ssp.) (a)									nb	nb	nb								nb	nb				nb			nb	nb						nb			nb		+	+	+	+	+				+
Semipalmated Sandpiper (Eastern)										nb	nb													nb			nb	nb									nb				+	+	+				+
Purple Sandpiper											nb																nb																+				+
Rock Sandpiper (*ptilocnemis*)	x	nb		nb																																										+		+
Dunlin (*arcticola*)		nb	x																																											+		+
Buff-breasted Sandpiper			x					nb	nb	nb						nb		nb	nb	nb	nb	nb	nb	nb			nb	nb						nb					+	+	+		+	+	+		+
Short-billed Dowitcher		x		x	nb			nb	nb							nb			nb	nb			nb	nb			nb	nb	nb					nb				+	+	+	+		+	+	+	+	+
Red-legged Kittiwake	x																																													+		+
Aleutian Tern	x	x			x																																								+		+
Least Tern (c)																								x			x	x						x								+				+
Gull-billed Tern																								x			x	x	x	x			x	x					+		+		+			+	+
Caspian Tern					x																																											
Black Tern								x	x	x									x	x																				+							
Common Tern									x	x									x	x																				+							
Arctic Tern	x	x	x		x						x																																+					
Sandwich Tern																								x										x					+							
Black Skimmer																								x			x	x	x	x				x					+		+		+			+	+
Marbled Murrelet (c)	x	x			x																																								+		+

	Bird Conservation Regions																																USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Kittlitz's Murrelet (a)	x	x			x																																				+		+
Xantus's Murrelet (a)																												x														+	+
Cassin's Auklet																												x															
Whiskered Auklet	x																																								+		
White-crowned Pigeon																											x									x					+	+			+
Red-billed Pigeon																																x											
Common Ground-Dove																								x			x																
Bridled Quail-Dove																																				x					+		
Friendly Ground-Dove (American Samoa DPS) (a,d)																																			x		+						+
Green Parakeet (d)																																x											+
Red-crowned Parrot (d)																																x											+
Yellow-billed Cuckoo (w. U.S. DPS) (a)						x	x						x																x	x	x	x					+	+					+	+
Mangrove Cuckoo																											x													+				+
Black-billed Cuckoo								x		x				x					x	x																				+			+	
Smooth-billed Ani																											x													+				
Flammulated Owl						x	x					x	x															x		x	x							+	+			+		+	+
Elf Owl																													x	x	x	x						+					+	+
Burrowing Owl													x	x	x													x	x		x	x						+				+		+	
Spotted Owl (*occidentalis* ssp.) (c)												x																x														+		+	
Short-eared Owl								x		nb				x					nb	nb	nb		nb			nb	nb								nb	x			+		+	+		+	+	
Northern Saw-whet Owl (S. Appalachian breeding pop.)																									x																			
Chuck-will's-widow																						x		x			x														+			
Whip-poor-will																			x		x			x	x	x	x														+		+	
Black Swift					x	x	x					x																x												+				+	+

	Bird Conservation Regions																																	USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Antillean Mango (d)																																					x					+					
Buff-bellied Hummingbird																																x														
Blue-throated Hummingbird																															x														
Lucifer Hummingbird																																x						+								
Costa's Hummingbird																													x	x								+							+	+
Calliope Hummingbird						x	x					x																										+							+	+
Rufous Hummingbird					x																																+						+		+
Allen's Hummingbird					x																								x								+							+	+
Elegant Trogon																															x													+	
Lewis's Woodpecker						x	x					x	x	x	x														x		x						+	+				+		+	+
Red-headed Woodpecker								x	x	x				x		x		x	x	x	x	x	x	x		x	x												+	+	+		+	+		+
Gila Woodpecker																														x																
Williamson's Sapsucker						x	x					x																										+							+	
Yellow-bellied Sapsucker (S. Appalachian breeding pop.)																									x																				
Nuttall's Woodpecker																													x															+	
Arizona Woodpecker																															x													+	
White-headed Woodpecker						x	x																						x								+							+	
Northern Flicker																			x																										
Gilded Flicker																														x								+								
Northern Beardless-Tyrannulet																															x		x					+								
Olive-sided Flycatcher				x	x		x		x		x	x													x													+		+	+		+		+	+	+
Acadian Flycatcher																			x																										
Willow Flycatcher (c)					x	x	x					x	x		x					x																			+					+		+	+
Buff-breasted Flycatcher																															x							+								
Loggerhead Kingbird																																					x					+					
Scissor-tailed Flycatcher																x		x																												

	Bird Conservation Regions																																	USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Rose-throated Becard																															x		x													
Micronesian Myzomela (d)																																				x										
Loggerhead Shrike						x	x							x		x		x	x		x	x		x	x	x	x	x	x			x		x				+	+	+	+		+	+		+	+
Puerto Rican Vireo																																					x						+				+
Bell's Vireo (c)															x	x		x	x		x									x	x	x	x						+	+				+		+	+
Gray Vireo													x				x													x	x	x							+					+		+	+
Black-whiskered Vireo																												x														+						
Island Scrub-Jay																													x																	+	+
Pinyon Jay						x							x	x																	x									+	+				+	+	+
Yellow-billed Magpie																													x																	+	+
Rufous Fantail (*mariae* ssp.) (d)																																				x			+							+
Rufous Fantail (*saipanensis* ssp.) (d)																																				x										
`Elepaio (d)																																			x				+							+
Fiji Shrikebill (d)																																				x										
Tinian Monarch (d)																																				x			+							+
Horned Lark (*strigata* ssp.) (a)					x																																		+							+
Black-capped Chickadee (S. Appalachian pop.)																									x																					
Oak Titmouse																													x																	+	+
Juniper Titmouse													x																																		
Verdin																																	x														
Brown-headed Nuthatch																					x	x		x		x	x	x												+		+						+
Cactus Wren																													x																	+	
Bewick's Wren (*bewickii* ssp.)																			x		x	x		x	x	x															+	+		+	+		
Sedge Wren																					x		nb	nb	nb	x	x								nb					+		+		+				
Marsh Wren																				x																											

	Bird Conservation Regions																																USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
`Omao																																			x			+									+
Veery													x																																		
Bicknell's Thrush											x																																+					+
Wood Thrush									x	x	x								x		x	x	x	x	x	x	x													+	+	+		+				+
Bridled White-eye (*saypani* ssp. only) (c,d)																																				x										
Golden White-eye (d)																																				x		+									+
Sage Thrasher						x	x							x																									+					+		+	
Brown Thrasher																				x																										
Bendire's Thrasher													x																	x	x	x							+					+
Curve-billed Thrasher																																	x												
LeConte's Thrasher																												x	x									+							+	+
Micronesian Starling (*guami ssp.) (d)*																																				x										
Polynesian Starling (d)																																				x										
Sprague's Pipit								x						x	nb	nb		nb				nb								nb	nb	nb	nb						+		+			+			+
Phainopepla																															x															
Olive Warbler																															x									+						
Blue-winged Warbler										x	x								x	x	x			x	x	x	x														+	+			+				+
Golden-winged Warbler									x	x										x					x		x															+	+			+				+
Virginia's Warbler						x																										x									+					+		+	+
Colima Warbler																																x									+								+
Lucy's Warbler																													x	x											+								+
Tropical Parula																																	x														
Yellow Warbler (*brewsteri*)																													x																		+	
Yellow Warbler (*gundlachi* ssp.)																											x																				
Yellow Warbler (*sonorana*)																													x	x	x										+								+	

	Bird Conservation Regions																																	USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Black-throated Gray Warbler																															x														
Black-throated Green Warbler																								x																					
Grace's Warbler													x																		x	x							+						+
Prairie Warbler																					x	x		x	x	x	x	x											+	+	+		+				+
Bay-breasted Warbler											x																																+				+
Cerulean Warbler										x									x	x	x	x	x	x	x	x	x													+	+	+		+				+
Elfin-woods Warbler (a)																																					x					+				+
Prothonotary Warbler																			x			x	x	x				x							x				+		+						+
Worm-eating Warbler																					x	x			x		x													+	+	+		+				+
Swainson's Warbler																		x			x	x	x	x	x	x									x					+	+	+		+				+
Louisiana Waterthrush																						x			x																						
Kentucky Warbler																			x		x	x	x	x	x	x	x													+	+	+		+				+
Common Yellowthroat (*sinuosa* ssp.)																													x																+	
Canada Warbler									x	x	x														x																	+	+		+				+
Red-faced Warbler																															x	x									+							+
Summer Tanager																																	x														
White-collared Seedeater																																	x														
Green-tailed Towhee						x																																			+						+	
Spotted Towhee (*clementae* ssp.)																													x																		+	
Canyon Towhee																															x																
Rufous-winged Sparrow																														x	x										+							+
Cassin's Sparrow																x																x	x														
Bachman's Sparrow																					x	x		x		x		x													+	+	+						+
Botteri's Sparrow																															x			x							+							
Rufous-crowned Sparrow																	x																														

	Bird Conservation Regions																																	USFWS Regions								National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)								
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Five-striped Sparrow																															x								+								+
Brewer's Sparrow						x	x						x	x																										+					+		+	+
Field Sparrow																			x																				+								
Black-chinned Sparrow						x																							x	x	x	x							+							+	+
Oregon Vesper Sparrow (*affinis* ssp.)					x																																	+								
Sage Sparrow						x	x							x																									+					+		+	
Lark Bunting															x	x															nb	nb	nb						+								
Grasshopper Sparrow								x					x	x					x									x			nb			x											+		
Grasshopper Sparrow (*ammolegus* ssp.)																															x								+								
Baird's Sparrow								x						x																	nb	nb							+					+			+
Henslow's Sparrow									x	x						x		nb	x	x	x	nb	nb	x	x	x	x	nb						nb					+	+	+		+	+			+
LeConte's Sparrow																					nb		nb	nb										nb					+		+						
Nelson's Sharp-tailed Sparrow								x			x													nb			x	nb						nb					+	+	+		+	+			+
Saltmarsh Sharp-tailed Sparrow											x													nb			x	nb													+		+					+
Seaside Sparrow (c)																								x			x	x						x					+		+		+				+
Song Sparrow (*graminea* ssp.)																													x																+	
Song Sparrow (*maxillaris* ssp.)																													x																+	
Song Sparrow (*pusillula* ssp.)																													x																+	
Song Sparrow (*samuelis* ssp.)																													x																+	
Harris's Sparrow																nb	nb	nb																					+								+
McCown's Longspur							x	x						x	x	nb	nb															nb								+					+			+
Smith's Longspur			x	x				nb								nb		nb	nb		nb	nb																	+	+	+			+	+		+
Chestnut-collared Longspur								x					nb	x	x	nb	nb														nb	nb	nb						+	+				+			
McKay's Bunting	x	nb																																												+	+

	Bird Conservation Regions																																	USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																	(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Varied Bunting																															x	x	x					+								+
Painted Bunting																					x	x	x	x				nb				x	x	x					+		+						+
Dickcissel								x						x					x	x			x										x	x							+						+
Bobolink																				x																											
Tricolored Blackbird						x																							x																+	+
Rusty Blackbird				x					x		x								nb	nb	nb		nb	nb	nb	nb	nb												+	+	+		+		+		+
Greater Antillean Oriole																																				x						+					
Orchard Oriole																	x	x				x	x																							
Hooded Oriole																																	x												
Altamira Oriole																																	x												
Audubon's Oriole																																	x					+							+
Black Rosy-Finch						x	x						x																									+				+			+
Brown-capped Rosy-Finch													x																													+			+
Purple Finch					x																																							
Cassin's Finch							x					x	x																									+				+			
Red Crossbill (S. Appalachian pop.)																									x																				
Lawrence's Goldfinch																													x	x													+	+
Hawai`i `Amakihi (d)																																			x			+							+
Oahu `Amakihi (d)																																			x			+							+
Kaua`i `Amakihi (d)																																			x			+							+
`Anianiau (d)																																			x			+							+
`Akikiki (a,d)																																			x			+							+
Maui `Alauahio (d)																																			x			+							+
`Akeke`e (d)																																			x			+							+
`I`iwi (d)																																			x			+							+
`Apapane (d)																																			x			+							+

	Bird Conservation Regions																																		USFWS Regions									National
	'x' indicates species is included for breeding period (plus non-breeding where species occurs year-round), 'nb' indicates species is included only for non-breeding period																																		(4a = Puerto Rico & USVI)									
	1	2	3	4	5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	67	U.S. Pacif. Islds.	U.S. Carib. Islds.	1	2	3	4	4a	5	6	7	8	
Totals	13	22	10	14	30	28	22	27	23	27	29	11	27	28	16	26	11	19	39	30	26	27	26	53	25	18	45	48	45	28	37	31	31	42	18	20	27	61	78	45	61	27	51	45	34	55	147

(a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of ESA listed species, (d) MBTA protection uncertain or lacking

APPENDIX C

Index of Scientific Names of Species Appearing in the BCC 2008 Lists (Tables 2-48), Arranged Alphabetically by Common Name

Common Name	Scientific Name
Akekee	*Loxops caeruleirostris*
Akikiki	*Oreomysis bairdi*
Alauahio, Maui	*Paroreomyza maculata*
Albatross, Black-footed	*Phoebastria nigripes*
Albatross, Laysan	*Phoebastria immutabilis*
Amakihi, Hawaii	*Hemignathus virens*
Amakihi, Kauai	*Hemignathus kauaiensis*
Amakihi, Oahu	*Hemignathus flavus*
Ani, Smooth-billed	*Crotophaga ani*
Anianiau	*Hemignathus pan*/us
Apapane	*Mimatione sanguinea*
Auklet, Cassin's	*Ptychororamphus aleuticus*
Auklet, Whiskered	*Aethia pygmaea*
Beardless-Tyrannulet, Northern	*Camptostoma imberbe*
Becard, Rose-throated	*Pachyramphus aglaiae*
Bittern, American	*Botaurus lentiginosus*
Bittern, Least	*Ixobrychus exilis*
Blackbird, Rusty	*Euphagus carolinus*
Blackbird, Tricolored	*Agelaius tricolor*
Black-Hawk, Common	*Buteogallus anthracinus*
Bobolink	*Dolichonyx oryzivorus*
Booby, Brown	*Sula leucogaster*
Booby, Masked	*Sula dactylatra*
Booby, Red-footed	*Sula sula*
Bunting, Lark	*Calamospiza melanocorys*
Bunting, McKay's	*Plectrophenax hyperboreus*
Bunting, Painted	*Passerina ciris*
Bunting, Varied	*Passerina versicolor*
Chickadee, Black-capped	*Poecile atricapillus*
Chuck-will's-widow	*Caprimulgus carolinensis*
Coot, Caribbean	*Fulica caribaea*
Cormorant, Great	*Phalacrocorax carbo*
Cormorant, Red-faced	*Phalacrocorax urile*
Cormorant, Pelagic	*Phalacrocorax pelagicus pelagicus*
Crake, Spotless	*Porzana tabuensis*
Crake, Yellow-breasted	*Porzana flaviventer*
Crossbill, Red	*Loxia curvirostra*
Cuckoo, Black-billed	*Coccyzus erythropthalmus*
Cuckoo, Mangrove	*Coccyzus minor*
Cuckoo, Yellow-billed	*Coccyzus americanus*
Curlew, Bristle-thighed	*Numenius tahitiensis*
Curlew, Long-billed	*Numenius americanus*
Dickcissel	*Spiza americana*
Dowitcher, Short-billed	*Limnodromus griseus*
Duck, Masked	*Nomonyx dominicus*

Duck, Ruddy	*Oxyura jamaicensis jamaicensis*
Dunlin	*Calidris alpina arcticola*
Eagle, Bald	*Haliaeetus leucocephalus*
Eagle, Golden	*Aquila chrysaetos*
Egret, Reddish	*Egretta rufescens*
Egret, Snowy	*Egretta thula*
Elepaio	*Chasiempis sandwichensis*
Falcon, Peregrine	*Falco peregrinus*
Falcon, Prairie	*Falco mexicanus*
Fantail, Rufous	*Rhipidura rufifrons mariae*
Fantail, Rufous	*Rhipidura rufifrons saipanensis*
Finch, Cassin's	*Carpodacus cassinii*
Finch, Purple	*Carpodacus purpureus*
Flamingo, American	*Phoenicopterus ruber*
Flicker, Gilded	*Colaptes chrysoides*
Flicker, Northern	*Colaptes auratus*
Flycatcher, Acadian	*Empidonax virescens*
Flycatcher, Buff-breasted	*Empidonax fulvifrons*
Flycatcher, Olive-sided	*Contopus cooperi*
Flycatcher, Scissor-tailed	*Tyrannus forficatus*
Flycatcher, Willow	*Empidonax traillii*
Frigatebird, Magnificent	*Fregata magnificens*
Godwit, Bar-tailed	*Limosa lapponica baueri*
Godwit, Hudsonian	*Limosa haemastica*
Godwit, Marbled	*Limosa fedoa*
Goldfinch, Lawrence's	*Carduelis lawrencei*
Goshawk, Northern	*Accipiter gentilis laingi*
Grebe, Eared	*Podiceps nigricollis*
Grebe, Horned	*Podiceps auritus*
Grebe, Pied-billed	*Podilymbus podiceps*
Grebe, Western	*Aechmophorus occidentalis*
Ground-Dove, Common	*Columbina passerina*
Ground-Dove, Friendly	*Gallicolumba stairi*
Hawk, Ferruginous	*Buteo regalis*
Hawk, Harris's	*Parabuteo unicinctus*
Hawk, Short-tailed	*Buteo brachyurus*
Hawk, Swainson's	*Buteo swainsoni*
Hawk, White-tailed	*Buteo albicaudatus*
Heron, Little Blue	*Egretta caerulea*
Hummingbird, Allen's	*Selasphorus sasin*
Hummingbird, Blue-throated	*Lampornis clemenciae*
Hummingbird, Buff-bellied	*Amazilia yucatanensis*
Hummingbird, Calliope	*Stellula calliope*
Hummingbird, Costa's	*Calypte costae*
Hummingbird, Lucifer	*Calothorax lucifer*
Hummingbird, Rufous	*Selasphorus rufus*
liwi	*Vestiaria coccinea*

Jay, Pinyon	*Gymnorhinus cyanocephalus*
Kestrel, American	*Falco sparverius paulus*
Kingbird, Loggerhead	*Tyrannus caudifasciatus*
Kite, Mississippi	*Ictinia mississippiensis*
Kite, Swallow-tailed	*Elanoides forficatus*
Kittiwake, Red-legged	*Rissa brevirostris*
Knot, Red	*Calidris canutu roselaari*
Knot, Red	*Calidris canutus rufa*
Lark, Horned	*Eremophila alpestris strigata*
Limpkin	*Aramus guarauna*
Longspur, Chestnut-collared	*Calcarius ornatus*
Longspur, McCown's	*Calcarius mccownii*
Longspur, Smith's	*Calcarius pictus*
Loon, Red-throated	*Gavia stellata*
Loon, Yellow-billed	*Gavia adamsii*
Magpie, Yellow-billed	*Pica nuttalli*
Mango, Antillean	*Anthracothorax dominicus*
Monarch, Tinian	*Monarcha takatsukasae*
Murrelet, Kittlitz's	*Brachyramphus brevirostris*
Murrelet, Marbled	*Brachyramphus marmoratus*
Murrelet, Xantus's	*Synthliboramphus hypoleucus*
Myzomela, Micronesian	*Myzomela rubrata*
Night-Heron, Black-crowned	*Nycticorax nycticorax*
Nuthatch, Brown-headed	*Sitta pusilla*
Omao	*Myadestes obscurus*
Oriole, Altamira	*Icterus gularis*
Oriole, Audubon's	*Icterus graduacauda*
Oriole, Greater Antillean	*Icterus dominicensis*
Oriole, Hooded	*Icterus cucullatus*
Oriole, Orchard	*Icterus spurius*
Owl, Burrowing	*Athene cunicularia*
Owl, Elf	*Micrathene whitneyi*
Owl, Flammulated	*Otus flammeolus*
Owl, Northern Saw-whet	*Aegolius acadicus*
Owl, Short-eared	*Asio flammeus*
Owl, Spotted	*Strix occidentalis occidentalis*
Oystercatcher, American	*Haematopus palliatus palliatus*
Oystercatcher, Black	*Haematopus bachmani*
Parakeet, Green	*Aratinga holochlora*
Parrot, Red-crowned	*Amazona viridigenalis*
Parula, Tropical	*Parula pitiayumi*
Petrel, Black-capped	*Pterodroma hasitata*
Petrel, Herald	*Pterodroma arminjoniana*
Petrel, Phoenix	*Pterodroma alba*
Petrel, Tahiti	*Pterodroma rostrata*
Phainopepla	*Phainopepla nitens*
Pigeon, Red-billed	*Columba flavirostris*

Pigeon, White-crowned	*Columba leucocephala*
Pintail, White-cheeked	*Anas bahamensis*
Pipit, Sprague's	*Anthus spragueii*
Plover, Mountain	*Charadrius montanus*
Plover, Snowy	*Charadrius alexandrinus nivosus/tenuirostris*
Plover, Wilson's	*Charadrius wilsonia wilsonia*
Prairie-Chicken, Lesser	*Tympanuchus pallidicinctus*
Quail-Dove, Bridled	*Geotrygon mystacea*
Rail, Black	*Laterallus jamaicensis*
Rail, Yellow	*Coturnicops noveboracensis*
Rosy-Finch, Black	*Leucosticte atrata*
Rosy-Finch, Brown-capped	*Leucosticte australis*
Sage-Grouse, Greater	*Centrocerus urophasianus*
Sage-Grouse, Gunnison	*Centrocercus minimus*
Sandpiper, Buff-breasted	*Tryngites subruficollis*
Sandpiper, Purple	*Calidris maritima maritima/belcheri*
Sandpiper, Rock	*Calidris ptilocnemis ptilocnemis*
Sandpiper, Semipalmated	*Calidris pusilla*
Sandpiper, Solitary	*Tringa solitaria*
Sandpiper, Upland	*Bartramia longicauda*
Sapsucker, Williamson's	*Sphyrapicus thyroideus*
Sapsucker, Yellow-bellied	*Sphyrapicus varius*
Scrub-Jay, Island	*Aphelocoma insularis*
Seedeater, White-collared	*Sporophila torqueola*
Shearwater, Audubon's	*Puffinus nativitatis*
Shearwater, Black-vented	*Puffinus opisthomelas*
Shearwater, Christmas	*Puffinus nativitatis*
Shearwater, Greater	*Puffinus gravis*
Shearwater, Pink-footed	*Puffinus creatopus*
Shrike, Loggerhead	*Lanius ludovicianus*
Shrikebill, Fiji	*Clytorhynchus vitiensis*
Skimmer, Black	*Rynchops niger*
Sparrow, Bachman's	*Aimophila aestivalis*
Sparrow, Baird's	*Ammodramus bairdii*
Sparrow, Black-chinned	*Spizella atrogularis*
Sparrow, Botteri's	*Aimophila botterii*
Sparrow, Brewer's	*Spizella breweri*
Sparrow, Cassin's	*Aimophila cassinii*
Sparrow, Field	*Spizella pusilla*
Sparrow, Five-striped	*Aimophila quinquestriata*
Sparrow, Grasshopper	*Ammodramus savannarum*
Sparrow, Grasshopper	*Ammodramus savannarum ammolegus*
Sparrow, Harris's	*Zonotrichia querula*
Sparrow, Henslow's	*Ammodramus henslowii*
Sparrow, Le Conte's	*Ammodramus leconteii*
Sparrow, Nelson's Sharp-tailed	*Ammodramus nelsoni*
Sparrow, Rufous-crowned	*Aimophila ruficeps*

Sparrow, Rufous-winged	*Aimophila carpalis*
Sparrow, Sage	*Amphispiza belli*
Sparrow, Saltmarsh Sharp-tailed	*Ammodramus caudacutus*
Sparrow, Seaside	*Ammodramus maritimus*
Sparrow, Song	*Melospiza melodia graminea*
Sparrow, Song	*Melospiza melodia maxillaris*
Sparrow, Song	*Melospiza melodia pusillula*
Sparrow, Song	*Melospiza melodia samuelis*
Sparrow, Oregon Vesper	*Pooecetes gramineus affinis*
Spoonbill, Roseate	*Platalea ajaja*
Starling, Micronesia	*Aplonis opaca guami*
Starling, Polynesian	*Aplonis tabuensis*
Storm-Petrel, Ashy	*Oceanodroma homochroa*
Storm-Petrel, Band-rumped	*Oceanodroma castro*
Storm-Petrel, Polynesian	*Nesofregatta fuliginosa*
Storm-Petrel, Tristram's	*Oceanodroma tristrami*
Swamphen, Purple	*Porphyrio porphyrio*
Swift, Black	*Cypseloides niger*
Tanager, Summer	*Piranga rubra*
Tern, Caspian	*Hydroprogne caspia*
Tern, Aleutian	*Sterna aleutica*
Tern, Arctic	*Sterna paradisaea*
Tern, Black	*Chlidonias niger*
Tern, Common	*Sterna hirundo*
Tern, Gull-billed	*Gelochelidon nilotica*
Tern, Least	*Sternula antillarum*
Tern, Sandwich	*Thalasseus sandvicensis*
Thrasher, Bendire's	*Toxostoma bendirei*
Thrasher, Brown	*Toxostoma rufum*
Thrasher, Curve-billed	*Toxostoma curvirostre*
Thrasher, Le Conte's	*Toxostoma lecontei*
Thrasher, Sage	*Oreoscoptes montanus*
Thrush, Bicknell's	*Catharus bicknelli*
Thrush, Wood	*Hylocichla mustelina*
Titmouse, Juniper	*Baeolophus ridgwayi*
Titmouse, Oak	*Baeolophus inornatus*
Towhee, Canyon	*Pipilo fuscus*
Towhee, Green- tailed	*Pipilo chlorurus*
Towhee, Spotted	*Pipilo maculates clementae*
Trogon, Elegant	*Trogon elegans*
Verdin	*Auriparus flaviceps*
Veery	*Catharus fuscescens*
Vireo, Bell's	*Vireo bellii*
Vireo, Black-whiskered	*Vireo altiloquus*
Vireo, Gray	*Vireo vicinior*
Vireo, Puerto Rican	*Vireo latimeri*
Warbler, Bay-breasted	*Dendroica castanea*

Warbler, Black-throated-green	*Dendroica virens*
Warbler, Black-throated Gray	*Dendroica nigrescens*
Warbler, Blue-winged	*Vermivora pinus*
Warbler, Canada	*Wilsonia canadensis*
Warbler, Cerulean	*Dendroica cerulea*
Warbler, Colima	*Vermivora crissalis*
Warbler, Elfin-wood	*Dendroica angelae*
Warbler, Golden-winged	*Vermivora chrysoptera*
Warbler, Grace's	*Dendroica graciae*
Warbler, Kentucky	*Oporornis formosus*
Warbler, Lucy's	*Vermivora luciae*
Warbler, Olive	*Peucedramus taeniatus*
Warbler, Prairie	*Dendroica discolor*
Warbler, Prothonotary	*Protonotaria citrea*
Warbler, Red-faced	*Cardellina rubrifrons*
Warbler, Swainson's	*Limnothlypis swainsonii*
Warbler, Virginia's	*Vermivora virginiae*
Warbler, Worm-eating	*Helmitheros vermivorus*
Warbler, Yellow	*Dendroica petechia brewsteri*
Warbler, Yellow	*Dendroica petechia gundlachi*
Warbler, Yellow	*Dendroica petechia sonorana*
Waterthrush, Louisiana	*Seiurus motacilla*
Whimbrel	*Numenius phaeopus*
Whip-poor-will	*Caprimulgus vociferus*
Whistling-Duck, West Indian	*Dendrocygna arborea*
White-eye, Bridled	*Zosterops conspicillatus saypani*
White-eye, Golden	*Cleptornis marchei*
Woodpecker, Arizona	*Picoides arizonae*
Woodpecker, Gila	*Melanerpes uropygialis*
Woodpecker, Lewis's	*Melanerpes lewis*
Woodpecker, Nutall's	*Picoides nuttallii*
Woodpecker, Red-headed	*Melanerpes erythrocephalus*
Woodpecker, White-headed	*Picoides albolarvatus*
Wren, Bewick's	*Thryomanes bewickii bewickii*
Wren, Cactus	*Campylorhynchus brunneicapillus*
Wren, Marsh	*Cistothorus palustris*
Wren, Sedge	*Cistothorus platensis*
Yellowlegs, Lesser	*Tringa flavipes*
Yellowthroat, Common	*Geothlypis trichas sinuosa*

Exhibit 7

Chino Hills State Park

Discovery Center Interpretation Project Plan



Chino Hills State Park Discovery Center Interpretation Project Plan
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Cover image: View of the new Chino Hills State Park Discovery Center.

Contents

Introduction – 4
- Project Overview
- Chino Hills State Park Discovery Center Mission Statement
- Project Goals

Overview of Chino Hills State Park – 6
- Declaration of Purpose
- Spirit of Place
- Location
- Park History
- Geography
- Plant Communities and Wildlife
- Building the Chino Hills Bio-Link
- Recreational Resources

Current Status of Interpretation – 12
- Existing Interpretive Planning Documents
- Interpretive Collections
- Visitor Orientation
- Interpretive Facilities and Media
- Park Programs and Events

Special Concerns – 16
- Potential Audience
- Staffing and Park Support

Overall Interpretive Direction – 18
- California State Parks' Interpretation Mission Statement
- Interpretive Goals and Interpretive Objectives
- Interpretive Themes and Interpretive Periods
- California State Parks' Education Mission Statement
- California Educational Content Standards

Interpretive Recommendations – 44
- Proposed Interpretive Programs
- Proposed Visitor Flow, Interpretive Areas, and Exhibit Concepts
- Proposed Phasing and Preliminary Budget

References – 47

Appendices – 52

Introduction

Project Overview

Chino Hills State Park features significant open space that supports healthy wildlife and plant communities within the Mediterranean California Ecoregion, one of the most biologically diverse areas in the world. A new Discovery Center and day-use facilities located at the western end of Chino Hills State Park will provide opportunities for visitors to better understand the park's significance and value.

The new 2,065 square foot Discovery Center (approximately 1,500 square feet of exhibit space), a multi-purpose room (approximately 1,652 square feet), and associated elements will provide improved park access, restroom facilities, parking, visitor orientation, safety information, and further communicate the significance of the park. The area will include interior and exterior exhibits, an outdoor amphitheater, viewing platforms, and a "Discovery Trail" landscaped with native plants. The main exhibit hall will provide visitors with interpretive media and activities, while the multi-purpose room will support rotating exhibits, and community events.

The Chino Hills State Park Visitor Center Project came into fruition as a result of 2000 Bond Act funding and a $950,000 donation from the Wildlands Conservancy. The current budget allocation for construction of this project is $2,189,000 from DPR bond funds. An additional $500,000 is budgeted for interior exhibits, while $225,000 is allocated for exterior improvements: outdoor exhibits ($90,000), interpretive landscaping ($115,000), and parking lot landscaping ($20,000).

Near trailheads and scenic views of riparian habitat, the Discovery Center will provide visitors with opportunities to enhance their park experience, participate in community-based programs and events, support educational programs for school groups, and a place to embark on an adventure at Chino Hills State Park.[1] Interpretation is often considered the best ally in the protection of such a precious place. Educational and interpretive programs will play a key role in

[1] Trail use by equestrians, mountain bikes, and hikers will be permitted within the area, but off-trail use poses a threat to native plants and animals.

enhancing the protection of this irreplaceable open space area so close to a large urban population.

The Discovery Center is a desirable location to explore the concepts of the park's biodiversity, regional biocorridors, and human impacts on and relationship with the Chino Hills environment. Drawing upon resource specialists, Hills for Everyone, and park staff, this plan proposes media, themes, and methods for interpreting the extraordinary biodiversity and resources within Chino Hills State Park.

Chino Hills State Park Discovery Center Mission Statement

The Chino Hills State Park Discovery Center is dedicated to the preservation and interpretation of the biological diversity and natural and cultural resources of Chino Hills State Park. The facility provides unique learning opportunities, inspires positive environmental actions, and builds lasting connections between humans and this precious urban wildland.

Project Goals

The Chino Hills State Park Discovery Center will be a premier educational and interpretive destination for children, teachers, and the local community. Overall goals for the Chino Hills Discovery Center include the following. The interpretive facility will:

- Protect the park's natural and cultural resources and the biological diversity of Chino Hills State Park through education and interpretation.
- Enhance visitors' experience with exhibits, displays, and park information.
- Enrich the experience of school groups by providing curriculum related activities, exhibits, and educational opportunities.
- Provide learning experiences that appeal to visitors with different levels of knowledge and interest.
- Offer a multi-use area to encourage community based learning and activities.
- Upon visiting the Chino Hills Discovery Center and exploring its exhibits, visitors will want to explore the rest of the park.

Overview of Chino Hills State Park

Declaration of Purpose

The purpose of Chino Hills State Park is to preserve the natural, cultural, and scenic resources of the rolling hills, wooded canyons, and riparian forests that are representative of the early California landscape, and make them available for public enjoyment and education.

California State Parks will endeavor to preserve and restore native habitats in the park for their intrinsic natural values, to promote biological diversity, and to support the integrity of regional ecosystems. California State Parks will endeavor to protect the cultural and scenic resources, promote an understanding of the park's unique features, and provide recreation opportunities in a manner consistent with the protection of natural and cultural values.[2]

Spirit of Place

Chino Hills State Park gives those who visit it a sense of being transported back in time to an earlier and more undeveloped California. Upon entering the park, the transition from the human-made environment to the natural environment is abrupt; housing tracts quickly give way to open hills, and once inside, the sights and sounds of modern intrusions are minimal and one feels many miles away from cities and freeways. The park interior is enveloped by its ridgelines, and one perceives the land as being secluded, protected, and still. Without city noises and visual obtrusions, visitors become aware of the park's subtle movements, natural smells, and variations in microclimate, vegetation, and topography. Many endearing values of the park are intangible. The qualities of open space, natural sounds, and fresh air cannot be quantified like physical resources can, but they allow visitors to be aware of and reconnected with the natural world.

The forces of nature that have shaped the land are evident by the steeply cut valleys, landslides, and rolling hills of the park. These places mark the passage of time through their variation of seasonal colors. The park's landscape changes over the course of a year from one that is dry and dusty to one that is moist and lush. These variations can also be discovered while moving from the exposed ridgetops to the dense shade under riparian tree canopies.

[2] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 48.

The park is one of few in the Los Angeles Basin that offers opportunities for tranquility, solitude, and relief from the hectic urban life that surrounds it. It gives visitors a place to explore and recreate at their leisure. As the pace of life in this area quickens and the size of the population adjacent to the park grows, these values will become increasingly precious to many park visitors.

One comes away from Chino Hills State Park feeling refreshed. But the effect of one's experience at the park is most apparent when one returns to the urban environment. The park leaves visitors with a feeling of compassion for the disappearing values of California's past landscapes and a sincere appreciation for the remaining open space that is available for today's enjoyment.[3]

Location

Chino Hills State Park is an open space area located within three, highly urban counties (Orange, Riverside, and San Bernardino). It is a significant biocorridor linking wildlife habitats of the Puente-Chino Hills and Santa Ana Mountains. This area is one of the few Los Angeles Basin parks offering opportunities for tranquility, solitude, and relief from the hectic urban life that surrounds it.

Its 14,102 acres encompass stands of forest, scrub, and grassland habitats. The park is part of an important 31 mile long regional wildlife movement corridor of natural open space where animals move back and forth between the Santa Ana Mountains and the west end of the Whittier Hills. The Cleveland National Forest in the Santa Ana Mountains is just south of the Coal Canyon area of the park on the opposite side of Highway 91.

Chino Hills State Park is a vitally important refuge for many species of plants and animals as a link between natural areas. It is biologically connected to Santa Ana Mountains and the Cleveland National Forest via the Coal Canyon biocorridor, the only remaining viable link between them. Other parks in the vicinity include Carbon Canyon Regional Park to the west, Prado Regional Park to the east, Featherly Regional Park to the south, and Yorba Regional Park to the southwest.[4]

[3] CDPR, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 4.

[4] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 1.

Park History

Over the centuries, many people have made use of the open spaces and plentiful water, plant and animal resources of the Chino Hills. Prior to European contact, the Gabrielino (Tongva) Indians, who lived along the Santa Ana River basin, set up temporary camps for gathering acorns, elderberries, and other seeds.

After the Spanish founded Mission San Gabriel in 1771, the Chino Hills were used extensively for grazing by mission cattle. During the Mexican Republic era, the hills were used as spillover grazing from such surrounding Mexican ranchos as Santa Ana del Chino and La Sierra Yorba. After Mexico ceded California to the United States in 1848, the land was still used primarily for grazing.

Private land acquisition began in the 1870s and continued into the 1890s. In 1948, the 1,720-acre Rolling M Ranch was established and the land leased to nearby landowners for cattle grazing. Some late nineteenth and early twentieth century oil exploration and mining activity also took place in the park. A ranch house, barn, and several windmills and watering troughs serve as reminders of the cattle ranching days.

In 1977, the California legislature passed a resolution directing California State Parks to conduct a study about acquiring Chino Hills land for park purposes. A local citizens group, Hills for Everyone, worked closely with California State Parks and the legislature to create the park with an initial acquisition of 2,237 acres. In 1984, the State Park and Recreation Commission officially declared the area a unit of the State Park System. Since that date, numerous land acquisitions from various private landowners have expanded the park to its present acreage. [5]

Geography

Ranging from 430 feet to 1,781 feet in elevation, the park straddles the north end of the Santa Ana Mountains and the southeast portion of the Puente-Chino Hills, which together form the northern end of the Peninsular Ranges in Southern California. This formation interrupts the generally flat Los Angeles Basin with a variety of rolling hills, mountains and canyons on its south and east sides. The hills are a result of uplift and folding along the Whittier and Chino faults.

[5] California State Parks, *Park History*, http://www.parks.ca.gov/default.asp?page_id=21967.

The Puente-Chino Hills are made up of sedimentary rocks of the Puente Formation, deposited from five to fifteen million years ago. Associated with this formation are petroleum resources that have been explored and exploited in the Los Angeles region since the late 1800s. Fine clay soils are found in these formations, as well as a few areas of alluvial deposits that wash down from the hills and mountains during winter rains. [6]

Plant Communities

Diversity is perhaps the most important feature of the vegetation found within Chino Hills State Park. In fact, Chino Hills has several different kinds of vegetation in each of its major habitats.

In the park's creek zones, cattail stands provide habitat for a variety of wildlife, among them red-winged blackbirds. Along seasonal and year-round creeks, the willow and sycamore woodlands have understories of wild rose, stinging nettle and mule fat. These riparian areas provide cover and food for numerous animals and nesting birds. Many of these nesting birds are migratory species that come to the streamside habitats from Central and South America each spring to raise their young. Southern California black walnut trees join coast live oaks to form woodlands above the creeks, often on north facing slopes. These walnut woodlands are another important and rare plant community preserved in the park. Only a few thousand acres of this California habitat still exist, with about 1500 acres in preserves. Several hundred acres are protected at Chino Hills State Park.

The Tecate cypress is another special type of plant community found only in a few places in the United States. Several Tecate cypresses are found in Coal Canyon, adjacent to the larger ecological reserve managed by the California Department of Fish and Game.

Scrub and chaparral communities along the hills and slopes above the canyon floors include coastal sage scrub, dominated by California buckwheat and California sagebrush and mixed chaparral dominated by laurel sumac and toyon. Many California wildlife species depend on these scrub and chaparral communities for survival. Because these communities are disappearing as urban development continues, they form an increasingly important part of the biological resources protected in the park.

[6] California State Parks, *Geography*, http://www.parks.ca.gov/default.asp?page_id=21971.

Most of the grassland in the park is non-native annual European grasses that were introduced here during the early ranching years. However, grassland species native to California, such as purple needle grass and giant rye can be found among the annuals. An active grassland restoration program in the park is restoring native grassland to its more natural and dominant state. [7]

Wildlife

Because of its great variety of habitats and microclimates, Chino Hills State Park is an ideal location for observing many wildlife species native to Southern California. Red-tailed hawks and turkey vultures soar above. Coyotes, deer, bobcats and other mammals are often seen in the woodlands, scrub, and grasslands. Visitors with good ears and sharp eyes will enjoy the many songbird species seen and heard foraging and raising young in the trees and shrubs.

More than 200 species of birds and mammals, numerous reptiles and amphibians, and thousands of types of insects and other invertebrates live in the park. Some of these animals, including least Bell's vireo, the California gnatcatcher and the coastal cactus wren, are considered rare, threatened or endangered. The local diversity of native plants and animals found here in the Southern California region is greater than in any other area of comparable size in the United States. [8]

Building the Chino Hills Bio-Link

For humans relaxing or recreating in the park, Chino Hills is an island of tranquility in a sea of urbanization. For the plants and animals in the park, it is a link to other natural areas. By providing a major biological link between islands of open space, Chino Hills State Park effectively makes habitats larger and helps to ensure species diversity.

The many different watersheds of Chino Hills State Park combine to make up a biological corridor that allows wide-ranging species such as bobcats, mountain lions and a variety of rare species to avoid becoming trapped in isolated patches of habitat. When small patches of wilderness are cut off from other open space areas, many of the species present at the time of isolation will inevitably disappear. [9]

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[7] California State Parks, *Plant Communities*, http://www.parks.ca.gov/default.asp?page_id=21972.
[8] California State Parks, *Wildlife*, http://www.parks.ca.gov/default.asp?page_id=21970.
[9] California State Parks, *Building the Chino Hills Bio-Link*, http://www.parks.ca.gov/default.asp?page_id=21969.

Biological corridors help to maintain healthy populations of plants and animals by allowing for genetic exchange, species migration, maintaining a balanced food chain, and repopulating after a catastrophe such as the 2008 fire that burned "More than 95% of the park's 14,100 acres..."[10]

Recreational Resources

The proximity of its natural open space to urban populations and extensive trail network make Chino Hills State Park a popular and valuable recreational resource. Visitors enjoy both active and passive forms of recreation that focus primarily on trail use. People frequently visit the park from adjacent communities to walk, jog, bike, or ride horses. The park is also a popular spot for family and equestrian campers, as well as picnickers.[11]

[10]David Kelly, "A state park left a shambles," *Los Angeles Times*, November 29, 2008, sec. B.
[11] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 36.

Current Status of Interpretation

Existing Interpretive Planning Documents

Derived from the original general plan and resource inventory completed during the 1980s, a revised *Chino Hills State Park General Plan* was completed in 1999. This document outlines interpretive themes, resources, interpretive collections, and proposed facilities (including plans for a visitor center) within the park. Suggesting a new emphasis on habitat connections, native plant and animal diversity and fragility in the area, the general plan provides the framework for the interpretive programs, media, and facilities within the park.[12] No formal interpretive planning documents have been previously completed for the park.

Interpretive Collections

The Department acquires and maintains collections for several reasons. First, to preserve elements of the natural and cultural environment original to the park; second, to document the people, events, and cultural and natural features that are central to the park's purpose; and third, to support the interpretation of themes that are important to the park.

The following Goal and Scope of Collections Statement, identified in the park's 1999 General Plan, states the management objectives and provides guidelines for the type of park collections at Chino Hills State Park.[13]

Goal: Provide for the collection of natural and cultural artifacts original to Chino Hills State Park which supports the Declaration of Purpose and Department mission.

Scope of Collections Statement:
Natural and cultural material and object collections at Chino Hills State Park will have a specific connection to the natural and cultural history of the park, or provide support for interpretive themes and programs. Archaeological and paleontological materials, natural history specimens of park flora and fauna, and objects like historic furnishings, equipment, or personal items associated with the park are all potential collection items at Chino Hills State Park. Historic object collections will include those of the ranching period up to the year 1950.

[12] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (Sacramento: CDPR, 1999), 44.
[13] Ibid, 66-67.

- *Acquisition of ranching era artifacts and props will have a local historical association to the Rolling M Ranch, or other ranching activities within or near Chino Hills State Park.*

- *Natural history specimens of rare species will not be collected. Only lawfully salvaged specimens will be maintained in collections.*

- *The Department will establish safe and secure spaces for storage and display of park collections, and systems for inventory and management. Policies as outlined in the Department Operations Manual (DOM) Chapter 20 will be followed.*

The Chino Hills State Park interpretive collections were inventoried on March 25, 2008 by Christina Swiden (Museum Curator III, Northern Service Center) with the assistance of Larrynn Carver (Inland Empire District Archaeologist) and Dennis Stephen (Chino Hills State Park Ranger) at the Rolling M Ranch. Thirteen objects with cultural significance were cataloged and photographed and included Native American and historic ranching artifacts. Natural objects such as animal bones, antlers, bird's nest, geological specimens, and the Chino Hills State Park plant catalogue were not inventoried as museum objects.[14]

Interpretive and photographic collections not owned by the park may be acquired from the Hills for Everyone archives, Chino Hills State Park Interpretive Association, Olinda Oil Museum, The Puente Hills Landfill and Native Habitat Preservation Authority, Hillside Open Space Education Coalition, The Pomona Valley Audubon, Sea and Sage Audubon Society, The Angeles Chapter of the Sierra Club, the California Native Plant Society, Department of Fish and Game, United States Fish and Wildlife Service, the Brea Museum and Heritage Center, The Fairchild Aerial Photography Collection at Whittier College, CalPhotos at UC Berkeley, State Park staff, Johnny Bennet, Bruce Farnsworth, Daniel S. Cooper, and other local photographers.

Visitor Orientation

The Chino Hills State Park brochure was revised in 2007 and is available at various locations within the park or online on the California State Park website.[15] These park brochures are offered at the entrances of Bane Canyon, Rolling M Campground, and Chino Hills Discovery Center.

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[14] California Department of Parks and Recreation, *Rolling M Ranch, Chino Hills State Park Museum Collection Inventory*, (Sacramento: Northern Service Center, Christina Swiden, 2008).
[15] California State Parks, *Chino Hills State Park brochure*, http://www.parks.ca.gov/pages/648/files/ChinoHillsPDF.pdf.

Outside the park, the Olinda Oil Museum makes Chino Hills State Park brochures available to the visiting public. Other external forms of information and orientation include "Franko's Map of the Santa Ana Mountains & Chino Hills State Park," which displays the trails within the park and interprets significant features in the area.[16]

Interpretive Facilities and Media

The majority of interpretive facilities are located at or near Rolling M Ranch and Coal Canyon. No orientation or major interpretive components exist at the far-western end of the park. The Discovery Center will create much-needed interpretive facilities that are non-existent at the western end of the park.

The only other major interpretive area is located at the Rolling M Ranch within the far eastern section of the park. With little emphasis on the importance of the area's natural heritage, the interpretation and education at the Rolling M Ranch mostly focuses on cultural history. This area includes a campfire amphitheater and interpretive panels about various topics such as ranching, sensitive birds, and wildfire issues. There is an interpretive station along the Santa Ana River Trail at Coal Canyon. There is some interpretive signage within Coal Canyon and near the confluence of Bane and Aliso drainages.

Signs focused on the interpretation of Native Americans are located along the Hills for Everyone Trail. This is a one mile long route that begins west of the Rolling M Ranch off of Telegraph Canyon Trail.

Audio-visual programs related to environmental conservation and biodiversity within Chino Hills State Park were created by Hills for Everyone and the Puente Hills Landfill Native Habitat Preservation Authority. These forms of media were produced in partial cooperation with California State Park staff and should be further evaluated for their relevance to this project.

Park Programs and Events

Chino Hills State Park was closed in 2009 due to the economic crisis affecting the state of California. Recently re-opened, budget constraints are limiting staff availability to provide services at the site. With improved funding, it is anticipated that park programs will again be available, including campfire and educational talks, school tours, nature hikes, bird

[16] Franko Maps Ltd, *Franko's Map of the Santa Ana Mountains & Chino Hills State Park*, http://www.frankosmaps.com/Santa_Ana_Mountains.htm.

walks, and flower walks. The Junior Ranger program, offered to children seven to twelve years of age, is also expected to resume.

Two key special events that have traditionally been held at the park – and that are expected to continue – are Living History Day (the last Saturday in April) and Wilderness Day (in the fall).

Other events include overnight camp out fundraisers that are hosted by the Chino Hills State Park Interpretive Association. These special events feature interpretive programs on topics such as bird calls, coyotes, and meteors.[17]

Special events also include park restoration, trail clean-up days, and Earth Day. These types of events incorporate safety talks and interpretive programs to increase visitor awareness and understanding of park resources.

Some of the park programs and events are expected to continue to be held on the eastern side of the park (Rolling M Ranch). Others will be held on the western side of the park, upon completion of the new Discovery Center.

The California State Parks website can be checked for upcoming programs and events at Chino Hills State Park: http://www.parks.ca.gov/default.asp?page_id=648

[17] Chino Hills State Park Interpretive Association, *Past Events*, http://www.chinohillsstatepark.org/Take_A_Tour/photo_gallery/meet-the-meteors.htm.

Special Concerns

Potential Audience

The park is situated within the counties of Orange, Riverside, and San Bernardino, and borders on Los Angeles County. Bordered on the northeast by the City of Chino Hills, on the south by the City of Yorba Linda, on the southeast by the City of Corona, on the west by the City of Brea, and is close to the communities of Chino, Olinda Village, and Sleepy Hollow. Chino Hills State Park is a popular destination for horseback riders, mountain bikers, joggers, wildlife enthusiasts, researchers, families, and organized groups. With fifteen million people living within a one-hour drive of the park, an extremely diverse population could potentially visit the park. Over the last five years, an average of 113,307 people visited the park on an annual basis.[18]

The Discovery Center portion of Chino Hills State Park is within the City of Brea and approximately 35,400 residents live in close proximity to this park entrance.[19] The primary audience currently visiting the park consists of twenty to forty year old males who are interested in trail recreation, wildlife viewing, and camping.[20] With access to three major trails, the Discovery Center is expected to attract mountain bikers, joggers, wildlife viewers.

The Discovery Center will also appeal to school groups from Anaheim, Brea, Chino, Chino Hills, Corona, Placentia, Yorba Linda, and beyond with curriculum-based programs and educational opportunities. In Brea alone there are six elementary schools, one junior high school, and two high schools.[21] The park's close proximity to the urban core creates many possibilities for visitation. Some schools, such as Olinda Elementary, are less than a mile from the Discovery Center. The proximity to new educational opportunities may inspire frequent visitation from school groups.

Community outreach, creative marketing, and accessible curriculum-relevant programming must be a top priority to meet the needs of school groups. A recent survey of nearly three hundred teachers from the local area showed that ninety-seven percent of teachers had never taken their

[18] California State Parks, *State Park System Statistical Reports 2003-2007*, http://www.parks.ca.gov/?page_id=23308.
[19] According to the 2000 United States Census, Brea is a city of approximately 35,400 people with a median income of $59,759. Approximately 77% of the population is white, 20% Hispanic, and 9% Asian.
[20] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 1 and Expanded from memorandum 4-30-04 (Karen Barry to Joanne Redoble)
[21] Brea Olinda School District, "Schools," http://www.bousd.k12.ca.us/schools/default.asp.

class to Chino Hills State Park and seventy-four percent said that lack of information had prevented them from visiting the park. The survey also revealed that many teachers are faced with lack of funding for transportation and limited ability to go on field trips. Taking these obstacles into consideration, the interpretive programs and media at the Discovery Center aim to ease limitations to access and exceed educational expectations in order to further develop a dedicated park constituency and an educational community tied to Chino Hills State Park and its resources.[22]

Staffing and Park Support

To be a successful interpretive institution, the Chino Hills State Park Discovery Center will need sufficient staff to meet the needs of visitors seven days a week. The Discovery Center will require the attention of maintenance and interpretive staff to meet visitor expectations of facility cleanliness and comfort. They will also answer telephone calls, arrange group visits and special events, and support regular interpretive and educational programs at the Discovery Center.

The facility will be supported by a State Park Ranger, an Interpreter, District Archaeologist, Environmental Scientists, maintenance workers, seasonal support, and volunteers. While volunteers will be essential to supporting the facility, it should be noted that volunteer management and training will require a significant amount of support and staff time.[23]

Current park partners include the Chino Hills State Park Interpretive Association, a State Park cooperating association that supports interpretation and education in the park. Other potential support for future park program development includes Hills for Everyone, Metropolitan Water District, Aera Energy LLC, Olinda Oil Museum, and other local community groups.

[22] California State Parks conducted a K-12 teacher survey in May 2008 which included responses primarily from the Placentia-Yorba Unified School District and the Brea Olinda Unified School District.

[23] Refer to the following for more information regarding volunteer development and management: California State Parks, *The Gift of Time: Effective Volunteer Program Management for Local Parks and Recreation Agencies*, http://www.parks.ca.gov/pages/795/files/the%20gift%20of%20time.pdf.

Overall Interpretive Direction

California State Parks' Interpretation Mission Statement

Interpretation is a special form of communication that helps people understand, appreciate, and emotionally connect with the rich natural and cultural heritage preserved in parks. It is the mission of interpretation in California State Parks to convey messages that initially will help visitors value their experience, and that ultimately will foster a conservation ethic and promote a dedicated park constituency. [24]

Interpretive Goals

Interpretation is based on the premise that knowledge deepens the park experience and provides lasting benefits not only to individuals but also to society in general. The goal of interpretation at Chino Hills State Park is to expand the visitor's awareness, understanding, and appreciation of the park's resources and explore how they are part of Southern California's natural and cultural heritage. [25]

The following new goals outline the expectations for communication and delivery of meaningful interpretive experiences at the Chino Hills State Park Discovery Center.

- Convey the significance of Chino Hills State Park as a regional biological corridor and a hotspot for biological diversity, essential to the survival of diverse natural communities.
- Create an appreciation among visitors for Chino Hills State Park as an urban wildland, connected to and influenced by the cities and populations surrounding the park.
- Provide interpretive programs that are compatible with the other interpretive methods and media offered within the park.
- Inform visitors that staying on the trails and following park regulations protects both the visitor and the park's irreplaceable resources.
- Inspire visitors to take an active role in protecting their natural and cultural heritage.

Interpretive Objectives

Interpretive objectives refer to specific statements of expected accomplishment or desired future condition within the context of achieving a broader goal. The following objectives have been developed

[24] California State Parks Interpretation and Education Division, *Interpretation and Education Mission Statements*, http://www.parks.ca.gov/?page_id=23434.
[25] California Department of Parks and Recreation, *Chino Hills State Park General Plan*, 66.

to determine what people will learn, feel, and do as a result of their experience at the Chino Hills State Park Discovery Center.

Learning Objectives

- Visitors will be able to identify plants and animals as they explore the park.
- Visitors will understand that the preservation of native plants is essential to biodiversity.
- Visitors will understand that plants and animals play a distinct role within their community.
- Visitors will understand what a food chain is and its role in the ecosystem.
- Visitors will understand that the walnut woodland community found within Chino Hills State Park is rare.
- Visitors will understand the concept of biodiversity and the variety of plant and animal life within Chino Hills State Park.
- Visitors will understand that plants and animals need regional wildland connectivity to survive and stay in balance.
- Visitors will understand the challenges that an animal faces living on the urban edge and navigating through the biocorridor.
- Visitors will understand the relationship between the urban and wildland environments.
- Visitors will understand that their actions at home impact natural processes.
- Visitors will understand that humans depend on and use diverse natural resources in a variety of ways.
- Visitors will understand the actions that led to the preservation of the park and its resources including the civic involvement of Hills for Everyone and California State Parks.
- Visitors will understand the importance of environmental stewardship to Southern California.
- Visitors will understand the variety of plant communities within Chino Hills State Park.

Emotional Objectives

- Visitors will be visually introduced to the park's spirit of place.
- Visitors will want to explore the park and its biodiversity.
- Visitors will want to explore the Discovery Center and the rest of the park.
- Visitors will see the environment through the eyes of the animals that live within the Chino Hills area.
- Visitors will feel that they are connected to the natural world.
- Visitors will feel more connected to the plants and animals at Chino Hills State Park.

- Visitors will feel that they have a role in protecting biodiversity.
- Visitors will appreciate the biodiversity at Chino Hills State Park.

Behavioral Objectives

- Visitors will easily find park facilities, features, and information.
- Visitors will explore the park in safety.
- Visitors will explore the variety of plant communities within Chino Hills State Park.
- Visitors will explore the amphitheater and the relationships between plants, animals, and people.
- Visitors will explore the combined forces that shape biodiversity at Chino Hills State Park.
- Visitors will use a microscope to study insect and seed specimen and will compare biological differences.
- Visitors will engage in activities related to environmental stewardship that extend beyond Chino Hills State Park.
- Visitors will study specimens associated with the park's plants, animals, and habitats.

Interpretive Themes

Interpretive themes define a point of view given to the park's natural, cultural, aesthetic, and recreational resources. Themes link tangible resources to intangible, universal concepts that engage and inspire visitors. Tangible resources related to Chino Hills State Park include plants, animals, wildlands, and the bordering urban development. Universal concepts relevant to the messages communicated at the Discovery Center include survival, adaptation, irreplaceable loss, refuge, and interconnectivity. The following themes will direct the messages and media delivered at the Discovery Center.

Unifying Interpretive Theme

Media, exhibits, and programs conducted at the Discovery Center will be related to the following unifying theme:

> **Chino Hills State Park is an irreplaceable urban wildland of regional and global biological significance.**

The unifying theme communicates the main idea interpreted at the Chino Hills State Park Discovery Center. The park is unique because of its preservation of wildlands within a highly urban core of Southern California and the biologically diverse plant and animal populations that depend on these wildland areas within and connected to Chino Hills State Park to survive. Visitors will explore how human actions are impacting the natural areas within the region and why the protection of wildlands is vital today and for the future. Interpretive topics will explore concepts of biodiversity, regional connectivity, and human interrelationships with the Chino Hills environment. Additional themes and key messages are listed below:

Primary Theme I: The biodiversity connected to Chino Hills State Park makes it an exceptional place.

Supporting Theme IA: The connection of Chino Hills State Park to other wildland areas is crucial to the survival of plants and animals throughout the region.

Supporting Theme IB: Diverse rare, threatened, and endangered native plants and animals find refuge in the fragile natural environment of Chino Hills State Park.

Primary Theme II: Living on the edge of wildlands brings challenges and responsibilities for preserving the delicate balance between the habitats of wild animals and the needs of human residents.

Primary Theme I:
The biodiversity connected to Chino Hills State Park makes it an exceptional place.

MESSAGES

What is biodiversity? [26]

1.1 Biodiversity simply means the variety of plants and animals and other living things in a particular area or region.

Generally, the higher the degree of biodiversity, the healthier an ecosystem tends to be.[27]

1.2 Chino Hills State Park, an important open space area within the Los Angeles Basin, provides refuge for an unusually large number of plant and animal species for an open space area of its size.

More than 200 species of birds and mammals, numerous reptiles and amphibians, and thousands of types of invertebrates can be found in the park.

1.3 "Maintaining a wide diversity of species in each ecosystem is necessary to preserve the web of life that sustains all living things." Chino Hills is a unique variety of interconnected plants and animals.[28]

Biodiversity is not only important to the natural world, it is important to all people. The world's plants and animals provide them with food and medicine, clean air and water, and places to escape city life.

Global and Regional Significance

1.4 California contains the greatest number of endangered plants and the greatest number of endangered birds of any region in the continental U.S.[29]

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[26] California Biodiversity Council, *California Biodiversity Council: An Applied Definition of Biodiversity*, http://biodiversity.ca.gov/Biodiversity/biodiv_definition.html and Michael G. Barbour and Jack Major, *Terrestrial Vegetation of California* (Davis: California Native Plant Society, 1988), 111.

[27] The Field Museum, "Underground Adventure-Soil Biodiversity," http://www.fieldmuseum.org/UndergroundAdventure/teachers/soil_biodiversity.shtml.

[28] Ibid.

[29] U.S. Fish and Wildlife, http://endangered.fws.gov.

Los Angeles, Santa Barbara, San Diego, and San Bernardino counties are four of ten counties in the continental United States with the largest number of threatened or endangered plant and animal species.[30]

1.5 The Mediterranean California Ecoregion, which covers much of western California and northwestern Baja California, is recognized worldwide as a significant area of biodiversity. This area contains a greater number of biological resources than any other area of comparable size in the United States.[31]

1.6 The Mediterranean climate type only occurs in four locations outside of the region surrounding the Mediterranean Sea. Sometimes it is considered relatively "rare" when compared to other world climate types. Only a very narrow area of the earth's surface actually supports plants and animals found in Mediterranean climates.

Among the recognized hotspots of biodiversity on Earth, all five main regions with a Mediterranean climate are included: The California Floristic Province; Central Chile; The Mediterranean Basin; The Cape Floristic Region and Southwest Australia.[32]

Mediterranean ecosystems are among the most threatened on Earth. More than 41 percent of their land has been converted to farmland and urban uses. Worldwide, only 5 percent of their natural area is protected.

Most people understand the plight of tropical rainforests, where habitat loss exceeds habitat protection by 2 to 1. In other words, for every acre of rainforest saved, two have been lost to conversion or development. In Mediterranean habitats, the disparity is much greater. For every acre of Mediterranean habitat saved, eight acres have been permanently lost.[33]

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[30] California State Parks, *Chino Hills General Plan* (Sacramento: State Park and Recreation Commission, 1999), 27-29.
[31] Environmental Protection Agency, Western Ecology Division "Ecoregions of North America," http://www.epa.gov/wed/pages/ecoregions/na_eco.htm
[32] Royal Botanic Gardens Kew, "Evolutionary Origin of Biodiversity Hotspots with a Mediterranean Climate," http://www.kew.org/science/directory/projects/HOTMED.html.
[33] Nature Conservancy, *California Saving Mediterranean Habitats Worldwide*, http://www.nature.org/wherewework/northamerica/states/california/projectprofiles/shawquestions.html.

Building Blocks of Biodiversity

1.7 "Soil is a living thing. A single gram can contain as many as 15, 000 different species, 6 million creatures in total. Talk about diversity! While most of us may never actually see these life forms with our own eyes, they are there — and they are immensely important to us."[34]

Chino Hills State Park is located in Soil Region VII-Southern California. The Soil Conservation Service has mapped thirty-nine soil units representing twenty soil series. These soils vary widely in depth, fertility, permeability, and other important characteristics, which support diverse animal life.[35]

The soil, as the major medium for plant growth, is the basic resource for all land use and development. The healthier the soil, the more life that ecosystem can support, resulting in a greater degree of biodiversity.[36]

1.8 The Chino Hills are part of the divide between the Los Angeles and Santa Ana Hydrologic Basins. Chino Hills State Park contains some complete watersheds such as Aliso Canyon, Telegraph Canyon, and Water Canyon. Most of the park drains toward the Santa Ana River or Carbon Creek. The high divide in the park between San Juan Hill and Gilman Peak creates microclimate differences due to rain shadow effect.

Supporting Theme IA:
The connection of Chino Hills State Park to other wildland areas is crucial to the survival of plants and animals throughout the region.

MESSAGES
The Biocorridor

1.9 Habitat fragmentation is the tearing of the fabric of natural landscapes into smaller and smaller pieces. The alteration of habitats by human activities has been called the greatest threat to biodiversity on earth.[37]

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[34] GreenTreks Network, Inc, *Biodiversity: Healthy Soil*, http://www.greentreks.org/documentaries/biodiversity/healthysoil.asp.
[35] California State Parks, *Chino Hills State Park General Plan* (Sacramento: State Park and Recreation Commission, 1999), 18.
[36] The Field Museum, "Underground Adventure-Soil Biodiversity," http://www.fieldmuseum.org/UndergroundAdventure/teachers/soil_biodiversity.shtml.
[37] Melanie Marie Schlotterbeck, *GIS Mapping of Biological Studies in the Puente-Chino Hills Wildlife Corridor Including Species Diversity and Relative Abundance* (Masters Thesis: CSU, Fullerton, 2001), 8.

Roads, trails, developments, and power lines are all ways a landscape is fragmented. Fragmentation begins with a gap, the initial loss of native habitat, which overtime gets bigger and bigger. [38] The Puente-Chino Hills, including the park, have become increasingly isolated by the conversion of the surrounding landscape to urban uses.

1.10 Biocorridors, like hallways between rooms, are extensions of habitat that connect one core habitat area to another. Small isolated areas of habitat simply cannot support as many species as larger areas. In order for the biodiversity of the park to be maintained at or near current levels it must remain connected to other protected wildlands in the region.

Biological corridors help to maintain healthy populations of plants and animals by allowing for genetic exchange, species migration, maintaining a balanced food chain, and repopulating after a catastrophe such as a fire. When small patches of wilderness are cut off from other open areas, many of the species present at the time of isolation will inevitably disappear or become extinct.

1.11 The habitat linkages important to the biological survival within the park include Coal Canyon, Sonome Canyon, and the natural slopes and drainages that connect the park to the Prado Basin to the east.

Coal Canyon links the park to the Cleveland National Forest and the Santa Ana Mountains. This is the most important biocorridor in the park because of its linkage to these much larger wildland areas.

Sonome Canyon links Chino Hills State Park to Tonner Canyon and other wildlands to the northwest, which lies in Los Angeles County.

Natural slopes and drainages east of the park connect it to important core habitat in the Prado Basin east of State Route 71. Both the Santa Ana River and the Prado Basin enhance the biocorridor.[39]

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[38] Melanie Marie Schlotterbeck, *GIS Mapping of Biological Studies in the Puente-Chino Hills Wildlife Corridor Including Species Diversity and Relative Abundance* (Masters Thesis: CSU, Fullerton, 2001), 8-9.
[39] California State Parks, *Chino Hills State Park General Plan* (Sacramento: State Park and Recreation Commission, 1999), 17.

Food Chains and Ecosystems

1.12 Wide-ranging species mostly include predators at the top of the food chain that are essential for the maintenance of healthy ecosystems. Biocorridors allow wide-ranging species such as bobcats, mountain lions, and a variety of rare species from becoming trapped in isolated patches of habitat.

Mountain lions are predators at the top of the food chain and keep the ecosystem in balance. Bobcats eat smaller fare: rabbits, squirrels, reptiles, birds. Bobcats are near the top of the food chain, but mountain lions sometimes eat them. Both require plenty of space to find enough prey. A healthy ecosystem supports healthy predators.

1.13 The greatest threat to wildlife everywhere is habitat loss and fragmentation. Mountain lions and bobcats need a large, contiguous range for adequate prey and successful reproduction. The maintenance of wild areas that are connected by wildlife corridors is essential. A continuous range is the only way to preserve viable populations.

1.14 The movement of medium and large terrestrial carnivores occurs within the park and through the park vicinity (see Barrett and Beir, 1993 and Crooks and Haas, 1999).

Supporting Theme IB:
Diverse rare, threatened, and endangered native plants and animals find refuge in the fragile natural environment of Chino Hills State Park.

MESSAGES
Sensitive Species

1.15 Over 30 species of mammals, birds, reptiles, and amphibians have been documented in the park that are considered Endangered, Threatened or California Species of Special Concern.

1.16 When there are too few animals of a species left, the species can no longer successfully reproduce itself, no more individuals are born, and the species becomes extinct.

In our state, the California grizzly bear, the official state animal, and the gray wolf have become extinct, and the California condor teeters on the edge of extinction.

At least twenty-one animal species and thirty-four plant species have become extinct in recent decades in California.[40]

Native Plant Communities

1.17 More than 5,000 plants in California are native. This is more than are found in the northeastern United States and Canada combined, an area 10 times larger than California. At least one-third of these 5,000 plants are found nowhere else in the world.[41]

California's native plants evolved here over a very long period, and are the plants which the first Californians knew and depended on for their livelihood.[42] Plants have adapted to the extreme difference in rainfall and temperature between winter and summer seasons. Sclerophyll plants range in formations from forests, to woodland, and scrub. Fires occur frequently in Mediterranean climate zones.

1.18 These plants have co-evolved with animals, fungi and microbes, to form a complex network of relationships. They are the foundation of our native ecosystems, or natural communities.[43] Plants and animals are uniquely adapted to their environments and can be adversely influenced by changes to their environment.

1.19 Native plants often support 10 to 50 times as many species of native wildlife as non-native plants.[44] Plants are a cornerstone of biological diversity. Native plants do the best job of providing food and shelter for native wild animals. Native plants are used in the development of new foods, medicines and industrial products. Commercial strawberries were developed using our coast strawberry, *Fragaria chiloensis*, and pacific yew, *Taxus brevifolia*, yielded Taxol, an anti-cancer drug. Native plants are also an essential element in the natural beauty for which California is famous.

1.20 Defined by the type of plants that live within them, it is important to recognize that plant communities are not always clearly defined entities with strictly delineated boundaries, and that a given species may well inhabit two or more different such communities. Plant communities or associations are typically dependent on or affected

[40] U.S. Fish and Wildlife, http://endangered.fws.gov.
[41] California Biodiversity Council, *California Biodiversity Council: An Educator's Guide to Biodiversity*, http://biodiversity.ca.gov/Biodiversity/what_is.html.
[42] California Native Plant Society, "Native Plants," http://www.cnps.org/cnps/nativeplants/.
[43] Ibid.
[44] California Native Plant Society, "Vegetation," http://www.cnps.org/cnps/vegetation/.

by such factors as geographical location, soil types, precipitation rates, angle and direction of slopes, elevations, microclimates and successional considerations, and thus it is not uncommon to find a particular plant or grouping of plants growing outside what would be thought of as its customary habitat if some of the above factors are advantageous to that growth.[45]

1.21 The region is rich in flora and fauna, due in part, to the vegetation communities, which support such a diversity of life.[46]

Walnut Woodlands[47]

1.22 The acorn woodpecker, Nuttall's woodpecker, California ground squirrel, western bluebird, great horned owl, band-tailed pigeon, plain titmouse, red-shouldered hawk, Pacific slender salamander, and western skink are typical animals.

1.23 Southern California black walnut trees join coast live oak to form woodlands above the creeks, often on the north facing slope. While black walnut used to be very common, only a few thousand acres of protected walnut woodland now exists. Several hundred acres exist in the park.

1.24 Walnuts were used for black die by Native Americans.

1.25 Woodlands have understories of California redberry, purple nightshade, native bunchgrass, lupines and poppies that blend into the grasslands.

Valley Grasslands[48]

1.26 Most grassland in the park is composed of non-native European annual grass and weed species introduced by early ranching.

1.27 Valley grassland once covered the major valleys of Southern California, and consisted mainly of native bunchgrasses. However, these perennial grasses were not well adapted to disturbances

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[45] Calflora, *Southern California Plant Communities,* http://www.calflora.net/botanicalnames/plantcommunities.html.
[46] Melanie Marie Schlotterbeck, *GIS Mapping of Biological Studies in the Puente-Chino Hills Wildlife Corridor Including Species Diversity and Relative Abundance* (Masters Thesis: CSU, Fullerton, 2001), 1.
[47] Kathy Jacobs, *From the Desert to the Sea: Major Habitats of Southern California*, http://www.lalc.k12.ca.us/uclasp/local_habitats/habitats/chaparral.html.
[48] Kathy Jacobs, *From the Desert to the Sea: Major Habitats of Southern California*, http://www.lalc.k12.ca.us/uclasp/local_habitats/habitats/chaparral.html.

created by grazing herd mammals and humans, and have been largely replaced by imported Mediterranean weeds from Europe. In addition, in Southern California, much of the former expanse of this habitat has been built on, and the habitat so completely altered that it is now classified as non-native grassland.

1.28 Grassland species native to California such as purple needlegrass and giant rye can still be found among the European annuals at the park.

Chaparral[49]

1.29 Chaparral is the dominant habitat found in the mountains of Southern California.

1.30 The plants must be able to tolerate long periods without rain, dry soil, baking sun.

1.31 Chaparral plants often have two root systems; shallow roots for catching water when it falls as rain, and tap roots for support.

1.32 Some chaparral plants are *allelopathic*, producing toxins which inhibit plant growth near them.

1.33 Chaparral plants include chamise, laurel sumac, and coffee berry.

Coastal Sage Scrub[50]

1.34 Coastal sage scrub is found below 3000 feet on dry slopes, usually near the coast (although it can extend into inland valleys). This habitat is cooler than chaparral, but ironically often drier. Rainfall is often heavier at higher elevations, and coastal sage scrub often has rainfall less than 10 inches, which is about the same as in some desert regions. Coastal sage scrub is limited to areas that do not freeze.

1.35 Many of the plants are drought-deciduous and strongly odoriferous. Some of the community's plants and animals are also found in desert habitats.

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[49] Kathy Jacobs, *From the Desert to the Sea: Major Habitats of Southern California*, http://www.lalc.k12.ca.us/uclasp/local_habitats/habitats/chaparral.html.

[50] Kathy Jacobs, *From the Desert to the Sea: Major Habitats of Southern California*, http://www.lalc.k12.ca.us/uclasp/local_habitats/habitats/chaparral.html.

1.36 California sagebrush; California encelia; white, purple, and black sages; California buckwheat; Coyote bush; coast goldenbush; and golden yarrow are typical plants.

1.37 Some chaparral plants are found scattered within patches of coastal sage scrub. They include lemonadeberry, toyon and laurel sumac. Prickly-pear cactus is also found abundantly here, especially after grazing by cattle.

1.38 Two birds considered threatened or sensitive, the coastal California gnatcatcher and the coastal cactus wren, are found here. The cactus mouse, pocket mice, deer mice, coyotes, agile kangaroo rats, and mountain lions are also here.

1.39 This habitat is much reduced due to development.

Riparian Woodlands[51]

1.40 Riparian woodland is made up of plants which grow near streams and lakes.

1.41 These plants require more water than scrub-adapted plants, and often have large leaves.

1.42 In Chino Hills State Park the dominant trees are western sycamore, black willow, red willow, and arroyo willow. Cottonwoods are also found along the Santa Ana River. The riparian understory consists of mule fat, wild rose, poison oak, and stinging nettle.

1.43 Due to stream channelization and development, much riparian habitat is disappearing in Southern California, and as it vanishes, so do the animals relying on it.

1.44 Before it was listed as Endangered, the least Bell's vireo, a small songbird that breeds in riparian forests, was reduced to less than 300 pairs in Southern California. Habitat destruction, cattle grazing, and brood parasitism by the brown-headed cowbird were the main reason for its decline.

1.45 Cattail stands provide cover for a variety of wildlife, including red-winged black birds.

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[51] Kathy Jacobs, *From the Desert to the Sea: Major Habitats of Southern California*, http://www.lalc.k12.ca.us/uclasp/local_habitats/habitats/chaparral.html.

Primary Theme II:
Living on the edge of wildlands brings challenges and responsibilities for preserving the delicate balance between the habitats of wild animals and the needs of human residents.

MESSAGES
Native American land use

2.1 Native Americans commonly used plants to make baskets, dye, and other items. Native Californians also managed land for preferred species.

Agriculture and Ranching

2.2 Agriculture and other human activities disturbed native species and brought invasive species to the area including an abundance of non-native European annual grasses and weeds.

Urbanization and Edge Effects

2.3 The discovery of oil led to the first major influx of human activity in the hills, which continues to this day. Oil operations attracted commercial business needed to sustain and support the work force. In the quest for oil, settlers created many new towns across the hills including Brea, Yorba Linda, La Habra, and Whittier.[52]

2.4 The Inland Empire experienced the largest growth within California and continues to follow this trend. The Inland Empire (Riverside and San Bernardino Counties) added over 666,000 persons between 1990 and 2000. The increase is comparable to the entire population of Kern County.[53]

2.5 Urbanization leads to the loss of habitat making it difficult for animals to find food, shelter, and space that they need to survive.

As land in Southern California becomes more developed and wildlands dwindle, the importance of Chino Hills State Park to the preservation of biodiversity will greatly increase.

2.6 Edge effects occur where development, including roads, takes place adjacent to wildlands.

[52] Melanie Marie Schlotterbeck, *GIS Mapping of Biological Studies in the Puente-Chino Hills Wildlife Corridor Including Species Diversity and Relative Abundance* (Masters Thesis: CSU, Fullerton, 2001), 5.
[53] Southern California Association of Governments, Census Data, http://www.scag.ca.gov/census/.

Edge effects threaten the ecological integrity, recreational experience, aesthetic quality, public investment, and safety operations of preserved areas.

Because of adverse effects to wildlands from surrounding areas, the following impacts may occur:
-Introduction of exotic vegetation inadvertently carried in from bikes, people, animals or spread from backyards or other areas adjacent to the wildland.
-Fires can become more frequent and severe (as witnessed in November 2008 when 95% of the park burned).
-Pets can act as predators of and competitors with native wildlife, as well as vectors for disease.
-Use and creation of designated trails can degrade the natural environment.
-Introduction of exotic animals which can compete with or prey on native animals.
-Influence on Earth Systems, such as solar radiation, soil richness and erosion, wind damage, hydrologic cycle, and water pollution can affect the natural and built environment.
-Loss of foraging habitat.

Park use today

2.7 Concerned individuals and organizations such as Hills for Everyone, The Wildlands Conservancy and California State Parks helped to preserve Chino Hills State Park.

Individuals and groups have made a positive impact on the environment. When realizing the value of wildlands and the biodiversity of the Puente-Chino Hills, concerned individuals and groups such as Hills for Everyone took action to preserve Chino Hills and make it a California State Park. With determination and dedication, concerned individuals continue to support the conservation of open land and biodiversity.

2.8 Urban parks also protect watersheds. Natural habitat can filter pollutants out of water, helping to ensure that water is safe to drink.[54]

[54] The Nature Conservancy, "Do Urban Parks Matter?," http://support.nature.org/site/PageServer?pagename=asktheconservationist_200809

2.9 Many urban parks exist primarily for the recreation and enjoyment of urban residents. This is very important to many people's quality of life.[55]

2.10 Visitors can also become steward of wildlands and promote biodiversity by planting native gardens, removing invasive species, reducing loss of wildlands by limiting new development (living in environmentally friendly, older communities), recycling, staying on park trails, keeping your pets inside or on a leash, and not feeding wildlife.

[55] Ibid.

Interpretive Periods[56]

The primary interpretive period for the cultural history of Chino Hills State Park spans from the 1920s to the 1980s and represents the most active period of ranching in the area. A secondary interpretive period relates to Native American habitation of the area, though much archaeological data is lacking.[57] The Discovery Center will primarily interpret the urbanization of the twenty-first century that continues to build along the park boundaries.

Most of the current cultural features within the park are associated with ranching, the most dominant historical land use. Other resources are associated with mineral and oil extraction, transportation and other public utilities, and varied agricultural and horticultural uses. The following periods are identified as significant in the 1999 General Plan:

Native American period (1,000BP-1771)

Chino Hills State Park is located in the inland portion of the traditional Gabrielino territory in close proximity to the Juaneño, Luiseño, Serrano, and Cahuilla tribes. The Gabrielino (Tongva) were occupying lands in and around the park at the time the Spaniards arrived in Southern California.

The most recent dates for sites in the Prado Basin and Chino Hills are not well defined, but fall around 1,000 years before present (BP). Mission baptismal records indicate the former presence of aboriginal villages near Chino Hills State Park; however, archeological data about these sites is lacking. One site within Chino Hills State Park yielded dates between 1070 and 2380 years BP.

Spanish/Mexican Period (1771-1848)

Although exploration occurred both north and south of the park, there is no documented evidence indicating the park was formally surveyed during the eighteenth or early-nineteenth century, nor legally acquired prior to the 1830s. Mission San Gabriel was established just twenty miles northwest of the park, so stock grazing may have occurred on park land as early as the 1770s.

Early American Period (1848-1920)

In contrast to the surrounding region, there is no evidence of permanent activity other than grazing in the present-day park prior to the U.S. Surveyor General's public domain surveys. These surveys began in 1853 and were not completed until 1894. The deputy surveyor's field notes do

[56] California Department of Parks and Recreation, *Chino Hills State Park General Plan*, 31-32.
[57] California Department of Parks and Recreation, *Chino Hills State Park General Plan*, 33.

not indicate any structures, fences, or wagon roads in the park, although much of the land was obtained and used for grazing during this period.

Legal acquisition of public domain land within Chino Hills State Park by private individuals did not begin until the early 1870s. Many of those filing were associated with the small ranching community of Rincon just east of the park boundary along the Prado Basin. Local ranchers such as Fenton Slaughter, who had purchased Raymundo Yorba's home and property in 1868, established successful sheep and cattle ranching operations that extended into the eastern limits of Chino Hills State Park. Activity and ownership increased during the Great Land Boom of the mid-l880s. Those who purchased Chino Hills land for ranching use included the founder of the town of Chino, Richard Gird. By 1895 much of the future park property was under absentee ownership, such as that of the San Francisco based Chino Land and Water Company.

Although most of the Chino Hills land was in ownership by 1900, the first published USGS quadrangle map of 1902 indicates only three miscellaneous structures and a wagon road running within current park boundaries. These structures were likely associated with various ranching and mineral extraction activities. Although no large deposits were located or exploited within the park, several oil wells and mines have been documented from this period.

Twentieth Century Development Period (1920s-1980)
During the inter-war years of the 1920s to the 1940s, the ranching industry reached its most active period at Chino Hills. In 1921, local dairy rancher Frank Pellissier purchased most of the Chino Land and Water Company holdings for his dairy herds, including the area of the future Rolling M Ranch. The first aerial photographs of the region in the late l930s indicate numerous cleared areas that had obviously received regular grazing activity along almost all the watershed canyons of the park, including near the Santa Ana River and Carbon Canyon.

The 1940s saw the increased development of the Rolling M Ranch complex. Aerial photographs show several structures and cleared areas on the site by 1940. In 1948, the Mollin Investment Company acquired 1,720 acres, subsequently naming the area Rolling M Ranch. The company enlarged and improved the corral system and rehabilitated and enlarged the main house. Mollin owned the property until the establishment of the State Park in the 1980s.

California State Parks' Education Mission Statement

The most powerful forms of education are meaningful, involve the student, promote critical thinking, and appeal to different learning styles. Our mission is to provide educational experiences both in California State Parks and in the classroom, assisting educators with curriculum needs and offering activities that enable students to investigate, research, and participate in interactive learning. [58]

California Educational Content Standards

In 2005, a survey was conducted of thirty-four third to fifth grade elementary school teachers in the areas surrounding Chino Hills State Park. This study found that cultural history, water cycles, plant germination, life cycles, geology, food chains, and responsibility and awareness are the most curriculum relevant topics.[59]

In 2008, this survey was revised and expanded, with more than three hundred K-12 teachers responding. They confirmed the previously identified curriculum content was relevant to a wider student population (beyond third to fifth grade). Life cycles, environmental stewardship/conservation, food chains, and cultural history were identified as the top four curriculum relevant subjects. Interpretive facilities and educational programs at Chino Hills State Park should consider these findings in order to meet the educational needs of the local community.

The Discovery Center will emphasize the connections between humans and the natural environment helping to integrate natural and cultural history curriculum. The identified interpretive topics of biological diversity, urban interface, and environmental stewardship will best relate to the curriculum relevant topics of life cycles, the food chain, plant and animal structures, responsibility and awareness, and other identified curriculum content standards. The following list identifies specific California Department of Education Content Standards[60] for Grades K through 12 with notes identifying the potential application through educational programs and interpretive facilities at the Chino Hills State Park:

Kindergarten

Science Content Standards: Life Sciences

Different types of plants and animals inhabit the earth. As a basis for understanding this concept:

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[58] California State Parks Interpretation and Education Division, *Interpretation and Education Mission Statements*, http://www.parks.ca.gov/?page_id=23434.
[59] E-mail from Kelly Elliott to Kathy Weatherman, May 23, 2005.
[60] California State Board of Education, "Content Standards," http://www.cde.ca.gov/be/st/ss/.

Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).

Application
The basis for understanding the concept of biodiversity is discussing the variety, features, and traits of plants and animals within Chino Hills State Park.

Kindergarten
Science Content Standards: Earth Science
Earth is composed of land, air, and water. As a basis for understanding this concept:

Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.

Application
The Discovery Center will explore how humans use their natural environment.

Grade One
Science Content Standards: Life Sciences
Plants and animals meet their needs in different ways. As a basis for understanding this concept:

Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

Students know both plants and animals need water, animals need food, and plants need light.

Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.

Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

Application
Students will explore the factors that impact plants and animals, why animals need certain habitats, and how all native animals and plants within Chino Hills State Park need each other to survive.

Grade Two
Science Content Standards: Life Sciences
Plants and animals have predictable life cycles. As a basis for understanding this concept:

Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.

Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.

Students know there is variation among individuals of one kind within a population.

Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.

Students know flowers and fruits are associated with reproduction in plants.

Application
Students will explore how plants and animals reproduce and thrive within Chino Hills State Park. Students will study the factors that can negatively impact biodiversity.

Grade Two
Science Content Standards: Earth Sciences
Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:

Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.

Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.

Application
This standard can be aligned with the factors that influence biodiversity and explain the history of the oil industry at Olinda (a former oil town just outside the western park boundaries). This may also include a discussion of how soil influences plant growth and the location of where plants grow.

Grade Three
History-Social Science Content Standards
Trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).

Application
Interpretive topics related to this standard include the impacts of increasing urbanization and the variety of human uses associated with the Chino Hills environment. This includes Native California uses; mining, farming which led to the introduction of non-native species; and erosion.

Grade Three
Science Content Standards: Life Sciences
Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.

Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.

Application
Interpretive topics related to this standard include plant and animal adaptations, the changes within the Chino Hills environment, urban edge effects, animals that have already become extinct within Southern California, the impacts of fire, and the concept of biodiversity.

Grade Four
Science Content Standards: Life Sciences
All organisms need energy and matter to live and grow. As a basis for understanding this concept:

Students know plants are the primary source of matter and energy entering most food chains.

Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.

Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Application
Topics related to this standard include the importance of native plants to the ecosystems within Chino Hills State Park and Southern California.

Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:

Students know ecosystems can be characterized by their living (biotic) and nonliving (abiotic) components.

Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

Students know that most microorganisms do not cause disease and that many are beneficial.

Application
Topics related to this standard include biodiversity, ecosystems, adaptation to the urban environment, and food chains and exploring what happens when a food chain/web is broken.

Grade Five
Science Content Standards: Earth Sciences
Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:

Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet or snow.

Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.

Students know the origin of water used by their local communities.

Energy from the sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:

Students know uneven heating of the Earth causes air movements (convection currents).

Students know the influence the ocean has on the weather and the role the water cycle plays in weather patterns.

Application
Topics related to these standards include the water cycle, weather and climate. The movement of water (the water cycle) influences the weather and climate of the Chino Hills environment, which in turn determines the plants and animals living in the area.

Grade Six
Science Content Standards: Ecology/Life Sciences
Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
Students know populations of organisms can be categorized by the functions they serve in an ecosystem.

Students know different kinds of organisms may play similar ecological roles in similar biomes.

Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Application
The Discovery Center will explore ecosystems, food chains, niches, and succession.

Grade Seven
Science Content Standards: Focus on Life Sciences
Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:

Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.

Students know that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.

Application
Species diversity in Chino Hills State Park includes rare, threatened and endangered species and species which are now extinct or extirpated from the region.

Grade Eight
Science Content Standards: Focus on Physical Sciences
Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:

Students know that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.

Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.

Application
These standards can be used to explain processes necessary to the functioning of an ecosystem, such as photosynthesis, evaporation, transpiration and decomposition.

Grades Nine Through Twelve
Science Content Standards: Biology/Life Sciences
Ecology
Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:

Students know **biodiversity** is the sum total of different kinds of organisms and is affected by alterations of habitats.

Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.

Students know a vital part of an ecosystem is the stability of its producers and decomposers.

Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.

Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaptation of a lineage of organisms through genetic change.

Application
These standards can be directly applied to the concept of biological diversity explored within the Discovery Center.

Interpretive Recommendations

Proposed Interpretive Programs

The Discovery Center will offer opportunities for interpretive talks, walks, and educational programs. Possible areas within the vicinity to conduct these activities include the multi-purpose room, the amphitheater area, the Discovery Trail, or along adjacent trails. Topics may include biological diversity, food chains, animal adaptations, human land use, invasive species, life cycles, or other messages of relevance to the park.

The Discovery Center's multi-use facility will also be a desirable place to host community events and educational workshops. This space will allow the local community, visitors, and others to further explore the significant cultural and natural resources of Chino Hills State Park. The amphitheater offers potential for interpretive programming. Recommended messages include food chains, food webs, and how healthy ecosystems support biodiversity.

All interpretive programming should relate to the messages being delivered at the Discovery Center or outlined in the Chino Hills State Park General Plan. Programs should be relevant, accurate, provocative, programmatically accessible, organized, retained, and thematic. See California State Parks' *Basic Interpretive Learning System* or www.parks.ca.gov/interptools for more information on conducting interpretation at Chino Hills State Park.

Interpretive opportunities within the Discovery Center and outside its doors will stimulate the discovery, appreciation, and protection of the irreplaceable urban wildland of Chino Hills State Park. Thematic, interactive exhibits will focus on the human connections to biological diversity, the regional importance of Chino Hills State Park as a biological corridor, and the impact of human actions on the natural world. It will also introduce the cultural history of the area including Native American involvement in the area and historic ranching.[61]

Exhibits and programs will be primarily geared toward local schools and nearby communities. Discovery Center exhibits and curriculum-aligned interpretive learning carts will inspire an appreciation for the biological diversity of the Chino Hills region and promote environmental stewardship.

[61] California Department of Parks and Recreation, *Chino Hills State Park General Plan* (San Diego: CDPR Southern Service Center, 1999), 44.

The center will also provide interpretive media and park information for all visitors to make the most of their visit to Chino Hills State Park.

The park's unifying theme will be relevant to all interpretive messages and media developed within the Discovery Center and related interpretive facilities including the amphitheater and trails. This unifying theme, as previously outlined in this document, is:

> **Chino Hills State Park is an irreplaceable urban wildland of regional and global biological significance.**

Proposed Visitor Flow, Interpretive Areas, and Exhibit Concepts

Appendix A provides detailed information on the proposed visitor flow, interpretive areas, and exhibit concepts. There are four exterior exhibit areas (Area E-1 through E-4) and eight interior exhibit areas (Area I-1 through I-8) as follows:

Area E-1: Welcome to Chino Hills State Park!
Area E-2: Discovery Trail
Area E-3: Walnut Woodland Amphitheater
Area E-4: Discovery Cart
Area I-1: Welcome to Chino Hills State Park
Area I-2: Discover Biodiversity
Area I-3: Building Blocks of Biodiversity
Area I-4: A Closer Look at Biodiversity
Area I-5: Biocorridors: Linkages to Survival
Area I-6: Living on the Edge
Area I-7: Biodiversity Benefits Us All
Area I-8: Become a Park Protector!

The proposed visitor flow within the Discovery Center begins after passing through the main entrance and sales area where visitors will be greeted at the reception counter (I-1). Straight ahead, an exhibit title wall (I-2) will create a visual invitation to explore the exhibit hall. To the right (I-3) a tactile map of the entire Park will be the central feature of this area. The primary thematic focus here will be on the factors that influence biodiversity at the Park. In the distance, a large floor-to-ceiling window wall offers views of the Chino Hills. The adjoining space beyond features a central counter that serves as an interactive exhibit allowing visitors to have a closer look at biodiversity (I-4). Adjacent exhibits explore the concept of biocorridors (I-5) and the important role they play in species survival. The concept of living on the urban edge takes advantage of the building's interior architecture, creating a series of discovery encounters

such as motion-activated lights, evening sounds, and a vignette portraying a typical urban backyard (I-6). Additional stories for interpretation in the Discovery Center include the benefits of biodiversity (I-7) and an exit message that encourages all visitors to become park protectors (I-8). Visitors will exit the exhibit space through an exterior corridor that leads to a platform with views of the Chino Hills in the distance and of the Walnut Woodland Amphitheater below.

Proposed Phasing and Preliminary Budget

Based on the total funds allocated to the interpretive portion of the project ($705,000), the following is suggested as the Proposed Phasing and Preliminary Budgets:

Phase I: Interpretive Exhibits - $514,000
- Interior Exhibits (Discovery Center @ $420K; Discovery Cart @ $35k)
- Outdoor Exhibits (Exterior Interpretive Panels @ $59K)

Phase II: Interpretive Landscaping and Misc. Outdoor Exhibits - $139,000

Phase III: Discovery Center Mural - $52,000

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Appendices

Appendix A: Exhibit Concepts (19 sheets, each 11" X 17")

Appendix B: Proposed Interpretive Objects List

Appendix C: Multimedia and Audio Treatment Plans

Appendix D: Interpretive Text Outlines

Appendix B: Proposed Interpretive Objects List

The following list is based on proposed interpretive objects identified in Appendix A: Exhibit Concepts. Quantity, materials, and other fabrication/purchase details still to be determined. This list does not include exhibit components such as the tactile map or other interactives, exhibit supports, audio visual equipment, or items such as park brochures.

Area I-4

- Plant and animal specimens (fabricated) for the diorama
- Magnifiers (sliding carriage, turning, and tethered/hand-held)
- Wentz Scope with rotating specimen wheels
- Natural history specimens/slides*
- Replica skulls, bones and/or bird bills
- Stools

Area I-5

- Wildlife camera (actual or fabricated)

Area I-6

- Motion sensor light
- Trashcan & lid with trash (actual or fabricated)
- Urban Threats sculpture –pesticide containers, plastic can rings, etc. (actual or fabricated)

Area I-7

- Guest book (or create cover similar to flipbooks with removable pages)

Area E-4

- Specific objects still to be determined

*NOTE: The Park will provide some natural history specimens that can be prepared for display by others (e.g., slides). These may include:

- Seeds, pods, leaves, flowers
- Feathers, animal scat/owl pellets, insects/spiders
- Soil samples

Appendix C: Multimedia and Audio Treatment Plans

Multimedia Programs

Building Blocks of Biodiversity (Area I-3)

Description

This push-button interactive will give visitors an impression of the park's biological significance with a "sprinkling" of the reasons why the building blocks come together at Chino Hills. By exploring the conditions necessary to support biodiversity, visitors will have a renewed appreciation for the rich plant and animal life that Chino Hills State Park sustains. Six (6) buttons will trigger the 5 building blocks (each 30-60 seconds in length) plus one that puts all the blocks together (1-2 minutes in length). Messages will be delivered primarily via captions with related nature sounds.

Emotional Impact

a. Provide examples of the biodiversity "building blocks" in a manner that allows visitors to discover the varied and unique qualities (motion, sound, form, etc.) to be found at Chino Hills SP.
b. Explain that the biodiversity "building blocks" are connected.
c. Explore how the various combinations of the "building blocks" shape biodiversity at Chino Hills SP.
d. Express the program's primary theme: Chino Hills State Park is a special place because it has all of the conditions to create a high level of biological diversity.

Specific Method

a. Putting it all together: Visitors will be invited to discover why Chino Hills has such high biological diversity compared to most places. Image begins with a map of the world with Mediterranean climate areas (see 'Climate' graphic on exhibit concept layout) with zoom to North America, then California, and finally to Chino Hills State Park. Image focuses on the Puente/Chino Hills/Coal Canyon area as story unfolds about the creation of the Chino Hills (geomorphology). The variety of soils, along with climate and water factors, is used to describe the variety of habitats found at CHSP. The presence of the rain shadow effect dramatically conveys the movement of water over wildlands. Examples of plant and animal species (e.g. insects, reptiles, mammals, birds) remind visitors of the life that these wildlands sustain, zooming into the eyes of one of the animals, then panning back out at the "floating" map of CHSP (see 'Attract Loop' below).

b. Geomorphology: close-up views of maps, photography (including aerials such as DWR 2005 set of 50-copy at DPR/Natural Resources Division), etc. to help visitors read the contours of Chino Hills (canyons, slopes and ridgelines). Possibly include aerial footage from Saving Open Space DVD.
c. Soil: close-up views (original footage and/or photo stills) to capture the textures and colors of the park's various soil types.
d. Climate: a journey through the park (via original footage and/or photo stills with related nature sounds) highlighting the wet and dry seasons, wind, and other climactic factors.
e. Water: watersheds, seasonal wetlands/creeks, and rain shadow effect captured with original footage and/or photo stills and related nature sounds.
f. Wildlands: from open grasslands to tree-clustered woodlands, Chino's wildlands provide habitat for diverse plants and animals as depicted via original footage and/or photo stills with related nature sounds. The topic of "zone interface" may also be highlighted here.

Attract Loop & Surrounding Text

a. An attract loop will depict a "floating" 3-D animation of Chino Hills SP (use tactile model as reference) with a statement defining biodiversity and its significance at Chino Hills SP. Ambient sounds of diverse animal species may also be used here.
b. The upright graphic panel (location of interactive monitor) should provide a brief message to encourage visitors to press the buttons below to find out more about the building blocks of biodiversity. Additional text could explain that Chino Hills State Park is a special place because it has all of the conditions to create a high level of biological diversity.
c. Text on the reader rail (location of interactive buttons) should provide instructions and an attractor statement such as "Select a button below to explore the factors that shape biodiversity".

Biocorridors: Linkages to Survival (Area I-5)

"Animal Signs – Looking for Clues: Tracks, Scat, Collars, and Cameras!"

Description

This push-button interactive will give visitors an in-depth look at how and why scientists study animal presence and movement. Four (4) buttons will trigger specific examples: tracks, scat, collars, and cameras (each approximately 2 minutes in length). Narration may be provided by park staff (biologist and interpreter). Scientists who have conducted animal studies in the area will be invited to explain techniques they have used and data they have gathered – such as

the low presence of certain animals in areas frequented by domestic dogs.

Emotional Impact

a. Demonstrate the variety of methods and techniques used to locate evidence of animal presence and movement.
b. Provide track and scat examples in a fun and engaging way such that visitors will want to explore the park to look for animal signs.
c. Explain the use of animal collars, tracking stations, and cameras (video and still) as a study method that requires trained professionals and strategic planning.
d. Express the program's primary theme: scientific studies are important to determine species survival within the area's biocorridors.

Specific Method

a. Tracks: Locate tracks along the park trails, zooming in to focus on details. Look for a variety of animals such as reptile, mammal (small and large), and bird species. Will require original footage and/or high resolution photography.
b. Scat: Locate scat along the park trails, zooming in to focus on details. Look for a variety of animals such as reptile (snake and lizard), mammal (small and large), and bird species. Will require original footage and/or high resolution photography.
c. Collars: Interview scientists such as Paul Beier (mountain lions) and/or Lisa Lyren (bobcats and coyotes) to explain the use of radio collars to monitor animal movement. Photo stills may also be available, particularly of animals using an undercrossing. Animal and human safety, and the concept of "island biogeography" – patches of land that are disconnected – might also be addressed.
d. Cameras: Interview scientists such as Paul Beier (mountain lions) and/or Lisa Lyren (bobcats) to explain the use of cameras (still and/or video) to monitor animal movement. Video tape from previous studies, if permission can be obtained, might be used here. Photo stills may also be available, particularly of animals using an undercrossing (try not to duplicate ones being used with 'Collars' above). Tracking stations may also be discussed here.

Attract Loop & Surrounding Text

a. An attract loop will provide enticing visual cues to draw visitors in to playing the various programs. Ambient sounds of diverse animal species may also be used here.
b. Text on upright graphic panel (location of interactive monitor) should provide a brief introduction to the four animal sign "clues"

and encourage visitors to press the buttons below to find out more. Additional text could explain that the various animal signs are proof that animals are using biocorridors and that places such as Chino Hills State Park are doing a good job of protecting open space.

c. Text on the reader rail (location of interactive buttons) should provide instructions and an attractor statement such as "Select a button below to find out more clues to animal signs".

Living on the Edge (Area I-6): "We all need a safe place to live"

Description

This multimedia program will run as a continuous loop and will require no activation. A series of images and accompanying brief text will convey positive steps that visitors can take both at home and in the park to promote a healthy environment. Amount of steps to correlate with adjacent flip panel exhibits (approximately 10). Steps/text will be approximately 30 seconds each; entire program will be no longer than 5 minutes in length.

Emotional Impact

a. Demonstrate positive actions that visitors can take to promote a healthy environment at home and in the park.
b. Explain the positive consequences each action has to protecting wildlife and wildlands.
c. Provide specific examples that are introduced in the adjacent panels and flip panel interactive exhibits. Accompanying text may be repeated here for emphasis and/or as a way to test information learned.
d. Express the program's primary theme: people can help keep wildlife and wildlands a safe place to live.

Specific Method

a. Predation: keeping pets away from wildlands (dogs on trails & impacts to bobcats)
b. Let them Be: enjoying nature and keeping it wild by letting it be
c. Lights Out: having security lights on timers rather than motion activated; using lights only when needed; using low illumination
d. No to Noise: keeping music volume low, especially at night; minimizing auto-related sounds (gunning engine, screeching breaks, alarms)
e. Water Wise: using native/drought-tolerant plants and minimizing non-native grass/turf lawns
f. Natural Products: eliminating (or minimizing) use of herbicides and pesticides; when needed, use those made from natural compounds

g. Fire Safety: keeping vegetation away from homes
h. Goodbye Exotics: keeping up with weed abatement and replacing with native plants
i. Wildlife Attractors: using native plants that attract pollinators, birds
j. Living Lightly: walking, bicycling, and carpooling

No Attract Loop/Surrounding Text (continuous loop program with text)

Audio Program

Living on the Edge (Area I-6): "Evening in an Urban Edge Backyard"
Description

As visitors enter the low-lit space they hear various nighttime sounds associated with nocturnal animals of the natural environment. As they enter further, a motion-activated light is triggered and different sounds associated with the urban environment can be heard. The light dims a bit, providing illumination of the interpretive messages/panels. After a few minutes the lights return to create the low-lit space and the natural environment's nocturnal sounds return.

Emotional Impact

a. Feel the surprise of urban lights and noise as nocturnal animals might experience them.
b. Recognize actions that help prevent wild species from entering backyards (keep lids on trash cans, pets and pet food inside, etc.)
c. Appreciate the nighttime sounds of nature.
d. Express the program's primary theme: people can help keep wildlife and wildlands a safe place to live.

Specific Method

a. Nighttime sounds prior to motion sensor triggered light: frogs, crickets, owls, coyotes, the soft scampering of animals, etc.
b. Nighttime sounds after motion sensor triggered light: barking dogs, trash can lid falling to the ground, quick sound of panicked animals (e.g. raccoon) quickly leaving the area and rustling through dried leaves, car alarms, gunning engines, etc.

Accessibility related notes/questions:

- All AV programs will be close-caption.
- Use raised tactile elements and/or braille to make the push-buttons more accessible to the visually impaired.
- Consider the use of raised tactile elements on the reader rails to further assist people with visual impairments, such as the use of tracks in Area I-5: Animal Signs.

Appendix D: Interpretive Text Outlines

INTERIOR EXHIBITS

Area I-2: Discover Biodiversity

Exhibit Title Panel

Discover Biodiversity

The biological richness of Chino Hills

Area I-3: Building Blocks of Biodiversity

Introductory Panel

Discover why Chino Hills has very high biological diversity compared to most places!

- □ Describe the basic concept of biodiversity
- □ Explain that Chino Hills has a high biodiversity compared to most places (it has many habitats in one area)
- □ Invite visitors to discover the rich biodiversity at Chino Hills

Building Blocks Panel

Building Blocks of Biodiversity

What contributes to the biodiversity at Chino Hills?

Climate

Our Mediterranean climate is the reason so many living things love to call California home.

- □ Describe Mediterranean Climate & CA floristic province
- □ Give examples of how these factors influence CH biodiversity

Water

The availability of water is a major factor influencing the survival of plants and animals.

- □ Describe the basic concepts of water cycles and watersheds
- □ Give examples depicting how the seasonality of water influences biodiversity in the Chino Hills area

Wildlands

A variety of habitats support a great diversity of plants and animals.

- □ Describe the basic concepts of wildlands and habitats
- □ Explain how wildlands provide places for biodiversity to thrive
- □ Give examples of flora and fauna associated with diverse habitats found within Chino Hills (and/or CHSP)

Geomorphology
The diversity of landforms supports a greater variety of plant communities.
- □ Describe the basic concept of geomorphology
- □ Give examples of the land-shaping processes that can be found in the Chino Hills (and/or CHSP)

Soil
A tablespoon of soil contains hundreds of microorganisms invisible to the naked eye.
- □ Explain how soil is different than dirt
- □ Give examples of the types of soil found in Chino Hills and the associated plants that grow in a given soil type/area (habitat)

Reading Rail
Adaptability
The plants and animals of this southern California region (or CHSP) have adapted to live in a Mediterranean climate.
- □ Describe the basic concept of adaptability
- □ Give examples that show how flora and fauna found in the Chino Hills area (or CHSP) have adapted – generalists & specialists

Topographical Map Labels
- □ Identify key landmarks within and surrounding Chino Hills SP
- □ Provide directional information (compass or just an arrow with 'N')
- □ Other?

Area I-4: A Closer Look at Biodiversity

Diorama Title Panel – side 1 (Grassland Soils)
Nature's Rototiller
Even this common pest serves a purpose.
- □ Describe the benefits of a pocket gopher to grassland soils

Diorama Title Panel – side 2 (Woodland Soils)
Nature's Soil Makers
Woodlands are a community of decomposers.
- □ Describe the benefits of decomposers to woodland soils

Closer Look Panel
A Closer Look at Biodiversity
Color – Pattern – Size – Shape

[NOTE: Flip books will have approximately 8 pages, 1 for each specimen]
Flip book #1: Seed dispersal (with magnifiers on sliding carriages)

Where do these seeds grow?

- Identify a variety of seeds/seed pods, the plants they come from and location (habitat) where the plant grows
- Give examples of seeds/seed pods that demonstrate a variety of dispersal mechanisms (coordinate examples with exterior exhibits)

Flip book #2: Animals (with magnifiers)
What kind of animal is this?

- Identify a variety of animals/animal parts, the animals they come from and the location (habitat) where the animal lives
- Give examples such as feathers, animal scat (e.g., owl pellets), insects, and spiders

Flip book #3: Soil (with multiple magnifiers on tethers)
Where does the soil exist?

- Identify the key soil types that exist in the park/Chino Hills, their distinctive characteristics/composition (parent material), and where they are located (habitat)
- Give soil examples that demonstrate the varieties located in the park (coordinate examples with exterior exhibits)

Wentz Scope
[Text will primarily be captions based on final specimens selected]

Area I-5: Biocorridors: Linkages to Survival

Habitat Fragmentation Panel

Habitat Fragmentation
Habitat fragmentation creates a landscape of isolated patches of wildlife habitat.

- Describe the basic concept of habitat fragmentation
- Explain how habitat fragmentation threatens species
- Give examples of habitat fragmentation in the Chino Hills area

Tracking Panel

Telltale Clues
How do we know where animals go and what they do?

- Explain that nibbled plant leaves, holes in the ground, and matted down vegetation are clues to animal activity

Tracks

- Describe how tracks are indicators of where animals are found and patterns of travel

Scat

- Describe how scat indicates what an animal is eating

Cameras

- Describe how cameras help scientists monitor animal movement

Biocorridors Panel

Biocorridors: Linkages to Survival

What are Biocorridors?

- Describe the basic concept of biocorridors
- Explain that Chino Hills/CHSP is an important biocorridor

Crossing Design

- Describe the basic concept of wildlife crossings
- Discuss the different types of wildlife crossings
- Use Coal Canyon as an example to explain how undercrossings work and why one size doesn't fit all

How much space do they need?

- Define territory vs. range
- Give examples of the 5 animals that are displayed in the interactive to explain how much space they need

Why do they move?

[Note: This may be developed into an interactive exhibit

- Explain why certain animals need such large territories
- Describe predator-prey relationship in context of animal movement

Interactives

[Text will primarily be captions and directions – if required – based on final interactive design]

Before/After Fragmentation

What is left of our wildlands?

Range of movement map/map inset [Buttons: See where they go – push buttons activate lighting for paths of travel by various species on the large map and on the smaller map inset]

Area I-6: Living on the Edge

Introductory Panel

Living on the edge

- Describe the basic concept of urban edge effects
- Explain the importance of living responsibly in these sensitive areas

From Habitat to Homes

- Describe the change from native habitats to human habitation over time in the Chino Hills including Native American villages
- Provide an overview of the area's land use/ranching history including Rolling M Ranch
- Explain the period/s of population growth in this inland region including new communities surrounding the Chino Hills

Urban Backyard Panel/s

- Vignette will include 'Keep a lid on it' and 'Don't feed them trash' signs (no other interpretive text here)

Peace and Quiet Panel

We all need peace and quiet

Shhhhh!

Light and Noise

- Describe the basic concept of the impacts of light and noise on nocturnal animals

Animal "Voice" Bubbles

- Provide examples from the "perspective" of nocturnal animals of the impacts of light and noise

Urban Threats Panel

- Ask visitors what they can do to keep wild lands safe [use sculptural 'threat' elements as a counterpoint to the positive steps/actions depicted in the AV program and/or in the Positive Steps Panel]

Safe Place Panel

We all need a safe place to live

Positive Steps

[NOTE: The nearby audiovisual program will focus on positive steps to protect wildlands/wildlife; this panel may not be needed]

Animal "Voice" Bubbles

- Provide example/s from the "perspective" of nocturnal animals related to needing a safe place to live

Area I-7: Biodiversity Benefits Us All

Introductory Panel (All Living Things Feel Stress)

Pushed into a corner

Urban development has cornered wildlife into increasingly smaller spaces.

- Explain the importance of wildlands such as CHSP to the preservation of biodiversity

Balanced Needs

Living on the edge of wildlands is a delicate balance between preserving wildlife habitat and providing for the needs of humans.

- Describe the challenges to preserving wildlife habitats
- Explain why (or ask visitors why) we should protect habitats

Food & Medicine Panel

Food & Medicine

Native plants and animals can provide materials to feed humans and treat many of their illnesses.

- Describe the uses of local plants and animals by California Indians
- Compare cultivated foods with native plant species
- Identify medical contributions provided by native plants & animals

Clean Air & Water Panel

Clean Air & Water

Pollutants are filtered out of the air and water by a variety of plants and animals.

- Describe species that are indicators of environmental health
- Explain how plants and animals detoxify and decompose wastes found in water
- Explain how plants filter out contaminants in the air

Health & Wellness Panel

Health & Wellness

Wildlands provide spaces for healthy outdoor experiences.

- Identify the variety of outdoor experiences available at CHSP
- Explain the relationship between health and the outdoors
- Describe the intangible, intrinsic values provided by a wildlands experience

Interactives

[Text will primarily be captions and directions – if required – based on final interactive design]

Food & Medicine
Polar Motion Wetlands
Guest Book

Area I-8: Become a Park Protector!

Introductory Panel
How Will You Protect Biodiversity?

Reader Rail Panel
It's easy to become a Park Protector

- Explain that Chino Hills is one of 25 biodiversity hotspots in the world
- Invite visitors to start becoming Park Protectors
- Identify behaviors & activities that protect biodiversity when entering a wild land – locally and globally; include something specific for children

Brochure possibilities: Joining the Chino Hills SP Volunteer Association, Hills for Everyone, and/or California State Park Foundation; Living on the Edge/Urban Edge; Exotic Species; Trail Etiquette/Leave No Trace; CHSP Trails Map.

EXTERIOR EXHIBITS

Area E-1: Welcome to Chino Hills State Park!

Park Map Panel
Welcome to Chino Hills State Park!

- Provide a brief introductory message that invites visitors to explore the park (perhaps highlight recreational opportunities and park resources)
- Describe basic safety related to visiting the park and hiking the trails
- List the significant regulatory information that park visitors need to know

Brea Canyon Entrance "Inset" Panel
[Text will primarily be captions/labels of park features]

Area E-2: Discovery Trail

Discovery Trail Panel

- Describe the basic concept of biodiversity
- Introduce the plant communities found in the park
- Describe the revegetation process in the Discovery Trail area

Plant Communities Panels (one each: Oak Woodland, Grasslands, Coastal Sage Scrub, Chaparral, and Riparian Woodland)

- Describe the characteristics of this habitat (such as the types of animals that thrive here)
- Explain where it can be found in the park (identify specific trails or other features)

Plant Identification Panels (5 per habitat; 2-3 shapes)

- Describe the types of plants that thrive in this habitat and that are represented along the Discovery Trail

Planting Table
[Text will primarily be captions/labels of graphics used in final design]

Soils Display Panels (6 total)

- Describe the characteristics of each soil type that is displayed(such as the associated plants that grow in a given soil type/habitat)
- Explain where it can be found in the park (identify specific trails or other features)

Area E-3: Walnut Woodland Amphitheater

Walnut Woodland Panel

- Describe the significance of walnut woodlands
- Explain the basic concept of a food chain
- Identify the role of each plant and animal within a food chain that can be found in a walnut woodland habitat

Area E-4: Discovery Cart

Adaptations & Life Cycles Panel (Positive Steps)

- Provide a brief introductory message that invites visitors to explore how life cycles and adaptations promote biodiversity

Discovery Drawers/Displays
[Text will primarily be captions/labels based on the cart's final design]

Exhibit 8



California Department of Fish and Wildlife
California Natural Diversity Database (CNDDB)



SPECIAL VASCULAR PLANTS, BRYOPHYTES, AND LICHENS LIST

AUGUST 2018

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Table of Contents

Special Plants i
NatureServe Element Ranking For Plants ii
California Rare Plant Ranks iv
Special Lichens vi
Rare Plant Seed Banking vii
Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities viii
Special Vascular Plants, Bryophytes, and Lichens List ix

Special Plants

"Special Plants" is a broad term used to refer to all the plant taxa inventoried by the Department of Fish and Wildlife's California Natural Diversity Database (CNDDB), regardless of their legal or protection status. Special Plants include vascular plants as well as high priority bryophytes (mosses, liverworts, and hornworts) and lichens. Special Plant taxa are species, subspecies, or varieties that fall into one or more of the following categories:

- Officially listed by California or the Federal Government as Endangered, Threatened, or Rare;

- A candidate for state or federal listing as Endangered, Threatened, or Rare;

- Taxa listed in the California Native Plant Society's *Inventory of Rare and Endangered Plants of California*;

- Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines; these taxa may indicate "None" under listing status, but note that all California Rare Plant Rank 1 and 2 and some Rank 3 and 4 plants may fall under Section 15380 of CEQA;

- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation;

- A Bureau of Land Management, U.S. Fish and Wildlife Service, or U.S. Forest Service Sensitive Species;

- Population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with extirpation in California; and

- Taxa closely associated with a habitat that is declining in California at a significant rate (e.g. wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, etc.).

The Special Vascular Plants, Bryophytes, and Lichens List (located at the end of this document) contains taxa that are actively inventoried, tracked, and mapped by the CNDDB (California Rare Plant Rank 1 and 2 plants) as well as taxa which we track but for which we currently only have quad and county level geographic information available to our users (California Rare Plant Rank 3 and 4 plants). For the latter taxa, we maintain site and other information in manual files along with Internet access to the quad and county level information via our CNDDB QuickView Tool.

NatureServe Element Ranking For Plants

Last updated July 2013

All Heritage Programs, such as the California Natural Diversity Database (CNDDB) use the same ranking methodology, originally developed by The Nature Conservancy and now maintained and recently revised by NatureServe. It includes a **Global rank** (G rank), describing the rank for a given taxon over its entire distribution and a **State rank** (S rank), describing the rank for the taxon over its state distribution. For subspecies and varieties, there is also a "T" rank describing the global rank for the subspecies. The next page of this document details the criteria used to assign element ranks, from G1 to G5 for the Global rank and from S1 to S5 for the State rank. Procedurally, state programs such as the CNDDB develop the State ranks and the Global ranks collaboratively among states/provinces containing the species. NatureServe then checks for consistency and logical errors at the national level.

An element rank is assigned using standard criteria and rank definitions. This standardization makes the ranks comparable across organism and political boundaries. NatureServe has developed a "rank calculator" to help increase repeatability and transparency of the ranking process. The three main categories that are taken into consideration when assigning an element rank are rarity, threats, and trends. Within these three categories, various factors are considered including:

- Range extent, area of occupancy, population size, number of occurrences and number of good occurrences (ranked A or B). Environmental specificity can also be used if other information is lacking.
- Overall threat impact as well as intrinsic vulnerability (if threats are unknown).
- Long-term and short-term trends.

Detailed information on the newest element ranking methodology can be found here: http://natureserve.org/publications/library.jsp

With the above considerations in mind, refer below for the numerical definitions for G1-5 and S1-5. An element's ranking status may be adjusted up or down depending upon the considerations above.

Element Ranking

Global Ranking

The *global rank* (G-rank) is a reflection of the overall status of an element throughout its global range. Both Global and State ranks represent a letter+number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity.

Species or natural community level:

G1 = Critically Imperiled— At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled— At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable— At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure— Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Secure— Common; widespread and abundant.

Subspecies/variety level:

Subspecies/varieties receive a T-rank attached to the G-rank. With the subspecies/varieties, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. For example: *Chorizanthe robusta* var. *hartwegii* is ranked G2T1. The G-rank refers to the whole species range i.e., *Chorizanthe robusta.* The T-rank refers only to the global condition of var. *hartwegii*.

State Ranking

The *state rank* (S-rank) is assigned much the same way as the global rank, but state ranks refer to the imperilment status only within California's state boundaries.

S1 = Critically Imperiled— Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
S2 = Imperiled— Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable— Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S4 = Apparently Secure— Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.
S5 = Secure— Common, widespread, and abundant in the state.

Notes:

1. Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a bird's eye or aerial view when ranking sensitive elements rather than simply counting element occurrences.
2. Uncertainty about the rank of an element is expressed in two major ways: by giving a range rank (e.g. S2S3 means the rank is somewhere between S2 and S3) or by adding a ? to the rank (e.g. S2? means the rank is more certain than S2S3 but less certain than S2).
3. Other symbols include: GH (all sites are historical), SH (all CA sites are historical), GX (all sites are extirpated, element is extinct in the wild), SX (all CA sites are extirpated), G#Q (the element is very rare but there are taxonomic questions associated with it; the calculated G rank is qualified by adding a Q after the G#).

California Rare Plant Ranks[1]

1A. Presumed extirpated in California and either rare or extinct elsewhere
1B. Rare or Endangered in California and elsewhere
2A. Presumed extirpated in California, but more common elsewhere
2B. Rare or Endangered in California, but more common elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

1A: Plants Presumed Extirpated in California and either rare or extinct elsewhere

The plants of Rank 1A are presumed extirpated because they have not been seen or collected in the wild in California for many years. This rank includes those plant taxa that are both presumed extinct, as well as those plants which are presumed extirpated in California and rare elsewhere. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range.

1B: Plants Rare, Threatened, or Endangered in California and Elsewhere (Includes Rare Plant Ranks 1B.1, 1B.2, 1B.3)

The plants of Rank 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of plant taxa tracked by the CNDDB, with more than 1,000 plants assigned to this category of rarity.

2A: Plants Presumed Extirpated in California, but more common elsewhere

The plants of Rank 2A are presumed extirpated because they have not been seen or collected in the wild in California for many years. This rank includes only those plant taxa that are presumed extirpated in California, but that are more common elsewhere in their range. Note: Plants of both Rank 1A and 2A are presumed extirpated in California; the only difference is the status of the plants outside of the state.

2B: Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere (Includes Rare Plant Ranks 2B.1, 2B.2, 2B.3)

The plants of Rank 2B are rare, threatened or endangered in California, but more common elsewhere. Plants common in other states or countries are not eligible for consideration under the provisions of the Federal Endangered Species Act; however they are eligible for consideration under the California Endangered Species Act. This rank is meant to highlight the importance of protecting the geographic range and genetic diversity of more widespread species by protecting those species whose ranges just extend into California. Note: Plants of both Rank 1B and 2B are rare, threatened or endangered in California; the only difference is the status of the plants outside of the state.

3: Plants About Which We Need More Information - A Review list

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1 In March, 2010, DFG changed the name of “CNPS List” or “CNPS Ranks” to “California Rare Plant Rank” (or CRPR). This was done to reduce confusion over the fact that CNPS and DFG jointly manage the Rare Plant Status Review groups (300+ botanical experts from government, academia, NGOs and the private sector) and that the rank assignments are the product of a collaborative effort and not solely a CNPS assignment.

In July 2013, CNPS revised the Rare Plant Ranks in order to better define and categorize rarity in California’s flora. In essence, Rank 2 was split into Rank 2A and Rank 2B to be complementary to the already existing 1A and 1B ranks. This split in Rank 2 plants resulted in five Rank 2 plants moving to Rank 2A (Presumed extirpated in California, but more common elsewhere) and the remaining Rank 2 plants being re-classified as Rank 2B (Rare, Threatened or Endangered in California, but more common elsewhere).

(Includes Rare Plant Ranks 3, 3.1, 3.2, 3.3)

The plants that comprise Rank 3 are united by one common theme--we lack the necessary information to assign them to one of the other lists or to reject them. Nearly all of the plants remaining on Rank 3 are taxonomically problematic.

4: Plants of Limited Distribution - A Watch list
(Includes Rare Plant Ranks 4.1, 4.2, 4.3)

The plants in this category are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears low at this time. While we cannot call these plants “rare” from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a Rank 4 plant change, we will transfer it to a more appropriate rank or delete it from consideration.

Threat Ranks:
The California Rare Plant Ranks (CRPR) use a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened. So most CRPRs read as 1B.1, 1B.2, 1B.3, etc. Note that some Rank 3 plants do not have a threat code extension due to difficulty in ascertaining threats for these species. Rank 1A and 2A plants also do not have threat code extensions since there are no known extant populations of the plants in California.

Threat Code extensions and their meanings:
.1 - Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 – Moderately threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat)
.3 – Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Special Lichens

Lichens are not plants, but a symbiotic relationship between a fungus and either green algae or cyanobacteria (aka bluegreen algae).

Many lichen taxa are under-studied and under-surveyed. For this reason, a detailed and cautious approach is taken when a lichen taxa is nominated as a potential species of conservation concern. In particular, special attention is paid to survey efforts and rate of occurrence discovery when deciding whether a lichen is of conservation concern.

There are a few lichens in California for which we have adequate information to place them on our Special Vascular Plants, Bryophytes, and Lichens list. They appear after the bryophytes at the beginning of the list. Lichen statuses are developed in coordination with the California Lichen Society (CALS) and relevant experts. Please visit the California Lichen Society webpage for additional information about sponsoring a lichen of conservation concern (http://californialichens.org/).

Rare Plant Seed Banking

As of July 2014, the CNDDB is including within our database information on whether a particular CNDDB-tracked taxon has been seed banked at an official seed banking institution. The institutions that we currently have information from are: Rancho Santa Ana Botanic Garden, Santa Barbara Botanic Garden, UC Berkeley Botanical Garden, US Department of Agriculture, Berry Seed Bank, Kew Royal Botanic Gardens, and the San Diego Zoo Conservation and Research for Endangered Species (CRES) Native Gene Seed Bank.

The Special Vascular Plants, Bryophytes, and Lichens List now contains a column for whether the taxon has been seed banked (Yes or No). For those with a subscription to the CNDDB, additional information about which institution/organization houses the seed bank, as well as seed bank querying capabilities, are available through RareFind.

CNDDB is providing this seed bank information as a courtesy to our clients for use in their conservation activities. Seed banking is a long-term conservation strategy that can complement the *in situ* protection and conservation of rare plant populations. If a species is seed banked, it does not mean that the species is any less rare or of any less conservation concern. As with all information in CNDDB, this seed bank information should be used with caution. It is essential that anyone who makes a seed collection be aware of seed collection and documentation guidelines. Please see Rancho Santa Ana Botanic Garden's webpage for some additional information on seed collections (https://www.rsabg.org/conservation/seed-conservation).

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities

In order to facilitate a consistent and systematic approach to botanical field surveys and assessments of special status plants and sensitive natural communities, protocols for surveying and evaluating impacts to these resources have been developed. These protocols were put together by California Department of Fish and Wildlife staff and may be found in the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities document.

Special Vascular Plants, Bryophytes, and Lichens List

Last updated August 9, 2018

The remainder of this document contains the CNDDB's Special Vascular Plants, Bryophytes, and Lichens List current as of the date on the title page of this document. While the CNDDB and CNPS strive to remain consistent in the taxa we track and the ranks assigned to those taxa, there can be discrepancies usually due to lag time between when a plant species undergoes review in CNPS and when it gets added to the CNDDB. However, all species tracked by CNPS are also tracked by the CNDDB.

For additional information on how CNDDB determines what species to track on our Special Vascular Plants, Bryophytes, and Lichens List, please see the document "How Revisions Are Made to the Special Plants, Bryophytes, and Lichens List" on the CNDDB webpage.

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Bryophytes

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Anomobryum julaceum slender silver moss	NBMUS80010	None	None	G5?/S2	4.2		No	Yes
Bruchia bolanderi Bolander's bruchia	NBMUS13010	None	None	G3G4/S3	4.2	USFS:S	No	Yes
Bryum chryseum brassy bryum	NBMUS1A430	None	None	G5/S3	4.3		No	No
Buxbaumia viridis buxbaumia moss	NBMUS1B040	None	None	G4G5/S1	2B.2	BLM:S USFS:S	No	Yes
Campylopodiella stenocarpa flagella-like atractylocarpus	NBMUS84010	None	None	G5/S1?	2B.2		No	Yes
Climacium dendroides tree climacium moss	NBMUS1T020	None	None	G5/S1	2B.1		No	Yes
Coscinodon arctolimnius ssp. higuchii Higuchi's sieve-tooth moss	NBMUS96032	None	None	GUTU/S1S3	4.2		No	No
Dacryophyllum falcifolium tear drop moss	NBMUS8Z010	None	None	G2/S2	1B.3	USFS:S	No	Yes
Didymodon californicus California beard-moss	NBMUS2C0N0	None	None	G2G3/S2S3	4.2		No	No
Discelium nudum naked flag moss	NBMUS2E010	None	None	G4G5/S1	2B.2		No	Yes
Entosthodon kochii Koch's cord moss	NBMUS2P050	None	None	G1/S1	1B.3		No	Yes
Fissidens aphelotaxifolius brook pocket moss	NBMUS2W290	None	None	G3G4/S1	2B.2	USFS:S	No	Yes
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?/S2	1B.2	USFS:S	No	Yes
Geothallus tuberosus Campbell's liverwort	NBHEP1C010	None	None	G1/S1	1B.1		No	Yes
Grimmia torenii Toren's grimmia	NBMUS32330	None	None	G2/S2	1B.3		No	Yes
Grimmia vaginulata vaginulate grimmia	NBMUS32340	None	None	G2G3/S1	1B.1		No	Yes
Haplodontium tehamense Lassen Peak copper moss	NBMUS4Q030	None	None	G2/S2	1B.3		No	Yes
Helodium blandowii Blandow's bog moss	NBMUS3C010	None	None	G4/S2	2B.3	USFS:S	No	Yes
Jaffueliobryum raui Rau's jaffueliobryum moss	NBMUS97010	None	None	G4?/S2?	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Jaffueliobryum wrightii Wright's jaffueliobryum moss	NBMUS97020	None	None	G4G5/S2?	2B.3		No	Yes
Meesia longiseta long seta hump moss	NBMUS4L010	None	None	G5/S2	2B.3		No	Yes
Meesia triquetra three-ranked hump moss	NBMUS4L020	None	None	G5/S4	4.2		No	Yes
Meesia uliginosa broad-nerved hump moss	NBMUS4L030	None	None	G5/S3	2B.2	USFS:S	No	Yes
Mielichhoferia elongata elongate copper moss	NBMUS4Q022	None	None	G5/S4	4.3	USFS:S	No	Yes
Mielichhoferia mielichhoferiana Mielichhofer's copper moss	NBMUS4Q020	None	None	G4/S1	2B.3		No	Yes
Mielichhoferia shevockii Shevock's copper moss	NBMUSA1010	None	None	G2/S2	1B.2		No	Yes
Myurella julacea small mousetail moss	NBMUS4U010	None	None	G5/S2	2B.3		No	Yes
Nardia hiroshii Hiroshi's flapwort	NBHEP2A080	None	None	G5/S1	2B.3		No	Yes
Orthotrichum holzingeri Holzinger's orthotrichum moss	NBMUS560E0	None	None	G3/S2	1B.3		No	Yes
Orthotrichum kellmanii Kellman's bristle moss	NBMUS56190	None	None	G2/S2	1B.2	USFS:S	No	Yes
Orthotrichum spjutii Spjut's bristle moss	NBMUS56160	None	None	G1/S1	1B.3		No	Yes
Plagiobryoides vinosula wine-colored tufa moss	NBMUS0Y090	None	None	G3G4/S2	4.2		No	No
Pleuridium mexicanum Mexican earthmoss	NBMUS5M080	None	None	G5/S1	2B.1		No	Yes
Pohlia flexuosa flexuose threadmoss	NBMUS5S1D0	None	None	G5/S1	2B.1		No	Yes
Pohlia tundrae tundra thread moss	NBMUS5S1B0	None	None	G3/S3	2B.3		No	Yes
Ptilidium californicum Pacific fuzzwort	NBHEP2U010	None	None	G4G5/S3S4	4.3	BLM:S	No	Yes
Riella americana American riella	NBHEP31020	None	None	G3?/S1	2B.2		No	Yes
Scopelophila cataractae tongue-leaf copper moss	NBMUS6U010	None	None	G3G4/S1	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Sphaerocarpos drewei bottle liverwort	NBHEP35030	None	None	G1/S1	1B.1		No	Yes
Tortella alpicola alpine crisp-moss	NBMUS7K090	None	None	G5?/S1	2B.3		No	Yes
Tortula californica California screw moss	NBMUS7L090	None	None	G2G3/S2S3	1B.2	BLM:S	No	Yes
Trichodon cylindricus cylindrical trichodon	NBMUS7N020	None	None	G4/S2	2B.2		No	Yes
Triquetrella californica coastal triquetrella	NBMUS7S010	None	None	G2/S2	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Lichens

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Bryoria pseudocapillaris false gray horsehair lichen	NLTEST5420	None	None	G3/S2	3.2		No	No
Bryoria spiralifera twisted horsehair lichen	NLTEST5460	None	None	G3/S1S2	1B.1		No	Yes
Calicium adspersum spiral-spored gilded-head pin lichen	NLT0005640	None	None	G3G4/S1?	2B.2	USFS:S	No	Yes
Cladonia firma popcorn lichen	NLT0008460	None	None	G4/S1	2B.1		No	Yes
Graphis saxorum Baja rock lichen	NLTES29470	None	None	G2?/S1	3		No	Yes
Hypogymnia schizidiata island tube lichen	NLT0032640	None	None	G2/S1	1B.3		No	Yes
Mobergia calculiformis light gray lichen	NLT0018660	None	None	G3/S1	3		No	Yes
Peltigera gowardii western waterfan lichen	NLVER00460	None	None	G3G4/S3	4.2	USFS:S	No	Yes
Ramalina thrausta angel's hair lichen	NLLEC3S340	None	None	G5/S2?	2B.1		No	Yes
Solorina spongiosa fringed chocolate chip lichen	NLT0028030	None	None	G4G5/S1	2B.2		No	Yes
Sulcaria isidiifera splitting yarn lichen	NLTEST0020	None	None	G1/S1	1B.1		No	Yes
Texosporium sancti-jacobi woven-spored lichen	NLTEST7980	None	None	G3/S1	3		No	Yes
Thamnolia vermicularis whiteworm lichen	NLTES43860	None	None	G3G5/S1	2B.1		No	Yes
Usnea longissima Methuselah's beard lichen	NLLEC5P420	None	None	G4/S4	4.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Vascular Plants

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Abies amabilis Pacific silver fir	PGPIN01010	None	None	G5/S2	2B.3		No	Yes
Abies bracteata bristlecone fir	PGPIN01030	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Abies lasiocarpa var. lasiocarpa subalpine fir	PGPIN01072	None	None	G5T5/S3	2B.3		No	Yes
Abronia alpina Ramshaw Meadows abronia	PDNYC01020	None	None	G2/S2	1B.1	USFS:S	No	Yes
Abronia maritima red sand-verbena	PDNYC010E0	None	None	G4/S3?	4.2		Yes	No
Abronia nana var. covillei Coville's dwarf abronia	PDNYC010H1	None	None	G4T3/S3	4.2	USFS:S	Yes	No
Abronia umbellata var. breviflora pink sand-verbena	PDNYC010N4	None	None	G4G5T2/S2	1B.1	BLM:S	No	Yes
Abronia villosa var. aurita chaparral sand-verbena	PDNYC010P1	None	None	G5T2?/S2	1B.1	BLM:S USFS:S	No	Yes
Abutilon abutiloides shrubby Indian mallow	PDMAL02010	None	None	G5/S1	2B.1		No	Yes
Abutilon parvulum dwarf abutilon	PDMAL020F0	None	None	G5/S2S3	2B.3		No	Yes
Acanthomintha duttonii San Mateo thorn-mint	PDLAM01040	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Acanthomintha ilicifolia San Diego thorn-mint	PDLAM01010	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Acanthomintha lanceolata Santa Clara thorn-mint	PDLAM01020	None	None	G4/S4	4.2		Yes	No
Acanthomintha obovata ssp. cordata heart-leaved thorn-mint	PDLAM01033	None	None	G4T3/S3	4.2		Yes	No
Acanthomintha obovata ssp. obovata San Benito thorn-mint	PDLAM01032	None	None	G4T3T4/S3S4	4.2		No	No
Acanthoscyphus parishii var. abramsii Abrams' oxytheca	PDPGN0J041	None	None	G4? T1T2/S1S2	1B.2	USFS:S	No	Yes
Acanthoscyphus parishii var. cienegensis Cienega Seca oxytheca	PDPGN0J042	None	None	G4?T2/S2	1B.3	USFS:S	No	Yes
Acanthoscyphus parishii var. goodmaniana Cushenbury oxytheca	PDPGN0J043	Endangered	None	G4?T1/S1	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Acanthoscyphus parishii var. parishii Parish's oxytheca	PDPGN0J044	None	None	G4? T3T4/S3S4	4.2		No	No
Acleisanthes longiflora angel trumpets	PDNYC02040	None	None	G5/S1	2B.3		No	Yes
Acleisanthes nevadensis desert wing-fruit	PDNYC0F040	None	None	G4?/S1	2B.1		No	Yes
Acmispon argophyllus var. adsurgens San Clemente Island bird's-foot trefoil	PDFAB2A041	None	Endangered	G5T2/S2	1B.1		Yes	Yes
Acmispon argophyllus var. niveus Santa Cruz Island bird's-foot trefoil	PDFAB2A048	None	Endangered	G5T3/S3	4.3		Yes	Yes
Acmispon argyraeus var. multicaulis scrub lotus	PDFAB2A052	None	None	G4?T2/S2	1B.3	BLM:S	Yes	Yes
Acmispon argyraeus var. notitius Providence Mountains lotus	PDFAB2A053	None	None	G4?T2/S2	1B.3		No	Yes
Acmispon dendroideus var. dendroideus island broom	PDFAB2A1G1	None	None	G4T3/S3	4.2		Yes	No
Acmispon dendroideus var. traskiae San Clemente Island lotus	PDFAB2A1G2	Threatened	Endangered	G4T3/S3	1B.3		Yes	Yes
Acmispon dendroideus var. veatchii San Miguel Island deerweed	PDFAB2A1G3	None	None	G4T3/S3	4.3		Yes	No
Acmispon haydonii pygmy lotus	PDFAB2A0H0	None	None	G3/S3	1B.3		Yes	Yes
Acmispon prostratus Nuttall's acmispon	PDFAB2A0V0	None	None	G1G2/S1	1B.1		Yes	Yes
Acmispon rubriflorus red-flowered bird's-foot-trefoil	PDFAB2A150	None	None	G2/S2	1B.1	BLM:S	No	Yes
Adiantum shastense Shasta maidenhair fern	PPADI030W0	None	None	G3/S3	4.3		No	No
Adolphia californica California adolphia	PDRHA01010	None	None	G3/S2	2B.1		Yes	Yes
Agave shawii var. shawii Shaw's agave	PMAGA010P1	None	None	G2G3T2/S1	2B.1		No	Yes
Agave utahensis var. eborispina ivory-spined agave	PMAGA010S1	None	None	G4T3T4/S2	1B.3	BLM:S	Yes	Yes
Agave utahensis var. nevadensis Clark Mountain agave	PMAGA010S3	None	None	G4T4?/S3	4.2		No	No
Ageratina herbacea desert ageratina	PDASTBX0J0	None	None	G5/S2S3	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ageratina shastensis Shasta ageratina	PDASTBX0R0	None	None	G3/S3	1B.2		No	Yes
Agrostis blasdalei Blasdale's bent grass	PMPOA04060	None	None	G2/S2	1B.2	BLM:S	No	Yes
Agrostis hendersonii Henderson's bent grass	PMPOA040K0	None	None	G2Q/S2	3.2		No	Yes
Agrostis hooveri Hoover's bent grass	PMPOA040M0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Agrostis humilis mountain bent grass	PMPOA040P0	None	None	G4Q/S2	2B.3		No	Yes
Agrostis lacuna-vernalis vernal pool bent grass	PMPOA041N0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Aliciella ripleyi Ripley's aliciella	PDPLM041E0	None	None	G3/S2	2B.3		No	Yes
Aliciella triodon coyote gilia	PDPLM041T0	None	None	G5/S2	2B.2		No	Yes
Alisma gramineum grass alisma	PMALI01010	None	None	G5/S3	2B.2		No	Yes
Allium abramsii Abrams' onion	PMLIL02360	None	None	G3/S3	1B.2		No	Yes
Allium atrorubens var. atrorubens Great Basin onion	PMLIL02061	None	None	G4T4/S2	2B.3		No	Yes
Allium atrorubens var. cristatum Inyo onion	PMLIL02063	None	None	G4T4/S4	4.3		No	No
Allium fimbriatum var. purdyi Purdy's onion	PMLIL020Y7	None	None	G4G5T3/S3	4.3		No	No
Allium hickmanii Hickman's onion	PMLIL02140	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Allium hoffmanii Beegum onion	PMLIL02150	None	None	G4/S4	4.3		No	No
Allium howellii var. clokeyi Mt. Pinos onion	PMLIL02161	None	None	G4T2/S2	1B.3	USFS:S	Yes	Yes
Allium howellii var. howellii Howell's onion	PMLIL02162	None	None	G3G4T3/S3	4.3		No	No
Allium howellii var. sanbenitense San Benito onion	PMLIL02163	None	None	G3G4T3/S3	1B.3		No	Yes
Allium jepsonii Jepson's onion	PMLIL022V0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Allium marvinii Yucaipa onion	PMLIL02330	None	None	G1/S1	1B.2	USFS:S	No	Yes
Allium munzii Munz's onion	PMLIL022Z0	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Allium nevadense Nevada onion	PMLIL021J0	None	None	G4/S3	2B.3		No	Yes
Allium parishii Parish's onion	PMLIL021N0	None	None	G3/S3	4.3		No	No
Allium peninsulare var. franciscanum Franciscan onion	PMLIL021R1	None	None	G5T2/S2	1B.2		No	Yes
Allium punctum dotted onion	PMLIL021Y0	None	None	G3/S1	2B.2		No	Yes
Allium sanbornii var. congdonii Congdon's onion	PMLIL02211	None	None	G4T3/S3	4.3		No	No
Allium sanbornii var. sanbornii Sanborn's onion	PMLIL02212	None	None	G4T3T4/S3S4	4.2		No	No
Allium sharsmithiae Sharsmith's onion	PMLIL02310	None	None	G2/S2	1B.3		No	Yes
Allium shevockii Spanish Needle onion	PMLIL022M0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Allium siskiyouense Siskiyou onion	PMLIL02280	None	None	G4/S4	4.3		No	No
Allium tribracteatum three-bracted onion	PMLIL022D0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Allium tuolumnense Rawhide Hill onion	PMLIL022W0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Allium yosemitense Yosemite onion	PMLIL022L0	None	Rare	G3/S3	1B.3	USFS:S	No	Yes
Almutaster pauciflorus alkali marsh aster	PDASTEL010	None	None	G4/S1S2	2B.2		No	Yes
Alopecurus aequalis var. sonomensis Sonoma alopecurus	PMPOA07012	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Aloysia wrightii Wright's beebrush	PDVER02040	None	None	G5/S4	4.3		No	No
Amaranthus watsonii Watson's amaranth	PDAMA04170	None	None	G5?/S3	4.3		No	No
Ambrosia chenopodiifolia San Diego bur-sage	PDAST0C080	None	None	G2G3/S1	2B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ambrosia monogyra singlewhorl burrobrush	PDAST50010	None	None	G5/S2	2B.2		No	Yes
Ambrosia pumila San Diego ambrosia	PDAST0C0M0	Endangered	None	G1/S1	1B.1		No	Yes
Amorpha californica var. napensis Napa false indigo	PDFAB08012	None	None	G4T2/S2	1B.2		Yes	Yes
Amsinckia douglasiana Douglas' fiddleneck	PDBOR01010	None	None	G4/S4	4.2		No	No
Amsinckia furcata forked fiddleneck	PDBOR010D1	None	None	G4/S4	4.2		Yes	No
Amsinckia grandiflora large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3/S3	1B.2	BLM:S	No	Yes
Ancistrocarphus keilii Santa Ynez groundstar	PDASTD5020	None	None	G1/S1	1B.1	BLM:S	No	Yes
Androsace elongata ssp. acuta California androsace	PDPRI02031	None	None	G5? T3T4/S3S4	4.2		Yes	No
Androsace filiformis slender-stemmed androsace	PDPRI02040	None	None	G3G4/S1	2B.3		No	Yes
Androstephium breviflorum small-flowered androstephium	PMLIL06010	None	None	G4/S2	2B.2		No	Yes
Anemone multifida var. multifida cut-leaf anemone	PDRAN040E6	None	None	G5T5/S1S2	2B.2		No	No
Angelica callii Call's angelica	PDAPI07060	None	None	G3/S3	4.3		No	No
Angelica kingii King's angelica	PDAPI070D0	None	None	G4/S3	4.2		No	No
Angelica lucida sea-watch	PDAPI070G0	None	None	G5/S3	4.2		Yes	No
Anisocarpus scabridus scabrid alpine tarplant	PDASTDU020	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Antennaria flagellaris stoloniferous pussy-toes	PDAST0H0W0	None	None	G4/S3	4.2		No	Yes
Antennaria marginata white-margined everlasting	PDAST0H1G0	None	None	G4G5/S1	2B.3	USFS:S	No	Yes
Antennaria pulchella beautiful pussy-toes	PDAST0H1H0	None	None	G4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Antennaria sawyeri Sawyer's pussy-toes	PDAST0H1S0	None	None	G1/S1	1B.2		No	Yes
Antennaria suffrutescens evergreen everlasting	PDAST0H0S0	None	None	G4/S4?	4.3		No	No
Anthoxanthum nitens ssp. nitens vanilla-grass	PMPOA0F041	None	None	G5/S2	2B.3		No	Yes
Antirrhinum ovatum oval-leaved snapdragon	PDSCR2K010	None	None	G3/S3	4.2		No	Yes
Antirrhinum subcordatum dimorphic snapdragon	PDSCR2S070	None	None	G3/S3	4.3	USFS:S	No	Yes
Antirrhinum virga twig-like snapdragon	PDSCR2S090	None	None	G3?/S3?	4.3		No	No
Aphanisma blitoides aphanisma	PDCHE02010	None	None	G3G4/S2	1B.2		No	Yes
Arabis aculeolata Waldo rockcress	PDBRA06010	None	None	G4/S2	2B.2		Yes	Yes
Arabis blepharophylla coast rockcress	PDBRA06040	None	None	G4/S4	4.3		No	No
Arabis mcdonaldiana McDonald's rockcress	PDBRA06150	Endangered	Endangered	G3/S3	1B.1		Yes	Yes
Arabis modesta modest rockcress	PDBRA06180	None	None	G3/S3	4.3		No	No
Arabis oregana Oregon rockcress	PDBRA061A0	None	None	G3G4Q/S3	4.3		No	No
Arabis repanda var. greenei Greene's rockcress	PDBRA061Q1	None	None	G5T3Q/S3	3.3		No	No
Arabis rigidissima var. demota Galena Creek rockcress	PDBRA061R1	None	None	G3T3Q/S1	1B.2	USFS:S	No	Yes
Arabis rigidissima var. rigidissima Trinity Mountains rockcress	PDBRA061R2	None	None	G3T3/S3	1B.3		No	Yes
Arctomecon merriamii white bear poppy	PDPAP02030	None	None	G3/S3	2B.2		Yes	Yes
Arctostaphylos andersonii Anderson's manzanita	PDERI04030	None	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos auriculata Mt. Diablo manzanita	PDERI04040	None	None	G2/S2	1B.3		No	Yes
Arctostaphylos bakeri ssp. bakeri Baker's manzanita	PDERI04221	None	Rare	G2T1/S1	1B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Arctostaphylos bakeri ssp. sublaevis The Cedars manzanita	PDERI04222	None	Rare	G2T2/S2	1B.2	BLM:S	No	Yes
Arctostaphylos catalinae Santa Catalina Island manzanita	PDERI04070	None	None	G2?/S2?	1B.2		Yes	Yes
Arctostaphylos confertiflora Santa Rosa Island manzanita	PDERI040A0	Endangered	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos crustacea ssp. eastwoodiana Eastwood's brittle-leaf manzanita	PDERI041H4	None	None	G4T2/S2	1B.1		No	Yes
Arctostaphylos crustacea ssp. insulicola island manzanita	PDERI041H5	None	None	G4T3/S3	4.2		No	No
Arctostaphylos crustacea ssp. subcordata Santa Cruz Island manzanita	PDERI041H7	None	None	G4T3/S3	4.2		No	No
Arctostaphylos cruzensis Arroyo de la Cruz manzanita	PDERI040B0	None	None	G1G2/S1S2	1B.2	BLM:S USFS:S	No	Yes
Arctostaphylos densiflora Vine Hill manzanita	PDERI040C0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos edmundsii Little Sur manzanita	PDERI04260	None	None	G2/S2	1B.2	USFS:S	No	Yes
Arctostaphylos franciscana Franciscan manzanita	PDERI040J3	Endangered	None	G1/S1	1B.1		Yes	Yes
Arctostaphylos gabilanensis Gabilan Mountains manzanita	PDERI042X0	None	None	G1/S1	1B.2		No	Yes
Arctostaphylos glandulosa ssp. crassifolia Del Mar manzanita	PDERI040E8	Endangered	None	G5T2/S2	1B.1		No	Yes
Arctostaphylos glandulosa ssp. gabrielensis San Gabriel manzanita	PDERI042P0	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Arctostaphylos glutinosa Schreiber's manzanita	PDERI040G0	None	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos hispidula Howell's manzanita	PDERI04230	None	None	G4/S3	4.2		No	No
Arctostaphylos hookeri ssp. hearstiorum Hearsts' manzanita	PDERI040J4	None	Endangered	G3T2/S2	1B.2		No	Yes
Arctostaphylos hookeri ssp. hookeri Hooker's manzanita	PDERI040J1	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Arctostaphylos hooveri Hoover's manzanita	PDERI040K0	None	None	G3/S3	4.3	USFS:S	Yes	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Arctostaphylos imbricata San Bruno Mountain manzanita	PDERI040L0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos klamathensis Klamath manzanita	PDERI041R0	None	None	G2S3/S2S3	1B.2	BLM:S	Yes	Yes
Arctostaphylos luciana Santa Lucia manzanita	PDERI040N0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Arctostaphylos malloryi Mallory's manzanita	PDERI042V0	None	None	G3/S3	4.3		No	No
Arctostaphylos manzanita ssp. elegans Konocti manzanita	PDERI04271	None	None	G5T3/S3	1B.3		No	Yes
Arctostaphylos manzanita ssp. laevigata Contra Costa manzanita	PDERI04273	None	None	G5T2/S2	1B.2		No	Yes
Arctostaphylos mewukka ssp. truei True's manzanita	PDERI040Q2	None	None	G4?T3/S3	4.2		No	No
Arctostaphylos montana ssp. montana Mt. Tamalpais manzanita	PDERI040J5	None	None	G3T3/S3	1B.3		No	Yes
Arctostaphylos montana ssp. ravenii Presidio manzanita	PDERI040J2	Endangered	Endangered	G3T1/S1	1B.1		No	Yes
Arctostaphylos montaraensis Montara manzanita	PDERI042W0	None	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos montereyensis Toro manzanita	PDERI040R0	None	None	G2?/S2?	1B.2	BLM:S	No	Yes
Arctostaphylos morroensis Morro manzanita	PDERI040S0	Threatened	None	G1/S1	1B.1		No	Yes
Arctostaphylos myrtifolia Ione manzanita	PDERI04240	Threatened	None	G1G2/S1S2	1B.2		No	Yes
Arctostaphylos nissenana Nissenan manzanita	PDERI040V0	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Arctostaphylos nortensis Del Norte manzanita	PDERI04092	None	None	G2/S2	4.3		No	No
Arctostaphylos nummularia ssp. mendocinoensis pygmy manzanita	PDERI04280	None	None	G3?T1/S1	1B.2		No	Yes
Arctostaphylos obispoensis Bishop manzanita	PDERI040X0	None	None	G3/S3	4.3	USFS:S	No	No
Arctostaphylos ohloneana Ohlone manzanita	PDERI042Y0	None	None	G1/S1	1B.1		Yes	Yes
Arctostaphylos osoensis Oso manzanita	PDERI042S0	None	None	G1/S1	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Arctostaphylos otayensis Otay manzanita	PDERI040Y0	None	None	G1/S1	1B.2	BLM:S	Yes	Yes
Arctostaphylos pacifica Pacific manzanita	PDERI040Z0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos pajaroensis Pajaro manzanita	PDERI04100	None	None	G1/S1	1B.1	BLM:S	No	Yes
Arctostaphylos pallida pallid manzanita	PDERI04110	Threatened	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos parryana ssp. tumescens interior manzanita	PDERI042A1	None	None	G4T3T4/S3S4	4.3	USFS:S	No	No
Arctostaphylos pechoensis Pecho manzanita	PDERI04140	None	None	G2/S2	1B.2		No	Yes
Arctostaphylos pilosula Santa Margarita manzanita	PDERI042Z0	None	None	G2?/S2?	1B.2	BLM:S USFS:S	Yes	Yes
Arctostaphylos pumila sandmat manzanita	PDERI04180	None	None	G1/S1	1B.2	BLM:S	No	Yes
Arctostaphylos purissima La Purisima manzanita	PDERI041A0	None	None	G2/S2	1B.1		Yes	Yes
Arctostaphylos rainbowensis Rainbow manzanita	PDERI042T0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Arctostaphylos refugioensis Refugio manzanita	PDERI041B0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Arctostaphylos regismontana Kings Mountain manzanita	PDERI041C0	None	None	G2/S2	1B.2		No	Yes
Arctostaphylos rudis sand mesa manzanita	PDERI041E0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Arctostaphylos silvicola Bonny Doon manzanita	PDERI041F0	None	None	G1/S1	1B.2		No	Yes
Arctostaphylos stanfordiana ssp. decumbens Rincon Ridge manzanita	PDERI041G4	None	None	G3T1/S1	1B.1		No	Yes
Arctostaphylos stanfordiana ssp. raichei Raiche's manzanita	PDERI041G2	None	None	G3T2/S2	1B.1		Yes	Yes
Arctostaphylos tomentosa ssp. daciticola dacite manzanita	PDERI041HD	None	None	G4T1/S1	1B.1		No	Yes
Arctostaphylos virgata Marin manzanita	PDERI041K0	None	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos viridissima white-haired manzanita	PDERI041L0	None	None	G4/S4	4.2		Yes	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Arenaria lanuginosa var. saxosa rock sandwort	PDCAR040E4	None	None	G5T5/S2	2B.3	USFS:S	Yes	Yes
Arenaria paludicola marsh sandwort	PDCAR040L0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Argyrochosma limitanea ssp. limitanea southwestern false cloak-fern	PPADI0N051	None	None	G4G5T3T4/S1	2B.1		No	Yes
Aristocapsa insignis Indian Valley spineflower	PDPGN0U010	None	None	G1/S1	1B.2	BLM:S	No	Yes
Arnica cernua serpentine arnica	PDAST0Q040	None	None	G5/S4	4.3		No	No
Arnica fulgens hillside arnica	PDAST0Q090	None	None	G5/S3	2B.2		No	Yes
Arnica spathulata Klamath arnica	PDAST0Q0M0	None	None	G3?/S3	4.3		No	No
Arnica venosa Shasta County arnica	PDAST0Q0Q0	None	None	G3/S3	4.2		No	No
Arnica viscosa Mt. Shasta arnica	PDAST0Q0R0	None	None	G4/S3	4.3		No	No
Artemisia nesiotica island sagebrush	PDAST0S120	None	None	G3/S3	4.3		No	No
Artemisia palmeri San Diego sagewort	PDAST0S160	None	None	G3?/S3?	4.2		No	Yes
Artemisia tripartita ssp. tripartita threetip sagebrush	PDAST0S1S2	None	None	G5T4T5/S2	2B.3		No	Yes
Asarum marmoratum marbled wild-ginger	PDARI02070	None	None	G4?/S2	2B.3		No	Yes
Asclepias asperula ssp. asperula antelope-horns	PDASC02051	None	None	G5T5/S3	4.3		No	No
Asclepias nyctaginifolia Mojave milkweed	PDASC02190	None	None	G4G5/S2	2B.1		No	Yes
Asclepias solanoana serpentine milkweed	PDASC021R0	None	None	G3/S3	4.2		Yes	No
Aspidotis carlotta-halliae Carlotta Hall's lace fern	PPADI07020	None	None	G3/S3	4.2		No	No
Asplenium septentrionale northern spleenwort	PPASP021F0	None	None	G4G5/S3	2B.3		No	Yes
Asplenium trichomanes ssp. trichomanes maidenhair spleenwort	PPASP021K2	None	None	G5T5/S1	2B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Asplenium vespertinum western spleenwort	PPASP021P0	None	None	G4/S4	4.2		No	No
Asplenium viride green spleenwort	PPASP02250	None	None	G5?/S1	2B.3		No	Yes
Astragalus agnicidus Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2/S2	1B.1	BLM:S	Yes	Yes
Astragalus agrestis field milk-vetch	PDFAB0F090	None	None	G5/S2	2B.2	BLM:S	No	Yes
Astragalus albens Cushenbury milk-vetch	PDFAB0F0A0	Endangered	None	G1/S1	1B.1		Yes	Yes
Astragalus allochrous var. playanus playa milk-vetch	PDFAB0F0C1	None	None	G4T4/S2	2B.2		No	Yes
Astragalus anxius Ash Valley milk-vetch	PDFAB0FBD0	None	None	G1/S1	1B.3	BLM:S USFS:S	No	Yes
Astragalus argophyllus var. argophyllus silver-leaved milk-vetch	PDFAB0F0S1	None	None	G5T4/S2	2B.2	BLM:S	No	Yes
Astragalus atratus var. mensanus Darwin Mesa milk-vetch	PDFAB0F0Z3	None	None	G4G5T2/S2	1B.1	BLM:S	No	Yes
Astragalus austiniae Austin's astragalus	PDFAB0F120	None	None	G2G3/S2S3	1B.3		No	Yes
Astragalus bernardinus San Bernardino milk-vetch	PDFAB0F190	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Astragalus bicristatus crested milk-vetch	PDFAB0F1A0	None	None	G3/S3	4.3	USFS:S	No	No
Astragalus brauntonii Braunton's milk-vetch	PDFAB0F1G0	Endangered	None	G2/S2	1B.1		Yes	Yes
Astragalus breweri Brewer's milk-vetch	PDFAB0F1J0	None	None	G3/S3	4.2		No	No
Astragalus cimae var. cimae Cima milk-vetch	PDFAB0F231	None	None	G3T3/S2?	1B.2		Yes	Yes
Astragalus cimae var. sufflatus inflated Cima milk-vetch	PDFAB0F232	None	None	G3T3/S3	1B.3	USFS:S	No	Yes
Astragalus claranus Clara Hunt's milk-vetch	PDFAB0F240	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Astragalus clevelandii Cleveland's milk-vetch	PDFAB0F250	None	None	G4/S4	4.3		No	No
Astragalus crotalariae Salton milk-vetch	PDFAB0F2K0	None	None	G4G5/S4	4.3		Yes	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Astragalus deanei Dean's milk-vetch	PDFAB0F2R0	None	None	G1/S1	1B.1	BLM:S USFS:S	No	Yes
Astragalus didymocarpus var. milesianus Miles' milk-vetch	PDFAB0F2X3	None	None	G5T2/S2	1B.2		No	Yes
Astragalus douglasii var. perstrictus Jacumba milk-vetch	PDFAB0F303	None	None	G5T3?/S2S3	1B.2	BLM:S USFS:S	No	Yes
Astragalus ertterae Walker Pass milk-vetch	PDFAB0FB30	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Astragalus funereus black milk-vetch	PDFAB0F3K0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Astragalus geyeri var. geyeri Geyer's milk-vetch	PDFAB0F3M1	None	None	G4T4/S2	2B.2		No	Yes
Astragalus gilmanii Gilman's milk-vetch	PDFAB0F3R0	None	None	G2/S2	1B.2		No	Yes
Astragalus hornii var. hornii Horn's milk-vetch	PDFAB0F421	None	None	G4G5T1T2/S1	1B.1	BLM:S	No	Yes
Astragalus insularis var. harwoodii Harwood's milk-vetch	PDFAB0F491	None	None	G5T4/S2	2B.2		Yes	Yes
Astragalus inversus Susanville milk-vetch	PDFAB0F4A0	None	None	G4/S4	4.3		No	No
Astragalus inyoensis Inyo milk-vetch	PDFAB0F4B0	None	None	G3/S3	4.2		Yes	No
Astragalus iodanthus var. diaphanoides snake milk-vetch	PDFAB0F4C3	None	None	G4T4/S3	4.3		No	No
Astragalus jaegerianus Lane Mountain milk-vetch	PDFAB0F4F0	Endangered	None	G2/S2	1B.1		Yes	Yes
Astragalus johannis-howellii Long Valley milk-vetch	PDFAB0F4H0	None	Rare	G2/S1	1B.2	BLM:S USFS:S	No	Yes
Astragalus kentrophyta var. danaus Sweetwater Mountains milk-vetch	PDFAB0F4J2	None	None	G5T4/S4	4.3		No	No
Astragalus kentrophyta var. elatus spiny-leaved milk-vetch	PDFAB0F4J4	None	None	G5T4/S2	2B.2		No	Yes
Astragalus kentrophyta var. ungulatus spiny milk-vetch	PDFAB0F4JB	None	None	G5T3T4/S1	2B.2		No	Yes
Astragalus lemmonii Lemmon's milk-vetch	PDFAB0F4N0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus lentiformis lens-pod milk-vetch	PDFAB0F4P0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Astragalus lentiginosus var. antonius San Antonio milk-vetch	PDFAB0FB92	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Astragalus lentiginosus var. borreganus Borrego milk-vetch	PDFAB0FB95	None	None	G5T5?/S4	4.3		Yes	No
Astragalus lentiginosus var. coachellae Coachella Valley milk-vetch	PDFAB0FB97	Endangered	None	G5T1/S1	1B.2		Yes	Yes
Astragalus lentiginosus var. kernensis Kern Plateau milk-vetch	PDFAB0FB98	None	None	G5T2?/S2	1B.2	USFS:S	No	Yes
Astragalus lentiginosus var. micans shining milk-vetch	PDFAB0FB9C	None	None	G5T1/S1	1B.2		Yes	Yes
Astragalus lentiginosus var. piscinensis Fish Slough milk-vetch	PDFAB0FB9E	Threatened	None	G5T1/S1	1B.1		Yes	Yes
Astragalus lentiginosus var. sesquimetralis Sodaville milk-vetch	PDFAB0FB9K	None	Endangered	G5T1/S1	1B.1		No	Yes
Astragalus lentiginosus var. sierrae Big Bear Valley milk-vetch	PDFAB0FB9L	None	None	G5T2/S2	1B.2	USFS:S	Yes	Yes
Astragalus leucolobus Big Bear Valley woollypod	PDFAB0F4T0	None	None	G2/S2	1B.2		Yes	Yes
Astragalus macrodon Salinas milk-vetch	PDFAB0F520	None	None	G4/S4	4.3		No	No
Astragalus magdalenae var. peirsonii Peirson's milk-vetch	PDFAB0F532	Threatened	Endangered	G3G4T2/S1	1B.2		Yes	Yes
Astragalus miguelensis San Miguel Island milk-vetch	PDFAB0F5C0	None	None	G4/S4	4.3		Yes	No
Astragalus mohavensis var. hemigyrus curved-pod milk-vetch	PDFAB0F5J1	None	None	G3G4T2T3/S1	1B.1	BLM:S	No	Yes
Astragalus monoensis Mono milk-vetch	PDFAB0F5N0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Astragalus nevinii San Clemente Island milk-vetch	PDFAB0F5X0	None	None	G3/S3	1B.2		Yes	Yes
Astragalus nutans Providence Mountains milk-vetch	PDFAB0F620	None	None	G3/S3	4.3		No	No
Astragalus nuttallii var. nuttallii ocean bluff milk-vetch	PDFAB0F641	None	None	G4T4/S4	4.2		No	No
Astragalus nyensis Nye milk-vetch	PDFAB0F660	None	None	G3?/S1	1B.1	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Astragalus oocarpus San Diego milk-vetch	PDFAB0F6B0	None	None	G2?/S2?	1B.2	BLM:S USFS:S	No	Yes
Astragalus oophorus var. lavinii Lavin's milk-vetch	PDFAB0F6C4	None	None	G4T2/S1	1B.2	BLM:S	No	Yes
Astragalus oophorus var. oophorus egg milk-vetch	PDFAB0F6C6	None	None	G4T4?/S3S4	4.3		No	No
Astragalus pachypus var. jaegeri Jaeger's milk-vetch	PDFAB0F6G1	None	None	G4T2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Astragalus pauperculus depauperate milk-vetch	PDFAB0F6N0	None	None	G4/S4	4.3		No	No
Astragalus platytropis broad-keeled milk-vetch	PDFAB0F6X0	None	None	G5/S3	2B.2		No	Yes
Astragalus preussii var. laxiflorus Lancaster milk-vetch	PDFAB0F721	None	None	G4T2/S1	1B.1		No	Yes
Astragalus preussii var. preussii Preuss' milk-vetch	PDFAB0F722	None	None	G4T4/S1	2B.1		No	Yes
Astragalus pseudiodanthus Tonopah milk-vetch	PDFAB0F750	None	None	G2Q/S2	1B.2	BLM:S	No	Yes
Astragalus pulsiferae var. coronensis Modoc Plateau milk-vetch	PDFAB0F784	None	None	G4T3/S3	4.2	USFS:S	No	No
Astragalus pulsiferae var. pulsiferae Pulsifer's milk-vetch	PDFAB0F783	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus pulsiferae var. suksdorfii Suksdorf's milk-vetch	PDFAB0F782	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus pycnostachyus var. lanosissimus Ventura Marsh milk-vetch	PDFAB0F7B1	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2/S2	1B.2	BLM:S	Yes	Yes
Astragalus rattanii var. jepsonianus Jepson's milk-vetch	PDFAB0F7E1	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Astragalus rattanii var. rattanii Rattan's milk-vetch	PDFAB0F7E2	None	None	G4T4/S4	4.3		No	No
Astragalus ravenii Raven's milk-vetch	PDFAB0F7F0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Astragalus sabulonum gravel milk-vetch	PDFAB0F7R0	None	None	G4G5/S2	2B.2		No	Yes
Astragalus serenoi var. shockleyi Shockley's milk-vetch	PDFAB0F802	None	None	G4T3/S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Astragalus shevockii Shevock's milk-vetch	PDFAB0F850	None	None	G2/S2	1B.3	BLM:S	No	Yes
Astragalus subvestitus Kern County milk-vetch	PDFAB0F8M0	None	None	G3/S3	4.3		No	No
Astragalus tener var. ferrisiae Ferris' milk-vetch	PDFAB0F8R3	None	None	G2T1/S1	1B.1	BLM:S	No	Yes
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T2/S2	1B.2		No	Yes
Astragalus tener var. titi coastal dunes milk-vetch	PDFAB0F8R2	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Astragalus tidestromii Tidestrom's milk-vetch	PDFAB0F8X0	None	None	G3/S2	2B.2	USFS:S	Yes	Yes
Astragalus traskiae Trask's milk-vetch	PDFAB0F910	None	Rare	G3/S3	1B.2		No	Yes
Astragalus tricarinatus triple-ribbed milk-vetch	PDFAB0F920	Endangered	None	G2/S2	1B.2		Yes	Yes
Astragalus umbraticus Bald Mountain milk-vetch	PDFAB0F990	None	None	G4/S2	2B.3		No	Yes
Astragalus webberi Webber's milk-vetch	PDFAB0F9J0	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Astragalus whitneyi var. lenophyllus woolly-leaved milk-vetch	PDFAB0F9L6	None	None	G5T4/S4	4.3		No	No
Astrolepis cochisensis ssp. cochisensis scaly cloak fern	PPADI0P013	None	None	G5?T4/S2	2B.3		Yes	Yes
Atriplex argentea var. hillmanii Hillman's silverscale	PDCHE04055	None	None	G5T4/S2	2B.2		No	Yes
Atriplex argentea var. longitrichoma Pahrump orache	PDCHE04056	None	None	G5T2/S2	1B.1	BLM:S	Yes	Yes
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Atriplex cordulata var. erecticaulis Earlimart orache	PDCHE042V0	None	None	G3T1/S1	1B.2	BLM:S	No	Yes
Atriplex coronata var. coronata crownscale	PDCHE040C3	None	None	G4T3/S3	4.2		No	No
Atriplex coronata var. notatior San Jacinto Valley crownscale	PDCHE040C2	Endangered	None	G4T1/S1	1B.1		Yes	Yes
Atriplex coronata var. vallicola Lost Hills crownscale	PDCHE04250	None	None	G4T2/S2	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Atriplex coulteri Coulter's saltbush	PDCHE040E0	None	None	G3/S1S2	1B.2		Yes	Yes
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2/S2	1B.2		No	Yes
Atriplex gardneri var. falcata falcate saltbush	PDCHE040J0	None	None	G4T4Q/S2S3	2B.2		No	Yes
Atriplex minuscula lesser saltscale	PDCHE042M0	None	None	G2/S2	1B.1		No	Yes
Atriplex pacifica south coast saltscale	PDCHE041C0	None	None	G4/S2	1B.2		No	Yes
Atriplex parishii Parish's brittlescale	PDCHE041D0	None	None	G1G2/S1	1B.1	USFS:S	No	Yes
Atriplex persistens vernal pool smallscale	PDCHE042P0	None	None	G2/S2	1B.2		No	Yes
Atriplex pusilla smooth saltbush	PDCHE041P0	None	None	G4/SH	2B.1		No	Yes
Atriplex serenana var. davidsonii Davidson's saltscale	PDCHE041T1	None	None	G5T1/S1	1B.2		No	Yes
Atriplex subtilis subtle orache	PDCHE042T0	None	None	G1/S1	1B.2	BLM:S	No	Yes
Atriplex tularensis Bakersfield smallscale	PDCHE04240	None	Endangered	GX/SX	1A		No	Yes
Ayenia compacta California ayenia	PDSTE01020	None	None	G4/S3	2B.3		No	Yes
Azolla microphylla Mexican mosquito fern	PPAZO01030	None	None	G5/S4	4.2		No	No
Baccharis malibuensis Malibu baccharis	PDAST0W0W0	None	None	G1/S1	1B.1		Yes	Yes
Baccharis plummerae ssp. glabrata San Simeon baccharis	PDAST0W0D1	None	None	G3T1/S1	1B.2	USFS:S	No	Yes
Baccharis plummerae ssp. plummerae Plummer's baccharis	PDAST0W0D2	None	None	G3T3/S3	4.3		Yes	No
Baccharis vanessae Encinitas baccharis	PDAST0W0P0	Threatened	Endangered	G1/S1	1B.1		No	Yes
Bahia neomexicana many-flowered bahia	PDAST8C020	None	None	G5/S2S3	2B.3		No	Yes
Balsamorhiza lanata woolly balsamroot	PDAST11047	None	None	G3/S3	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Balsamorhiza sericea silky balsamroot	PDAST110C0	None	None	G4Q/S3	1B.3	BLM:S	No	Yes
Balsamorhiza serrata serrated balsamroot	PDAST110A0	None	None	G5/S2	2B.3		No	Yes
Benitoa occidentalis western lessingia	PDAST15010	None	None	G3G4/S3S4	4.3		No	No
Bensoniella oregona bensoniella	PDSAX02010	None	Rare	G3/S2	1B.1	USFS:S	No	Yes
Berberis fremontii Fremont barberry	PDBER06060	None	None	G5/S3	2B.3		Yes	Yes
Berberis harrisoniana Kofa Mountain barberry	PDBER02030	None	None	G2/S1	1B.2	BLM:S	Yes	Yes
Berberis higginsiae Higgin's barberry	PDBER06080	None	None	G3Q/S1	3.2		No	Yes
Berberis nevinii Nevin's barberry	PDBER060A0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Berberis pinnata ssp. insularis island barberry	PDBER060B2	Endangered	Endangered	G5T1/S1	1B.2		No	Yes
Bergerocactus emoryi golden-spined cereus	PDCAC11010	None	None	G2G3/S2	2B.2		Yes	Yes
Betula glandulosa dwarf resin birch	PDBET02030	None	None	G5/S2	2B.2		No	Yes
Blennosperma bakeri Sonoma sunshine	PDAST1A010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Blennosperma nanum var. robustum Point Reyes blennosperma	PDAST1A022	None	Rare	G4T2/S2	1B.2		No	Yes
Blepharidachne kingii King's eyelash grass	PMPOA0X020	None	None	G4/S2	2B.3		No	Yes
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G1G2/S1S2	1B.1		Yes	Yes
Bloomeria clevelandii San Diego goldenstar	PMLIL1H010	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Bloomeria humilis dwarf goldenstar	PMLIL0B020	None	Rare	G1/S1	1B.2	USFS:S	Yes	Yes
Boechera bodiensis Bodie Hills rockcress	PDBRA06240	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Boechera cobrensis Masonic rockcress	PDBRA06080	None	None	G5/S3	2B.3		No	Yes
Boechera constancei Constance's rockcress	PDBRA06090	None	None	G2/S2	1B.1	USFS:S	No	Yes
Boechera dispar pinyon rockcress	PDBRA060F0	None	None	G3/S3	2B.3		Yes	Yes
Boechera evadens hidden rockcress	PDBRA40030	None	None	G1/S1	1B.3	USFS:S	No	Yes
Boechera hirshbergiae Hirshberg's rockcress	PDBRA064D0	None	None	G1Q/S1	1B.2		No	Yes
Boechera hoffmannii Hoffmann's rockcress	PDBRA060V0	Endangered	None	G1G2/S1S2	1B.1		Yes	Yes
Boechera johnstonii Johnston's rockcress	PDBRA060Y0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Boechera koehleri Koehler's stipitate rockcress	PDBRA060Z0	None	None	G3/S2S3	1B.3	USFS:S	No	Yes
Boechera lincolnensis Lincoln rockcress	PDBRA061M3	None	None	G4G5/S3	2B.3	BLM:S	No	Yes
Boechera microphylla small-leaved rockcress	PDBRA06162	None	None	G4Q/S3	3		No	No
Boechera parishii Parish's rockcress	PDBRA061C0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Boechera peirsonii San Bernardino rockcress	PDBRA06053	None	None	G1/S1	1B.2	USFS:S	No	Yes
Boechera pendulina rabbit-ear rockcress	PDBRA061E0	None	None	G5/S2	2B.1		No	Yes
Boechera pinzliae Pinzl's rockcress	PDBRA06270	None	None	G2/S1	1B.3	USFS:S	No	Yes
Boechera pygmaea Tulare County rockcress	PDBRA061N0	None	None	G3/S3	4.3		No	No
Boechera rollei Rolle's rockcress	PDBRA064H0	None	None	G1/S1	1B.1		No	Yes
Boechera rubicundula Mt. Day rockcress	PDBRA40100	None	None	G1/S1	1B.1		No	Yes
Boechera serpenticola serpentine rockcress	PDBRA40110	None	None	G1/S1	1B.2	BLM:S	No	Yes
Boechera shevockii Shevock's rockcress	PDBRA40120	None	None	G1/S1	1B.1	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Boechera shockleyi Shockley's rockcress	PDBRA061V0	None	None	G3/S2	2B.2	USFS:S	Yes	Yes
Boechera tiehmii Tiehm's rockcress	PDBRA06280	None	None	G3/S3	1B.3	USFS:S	No	Yes
Boechera tularensis Tulare rockcress	PDBRA40130	None	None	G3/S3	1B.3	USFS:S	No	Yes
Boechera ultraalsa Snow Mountain rockcress	PDBRA40140	None	None	G1/S1	1B.1		No	Yes
Boechera yorkii Last Chance rockcress	PDBRA40010	None	None	G1/S1	1B.3		No	Yes
Bolandra californica Sierra bolandra	PDSAX03010	None	None	G4/S4	4.3		No	No
Botrychium ascendens upswept moonwort	PPOPH010S0	None	None	G3G4/S2	2B.3	USFS:S	No	Yes
Botrychium crenulatum scalloped moonwort	PPOPH010L0	None	None	G4/S3	2B.2	USFS:S	No	Yes
Botrychium lineare slender moonwort	PPOPH01120	None	None	G3/S1	1B.1	USFS:S	No	Yes
Botrychium lunaria common moonwort	PPOPH01080	None	None	G5/S2	2B.3	USFS:S	No	Yes
Botrychium minganense Mingan moonwort	PPOPH010R0	None	None	G4G5/S3	2B.2	USFS:S	No	Yes
Botrychium montanum western goblin	PPOPH010K0	None	None	G3/S2	2B.1	USFS:S	No	Yes
Botrychium paradoxum paradox moonwort	PPOPH010J0	None	None	G3G4/S1	2B.1	USFS:S	No	Yes
Botrychium pedunculosum stalked moonwort	PPOPH010T0	None	None	G3/S1	2B.1	USFS:S	No	Yes
Botrychium pinnatum northwestern moonwort	PPOPH010V0	None	None	G4?/S2	2B.3	USFS:S	No	Yes
Botrychium pumicola pumice moonwort	PPOPH010D0	None	None	G3/S1	2B.2	USFS:S	No	Yes
Botrychium tunux moosewort	PPOPH01240	None	None	G3/S1	2B.1	USFS:S	No	Yes
Botrychium yaaxudakeit giant moonwort	PPOPH01180	None	None	G3G4/S1	2B.1	USFS:S	No	Yes
Botrypus virginianus rattlesnake fern	PPOPH010H0	None	None	G5/S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Bouteloua eriopoda black grama	PMPOA10080	None	None	G5/S4	4.2		No	No
Bouteloua trifida three-awned grama	PMPOA100L0	None	None	G4G5/S3	2B.3		No	Yes
Brasenia schreberi watershield	PDCAB01010	None	None	G5/S3	2B.3		No	Yes
Brodiaea filifolia thread-leaved brodiaea	PMLIL0C050	Threatened	Endangered	G2/S2	1B.1		Yes	Yes
Brodiaea insignis Kaweah brodiaea	PMLIL0C060	None	Endangered	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Brodiaea kinkiensis San Clemente Island brodiaea	PMLIL0C080	None	None	G2/S2	1B.2		Yes	Yes
Brodiaea leptandra narrow-anthered brodiaea	PMLIL0C022	None	None	G3?/S3?	1B.2		No	Yes
Brodiaea matsonii Sulphur Creek brodiaea	PMLIL0C0H0	None	None	G1/S1	1B.1		No	Yes
Brodiaea orcuttii Orcutt's brodiaea	PMLIL0C0B0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Brodiaea pallida Chinese Camp brodiaea	PMLIL0C0C0	Threatened	Endangered	G1/S1	1B.1		No	Yes
Brodiaea rosea Indian Valley brodiaea	PMLIL0C032	None	Endangered	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Brodiaea santarosae Santa Rosa Basalt brodiaea	PMLIL0C0G0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Brodiaea sierrae Sierra foothills brodiaea	PMLIL0C0J0	None	None	G3/S3	4.3		No	No
Bulbostylis capillaris thread-leaved beakseed	PMCYP02020	None	None	G5/S3	4.2		No	No
Bursera microphylla little-leaf elephant tree	PDBUR01020	None	None	G4/S2	2B.3		No	Yes
Calamagrostis bolanderi Bolander's reed grass	PMPOA17010	None	None	G4/S4	4.2		No	No
Calamagrostis crassiglumis Thurber's reed grass	PMPOA17070	None	None	G3Q/S2	2B.1		No	Yes
Calamagrostis foliosa leafy reed grass	PMPOA170C0	None	Rare	G3/S3	4.2	BLM:S	No	Yes
Calamagrostis ophitidis serpentine reed grass	PMPOA170V0	None	None	G3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Calandrinia breweri Brewer's calandrinia	PDPOR01020	None	None	G4/S4	4.2		No	No
Calliandra eriophylla pink fairy-duster	PDFAB0N040	None	None	G5/S3	2B.3		Yes	Yes
Callitropsis nootkatensis Alaska cedar	PGCUP03020	None	None	G4G5/S3	4.3		No	No
Calochortus catalinae Catalina mariposa-lily	PMLIL0D080	None	None	G3G4/S3S4	4.2		Yes	No
Calochortus clavatus var. avius Pleasant Valley mariposa-lily	PMLIL0D095	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Calochortus clavatus var. clavatus club-haired mariposa-lily	PMLIL0D091	None	None	G4T3/S3	4.3	USFS:S	Yes	No
Calochortus clavatus var. gracilis slender mariposa-lily	PMLIL0D096	None	None	G4T2T3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus clavatus var. recurvifolius Arroyo de la Cruz mariposa-lily	PMLIL0D098	None	None	G4T1/S1	1B.2		No	Yes
Calochortus dunnii Dunn's mariposa-lily	PMLIL0D0C0	None	Rare	G2G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus excavatus Inyo County star-tulip	PMLIL0D0F0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Calochortus fimbriatus late-flowered mariposa-lily	PMLIL0D1J2	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Calochortus greenei Greene's mariposa-lily	PMLIL0D0H0	None	None	G3/S2S3	1B.2	BLM:S USFS:S	No	Yes
Calochortus longebarbatus var. longebarbatus long-haired star-tulip	PMLIL0D0R1	None	None	G4T3/S3	1B.2	BLM:S USFS:S	No	Yes
Calochortus monanthus single-flowered mariposa-lily	PMLIL0D0W0	None	None	GH/SH	1A	BLM:S	No	Yes
Calochortus obispoensis San Luis mariposa-lily	PMLIL0D110	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus palmeri var. munzii San Jacinto mariposa-lily	PMLIL0D121	None	None	G3T3/S3	1B.2	USFS:S	Yes	Yes
Calochortus palmeri var. palmeri Palmer's mariposa-lily	PMLIL0D122	None	None	G3T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus panamintensis Panamint mariposa-lily	PMLIL0D130	None	None	G3/S3	4.2		No	No
Calochortus persistens Siskiyou mariposa-lily	PMLIL0D140	None	Rare	G1/S1	1B.2	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Calochortus plummerae Plummer's mariposa-lily	PMLIL0D150	None	None	G4/S4	4.2		Yes	Yes
Calochortus pulchellus Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2/S2	1B.2		No	Yes
Calochortus raichei The Cedars fairy-lantern	PMLIL0D1L0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Calochortus simulans La Panza mariposa-lily	PMLIL0D170	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Calochortus striatus alkali mariposa-lily	PMLIL0D190	None	None	G3?/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus syntrophus Callahan's mariposa-lily	PMLIL0D1S0	None	None	G1/S1	1B.1		No	Yes
Calochortus tiburonensis Tiburon mariposa-lily	PMLIL0D1C0	Threatened	Threatened	G1/S1	1B.1		No	Yes
Calochortus umbellatus Oakland star-tulip	PMLIL0D1E0	None	None	G3?/S3?	4.2		Yes	No
Calochortus uniflorus pink star-tulip	PMLIL0D1F0	None	None	G4/S4	4.2		No	No
Calochortus weedii var. intermedius intermediate mariposa-lily	PMLIL0D1J1	None	None	G3G4T2/S2	1B.2	USFS:S	Yes	Yes
Calochortus westonii Shirley Meadows star-tulip	PMLIL0D1M0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Calycadenia hooveri Hoover's calycadenia	PDAST1P040	None	None	G2/S2	1B.3	BLM:S	No	Yes
Calycadenia micrantha small-flowered calycadenia	PDAST1P0C0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Calycadenia oppositifolia Butte County calycadenia	PDAST1P070	None	None	G3/S3	4.2	USFS:S	No	No
Calycadenia villosa dwarf calycadenia	PDAST1P0B0	None	None	G3/S3	1B.1	BLM:S USFS:S	Yes	Yes
Calyptridium arizonicum Arizona pussypaws	PDPOR09051	None	None	G3?/S1	2B.1		No	Yes
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2/S2	1B.1	BLM:S	No	Yes
Calyptridium pulchellum Mariposa pussypaws	PDPOR09060	Threatened	None	G1/S1	1B.1		No	Yes
Calyptridium pygmaeum pygmy pussypaws	PDPOR09070	None	None	G1G2/S1S2	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Calyptridium quadripetalum four-petaled pussypaws	PDPOR09080	None	None	G4/S4	4.3		No	No
Calystegia atriplicifolia ssp. buttensis Butte County morning-glory	PDCON04012	None	None	G5T3/S3	4.2		No	Yes
Calystegia collina ssp. oxyphylla Mt. Saint Helena morning-glory	PDCON04032	None	None	G4T3/S3	4.2		No	Yes
Calystegia collina ssp. tridactylosa three-fingered morning-glory	PDCON04036	None	None	G4T1/S1	1B.2	BLM:S	No	Yes
Calystegia collina ssp. venusta South Coast Range morning-glory	PDCON04034	None	None	G4T4/S4	4.3		No	No
Calystegia felix lucky morning-glory	PDCON040P0	None	None	G1Q/S1	1B.1		No	Yes
Calystegia macrostegia ssp. amplissima island morning-glory	PDCON04081	None	None	G4G5T4/S4	4.3		Yes	No
Calystegia malacophylla var. berryi Berry's morning-glory	PDCON040K2	None	None	G4G5T2T3Q/S2S3	3.3		No	Yes
Calystegia peirsonii Peirson's morning-glory	PDCON040A0	None	None	G4/S4	4.2		No	Yes
Calystegia purpurata ssp. saxicola coastal bluff morning-glory	PDCON040D2	None	None	G4T2T3/S2S3	1B.2		No	Yes
Calystegia sepium ssp. binghamiae Santa Barbara morning-glory	PDCON040E6	None	None	G5TXQ/SX	1A		No	Yes
Calystegia stebbinsii Stebbins' morning-glory	PDCON040H0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Calystegia subacaulis ssp. episcopalis Cambria morning-glory	PDCON040J1	None	None	G3T2/S2	4.2		No	Yes
Calystegia vanzuukiae Van Zuuk's morning-glory	PDCON040Q0	None	None	G2Q/S2	1B.3		No	Yes
Camissonia benitensis San Benito evening-primrose	PDONA03030	Threatened	None	G2/S2	1B.1		Yes	Yes
Camissonia integrifolia Kern River evening-primrose	PDONA030T0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Camissonia kernensis ssp. kernensis Kern County evening-primrose	PDONA030V2	None	None	G4T3/S3	4.3		No	No
Camissonia sierrae ssp. alticola Mono Hot Springs evening-primrose	PDONA031H1	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Camissonia sierrae ssp. sierrae Yosemite evening-primrose	PDONA031H2	None	None	G3T3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Camissoniopsis guadalupensis ssp. clementina San Clemente Island evening-primrose	PDONA030M1	None	None	G3T2/S2	1B.2		Yes	Yes
Camissoniopsis hardhamiae Hardham's evening-primrose	PDONA030N0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Camissoniopsis lewisii Lewis' evening-primrose	PDONA030X0	None	None	G4/S4	3		No	No
Campanula californica swamp harebell	PDCAM02060	None	None	G3/S3	1B.2	BLM:S	No	Yes
Campanula exigua chaparral harebell	PDCAM020A0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Campanula scabrella rough harebell	PDCAM020U0	None	None	G4/S4	4.3		Yes	No
Campanula sharsmithiae Sharsmith's harebell	PDCAM02100	None	None	G1G2/S1S2	1B.2	BLM:S	No	Yes
Campanula shetleri Castle Crags harebell	PDCAM020W0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Campanula wilkinsiana Wilkin's harebell	PDCAM020Z0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Canbya candida white pygmy-poppy	PDPAP05020	None	None	G3G4/S3S4	4.2	USFS:S	Yes	Yes
Cardamine angulata seaside bittercress	PDBRA0K010	None	None	G4G5/S3	2B.1		No	Yes
Cardamine bellidifolia var. pachyphylla fleshy toothwort	PDBRA0K022	None	None	G5T4/S3	4.3		No	No
Cardamine nuttallii var. gemmata yellow-tubered toothwort	PDBRA0K0R3	None	None	G5T3Q/S2	3.3		No	Yes
Cardamine pachystigma var. dissectifolia dissected-leaved toothwort	PDBRA0K1B1	None	None	G3G5T2Q/S2	1B.2		No	Yes
Carex arcta northern clustered sedge	PMCYP030X0	None	None	G5/S1	2B.2		No	Yes
Carex atherodes wheat sedge	PMCYP03160	None	None	G5/S1	2B.2		No	Yes
Carex buxbaumii Buxbaum's sedge	PMCYP032B0	None	None	G5/S3	4.2		No	No
Carex californica California sedge	PMCYP032D0	None	None	G5/S2	2B.3		No	Yes
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5/S2	2B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Carex congdonii Congdon's sedge	PMCYP03320	None	None	G4/S4	4.3		No	No
Carex cyrtostachya Sierra arching sedge	PMCYP03M00	None	None	G2/S2	1B.2		No	Yes
Carex davyi Davy's sedge	PMCYP033H0	None	None	G3/S3	1B.3		No	Yes
Carex duriuscula spikerush sedge	PMCYP03GJ0	None	None	G5/S2	2B.3		No	Yes
Carex geyeri Geyer's sedge	PMCYP03540	None	None	G5/S4	4.2		No	No
Carex halliana Oregon sedge	PMCYP035M0	None	None	G4/S2	2B.3		No	Yes
Carex hystericina porcupine sedge	PMCYP036D0	None	None	G5/S2	2B.1		No	Yes
Carex idahoa Idaho sedge	PMCYP036E0	None	None	G3/S1	2B.3		No	Yes
Carex incurviformis Mt. Dana sedge	PMCYP036G0	None	None	G5/S4	4.3		No	No
Carex klamathensis Klamath sedge	PMCYP03L70	None	None	G2/S2	1B.2	BLM:S	No	Yes
Carex lasiocarpa woolly-fruited sedge	PMCYP03720	None	None	G5/S2	2B.3		No	Yes
Carex lenticularis var. limnophila lagoon sedge	PMCYP037A7	None	None	G5T5/S1	2B.2		No	Yes
Carex leptalea bristle-stalked sedge	PMCYP037E0	None	None	G5/S1	2B.2		No	Yes
Carex limosa mud sedge	PMCYP037K0	None	None	G5/S3	2B.2		No	Yes
Carex livida livid sedge	PMCYP037L0	None	None	G5/SH	2A		No	Yes
Carex lyngbyei Lyngbye's sedge	PMCYP037Y0	None	None	G5/S3	2B.2		No	Yes
Carex nardina nard sedge	PMCYP03920	None	None	G4G5/S1	2B.2		No	Yes
Carex obispoensis San Luis Obispo sedge	PMCYP039J0	None	None	G3?/S3?	1B.2	BLM:S USFS:S	Yes	Yes
Carex occidentalis western sedge	PMCYP039M0	None	None	G4/S3	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Carex petasata Liddon's sedge	PMCYP03AE0	None	None	G5/S3	2B.3		No	Yes
Carex praticola northern meadow sedge	PMCYP03B20	None	None	G5/S2	2B.2		No	Yes
Carex saliniformis deceiving sedge	PMCYP03BY0	None	None	G2/S2	1B.2		No	Yes
Carex scabriuscula Siskiyou sedge	PMCYP03C40	None	None	G4G5/S4	4.3		Yes	No
Carex scirpoidea ssp. pseudoscirpoidea western single-spiked sedge	PMCYP03C85	None	None	G5T4/S2	2B.2		No	Yes
Carex scoparia var. scoparia pointed broom sedge	PMCYP03C91	None	None	G5T5/SX	2A		No	Yes
Carex serpenticola serpentine sedge	PMCYP03KM0	None	None	G4/S3	2B.3		No	Yes
Carex sheldonii Sheldon's sedge	PMCYP03CE0	None	None	G4/S2	2B.2		No	Yes
Carex stevenii Steven's sedge	PMCYP039D4	None	None	G4?/S1	2B.2		No	Yes
Carex tahoensis Tahoe sedge	PMCYP03DG0	None	None	G5/S4	4.3		No	No
Carex tiogana Tioga Pass sedge	PMCYP03GP0	None	None	G2Q/S1	1B.3	USFS:S	No	Yes
Carex tompkinsii Tompkins' sedge	PMCYP03DR0	None	Rare	G3G4/S3S4	4.3		No	Yes
Carex vallicola western valley sedge	PMCYP03EA0	None	None	G5/S2	2B.3		No	Yes
Carex viridula ssp. viridula green yellow sedge	PMCYP03EM5	None	None	G5T5/S2	2B.3		No	Yes
Carex xerophila chaparral sedge	PMCYP03M60	None	None	G2/S2	1B.2		No	Yes
Carlowrightia arizonica Arizona carlowrightia	PDACA07010	None	None	G4G5/S2	2B.2		No	Yes
Carlquistia muirii Muir's tarplant	PDASTDU010	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Carnegiea gigantea saguaro	PDCAC12010	None	None	G5/S1	2B.2		Yes	Yes
Carpenteria californica tree-anemone	PDHDR04010	None	Threatened	G1?/S1?	1B.2	BLM:S USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Cascadia nuttallii Nuttall's saxifrage	PDSAX0U160	None	None	G4?/S1	2B.1		No	Yes
Castela emoryi Emory's crucifixion-thorn	PDSIM03030	None	None	G3G4/S2S3	2B.2		Yes	Yes
Castilleja affinis var. neglecta Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1T2/S1S2	1B.2		Yes	Yes
Castilleja ambigua var. ambigua johnny-nip	PDSCR0D401	None	None	G4T5/S4	4.2		No	No
Castilleja ambigua var. humboldtiensis Humboldt Bay owl's-clover	PDSCR0D402	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Castilleja ambigua var. insalutata pink Johnny-nip	PDSCR0D403	None	None	G4T2/S2	1B.1		No	Yes
Castilleja ambigua var. meadii Mead's owls-clover	PDSCR0D404	None	None	G4T1/S1	1B.1		No	Yes
Castilleja brevilobata short-lobed paintbrush	PDSCR0D181	None	None	G4/S3	4.2		No	No
Castilleja campestris var. succulenta succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	G4?T2T3/S2S3	1B.2		No	Yes
Castilleja cinerea ash-gray paintbrush	PDSCR0D0H0	Threatened	None	G1G2/S1S2	1B.2		Yes	Yes
Castilleja densiflora var. obispoensis San Luis Obispo owl's-clover	PDSCR0D453	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Castilleja elata Siskiyou paintbrush	PDSCR0D213	None	None	G3/S2S3	2B.2		No	Yes
Castilleja gleasoni Mt. Gleason paintbrush	PDSCR0D140	None	Rare	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Castilleja grisea San Clemente Island paintbrush	PDSCR0D160	Threatened	Endangered	G3/S3	1B.3		Yes	Yes
Castilleja hololeuca island white-felted paintbrush	PDSCR0D1L1	None	None	G3/S3	1B.2		No	Yes
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	PDSCR0D410	None	None	G2?/S2?	1B.2	USFS:S	Yes	Yes
Castilleja lassenensis Lassen paintbrush	PDSCR0D4L0	None	None	G3/S3	1B.3		No	Yes
Castilleja latifolia Monterey Coast paintbrush	PDSCR0D1P0	None	None	G4/S4	4.3		No	No
Castilleja leschkeana Point Reyes paintbrush	PDSCR0D1R0	None	None	GHQ/SH	1A		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Castilleja litoralis Oregon coast paintbrush	PDSCR0D012	None	None	G3/S3	2B.2		No	Yes
Castilleja mendocinensis Mendocino Coast paintbrush	PDSCR0D3N0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Castilleja mollis soft-leaved paintbrush	PDSCR0D230	Endangered	None	G2/S2	1B.1		Yes	Yes
Castilleja montigena Heckard's paintbrush	PDSCR0D3G0	None	None	G3/S3	4.3		No	No
Castilleja plagiotoma Mojave paintbrush	PDSCR0D2J0	None	None	G4/S4	4.3	USFS:S	Yes	No
Castilleja rubicundula var. rubicundula pink creamsacs	PDSCR0D482	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Castilleja schizotricha split-hair paintbrush	PDSCR0D2Y0	None	None	G3/S3	4.3		No	No
Castilleja uliginosa Pitkin Marsh paintbrush	PDSCR0D380	None	Endangered	GXQ/SX	1A		No	Yes
Caulanthus amplexicaulis var. barbarae Santa Barbara jewelflower	PDBRA0M012	None	None	G4T2/S2	1B.1	USFS:S	No	Yes
Caulanthus californicus California jewelflower	PDBRA31010	Endangered	Endangered	G1/S1	1B.1		No	Yes
Caulanthus lemmonii Lemmon's jewelflower	PDBRA0M0E0	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Caulanthus major var. nevadensis slender jewelflower	PDBRA0M0F1	None	None	G4T3?/S3?	4.3		No	No
Caulanthus simulans Payson's jewelflower	PDBRA0M0H0	None	None	G4/S4	4.2	USFS:S	No	Yes
Ceanothus confusus Rincon Ridge ceanothus	PDRHA04220	None	None	G1/S1	1B.1	BLM:S	No	Yes
Ceanothus cuneatus var. fascicularis Lompoc ceanothus	PDRHA04066	None	None	G5T4/S4	4.2		Yes	No
Ceanothus cyaneus Lakeside ceanothus	PDRHA04070	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Ceanothus decornutus Nicasio ceanothus	PDRHA04440	None	None	G1/S1	1B.2		No	Yes
Ceanothus divergens Calistoga ceanothus	PDRHA04240	None	None	G2/S2	1B.2	BLM:S	No	Yes
Ceanothus ferrisiae Coyote ceanothus	PDRHA041N0	Endangered	None	G1/S1	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ceanothus foliosus var. vineatus Vine Hill ceanothus	PDRHA040D6	None	None	G3T1/S1	1B.1		No	Yes
Ceanothus fresnensis Fresno ceanothus	PDRHA040E0	None	None	G4/S4	4.3		No	No
Ceanothus gloriosus var. exaltatus glory brush	PDRHA040F4	None	None	G4T4/S4	4.3		No	No
Ceanothus gloriosus var. gloriosus Point Reyes ceanothus	PDRHA040F5	None	None	G4T4/S4	4.3		Yes	No
Ceanothus gloriosus var. porrectus Mt. Vision ceanothus	PDRHA040F7	None	None	G4T2/S2	1B.3		No	Yes
Ceanothus hearstiorum Hearsts' ceanothus	PDRHA040J0	None	Rare	G2?/S2?	1B.2	BLM:S	No	Yes
Ceanothus maritimus maritime ceanothus	PDRHA040T0	None	Rare	G2/S2	1B.2		No	Yes
Ceanothus masonii Mason's ceanothus	PDRHA04200	None	Rare	G1/S1	1B.2		Yes	Yes
Ceanothus megacarpus var. insularis island ceanothus	PDRHA040W1	None	None	G5T4/S4	4.3		Yes	No
Ceanothus ophiochilus Vail Lake ceanothus	PDRHA041M0	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Ceanothus otayensis Otay Mountain ceanothus	PDRHA04430	None	None	G1G2/S1	1B.2	BLM:S	Yes	Yes
Ceanothus pinetorum Kern ceanothus	PDRHA04130	None	None	G3/S3	4.3		No	No
Ceanothus purpureus holly-leaved ceanothus	PDRHA04160	None	None	G2/S2	1B.2		No	Yes
Ceanothus rigidus Monterey ceanothus	PDRHA04067	None	None	G4/S4	4.2		No	No
Ceanothus roderickii Pine Hill ceanothus	PDRHA04190	Endangered	Rare	G1/S1	1B.1		Yes	Yes
Ceanothus sonomensis Sonoma ceanothus	PDRHA04420	None	None	G2/S2	1B.2		No	Yes
Ceanothus verrucosus wart-stemmed ceanothus	PDRHA041J0	None	None	G2/S2?	2B.2		Yes	Yes
Centromadia parryi ssp. australis southern tarplant	PDAST4R0P4	None	None	G3T2/S2	1B.1		Yes	Yes
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2/S2	1B.1	BLM:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Centromadia parryi ssp. rudis Parry's rough tarplant	PDAST4R0P3	None	None	G3T3/S3	4.2		No	No
Centromadia pungens ssp. laevis smooth tarplant	PDAST4R0R4	None	None	G3G4T2/S2	1B.1		Yes	Yes
Cercocarpus betuloides var. blancheae island mountain-mahogany	PDROS08022	None	None	G5T4/S4	4.3		Yes	No
Cercocarpus traskiae Catalina Island mountain-mahogany	PDROS08030	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chaenactis carphoclinia var. peirsonii Peirson's pincushion	PDAST20042	None	None	G5T2/S2	1B.3		No	Yes
Chaenactis douglasii var. alpina alpine dusty maidens	PDAST20065	None	None	G5T5/S2	2B.3		No	Yes
Chaenactis glabriuscula var. orcuttiana Orcutt's pincushion	PDAST20095	None	None	G5T1T2/S1	1B.1	BLM:S	Yes	Yes
Chaenactis parishii Parish's chaenactis	PDAST200D0	None	None	G3G4/S3	1B.3		No	Yes
Chaenactis suffrutescens Shasta chaenactis	PDAST200H0	None	None	G3/S3	1B.3	BLM:S USFS:S	Yes	Yes
Chaetadelpha wheeleri Wheeler's dune-broom	PDAST21010	None	None	G4/S2	2B.2		No	Yes
Chamaebatia australis southern mountain misery	PDROS0A010	None	None	G4/S4	4.2		No	No
Chenopodium littoreum coastal goosefoot	PDCHE091Z0	None	None	G2/S2	1B.2		No	Yes
Chenopodium simplex large-seeded goosefoot	PDCHE091P0	None	None	G5/S4	4.3		No	No
Chlorogalum grandiflorum Red Hills soaproot	PMLIL0G020	None	None	G3/S3	1B.2	BLM:S	No	Yes
Chlorogalum pomeridianum var. minus dwarf soaproot	PMLIL0G042	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Chlorogalum purpureum var. purpureum Santa Lucia purple amole	PMLIL0G051	Threatened	None	G2T2/S2	1B.1		Yes	Yes
Chlorogalum purpureum var. reductum Camatta Canyon amole	PMLIL0G052	Threatened	Rare	G2T1/S1	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Chloropyron maritimum ssp. maritimum salt marsh bird's-beak	PDSCR0J0C2	Endangered	Endangered	G4?T1/S1	1B.2		Yes	Yes
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2/S2	1B.2	BLM:S	No	Yes
Chloropyron molle ssp. hispidum hispid salty bird's-beak	PDSCR0J0D1	None	None	G2T1/S1	1B.1	BLM:S	No	Yes
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1/S1	1B.2		No	Yes
Chloropyron palmatum palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chloropyron tecopense Tecopa bird's-beak	PDSCR0J0Q0	None	None	G2/S1	1B.2	BLM:S	Yes	Yes
Chorizanthe biloba var. immemora Hernandez spineflower	PDPGN04025	None	None	G3T1T2/S1S2	1B.2	BLM:S	No	Yes
Chorizanthe blakleyi Blakley's spineflower	PDPGN04030	None	None	G2/S2	1B.3	USFS:S	No	Yes
Chorizanthe breweri Brewer's spineflower	PDPGN04050	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Chorizanthe cuspidata var. cuspidata San Francisco Bay spineflower	PDPGN04081	None	None	G2T1/S1	1B.2		No	Yes
Chorizanthe cuspidata var. villosa woolly-headed spineflower	PDPGN04082	None	None	G2T2/S2	1B.2		No	Yes
Chorizanthe douglasii Douglas' spineflower	PDPGN040A0	None	None	G4/S4	4.3		No	No
Chorizanthe howellii Howell's spineflower	PDPGN040C0	Endangered	Threatened	G1/S1	1B.2		No	Yes
Chorizanthe leptotheca Peninsular spineflower	PDPGN040D0	None	None	G3/S3	4.2		No	No
Chorizanthe minutiflora Fort Ord spineflower	PDPGN04100	None	None	G1/S1	1B.2		No	Yes
Chorizanthe orcuttiana Orcutt's spineflower	PDPGN040G0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chorizanthe palmeri Palmer's spineflower	PDPGN040H0	None	None	G4/S4	4.2		No	No
Chorizanthe parryi var. fernandina San Fernando Valley spineflower	PDPGN040J1	Proposed Threatened	Endangered	G2T1/S1	1B.1	USFS:S	Yes	Yes
Chorizanthe parryi var. parryi Parry's spineflower	PDPGN040J2	None	None	G3T2/S2	1B.1	BLM:S USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Chorizanthe polygonoides var. longispina long-spined spineflower	PDPGN040K1	None	None	G5T3/S3	1B.2	BLM:S	Yes	Yes
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	PDPGN040M1	Endangered	None	G2T1/S1	1B.1		No	Yes
Chorizanthe pungens var. pungens Monterey spineflower	PDPGN040M2	Threatened	None	G2T2/S2	1B.2		Yes	Yes
Chorizanthe rectispina straight-awned spineflower	PDPGN040N0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Chorizanthe robusta var. hartwegii Scotts Valley spineflower	PDPGN040Q1	Endangered	None	G2T1/S1	1B.1		No	Yes
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1/S1	1B.1	BLM:S	No	Yes
Chorizanthe spinosa Mojave spineflower	PDPGN040R0	None	None	G4/S4	4.2		No	No
Chorizanthe valida Sonoma spineflower	PDPGN040V0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chorizanthe ventricosa potbellied spineflower	PDPGN040W0	None	None	G3/S3	4.3		No	No
Chorizanthe wheeleri Wheeler's spineflower	PDPGN040Y0	None	None	G3G4/S3S4	4.3		No	No
Chorizanthe xanti var. leucotheca white-bracted spineflower	PDPGN040Z1	None	None	G4T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Chrysosplenium glechomifolium Pacific golden saxifrage	PDSAX07020	None	None	G5/S3	4.3		No	No
Chrysothamnus greenei Greene's rabbitbrush	PDAST2C030	None	None	G5/S3	2B.3		No	Yes
Chylismia arenaria sand evening-primrose	PDONA03020	None	None	G4?/S2S3	2B.2		No	Yes
Chylismia claviformis ssp. cruciformis cruciform evening-primrose	PDONA030D4	None	None	G5T4/S2	2B.3		No	Yes
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4/S2	2B.1		No	Yes
Cinna bolanderi Bolander's woodreed	PMPOA1H040	None	None	G2G3/S2S3	1B.2	USFS:S	No	Yes
Cirsium andrewsii Franciscan thistle	PDAST2E050	None	None	G3/S3	1B.2		No	Yes
Cirsium arizonicum var. tenuisectum desert mountain thistle	PDAST2E083	None	None	G5T2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Cirsium ciliolatum Ashland thistle	PDAST2E0P0	None	Endangered	G3/S1	2B.1	BLM:S	No	Yes
Cirsium crassicaule slough thistle	PDAST2E0U0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	PDAST2E163	None	None	G2T2/S2	1B.2	BLM:S	No	Yes
Cirsium fontinale var. fontinale Crystal Springs fountain thistle	PDAST2E161	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Cirsium fontinale var. obispoense San Luis Obispo fountain thistle	PDAST2E162	Endangered	Endangered	G2T2/S2	1B.2		Yes	Yes
Cirsium hydrophilum var. hydrophilum Suisun thistle	PDAST2E1G1	Endangered	None	G2T1/S1	1B.1		Yes	Yes
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	PDAST2E1G2	None	None	G2T1/S1	1B.2		No	Yes
Cirsium occidentale var. compactum compact cobwebby thistle	PDAST2E1Z1	None	None	G3G4T2/S2	1B.2		No	Yes
Cirsium occidentale var. lucianum Cuesta Ridge thistle	PDAST2E1Z6	None	None	G3G4T2/S2	1B.2	BLM:S	No	Yes
Cirsium praeteriens lost thistle	PDAST2E2B0	None	None	GX/SX	1A		No	Yes
Cirsium rhothophilum surf thistle	PDAST2E2J0	None	Threatened	G1/S1	1B.2	BLM:S	Yes	Yes
Cirsium scariosum var. loncholepis La Graciosa thistle	PDAST2E1N0	Endangered	Threatened	G5T1/S1	1B.1		No	Yes
Cistanthe maritima seaside cistanthe	PDPOR09020	None	None	G3G4/S3	4.2		Yes	No
Cladium californicum California saw-grass	PMCYP04010	None	None	G4/S2	2B.2	USFS:S	No	Yes
Clarkia amoena ssp. whitneyi Whitney's farewell-to-spring	PDONA05025	None	None	G5T1/S1	1B.1		No	Yes
Clarkia australis Small's southern clarkia	PDONA05040	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Clarkia biloba ssp. australis Mariposa clarkia	PDONA05051	None	None	G4G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Clarkia biloba ssp. brandegeeae Brandegee's clarkia	PDONA05053	None	None	G4G5T4/S4	4.2	BLM:S	No	Yes
Clarkia borealis ssp. arida Shasta clarkia	PDONA05061	None	None	G3T2/S2	1B.1	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Clarkia borealis ssp. borealis northern clarkia	PDONA05062	None	None	G3T3/S3	1B.3	BLM:S USFS:S	No	Yes
Clarkia breweri Brewer's clarkia	PDONA05080	None	None	G4/S4	4.2		Yes	No
Clarkia concinna ssp. automixa Santa Clara red ribbons	PDONA050A1	None	None	G5?T3/S3	4.3		No	Yes
Clarkia concinna ssp. raichei Raiche's red ribbons	PDONA050A2	None	None	G5?T1/S1	1B.1		No	Yes
Clarkia delicata delicate clarkia	PDONA050D0	None	None	G3/S3	1B.2	BLM:S	No	Yes
Clarkia exilis slender clarkia	PDONA050G0	None	None	G3/S3	4.3		No	No
Clarkia franciscana Presidio clarkia	PDONA050H0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Clarkia gracilis ssp. albicaulis white-stemmed clarkia	PDONA050J1	None	None	G5T3/S3	1B.2	BLM:S USFS:S	No	Yes
Clarkia gracilis ssp. tracyi Tracy's clarkia	PDONA050J4	None	None	G5T3/S3	4.2		Yes	No
Clarkia imbricata Vine Hill clarkia	PDONA050K0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Clarkia jolonensis Jolon clarkia	PDONA050L0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Clarkia lewisii Lewis' clarkia	PDONA050N0	None	None	G4/S4	4.3		Yes	No
Clarkia lingulata Merced clarkia	PDONA050P0	None	Endangered	G1/S1	1B.1	USFS:S	No	Yes
Clarkia mildrediae ssp. lutescens golden-anthered clarkia	PDONA050Q1	None	None	G3T3/S3	4.2		No	No
Clarkia mildrediae ssp. mildrediae Mildred's clarkia	PDONA050Q2	None	None	G3T2T3/S2S3	1B.3	BLM:S USFS:S	No	Yes
Clarkia mosquinii Mosquin's clarkia	PDONA050S0	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Clarkia rostrata beaked clarkia	PDONA050Y0	None	None	G2G3/S2S3	1B.3	BLM:S	Yes	Yes
Clarkia speciosa ssp. immaculata Pismo clarkia	PDONA05111	Endangered	Rare	G4T1/S1	1B.1		Yes	Yes
Clarkia springvillensis Springville clarkia	PDONA05120	Threatened	Endangered	G2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Clarkia tembloriensis ssp. calientensis Vasek's clarkia	PDONA05141	None	None	G3T1/S1	1B.1	BLM:S	Yes	Yes
Clarkia virgata Sierra clarkia	PDONA05160	None	None	G3/S3	4.3		Yes	No
Clarkia xantiana ssp. parviflora Kern Canyon clarkia	PDONA05181	None	None	G4T3T4/S3S4	4.2		Yes	Yes
Claytonia lanceolata var. peirsonii Peirson's spring beauty	PDPOR03097	None	None	G5T1Q/S1	3.1	USFS:S	Yes	Yes
Claytonia megarhiza fell-fields claytonia	PDPOR030A0	None	None	G5/S2	2B.3		No	Yes
Claytonia palustris marsh claytonia	PDPOR030S0	None	None	G4/S4	4.3		No	No
Claytonia parviflora ssp. grandiflora streambank spring beauty	PDPOR030D1	None	None	G5T3/S3	4.2		No	No
Claytonia umbellata Great Basin claytonia	PDPOR030P0	None	None	G5?/S1	2B.3		No	Yes
Cleomella brevipes short-pedicelled cleomella	PDCPP04020	None	None	G4/S3	4.2		No	No
Cleomella hillmanii var. hillmanii Hillman's cleomella	PDCPP04030	None	None	G4G5T4T5/S2	2B.2		No	Yes
Clinopodium chandleri San Miguel savory	PDLAM08030	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Clinopodium mimuloides monkey-flower savory	PDLAM1T040	None	None	G3/S3	4.2		No	No
Cochlearia groenlandica Greenland cochlearia	PDBRA0S020	None	None	G4/S1	2B.3		No	Yes
Collinsia antonina San Antonio collinsia	PDSCR0H010	None	None	G2/S2	1B.2	BLM:S	No	Yes
Collinsia corymbosa round-headed Chinese-houses	PDSCR0H060	None	None	G1/S1	1B.2		No	Yes
Collinsia multicolor San Francisco collinsia	PDSCR0H0B0	None	None	G2/S2	1B.2		Yes	Yes
Collomia diversifolia serpentine collomia	PDPLM02020	None	None	G4/S4	4.3		No	No
Collomia larsenii talus collomia	PDPLM02014	None	None	G4/S2	2B.2	USFS:S	No	Yes
Collomia rawsoniana Rawson's flaming trumpet	PDPLM02080	None	None	G2/S2	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Collomia tenella slender collomia	PDPLM02090	None	None	G4?/S1	2B.2		No	Yes
Collomia tracyi Tracy's collomia	PDPLM020B0	None	None	G4/S4	4.3		No	No
Colubrina californica Las Animas colubrina	PDRHA05030	None	None	G4/S2S3	2B.3		Yes	Yes
Comarostaphylis diversifolia ssp. diversifolia summer holly	PDERI0B011	None	None	G3T2/S2	1B.2	BLM:S	Yes	Yes
Condalia globosa var. pubescens spiny abrojo	PDRHA06031	None	None	G5T4/S3	4.2		No	No
Constancea nevinii Nevin's woolly sunflower	PDAST3N090	None	None	G3/S3	1B.3		Yes	Yes
Convolvulus simulans small-flowered morning-glory	PDCON05060	None	None	G4/S4	4.2		No	No
Coptis laciniata Oregon goldthread	PDRAN0A020	None	None	G4?/S3?	4.2		No	Yes
Corallorhiza trifida northern coralroot	PMORC0M050	None	None	G5/S1	2B.1		No	Yes
Cordylanthus capitatus Yakima bird's-beak	PDSCR0J030	None	None	G4/S2	2B.2		No	Yes
Cordylanthus eremicus ssp. eremicus desert bird's-beak	PDSCR0J042	None	None	G3T3/S3	4.3		No	No
Cordylanthus eremicus ssp. kernensis Kern Plateau bird's-beak	PDSCR0J043	None	None	G3T2/S2	1B.3	USFS:S	No	Yes
Cordylanthus nidularius Mt. Diablo bird's-beak	PDSCR0J0F0	None	Rare	G1/S1	1B.1	BLM:S	No	Yes
Cordylanthus parviflorus small-flowered bird's-beak	PDSCR0J0K0	None	None	G4/S2	2B.3		No	Yes
Cordylanthus rigidus ssp. brevibracteatus short-bracted bird's-beak	PDSCR0J0P3	None	None	G5T3/S3	4.3		No	No
Cordylanthus rigidus ssp. littoralis seaside bird's-beak	PDSCR0J0P2	None	Endangered	G5T2/S2	1B.1	BLM:S	No	Yes
Cordylanthus tenuis ssp. barbatus Fresno County bird's-beak	PDSCR0J0S4	None	None	G4G5T3/S3	4.3		No	No
Cordylanthus tenuis ssp. brunneus serpentine bird's-beak	PDSCR0J0S1	None	None	G4G5T3/S3	4.3		No	No
Cordylanthus tenuis ssp. capillaris Pennell's bird's-beak	PDSCR0J0S2	Endangered	Rare	G4G5T1/S1	1B.2		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Cordylanthus tenuis ssp. pallescens pallid bird's-beak	PDSCR0J0S3	None	None	G4G5T1/S1	1B.2	BLM:S USFS:S	No	Yes
Corethrogyne filaginifolia var. incana San Diego sand aster	PDAST2M025	None	None	G4T1Q/S1	1B.1		No	Yes
Corethrogyne filaginifolia var. linifolia Del Mar Mesa sand aster	PDAST2M027	None	None	G4T1T2Q/S1S2	1B.1		No	Yes
Corethrogyne leucophylla branching beach aster	PDAST2M030	None	None	G3Q/S3	3.2		No	No
Corispermum americanum var. americanum American bugseed	PDCHE0A091	None	None	G5?T5?/S1	2B.2		No	Yes
Cornus canadensis bunchberry	PDCOR01040	None	None	G5/S2	2B.2		No	Yes
Coryphantha alversonii Alverson's foxtail cactus	PDCAC0X060	None	None	G3/S3	4.3		No	Yes
Coryphantha chlorantha desert pincushion	PDCAC040J0	None	None	G4/S3	2B.1		No	Yes
Coryphantha vivipara var. rosea viviparous foxtail cactus	PDCAC0X0G8	None	None	G5T3/S1	2B.2		No	Yes
Crataegus castlegarensis Calstlegar hawthorne	PDROS0H9E0	None	None	G5/S1S3	3		No	No
Crepis runcinata fiddleleaf hawksbeard	PDAST2R0K0	None	None	G5/S3	2B.2		No	Yes
Crocanthemum greenei island rush-rose	PDCIS02090	Threatened	None	G3/S3	1B.2		Yes	Yes
Crocanthemum suffrutescens Bisbee Peak rush-rose	PDCIS020F0	None	None	G2?Q/S2?	3.2		No	Yes
Crossosoma californicum Catalina crossosoma	PDCRO02020	None	None	G3/S3	1B.2		Yes	Yes
Croton wigginsii Wiggins' croton	PDEUP0H140	None	Rare	G2G3/S2	2B.2	BLM:S	No	Yes
Cryptantha celosioides cocks-comb cat's-eye	PDBOR0A0F0	None	None	G5/S1	2B.3		No	Yes
Cryptantha clokeyi Clokey's cryptantha	PDBOR0A3M0	None	None	G3/S3	1B.2	BLM:S	No	Yes
Cryptantha crinita silky cryptantha	PDBOR0A0Q0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Cryptantha crymophila subalpine cryptantha	PDBOR0A0R0	None	None	G3/S3	1B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Cryptantha dissita serpentine cryptantha	PDBOR0A0H2	None	None	G2/S2	1B.2	BLM:S	No	Yes
Cryptantha excavata deep-scarred cryptantha	PDBOR0A0W0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Cryptantha fendleri sand dune cryptantha	PDBOR0A0X0	None	None	G5/S1	2B.2		No	Yes
Cryptantha ganderi Gander's cryptantha	PDBOR0A120	None	None	G2/S1	1B.1	BLM:S	No	Yes
Cryptantha glomeriflora clustered-flower cryptantha	PDBOR0A130	None	None	G4Q/S4	4.3		No	No
Cryptantha hooveri Hoover's cryptantha	PDBOR0A190	None	None	GH/SH	1A		No	Yes
Cryptantha incana Tulare cryptantha	PDBOR0A1D0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Cryptantha mariposae Mariposa cryptantha	PDBOR0A1Q0	None	None	G2G3/S2S3	1B.3	BLM:S	No	Yes
Cryptantha rattanii Rattan's cryptantha	PDBOR0A2H0	None	None	G4/S4	4.3		No	No
Cryptantha rostellata red-stemmed cryptantha	PDBOR0A2M1	None	None	G4/S3	4.2		No	No
Cryptantha scoparia gray cryptantha	PDBOR0A2Q0	None	None	G4?/S4	4.3		No	No
Cryptantha spithamaea Red Hills cryptantha	PDBOR0A2M2	None	None	G2/S2	1B.3		No	Yes
Cryptantha traskiae Trask's cryptantha	PDBOR0A370	None	None	G2/S2	1B.1		Yes	Yes
Cryptantha tumulosa New York Mountains cryptantha	PDBOR0A380	None	None	G4/S4	4.3		No	No
Cryptantha wigginsii Wiggins' cryptantha	PDBOR0A400	None	None	G2/S1	1B.2		No	Yes
Cuniculotinus gramineus Panamint rock-goldenrod	PDAST2C0H0	None	None	G3G4/S3	2B.3		No	Yes
Cuscuta californica var. apiculata pointed dodder	PDCUS01071	None	None	G5T2T4/S3?	3		No	No
Cuscuta jepsonii Jepson's dodder	PDCUS011T0	None	None	GH/SH	1B.2		No	Yes
Cuscuta obtusiflora var. glandulosa Peruvian dodder	PDCUS01111	None	None	G5T4T5/SH	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Cuscuta pacifica var. papillata Mendocino dodder	PDCUS011A2	None	None	G5T1/S1	1B.2		No	Yes
Cusickiella quadricostata Bodie Hills cusickiella	PDBRA2V010	None	None	G2/S2	1B.2	BLM:S	No	Yes
Cylindropuntia californica var. californica snake cholla	PDCAC0D2Y1	None	None	G3T2/S1	1B.1		No	Yes
Cylindropuntia fosbergii pink teddy-bear cholla	PDCAC0D2U0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Cylindropuntia munzii Munz's cholla	PDCAC0D0V0	None	None	G3/S1	1B.3	BLM:S	No	Yes
Cylindropuntia wolfii Wolf's cholla	PDCAC0D2R0	None	None	G4/S3	4.3		No	No
Cymopterus deserticola desert cymopterus	PDAPI0U090	None	None	G2/S2	1B.2	BLM:S	No	Yes
Cymopterus gilmanii Gilman's cymopterus	PDAPI0U0C0	None	None	G3/S2	2B.3		Yes	Yes
Cymopterus globosus globose cymopterus	PDAPI0U0E0	None	None	G3G4/S1	2B.2		No	Yes
Cymopterus multinervatus purple-nerve cymopterus	PDAPI0U0Q0	None	None	G4G5/S2	2B.2		No	Yes
Cymopterus ripleyi var. saniculoides sanicle cymopterus	PDAPI0U0X1	None	None	G3G4T3Q/S1	1B.2	BLM:S	No	Yes
Cypripedium californicum California lady's-slipper	PMORC0Q040	None	None	G4/S4	4.2		No	No
Cypripedium fasciculatum clustered lady's-slipper	PMORC0Q060	None	None	G4/S4	4.2	BLM:S USFS:S	No	No
Cypripedium montanum mountain lady's-slipper	PMORC0Q080	None	None	G4/S4	4.2	BLM:S USFS:S	No	No
Cypripedium parviflorum var. makasin northern yellow lady's slipper	PMORC0Q093	None	None	G5T4T5/S1	3.1		No	No
Dalea ornata ornate dalea	PDFAB1A150	None	None	G4G5/S2	2B.1	BLM:S	No	Yes
Darlingtonia californica California pitcherplant	PDSAR01010	None	None	G4/S4	4.2		Yes	No
Dedeckera eurekensis July gold	PDPGN06010	None	Rare	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Deinandra arida Red Rock tarplant	PDAST4R010	None	Rare	G1/S1	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Deinandra bacigalupii Livermore tarplant	PDAST4R0V0	None	Endangered	G1/S1	1B.1		No	Yes
Deinandra clementina island tarplant	PDAST4R040	None	None	G4/S4	4.3		Yes	No
Deinandra conjugens Otay tarplant	PDAST4R070	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Deinandra floribunda Tecate tarplant	PDAST4R0B0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Deinandra halliana Hall's tarplant	PDAST4R0C0	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Deinandra increscens ssp. villosa Gaviota tarplant	PDAST4R0U3	Endangered	Endangered	G4G5T2/S2	1B.1		Yes	Yes
Deinandra minthornii Santa Susana tarplant	PDAST4R0J0	None	Rare	G2/S2	1B.2	BLM:S	Yes	Yes
Deinandra mohavensis Mojave tarplant	PDAST4R0K0	None	Endangered	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Deinandra paniculata paniculate tarplant	PDAST4R0N0	None	None	G4/S4	4.2		No	No
Delphinium bakeri Baker's larkspur	PDRAN0B050	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Delphinium californicum ssp. interius Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3/S3	1B.2		No	Yes
Delphinium gypsophilum ssp. parviflorum small-flowered gypsum-loving larkspur	PDRAN0B0S2	None	None	G4T2T3Q/S2S3	3.2		No	No
Delphinium hansenii ssp. ewanianum Ewan's larkspur	PDRAN0B0T2	None	None	G4T3/S3	4.2		No	No
Delphinium hesperium ssp. cuyamacae Cuyamaca larkspur	PDRAN0B0U1	None	Rare	G4T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Delphinium hutchinsoniae Hutchinson's larkspur	PDRAN0B0V0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Delphinium inopinum unexpected larkspur	PDRAN0B0W0	None	None	G3/S3	4.3	USFS:S	No	Yes
Delphinium luteum golden larkspur	PDRAN0B0Z0	Endangered	Rare	G1/S1	1B.1		Yes	Yes
Delphinium parishii ssp. subglobosum Colorado Desert larkspur	PDRAN0B1A3	None	None	G4T4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Delphinium parryi ssp. blochmaniae dune larkspur	PDRAN0B1B1	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Delphinium parryi ssp. eastwoodiae Eastwood's larkspur	PDRAN0B1B2	None	None	G4T2/S2	1B.2		No	Yes
Delphinium parryi ssp. purpureum Mt. Pinos larkspur	PDRAN0B1B5	None	None	G4T4/S4	4.3	USFS:S	Yes	No
Delphinium purpusii rose-flowered larkspur	PDRAN0B1G0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Delphinium recurvatum recurved larkspur	PDRAN0B1J0	None	None	G2?/S2?	1B.2	BLM:S	No	Yes
Delphinium scaposum bare-stem larkspur	PDRAN0B1M0	None	None	G5/S1	2B.3		No	Yes
Delphinium stachydeum spiked larkspur	PDRAN0B1Q0	None	None	G5?/S3	2B.3		No	Yes
Delphinium uliginosum swamp larkspur	PDRAN0B1V0	None	None	G3/S3	4.2		No	No
Delphinium umbraculorum umbrella larkspur	PDRAN0B1W0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Delphinium variegatum ssp. kinkiense San Clemente Island larkspur	PDRAN0B1X3	Endangered	Endangered	G4T2/S2	1B.1		Yes	Yes
Delphinium variegatum ssp. thornei Thorne's royal larkspur	PDRAN0B1X2	None	None	G4T1/S1	1B.1		Yes	Yes
Dendromecon harfordii var. harfordii north island bush-poppy	PDPAP08020	None	None	G3T3Q/S3	3.2		Yes	No
Dendromecon harfordii var. rhamnoides south island bush-poppy	PDPAP08012	None	None	G4T1Q/S1	3.1		No	Yes
Dicentra formosa ssp. oregana Oregon bleeding heart	PDFUM04052	None	None	G5T4/S3	4.2		No	No
Dicentra nevadensis Tulare County bleeding heart	PDFUM04060	None	None	G4?/S4?	4.3	USFS:S	No	No
Dichondra occidentalis western dichondra	PDCON08060	None	None	G3G4/S3S4	4.2		No	No
Dicranostegia orcuttiana Orcutt's bird's-beak	PDSCR0J0G0	None	None	G2G3/S1	2B.1		Yes	Yes
Dieteria asteroides var. lagunensis Mt. Laguna aster	PDAST64131	None	Rare	G5T2T3/S1	2B.1	BLM:S USFS:S	No	Yes
Dieteria canescens var. ziegleri Ziegler's aster	PDAST640B2	None	None	G5T1/S1	1B.2	USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Digitaria californica var. californica Arizona cottontop	PMPOA27051	None	None	G5T5/S2	2B.3		No	Yes
Dimeresia howellii doublet	PDAST2Z010	None	None	G4?/S3	2B.3		No	Yes
Diplacus aridus low bush monkeyflower	PDSCR22040	None	None	G4/S3	4.3		Yes	No
Diplacus brandegeei Santa Cruz Island monkeyflower	PDSCR1B0K0	None	None	G1Q/SX	1A		No	Yes
Diplacus clevelandii Cleveland's bush monkeyflower	PDSCR22010	None	None	G4/S4	4.2		Yes	No
Diplacus cusickioides Cusick's monkeyflower	PDSCR220E0	None	None	G4G5/S2	2B.3		No	Yes
Diplacus johnstonii Johnston's monkeyflower	PDSCR1B1H0	None	None	G4/S4	4.3		No	No
Diplacus mohavensis Mojave monkeyflower	PDSCR1B1V0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Diplacus parryi Parry's monkeyflower	PDSCR1B230	None	None	G4G5/S3	2B.3		No	Yes
Diplacus parviflorus island bush monkeyflower	PDSCR22030	None	None	G4/S4	4.3		Yes	No
Diplacus pictus calico monkeyflower	PDSCR1B240	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Diplacus pulchellus yellow-lip pansy monkeyflower	PDSCR1B280	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Diplacus pygmaeus Egg Lake monkeyflower	PDSCR1B2C0	None	None	G4/S3	4.2		No	Yes
Diplacus rupicola Death Valley monkeyflower	PDSCR1B2H0	None	None	G4/S4	4.3		No	No
Diplacus traskiae Santa Catalina Island monkeyflower	PDSCR1B2P0	None	None	GX/SX	1A		No	Yes
Diplacus vandenbergensis Vandenberg monkeyflower	PDSCR1B381	Endangered	None	G1/S1	1B.1		Yes	Yes
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2/S2	1B.2		Yes	Yes
Dissanthelium californicum California dissanthelium	PMPOA29010	None	None	G2/S1	1B.2		Yes	Yes
Ditaxis claryana glandular ditaxis	PDEUP080L0	None	None	G3G4/S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ditaxis serrata var. californica California ditaxis	PDEUP08050	None	None	G5T3T4/S2?	3.2		No	Yes
Dithyrea maritima beach spectaclepod	PDBRA10020	None	Threatened	G1/S1	1B.1	BLM:S	No	Yes
Dodecahema leptoceras slender-horned spineflower	PDPGN0V010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Downingia concolor var. brevior Cuyamaca Lake downingia	PDCAM06041	None	Endangered	G4T1/S1	1B.1		No	Yes
Downingia laeta Great Basin downingia	PDCAM06080	None	None	G5/S3	2B.2		No	Yes
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU/S2	2B.2		No	Yes
Draba asterophora var. asterophora Tahoe draba	PDBRA110D1	None	None	G2T2?/S2?	1B.2	USFS:S	No	Yes
Draba asterophora var. macrocarpa Cup Lake draba	PDBRA110D2	None	None	G2T1/S1	1B.1	USFS:S	No	Yes
Draba aureola golden alpine draba	PDBRA110F0	None	None	G4/S2	1B.3		No	Yes
Draba californica California draba	PDBRA11380	None	None	G3/S3	4.2		No	No
Draba cana canescent draba	PDBRA110M0	None	None	G5/S2	2B.3		No	Yes
Draba carnosula Mt. Eddy draba	PDBRA112T0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Draba cruciata Mineral King draba	PDBRA110U0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Draba howellii Howell's draba	PDBRA11150	None	None	G4/S4	4.3		Yes	No
Draba incrassata Sweetwater Mountains draba	PDBRA113G0	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Draba lonchocarpa spear-fruited draba	PDBRA111F0	None	None	G5/S1	2B.3		No	Yes
Draba monoensis White Mountains draba	PDBRA113B0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Draba praealta tall draba	PDBRA11210	None	None	G5/S3	2B.3		No	Yes
Draba pterosperma winged-seed draba	PDBRA11230	None	None	G3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Draba saxosa Southern California rock draba	PDBRA110Q2	None	None	G2/S2	1B.3	USFS:S	No	Yes
Draba sharsmithii Mt. Whitney draba	PDBRA113F0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Draba sierrae Sierra draba	PDBRA112A0	None	None	G3/S3	1B.3		No	Yes
Draba subumbellata mound draba	PDBRA11370	None	None	G3/S3	4.3		No	No
Drosera anglica English sundew	PDDRO02010	None	None	G5/S2	2B.3		No	Yes
Drymocallis cuneifolia var. cuneifolia wedgeleaf woodbeauty	PDROS2D011	None	None	G2T1/S1	1B.1	USFS:S	Yes	Yes
Drymocallis cuneifolia var. ewanii Ewan's cinquefoil	PDROS1B0S3	None	None	G2T2/S2	1B.3	USFS:S	Yes	Yes
Dryopteris filix-mas male fern	PPDRY0A0B0	None	None	G5/S2	2B.3		No	Yes
Dudleya abramsii ssp. affinis San Bernardino Mountains dudleya	PDCRA04013	None	None	G4T2/S2	1B.2	USFS:S	Yes	Yes
Dudleya abramsii ssp. bettinae Betty's dudleya	PDCRA04011	None	None	G4T2/S2	1B.2		Yes	Yes
Dudleya abramsii ssp. calcicola limestone dudleya	PDCRA040Y0	None	None	G4T4/S4	4.3		No	No
Dudleya abramsii ssp. murina mouse-gray dudleya	PDCRA04012	None	None	G4T2/S2	1B.3	BLM:S	Yes	Yes
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	PDCRA040Z0	Endangered	None	G4T2/S2	1B.1		Yes	Yes
Dudleya alainae banner dudleya	PDCRA040X0	None	None	G2Q/S2	3.2		No	No
Dudleya attenuata ssp. attenuata Orcutt's dudleya	PDCRA04032	None	None	G4T3?/S1	2B.1		No	Yes
Dudleya blochmaniae ssp. blochmaniae Blochman's dudleya	PDCRA04051	None	None	G3T2/S2	1B.1		Yes	Yes
Dudleya blochmaniae ssp. insularis Santa Rosa Island dudleya	PDCRA04052	None	None	G3T1/S1	1B.1		No	Yes
Dudleya brevifolia short-leaved dudleya	PDCRA04053	None	Endangered	G1/S1	1B.1		Yes	Yes
Dudleya candelabrum candleholder dudleya	PDCRA04080	None	None	G3/S3	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Dudleya cymosa ssp. agourensis Agoura Hills dudleya	PDCRA040A7	Threatened	None	G5T1/S1	1B.2		Yes	Yes
Dudleya cymosa ssp. costatifolia Pierpoint Springs dudleya	PDCRA040A2	None	None	G5T1/S1	1B.2	USFS:S	No	Yes
Dudleya cymosa ssp. crebrifolia San Gabriel River dudleya	PDCRA040A8	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Dudleya cymosa ssp. marcescens marcescent dudleya	PDCRA040A3	Threatened	Rare	G5T2/S2	1B.2		Yes	Yes
Dudleya cymosa ssp. ovatifolia Santa Monica dudleya	PDCRA040A5	Threatened	None	G5T1/S1	1B.1		Yes	Yes
Dudleya densiflora San Gabriel Mountains dudleya	PDCRA040B0	None	None	G2/S2	1B.1	USFS:S	Yes	Yes
Dudleya gnoma munchkin dudleya	PDCRA040W0	None	None	G1/S1	1B.1		No	Yes
Dudleya greenei Greene's dudleya	PDCRA040E0	None	None	G3/S3	4.2		Yes	No
Dudleya multicaulis many-stemmed dudleya	PDCRA040H0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Dudleya nesiotica Santa Cruz Island dudleya	PDCRA040J0	Threatened	Rare	G1/S1	1B.1		Yes	Yes
Dudleya parva Conejo dudleya	PDCRA04016	Threatened	None	G1/S1	1B.2		Yes	Yes
Dudleya saxosa ssp. saxosa Panamint dudleya	PDCRA040N2	None	None	G4T3/S3	1B.3	BLM:S	No	Yes
Dudleya stolonifera Laguna Beach dudleya	PDCRA040P0	Threatened	Threatened	G1/S1	1B.1		Yes	Yes
Dudleya traskiae Santa Barbara Island dudleya	PDCRA040Q0	Endangered	Endangered	G1/S1	1B.2		No	Yes
Dudleya variegata variegated dudleya	PDCRA040R0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Dudleya verityi Verity's dudleya	PDCRA040U0	Threatened	None	G1/S1	1B.1		Yes	Yes
Dudleya virens ssp. hassei Catalina Island dudleya	PDCRA040S1	None	None	G3?T2/S2	1B.2		Yes	Yes
Dudleya virens ssp. insularis island green dudleya	PDCRA040S2	None	None	G3?T3/S3	1B.2		No	Yes
Dudleya virens ssp. virens bright green dudleya	PDCRA040S3	None	None	G3?T2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Dudleya viscida sticky dudleya	PDCRA040T0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Echinocereus engelmannii var. howei Howe's hedgehog cactus	PDCAC06035	None	None	G5T1/S1	1B.1	BLM:S	No	Yes
Eleocharis parvula small spikerush	PMCYP091G0	None	None	G5/S3	4.3		No	No
Eleocharis torticulmis California twisted spikerush	PMCYP092E0	None	None	G1/S1	1B.3	USFS:S	No	Yes
Elymus californicus California bottle-brush grass	PMPOA2H0W0	None	None	G4/S4	4.3		No	No
Elymus salina Salina Pass wild-rye	PMPOA6P010	None	None	G4G5/S2S3	2B.3		Yes	Yes
Elymus scribneri Scribner's wheat grass	PMPOA2H170	None	None	G5/S3	2B.3		No	Yes
Empetrum nigrum black crowberry	PDEMP03020	None	None	G5/S1?	2B.2		No	Yes
Enceliopsis covillei Panamint daisy	PDAST3G020	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Enceliopsis nudicaulis var. corrugata Ash Meadows daisy	PDAST3G031	Threatened	None	G5T1T2Q/S1	3.3		No	Yes
Enceliopsis nudicaulis var. nudicaulis naked-stemmed daisy	PDAST3G032	None	None	G5T5/S3	4.3		Yes	No
Enneapogon desvauxii nine-awned pappus grass	PMPOA2J010	None	None	G5/S3	2B.2		Yes	Yes
Ephedra torreyana Torrey's Mormon-tea	PGEPH01080	None	None	G4G5/S1	2B.1		No	Yes
Epilobium howellii subalpine fireweed	PDONA06180	None	None	G4/S4	4.3		No	Yes
Epilobium luteum yellow willowherb	PDONA060H0	None	None	G5/S1	2B.3		No	Yes
Epilobium nivium Snow Mountain willowherb	PDONA060M0	None	None	G2G3/S2S3	1B.2	USFS:S	No	Yes
Epilobium oreganum Oregon fireweed	PDONA060P0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Epilobium palustre marsh willowherb	PDONA060R0	None	None	G5/S2	2B.3		No	Yes
Epilobium rigidum Siskiyou Mountains willowherb	PDONA060V0	None	None	G3G4/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Epilobium septentrionale Humboldt County fuchsia	PDONA06110	None	None	G4/S4	4.3		No	No
Epilobium siskiyouense Siskiyou fireweed	PDONA06100	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Equisetum palustre marsh horsetail	PPEQU01050	None	None	G5/S1S3	3		No	No
Eremalche parryi ssp. kernensis Kern mallow	PDMAL0C031	Endangered	None	G3G4T3/S3	1B.2		Yes	Yes
Eremogone cliftonii Clifton's eremogone	PDCAR17010	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Eremogone congesta var. charlestonensis Charleston sandwort	PDCAR0405B	None	None	G5T2?/S1	1B.3		No	Yes
Eremogone ursina Big Bear Valley sandwort	PDCAR040R0	Threatened	None	G1/S1	1B.2		Yes	Yes
Eremothera boothii ssp. alyssoides Pine Creek evening-primrose	PDONA03051	None	None	G5T4/S4	4.3		No	No
Eremothera boothii ssp. boothii Booth's evening-primrose	PDONA03052	None	None	G5T4/S2	2B.3		No	Yes
Eremothera boothii ssp. intermedia Booth's hairy evening-primrose	PDONA03056	None	None	G5T3T4/S3	2B.3		No	Yes
Eremothera minor Nelson's evening-primrose	PDONA03110	None	None	G4/S1S2	2B.3		No	Yes
Eriastrum brandegeeae Brandegee's eriastrum	PDPLM03020	None	None	G1Q/S1	1B.1	BLM:S	No	Yes
Eriastrum densifolium ssp. sanctorum Santa Ana River woollystar	PDPLM03035	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Eriastrum ertterae Lime Ridge eriastrum	PDPLM030F0	None	None	G1/S1	1B.1		No	Yes
Eriastrum harwoodii Harwood's eriastrum	PDPLM030B1	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Eriastrum hooveri Hoover's eriastrum	PDPLM03070	Delisted	None	G3/S3	4.2		Yes	Yes
Eriastrum luteum yellow-flowered eriastrum	PDPLM03080	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Eriastrum rosamondense Rosamond eriastrum	PDPLM030G0	None	None	G1?/S1?	1B.1		No	Yes
Eriastrum sparsiflorum few-flowered eriastrum	PDPLM030B2	None	None	G5/S4	4.3		Yes	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriastrum tracyi Tracy's eriastrum	PDPLM030C0	None	Rare	G3Q/S3	3.2	USFS:S	No	Yes
Eriastrum virgatum virgate eriastrum	PDPLM030D0	None	None	G3/S3	4.3		No	No
Ericameria albida white-flowered rabbitbrush	PDAST2C010	None	None	G4/S3	4.2		No	No
Ericameria cuneata var. macrocephala Laguna Mountains goldenbush	PDAST3L062	None	None	G5T2T3/S2S3	1B.3		No	Yes
Ericameria fasciculata Eastwood's goldenbush	PDAST3L080	None	None	G2/S2	1B.1	BLM:S	No	Yes
Ericameria gilmanii Gilman's goldenbush	PDAST3L0P0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Ericameria nana dwarf goldenbush	PDAST3L0B0	None	None	G5/S4	4.3		No	No
Ericameria ophitidis serpentine goldenbush	PDAST3L0S0	None	None	G4/S4	4.3		No	No
Ericameria palmeri var. palmeri Palmer's goldenbush	PDAST3L0C1	None	None	G4T2?/S2	1B.1	BLM:S	Yes	Yes
Erigeron aequifolius Hall's daisy	PDAST3M030	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Erigeron biolettii streamside daisy	PDAST3M5H0	None	None	G3?/S3?	3		No	No
Erigeron blochmaniae Blochman's leafy daisy	PDAST3M5J0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Erigeron bloomeri var. nudatus Waldo daisy	PDAST3M0M2	None	None	G5T4/S3	2B.3		No	Yes
Erigeron breweri var. jacinteus San Jacinto Mountains daisy	PDAST3M0P3	None	None	G5T3/S3	4.3		Yes	No
Erigeron calvus bald daisy	PDAST3M5N0	None	None	G1Q/S1	1B.1	BLM:S	No	Yes
Erigeron cervinus Siskiyou daisy	PDAST3M0U0	None	None	G4/S4	4.3		No	No
Erigeron compactus compact daisy	PDAST3M5Z0	None	None	G3/S3	2B.3		No	Yes
Erigeron eatonii var. nevadincola Nevada daisy	PDAST3M2U0	None	None	G5T2T3/S2S3	2B.3		No	Yes
Erigeron elegantulus volcanic daisy	PDAST3M190	None	None	G4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Erigeron greenei Greene's narrow-leaved daisy	PDAST3M5G0	None	None	G3/S3	1B.2		No	Yes
Erigeron inornatus var. calidipetris hot rock daisy	PDAST3M1Z1	None	None	G5T3/S3	4.3		No	No
Erigeron inornatus var. keilii Keil's daisy	PDAST3M1Z2	None	None	G5T2/S2	1B.3		No	Yes
Erigeron lassenianus var. deficiens Plumas rayless daisy	PDAST3M262	None	None	G3G4T2T3/S2S3	1B.3		No	Yes
Erigeron maniopotamicus Mad River fleabane daisy	PDASTE1050	None	None	G2?/S2?	1B.2	USFS:S	No	Yes
Erigeron mariposanus Mariposa daisy	PDAST3M5L0	None	None	GH/SH	1A		No	Yes
Erigeron miser starved daisy	PDAST3M2K0	None	None	G3?/S3?	1B.3	USFS:S	No	Yes
Erigeron multiceps Kern River daisy	PDAST3M2N0	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	No	Yes
Erigeron nivalis snow fleabane daisy	PDASTE1060	None	None	G4G5/S3	2B.3		No	Yes
Erigeron oxyphyllus wand-like fleabane daisy	PDAST3M2Z0	None	None	G4/S2	2B.3		No	Yes
Erigeron parishii Parish's daisy	PDAST3M310	Threatened	None	G2/S2	1B.1		Yes	Yes
Erigeron petrophilus var. sierrensis northern Sierra daisy	PDAST3M351	None	None	G4T4/S4	4.3		No	No
Erigeron petrophilus var. viscidulus Klamath rock daisy	PDAST3M352	None	None	G4T4/S4	4.3		No	No
Erigeron robustior robust daisy	PDAST3M134	None	None	G3/S3	4.3		No	No
Erigeron sanctarum saints' daisy	PDAST3M3R0	None	None	G3/S3	4.2		No	No
Erigeron serpentinus serpentine daisy	PDAST3M5M0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Erigeron supplex supple daisy	PDAST3M3Z0	None	None	G2/S2	1B.2		No	Yes
Erigeron uncialis var. uncialis limestone daisy	PDAST3M452	None	None	G3G4T2/S2	1B.2	USFS:S	No	Yes
Erigeron utahensis Utah daisy	PDAST3M480	None	None	G4/S2	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriodictyon altissimum Indian Knob mountainbalm	PDHYD04010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eriodictyon angustifolium narrow-leaved yerba santa	PDHYD04020	None	None	G5/S3	2B.3		No	Yes
Eriodictyon capitatum Lompoc yerba santa	PDHYD04040	Endangered	Rare	G2/S2	1B.2		Yes	Yes
Eriodictyon sessilifolium sessile-leaved yerba santa	PDHYD040A0	None	None	G4/S1	2B.1		No	Yes
Eriogonum alexanderae Alexander's buckwheat	PDPGN084C5	None	None	G2G3/S1	1B.1	BLM:S	No	Yes
Eriogonum alpinum Trinity buckwheat	PDPGN08060	None	Endangered	G2/S2	1B.2	USFS:S	No	Yes
Eriogonum apricum var. apricum Ione buckwheat	PDPGN080F1	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Eriogonum apricum var. prostratum Irish Hill buckwheat	PDPGN080F2	Endangered	Endangered	G2T1/S1	1B.1		No	Yes
Eriogonum argillosum clay buckwheat	PDPGN080J0	None	None	G3G4/S3S4	4.3		No	No
Eriogonum baileyi var. praebens Bailey's woolly buckwheat	PDPGN080M2	None	None	G5T4/S4	4.3		No	No
Eriogonum bifurcatum forked buckwheat	PDPGN080R0	None	None	G3/S3	1B.2	BLM:S	No	Yes
Eriogonum breedlovei var. breedlovei Breedlove's buckwheat	PDPGN080V1	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Eriogonum breedlovei var. shevockii The Needles buckwheat	PDPGN080V2	None	None	G3T3/S3	4.3		No	Yes
Eriogonum butterworthianum Butterworth's buckwheat	PDPGN080X0	None	Rare	G2/S2	1B.3	USFS:S	No	Yes
Eriogonum callistum Tehachapi buckwheat	PDPGN08790	None	None	G1/S1	1B.1		Yes	Yes
Eriogonum cedrorum The Cedars buckwheat	PDPGN087A0	None	None	G1/S1	1B.3	BLM:S	Yes	Yes
Eriogonum collinum hill buckwheat	PDPGN08160	None	None	G4/S3	4.3		No	No
Eriogonum congdonii Congdon's buckwheat	PDPGN081A0	None	None	G4/S4	4.3		No	No
Eriogonum contiguum Reveal's buckwheat	PDPGN081B0	None	None	G3/S2	2B.3	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriogonum crocatum conejo buckwheat	PDPGN081G0	None	Rare	G1/S1	1B.2		Yes	Yes
Eriogonum diclinum Jaynes Canyon buckwheat	PDPGN081S0	None	None	G3/S3	2B.3		No	Yes
Eriogonum eastwoodianum Eastwood's buckwheat	PDPGN081V0	None	None	G2/S2	1B.3		No	Yes
Eriogonum elegans elegant wild buckwheat	PDPGN081Y0	None	None	G3G4/S3S4	4.3		No	No
Eriogonum eremicola Wildrose Canyon buckwheat	PDPGN08210	None	None	G2/S2	1B.3	BLM:S	No	Yes
Eriogonum evanidum vanishing wild buckwheat	PDPGN08780	None	None	G2/S1	1B.1	USFS:S	Yes	Yes
Eriogonum giganteum var. compactum Santa Barbara Island buckwheat	PDPGN082A1	None	Rare	G2T2/S2	1B.3		Yes	Yes
Eriogonum giganteum var. formosum San Clemente Island buckwheat	PDPGN082A2	None	None	G3T3?/S3?	1B.2		Yes	Yes
Eriogonum giganteum var. giganteum Santa Catalina Island buckwheat	PDPGN082A3	None	None	G3T3/S3	4.3		Yes	No
Eriogonum gilmanii Gilman's buckwheat	PDPGN082B0	None	None	G3/S3	1B.3		No	Yes
Eriogonum gossypinum cottony buckwheat	PDPGN082E0	None	None	G3G4/S3S4	4.2		No	No
Eriogonum grande var. grande island buckwheat	PDPGN082J1	None	None	G4T4/S4	4.2		Yes	No
Eriogonum grande var. rubescens red-flowered buckwheat	PDPGN082J2	None	None	G4T3/S3	1B.2		No	Yes
Eriogonum grande var. timorum San Nicolas Island buckwheat	PDPGN082J3	None	Endangered	G4T1/S1	1B.1		No	Yes
Eriogonum heermannii var. floccosum Clark Mountain buckwheat	PDPGN082P3	None	None	G5T4/S4	4.3		Yes	No
Eriogonum heermannii var. occidentale western Heermann's buckwheat	PDPGN082P6	None	None	G5T2/S2	1B.2		No	Yes
Eriogonum heracleoides var. heracleoides parsnip-flowered buckwheat	PDPGN082R2	None	None	G5T5/S3	4.3		No	No
Eriogonum hirtellum Klamath Mountain buckwheat	PDPGN082T0	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriogonum hoffmannii var. hoffmannii Hoffmann's buckwheat	PDPGN082V1	None	None	G3T2/S2	1B.3	BLM:S	No	Yes
Eriogonum hoffmannii var. robustius robust Hoffmann's buckwheat	PDPGN082V2	None	None	G3T3/S3	1B.3		No	Yes
Eriogonum intrafractum jointed buckwheat	PDPGN08360	None	None	G3/S3	1B.3		No	Yes
Eriogonum kelloggii Kellogg's buckwheat	PDPGN083A0	None	Endangered	G2/S2	1B.2	BLM:S	No	Yes
Eriogonum kennedyi var. alpigenum southern alpine buckwheat	PDPGN083B1	None	None	G4T3/S3	1B.3	USFS:S	No	Yes
Eriogonum kennedyi var. austromontanum southern mountain buckwheat	PDPGN083B2	Threatened	None	G4T2/S2	1B.2		Yes	Yes
Eriogonum kennedyi var. pinicola Kern buckwheat	PDPGN083B4	None	None	G4T1/S1	1B.1	BLM:S	No	Yes
Eriogonum libertini Dubakella Mountain buckwheat	PDPGN083M0	None	None	G4/S4	4.2		No	No
Eriogonum luteolum var. caninum Tiburon buckwheat	PDPGN083S1	None	None	G5T2/S2	1B.2		No	Yes
Eriogonum luteolum var. saltuarium Jack's wild buckwheat	PDPGN083S4	None	None	G5T1/S1	1B.2	USFS:S	No	Yes
Eriogonum mensicola Pinyon Mesa buckwheat	PDPGN084H1	None	None	G3/S3	1B.3	BLM:S	No	Yes
Eriogonum microthecum var. alpinum alpine slender buckwheat	PDPGN083WA	None	None	G5T3/S3	4.3		No	No
Eriogonum microthecum var. johnstonii Johnston's buckwheat	PDPGN083W5	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Eriogonum microthecum var. lacus-ursi Bear Lake buckwheat	PDPGN083WF	None	None	G5T1/S1	1B.1	USFS:S	Yes	Yes
Eriogonum microthecum var. lapidicola Inyo Mountains buckwheat	PDPGN083W6	None	None	G5T4/S3	4.3		No	No
Eriogonum microthecum var. panamintense Panamint Mountains buckwheat	PDPGN083W9	None	None	G5T3/S3	1B.3	BLM:S	No	Yes
Eriogonum microthecum var. schoolcraftii Schoolcraft's wild buckwheat	PDPGN083WG	None	None	G5T3/S3	1B.2	BLM:S USFS:S	No	Yes
Eriogonum nervulosum Snow Mountain buckwheat	PDPGN08440	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriogonum nortonii Pinnacles buckwheat	PDPGN08470	None	None	G2/S2	1B.3		No	Yes
Eriogonum nudum var. decurrens Ben Lomond buckwheat	PDPGN08492	None	None	G5T1/S1	1B.1		No	Yes
Eriogonum nudum var. indictum protruding buckwheat	PDPGN08494	None	None	G5T4/S4	4.2		No	No
Eriogonum nudum var. murinum mouse buckwheat	PDPGN08495	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Eriogonum nudum var. paralinum Del Norte buckwheat	PDPGN08498	None	None	G5T2/S1	2B.2		No	Yes
Eriogonum nudum var. psychicola Antioch Dunes buckwheat	PDPGN0849Q	None	None	G5T1/S1	1B.1		No	Yes
Eriogonum nudum var. regirivum Kings River buckwheat	PDPGN0849F	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Eriogonum nutans var. nutans Dugway wild buckwheat	PDPGN084B2	None	None	G5T3T4/S2?	2B.3		No	Yes
Eriogonum ochrocephalum var. ochrocephalum ochre-flowered buckwheat	PDPGN084C6	None	None	G5T2T3/S2	2B.2		No	Yes
Eriogonum ovalifolium var. depressum depressed wild buckwheat	PDPGN084FF	None	None	G5T4T5/S1	2B.1		No	Yes
Eriogonum ovalifolium var. eximium brown-margined buckwheat	PDPGN084FD	None	None	G5T2/S2	4.3		No	No
Eriogonum ovalifolium var. monarchense Monarch buckwheat	PDPGN084FJ	None	None	G5T1/S1	1B.1	USFS:S	No	Yes
Eriogonum ovalifolium var. vineum Cushenbury buckwheat	PDPGN084F8	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Eriogonum pendulum Waldo wild buckwheat	PDPGN084Q0	None	None	G4/S2S3	2B.2		No	Yes
Eriogonum polypodum Tulare County buckwheat	PDPGN084U0	None	None	G4/S4	4.3		No	No
Eriogonum prattenianum var. avium Kettle Dome buckwheat	PDPGN084V1	None	None	G4T3/S3	4.2		No	No
Eriogonum prociduum prostrate buckwheat	PDPGN084W0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Eriogonum pyrolifolium var. pyrolifolium pyrola-leaved buckwheat	PDPGN084Z2	None	None	G4T4/S3	2B.3		No	Yes
Eriogonum shockleyi var. shockleyi Shockley's buckwheat	PDPGN085E2	None	None	G5T4?/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriogonum siskiyouense Siskiyou buckwheat	PDPGN085F0	None	None	G3/S3	4.3		No	No
Eriogonum spectabile Barron's buckwheat	PDPGN08750	None	None	G1/S1	1B.2	USFS:S	No	Yes
Eriogonum spergulinum var. pratense mountain meadow wild buckwheat	PDPGN085J1	None	None	G4T3/S3	4.3		No	No
Eriogonum strictum var. greenei Greene's buckwheat	PDPGN085L3	None	None	G5T4/S4	4.3		No	No
Eriogonum temblorense Temblor buckwheat	PDPGN085P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Eriogonum ternatum ternate buckwheat	PDPGN085R0	None	None	G4/S4	4.3		No	No
Eriogonum thornei Thorne's buckwheat	PDPGN08233	None	Endangered	G1/S1	1B.2	BLM:S	No	Yes
Eriogonum tripodum tripod buckwheat	PDPGN085Y0	None	None	G4/S4	4.2	USFS:S	No	No
Eriogonum truncatum Mt. Diablo buckwheat	PDPGN085Z0	None	None	G1/S1	1B.1		No	Yes
Eriogonum twisselmannii Twisselmann's buckwheat	PDPGN08610	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Eriogonum umbellatum var. ahartii Ahart's buckwheat	PDPGN086UY	None	None	G5T3/S3	1B.2	BLM:S USFS:S	No	Yes
Eriogonum umbellatum var. bahiiforme bay buckwheat	PDPGN086UB	None	None	G5T3/S3	4.2		No	No
Eriogonum umbellatum var. glaberrimum Warner Mountains buckwheat	PDPGN086U2	None	None	G5T2?/S2	1B.3	BLM:S USFS:S	No	Yes
Eriogonum umbellatum var. humistratum Mt. Eddy buckwheat	PDPGN086U4	None	None	G5T4/S4	4.3		No	No
Eriogonum umbellatum var. juniporinum juniper sulphur-flowered buckwheat	PDPGN086U6	None	None	G5T4/S3	2B.3		Yes	Yes
Eriogonum umbellatum var. lautum Scott Valley buckwheat	PDPGN086UX	None	None	G5T1/S1	1B.1		No	Yes
Eriogonum umbellatum var. minus alpine sulphur-flowered buckwheat	PDPGN086U7	None	None	G5T4/S4	4.3		Yes	No
Eriogonum umbellatum var. torreyanum Donner Pass buckwheat	PDPGN086U9	None	None	G5T2/S2	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eriogonum ursinum var. erubescens blushing wild buckwheat	PDPGN08632	None	None	G3G4T3/S3	1B.3	BLM:S USFS:S	No	Yes
Eriogonum vestitum Idria buckwheat	PDPGN08640	None	None	G3/S3	4.3		No	No
Eriogonum wrightii var. olanchense Olancha Peak buckwheat	PDPGN086D3	None	None	G5T2/S2	1B.3	USFS:S	No	Yes
Erioneuron pilosum hairy erioneuron	PMPOA2S020	None	None	G5/S3	2B.3		No	Yes
Eriophorum gracile slender cottongrass	PMCYP0A080	None	None	G5/S4	4.3		No	No
Eriophyllum confertiflorum var. tanacetiflorum tansy-flowered woolly sunflower	PDAST3N0D0	None	None	G5T2?Q/S2?	4.3		No	No
Eriophyllum congdonii Congdon's woolly sunflower	PDAST3N030	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Eriophyllum jepsonii Jepson's woolly sunflower	PDAST3N040	None	None	G3/S3	4.3		No	No
Eriophyllum lanatum var. hallii Fort Tejon woolly sunflower	PDAST3N058	None	None	G5T1/S1	1B.1	USFS:S	No	Yes
Eriophyllum lanatum var. obovatum southern Sierra woolly sunflower	PDAST3N05D	None	None	G5T4/S4	4.3		Yes	No
Eriophyllum latilobum San Mateo woolly sunflower	PDAST3N060	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eriophyllum mohavense Barstow woolly sunflower	PDAST3N070	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Eriophyllum nubigenum Yosemite woolly sunflower	PDAST3N0A0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Eryngium aristulatum var. hooveri Hoover's button-celery	PDAPI0Z043	None	None	G5T1/S1	1B.1		Yes	Yes
Eryngium aristulatum var. parishii San Diego button-celery	PDAPI0Z042	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Eryngium constancei Loch Lomond button-celery	PDAPI0Z0W0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eryngium jepsonii Jepson's coyote-thistle	PDAPI0Z130	None	None	G2/S2	1B.2		No	Yes
Eryngium pendletonense Pendleton button-celery	PDAPI0Z120	None	None	G1/S1	1B.1		No	Yes
Eryngium pinnatisectum Tuolumne button-celery	PDAPI0Z0P0	None	None	G2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eryngium racemosum Delta button-celery	PDAPI0Z0S0	None	Endangered	G1/S1	1B.1		No	Yes
Eryngium spinosepalum spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	G2/S2	1B.2		No	Yes
Erysimum ammophilum sand-loving wallflower	PDBRA16010	None	None	G2/S2	1B.2	BLM:S	No	Yes
Erysimum capitatum var. angustatum Contra Costa wallflower	PDBRA16052	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Erysimum capitatum var. lompocense San Luis Obispo wallflower	PDBRA16057	None	None	G5T3/S3	4.2		No	No
Erysimum concinnum bluff wallflower	PDBRA160E3	None	None	G3/S2	1B.2		No	Yes
Erysimum franciscanum San Francisco wallflower	PDBRA160A0	None	None	G3/S3	4.2		No	No
Erysimum insulare island wallflower	PDBRA160D1	None	None	G3/S3	1B.3		Yes	Yes
Erysimum menziesii Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Erysimum suffrutescens suffrutescent wallflower	PDBRA160D2	None	None	G3/S3	4.2		Yes	No
Erysimum teretifolium Santa Cruz wallflower	PDBRA160N0	Endangered	Endangered	G1/S1	1B.1		No	Yes
Erythranthe acutidens Kings River monkeyflower	PDSCR1B010	None	None	G2?Q/S2?	3		No	No
Erythranthe calcicola limestone monkeyflower	PDPHR01010	None	None	G3/S3	1B.3	BLM:S	No	Yes
Erythranthe carsonensis Carson Valley monkeyflower	PDPHR01020	None	None	G2/S1	1B.1		No	Yes
Erythranthe diffusa Palomar monkeyflower	PDSCR1B0Z0	None	None	G4/S3	4.3		Yes	No
Erythranthe exigua San Bernardino Mountains monkeyflower	PDSCR1B140	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Erythranthe filicaulis slender-stemmed monkeyflower	PDSCR1B150	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Erythranthe filicifolia fern-leaved monkeyflower	PDPHR01150	None	None	G2/S2	1B.2		No	Yes
Erythranthe glaucescens shield-bracted monkeyflower	PDSCR1B1B0	None	None	G3G4/S3S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Erythranthe gracilipes slender-stalked monkeyflower	PDSCR1B1C0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Erythranthe grayi Gray's monkeyflower	PDSCR1B1D0	None	None	G2G3Q/S2S3	4.3		No	No
Erythranthe hardhamiae Santa Lucia monkeyflower	PDPHR01030	None	None	G1/S1	1B.1		No	Yes
Erythranthe inconspicua small-flowered monkeyflower	PDSCR1B1F0	None	None	G4/S4	4.3		No	No
Erythranthe inflatula ephemeral monkeyflower	PDSCR1B370	None	None	G3/S2	1B.2	BLM:S USFS:S	No	Yes
Erythranthe laciniata cut-leaved monkeyflower	PDSCR1B1L0	None	None	G4/S4	4.3		No	No
Erythranthe marmorata Stanislaus monkeyflower	PDPHR01130	None	None	G2?/S2?	1B.1		No	Yes
Erythranthe norrisii Kaweah monkeyflower	PDSCR1B2Y0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Erythranthe nudata bare monkeyflower	PDSCR1B200	None	None	G4/S4	4.3		No	No
Erythranthe percaulis Serpentine Canyon monkeyflower	PDPHR01140	None	None	G1/S1	1B.1		No	Yes
Erythranthe purpurea little purple monkeyflower	PDSCR1B2B0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Erythranthe rhodopetra Red Rock Canyon monkeyflower	PDPHR01040	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Erythranthe shevockii Kelso Creek monkeyflower	PDSCR1B2Z0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Erythranthe sierrae Sierra Nevada monkeyflower	PDPHR01060	None	None	G2/S2	4.2		No	No
Erythranthe taylorii Shasta limestone monkeyflower	PDPHR01080	None	None	G2/S2	1B.1		No	Yes
Erythranthe trinitiensis pink-margined monkeyflower	PDPHR01070	None	None	G2/S2	1B.3		No	Yes
Erythranthe utahensis Utah monkeyflower	PDSCR1B1A6	None	None	G4G5/S1	2B.1		No	Yes
Erythronium citrinum var. citrinum lemon-colored fawn lily	PMLIL0U041	None	None	G4T3T4/S3	4.3		No	No
Erythronium citrinum var. roderickii Scott Mountains fawn lily	PMLIL0U042	None	None	G4T3/S3	1B.3	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Erythronium helenae St. Helena fawn lily	PMLIL0U060	None	None	G3/S3	4.2		No	No
Erythronium hendersonii Henderson's fawn lily	PMLIL0U070	None	None	G4/S2	2B.3	USFS:S	No	Yes
Erythronium howellii Howell's fawn lily	PMLIL0U080	None	None	G3G4/S2	1B.3		No	Yes
Erythronium klamathense Klamath fawn lily	PMLIL0U090	None	None	G4/S2	2B.2		No	Yes
Erythronium oregonum giant fawn lily	PMLIL0U0C0	None	None	G4G5/S2	2B.2		No	Yes
Erythronium pluriflorum Shuteye Peak fawn lily	PMLIL0U0Q0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Erythronium pusaterii Kaweah fawn lily	PMLIL0U0R0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Erythronium revolutum coast fawn lily	PMLIL0U0F0	None	None	G4G5/S3	2B.2		No	Yes
Erythronium shastense Shasta fawn lily	PMLIL0U0V0	None	None	G2/S2	1B.2		No	Yes
Erythronium taylorii Pilot Ridge fawn lily	PMLIL0U0S0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Erythronium tuolumnense Tuolumne fawn lily	PMLIL0U0H0	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Eschscholzia androuxii Joshua Tree poppy	PDPAP0A0E0	None	None	G3/S3	4.3		No	No
Eschscholzia hypecoides San Benito poppy	PDPAP0A060	None	None	G4/S4	4.3		No	No
Eschscholzia lemmonii ssp. kernensis Tejon poppy	PDPAP0A071	None	None	G5T2/S2	1B.1		Yes	Yes
Eschscholzia minutiflora ssp. twisselmannii Red Rock poppy	PDPAP0A093	None	None	G5T2/S2	1B.2	BLM:S	Yes	Yes
Eschscholzia procera Kernville poppy	PDPAP0A0B0	None	None	G1?Q/S1?	3		Yes	No
Eschscholzia ramosa island poppy	PDPAP0A0C0	None	None	G4/S4	4.3		Yes	No
Eschscholzia rhombipetala diamond-petaled California poppy	PDPAP0A0D0	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Eucephalus vialis wayside aster	PDASTEC0A0	None	None	G3/S1	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Eucnide rupestris annual rock-nettle	PDLOA02020	None	None	G3/S1	2B.2		No	Yes
Euphorbia abramsiana Abrams' spurge	PDEUP0D010	None	None	G4/S2	2B.2		Yes	Yes
Euphorbia arizonica Arizona spurge	PDEUP0D060	None	None	G5/S3	2B.3		No	Yes
Euphorbia exstipulata var. exstipulata Clark Mountain spurge	PDEUP0Q0P1	None	None	G5T5?/S2	2B.1		Yes	Yes
Euphorbia hooveri Hoover's spurge	PDEUP0D150	Threatened	None	G1/S1	1B.2		No	Yes
Euphorbia jaegeri Orocopia Mountains spurge	PDEUP0Q440	None	None	G1/S1	1B.1	BLM:S	No	Yes
Euphorbia misera cliff spurge	PDEUP0Q1B0	None	None	G5/S2	2B.2		Yes	Yes
Euphorbia ocellata ssp. rattanii Stony Creek spurge	PDEUP0D1P1	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Euphorbia parryi Parry's spurge	PDEUP0D1T0	None	None	G5/S1	2B.3		No	Yes
Euphorbia platysperma flat-seeded spurge	PDEUP0D1X0	None	None	G3/S1	1B.2	BLM:S	No	Yes
Euphorbia revoluta revolute spurge	PDEUP0D230	None	None	G5/S4	4.3		Yes	No
Euphorbia vallis-mortae Death Valley sandmat	PDEUP0D2G0	None	None	G3/S3	4.2		No	No
Euphrosyne acerosa copperwort	PDAST58010	None	None	G4G5/S3	4.2		No	No
Euphrosyne nevadensis Nevada wormwood	PDAST580D0	None	None	G4/S3	4.3		No	No
Eurybia merita subalpine aster	PDASTEB030	None	None	G5/SH	2B.3		No	Yes
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Fendlerella utahensis yerba desierto	PDHDR08010	None	None	G5/S4	4.3		Yes	No
Ferocactus viridescens San Diego barrel cactus	PDCAC08060	None	None	G3?/S2S3	2B.1		Yes	Yes
Festuca minutiflora small-flowered fescue	PMPOA2V1M0	None	None	G5/S2	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Fimbristylis thermalis hot springs fimbristylis	PMCYP0B0N0	None	None	G4/S1S2	2B.2		No	Yes
Frangula purshiana ssp. ultramafica Caribou coffeeberry	PDRHA0H061	None	None	G4T2T3/S2S3	1B.2	USFS:S	No	Yes
Frankenia palmeri Palmer's frankenia	PDFRA01040	None	None	G3?/S1	2B.1		No	Yes
Frasera albomarginata var. albomarginata desert green-gentian	PDGEN05021	None	None	G5T5/S3	2B.2		No	Yes
Frasera albomarginata var. induta Clark Mountain green-gentian	PDGEN05022	None	None	G5T2/S1	1B.2		No	Yes
Frasera neglecta pine green-gentian	PDGEN05080	None	None	G4/S4	4.3		Yes	No
Frasera tubulosa Coville's green-gentian	PDGEN050E0	None	None	G3/S3	4.3		No	No
Frasera umpquaensis Umpqua green-gentian	PDGEN050F0	None	None	G3Q/S1	2B.2	USFS:S	No	Yes
Fraxinus parryi chaparral ash	PDOLE040K0	None	None	G3?/S1	2B.2		No	Yes
Fremontodendron decumbens Pine Hill flannelbush	PDSTE03030	Endangered	Rare	G1/S1	1B.2		Yes	Yes
Fremontodendron mexicanum Mexican flannelbush	PDSTE03020	Endangered	Rare	G2/S1	1B.1		Yes	Yes
Fritillaria agrestis stinkbells	PMLIL0V010	None	None	G3/S3	4.2		No	Yes
Fritillaria biflora var. ineziana Hillsborough chocolate lily	PMLIL0V031	None	None	G3G4T1/S1	1B.1		Yes	Yes
Fritillaria brandegeei Greenhorn fritillary	PMLIL0V040	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Fritillaria eastwoodiae Butte County fritillary	PMLIL0V060	None	None	G3Q/S3	3.2	USFS:S	No	Yes
Fritillaria falcata talus fritillary	PMLIL0V070	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Fritillaria gentneri Gentner's fritillary	PMLIL0V080	Endangered	None	G1/S1	1B.1		No	Yes
Fritillaria glauca Siskiyou fritillaria	PMLIL0V090	None	None	G3G4/S3	4.2		No	No
Fritillaria lanceolata var. tristulis Marin checker lily	PMLIL0V0P1	None	None	G5T2/S2	1B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Fritillaria ojaiensis Ojai fritillary	PMLIL0V0N0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Fritillaria pinetorum pine fritillary	PMLIL0V0E0	None	None	G4/S4	4.3		Yes	No
Fritillaria pluriflora adobe-lily	PMLIL0V0F0	None	None	G2G3/S2S3	1B.2	BLM:S	Yes	Yes
Fritillaria purdyi Purdy's fritillary	PMLIL0V0H0	None	None	G4/S4	4.3		No	No
Fritillaria roderickii Roderick's fritillary	PMLIL0V0M0	None	Endangered	G1Q/S1	1B.1		Yes	Yes
Fritillaria striata striped adobe-lily	PMLIL0V0K0	None	Threatened	G2?/S2?	1B.1	BLM:S USFS:S	Yes	Yes
Fritillaria viridea San Benito fritillary	PMLIL0V0L0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Funastrum crispum wavyleaf twinvine	PDASC0F020	None	None	G4/S1	2B.2		No	Yes
Funastrum utahense Utah vine milkweed	PDASC050M0	None	None	G4/S4	4.2		No	No
Galium andrewsii ssp. gatense phlox-leaf serpentine bedstraw	PDRUB0N032	None	None	G5T3/S3	4.2		No	No
Galium angustifolium ssp. borregoense Borrego bedstraw	PDRUB0N042	None	Rare	G5T3?/S3?	1B.3		No	Yes
Galium angustifolium ssp. gabrielense San Antonio Canyon bedstraw	PDRUB0N044	None	None	G5T3/S3	4.3		No	No
Galium angustifolium ssp. gracillimum slender bedstraw	PDRUB0N04B	None	None	G5T4/S4	4.2		No	No
Galium angustifolium ssp. jacinticum San Jacinto Mountains bedstraw	PDRUB0N04C	None	None	G5T2?/S2?	1B.3	USFS:S	No	Yes
Galium angustifolium ssp. onycense Onyx Peak bedstraw	PDRUB0N048	None	None	G5T3/S3	1B.3	BLM:S	No	Yes
Galium buxifolium box bedstraw	PDRUB0N0D0	Endangered	Rare	G2G3/S2S3	1B.2		Yes	Yes
Galium californicum ssp. luciense Cone Peak bedstraw	PDRUB0N0E3	None	None	G5T3/S3	1B.3	USFS:S	No	Yes
Galium californicum ssp. miguelense San Miguel Island bedstraw	PDRUB0N0E5	None	None	G5T3/S3	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Galium californicum ssp. primum Alvin Meadow bedstraw	PDRUB0N0E6	None	None	G5T2/S2	1B.2	BLM:S USFS:S	No	Yes
Galium californicum ssp. sierrae El Dorado bedstraw	PDRUB0N0E7	Endangered	Rare	G5T1/S1	1B.2		Yes	Yes
Galium catalinense ssp. acrispum San Clemente Island bedstraw	PDRUB0N0F1	None	Endangered	G4T3/S3	1B.3		Yes	Yes
Galium catalinense ssp. catalinense Santa Catalina Island bedstraw	PDRUB0N0F2	None	None	G4T2/S2	1B.3		Yes	Yes
Galium clementis Santa Lucia bedstraw	PDRUB0N0H0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Galium cliftonsmithii Santa Barbara bedstraw	PDRUB0N0J0	None	None	G4/S4	4.3		No	No
Galium glabrescens ssp. modocense Modoc bedstraw	PDRUB0N0T2	None	None	G4T3/S3	1B.2	BLM:S USFS:S	No	Yes
Galium grande San Gabriel bedstraw	PDRUB0N0V0	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Galium hardhamiae Hardham's bedstraw	PDRUB0N0Y0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Galium hilendiae ssp. carneum Panamint Mountains bedstraw	PDRUB0N0Z1	None	None	G4T3/S3	1B.3		No	Yes
Galium hilendiae ssp. kingstonense Kingston Mountains bedstraw	PDRUB0N0Z3	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Galium hypotrichium ssp. tomentellum Telescope Peak bedstraw	PDRUB0N126	None	None	G5T1/S1	1B.3		No	Yes
Galium jepsonii Jepson's bedstraw	PDRUB0N130	None	None	G3/S3	4.3		No	No
Galium johnstonii Johnston's bedstraw	PDRUB0N140	None	None	G4/S4	4.3		No	No
Galium munzii Munz's bedstraw	PDRUB0N1G0	None	None	G4G5/S4	4.3		No	No
Galium nuttallii ssp. insulare Nuttall's island bedstraw	PDRUB0N1K1	None	None	G5?T4/S4	4.3		No	No
Galium oreganum Oregon bedstraw	PDRUB0N1N0	None	None	G4G5/S1S2	3		No	No
Galium proliferum desert bedstraw	PDRUB0N1V0	None	None	G5/S2	2B.2		No	Yes
Galium serpenticum ssp. scotticum Scott Mountain bedstraw	PDRUB0N1Y6	None	None	G4G5T2/S2	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Galium serpenticum ssp. warnerense Warner Mountains bedstraw	PDRUB0N1Y8	None	None	G4G5T2T3/S2	1B.2	BLM:S USFS:S	No	Yes
Galium wrightii Wright's bedstraw	PDRUB0N2F0	None	None	G5/S3	2B.3		No	Yes
Gambelia speciosa showy island snapdragon	PDSCR2H010	None	None	G3/S3	1B.2		Yes	Yes
Gentiana affinis var. parvidentata small-toothed prairie gentian	PDGEN06013	None	None	G5T2T4Q/S1S3	3		No	No
Gentiana fremontii Fremont's gentian	PDGEN060Y0	None	None	G4/S2	2B.3	USFS:S	No	Yes
Gentiana plurisetosa Klamath gentian	PDGEN060V0	None	None	G2G3/S2	1B.3		No	Yes
Gentiana prostrata pygmy gentian	PDGEN060M0	None	None	G4G5/S1	2B.3		No	Yes
Gentiana setigera Mendocino gentian	PDGEN060S0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Geraea viscida sticky geraea	PDAST42020	None	None	G2G3/S2	2B.2		No	Yes
Geum aleppicum Aleppo avens	PDROS0S010	None	None	G5/S2	2B.2		No	Yes
Gilia capitata ssp. chamissonis blue coast gilia	PDPLM040B3	None	None	G5T2/S2	1B.1		No	Yes
Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6	None	None	G5T3/S2	1B.2		No	Yes
Gilia capitata ssp. tomentosa woolly-headed gilia	PDPLM040B9	None	None	G5T1/S1	1B.1		No	Yes
Gilia interior inland gilia	PDPLM040Q0	None	None	G4/S4	4.3		No	No
Gilia latiflora ssp. cuyamensis Cuyama gilia	PDPLM040T2	None	None	G5?T4/S4	4.3		No	No
Gilia leptantha ssp. leptantha San Bernardino gilia	PDPLM040W1	None	None	G4T2/S2	1B.3	USFS:S	Yes	Yes
Gilia leptantha ssp. pinetorum pine gilia	PDPLM040W2	None	None	G4T4/S4	4.3		No	No
Gilia mexicana El Paso gilia	PDPLM04110	None	None	G4/S1	2B.3		No	Yes
Gilia millefoliata dark-eyed gilia	PDPLM04130	None	None	G2/S2	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Gilia nevinii Nevin's gilia	PDPLM04160	None	None	G4/S4	4.3		Yes	No
Gilia tenuiflora ssp. amplifaucalis trumpet-throated gilia	PDPLM041P4	None	None	G3G4T3/S3	4.3		No	No
Gilia tenuiflora ssp. arenaria Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2/S2	1B.2		Yes	Yes
Gilia tenuiflora ssp. hoffmannii Hoffmann's slender-flowered gilia	PDPLM041P3	Endangered	None	G3G4T1/S1	1B.1		Yes	Yes
Gilia yorkii Monarch gilia	PDPLM04230	None	None	G2/S2	1B.1	USFS:S	No	Yes
Gilmania luteola golden-carpet gilmania	PDPGN0A010	None	None	G2G3/S2S3	1B.3		Yes	Yes
Githopsis diffusa ssp. filicaulis Mission Canyon bluecup	PDCAM07023	None	None	G5T1Q/S1	3.1	USFS:S	No	Yes
Githopsis pulchella ssp. serpentinicola serpentine bluecup	PDCAM07053	None	None	G4T3/S3	4.3		No	No
Githopsis tenella delicate bluecup	PDCAM07070	None	None	G2/S2	1B.3		No	Yes
Glehnia littoralis ssp. leiocarpa American glehnia	PDAPI13011	None	None	G5T4/S3	4.2		No	No
Glossopetalon pungens pungent glossopetalon	PDCRO04020	None	None	G2G3/S1	1B.2	BLM:S	No	Yes
Glyceria grandis American manna grass	PMPOA2Y080	None	None	G5/S3	2B.3		No	Yes
Goodmania luteola golden goodmania	PDPGN0B010	None	None	G3/S3	4.2		No	No
Gratiola heterosepala Boggs Lake hedge-hyssop	PDSCR0R060	None	Endangered	G2/S2	1B.2	BLM:S	No	Yes
Greeneocharis circumscissa var. rosulata rosette cushion cryptantha	PDBOR0A0G3	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Grindelia fraxinipratensis Ash Meadows gumplant	PDAST47080	Threatened	None	G2/S1	1B.2		Yes	Yes
Grindelia hallii San Diego gumplant	PDAST470D4	None	None	G2/S2	1B.2	BLM:S	No	Yes
Grindelia hirsutula var. maritima San Francisco gumplant	PDAST470D3	None	None	G5T1Q/S1	3.2		No	Yes
Grusonia parishii Parish's club-cholla	PDCAC0D2H0	None	None	G3G4/S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Grusonia pulchella beautiful cholla	PDCAC0D120	None	None	G4/S2	2B.2		No	Yes
Hackelia amethystina amethyst stickseed	PDBOR0G010	None	None	G4/S4	4.3		No	No
Hackelia brevicula Poison Canyon stickseed	PDBOR0G040	None	None	G3/S3	3.3		No	Yes
Hackelia cusickii Cusick's stickseed	PDBOR0G090	None	None	G4/S3S4	4.3		No	No
Hackelia sharsmithii Sharsmith's stickseed	PDBOR0G0Q0	None	None	G3/S3	2B.3		No	Yes
Harmonia doris-nilesiae Niles' harmonia	PDAST650L0	None	None	G2G3/S2S3	1B.1	BLM:S USFS:S	No	Yes
Harmonia guggolziorum Guggolz's harmonia	PDAST650M0	None	None	G1/S1	1B.1		No	Yes
Harmonia hallii Hall's harmonia	PDAST650A0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Harmonia nutans nodding harmonia	PDAST650D0	None	None	G3/S3	4.3		No	No
Harmonia stebbinsii Stebbins' harmonia	PDAST650K0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Harpagonella palmeri Palmer's grapplinghook	PDBOR0H010	None	None	G4/S3	4.2		Yes	Yes
Hazardia cana San Clemente Island hazardia	PDAST4H020	None	None	G2/S2	1B.2		No	Yes
Hazardia detonsa northern islands hazardia	PDAST4H030	None	None	G4/S4	4.3		Yes	No
Hazardia orcuttii Orcutt's hazardia	PDAST4H070	None	Threatened	G1/S1	1B.1		Yes	Yes
Hecastocleis shockleyi prickle-leaf	PDAST4J010	None	None	G3G4/S3S4	3		No	No
Hedeoma drummondii Drummond's false pennyroyal	PDLAM0M060	None	None	G5/S1	2B.2		No	Yes
Hedeoma nana ssp. californica California mock pennyroyal	PDLAM0M0S1	None	None	G5T4/S4	4.3		Yes	No
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2/S2	1B.2	BLM:S	No	Yes
Helianthus exilis serpentine sunflower	PDAST4N1J0	None	None	G3/S3	4.2		Yes	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Helianthus inexpectatus Newhall sunflower	PDAST4N250	None	None	G1/S1	1B.1		Yes	Yes
Helianthus niveus ssp. tephrodes Algodones Dunes sunflower	PDAST4N0Z2	None	Endangered	G4T2T3/S1	1B.2	BLM:S	Yes	Yes
Helianthus nuttallii ssp. parishii Los Angeles sunflower	PDAST4N102	None	None	G5TH/SH	1A		No	Yes
Helianthus winteri Winter's sunflower	PDAST4N260	None	None	G2?/S2?	1B.2		No	Yes
Hemieva ranunculifolia buttercup-leaf suksdorfia	PDSAX0W010	None	None	G5/S2	2B.2		No	Yes
Hemizonia congesta ssp. calyculata Mendocino tarplant	PDAST4R063	None	None	G5T4/S4	4.3		No	No
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	PDAST4R065	None	None	G5T2/S2	1B.2		No	Yes
Hemizonia congesta ssp. tracyi Tracy's tarplant	PDAST4R067	None	None	G5T4/S4	4.3		No	No
Herissantia crispa curly herissantia	PDMAL0F010	None	None	G5/S1	2B.3		No	Yes
Hesperevax caulescens hogwallow starfish	PDASTE5020	None	None	G3/S3	4.2		No	No
Hesperevax sparsiflora var. brevifolia short-leaved evax	PDASTE5011	None	None	G4T3/S2	1B.2	BLM:S	No	Yes
Hesperidanthus jaegeri Jaeger's hesperidanthus	PDBRA0N010	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Hesperocyparis abramsiana var. abramsiana Santa Cruz cypress	PGCUP04081	Threatened	Endangered	G1T1/S1	1B.2		No	Yes
Hesperocyparis abramsiana var. butanoensis Butano Ridge cypress	PGCUP04082	Threatened	Endangered	G1T1/S1	1B.2		No	Yes
Hesperocyparis bakeri Baker cypress	PGCUP04020	None	None	G3/S3	4.2		Yes	No
Hesperocyparis forbesii Tecate cypress	PGCUP040C0	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Hesperocyparis goveniana Gowen cypress	PGCUP04031	Threatened	None	G1/S1	1B.2		Yes	Yes
Hesperocyparis macrocarpa Monterey cypress	PGCUP04060	None	None	G1/S1	1B.2		Yes	Yes
Hesperocyparis nevadensis Piute cypress	PGCUP04012	None	None	G2/S2	1B.2	BLM:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Hesperocyparis pygmaea pygmy cypress	PGCUP04032	None	None	G1/S1	1B.2		Yes	Yes
Hesperocyparis stephensonii Cuyamaca cypress	PGCUP040B0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Hesperolinon adenophyllum glandular western flax	PDLIN01010	None	None	G2G3/S2S3	1B.2	BLM:S	No	Yes
Hesperolinon bicarpellatum two-carpellate western flax	PDLIN01020	None	None	G2/S2	1B.2		No	Yes
Hesperolinon breweri Brewer's western flax	PDLIN01030	None	None	G2/S2	1B.2	BLM:S	No	Yes
Hesperolinon congestum Marin western flax	PDLIN01060	Threatened	Threatened	G1/S1	1B.1		Yes	Yes
Hesperolinon didymocarpum Lake County western flax	PDLIN01070	None	Endangered	G1/S1	1B.2	BLM:S	No	Yes
Hesperolinon drymarioides drymaria-like western flax	PDLIN01090	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Hesperolinon sharsmithiae Sharsmith's western flax	PDLIN010E0	None	None	G2Q/S2	1B.2	BLM:S	No	Yes
Hesperolinon tehamense Tehama County western flax	PDLIN010C0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Heteranthera dubia water star-grass	PMPON03010	None	None	G5/S2	2B.2		No	Yes
Heterotheca monarchensis Monarch golden-aster	PDAST4V0U0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Heterotheca sessiliflora ssp. sessiliflora beach goldenaster	PDAST4V0K2	None	None	G4T2T3/S1	1B.1		Yes	Yes
Heterotheca shevockii Shevock's golden-aster	PDAST4V0T0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Heuchera abramsii Abrams' alumroot	PDSAX0E010	None	None	G3/S3	4.3	USFS:S	Yes	No
Heuchera brevistaminea Laguna Mountains alumroot	PDSAX0E050	None	None	G2/S2	1B.3	BLM:S	No	Yes
Heuchera caespitosa urn-flowered alumroot	PDSAX0E1C0	None	None	G3/S3	4.3	USFS:S	Yes	No
Heuchera hirsutissima shaggy-haired alumroot	PDSAX0E0J0	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Heuchera maxima island alumroot	PDSAX0E0M0	None	None	G3/S3	1B.2		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Heuchera parishii Parish's alumroot	PDSAX0E0S0	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Heuchera rubescens var. versicolor San Diego County alumroot	PDSAX0E106	None	None	G5T4/S2	3.3		No	Yes
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T3/S3	1B.2		Yes	Yes
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2?/S2?	1B.1		No	Yes
Holmgrenanthe petrophila rock lady	PDSCR2J010	None	Rare	G1/S1	1B.2		No	Yes
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Holocarpha virgata ssp. elongata curving tarplant	PDAST4X041	None	None	G5T3/S3	4.2		No	No
Hordeum intercedens vernal barley	PMPOA380E0	None	None	G3G4/S3S4	3.2		Yes	No
Horkelia bolanderi Bolander's horkelia	PDROS0W010	None	None	G1/S1	1B.2	BLM:S	No	Yes
Horkelia congesta var. nemorosa Josephine horkelia	PDROS0W032	None	None	G4T4?/S1	2B.1		No	Yes
Horkelia cuneata var. puberula mesa horkelia	PDROS0W045	None	None	G4T1/S1	1B.1	USFS:S	No	Yes
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?/S1?	1B.1	USFS:S	No	Yes
Horkelia daucifolia var. indicta Jepson's horkelia	PDROS0W053	None	None	G4T1/S1	1B.1		No	Yes
Horkelia hendersonii Henderson's horkelia	PDROS0W090	None	None	G1G2/S1	1B.1	BLM:S USFS:S	Yes	Yes
Horkelia hispidula White Mountains horkelia	PDROS0W0A0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2/S2	1B.2		No	Yes
Horkelia parryi Parry's horkelia	PDROS0W0C0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Horkelia sericata Howell's horkelia	PDROS0W0D0	None	None	G4/S3	4.3		No	No
Horkelia tenuiloba thin-lobed horkelia	PDROS0W0E0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Horkelia truncata Ramona horkelia	PDROS0W0G0	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Horkelia tularensis Kern Plateau horkelia	PDROS0W0H0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Horkelia wilderae Barton Flats horkelia	PDROS0W0J0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Horkelia yadonii Santa Lucia horkelia	PDROS0W0K0	None	None	G3/S3	4.2	USFS:S	No	No
Horsfordia alata pink velvet-mallow	PDMAL0J010	None	None	G5/S4	4.3		Yes	No
Horsfordia newberryi Newberry's velvet-mallow	PDMAL0J020	None	None	G5/S4	4.3		No	No
Hosackia crassifolia var. otayensis Otay Mountain lotus	PDFAB2A092	None	None	G5T1/S1	1B.1	BLM:S	Yes	Yes
Hosackia gracilis harlequin lotus	PDFAB2A0D0	None	None	G3G4/S3	4.2		No	No
Hosackia oblongifolia var. cuprea copper-flowered bird's-foot trefoil	PDFAB2A0W1	None	None	G5T2/S2	1B.3		No	Yes
Hosackia yollabolliensis Yolla Bolly Mtns. bird's-foot trefoil	PDFAB2A1F0	None	None	G2/S2	1B.2		No	Yes
Howellanthus dalesianus Scott Mountain howellanthus	PDHYD0C140	None	None	G3/S3	4.3		No	Yes
Howellia aquatilis water howellia	PDCAM0A010	Threatened	None	G3/S2	2B.2		No	Yes
Hulsea brevifolia short-leaved hulsea	PDAST4Z020	None	None	G3/S3	1B.2	USFS:S	No	Yes
Hulsea californica San Diego sunflower	PDAST4Z030	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Hulsea mexicana Mexican hulsea	PDAST4Z050	None	None	G3G4/S1	2B.3		No	Yes
Hulsea nana little hulsea	PDAST4Z060	None	None	G4/S3	2B.3		Yes	Yes
Hulsea vestita ssp. callicarpha beautiful hulsea	PDAST4Z074	None	None	G5T4/S4	4.2		Yes	No
Hulsea vestita ssp. gabrielensis San Gabriel Mountains hulsea	PDAST4Z075	None	None	G5T3/S3	4.3	USFS:S	No	No
Hulsea vestita ssp. inyoensis Inyo hulsea	PDAST4Z073	None	None	G5T2T3/S1S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Hulsea vestita ssp. parryi Parry's hulsea	PDAST4Z076	None	None	G5T4/S4	4.3		Yes	No
Hulsea vestita ssp. pygmaea pygmy hulsea	PDAST4Z077	None	None	G5T1/S1	1B.3	USFS:S	No	Yes
Hymenopappus filifolius var. eriopodus hairy-podded fine-leaf hymenopappus	PDAST51032	None	None	G5T3?/S2?	2B.3		Yes	Yes
Hymenopappus filifolius var. nanus little cutleaf	PDAST5103H	None	None	G5T4/S2	2B.3		No	Yes
Hymenothrix wrightii Wright's hymenothrix	PDAST52030	None	None	G5/S3	4.3		No	No
Hymenoxys lemmonii alkali hymenoxys	PDAST530C0	None	None	G4?/S2S3	2B.2		No	Yes
Hymenoxys odorata bitter hymenoxys	PDAST530E0	None	None	G5/S2	2B.1		No	Yes
Iliamna bakeri Baker's globe mallow	PDMAL0K010	None	None	G4/S3	4.2		No	Yes
Iliamna latibracteata California globe mallow	PDMAL0K040	None	None	G2G3/S2	1B.2	USFS:S	No	Yes
Imperata brevifolia California satintail	PMPOA3D020	None	None	G4/S3	2B.1	USFS:S	Yes	Yes
Ipomopsis effusa Baja California ipomopsis	PDPLM060U0	None	None	G3?/SH	2B.1		No	Yes
Ipomopsis tenuifolia slender-leaved ipomopsis	PDPLM060J0	None	None	G3/S2	2B.3		No	Yes
Iris bracteata Siskiyou iris	PMIRI09020	None	None	G4G5/S3	3.3		No	No
Iris hartwegii ssp. columbiana Tuolumne iris	PMIRI090D2	None	None	G4T1/S1	1B.2	BLM:S USFS:S	No	Yes
Iris innominata Del Norte County iris	PMIRI090F0	None	None	G4G5/S3	4.3		No	No
Iris longipetala coast iris	PMIRI092E0	None	None	G3/S3	4.2		No	No
Iris munzii Munz's iris	PMIRI090M0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Iris tenax ssp. klamathensis Orleans iris	PMIRI090Z2	None	None	G4G5T4/S4	4.3		No	No
Isocoma arguta Carquinez goldenbush	PDAST57050	None	None	G1/S1	1B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Isocoma menziesii var. decumbens decumbent goldenbush	PDAST57091	None	None	G3G5T2T3/S2	1B.2		No	Yes
Isocoma menziesii var. diabolica Satan's goldenbush	PDAST57092	None	None	G3G5T3/S3	4.2		No	No
Iva hayesiana San Diego marsh-elder	PDAST580A0	None	None	G3/S2	2B.2		Yes	Yes
Ivesia aperta var. aperta Sierra Valley ivesia	PDROS0X011	None	None	G2T2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia aperta var. canina Dog Valley ivesia	PDROS0X012	None	None	G2T1/S1	1B.1	USFS:S	No	Yes
Ivesia argyrocoma var. argyrocoma silver-haired ivesia	PDROS0X021	None	None	G2T2/S2	1B.2	USFS:S	Yes	Yes
Ivesia arizonica var. arizonica yellow ivesia	PDROS0X0R1	None	None	G4T3T4/S1	2B.3		No	Yes
Ivesia baileyi var. baileyi Bailey's ivesia	PDROS0X031	None	None	G5T4/S2	2B.3		No	Yes
Ivesia baileyi var. beneolens Owyhee ivesia	PDROS0X032	None	None	G5T4/S1	2B.3		No	Yes
Ivesia callida Tahquitz ivesia	PDROS0X040	None	Rare	G1/S1	1B.3	USFS:S	No	Yes
Ivesia campestris field ivesia	PDROS0X050	None	None	G3/S3	1B.2		No	Yes
Ivesia jaegeri Jaeger's ivesia	PDROS0X080	None	None	G2G3/S1	1B.3	BLM:S	Yes	Yes
Ivesia kingii var. kingii alkali ivesia	PDROS0X092	None	None	G4T3Q/S2	2B.2	BLM:S	No	Yes
Ivesia longibracteata Castle Crags ivesia	PDROS0X0U0	None	None	G1/S1	1B.3	BLM:S USFS:S	Yes	Yes
Ivesia paniculata Ash Creek ivesia	PDROS0X0S0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia patellifera Kingston Mountains ivesia	PDROS0X0Z0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Ivesia pickeringii Pickering's ivesia	PDROS0X0D0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia sericoleuca Plumas ivesia	PDROS0X0K0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia unguiculata Yosemite ivesia	PDROS0X0N0	None	None	G3/S3	4.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ivesia webberi Webber's ivesia	PDROS0X0Q0	Threatened	None	G1/S1	1B.1	BLM:S USFS:S	No	Yes
Jamesia americana var. rosea rosy-petalled cliffbush	PDHDR02019	None	None	G5T4/S4	4.3		Yes	No
Jensia yosemitana Yosemite tarplant	PDAST650J0	None	None	G3/S3	3.2		No	No
Jepsonia heterandra foothill jepsonia	PDSAX0J010	None	None	G3/S3	4.3		No	No
Jepsonia malvifolia island jepsonia	PDSAX0J020	None	None	G4/S4	4.2		No	No
Johanneshowellia puberula downy buckwheat	PDPGN084X0	None	None	G4?/S1	2B.3		No	Yes
Johnstonella costata ribbed cryptantha	PDBOR0A0M0	None	None	G4G5/S4	4.3		Yes	No
Johnstonella holoptera winged cryptantha	PDBOR0A180	None	None	G4G5/S4	4.3		No	No
Juglans californica southern California black walnut	PDJUG02020	None	None	G3/S3	4.2		Yes	No
Juglans hindsii Northern California black walnut	PDJUG02040	None	None	G1/S1	1B.1		Yes	Yes
Juncus acutus ssp. leopoldii southwestern spiny rush	PMJUN01051	None	None	G5T5/S4	4.2		No	No
Juncus cooperi Cooper's rush	PMJUN010T0	None	None	G4/S3	4.3		No	No
Juncus digitatus finger rush	PMJUN013E0	None	None	G1/S1	1B.1		No	Yes
Juncus dudleyi Dudley's rush	PMJUN01390	None	None	G5/S1	2B.3		No	Yes
Juncus duranii Duran's rush	PMJUN013T0	None	None	G3/S3	4.3		No	No
Juncus hemiendytus var. abjectus Center Basin rush	PMJUN011F1	None	None	G5T5/S4	4.3		No	No
Juncus interior inland rush	PMJUN011J0	None	None	G4/S1	2B.2		No	Yes
Juncus leiospermus var. ahartii Ahart's dwarf rush	PMJUN011L1	None	None	G2T1/S1	1B.2		No	Yes
Juncus leiospermus var. leiospermus Red Bluff dwarf rush	PMJUN011L2	None	None	G2T2/S2	1B.1	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Juncus luciensis Santa Lucia dwarf rush	PMJUN013J0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Juncus nevadensis var. inventus Sierra rush	PMJUN011Z5	None	None	G5T3T4/S1	2B.2		No	Yes
Juncus nodosus knotted rush	PMJUN01210	None	None	G5/S3	2B.3		No	Yes
Juncus regelii Regel's rush	PMJUN012D0	None	None	G4/S1	2B.3		No	Yes
Juncus supiniformis hair-leaved rush	PMJUN012R0	None	None	G5/S1	2B.2		No	Yes
Kallstroemia parviflora warty caltrop	PDZYG03050	None	None	G5/S3	4.2		No	No
Kobresia myosuroides seep kobresia	PMCYP0F010	None	None	G5/S2	2B.2		No	Yes
Koeberlinia spinosa var. tenuispina slender-spined all thorn	PDCPP05012	None	None	G4T4?/S2	2B.2		No	Yes
Kopsiopsis hookeri small groundcone	PDORO01010	None	None	G4?/S1S2	2B.3		No	Yes
Ladeania lanceolata lance-leaved scurf-pea	PDFAB5M030	None	None	G5/S2	2B.3		No	Yes
Lagophylla diabolensis Diablo Range hare-leaf	PDAST5J060	None	None	G2/S2	1B.2		No	Yes
Lagophylla dichotoma forked hare-leaf	PDAST5J070	None	None	G2/S2	1B.1		No	Yes
Lasthenia burkei Burke's goldfields	PDAST5L010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lasthenia californica ssp. bakeri Baker's goldfields	PDAST5L0C4	None	None	G3T1/S1	1B.2		No	Yes
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2/S2	1B.2		No	Yes
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1/S1	1B.1		Yes	Yes
Lasthenia ferrisiae Ferris' goldfields	PDAST5L070	None	None	G3/S3	4.2		No	No
Lasthenia glabrata ssp. coulteri Coulter's goldfields	PDAST5L0A1	None	None	G4T2/S2	1B.1	BLM:S	Yes	Yes
Lasthenia leptalea Salinas Valley goldfields	PDAST5L0B0	None	None	G3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lathyrus biflorus two-flowered pea	PDFAB25180	None	None	G1/S1	1B.1	USFS:S	No	Yes
Lathyrus delnorticus Del Norte pea	PDFAB25070	None	None	G4/S3	4.3		Yes	No
Lathyrus glandulosus sticky pea	PDFAB251A0	None	None	G3/S3	4.3		Yes	No
Lathyrus hitchcockianus Bullfrog Mountain pea	PDFAB250A0	None	None	G2/S1	1B.3		No	Yes
Lathyrus japonicus seaside pea	PDFAB250C0	None	None	G5/S2	2B.1		No	Yes
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2/S2	1B.2		Yes	Yes
Lathyrus palustris marsh pea	PDFAB250P0	None	None	G5/S2	2B.2		No	Yes
Lathyrus rigidus rigid pea	PDFAB250W0	None	None	G5/S1	2B.2		No	Yes
Lathyrus splendens pride-of-California	PDFAB250Z0	None	None	G4/S4	4.3		Yes	No
Lathyrus sulphureus var. argillaceus dubious pea	PDFAB25101	None	None	G5T1T2/S1S2	3		No	Yes
Lavatera assurgentiflora ssp. assurgentiflora island mallow	PDMAL0N021	None	None	G1T1/S1	1B.1		Yes	Yes
Lavatera assurgentiflora ssp. glabra southern island mallow	PDMAL0N022	None	None	G1T1/S1	1B.1		Yes	Yes
Layia carnosa beach layia	PDAST5N010	Endangered	Endangered	G2/S2	1B.1		Yes	Yes
Layia discoidea rayless layia	PDAST5N030	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Layia heterotricha pale-yellow layia	PDAST5N070	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Layia jonesii Jones' layia	PDAST5N090	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Layia leucopappa Comanche Point layia	PDAST5N0A0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Layia munzii Munz's tidy-tips	PDAST5N0B0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Layia septentrionalis Colusa layia	PDAST5N0F0	None	None	G2/S2	1B.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Legenere limosa legenere	PDCAM0C010	None	None	G2/S2	1B.1	BLM:S	No	Yes
Lepechinia cardiophylla heart-leaved pitcher sage	PDLAM0V020	None	None	G3/S2S3	1B.2	USFS:S	Yes	Yes
Lepechinia fragrans fragrant pitcher sage	PDLAM0V030	None	None	G3/S3	4.2	USFS:S	Yes	No
Lepechinia ganderi Gander's pitcher sage	PDLAM0V040	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Lepechinia rossii Ross' pitcher sage	PDLAM0V060	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Lepidium flavum var. felipense Blair Valley pepper-grass	PDBRA1M0B1	None	None	G5T1/S1	1B.2	BLM:S	No	Yes
Lepidium jaredii ssp. album Panoche pepper-grass	PDBRA1M0G2	None	None	G2G3T2T3/S2S3	1B.2	BLM:S	Yes	Yes
Lepidium jaredii ssp. jaredii Jared's pepper-grass	PDBRA1M0G1	None	None	G2G3T1T2/S1S2	1B.2	BLM:S	No	Yes
Lepidium latipes var. heckardii Heckard's pepper-grass	PDBRA1M0K1	None	None	G4T1/S1	1B.2		No	Yes
Lepidium virginicum var. robinsonii Robinson's pepper-grass	PDBRA1M114	None	None	G5T3/S3	4.3		No	Yes
Leptosiphon acicularis bristly leptosiphon	PDPLM09010	None	None	G4?/S4?	4.2		No	No
Leptosiphon ambiguus serpentine leptosiphon	PDPLM09020	None	None	G4/S4	4.2		No	No
Leptosiphon croceus coast yellow leptosiphon	PDPLM09170	None	Candidate Endangered	G1/S1	1B.1		Yes	Yes
Leptosiphon floribundus ssp. hallii Santa Rosa Mountains leptosiphon	PDPLM090J3	None	None	G4T1T2/S1S2	1B.3	USFS:S	No	Yes
Leptosiphon grandiflorus large-flowered leptosiphon	PDPLM090K0	None	None	G3G4/S3S4	4.2		No	No
Leptosiphon jepsonii Jepson's leptosiphon	PDPLM09140	None	None	G3/S3	1B.2		Yes	Yes
Leptosiphon latisectus broad-lobed leptosiphon	PDPLM09150	None	None	G4/S4	4.3		No	No
Leptosiphon nuttallii ssp. howellii Mt. Tedoc leptosiphon	PDPLM090V4	None	None	G5T2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Leptosiphon oblanceolatus Sierra Nevada leptosiphon	PDPLM090W0	None	None	G4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Leptosiphon pygmaeus ssp. pygmaeus pygmy leptosiphon	PDPLM09102	None	None	G4T1/S1	1B.2		No	Yes
Leptosiphon rattanii Rattan's leptosiphon	PDPLM09110	None	None	G4/S4	4.3		No	No
Leptosiphon rosaceus rose leptosiphon	PDPLM09180	None	None	G1/S1	1B.1		No	Yes
Leptosiphon serrulatus Madera leptosiphon	PDPLM09130	None	None	G3/S3	1B.2	USFS:S	No	Yes
Leptosyne hamiltonii Mt. Hamilton coreopsis	PDAST2L0C0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Leptosyne maritima sea dahlia	PDAST2L0L0	None	None	G2/S1S2	2B.2		Yes	Yes
Lessingia arachnoidea Crystal Springs lessingia	PDAST5S0C0	None	None	G2/S2	1B.2		Yes	Yes
Lessingia germanorum San Francisco lessingia	PDAST5S010	Endangered	Endangered	G1/S1	1B.1		No	Yes
Lessingia glandulifera var. tomentosa Warner Springs lessingia	PDAST5S022	None	None	G4?T2/S2	1B.1	USFS:S	No	Yes
Lessingia hololeuca woolly-headed lessingia	PDAST5S030	None	None	G3?/S3?	3		No	No
Lessingia micradenia var. glabrata smooth lessingia	PDAST5S062	None	None	G2T2/S2	1B.2		No	Yes
Lessingia micradenia var. micradenia Tamalpais lessingia	PDAST5S063	None	None	G2T2/S2	1B.2		Yes	Yes
Lessingia tenuis spring lessingia	PDAST5S0B0	None	None	G4/S4	4.3		No	No
Lewisia brachycalyx short-sepaled lewisia	PDPOR04010	None	None	G4/S2	2B.2	USFS:S	No	Yes
Lewisia cantelovii Cantelow's lewisia	PDPOR04020	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Lewisia congdonii Congdon's lewisia	PDPOR04040	None	Rare	G2/S2	1B.3	USFS:S	No	Yes
Lewisia cotyledon var. heckneri Heckner's lewisia	PDPOR04052	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Lewisia cotyledon var. howellii Howell's lewisia	PDPOR04053	None	None	G4T4Q/S2	3.2		No	No
Lewisia disepala Yosemite lewisia	PDPOR04060	None	None	G2/S2	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lewisia kelloggii ssp. hutchisonii Hutchison's lewisia	PDPOR04071	None	None	G3G4T3Q/S3	3.2	USFS:S	No	No
Lewisia kelloggii ssp. kelloggii Kellogg's lewisia	PDPOR040M1	None	None	G3G4T2T3Q/S2S3	3.2	USFS:S	No	No
Lewisia longipetala long-petaled lewisia	PDPOR040K0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Lewisia oppositifolia opposite-leaved lewisia	PDPOR040B0	None	None	G3/S2	2B.2	USFS:S	No	Yes
Lewisia serrata saw-toothed lewisia	PDPOR040E0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Lewisia stebbinsii Stebbins' lewisia	PDPOR040G0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2/S2	1B.1		No	Yes
Lilium bolanderi Bolander's lily	PMLIL1A010	None	None	G4/S3S4	4.2		No	No
Lilium humboldtii ssp. humboldtii Humboldt lily	PMLIL1A071	None	None	G4T3/S3	4.2		No	No
Lilium humboldtii ssp. ocellatum ocellated humboldt lily	PMLIL1A072	None	None	G4T4?/S4?	4.2		Yes	No
Lilium kelloggii Kellogg's lily	PMLIL1A0A0	None	None	G3/S3	4.3		No	No
Lilium maritimum coast lily	PMLIL1A0C0	None	None	G2/S2	1B.1		No	Yes
Lilium occidentale western lily	PMLIL1A0G0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lilium pardalinum ssp. pitkinense Pitkin Marsh lily	PMLIL1A0H3	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Lilium pardalinum ssp. vollmeri Vollmer's lily	PMLIL1A0H2	None	None	G5T4/S3	4.3		No	No
Lilium pardalinum ssp. wigginsii Wiggins' lily	PMLIL1A0S0	None	None	G5T3/S3	4.3		No	No
Lilium parryi lemon lily	PMLIL1A0J0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Lilium rubescens redwood lily	PMLIL1A0N0	None	None	G3/S3	4.2		Yes	No
Lilium washingtonianum ssp. purpurascens purple-flowered Washington lily	PMLIL1A0R2	None	None	G4T4/S3S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Limnanthes alba ssp. parishii Parish's meadowfoam	PDLIM02052	None	Endangered	G4T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Limnanthes bakeri Baker's meadowfoam	PDLIM02020	None	Rare	G1/S1	1B.1	BLM:S	Yes	Yes
Limnanthes douglasii ssp. ornduffii Ornduff's meadowfoam	PDLIM02039	None	None	G4T1/S1	1B.1		No	Yes
Limnanthes douglasii ssp. sulphurea Point Reyes meadowfoam	PDLIM02038	None	Endangered	G4T1/S1	1B.2		No	Yes
Limnanthes floccosa ssp. bellingeriana Bellinger's meadowfoam	PDLIM02041	None	None	G4T2T3/S1	1B.2	BLM:S USFS:S	No	Yes
Limnanthes floccosa ssp. californica Butte County meadowfoam	PDLIM02042	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Limnanthes floccosa ssp. floccosa woolly meadowfoam	PDLIM02043	None	None	G4T4/S3	4.2		No	Yes
Limnanthes vinculans Sebastopol meadowfoam	PDLIM02090	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Limosella australis Delta mudwort	PDSCR10030	None	None	G4G5/S2	2B.1		No	Yes
Linanthus bellus desert beauty	PDPLM09070	None	None	G2G3/S2	2B.1		No	Yes
Linanthus bernardinus Pioneertown linanthus	PDPLM09190	None	None	G1/S1	1B.2	BLM:S	No	Yes
Linanthus californicus ssp. tomentosus fuzzy prickly-phlox	PDPLM08021	None	None	G5T3/S3	4.2		No	No
Linanthus concinnus San Gabriel linanthus	PDPLM090D0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Linanthus jaegeri San Jacinto linanthus	PDPLM08030	None	None	G2/S2	1B.2	USFS:S	No	Yes
Linanthus killipii Baldwin Lake linanthus	PDPLM090N0	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Linanthus maculatus ssp. emaculatus Jacumba Mountains linanthus	PDPLM041Y2	None	None	G2T1/S1	1B.1		Yes	Yes
Linanthus maculatus ssp. maculatus Little San Bernardino Mtns. linanthus	PDPLM041Y1	None	None	G2T2/S2	1B.2	BLM:S	Yes	Yes
Linanthus orcuttii Orcutt's linanthus	PDPLM090X0	None	None	G3/S2	1B.3	BLM:S USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Linum puberulum plains flax	PDLIN020P0	None	None	G5/S2	2B.3		Yes	Yes
Listera cordata heart-leaved twayblade	PMORC1N060	None	None	G5/S4	4.2		No	No
Lithophragma maximum San Clemente Island woodland star	PDSAX0M070	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lithospermum incisum plains stoneseed	PDBOR0L070	None	None	G5/S1	2B.3		No	Yes
Loeflingia squarrosa var. artemisiarum sagebrush loeflingia	PDCAR0E011	None	None	G5T3/S2	2B.2	BLM:S	No	Yes
Loeseliastrum depressum depressed standing-cypress	PDPLM06040	None	None	G5/S3S4	4.3		No	No
Lomatium canbyi Canby's lomatium	PDAPI1B060	None	None	G5/S3S4	4.3		No	No
Lomatium congdonii Congdon's lomatium	PDAPI1B0B0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Lomatium engelmannii Engelmann's lomatium	PDAPI1B0K0	None	None	G4/S3	4.3		No	No
Lomatium foeniculaceum ssp. inyoense Inyo lomatium	PDAPI1B0M4	None	None	G5T3/S3	4.3		No	No
Lomatium foeniculaceum ssp. macdougalii Macdougal's lomatium	PDAPI1B0M5	None	None	G5T4T5/S3	2B.2		No	Yes
Lomatium grayi Gray's lomatium	PDAPI1B0Q0	None	None	G5/S1S2	2B.3		No	Yes
Lomatium hendersonii Henderson's lomatium	PDAPI1B0T0	None	None	G5?/S2	2B.3		No	Yes
Lomatium hooveri Hoover's lomatium	PDAPI1B2K0	None	None	G3/S3	4.3		No	No
Lomatium howellii Howell's lomatium	PDAPI1B0U0	None	None	G4G5/S4	4.3		No	No
Lomatium insulare San Nicolas Island lomatium	PDAPI1B0W0	None	None	G3/S2S3	1B.2		No	Yes
Lomatium martindalei Coast Range lomatium	PDAPI1B140	None	None	G5/S2	2B.3		No	Yes
Lomatium observatorium Mt. Hamilton lomatium	PDAPI1B2J0	None	None	G1/S1	1B.2		No	Yes
Lomatium parvifolium small-leaved lomatium	PDAPI1B1F0	None	None	G4/S4	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lomatium peckianum Peck's lomatium	PDAPI1B1G0	None	None	G4/S1	2B.2		No	Yes
Lomatium ravenii var. paiutense Paiute lomatium	PDAPI1B1L1	None	None	G4T4/S2?	2B.3		No	Yes
Lomatium ravenii var. ravenii Raven's lomatium	PDAPI1B1L2	None	None	G4T2/S2	1B.3		No	Yes
Lomatium repostum Napa lomatium	PDAPI1B1M0	None	None	G3/S3	4.3		No	No
Lomatium rigidum stiff lomatium	PDAPI1B1N0	None	None	G3/S3	4.3		No	No
Lomatium roseanum adobe lomatium	PDAPI1B2G0	None	None	G2G3/S2	1B.2	BLM:S USFS:S	No	Yes
Lomatium shevockii Owens Peak lomatium	PDAPI1B2C0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Lomatium stebbinsii Stebbins' lomatium	PDAPI1B1V0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Lomatium tracyi Tracy's lomatium	PDAPI1B1Y0	None	None	G4/S4	4.3		No	No
Lonicera subspicata var. subspicata Santa Barbara honeysuckle	PDCPR030R3	None	None	G5T2?/S2?	1B.2	USFS:S	No	Yes
Lupinus albifrons var. abramsii Abrams' lupine	PDFAB2B010	None	None	G5T3?Q/S3?	3.2		No	No
Lupinus albifrons var. johnstonii interior bush lupine	PDFAB2B1J4	None	None	G4T4/S4	4.3		No	No
Lupinus albifrons var. medius Mountain Springs bush lupine	PDFAB2B1J5	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Lupinus antoninus Anthony Peak lupine	PDFAB2B0C0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Lupinus arboreus var. eximius San Mateo tree lupine	PDFAB2B570	None	None	G2Q/S2	3.2		No	No
Lupinus cervinus Santa Lucia lupine	PDFAB2B0X0	None	None	G3/S3	4.3		No	No
Lupinus citrinus var. citrinus orange lupine	PDFAB2B103	None	None	G2T2/S2	1B.2	BLM:S USFS:S	No	Yes
Lupinus citrinus var. deflexus Mariposa lupine	PDFAB2B102	None	Threatened	G2T1T2/S1S2	1B.2	BLM:S	No	Yes
Lupinus constancei The Lassics lupine	PDFAB2B490	None	Candidate Endangered	G1/S1	1B.1	USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lupinus croceus var. pilosellus saffron-flowered lupine	PDFAB2B162	None	None	G3T3/S3	4.3		No	No
Lupinus dalesiae Quincy lupine	PDFAB2B1A0	None	None	G3/S3	4.2		No	Yes
Lupinus duranii Mono Lake lupine	PDFAB2B1E0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Lupinus elatus silky lupine	PDFAB2B1F0	None	None	G4/S4	4.3		No	No
Lupinus elmeri South Fork Mountain lupine	PDFAB2B1G0	None	None	G2/S2	1B.2		No	Yes
Lupinus gracilentus slender lupine	PDFAB2B1R0	None	None	G3/S3	1B.3		No	Yes
Lupinus guadalupensis Guadalupe Island lupine	PDFAB2B1T0	None	None	G3/S3	4.2		Yes	Yes
Lupinus holmgrenianus Holmgren's lupine	PDFAB2B1Y0	None	None	G2/S2	2B.3		No	Yes
Lupinus lapidicola Heller's Mt. Eddy lupine	PDFAB2B280	None	None	G4/S4	4.3		No	No
Lupinus latifolius var. barbatus bearded lupine	PDFAB2B29H	None	None	G5T2Q/S2	3.2	USFS:S	No	Yes
Lupinus lepidus var. culbertsonii Hockett Meadows lupine	PDFAB2B171	None	None	G5T3/S3	1B.3	USFS:S	No	Yes
Lupinus lepidus var. utahensis stemless lupine	PDFAB2B0V2	None	None	G5T5?/S3	4.3		No	No
Lupinus ludovicianus San Luis Obispo County lupine	PDFAB2B2G0	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Lupinus magnificus var. glarecola Coso Mountains lupine	PDFAB2B2K1	None	None	G3T4/S4	4.3		No	No
Lupinus magnificus var. hesperius Mcgee Meadows lupine	PDFAB2B2K2	None	None	G3T1Q/S1	1B.3	BLM:S	No	Yes
Lupinus magnificus var. magnificus Panamint Mountains lupine	PDFAB2B2K3	None	None	G3T3/S3	1B.2	BLM:S	No	Yes
Lupinus milo-bakeri Milo Baker's lupine	PDFAB2B4E0	None	Threatened	G1Q/S1	1B.1		Yes	Yes
Lupinus nevadensis Nevada lupine	PDFAB2B500	None	None	G4/S4	4.3		No	No
Lupinus nipomensis Nipomo Mesa lupine	PDFAB2B550	Endangered	Endangered	G1/S1	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lupinus padre-crowleyi Father Crowley's lupine	PDFAB2B2Z0	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Lupinus paynei Payne's bush lupine	PDFAB2B580	None	None	G1Q/S1	1B.1		No	Yes
Lupinus peirsonii Peirson's lupine	PDFAB2B330	None	None	G3/S3	1B.3	USFS:S	No	Yes
Lupinus pusillus var. intermontanus intermontane lupine	PDFAB2B3B1	None	None	G5T5?/S2	2B.3		No	Yes
Lupinus sericatus Cobb Mountain lupine	PDFAB2B3J0	None	None	G2?/S2?	1B.2	BLM:S	No	Yes
Lupinus spectabilis shaggyhair lupine	PDFAB2B3P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Lupinus tidestromii Tidestrom's lupine	PDFAB2B3Y0	Endangered	Endangered	G1/S1	1B.1		No	Yes
Lupinus tracyi Tracy's lupine	PDFAB2B3Z0	None	None	G4/S3	4.3		No	No
Lupinus uncialis lilliput lupine	PDFAB2B410	None	None	G4/S2	2B.2	BLM:S	No	Yes
Lycium brevipes var. hassei Santa Catalina Island desert-thorn	PDSOL0G0N0	None	None	G5T1Q/S1	3.1		No	Yes
Lycium californicum California box-thorn	PDSOL0G050	None	None	G4/S4	4.2		No	No
Lycium exsertum Arizona desert-thorn	PDSOL0G090	None	None	G4G5/S1	2b.1		No	No
Lycium parishii Parish's desert-thorn	PDSOL0G0D0	None	None	G3?/S1	2B.3		No	Yes
Lycium torreyi Torrey's box-thorn	PDSOL0G0K0	None	None	G4G5/S3	4.2		No	No
Lycium verrucosum San Nicolas Island desert-thorn	PDSOL0G0M0	None	None	GXQ/SX	1A		No	Yes
Lycopodiella inundata inundated bog-clubmoss	PPLYC03060	None	None	G5/S1?	2B.2		No	Yes
Lycopodium clavatum running-pine	PPLYC01080	None	None	G5/S3	4.1		No	Yes
Lycopus uniflorus northern bugleweed	PDLAM0X080	None	None	G5/S4	4.3		No	No
Lyonothamnus floribundus ssp. aspleniifolius Santa Cruz Island ironwood	PDROS12011	None	None	G3T3/S3	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Lyonothamnus floribundus ssp. floribundus Santa Catalina Island ironwood	PDROS12012	None	None	G3T2/S2	1B.2		Yes	Yes
Lyrocarpa coulteri Palmer's lyrepod	PDBRA1R010	None	None	G4G5/S4	4.3		No	No
Lysimachia europaea arctic starflower	PDPRI0A030	None	None	G5/S1	2B.2		No	Yes
Lysimachia thyrsiflora tufted loosestrife	PDPRI070S0	None	None	G5/S1?	2B.3		No	Yes
Madia radiata showy golden madia	PDAST650E0	None	None	G3/S3	1B.1	BLM:S	Yes	Yes
Malacothamnus abbottii Abbott's bush-mallow	PDMAL0Q010	None	None	G1/S1	1B.1		No	Yes
Malacothamnus aboriginum Indian Valley bush-mallow	PDMAL0Q020	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Malacothamnus arcuatus arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q/S2	1B.2		No	Yes
Malacothamnus clementinus San Clemente Island bush-mallow	PDMAL0Q030	Endangered	Endangered	G2G3/S2S3	1B.1		Yes	Yes
Malacothamnus davidsonii Davidson's bush-mallow	PDMAL0Q040	None	None	G2/S2	1B.2		No	Yes
Malacothamnus fasciculatus var. catalinensis Santa Catalina Island bush-mallow	PDMAL0Q062	None	None	G4T3Q/S3	4.2		No	No
Malacothamnus fasciculatus var. nesioticus Santa Cruz Island bush-mallow	PDMAL0Q061	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Malacothamnus gracilis slender bush-mallow	PDMAL0Q0J0	None	None	G1Q/S1	1B.1		No	Yes
Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Malacothamnus helleri Heller's bush-mallow	PDMAL0Q0G0	None	None	G3Q/S3	3.3		No	No
Malacothamnus jonesii Jones' bush-mallow	PDMAL0Q090	None	None	G4/S4	4.3		No	No
Malacothamnus mendocinensis Mendocino bush-mallow	PDMAL0Q0D0	None	None	GXQ/SX	1A		No	Yes
Malacothamnus palmeri var. involucratus Carmel Valley bush-mallow	PDMAL0Q0B1	None	None	G3T2Q/S2	1B.2	BLM:S USFS:S	No	Yes
Malacothamnus palmeri var. lucianus Arroyo Seco bush-mallow	PDMAL0Q0B2	None	None	G3T1Q/S1	1B.2	BLM:S USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Malacothamnus palmeri var. palmeri Santa Lucia bush-mallow	PDMAL0Q0B5	None	None	G3T2Q/S2	1B.2	USFS:S	Yes	Yes
Malacothamnus parishii Parish's bush-mallow	PDMAL0Q0C0	None	None	GXQ/SX	1A		No	Yes
Malacothrix foliosa ssp. crispifolia wavy-leaved malacothrix	PDAST66066	None	None	G4T1/S1	1B.2		No	Yes
Malacothrix foliosa ssp. foliosa leafy malacothrix	PDAST66064	None	None	G4T3/S3	4.2		No	No
Malacothrix foliosa ssp. philbrickii Philbrick's malacothrix	PDAST66065	None	None	G4T1/S1	1B.2		No	Yes
Malacothrix foliosa ssp. polycephala many-headed malacothrix	PDAST66067	None	None	G4T3/S3	4.2		No	No
Malacothrix incana dunedelion	PDAST66070	None	None	G3G4/S3S4	4.3		Yes	No
Malacothrix indecora Santa Cruz Island malacothrix	PDAST660J0	Endangered	None	G2/S2	1B.1		No	Yes
Malacothrix junakii Junak's malcothrix	PDAST660Q0	None	None	G1/S1	1B.1		No	Yes
Malacothrix phaeocarpa dusky-fruited malacothrix	PDAST66090	None	None	G3/S3	4.3		No	No
Malacothrix saxatilis var. arachnoidea Carmel Valley malacothrix	PDAST660C2	None	None	G5T2/S2	1B.2	BLM:S USFS:S	No	Yes
Malacothrix saxatilis var. saxatilis cliff malacothrix	PDAST660C5	None	None	G5T4/S4	4.2		No	No
Malacothrix similis Mexican malacothrix	PDAST660D0	None	None	G2G3/SH	2A		No	Yes
Malacothrix squalida island malacothrix	PDAST660K0	Endangered	None	G1/S1	1B.1		No	Yes
Malaxis monophyllos var. brachypoda white bog adder's-mouth	PMORC1R010	None	None	G4?T4/S1	2B.1	USFS:S	No	Yes
Malperia tenuis brown turbans	PDAST67010	None	None	G4?/S2?	2B.3		Yes	Yes
Mammillaria grahamii var. grahamii Graham fishhook cactus	PDCAC0A021	None	None	G4T4/S2	2B.2		Yes	Yes
Marina orcuttii var. orcuttii California marina	PDFAB2F031	None	None	G2G3T1T2/S2 ?	1B.3	USFS:S	Yes	Yes
Matelea parvifolia spear-leaf matelea	PDASC0A0J0	None	None	G5/S3	2B.3	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Maurandella antirrhiniflora violet twining snapdragon	PDSCR2M010	None	None	G5/S2	2B.3		No	Yes
Meconella oregana Oregon meconella	PDPAP0G030	None	None	G2G3/S2	1B.1		No	Yes
Melica spectabilis purple onion grass	PMPOA3X0G0	None	None	G5/S4	4.3		No	No
Menodora scabra var. scabra rough menodora	PDOLE09045	None	None	G5T4T5/S3	2B.3		Yes	Yes
Menodora spinescens var. mohavensis Mojave menodora	PDOLE09061	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Mentzelia eremophila solitary blazing star	PDLOA030G0	None	None	G4/S3S4	4.2		Yes	No
Mentzelia hirsutissima hairy stickleaf	PDLOA030K0	None	None	G4?/S3	2B.3		Yes	Yes
Mentzelia inyoensis Inyo blazing star	PDLOA032Z0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Mentzelia monoensis Mono Craters blazing star	PDLOA032B0	None	None	G2/S2	4.3		No	No
Mentzelia polita polished blazing star	PDLOA031D0	None	None	G2G3/S2?	1B.2	BLM:S	Yes	Yes
Mentzelia pterosperma wing-seed blazing star	PDLOA031E0	None	None	G4/S1S2	2B.2		Yes	Yes
Mentzelia puberula Darlington's blazing star	PDLOA031F0	None	None	G5/S2	2B.2		No	Yes
Mentzelia torreyi Torrey's blazing star	PDLOA031S0	None	None	G4/S2	2B.2		No	Yes
Mentzelia tricuspis spiny-hair blazing star	PDLOA031T0	None	None	G4/S2	2B.1		No	Yes
Mentzelia tridentata creamy blazing star	PDLOA031U0	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Mertensia bella Oregon lungwort	PDBOR0N040	None	None	G4/S1	2B.2		No	Yes
Mertensia cusickii Toiyabe bluebells	PDBOR0N0M0	None	None	G4?/S2	2B.2		No	Yes
Mertensia longiflora long bluebells	PDBOR0N0D0	None	None	G4?/S2	2B.2		No	Yes
Mertensia oblongifolia var. amoena beautiful sagebrush bluebells	PDBOR0N0G1	None	None	G5T5/S2	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Mertensia oblongifolia var. oblongifolia sagebrush bluebells	PDBOR0N0G2	None	None	G5T5/S3	2B.2		No	Yes
Micranthes howellii Howell's saxifrage	PDSAX0U0T0	None	None	G4/S3	4.3		No	No
Micranthes marshallii Marshall's saxifrage	PDSAX0U0X0	None	None	G5/S3	4.3		No	No
Micromonolepis pusilla dwarf monolepis	PDCHE0F020	None	None	G5/S3?	2B.3		No	Yes
Micropus amphibolus Mt. Diablo cottonweed	PDAST6D030	None	None	G3G4/S3S4	3.2		No	No
Microseris borealis northern microseris	PDAST6E030	None	None	G5/S1	2B.1		No	Yes
Microseris douglasii ssp. platycarpha small-flowered microseris	PDAST6E062	None	None	G4T4/S4	4.2		No	No
Microseris laciniata ssp. detlingii Detling's silverpuffs	PDAST6E0A1	None	None	G4T3/S1	2B.2		No	Yes
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2/S2	1B.2		No	Yes
Microseris sylvatica sylvan microseris	PDAST6E0E0	None	None	G4/S4	4.2		No	No
Mimulus rattanii ssp. decurtatus Santa Cruz County monkeyflower	PDSCR1B2D2	None	None	G4T1T3Q/S1S3	4.2		No	No
Mimulus subsecundus one-sided monkeyflower	PDSCR1B2K0	None	None	G3G4Q/S3S4	4.3		No	No
Minuartia obtusiloba alpine sandwort	PDCAR0G0N0	None	None	G5/S4	4.3		No	No
Mirabilis coccinea red four o'clock	PDNYC0A090	None	None	G5/S2	2B.3		Yes	Yes
Mirabilis greenei Greene's four o'clock	PDNYC0A0N0	None	None	G3/S3	4.2		No	No
Mirabilis tenuiloba slender-lobed four o'clock	PDNYC0A150	None	None	G5/S4	4.3		No	No
Mitellastra caulescens leafy-stemmed mitrewort	PDSAX0N020	None	None	G5/S4	4.2		No	Yes
Monarda pectinata plains bee balm	PDLAM170A0	None	None	G5/SH	2B.3		No	Yes
Monardella antonina ssp. antonina San Antonio Hills monardella	PDLAM18011	None	None	G4T1T3Q/S1S3	3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Monardella antonina ssp. benitensis San Benito monardella	PDLAM18012	None	None	G4T3/S3	4.3		No	No
Monardella australis ssp. cinerea gray monardella	PDLAM18060	None	None	G4T3/S3	4.3		Yes	No
Monardella australis ssp. jokerstii Jokerst's monardella	PDLAM18112	None	None	G4T1/S1	1B.1	USFS:S	No	Yes
Monardella beneolens sweet-smelling monardella	PDLAM180U0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Monardella boydii Boyd's monardella	PDLAM18120	None	None	G1?Q/S1?	1B.2	BLM:S	Yes	Yes
Monardella candicans Sierra monardella	PDLAM18050	None	None	G4/S4	4.3		No	No
Monardella eremicola Clark Mountain monardella	PDLAM18130	None	None	G3Q/S3	1B.3	BLM:S	No	Yes
Monardella follettii Follett's monardella	PDLAM180W0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Monardella hypoleuca ssp. hypoleuca white-veined monardella	PDLAM180A3	None	None	G4T3/S3	1B.3		No	Yes
Monardella hypoleuca ssp. intermedia intermediate monardella	PDLAM180A4	None	None	G4T2?/S2?	1B.3		No	Yes
Monardella hypoleuca ssp. lanata felt-leaved monardella	PDLAM180A2	None	None	G4T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Monardella leucocephala Merced monardella	PDLAM180C0	None	None	GH/SH	1A		No	Yes
Monardella linoides ssp. oblonga Tehachapi monardella	PDLAM180D2	None	None	G5T2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Monardella macrantha ssp. hallii Hall's monardella	PDLAM180E1	None	None	G5T3/S3	1B.3	USFS:S	Yes	Yes
Monardella nana ssp. leptosiphon San Felipe monardella	PDLAM180F2	None	None	G4G5T2Q/S2	1B.2	BLM:S USFS:S	Yes	Yes
Monardella palmeri Palmer's monardella	PDLAM180H0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Monardella pringlei Pringle's monardella	PDLAM180J0	None	None	GX/SX	1A		No	Yes
Monardella robisonii Robison's monardella	PDLAM180K0	None	None	G3/S3	1B.3	BLM:S	No	Yes
Monardella saxicola rock monardella	PDLAM180Q1	None	None	G3/S3	4.2	USFS:S	No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Monardella sinuata ssp. gerryi Gerry's curly-leaved monardella	PDLAM18163	None	None	G3T1/S1	1B.1		No	Yes
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	PDLAM18162	None	None	G3T2/S2	1B.2		No	Yes
Monardella sinuata ssp. sinuata southern curly-leaved monardella	PDLAM18161	None	None	G3T2/S2	1B.2		No	Yes
Monardella stebbinsii Stebbins' monardella	PDLAM180L0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Monardella stoneana Jennifer's monardella	PDLAM180Y0	None	None	G2/S1	1B.2	BLM:S	No	Yes
Monardella undulata ssp. arguelloensis Point Arguello monardella	PDLAM18151	None	None	G3T1/S1	1B.1		No	Yes
Monardella undulata ssp. crispa crisp monardella	PDLAM18070	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Monardella undulata ssp. undulata San Luis Obispo monardella	PDLAM180X0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Monardella venosa veiny monardella	PDLAM18082	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Monardella viminea willowy monardella	PDLAM18140	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Monardella viridis green monardella	PDLAM180Q2	None	None	G3/S3	4.3		No	No
Moneses uniflora woodnymph	PDPYR02010	None	None	G5/S2	2B.2		No	Yes
Monolopia congdonii San Joaquin woollythreads	PDASTA8010	Endangered	None	G2/S2	1B.2		Yes	Yes
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3/S3	1B.2		No	Yes
Monotropa uniflora ghost-pipe	PDMON03030	None	None	G5/S2	2B.2		No	Yes
Montia howellii Howell's montia	PDPOR05070	None	None	G3G4/S2	2B.2		No	Yes
Mortonia utahensis Utah mortonia	PDCEL09030	None	None	G4G5/S3?	4.3		No	No
Mucronea californica California spineflower	PDPGN0F010	None	None	G3/S3	4.2		Yes	No
Muhlenbergia alopecuroides wolftail	PMPOA3W020	None	None	G5/S1?	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Muhlenbergia appressa appressed muhly	PMPOA48020	None	None	G4/S3	2B.2		No	Yes
Muhlenbergia arsenei tough muhly	PMPOA48060	None	None	G5/S2	2B.3		No	Yes
Muhlenbergia californica California muhly	PMPOA480A0	None	None	G4/S4	4.3		No	Yes
Muhlenbergia fragilis delicate muhly	PMPOA480Q0	None	None	G5/S2	2B.3		No	Yes
Muhlenbergia jonesii Jones' muhly	PMPOA480X0	None	None	G3/S3	4.3		No	No
Muhlenbergia pauciflora few-flowered muhly	PMPOA48170	None	None	G5/S2	2B.3		No	Yes
Muilla coronata crowned muilla	PMLIL1H020	None	None	G3/S3	4.2		No	No
Munroa squarrosa false buffalo-grass	PMPOA49010	None	None	G5/S2	2B.2		No	Yes
Munzothamnus blairii Blair's munzothamnus	PDAST8U0K0	None	None	G3/S3	1B.2		No	Yes
Myosurus minimus ssp. apus little mousetail	PDRAN0H031	None	None	G5T2Q/S2	3.1		No	Yes
Myrica hartwegii Sierra sweet bay	PDMCC02050	None	None	G4/S4	4.3		No	No
Myriopteris wootonii Wooton's lace fern	PPADI090S0	None	None	G5/S2	2B.3		No	Yes
Nama demissa var. covillei Coville's purple mat	PDHYD0A031	None	None	G5T3/S3	1B.3		No	No
Nama dichotoma var. dichotoma forked purple mat	PDHYD0A061	None	None	G5T5?/S1	2B.3		No	Yes
Nama stenocarpa mud nama	PDHYD0A0H0	None	None	G4G5/S1S2	2B.2		No	Yes
Nasturtium gambelii Gambel's water cress	PDBRA270V0	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Navarretia cotulifolia cotula navarretia	PDPLM0C040	None	None	G4/S4	4.2		No	No
Navarretia eriocephala hoary navarretia	PDPLM0C060	None	None	G4?/S4?	4.3		No	No
Navarretia fossalis spreading navarretia	PDPLM0C080	Threatened	None	G2/S2	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Navarretia gowenii Lime Ridge navarretia	PDPLM0C120	None	None	G1/S1	1B.1		No	Yes
Navarretia heterandra Tehama navarretia	PDPLM0C0A0	None	None	G4/S4	4.3		No	No
Navarretia jepsonii Jepson's navarretia	PDPLM0C0D0	None	None	G4/S4	4.3		No	No
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2/S2	1B.1	BLM:S	No	Yes
Navarretia leucocephala ssp. pauciflora few-flowered navarretia	PDPLM0C0E4	Endangered	Threatened	G4T1/S1	1B.1		Yes	Yes
Navarretia leucocephala ssp. plieantha many-flowered navarretia	PDPLM0C0E5	Endangered	Endangered	G4T1/S1	1B.2		Yes	Yes
Navarretia linearifolia ssp. pinnatisecta pinnate-leaved navarretia	PDPLM04211	None	None	G4G5T4/S4	4.3		No	No
Navarretia myersii ssp. deminuta small pincushion navarretia	PDPLM0C0X2	None	None	G2T1/S1	1B.1		No	Yes
Navarretia myersii ssp. myersii pincushion navarretia	PDPLM0C0X1	None	None	G2T2/S2	1B.1		No	Yes
Navarretia nigelliformis ssp. nigelliformis adobe navarretia	PDPLM0C0J1	None	None	G4T3/S3	4.2		No	No
Navarretia nigelliformis ssp. radians shining navarretia	PDPLM0C0J2	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Navarretia ojaiensis Ojai navarretia	PDPLM0C130	None	None	G2/S2	1B.1	USFS:S	Yes	Yes
Navarretia paradoxiclara Patterson's navarretia	PDPLM0C150	None	None	G2/S2	1B.3		No	Yes
Navarretia paradoxinota Porter's navarretia	PDPLM0C160	None	None	G2/S2	1B.3		No	Yes
Navarretia peninsularis Baja navarretia	PDPLM0C0L0	None	None	G3/S2	1B.2	USFS:S	Yes	Yes
Navarretia prolifera ssp. lutea yellow bur navarretia	PDPLM0C0N1	None	None	G4T3/S3	4.3	USFS:S	No	No
Navarretia prostrata prostrate vernal pool navarretia	PDPLM0C0Q0	None	None	G2/S2	1B.1		No	Yes
Navarretia rosulata Marin County navarretia	PDPLM0C0Z0	None	None	G2/S2	1B.2		No	Yes
Navarretia setiloba Piute Mountains navarretia	PDPLM0C0S0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Navarretia subuligera awl-leaved navarretia	PDPLM0C0U0	None	None	G4/S4	4.3		No	No
Nemacaulis denudata var. denudata coast woolly-heads	PDPGN0G011	None	None	G3G4T2/S2	1B.2		Yes	Yes
Nemacaulis denudata var. gracilis slender cottonheads	PDPGN0G012	None	None	G3G4T3?/S2	2B.2		No	Yes
Nemacladus calcaratus Chimney Creek nemacladus	PDCAM0F0E0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Nemacladus gracilis graceful nemacladus	PDCAM0F030	None	None	G4/S4	4.3		No	No
Nemacladus secundiflorus var. robbinsii Robbins' nemacladus	PDCAM0F0B2	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Nemacladus secundiflorus var. secundiflorus large-flowered nemacladus	PDCAM0F0B1	None	None	G3T3?/S3?	4.3		No	No
Nemacladus twisselmannii Twisselmann's nemacladus	PDCAM0F0D0	None	Rare	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Nemophila breviflora Great Basin nemophila	PDHYD0B020	None	None	G4G5/S3	2B.3		No	Yes
Nemophila parviflora var. quercifolia oak-leaved nemophila	PDHYD0B073	None	None	G5T4/S4	4.3		No	No
Neostapfia colusana Colusa grass	PMPOA4C010	Threatened	Endangered	G1/S1	1B.1		No	Yes
Neviusia cliftonii Shasta snow-wreath	PDROS14020	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Nitrophila mohavensis Amargosa nitrophila	PDCHE0G010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Noccaea fendleri ssp. californica Kneeland Prairie pennycress	PDBRA2P041	Endangered	None	G5?T1/S1	1B.1		No	Yes
Nolina cismontana chaparral nolina	PMAGA080E0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Nolina interrata Dehesa nolina	PMAGA08070	None	Endangered	G2/S2	1B.1	BLM:S	Yes	Yes
Oenothera californica ssp. eurekensis Eureka Dunes evening-primrose	PDONA0C071	Delisted	Rare	G4?T2/S2	1B.2		Yes	Yes
Oenothera cavernae cave evening-primrose	PDONA0C090	None	None	G2G3/S1	2B.1		Yes	Yes
Oenothera cespitosa ssp. crinita caespitose evening-primrose	PDONA0C063	None	None	G5T4/S4?	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Oenothera deltoides ssp. howellii Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Oenothera longissima long-stem evening-primrose	PDONA0C0T0	None	None	G4/S1	2B.2		No	Yes
Oenothera wolfii Wolf's evening-primrose	PDONA0C1K0	None	None	G2/S1	1B.1	BLM:S	Yes	Yes
Ophioglossum californicum California adder's-tongue	PPOPH020G0	None	None	G4/S4	4.2		No	No
Ophioglossum pusillum northern adder's-tongue	PPOPH020F0	None	None	G5/S1	2B.2	USFS:S	No	Yes
Opuntia basilaris var. brachyclada short-joint beavertail	PDCAC0D053	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Opuntia basilaris var. treleasei Bakersfield cactus	PDCAC0D055	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Opuntia fragilis brittle prickly-pear	PDCAC0D0H0	None	None	G4G5/S1	2B.1		No	Yes
Opuntia wigginsii Wiggins' cholla	PDCAC0D1P0	None	None	G3?Q/S1?	3.3		No	Yes
Opuntia xcurvispina curved-spine beavertail	PDCAC0D270	None	None	G2G3/S1	2B.2		No	Yes
Orcuttia californica California Orcutt grass	PMPOA4G010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Orcuttia inaequalis San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	G1/S1	1B.1		No	Yes
Orcuttia pilosa hairy Orcutt grass	PMPOA4G040	Endangered	Endangered	G1/S1	1B.1		No	Yes
Orcuttia tenuis slender Orcutt grass	PMPOA4G050	Threatened	Endangered	G2/S2	1B.1		Yes	Yes
Orcuttia viscida Sacramento Orcutt grass	PMPOA4G070	Endangered	Endangered	G1/S1	1B.1		No	Yes
Oreocarya roosiorum bristlecone cryptantha	PDBOR0A2L0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Oreocarya schoolcraftii Schoolcraft's cryptantha	PDBOR0A3H0	None	None	G3/S1	2B.2	BLM:S	No	Yes
Oreonana purpurascens purple mountain-parsley	PDAPI1G020	None	None	G3/S3	1B.2	USFS:S	No	Yes
Oreonana vestita woolly mountain-parsley	PDAPI1G030	None	None	G3/S3	1B.3	USFS:S	Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Oreostemma elatum tall alpine-aster	PDASTEA020	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Ornithostaphylos oppositifolia Baja California birdbush	PDERI0W010	None	Endangered	G3/S1	2B.1		Yes	Yes
Orobanche ludoviciana var. arenosa Suksdorf's broom-rape	PDORO04073	None	None	G5T5/S2	2B.3		No	Yes
Orobanche parishii ssp. brachyloba short-lobed broomrape	PDORO040A2	None	None	G4?T4/S3	4.2		No	Yes
Orobanche valida ssp. howellii Howell's broomrape	PDORO040G1	None	None	G4T3/S3	4.3		No	No
Orobanche valida ssp. valida Rock Creek broomrape	PDORO040G2	None	None	G4T2/S2	1B.2	USFS:S	No	Yes
Orthocarpus cuspidatus ssp. cuspidatus Siskiyou Mountains orthocarpus	PDSCR1H081	None	None	G5T3/S3	4.3		No	No
Orthocarpus pachystachyus Shasta orthocarpus	PDSCR1H0L0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Oryctes nevadensis Nevada oryctes	PDSOL0Q010	None	None	G3/S2	2B.1		No	Yes
Osmorhiza depauperata blunt-fruited sweet-cicely	PDAPI1K050	None	None	G5/S1	2B.3		No	Yes
Oxalis suksdorfii Suksdorf's wood-sorrel	PDOXA010U0	None	None	G4/S3	4.3		No	No
Oxytheca watsonii Watson's oxytheca	PDPGN0J070	None	None	G3?/S1	2B.2		No	Yes
Oxytropis deflexa var. sericea blue pendent-pod oxytrope	PDFAB2X053	None	None	G5T5/S1	2B.1		No	Yes
Oxytropis oreophila var. oreophila rock-loving oxytrope	PDFAB2X0H3	None	None	G5T4T5/S2	2B.3	USFS:S	No	Yes
Oxytropis parryi Parry's oxytrope	PDFAB2X0J0	None	None	G5/S4	4.3		No	No
Packera bernardina San Bernardino ragwort	PDAST8H0E0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Packera bolanderi var. bolanderi seacoast ragwort	PDAST8H0H1	None	None	G4T4/S2S3	2B.2		No	Yes
Packera eurycephala var. lewisrosei Lewis Rose's ragwort	PDAST8H182	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Packera ganderi Gander's ragwort	PDAST8H1F0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Packera hesperia western ragwort	PDAST8H1L0	None	None	G3/S1	2B.2	USFS:S	No	Yes
Packera indecora rayless mountain ragwort	PDAST8H1R0	None	None	G5/S2?	2B.2		No	Yes
Packera ionophylla Tehachapi ragwort	PDAST8H1T0	None	None	G4/S4	4.3		No	No
Packera layneae Layne's ragwort	PDAST8H1V0	Threatened	Rare	G2/S2	1B.2		Yes	Yes
Packera macounii Siskiyou Mountains ragwort	PDAST8H1Z0	None	None	G5?/S3	4.3		No	No
Palafoxia arida var. gigantea giant spanish-needle	PDAST6T012	None	None	G5T3?/S2	1B.3	BLM:S	Yes	Yes
Panicum acuminatum var. thermale Geysers panicum	PMPOA24028	None	Endangered	G5T2Q/S2	1B.2	BLM:S	No	Yes
Panicum hirticaule ssp. hirticaule roughstalk witch grass	PMPOA4K170	None	None	G5T5/S2	2B.1		No	Yes
Parkinsonia microphylla little-leaved palo verde	PDFAB2Z030	None	None	G5/S3	4.3		Yes	No
Parnassia cirrata var. cirrata San Bernardino grass-of-Parnassus	PDSAX0P030	None	None	G5T2/S2	1B.3	USFS:S	No	Yes
Parnassia cirrata var. intermedia Cascade grass-of-Parnassus	PDSAX0P044	None	None	G5T4/S3	2B.2	USFS:S	No	Yes
Parnassia parviflora small-flowered grass-of-Parnassus	PDSAX0P0A0	None	None	G5?/S2	2B.2		No	Yes
Paronychia ahartii Ahart's paronychia	PDCAR0L0V0	None	None	G3/S3	1B.1	BLM:S	No	Yes
Pedicularis bracteosa var. flavida yellowish lousewort	PDSCR1K044	None	None	G5T4/S3	4.3		No	No
Pedicularis centranthera Great Basin lousewort	PDSCR1K070	None	None	G4/S2	2B.3	BLM:S	No	Yes
Pedicularis contorta curved-beak lousewort	PDSCR1K090	None	None	G5/S3	4.3		No	No
Pedicularis crenulata scalloped-leaved lousewort	PDSCR1K0A0	None	None	G4/S1	2B.2		No	Yes
Pedicularis dudleyi Dudley's lousewort	PDSCR1K0D0	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Pedicularis howellii Howell's lousewort	PDSCR1K0J0	None	None	G4/S3	4.3	USFS:S	No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Pediomelum castoreum Beaver Dam breadroot	PDFAB5L050	None	None	G3/S2	1B.2	BLM:S	No	Yes
Pellaea truncata spiny cliff-brake	PPADI0H0C0	None	None	G5/S3	2B.3		No	Yes
Penstemon albomarginatus white-margined beardtongue	PDSCR1L070	None	None	G2/S1	1B.1	BLM:S	Yes	Yes
Penstemon barnebyi Barneby's beardtongue	PDSCR1L0Q0	None	None	G3G4/S1	2B.1		No	Yes
Penstemon bicolor ssp. roseus rosy two-toned beardtongue	PDSCR1L0S2	None	None	G3T3Q/S1	1B.1	BLM:S	Yes	Yes
Penstemon calcareus limestone beardtongue	PDSCR1L100	None	None	G3?/S3?	1B.3		No	Yes
Penstemon californicus California beardtongue	PDSCR1L110	None	None	G3/S2	1B.2	USFS:S	Yes	Yes
Penstemon cinereus ashy-gray beardtongue	PDSCR1L7F0	None	None	G4Q/S4	4.3		Yes	No
Penstemon cinicola ashy-gray beardtongue	PDSCR1L1B0	None	None	G4/S3	4.3		No	No
Penstemon clevelandii var. connatus San Jacinto beardtongue	PDSCR1L1D2	None	None	G5T4/S3	4.3		Yes	No
Penstemon filiformis thread-leaved beardtongue	PDSCR1L2A0	None	None	G3/S3	1B.3	BLM:S	No	Yes
Penstemon fruticiformis var. amargosae Amargosa beardtongue	PDSCR1L2F2	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Penstemon heterodoxus var. shastensis Shasta beardtongue	PDSCR1L5Q0	None	None	G5T3/S3	4.3		No	No
Penstemon janishiae Janish's beardtongue	PDSCR1L3A0	None	None	G4/S1	2B.2	BLM:S	No	Yes
Penstemon newberryi var. sonomensis Sonoma beardtongue	PDSCR1L483	None	None	G4T2/S2	1B.3		No	Yes
Penstemon pahutensis Pahute beardtongue	PDSCR1L4H0	None	None	G3/S1	2B.3		No	Yes
Penstemon papillatus Inyo beardtongue	PDSCR1L4L0	None	None	G3/S3	4.3		No	No
Penstemon personatus closed-throated beardtongue	PDSCR1L4Y0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Penstemon pseudospectabilis ssp. pseudospectabilis desert beardtongue	PDSCR1L562	None	None	G4G5T4/S3	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	PDSCR1L5B1	None	None	G4T2/S2	1B.2		No	Yes
Penstemon scapoides pinyon beardtongue	PDSCR1L5J0	None	None	G3/S3	4.3		Yes	No
Penstemon stephensii Stephens' beardtongue	PDSCR1L5W0	None	None	G3?/S3?	1B.3	BLM:S	Yes	Yes
Penstemon sudans Susanville beardtongue	PDSCR1L620	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Penstemon thompsoniae Thompson's beardtongue	PDSCR1L670	None	None	G4/S1	2B.3		Yes	Yes
Penstemon thurberi Thurber's beardtongue	PDSCR1L680	None	None	G5/S3	4.2		Yes	No
Penstemon tracyi Tracy's beardtongue	PDSCR1L6A0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Penstemon utahensis Utah beardtongue	PDSCR1L6G0	None	None	G4/S2	2B.3		No	Yes
Pentachaeta aurea ssp. allenii Allen's pentachaeta	PDAST6X021	None	None	G4T1/S1	1B.1		No	Yes
Pentachaeta aurea ssp. aurea golden-rayed pentachaeta	PDAST6X022	None	None	G4T3/S3	4.2		Yes	No
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Pentachaeta exilis ssp. aeolica San Benito pentachaeta	PDAST6X041	None	None	G5T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Pentachaeta fragilis fragile pentachaeta	PDAST6X050	None	None	G3/S3	4.3		No	No
Pentachaeta lyonii Lyon's pentachaeta	PDAST6X060	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Perideridia bacigalupii Bacigalupi's yampah	PDAPI1N020	None	None	G3/S3	4.2		No	No
Perideridia gairdneri ssp. gairdneri California Gairdner's yampah	PDAPI1N062	None	None	G5T3T4/S3S4	4.2		No	No
Perideridia leptocarpa narrow-seeded yampah	PDAPI1N0A0	None	None	G3Q/S3	4.3		No	No
Perideridia parishii ssp. parishii Parish's yampah	PDAPI1N0C2	None	None	G4T3T4/S2	2B.2		No	Yes
Perideridia pringlei adobe yampah	PDAPI1N0D0	None	None	G4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Perityle inyoensis Inyo rock daisy	PDAST700F0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Perityle villosa Hanaupah rock daisy	PDAST700V0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Petalonyx linearis narrow-leaf sandpaper-plant	PDLOA04010	None	None	G4/S3?	2B.3		No	Yes
Petalonyx thurberi ssp. gilmanii Death Valley sandpaper-plant	PDLOA04041	None	None	G5T2/S2	1B.3	BLM:S	No	Yes
Peteria thompsoniae spine-noded milk vetch	PDFAB32020	None	None	G4/S1	2B.1		No	Yes
Petradoria pumila ssp. pumila rock goldenrod	PDAST72022	None	None	G5T4/S4?	4.3		No	No
Petrophytum caespitosum ssp. acuminatum marble rockmat	PDROS18010	None	None	G5T2/S2	1B.3	USFS:S	No	Yes
Phacelia amabilis Saline Valley phacelia	PDHYD0C040	None	None	GHQ/SH	3.3		No	Yes
Phacelia anelsonii Aven Nelson's phacelia	PDHYD0C060	None	None	G3/S2	2B.3		Yes	Yes
Phacelia argentea sand dune phacelia	PDHYD0C070	None	None	G2/S1	1B.1		Yes	Yes
Phacelia barnebyana Barneby's phacelia	PDHYD0C0C0	None	None	G3?/S2	2B.3		No	Yes
Phacelia ciliata var. opaca Merced phacelia	PDHYD0C0S2	None	None	G5TH/SH	3.2		No	Yes
Phacelia coerulea sky-blue phacelia	PDHYD0C0U0	None	None	G5/S2	2B.3		No	Yes
Phacelia cookei Cooke's phacelia	PDHYD0C0Y0	None	None	G1/S1	1B.1	BLM:S USFS:S	Yes	Yes
Phacelia exilis Transverse Range phacelia	PDHYD0C4Y0	None	None	G4Q/S4	4.3		Yes	No
Phacelia floribunda many-flowered phacelia	PDHYD0C1G0	None	None	G2/S2	1B.2		No	Yes
Phacelia greenei Scott Valley phacelia	PDHYD0C1V0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Phacelia gymnoclada naked-stemmed phacelia	PDHYD0C1X0	None	None	G4/S2	2B.3		No	Yes
Phacelia hubbyi Hubby's phacelia	PDHYD0C0R4	None	None	G4/S4	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Phacelia insularis var. continentis North Coast phacelia	PDHYD0C2B1	None	None	G2T2/S2	1B.2		No	Yes
Phacelia insularis var. insularis northern Channel Islands phacelia	PDHYD0C2B2	Endangered	None	G2T1/S1	1B.2		No	Yes
Phacelia inundata playa phacelia	PDHYD0C2E0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Phacelia inyoensis Inyo phacelia	PDHYD0C2F0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Phacelia keckii Santiago Peak phacelia	PDHYD0C4G1	None	None	G1/S1	1B.3	USFS:S	No	Yes
Phacelia leonis Siskiyou phacelia	PDHYD0C2N0	None	None	G3/S2?	1B.3	BLM:S	No	Yes
Phacelia mohavensis Mojave phacelia	PDHYD0C310	None	None	G4Q/S4	4.3		Yes	No
Phacelia monoensis Mono County phacelia	PDHYD0C4V0	None	None	G3/S2	1B.1	BLM:S USFS:S	No	Yes
Phacelia mustelina Death Valley round-leaved phacelia	PDHYD0C330	None	None	G3/S2	1B.3	BLM:S	No	Yes
Phacelia nashiana Charlotte's phacelia	PDHYD0C350	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Phacelia novenmillensis Nine Mile Canyon phacelia	PDHYD0C3A0	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	No	Yes
Phacelia orogenes Sierra phacelia	PDHYD0C3C0	None	None	G3/S3	4.3		No	No
Phacelia parishii Parish's phacelia	PDHYD0C3G0	None	None	G2G3/S1	1B.1	BLM:S	No	Yes
Phacelia peirsoniana Peirson's phacelia	PDHYD0C3N0	None	None	G4/S4	4.3		No	No
Phacelia perityloides var. jaegeri Jaeger's phacelia	PDHYD0C1M0	None	None	G4T2/S2	1B.3		No	Yes
Phacelia phacelioides Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Phacelia pulchella var. gooddingii Goodding's phacelia	PDHYD0C3V1	None	None	G5T3/S2	2B.2		No	Yes
Phacelia ramosissima var. austrolitoralis south coast branching phacelia	PDHYD0C416	None	None	G5?T3Q/S3	3.2		No	No
Phacelia sericea var. ciliosa blue alpine phacelia	PDHYD0C4A1	None	None	G5T4T5/S3	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Phacelia stebbinsii Stebbins' phacelia	PDHYD0C4D0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Phacelia stellaris Brand's star phacelia	PDHYD0C510	None	None	G1/S1	1B.1		Yes	Yes
Phaseolus filiformis slender-stem bean	PDFAB330P0	None	None	G5/S1	2B.1		No	Yes
Phlox dispersa High Sierra phlox	PDPLM0D0M0	None	None	G3/S3	4.3		No	No
Phlox dolichantha Big Bear Valley phlox	PDPLM0D0P0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Phlox hirsuta Yreka phlox	PDPLM0D100	Endangered	Endangered	G1/S1	1B.2		Yes	Yes
Phlox muscoides squarestem phlox	PDPLM0D115	None	None	G4G5/S3	2B.3		No	Yes
Pholisma sonorae sand food	PDLNN02020	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Pholistoma auritum var. arizonicum Arizona pholistoma	PDHYD0D011	None	None	G5T4?/S3	2B.3		Yes	Yes
Physalis lobata lobed ground-cherry	PDSOL0T010	None	None	G5/S1S2	2B.3		Yes	Yes
Physaria chambersii Chambers' physaria	PDBRA22050	None	None	G5/S2S3	2B.3		Yes	Yes
Physaria kingii ssp. bernardina San Bernardino Mountains bladderpod	PDBRA1N0W1	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Physaria ludoviciana silver bladderpod	PDBRA1N110	None	None	G5/S1	2B.2		No	Yes
Physocarpus alternans Nevada ninebark	PDROS19010	None	None	G4/S3	2B.3		No	Yes
Picea engelmannii Engelmann spruce	PGPIN03030	None	None	G5/S2	2B.2		No	Yes
Pickeringia montana var. tomentosa woolly chaparral-pea	PDFAB34012	None	None	G5T3T4/S3S4	4.3		Yes	No
Pilostyles thurberi Thurber's pilostyles	PDRAF01010	None	None	G5/S4	4.3		No	Yes
Pinguicula macroceras horned butterwort	PDLNT01040	None	None	G4/S2	2B.2		No	Yes
Pinus contorta ssp. bolanderi Bolander's beach pine	PGPIN04081	None	None	G5T2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Pinus edulis two-needle pinyon pine	PGPIN040C0	None	None	G5/S3	3.3		No	No
Pinus longaeva bristlecone pine	PGPIN04180	None	None	G4/S3S4	4.3		Yes	No
Pinus radiata Monterey pine	PGPIN040V0	None	None	G1/S1	1B.1		Yes	Yes
Pinus torreyana ssp. insularis Santa Rosa Island Torrey pine	PGPIN04151	None	None	G1T1/S1	1B.2		Yes	Yes
Pinus torreyana ssp. torreyana Torrey pine	PGPIN04152	None	None	G1T1/S1	1B.2		Yes	Yes
Piperia candida white-flowered rein orchid	PMORC1X050	None	None	G3/S3	1B.2	BLM:S	No	Yes
Piperia colemanii Coleman's rein orchid	PMORC1X080	None	None	G4/S4	4.3		No	No
Piperia cooperi chaparral rein orchid	PMORC1X090	None	None	G3G4/S3S4	4.2		No	No
Piperia elegans ssp. decurtata Point Reyes rein orchid	PMORC1X011	None	None	G4T1/S1	1B.1		No	Yes
Piperia leptopetala narrow-petaled rein orchid	PMORC1X100	None	None	G4/S4	4.3		No	No
Piperia michaelii Michael's rein orchid	PMORC1X110	None	None	G3/S3	4.2		No	No
Piperia yadonii Yadon's rein orchid	PMORC1X070	Endangered	None	G1/S1	1B.1		No	Yes
Pityopus californicus California pinefoot	PDMON05010	None	None	G4G5/S4	4.2		No	No
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q/S1	1B.2		No	Yes
Plagiobothrys chorisianus var. hickmanii Hickman's popcornflower	PDBOR0V062	None	None	G3T3Q/S3	4.2		No	No
Plagiobothrys diffusus San Francisco popcornflower	PDBOR0V080	None	Endangered	G1Q/S1	1B.1		No	Yes
Plagiobothrys glaber hairless popcornflower	PDBOR0V0B0	None	None	GH/SH	1A		No	Yes
Plagiobothrys glyptocarpus var. modestus Cedar Crest popcornflower	PDBOR0V0C2	None	None	G3THQ/SH	3		No	No
Plagiobothrys hystriculus bearded popcornflower	PDBOR0V0H0	None	None	G2/S2	1B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Plagiobothrys lithocaryus Mayacamas popcornflower	PDBOR0V0P0	None	None	GH/SH	1A		No	Yes
Plagiobothrys mollis var. vestitus Petaluma popcornflower	PDBOR0V0Q2	None	None	G4?TX/SX	1A		No	Yes
Plagiobothrys nitens shiny-nutlet popcornflower	PDBOR0V1B0	None	None	GNR/S1	2B.1		No	Yes
Plagiobothrys parishii Parish's popcornflower	PDBOR0V0U0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Plagiobothrys salsus desert popcornflower	PDBOR0V0X0	None	None	G2G3/S1	2B.2		No	Yes
Plagiobothrys strictus Calistoga popcornflower	PDBOR0V120	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Plagiobothrys torreyi var. perplexans chaparral popcornflower	PDBOR0V153	None	None	G4T3?/S3?	4.3		No	No
Plagiobothrys torreyi var. torreyi Yosemite popcornflower	PDBOR0V152	None	None	G4T3Q/S3	1B.2		No	Yes
Plagiobothrys uncinatus hooked popcornflower	PDBOR0V170	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Plagiobothrys verrucosus warty popcornflower	PDBOR0V1D0	None	None	G4G5/S1	2B.1		No	Yes
Platanthera stricta slender bog-orchid	PMORC1Y0P0	None	None	G5/S3	4.2		No	No
Platanthera yosemitensis Yosemite bog orchid	PMORC1Y1B0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Platystemon californicus var. ciliatus Santa Barbara Island cream cups	PDPAP0J022	None	None	G5T1Q/S1	1B.2		No	Yes
Pleuropogon californicus var. davyi Davy's semaphore grass	PMPOA7Y012	None	None	G5T3/S3	4.3		No	No
Pleuropogon hooverianus North Coast semaphore grass	PMPOA4Y070	None	Threatened	G2/S2	1B.1	BLM:S	Yes	Yes
Pleuropogon refractus nodding semaphore grass	PMPOA4Y080	None	None	G4/S4	4.2		No	No
Poa abbreviata ssp. marshii Marsh's blue grass	PMPOA4Z013	None	None	G5T2/S1	2B.3		No	Yes
Poa abbreviata ssp. pattersonii Patterson's blue grass	PMPOA4Z015	None	None	G5T5/S1	2B.3		No	Yes
Poa atropurpurea San Bernardino blue grass	PMPOA4Z0A0	Endangered	None	G2/S2	1B.2		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Poa diaboli Diablo Canyon blue grass	PMPOA4Z390	None	None	G2/S2	1B.2	BLM:S	No	Yes
Poa lettermanii Letterman's blue grass	PMPOA4Z1H0	None	None	G4/S3	2B.3		No	Yes
Poa napensis Napa blue grass	PMPOA4Z1R0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Poa piperi Piper's blue grass	PMPOA4Z200	None	None	G4/S3	4.3		No	No
Poa rhizomata timber blue grass	PMPOA4Z250	None	None	G4?/S3S4	4.3		No	No
Poa sierrae Sierra blue grass	PMPOA4Z310	None	None	G3/S3	1B.3	USFS:S	No	Yes
Podistera nevadensis Sierra podistera	PDAPI1T030	None	None	G4/S4	4.3		No	No
Pogogyne abramsii San Diego mesa mint	PDLAM1K010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Pogogyne clareana Santa Lucia mint	PDLAM1K020	None	Endangered	G2/S2	1B.2		Yes	Yes
Pogogyne floribunda profuse-flowered pogogyne	PDLAM1K070	None	None	G3G4/S3	4.2		No	Yes
Pogogyne nudiuscula Otay Mesa mint	PDLAM1K040	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Polemonium carneum Oregon polemonium	PDPLM0E050	None	None	G3G4/S2	2B.2		No	Yes
Polemonium chartaceum Mason's sky pilot	PDPLM0E0T0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Polemonium eddyense Mt. Eddy sky pilot	PDPLM0E0S0	None	None	G1/S1	1B.2		No	Yes
Polemonium pulcherrimum var. shastense Mt. Shasta sky pilot	PDPLM0E0J4	None	None	G5T2/S2	1B.2		No	Yes
Poliomintha incana frosted mint	PDLAM1L020	None	None	G5/SH	2A		No	Yes
Polyctenium fremontii var. fremontii Fremont's combleaf	PDBRA23012	None	None	G4T4/S4	4.3		No	No
Polyctenium williamsiae Williams' combleaf	PDBRA23030	None	None	G2Q/S1	1B.2	BLM:S USFS:S	No	Yes
Polygala acanthoclada thorny milkwort	PDPGL02020	None	None	G4/S2S3	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Polygala cornuta var. fishiae Fish's milkwort	PDPGL020B2	None	None	G5T4/S4	4.3		No	No
Polygala heterorhyncha notch-beaked milkwort	PDPGL02270	None	None	G2/S2	2B.3		No	Yes
Polygala intermontana intermountain milkwort	PDPGL021U0	None	None	G4/S2	2B.1		No	Yes
Polygala subspinosa spiny milkwort	PDPGL021Q0	None	None	G4?/S3	2B.2		No	Yes
Polygonum bidwelliae Bidwell's knotweed	PDPGN0L0C0	None	None	G4/S4	4.3		No	No
Polygonum hickmanii Scotts Valley polygonum	PDPGN0L310	Endangered	Endangered	G1/S1	1B.1		No	Yes
Polygonum marinense Marin knotweed	PDPGN0L1C0	None	None	G2Q/S2	3.1		No	Yes
Polygonum polygaloides ssp. esotericum Modoc County knotweed	PDPGN0L1Y2	None	None	G4G5T3/S3	1B.3	BLM:S	No	Yes
Polystichum kruckebergii Kruckeberg's sword fern	PPDRY0R0C0	None	None	G4/S4	4.3		No	No
Polystichum lonchitis northern holly fern	PPDRY0R0F0	None	None	G5/S3	3		No	No
Populus angustifolia narrow-leaved cottonwood	PDSAL01020	None	None	G5/S2	2B.2		No	Yes
Portulaca halimoides desert portulaca	PDPOR06040	None	None	G5/S3	4.2		Yes	No
Potamogeton epihydrus Nuttall's ribbon-leaved pondweed	PMPOT03080	None	None	G5/S2S3	2B.2		No	Yes
Potamogeton foliosus ssp. fibrillosus fibrous pondweed	PMPOT030B1	None	None	G5T2T4/S1S2	2B.3		No	Yes
Potamogeton praelongus white-stemmed pondweed	PMPOT030V0	None	None	G5/S2	2B.3		No	Yes
Potamogeton robbinsii Robbins' pondweed	PMPOT030Z0	None	None	G5/S3	2B.3		No	Yes
Potamogeton zosteriformis eel-grass pondweed	PMPOT03160	None	None	G5/S3	2B.2		No	Yes
Potentilla basaltica Black Rock potentilla	PDROS1B270	None	None	G1/S1	1B.3	BLM:S USFS:S	No	Yes
Potentilla concinna var. proxima early cinquefoil	PDROS1B0F8	None	None	G5?T4T5/S1	2B.3		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Potentilla cristae crested potentilla	PDROS1B2F0	None	None	G2/S2	1B.3		No	Yes
Potentilla hickmanii Hickman's cinquefoil	PDROS1B0U0	Endangered	Endangered	G1/S1	1B.1		No	Yes
Potentilla morefieldii Morefield's cinquefoil	PDROS1B2R0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Potentilla multijuga Ballona cinquefoil	PDROS1B120	None	None	GX/SX	1A		No	Yes
Potentilla newberryi Newberry's cinquefoil	PDROS1B130	None	None	G3G4/S2S3	2B.3		No	Yes
Potentilla pulcherrima beautiful cinquefoil	PDROS1B2P0	None	None	G5/S1	2B.2		No	Yes
Potentilla rimicola cliff cinquefoil	PDROS1B2G0	None	None	G2/S1	2B.3	USFS:S	No	Yes
Potentilla uliginosa Cunningham Marsh cinquefoil	PDROS1B4A0	None	None	GH/SH	1A		No	Yes
Primula pauciflora beautiful shootingstar	PDPRI030D0	None	None	G5/S3	4.2		No	No
Proboscidea althaeifolia desert unicorn-plant	PDPED06010	None	None	G5/S4	4.3		Yes	No
Prosartes parvifolia Siskiyou bells	PMLIL0R014	None	None	G2/S1S2	1B.2	USFS:S	No	Yes
Prunus eremophila Mojave Desert plum	PDROS1C1Q0	None	None	G2/S2	1B.2		No	Yes
Prunus fasciculata var. punctata sand almond	PDROS1C0E2	None	None	G5T4/S4	4.3		No	No
Pseudobahia bahiifolia Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	G2/S2	1B.1		Yes	Yes
Pseudobahia peirsonii San Joaquin adobe sunburst	PDAST7P030	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Pseudognaphalium leucocephalum white rabbit-tobacco	PDAST440C0	None	None	G4/S2	2B.2		No	Yes
Pseudorontium cyathiferum Deep Canyon snapdragon	PDSCR2R010	None	None	G4G5/S1	2B.3		No	Yes
Pseudostellaria sierrae Sierra starwort	PDCAR13020	None	None	G3G4/S3	4.2		No	No
Psilocarphus brevissimus var. multiflorus Delta woolly-marbles	PDAST7R012	None	None	G4T3/S3	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Psilocarphus elatior tall woolly-marbles	PDAST7R020	None	None	G4/S2S3	4.3		No	No
Psorothamnus arborescens var. arborescens Mojave indigo-bush	PDFAB3C011	None	None	G5T4/S4	4.3		Yes	No
Psorothamnus fremontii var. attenuatus narrow-leaved psorothamnus	PDFAB3C031	None	None	G5T4?/S3	2B.3		No	Yes
Puccinellia howellii Howell's alkali grass	PMPOA531A0	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Puccinellia parishii Parish's alkali grass	PMPOA530T0	None	None	G3/S1	1B.1	BLM:S	No	Yes
Puccinellia pumila dwarf alkali grass	PMPOA531L0	None	None	G4?/SH	2B.2		No	Yes
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3/S2	1B.2		No	Yes
Pyrrocoma lucida sticky pyrrocoma	PDASTDT0E0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Pyrrocoma racemosa var. congesta Del Norte pyrrocoma	PDASTDT0F4	None	None	G5T4/S2	2B.3		No	Yes
Pyrrocoma racemosa var. pinetorum pine pyrrocoma	PDASTDT0F2	None	None	G5T3/S3	4.2		No	No
Pyrrocoma uniflora var. gossypina Bear Valley pyrrocoma	PDASTDT0K1	None	None	G5T1/S1	1B.2	USFS:S	Yes	Yes
Quercus cedrosensis Cedros Island oak	PDFAG05650	None	None	G3/S1	2B.2		No	Yes
Quercus dumosa Nuttall's scrub oak	PDFAG050D0	None	None	G3/S3	1B.1	USFS:S	No	Yes
Quercus durata var. gabrielensis San Gabriel oak	PDFAG050G2	None	None	G4T3/S3	4.2		No	No
Quercus engelmannii Engelmann oak	PDFAG050K0	None	None	G3/S3	4.2		No	No
Quercus pacifica island scrub oak	PDFAG05620	None	None	G4/S4	4.2		No	No
Quercus parvula var. parvula Santa Cruz Island oak	PDFAG051Q1	None	None	G4T3/S3	4.2		No	No
Quercus parvula var. tamalpaisensis Tamalpais oak	PDFAG051Q3	None	None	G4T2/S2	1B.3		No	Yes
Quercus tomentella island oak	PDFAG05250	None	None	G3G4/S3S4	4.2		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Quercus turbinella shrub live oak	PDFAG05270	None	None	G5/S4	4.3		No	No
Raillardella pringlei showy raillardella	PDAST7X030	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Ranunculus hydrocharoides frog's-bit buttercup	PDRAN0L190	None	None	G4/S1	2B.1		No	Yes
Ranunculus lobbii Lobb's aquatic buttercup	PDRAN0L1J0	None	None	G4/S3	4.2		No	No
Ranunculus macounii Macoun's buttercup	PDRAN0L1M0	None	None	G5/S1	2B.2		No	Yes
Rhamnus alnifolia alder buckthorn	PDRHA0C010	None	None	G5/S3	2B.2		No	Yes
Rhamnus pirifolia island redberry	PDRHA0C0A0	None	None	G4/S4	4.2		Yes	No
Rhus aromatica var. simplicifolia single-leaved skunkbrush	PDANA080B5	None	None	G5T5/S2	2B.3		No	Yes
Rhynchospora alba white beaked-rush	PMCYP0N010	None	None	G5/S2	2B.2		No	Yes
Rhynchospora californica California beaked-rush	PMCYP0N060	None	None	G1/S1	1B.1	BLM:S	No	Yes
Rhynchospora capitellata brownish beaked-rush	PMCYP0N080	None	None	G5/S1	2B.2		No	Yes
Rhynchospora globularis round-headed beaked-rush	PMCYP0N0W0	None	None	G4/S1	2B.1		No	Yes
Ribes amarum var. hoffmannii Hoffmann's bitter gooseberry	PDGRO02012	None	None	G4?T3/S3	3		No	No
Ribes canthariforme Moreno currant	PDGRO02070	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Ribes divaricatum var. parishii Parish's gooseberry	PDGRO020F3	None	None	G5TX/SX	1A		No	Yes
Ribes hudsonianum var. petiolare western black currant	PDGRO020N2	None	None	G5T5/S2	2B.3		No	Yes
Ribes laxiflorum trailing black currant	PDGRO020V0	None	None	G5?/S3	4.3		No	No
Ribes marshallii Marshall's gooseberry	PDGRO020Z0	None	None	G4/S4	4.3		No	No
Ribes menziesii var. ixoderme aromatic canyon gooseberry	PDGRO02104	None	None	G4T1/S1	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Ribes roezlii var. amictum hoary gooseberry	PDGRO021B1	None	None	G5T4/S4	4.3		No	No
Ribes sericeum Santa Lucia gooseberry	PDGRO021F0	None	None	G4/S4	4.3		No	No
Ribes thacherianum Santa Cruz Island gooseberry	PDGRO02109	None	None	G2/S2	1B.2		Yes	Yes
Ribes tularense Sequoia gooseberry	PDGRO021L0	None	None	G1/S1	1B.3	BLM:S	No	Yes
Ribes viburnifolium Santa Catalina Island currant	PDGRO021P0	None	None	G2?/S2?	1B.2		Yes	Yes
Ribes victoris Victor's gooseberry	PDGRO021Q0	None	None	G3G4/S3S4	4.3		No	No
Robinia neomexicana New Mexico locust	PDFAB3G070	None	None	G4/S1	2B.3		No	Yes
Romanzoffia tracyi Tracy's romanzoffia	PDHYD0E030	None	None	G4/S2	2B.3		No	Yes
Romneya coulteri Coulter's matilija poppy	PDPAP0L010	None	None	G4/S4	4.2		Yes	No
Rorippa columbiae Columbia yellow cress	PDBRA27060	None	None	G3/S2	1B.2	BLM:S USFS:S	No	Yes
Rorippa subumbellata Tahoe yellow cress	PDBRA270M0	None	Endangered	G1/S1	1B.1	USFS:S	Yes	Yes
Rosa gymnocarpa var. serpentina Gasquet rose	PDROS1J1V1	None	None	G5T3T4/S2	1B.3		Yes	Yes
Rosa minutifolia small-leaved rose	PDROS1J1B0	None	Endangered	G2G3/SXC	2B.1		Yes	Yes
Rosa pinetorum pine rose	PDROS1J0W0	None	None	G2/S2	1B.2		No	Yes
Rosa woodsii var. glabrata Cushenbury rose	PDROS1J191	None	None	G5T1/S1	1B.1		No	Yes
Rubus glaucifolius var. ganderi Cuyamaca raspberry	PDROS1K2N1	None	None	G5T1Q/S1	3.1		No	Yes
Rubus nivalis snow dwarf bramble	PDROS1K4S0	None	None	G4?/S1	2B.3		No	Yes
Rumex venosus winged dock	PDPGN0P1K0	None	None	G5?/S3	2B.3		No	Yes
Rupertia hallii Hall's rupertia	PDFAB62010	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Rupertia rigida Parish's rupertia	PDFAB62030	None	None	G4/S4	4.3		No	No
Sabulina decumbens The Lassics sandwort	PDCAR0G0Y0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Sabulina howellii Howell's sandwort	PDCAR0G0F0	None	None	G4/S3	1B.3	BLM:S	No	Yes
Sabulina rosei peanut sandwort	PDCAR0G0R0	None	None	G3/S3	4.2	USFS:S	No	No
Sabulina stolonifera Scott Mountain sandwort	PDCAR0G110	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Sabulina stricta bog sandwort	PDCAR0G0U0	None	None	G5/S3	2B.3		No	Yes
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3/S3	1B.2	BLM:S	No	Yes
Salix bebbiana Bebb's willow	PDSAL020E0	None	None	G5/S2S3	2B.3		No	Yes
Salix brachycarpa var. brachycarpa short-fruited willow	PDSAL020H5	None	None	G5T5/S2	2B.3		No	Yes
Salix delnortensis Del Norte willow	PDSAL023F0	None	None	G4/S4	4.3		No	No
Salix nivalis snow willow	PDSAL024K0	None	None	G5/S2	2B.3		No	Yes
Saltugilia caruifolia caraway-leaved woodland-gilia	PDPLM040C0	None	None	G4/S4	4.3		Yes	No
Saltugilia latimeri Latimer's woodland-gilia	PDPLM0H010	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Salvia brandegeei Brandegee's sage	PDLAM1S080	None	None	G3/S2	1B.2		No	Yes
Salvia dorrii var. incana fleshy sage	PDLAM1S0G8	None	None	G5T4/S2	3		No	No
Salvia eremostachya desert sage	PDLAM1S0K0	None	None	G4/S3	4.3		Yes	No
Salvia funerea Death Valley sage	PDLAM1S0M0	None	None	G4/S4	4.3		No	No
Salvia greatae Orocopia sage	PDLAM1S0P0	None	None	G2G3/S2S3	1B.3	BLM:S	Yes	Yes
Salvia munzii Munz's sage	PDLAM1S140	None	None	G2/S2	2B.2		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Sanguisorba officinalis great burnet	PDROS1L060	None	None	G5?/S2	2B.2		No	Yes
Sanicula hoffmannii Hoffmann's sanicle	PDAPI1Z090	None	None	G3/S3	4.3		Yes	No
Sanicula maritima adobe sanicle	PDAPI1Z0D0	None	Rare	G2/S2	1B.1	USFS:S	No	Yes
Sanicula peckiana Peck's sanicle	PDAPI1Z0E0	None	None	G4/S3	4.3		No	No
Sanicula saxatilis rock sanicle	PDAPI1Z0H0	None	Rare	G2/S2	1B.2	BLM:S	No	Yes
Sanicula tracyi Tracy's sanicle	PDAPI1Z0K0	None	None	G4/S4	4.2	USFS:S	No	Yes
Sanvitalia abertii Abert's sanvitalia	PDAST89010	None	None	G5/S2S3	2B.2		Yes	Yes
Sarcobatus baileyi Bailey's greasewood	PDCHE0L020	None	None	G4/S1	2B.3		No	Yes
Saussurea americana American saw-wort	PDAST8B020	None	None	G5/S1	2B.2		No	Yes
Saxifraga cespitosa tufted saxifrage	PDSAX0U0C0	None	None	G5/S1	2B.3		No	Yes
Scheuchzeria palustris American scheuchzeria	PMSCH02010	None	None	G5/S1	2B.1	USFS:S	No	Yes
Schoenoplectus heterochaetus slender bulrush	PMCYP0Q0T0	None	None	G5/S1	2B.1		No	Yes
Schoenoplectus subterminalis water bulrush	PMCYP0Q1G0	None	None	G4G5/S3	2B.3		No	Yes
Schoenus nigricans black bog-rush	PMCYP0P010	None	None	G4/S2	2B.2	USFS:S	No	Yes
Scirpus pendulus pendulous bulrush	PMCYP0Q160	None	None	G5/S1	2B.2		No	Yes
Sclerocactus johnsonii Johnson's bee-hive cactus	PDCAC0J0H0	None	None	G3/S2	2B.2		No	Yes
Sclerocactus polyancistrus Mojave fish-hook cactus	PDCAC0J050	None	None	G3/S3	4.2		Yes	No
Scleropogon brevifolius burro grass	PMPOA5G010	None	None	G5/S1S2	2B.3		No	Yes
Scrophularia atrata black-flowered figwort	PDSCR1S010	None	None	G2?/S2?	1B.2		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Scrophularia villosa Santa Catalina figwort	PDSCR1S0D0	None	None	G3/S3	1B.2		Yes	Yes
Scutellaria bolanderi ssp. austromontana southern mountains skullcap	PDLAM1U0A1	None	None	G4T3/S3	1B.2	USFS:S	No	Yes
Scutellaria galericulata marsh skullcap	PDLAM1U0J0	None	None	G5/S2	2B.2		No	Yes
Scutellaria holmgreniorum Holmgren's skullcap	PDLAM1U1C0	None	None	G3Q/S3	3.3		No	Yes
Scutellaria lateriflora side-flowering skullcap	PDLAM1U0Q0	None	None	G5/S2	2B.2		No	Yes
Sedella leiocarpa Lake County stonecrop	PDCRA0F020	Endangered	Endangered	G1/S1	1B.1		No	Yes
Sedum albomarginatum Feather River stonecrop	PDCRA0A030	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Sedum citrinum Blue Creek stonecrop	PDCRA0A200	None	None	G2/S2	1B.2		No	Yes
Sedum divergens Cascade stonecrop	PDCRA0A0B0	None	None	G5?/S2	2B.3		No	Yes
Sedum laxum ssp. eastwoodiae Red Mountain stonecrop	PDCRA0A0L1	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Sedum laxum ssp. flavidum pale yellow stonecrop	PDCRA0A0L2	None	None	G5T4Q/S4	4.3		No	Yes
Sedum laxum ssp. heckneri Heckner's stonecrop	PDCRA0A0L3	None	None	G5T4Q/S4	4.3		No	No
Sedum niveum Davidson's stonecrop	PDCRA0A0R0	None	None	G3/S3	4.2	USFS:S	Yes	No
Sedum oblanceolatum Applegate stonecrop	PDCRA0A0T0	None	None	G3/S1	1B.1		Yes	Yes
Sedum obtusatum ssp. paradisum Canyon Creek stonecrop	PDCRA0A0U3	None	None	G4G5T3/S3	1B.3	BLM:S USFS:S	No	Yes
Sedum pinetorum Pine City sedum	PDCRA0A0Z0	None	None	GUGHQ/SUSH	3		No	No
Selaginella asprella bluish spike-moss	PPSEL01060	None	None	G4/S4	4.3		No	No
Selaginella cinerascens ashy spike-moss	PPSEL01090	None	None	G3G4/S3	4.1		No	No
Selaginella eremophila desert spike-moss	PPSEL010G0	None	None	G4/S2S3	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Selaginella leucobryoides Mojave spike-moss	PPSEL010P0	None	None	G4/S3S4	4.3		No	No
Selaginella scopulorum Rocky Mountain spike-moss	PPSEL010C2	None	None	G4G5/S2S3	3		No	No
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3/S2	2B.2		No	Yes
Senecio astephanus San Gabriel ragwort	PDAST8H090	None	None	G3/S3	4.3		Yes	No
Senecio blochmaniae Blochman's ragwort	PDAST8H0G0	None	None	G3/S3	4.2		No	No
Senecio clevelandii var. clevelandii Cleveland's ragwort	PDAST8H0R1	None	None	G4?T3Q/S3	4.3		No	No
Senecio clevelandii var. heterophyllus Red Hills ragwort	PDAST8H0R2	None	None	G4?T2Q/S2	1B.2	BLM:S	No	Yes
Senecio hydrophiloides sweet marsh ragwort	PDAST8H400	None	None	G5/S3	4.2		No	No
Senecio pattersonensis Mt. Patterson senecio	PDAST8H2C0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Senna covesii Cove's cassia	PDFAB491X0	None	None	G5/S3	2B.2		Yes	Yes
Shepherdia canadensis Canadian buffalo-berry	PDELG03020	None	None	G5/S1	2B.1		No	Yes
Sibara deserti desert winged-rockcress	PDBRA2A010	None	None	G4/S4	4.3		No	No
Sibara filifolia Santa Cruz Island winged-rockcress	PDBRA2A020	Endangered	None	G2/S2	1B.1		Yes	Yes
Sibaropsis hammittii Hammitt's clay-cress	PDBRA32010	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	PDMAL11012	None	None	G5T2/S2	1B.2		No	Yes
Sidalcea celata Redding checkerbloom	PDMAL110FG	None	None	G2G3/S2S3	3		No	No
Sidalcea covillei Owens Valley checkerbloom	PDMAL11040	None	Endangered	G2/S2	1B.1	BLM:S	No	Yes
Sidalcea elegans Del Norte checkerbloom	PDMAL110F5	None	None	G4?/S2?	3.3		No	No
Sidalcea gigantea giant checkerbloom	PDMAL110T0	None	None	G3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Sidalcea hickmanii ssp. anomala Cuesta Pass checkerbloom	PDMAL110A1	None	Rare	G3T1/S1	1B.2	BLM:S USFS:S	Yes	Yes
Sidalcea hickmanii ssp. hickmanii Hickman's checkerbloom	PDMAL110A2	None	None	G3T2/S2	1B.3	USFS:S	Yes	Yes
Sidalcea hickmanii ssp. napensis Napa checkerbloom	PDMAL110A6	None	None	G3T1/S1	1B.1		No	Yes
Sidalcea hickmanii ssp. parishii Parish's checkerbloom	PDMAL110A3	None	Rare	G3T1/S1	1B.2	BLM:S USFS:S	Yes	Yes
Sidalcea hickmanii ssp. pillsburiensis Lake Pillsbury checkerbloom	PDMAL110A5	None	None	G3T1/S1	1B.2	USFS:S	No	Yes
Sidalcea hickmanii ssp. viridis Marin checkerbloom	PDMAL110A4	None	None	G3TH/SH	1B.1		No	Yes
Sidalcea keckii Keck's checkerbloom	PDMAL110D0	Endangered	None	G2/S2	1B.1		Yes	Yes
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3/S3	4.2		No	Yes
Sidalcea malviflora ssp. dolosa Bear Valley checkerbloom	PDMAL110FH	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Sidalcea malviflora ssp. purpurea purple-stemmed checkerbloom	PDMAL110FL	None	None	G5T1/S1	1B.2		No	Yes
Sidalcea multifida cut-leaf checkerbloom	PDMAL110G0	None	None	G3/S2	2B.3		No	Yes
Sidalcea neomexicana salt spring checkerbloom	PDMAL110J0	None	None	G4/S2	2B.2	USFS:S	No	Yes
Sidalcea oregana ssp. eximia coast checkerbloom	PDMAL110K9	None	None	G5T1/S1	1B.2	BLM:S	No	Yes
Sidalcea oregana ssp. hydrophila marsh checkerbloom	PDMAL110K2	None	None	G5T2/S2	1B.2		No	Yes
Sidalcea oregana ssp. valida Kenwood Marsh checkerbloom	PDMAL110K5	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Sidalcea pedata bird-foot checkerbloom	PDMAL110L0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Sidalcea robusta Butte County checkerbloom	PDMAL110P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Sidalcea stipularis Scadden Flat checkerbloom	PDMAL110R0	None	Endangered	G1/S1	1B.1		Yes	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Sidotheca caryophylloides chickweed oxytheca	PDPGN0J010	None	None	G4/S4	4.3	USFS:S	No	No
Sidotheca emarginata white-margined oxytheca	PDPGN0J030	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Silene aperta Tulare campion	PDCAR0U050	None	None	G4/S4	4.3		No	No
Silene campanulata ssp. campanulata Red Mountain catchfly	PDCAR0U0A2	None	Endangered	G5T3Q/S3	4.2	BLM:S	No	Yes
Silene krantzii Krantz's catchfly	PDCAR0U2H0	None	None	G1/S1	1B.2		No	Yes
Silene marmorensis Marble Mountain campion	PDCAR0U0Z0	None	None	G2/S2	1B.2		No	Yes
Silene occidentalis ssp. longistipitata long-stiped campion	PDCAR0U161	None	None	G4T2Q/S2	1B.2	BLM:S USFS:S	No	Yes
Silene occidentalis ssp. occidentalis western campion	PDCAR0U162	None	None	G4T3/S3	4.3		No	No
Silene oregana Oregon campion	PDCAR0U170	None	None	G4/S2	2B.2		No	Yes
Silene salmonacea Klamath Mountain catchfly	PDCAR0U2D0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Silene scouleri ssp. scouleri Scouler's catchfly	PDCAR0U1MC	None	None	G5T5/S2S3	2B.2		No	Yes
Silene serpentinicola serpentine catchfly	PDCAR0U2B0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Silene suksdorfii Cascade alpine campion	PDCAR0U1W0	None	None	G4/S3	2B.3		No	Yes
Silene verecunda ssp. verecunda San Francisco campion	PDCAR0U213	None	None	G5T1/S1	1B.2		No	Yes
Sisyrinchium funereum Death Valley blue-eyed grass	PMIRI0D0L0	None	None	G2/S2	1B.3		No	Yes
Sisyrinchium hitchcockii Hitchcock's blue-eyed grass	PMIRI0D0S0	None	None	G2/S1	1B.1		No	Yes
Sisyrinchium longipes timberland blue-eyed grass	PMIRI0D0Y0	None	None	G3G4/S1	2B.2	USFS:S	No	Yes
Smelowskia ovalis alpine smelowskia	PDBRA2D040	None	None	G5/S1	1B.2		No	Yes
Smilax jamesii English Peak greenbrier	PMSMI010D0	None	None	G3G4/S3S4	4.2	BLM:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Solanum clokeyi island nightshade	PDSOL0Z450	None	None	G3/S3	4.2		No	No
Solanum wallacei Wallace's nightshade	PDSOL0Z280	None	None	G3Q/S2	1B.1		Yes	Yes
Solidago guiradonis Guirado's goldenrod	PDAST8P0T0	None	None	G3G4/S3S4	4.3		No	No
Solidago lepida var. salebrosa Rocky Mountains Canada goldenrod	PDAST8P2D3	None	None	G5T5/S1	3.2		No	Yes
Sparganium natans small bur-reed	PMSPA01090	None	None	G5/S3S4	4.3		No	No
Spartina gracilis alkali cord grass	PMPOA5S060	None	None	G5/S3	4.2		No	No
Spergularia canadensis var. occidentalis western sand-spurrey	PDCAR0W032	None	None	G5T4/S1	2B.1		No	Yes
Spergularia macrotheca var. longistyla long-styled sand-spurrey	PDCAR0W062	None	None	G5T2/S2	1B.2		No	Yes
Spermolepis gigantea desert scaleseed	PDAPI05020	None	None	G2G3/SH	2B.1		No	Yes
Spermolepis infernensis Hellhole scaleseed	PDAPI23070	None	None	G1/S1	1B.2		No	Yes
Spermolepis lateriflora western bristly scaleseed	PDAPI23080	None	None	G5/SH	2A		No	Yes
Sphaeralcea grossulariifolia currant-leaved desert mallow	PDMAL14090	None	None	G4G5/S2	2B.3		No	Yes
Sphaeralcea munroana Munro's desert mallow	PDMAL140F0	None	None	G4/S1	2B.2		No	Yes
Sphaeralcea rusbyi var. eremicola Rusby's desert-mallow	PDMAL140L1	None	None	G4T2/S2	1B.2	BLM:S	Yes	Yes
Sphaeromeria potentilloides var. nitrophila alkali tansy-sage	PDAST8S061	None	None	G5T4?/S2	2B.2		No	Yes
Sphenopholis obtusata prairie wedge grass	PMPOA5T030	None	None	G5/S2	2B.2		No	Yes
Stachys pilosa hairy marsh hedge-nettle	PDLAM1X1A0	None	None	G5/S3	2B.3		No	Yes
Stanleya viridiflora green-flowered prince's plume	PDBRA2E060	None	None	G4/S2	2B.3		No	Yes
Stebbinsoseris decipiens Santa Cruz microseris	PDAST6E050	None	None	G2/S2	1B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Stellaria littoralis beach starwort	PDCAR0X0L0	None	None	G3/S3	4.2		No	No
Stellaria longifolia long-leaved starwort	PDCAR0X0M0	None	None	G5/S2	2B.2		No	Yes
Stellaria obtusa obtuse starwort	PDCAR0X0U0	None	None	G5/S4	4.3		No	Yes
Stemodia durantifolia purple stemodia	PDSCR1U010	None	None	G5/S2	2B.1		No	Yes
Stenotus lanuginosus var. lanuginosus woolly stenotus	PDASTCX012	None	None	G5T5/S3	2B.2	BLM:S	No	Yes
Stipa arida Mormon needle grass	PMPOA5X010	None	None	G5/S3?	2B.3		Yes	Yes
Stipa diegoensis San Diego County needle grass	PMPOA5X0B0	None	None	G4/S4	4.2		No	No
Stipa divaricata small-flowered rice grass	PMPOA4J070	None	None	G5/S2	2B.3		No	Yes
Stipa exigua little ricegrass	PMPOA80030	None	None	G4G5/S2	2B.3	BLM:S	No	Yes
Stipa lemmonii var. pubescens pubescent needle grass	PMPOA5X0F2	None	None	G5T1?Q/S1?	3.2		No	No
Streptanthus albidus ssp. albidus Metcalf Canyon jewelflower	PDBRA2G011	Endangered	None	G2T1/S1	1B.1	BLM:S	Yes	Yes
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	PDBRA2G012	None	None	G2T2/S2	1B.2	USFS:S	Yes	Yes
Streptanthus barbiger bearded jewelflower	PDBRA2G040	None	None	G3/S3	4.2		No	No
Streptanthus batrachopus Tamalpais jewelflower	PDBRA2G050	None	None	G2/S2	1B.3		No	Yes
Streptanthus bernardinus Laguna Mountains jewelflower	PDBRA2G060	None	None	G3G4/S3S4	4.3		Yes	Yes
Streptanthus brachiatus ssp. brachiatus Socrates Mine jewelflower	PDBRA2G072	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus brachiatus ssp. hoffmanii Freed's jewelflower	PDBRA2G071	None	None	G2T2/S2	1B.2	BLM:S	No	Yes
Streptanthus callistus Mt. Hamilton jewelflower	PDBRA2G0A0	None	None	G1G2/S1S2	1B.3	BLM:S	No	Yes
Streptanthus campestris southern jewelflower	PDBRA2G0B0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Streptanthus cordatus var. piutensis Piute Mountains jewelflower	PDBRA2G0D2	None	None	G5T1/S1	1B.2	BLM:S USFS:S	No	Yes
Streptanthus drepanoides sickle-fruit jewelflower	PDBRA2G200	None	None	G4/S4	4.3		No	No
Streptanthus farnsworthianus Farnsworth's jewelflower	PDBRA2G0G0	None	None	G4/S4	4.3		Yes	No
Streptanthus fenestratus Tehipite Valley jewelflower	PDBRA2G0H0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Streptanthus glandulosus ssp. hoffmanii Hoffman's bristly jewelflower	PDBRA2G0J4	None	None	G4T2/S2	1B.3	BLM:S	No	Yes
Streptanthus glandulosus ssp. niger Tiburon jewelflower	PDBRA2G0T0	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Streptanthus glandulosus ssp. pulchellus Mt. Tamalpais bristly jewelflower	PDBRA2G0J2	None	None	G4T2/S2	1B.2		Yes	Yes
Streptanthus gracilis alpine jewelflower	PDBRA2G0K0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Streptanthus hesperidis green jewelflower	PDBRA2G510	None	None	G2/S2	1B.2		No	Yes
Streptanthus hispidus Mt. Diablo jewelflower	PDBRA2G0M0	None	None	G2/S2	1B.3		No	Yes
Streptanthus howellii Howell's jewelflower	PDBRA2G0N0	None	None	G2G3/S2	1B.2	USFS:S	No	Yes
Streptanthus insignis ssp. lyonii Arburua Ranch jewelflower	PDBRA2G0Q1	None	None	G3G4T2/S2	1B.2		No	Yes
Streptanthus longisiliquus long-fruit jewelflower	PDBRA2G400	None	None	G3/S3	4.3		No	No
Streptanthus morrisonii ssp. elatus Three Peaks jewelflower	PDBRA2G0S1	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus morrisonii ssp. hirtiflorus Dorr's Cabin jewelflower	PDBRA2G0S2	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus morrisonii ssp. kruckebergii Kruckeberg's jewelflower	PDBRA2G0S4	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus morrisonii ssp. morrisonii Morrison's jewelflower	PDBRA2G0S3	None	None	G2T1?/S1?	1B.2	BLM:S	No	Yes
Streptanthus oblanceolatus Trinity River jewelflower	PDBRA2G500	None	None	G1/S1	1B.2	USFS:S	No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Streptanthus oliganthus Masonic Mountain jewelflower	PDBRA2G0V0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Streptanthus tortuosus ssp. truei True's mountain jewelflower	PDBRA2G108	None	None	G5T1T2/S1S2	1B.1		No	Yes
Streptanthus vernalis early jewelflower	PDBRA2G120	None	None	G1/S1	1B.2	BLM:S	No	Yes
Stuckenia filiformis ssp. alpina slender-leaved pondweed	PMPOT03091	None	None	G5T5/S3	2B.2		No	Yes
Stylocline citroleum oil neststraw	PDAST8Y070	None	None	G3/S3	1B.1	BLM:S	No	Yes
Stylocline masonii Mason's neststraw	PDAST8Y080	None	None	G1/S1	1B.1	BLM:S USFS:S	No	Yes
Stylocline sonorensis mesquite neststraw	PDAST8Y060	None	None	G3G5/SX	2A		No	Yes
Suaeda californica California seablite	PDCHE0P020	Endangered	None	G1/S1	1B.1		No	Yes
Suaeda esteroa estuary seablite	PDCHE0P0D0	None	None	G3/S2	1B.2		No	Yes
Suaeda occidentalis western seablite	PDCHE0P080	None	None	G5/S2	2B.3		No	Yes
Suaeda taxifolia woolly seablite	PDCHE0P0L0	None	None	G/S4	4.2		No	No
Subularia aquatica ssp. americana water awlwort	PDBRA2H012	None	None	G5T5/S4	4.3		No	No
Swallenia alexandrae Eureka Valley dune grass	PMPOA5Y010	Threatened	Rare	G2/S2	1B.2		Yes	Yes
Symphyotrichum defoliatum San Bernardino aster	PDASTE80C0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Symphyotrichum greatae Greata's aster	PDASTE80U0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2/S2	1B.2		Yes	Yes
Synthyris missurica ssp. missurica kitten-tails	PDSCR1W042	None	None	G4G5T4T5/S3	2B.3		Yes	Yes
Syntrichopappus lemmonii Lemmon's syntrichopappus	PDAST90020	None	None	G4/S4	4.3		Yes	No
Systenotheca vortriedei Vortriede's spineflower	PDPGN0W010	None	None	G3/S3	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Taraxacum californicum California dandelion	PDAST93050	Endangered	None	G1G2/S1S2	1B.1		Yes	Yes
Taraxacum ceratophorum horned dandelion	PDAST930Y1	None	None	G5/S1	2B.1		No	Yes
Tauschia glauca glaucous tauschia	PDAPI27020	None	None	G4/S4	4.3		No	No
Tauschia howellii Howell's tauschia	PDAPI27050	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Tetracoccus dioicus Parry's tetracoccus	PDEUP1C010	None	None	G2G3/S2	1B.2	BLM:S USFS:S	Yes	Yes
Tetracoccus hallii Hall's tetracoccus	PDEUP1C021	None	None	G4/S4	4.3		Yes	No
Tetracoccus ilicifolius holly-leaved tetracoccus	PDEUP1C030	None	None	G2/S2	1B.3		No	Yes
Tetradymia argyraea striped horsebrush	PDAST95010	None	None	G4?/S4	4.3		Yes	No
Tetradymia tetrameres dune horsebrush	PDAST950A0	None	None	G4/S2	2B.2		No	Yes
Teucrium cubense ssp. depressum dwarf germander	PDLAM20032	None	None	G4G5T3T4/S2	2B.2		No	Yes
Teucrium glandulosum desert germander	PDLAM20040	None	None	G4/S2	2B.3		No	Yes
Thalictrum alpinum arctic meadow-rue	PDRAN0M010	None	None	G5/S4	4.3		No	No
Thelypodium brachycarpum short-podded thelypodium	PDBRA2N010	None	None	G3/S3	4.2		No	No
Thelypodium howellii ssp. howellii Howell's thelypodium	PDBRA2N051	None	None	G1T1/S1	1B.2	BLM:S USFS:S	No	Yes
Thelypodium integrifolium ssp. complanatum foxtail thelypodium	PDBRA2N062	None	None	G5T4T5/S2	2B.2		No	Yes
Thelypodium milleflorum many-flowered thelypodium	PDBRA2N0A0	None	None	G5/S3?	2B.2		No	Yes
Thelypodium stenopetalum slender-petaled thelypodium	PDBRA2N0F0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Thelypteris puberula var. sonorensis Sonoran maiden fern	PPTHE05192	None	None	G5T3/S2	2B.2	USFS:S	No	Yes
Thermopsis californica var. argentata silvery false lupine	PDFAB3Z011	None	None	G4T4/S4	4.3		No	No

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Thermopsis californica var. semota velvety false lupine	PDFAB3Z013	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Thermopsis gracilis slender false lupine	PDFAB3Z0C1	None	None	G4/S4	4.3		No	No
Thermopsis macrophylla Santa Ynez false lupine	PDFAB3Z0E0	None	Rare	G1/S1	1B.3	USFS:S	Yes	Yes
Thermopsis robusta robust false lupine	PDFAB3Z0D0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Thysanocarpus conchuliferus Santa Cruz Island fringepod	PDBRA2Q060	Endangered	None	G2?/S2?	1B.2		Yes	Yes
Thysanocarpus rigidus rigid fringepod	PDBRA2Q070	None	None	G1G2/S1	1B.2	BLM:S USFS:S	No	Yes
Tiarella trifoliata var. trifoliata trifoliate laceflower	PDSAX10031	None	None	G5T5/S2S3	3.2		No	No
Tidestromia eliassoniana Eliasson's woolly tidestomia	PDAMA0J070	None	None	G5/S2	2B.2		No	No
Tiquilia canescens var. pulchella Chocolate Mountains tiquilia	PDBOR0Y012	None	None	G5T3T4/S3	3.2		No	No
Tonestus eximius Tahoe tonestus	PDASTE0030	None	None	G3/S3	4.3		No	No
Tonestus lyallii Lyall's tonestus	PDASTE0050	None	None	G5/S1	2B.3		No	Yes
Tonestus peirsonii Peirson's tonestus	PDASTE0070	None	None	G3/S3	4.3		No	No
Townsendia condensata cushion townsendia	PDAST9C040	None	None	G4/S3	2B.3		No	Yes
Townsendia leptotes slender townsendia	PDAST9C0F0	None	None	G4/S2	2B.3		No	Yes
Toxicoscordion fontanum marsh zigadenus	PMLIL28050	None	None	G3/S3	4.2		No	No
Tracyina rostrata beaked tracyina	PDAST9D010	None	None	G2/S2	1B.2	USFS:S	No	Yes
Tragia ramosa desert tragia	PDEUP1D090	None	None	G5/S4	4.3		No	No
Transberingia bursifolia ssp. virgata virgate halimolobos	PDBRA1A040	None	None	G4T4/S2	2B.3		No	Yes
Trichocoronis wrightii var. wrightii Wright's trichocoronis	PDAST9F031	None	None	G4T3/S1	2B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Trichophorum pumilum little bulrush	PMCYP0Q250	None	None	G5/S3	2B.2		No	Yes
Trichostema austromontanum ssp. compactum Hidden Lake bluecurls	PDLAM22022	Delisted	None	G3G4T1/S1	1B.1		Yes	Yes
Trichostema micranthum small-flowered bluecurls	PDLAM22080	None	None	G4/S4?	4.3		No	No
Trichostema ovatum San Joaquin bluecurls	PDLAM220A0	None	None	G4/S4	4.2		No	No
Trichostema rubisepalum Hernandez bluecurls	PDLAM220C0	None	None	G4/S4	4.3		Yes	No
Trichostema ruygtii Napa bluecurls	PDLAM220H0	None	None	G1G2/S1S2	1B.2		No	Yes
Trifolium amoenum two-fork clover	PDFAB40040	Endangered	None	G1/S1	1B.1		Yes	Yes
Trifolium andersonii ssp. andersonii Anderson's clover	PDFAB40055	None	None	G5T5/S4	4.3		Yes	No
Trifolium bolanderi Bolander's clover	PDFAB400G0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Trifolium dedeckerae Dedecker's clover	PDFAB400Q0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Trifolium gymnocarpon ssp. plummerae Plummer's clover	PDFAB40112	None	None	G5T4/S2	2B.3		No	Yes
Trifolium howellii Howell's clover	PDFAB40140	None	None	G4/S4	4.3		No	No
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2/S2	1B.2		No	Yes
Trifolium jokerstii Butte County golden clover	PDFAB40310	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Trifolium lemmonii Lemmon's clover	PDFAB401C0	None	None	G3/S3	4.2		Yes	No
Trifolium palmeri southern island clover	PDFAB40102	None	None	G3G4/S3	4.2		Yes	No
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1/S1	1B.1	BLM:S	Yes	Yes
Trifolium siskiyouense Siskiyou clover	PDFAB402S0	None	None	GH/SH	1B.1		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Trifolium trichocalyx Monterey clover	PDFAB402J0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Triglochin palustris marsh arrow-grass	PMJCG02040	None	None	G5/S2	2B.3		No	Yes
Trillium ovatum ssp. oettingeri Salmon Mountains wakerobin	PMLIL200M1	None	None	G5T3/S3	4.2		No	No
Triphysaria floribunda San Francisco owl's-clover	PDSCR2T010	None	None	G2?/S2?	1B.2		No	Yes
Tripterocalyx crux-maltae Kellogg's sand-verbena	PDNYC0G020	None	None	G4?/S1	2B.2		No	Yes
Tripterocalyx micranthus small-flowered sand-verbena	PDNYC0G030	None	None	G5/S1	2B.2		No	Yes
Triteleia clementina San Clemente Island triteleia	PMLIL21020	None	None	G2/S2	1B.2		Yes	Yes
Triteleia crocea var. crocea yellow triteleia	PMLIL21031	None	None	G4T4/S3S4	4.3		No	No
Triteleia crocea var. modesta Trinity Mountains triteleia	PMLIL21032	None	None	G4T3/S3	4.3		No	No
Triteleia grandiflora large-flowered triteleia	PMLIL21060	None	None	G4G5/S1	2B.1		No	Yes
Triteleia hendersonii Henderson's triteleia	PMLIL21070	None	None	G4/S1	2B.2		No	Yes
Triteleia ixioides ssp. cookii Cook's triteleia	PMLIL210A2	None	None	G5T2T3/S2S3	1B.3	USFS:S	No	Yes
Triteleia lugens dark-mouthed triteleia	PMLIL210D0	None	None	G4?/S4?	4.3		No	No
Triteleia piutensis Piute Mountains triteleia	PMLIL210H0	None	None	G1/S1	1B.1		No	Yes
Tropidocarpum californicum Kings gold	PDBRA33010	None	None	G1/S1	1B.1		No	Yes
Tropidocarpum capparideum caper-fruited tropidocarpum	PDBRA2R010	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Tuctoria greenei Greene's tuctoria	PMPOA6N010	Endangered	Rare	G1/S1	1B.1		No	Yes
Tuctoria mucronata Crampton's tuctoria or Solano grass	PMPOA6N020	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Utricularia intermedia flat-leaved bladderwort	PDLNT020A0	None	None	G5/S3	2B.2		No	Yes

Special Vascular Plants, Bryophytes, and Lichens List

California Department of Fish and Wildlife

Natural Diversity Database

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Utricularia minor lesser bladderwort	PDLNT020D0	None	None	G5/S3	4.2		No	No
Utricularia ochroleuca cream-flowered bladderwort	PDLNT020E0	None	None	G4G5/S1	2B.2		No	Yes
Vaccinium coccineum Siskiyou Mountains huckleberry	PDERI181N0	None	None	G3Q/S2S3	3.3		No	No
Vaccinium scoparium little-leaved huckleberry	PDERI180Y0	None	None	G5/S3	2B.2		No	Yes
Vaccinium shastense ssp. shastense Shasta huckleberry	PDERI181Z1	None	None	G4T3/S3	1B.3		No	Yes
Vahlodea atropurpurea mountain hair grass	PMPOA6M010	None	None	G5/S4	4.3		No	No
Valeriana occidentalis western valerian	PDVAL03080	None	None	G5/S1	2B.3		No	Yes
Vancouveria chrysantha Siskiyou inside-out-flower	PDBER09010	None	None	G4/S4	4.3		No	No
Veratrum fimbriatum fringed false-hellebore	PMLIL25030	None	None	G3/S3	4.3		No	No
Veratrum insolitum Siskiyou false-hellebore	PMLIL25040	None	None	G4/S4	4.3		No	No
Verbena californica Red Hills vervain	PDVER0N050	Threatened	Threatened	G2/S2	1B.1		Yes	Yes
Verbesina dissita big-leaved crownbeard	PDAST9R050	Threatened	Threatened	G1G2/S1	1B.1		Yes	Yes
Veronica copelandii Copeland's speedwell	PDSCR200B0	None	None	G3/S3	4.3		No	No
Veronica cusickii Cusick's speedwell	PDSCR200C0	None	None	G5/S4	4.3		Yes	No
Viburnum ellipticum oval-leaved viburnum	PDCPR07080	None	None	G4G5/S3?	2B.3		No	Yes
Viguiera laciniata San Diego County viguiera	PDAST9T060	None	None	G4/S4	4.3		Yes	No
Viguiera purisimae La Purisima viguiera	PDAST9T0S0	None	None	G4/S1	2B.3		No	Yes
Viola howellii Howell's violet	PDVIO040U0	None	None	G4/S1	2B.2		No	Yes
Viola langsdorffii Langsdorf's violet	PDVIO04100	None	None	G4/S1	2B.1		No	Yes

Scientific Name Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant Rank	Other Status	Seed Banked	Records in CNDDB ?
Viola palustris alpine marsh violet	PDVIO041G0	None	None	G5/S1S2	2B.2		No	Yes
Viola pinetorum ssp. grisea grey-leaved violet	PDVIO04431	None	None	G4G5T3/S3	1B.3		No	Yes
Viola primulifolia ssp. occidentalis western white bog violet	PDVIO040Y2	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Viola purpurea ssp. aurea golden violet	PDVIO04420	None	None	G5T2/S2	2B.2		No	Yes
Viola tomentosa felt-leaved violet	PDVIO04280	None	None	G3/S3	4.2		No	Yes
Wislizenia refracta ssp. palmeri Palmer's jackass clover	PDCPP09015	None	None	G5T3T5/S1	2B.2		No	Yes
Wislizenia refracta ssp. refracta jackass-clover	PDCPP09013	None	None	G5T5?/S1	2B.2		No	Yes
Wolffia brasiliensis Brazilian watermeal	PMLEM03020	None	None	G5/S1	2B.3		No	Yes
Woodsia plummerae Plummer's woodsia	PPDRY0U0A0	None	None	G5/S2	2B.3		No	Yes
Wyethia elata Hall's wyethia	PDAST9X050	None	None	G4/S4	4.3		No	No
Wyethia longicaulis Humboldt County wyethia	PDAST9X0A0	None	None	G4/S4	4.3		No	No
Wyethia reticulata El Dorado County mule ears	PDAST9X0D0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Xanthisma gracile annual bristleweed	PDAST640E0	None	None	G5/S4	4.3		No	No
Xanthisma junceum rush-like bristleweed	PDAST641A0	None	None	G5/S4	4.3		No	No
Xylorhiza cognata Mecca-aster	PDASTA1010	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Xylorhiza orcuttii Orcutt's woody-aster	PDASTA1040	None	None	G3?/S2	1B.2	BLM:S	Yes	Yes

Exhibit 9

SPECIAL VASCULAR PLANTS, BRYOPHYTES, AND LICHENS LIST

September 2020

State of California

Natural Resources Agency

Department of Fish and Wildlife

Biogeographic Data Branch

California Natural Diversity Database (CNDDB)

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Table of Contents

Special Plants i

NatureServe Element Ranking for Plants iii

Element Ranking v

California Rare Plant Ranks viii

Special Lichens xii

Other Status xiii

Rare Plant Seed Banking xiv

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities xv

Special Vascular Plants, Bryophytes, and Lichens List xvi

Special Plants

"Special Plants" is a broad term used to refer to all the plant taxa inventoried by the Department of Fish and Wildlife's California Natural Diversity Database (CNDDB), regardless of their legal or protection status. Special Plants include vascular plants as well as high priority bryophytes (mosses, liverworts, and hornworts) and lichens. Special Plant taxa are species, subspecies, or varieties that fall into one or more of the following categories:

- Officially listed by California or the Federal Government as Endangered, Threatened, or Rare;
- A candidate for state or federal listing as Endangered, Threatened, or Rare;
- Taxa listed in the California Native Plant Society's *Inventory of Rare and Endangered Plants of California*;
- Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Equality Act (CEQA) Guidelines; these taxa may indicate "None" under listing status, but note that all California Rare Plant Rank 1 and 2 and some Rank 3 and 4 plants may fall under Section 15380 of CEQA;
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation;
- A Bureau of Land Management, U.S. Fish and Wildlife Service, or U.S. Forest Service Sensitive Species/Species of Conservation Concern;
- Population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with extirpation in California; and

- Taxa closely associated with a habitat that is declining in California at a significant rate (e.g. wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, etc.).

The Special Vascular Plants, Bryophytes, and Lichens List (located at the end of this document) contains taxa that are actively inventoried, tracked, and mapped by the CNDDB (California Rare Plant Rank 1 and 2 plants) as well as taxa which we track but for which we currently only have quad and county level geographic information available to our users (California Rare Plant Rank 3 and 4 plants). For the latter taxa, we maintain site and other information in manual files along with Internet access to the quad and county level information via our CNDDB QuickView Tool.

NatureServe Element Ranking for Plants

All Heritage Programs, including the California Natural Diversity Database (CNDDB) use the same ranking methodology, originally developed by The Nature Conservancy and now maintained and periodically revised by NatureServe. It includes a **Global rank** (G rank), describing the rank for a given taxon over its entire distribution and a **State rank** (S rank), describing the rank for the taxon over its state distribution. For subspecies and varieties, there is also a "T" rank describing the global rank for the subspecies or variety. The next section of this document details the criteria used to assign element ranks, from G1 to G5 for the Global rank and from S1 to S5 for the State rank. Procedurally, state programs such as the CNDDB develop the State ranks and the Global ranks collaboratively among states/provinces containing the species. NatureServe then checks for consistency and logical errors at the national level.

An element rank is assigned using standard criteria and rank definitions. This standardization makes the ranks comparable across organism and political boundaries. NatureServe has developed a "rank calculator" to help increase repeatability and transparency of the ranking process. The three main categories that are taken into consideration when assigning an element rank are rarity, threats, and trends. Within these three categories, various factors are considered including:

- Range extent, area of occupancy, population size, number of occurrences, and number of good occurrences (ranked A or B). Environmental specificity can also be used if other information is lacking.
- Overall threat impact as well as intrinsic vulnerability (if threats are unknown).
- Long-term and short-term trends.

Detailed information on the newest element ranking methodology can be found on the NatureServe Publications webpage.

With the above considerations in mind, refer below for the definitions for G1-G5 and S1-S5. An element's ranking status may be adjusted up or down depending upon the considerations above.

Element Ranking

Global Ranking

The Global rank (G rank) is a reflection of the overall status of an element throughout its global range. Both Global and State ranks represent a letter + number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity.

Species or natural community level:

- GX - Presumed extinct
- GH - Possibly extinct; known only from historical occurrences but there is still some hope of rediscovery.
- G1 - Critically imperiled; at very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
- G2 - Imperiled; at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- G3 - Vulnerable; at moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- G4 - Apparently secure; at fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
- G5 - Secure; at very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

Subspecies/variety level:

Subspecies/varieties receive a T rank attached to the G rank. With the subspecies/varieties, the G rank reflects the condition of the entire species, whereas the T rank reflects the global situation of just the subspecies or variety. For example: *Chorizanthe robusta* var. *hartwegii* is ranked G2T1. The G rank refers to the whole species range i.e., *Chorizanthe robusta*. The T rank refers only to the global condition of var. *hartwegii*.

State Ranking

The State rank (S rank) is assigned much the same way as the Global rank, but State ranks refer to the imperilment status only within California's state boundaries.

- SX - Presumed extirpated
- SH - Possibly extirpated; known only from historical occurrences but there is still some hope of rediscovery.
- S1 - Critically imperiled; at very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
- S2 - Imperiled; at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- S3 - Vulnerable; at moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- S4 - Apparently secure; at a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible

cause for some concern as a result of local recent declines, threats, or other factors.

- S5 - Secure; at very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

Additional Notes on NatureServe Ranks

Other considerations used when raking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take an overall view when ranking sensitive elements rather than simply counting element occurrences.

Uncertainty in the exact status of an element can be expressed as range ranks (e.g., G3G4 to express uncertainty as to whether an element is a G3 or G4) and modifiers can be added to some of the ranks to denote questionable taxonomy (e.g., G3Q) or inexact numeric ranks (e.g., S3? to indicate the element is most likely an S3 but there is a significant chance the element could be an S2 or S4). In rare instances where an element is only extant in cultivation or captivity, a “C” modifier can be added to denote that the element is extinct in the wild across its native range but present in cultivation or captivity (e.g., G1C).

California Rare Plant Ranks[1]

1A Presumed extirpated in California and either rare or extinct elsewhere

1B Rare or Endangered in California and elsewhere

2A Presumed extirpated in California, but more common elsewhere

2B Rare or Endangered in California, but more common elsewhere

3 Plants for which we need more information – Review list

4 Plants of limited distribution – Watch list

1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere

The plants of Rank 1A are presumed extirpated because they have not been seen or collected in the wild in California for many years. This rank includes those plant taxa that are both presumed extinct, as well as those plants which are presumed extirpated in California and rare elsewhere. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range.

[1] In March 2010, CDFW changed the name of "CNPS List" or "CNPS Ranks" to "California Rare Plant Rank" (or CRPR). This was done to reduce confusion over the fact that CNPS and CDFW jointly manage the Rare Plant Status Review groups (300+ botanical experts from government, academia, NGOs, and the private sector) and that the rank assignments are the product of a collaborative effort and not solely a CNPS assignment.

1B: Plants Rare, Threatened, or Endangered in California and Elsewhere (Includes Rare Plant Ranks 1B.1, 1B.2, 1B.3)

The plants of Rank 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of plant taxa tracked by the CNDDB, with more than 1,000 plants assigned to this category of rarity.

2A: Plants Presumed Extirpated in California, but More Common Elsewhere

The plants of Rank 2A are presumed extirpated because they have not been seen or collected in the wild in California for many years. This rank includes only those plant taxa that are presumed extirpated in California, but that are more common elsewhere in their range. Note: Plants of both Rank 1A and 2A are presumed extirpated in California; the only difference is the status of the plants outside of the state.

2B: Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere (Includes Rare Plant Ranks 2B.1, 2B.2, 2B.3)

The plants of Rank 2B are rare, threatened, or endangered in California, but more common elsewhere. Plants common in other states or countries are not eligible for consideration under the provisions of the Federal Endangered Species Act; however they are eligible for consideration under the California Endangered Species Act. This rank is meant to highlight the importance of protecting the geographic range and genetic diversity of more widespread species by protecting those species whose ranges just extend into California. Note: Plants of both rank 1B and 2B are rare, threatened, or

endangered in California; the only difference is the status of the plants outside of the state.

3: Plants about which we need more information – A Review List (Includes Rare Plant Ranks 3, 3.1, 3.2, 3.3)

The plants that comprise Rank 3 are united by one common theme – we lack the necessary information to assign them to one of the other lists or reject them. Nearly all of the plants remaining on Rank 3 are taxonomically problematic.

4: Plants of Limited Distribution – A Watch List (Includes Rare Plant Ranks 4.1, 4.2, 4.3)

The plants in this category are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears low at this time. While we cannot call these plants "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a Rank 4 plant change, we will transfer it to a more appropriate rank or delete it from consideration.

Threat Ranks

The California Rare Plant Ranks (CRPR) use a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened. Most CRPRs read as 1B.1, 1B.2, 1B.3, etc. Note that some Rank 3 plants do not have a threat code extension due to difficulty in ascertaining threats for these species. Rank 1A and 2A

plants also do not have threat code extensions since there are no known extant populations of the plants in California.

Threat Code Extensions:

.1 – Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 – Moderately threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat)

.3 – Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Special Lichens

Lichens are not plants, but a symbiotic relationship between a fungus and either green algae or cyanobacteria (also known as bluegreen algae).

Many lichen taxa are under-studied and under-surveyed. For this reason, a detailed and cautious approach is taken when a lichen taxa is nominated as a potential species of conservation concern. In particular, special attention is paid to survey efforts and rate of occurrence discovery when deciding whether a lichen is of conservation concern.

There are a few lichens in California for which we have adequate information to place them on our Special Vascular Plants, Bryophytes, and Lichens list. They appear after the bryophytes at the beginning of the list. Lichen statuses are developed in coordination with the California Lichen Society (CALS) and relevant experts. Please visit the California Lichen Society webpage for additional information about sponsoring a lichen of conservation concern.

Other Status

The status of species on the Special Plants List according to other conservation organizations is provided below.

- **Bureau of Land Management (BLM) Sensitive:** Bureau of Land Management Manual §6840 states that "BLM sensitive species are: (1) species listed or proposed for listing under the Endangered Species Act (ESA), and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as Bureau sensitive by the State Director(s). All Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species." See the BLM webpage for California Threatened & Endangered Species for more information.
- **United States Forest Service (USFS) Sensitive:** The USDA Forest Service defines sensitive species as plant and animal species identified by a regional forester that are not listed or proposed for listing under the federal Endangered Species Act for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Regional Foresters shall identify sensitive species occurring within the region. More information on California species can be found on the Pacific Southwest Region (Region 5) Plants and Animals site.

Rare Plant Seed Banking

As of July 2014, the CNDDB is including within our database information regarding whether a CNDDB-tracked taxon has been seed banked at an official seed banking institution. The institutions that we currently have information from are: California Botanic Garden (formerly named Rancho Santa Ana Botanic Garden), Santa Barbara Botanic Garden, UC Botanical Garden at Berkeley, US Department of Agriculture, Berry Seed Bank, Kew Royal Botanic Gardens, the San Diego Zoo Conservation and Research for Endangered Species (CRES) Native Gene Seed Bank, and the University of California at Santa Cruz.

The Special Vascular Plants, Bryophytes, and Lichens List now contains a column for whether the taxon has been seed banked (Yes or No). For those with a subscription to the CNDDB, additional information about which institution/organization houses the seed bank, as well as seed bank querying capabilities, are available through RareFind.

CNDDB is providing this seed bank information as a courtesy to our clients for use in their conservation activities. Seed banking is a long-term conservation strategy that can complement the *in situ* protection and conservation of rare plant populations. If a species is seed banked, it does not mean that the species is any less rare or of any less conservation concern. As with all information in CNDDB, the seed bank information should be used with caution. It is essential that anyone who makes a seed collection be aware of seed collection and documentation guidelines. Please see the California Botanic Garden webpage for additional information on seed collections

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities

In order to facilitate a consistent and systematic approach to botanical field surveys and assessments of special status plants and sensitive natural communities, protocols for surveying and evaluating impacts to these resources have been developed. These protocols were put together by California Department of Fish and Wildlife staff and may be found in the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities document.

Special Vascular Plants, Bryophytes, and Lichens List

The remainder of this document contains the CNDDB's Special Vascular Plants, Bryophytes, and Lichens List current as of the date on the title page of this document. While the CNDDB and CNPS strive to remain consistent in the taxa we track and the ranks assigned to those taxa, there can be discrepancies usually due to lag time between when a plant species undergoes review in CNPS and when it is added to the CNDDB. However, all species tracked by CNPS are also tracked by the CNDDB.

For additional information on how CNDDB determines what species to track on our Special Vascular Plants, Bryophytes, and Lichens List, please see the documents "How Revisions are Made to the Special Plants, Bryophytes, and Lichens List" and "Rare Plant Data in California: The Cooperative Relationship between the California Natural Diversity Database and the California Native Plant Society" on the CNDDB webpage.

Bryophytes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Anomobryum julaceum	slender silver moss	NBMUS80010	None	None	G5?/S2	4.2		No	Yes
Bruchia bolanderi	Bolander's bruchia	NBMUS13010	None	None	G3G4/S3	4.2	USFS:S	No	Yes
Bryum chryseum	brassy bryum	NBMUS1A430	None	None	G5/S3	4.3		No	No
Buxbaumia viridis	buxbaumia moss	NBMUS1B040	None	None	G3G4/S2	2B.2	BLM:S USFS:S	No	Yes
Campylopodiella stenocarpa	flagella-like atractylocarpus	NBMUS84010	None	None	G5/S1?	2B.2		No	Yes
Climacium dendroides	tree climacium moss	NBMUS1T020	None	None	G5/S1	2B.1		No	Yes
Coscinodon arctolimnius ssp. higuchii	Higuchi's sieve-tooth moss	NBMUS96032	None	None	GUTU/S1S3	4.2		No	No
Dacryophyllum falcifolium	tear drop moss	NBMUS8Z010	None	None	G2/S2	1B.3	USFS:S	No	Yes
Didymodon californicus	California beard-moss	NBMUS2C0N0	None	None	G3/S3	4.2		No	No
Discelium nudum	naked flag moss	NBMUS2E010	None	None	G4G5/S1	2B.2		No	Yes
Entosthodon kochii	Koch's cord moss	NBMUS2P050	None	None	G1/S1	1B.3	BLM:S	No	Yes
Fissidens aphelotaxifolius	brook pocket moss	NBMUS2W290	None	None	G3G4/S1	2B.2	USFS:S	No	Yes
Fissidens pauperculus	minute pocket moss	NBMUS2W0U0	None	None	G3?/S2	1B.2	USFS:S	No	Yes
Geothallus tuberosus	Campbell's liverwort	NBHEP1C010	None	None	G2/S2	1B.1		No	Yes
Grimmia torenii	Toren's grimmia	NBMUS32330	None	None	G2/S2	1B.3	BLM:S	No	Yes
Grimmia vaginulata	vaginulate grimmia	NBMUS32340	None	None	G3/S1	1B.1	BLM:S	No	Yes
Haplodontium tehamense	Lassen Peak copper moss	NBMUS4Q030	None	None	G2/S2	1B.3		No	Yes
Helodium blandowii	Blandow's bog moss	NBMUS3C010	None	None	G4/S2	2B.3	USFS:S	No	Yes
Jaffueliobryum raui	Rau's jaffueliobryum moss	NBMUS97010	None	None	G4/S2	2B.3		No	Yes
Jaffueliobryum wrightii	Wright's jaffueliobryum moss	NBMUS97020	None	None	G5/S2S3	2B.3		No	Yes
Meesia longiseta	long seta hump moss	NBMUS4L010	None	None	G5/S1	2B.3		No	Yes
Meesia triquetra	three-ranked hump moss	NBMUS4L020	None	None	G5/S4	4.2		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Meesia uliginosa	broad-nerved hump moss	NBMUS4L030	None	None	G5/S3	2B.2	USFS:S	No	Yes
Mielichhoferia elongata	elongate copper moss	NBMUS4Q022	None	None	G5/S3S4	4.3	USFS:S	No	Yes
Mielichhoferia mielichhoferiana	Mielichhofer's copper moss	NBMUS4Q020	None	None	G4/S1	2B.3		No	Yes
Mielichhoferia shevockii	Shevock's copper moss	NBMUSA1010	None	None	G2/S2	1B.2	BLM:S	No	Yes
Myurella julacea	small mousetail moss	NBMUS4U010	None	None	G5/S2	2B.3		No	Yes
Nardia hiroshii	Hiroshi's flapwort	NBHEP2A080	None	None	G4G5/S1	2B.3		No	Yes
Orthotrichum holzingeri	Holzinger's orthotrichum moss	NBMUS560E0	None	None	G3G4/S2	1B.3		No	Yes
Orthotrichum kellmanii	Kellman's bristle moss	NBMUS56190	None	None	G1/S1	1B.2	USFS:S	No	Yes
Orthotrichum spjutii	Spjut's bristle moss	NBMUS56160	None	None	G1/S1	1B.3		No	Yes
Plagiobryoides vinosula	wine-colored tufa moss	NBMUS0Y090	None	None	G4/S3S4	4.2		No	No
Pleuridium mexicanum	Mexican earthmoss	NBMUS5M080	None	None	G5/S1	2B.1		No	Yes
Pohlia flexuosa	flexuose threadmoss	NBMUS5S1D0	None	None	G5/S1	2B.1		No	Yes
Pohlia tundrae	tundra thread moss	NBMUS5S1B0	None	None	G3/S3	2B.3		No	Yes
Ptilidium californicum	Pacific fuzzwort	NBHEP2U010	None	None	G4G5/S3S4	4.3	BLM:S	No	Yes
Riella americana	American riella	NBHEP31020	None	None	G3/S1	2B.2		No	Yes
Scopelophila cataractae	tongue-leaf copper moss	NBMUS6U010	None	None	G3G4/S1	2B.2		No	Yes
Sphaerocarpos drewiae	bottle liverwort	NBHEP35030	None	None	G1/S1	1B.1		No	Yes
Tortella alpicola	alpine crisp-moss	NBMUS7K090	None	None	G5?/S1	2B.3		No	Yes
Tortula californica	California screw moss	NBMUS7L090	None	None	G2G3/S2?	1B.2	BLM:S	No	Yes
Trichodon cylindricus	cylindrical trichodon	NBMUS7N020	None	None	G4G5/S2	2B.2		No	Yes
Triquetrella californica	coastal triquetrella	NBMUS7S010	None	None	G2/S2	1B.2	USFS:S	No	Yes

Lichens

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Bryoria pseudocapillaris	false gray horsehair lichen	NLTEST5420	None	None	G2?/S1S2	3.2		No	No
Bryoria spiralifera	twisted horsehair lichen	NLTEST5460	None	None	G1G2/S1S2	1B.1	BLM:S	No	Yes
Calicium adspersum	spiral-spored gilded-head pin lichen	NLT0005640	None	None	G3G4/S1	2B.2	USFS:S	No	Yes
Cladonia firma	popcorn lichen	NLT0008460	None	None	G4/S1	2B.1		No	Yes
Graphis saxorum	Baja rock lichen	NLTES29470	None	None	G1G2/S1	3		No	Yes
Hypogymnia schizidiata	island tube lichen	NLT0032640	None	None	G2G3/S2	1B.3		No	Yes
Mobergia calculiformis	light gray lichen	NLT0018660	None	None	G3/S1	3		No	Yes
Peltigera gowardii	western waterfan lichen	NLVER00460	None	None	G4?/S3	4.2	USFS:S	No	Yes
Ramalina thrausta	angel's hair lichen	NLLEC3S340	None	None	G5?/S2S3	2B.1		No	Yes
Solorina spongiosa	fringed chocolate chip lichen	NLT0028030	None	None	G4G5/S1	2B.2		No	Yes
Sulcaria isidiifera	splitting yarn lichen	NLTEST0020	None	None	G1/S1	1B.1		No	Yes
Texosporium sancti-jacobi	woven-spored lichen	NLTEST7980	None	None	G3/S2	3		No	Yes
Thamnolia vermicularis	whiteworm lichen	NLTES43860	None	None	G5/S1	2B.1		No	Yes
Usnea longissima	Methuselah's beard lichen	NLLEC5P420	None	None	G4/S4	4.2	BLM:S	No	Yes

Vascular Plants

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Abies amabilis	Pacific silver fir	PGPIN01010	None	None	G5?/S2	2B.3		No	Yes
Abies bracteata	bristlecone fir	PGPIN01030	None	None	G2G3/S2S3	1B.3	USFS:S	Yes	Yes
Abies lasiocarpa var. lasiocarpa	subalpine fir	PGPIN01072	None	None	G5T5/S3	2B.3		No	Yes
Abronia alpina	Ramshaw Meadows abronia	PDNYC01020	None	None	G2/S2	1B.1	USFS:S	No	Yes
Abronia maritima	red sand-verbena	PDNYC010E0	None	None	G4/S3?	4.2		Yes	No
Abronia nana var. covillei	Coville's dwarf abronia	PDNYC010H1	None	None	G4T3/S3	4.2	USFS:S	Yes	No
Abronia umbellata var. breviflora	pink sand-verbena	PDNYC010N4	None	None	G4G5T2/S2	1B.1	BLM:S	Yes	Yes
Abronia villosa var. aurita	chaparral sand-verbena	PDNYC010P1	None	None	G5T2?/S2	1B.1	BLM:S USFS:S	Yes	Yes
Abutilon abutiloides	shrubby Indian mallow	PDMAL02010	None	None	G5/S1	2B.1		No	Yes
Abutilon parvulum	dwarf abutilon	PDMAL020F0	None	None	G5/S2S3	2B.3		No	Yes
Acanthomintha duttonii	San Mateo thorn-mint	PDLAM01040	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Acanthomintha ilicifolia	San Diego thorn-mint	PDLAM01010	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Acanthomintha lanceolata	Santa Clara thorn-mint	PDLAM01020	None	None	G4/S4	4.2		Yes	No
Acanthomintha obovata ssp. cordata	heart-leaved thorn-mint	PDLAM01033	None	None	G4T3/S3	4.2		Yes	No
Acanthomintha obovata ssp. obovata	San Benito thorn-mint	PDLAM01032	None	None	G4T3T4/S3S4	4.2		No	No
Acanthoscyphus parishii var. abramsii	Abrams' oxytheca	PDPGN0J041	None	None	G4?T1T2/S1S2	1B.2	USFS:S	No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Acanthoscyphus parishii var. cienegensis	Cienega Seca oxytheca	PDPGN0J042	None	None	G4?T2/S2	1B.3	USFS:S	Yes	Yes
Acanthoscyphus parishii var. goodmaniana	Cushenbury oxytheca	PDPGN0J043	Endangered	None	G4?T1/S1	1B.1		Yes	Yes
Acanthoscyphus parishii var. parishii	Parish's oxytheca	PDPGN0J044	None	None	G4?T3T4/S3S4	4.2		No	No
Acleisanthes longiflora	angel trumpets	PDNYC02040	None	None	G5/S1	2B.3		No	Yes
Acleisanthes nevadensis	desert wing-fruit	PDNYC0F040	None	None	G4?/S1	2B.1		No	Yes
Acmispon argophyllus var. adsurgens	San Clemente Island bird's-foot trefoil	PDFAB2A041	None	Endangered	G5T2/S2	1B.1		Yes	Yes
Acmispon argophyllus var. niveus	Santa Cruz Island bird's-foot trefoil	PDFAB2A048	None	Endangered	G5T3/S3	4.3		Yes	Yes
Acmispon argyraeus var. multicaulis	scrub lotus	PDFAB2A052	None	None	G4?T2/S2	1B.3	BLM:S	Yes	Yes
Acmispon argyraeus var. notitius	Providence Mountains lotus	PDFAB2A053	None	None	G4?T2/S2	1B.3		No	Yes
Acmispon dendroideus var. dendroideus	island broom	PDFAB2A1G1	None	None	G4T3/S3	4.2		Yes	No
Acmispon dendroideus var. traskiae	San Clemente Island lotus	PDFAB2A1G2	Threatened	Endangered	G4T3/S3	1B.3		Yes	Yes
Acmispon dendroideus var. veatchii	San Miguel Island deerweed	PDFAB2A1G3	None	None	G4T3/S3	4.3		Yes	No
Acmispon haydonii	pygmy lotus	PDFAB2A0H0	None	None	G3/S3	1B.3		Yes	Yes

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Acmispon prostratus	Nuttall's acmispon	PDFAB2A0V0	None	None	G1G2/S1	1B.1		Yes	Yes
Acmispon rubriflorus	red-flowered bird's-foot trefoil	PDFAB2A150	None	None	G2/S2	1B.1		No	Yes
Adiantum shastense	Shasta maidenhair fern	PPADI030W0	None	None	G3/S3	4.3		No	No
Adolphia californica	California adolphia	PDRHA01010	None	None	G3/S2	2B.1		Yes	Yes
Agave shawii var. shawii	Shaw's agave	PMAGA010P1	None	None	G2G3T2/S1	2B.1		Yes	Yes
Agave utahensis var. eborispina	ivory-spined agave	PMAGA010S1	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Agave utahensis var. nevadensis	Clark Mountain agave	PMAGA010S3	None	None	G4T4?/S3	4.2		Yes	No
Ageratina herbacea	desert ageratina	PDASTBX0J0	None	None	G5/S3	2B.3		No	Yes
Ageratina shastensis	Shasta ageratina	PDASTBX0R0	None	None	G3/S3	1B.2		No	Yes
Agrostis blasdalei	Blasdale's bent grass	PMPOA04060	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Agrostis hendersonii	Henderson's bent grass	PMPOA040K0	None	None	G2Q/S2	3.2		No	Yes
Agrostis hooveri	Hoover's bent grass	PMPOA040M0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Agrostis humilis	mountain bent grass	PMPOA040P0	None	None	G4Q/S2	2B.3		No	Yes
Agrostis lacuna-vernalis	vernal pool bent grass	PMPOA041N0	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Aliciella ripleyi	Ripley's aliciella	PDPLM041E0	None	None	G3/S2	2B.3		No	Yes
Aliciella triodon	coyote gilia	PDPLM041T0	None	None	G5/S2	2B.2		No	Yes
Alisma gramineum	grass alisma	PMALI01010	None	None	G5/S3	2B.2		No	Yes
Allium abramsii	Abrams' onion	PMLIL02360	None	None	G3/S3	1B.2		No	Yes
Allium atrorubens var. atrorubens	Great Basin onion	PMLIL02061	None	None	G4T4/S2	2B.3		No	Yes
Allium atrorubens var. cristatum	Inyo onion	PMLIL02063	None	None	G4T4/S4	4.3		No	No

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Allium fimbriatum var. purdyi	Purdy's onion	PMLIL020Y7	None	None	G4G5T3/S3	4.3		No	No
Allium hickmanii	Hickman's onion	PMLIL02140	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Allium hoffmanii	Beegum onion	PMLIL02150	None	None	G4/S4	4.3		No	No
Allium howellii var. clokeyi	Mt. Pinos onion	PMLIL02161	None	None	G4T2/S2	1B.3	USFS:S	Yes	Yes
Allium howellii var. howellii	Howell's onion	PMLIL02162	None	None	G3G4T3/S3	4.3		No	No
Allium howellii var. sanbenitense	San Benito onion	PMLIL02163	None	None	G3G4T3/S3	1B.3	BLM:S	No	Yes
Allium jepsonii	Jepson's onion	PMLIL022V0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Allium marvinii	Yucaipa onion	PMLIL02330	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Allium munzii	Munz's onion	PMLIL022Z0	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Allium nevadense	Nevada onion	PMLIL021J0	None	None	G4/S3	2B.3		No	Yes
Allium parishii	Parish's onion	PMLIL021N0	None	None	G3/S3	4.3		No	No
Allium peninsulare var. franciscanum	Franciscan onion	PMLIL021R1	None	None	G5T2/S2	1B.2		No	Yes
Allium punctum	dotted onion	PMLIL021Y0	None	None	G3/S1	2B.2		No	Yes
Allium sanbornii var. congdonii	Congdon's onion	PMLIL02211	None	None	G4T3/S3	4.3		No	No
Allium sanbornii var. sanbornii	Sanborn's onion	PMLIL02212	None	None	G4T3T4/S3S4	4.2		No	No
Allium sharsmithiae	Sharsmith's onion	PMLIL02310	None	None	G2/S2	1B.3	BLM:S	No	Yes
Allium shevockii	Spanish Needle onion	PMLIL022M0	None	None	G2/S2	1B.3	BLM:S	Yes	Yes
Allium siskiyouense	Siskiyou onion	PMLIL02280	None	None	G4/S4	4.3		Yes	No
Allium tribracteatum	three-bracted onion	PMLIL022D0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Allium tuolumnense	Rawhide Hill onion	PMLIL022W0	None	None	G2/S2	1B.2	BLM:S	No	Yes

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Allium yosemitense	Yosemite onion	PMLIL022L0	None	Rare	G3/S3	1B.3	USFS:S	No	Yes
Almutaster pauciflorus	alkali marsh aster	PDASTEL010	None	None	G4/S1S2	2B.2		No	Yes
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	PMPOA07012	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Aloysia wrightii	Wright's beebrush	PDVER02040	None	None	G5/S4	4.3		No	No
Amaranthus watsonii	Watson's amaranth	PDAMA04170	None	None	G5?/S3	4.3		Yes	No
Ambrosia chenopodiifolia	San Diego bur-sage	PDAST0C080	None	None	G2G3/S1	2B.1		Yes	Yes
Ambrosia monogyra	singlewhorl burrobrush	PDAST50010	None	None	G5/S2	2B.2		No	Yes
Ambrosia pumila	San Diego ambrosia	PDAST0C0M0	Endangered	None	G1/S1	1B.1		Yes	Yes
Amorpha californica var. napensis	Napa false indigo	PDFAB08012	None	None	G4T2/S2	1B.2		Yes	Yes
Amsinckia douglasiana	Douglas' fiddleneck	PDBOR01010	None	None	G4/S4	4.2		Yes	No
Amsinckia furcata	forked fiddleneck	PDBOR010D1	None	None	G4/S4	4.2		Yes	No
Amsinckia grandiflora	large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Amsinckia lunaris	bent-flowered fiddleneck	PDBOR01070	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Ancistrocarphus keilii	Santa Ynez groundstar	PDASTD5020	None	None	G1/S1	1B.1		No	Yes
Androsace elongata ssp. acuta	California androsace	PDPRI02031	None	None	G5?T3T4/S3S4	4.2		Yes	No
Androsace filiformis	slender-stemmed androsace	PDPRI02040	None	None	G4/S1	2B.3		No	Yes
Androstephium breviflorum	small-flowered androstephium	PMLIL06010	None	None	G4/S2?	2B.2		No	Yes

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Anemone multifida var. multifida	cut-leaf anemone	PDRAN040E6	None	None	G5T5/S1S2	2B.2		No	Yes
Angelica callii	Call's angelica	PDAPI07060	None	None	G3/S3	4.3		No	No
Angelica kingii	King's angelica	PDAPI070D0	None	None	G4/S3	4.2		No	No
Angelica lucida	sea-watch	PDAPI070G0	None	None	G5/S3	4.2		Yes	No
Anisocarpus scabridus	scabrid alpine tarplant	PDASTDU020	None	None	G3/S3	1B.3	USFS:S	No	Yes
Antennaria flagellaris	stoloniferous pussy-toes	PDAST0H0W0	None	None	G4/S3	4.2		No	Yes
Antennaria marginata	white-margined everlasting	PDAST0H1G0	None	None	G4G5/S1	2B.3	USFS:S	No	Yes
Antennaria pulchella	beautiful pussy-toes	PDAST0H1H0	None	None	G4/S4	4.3		No	No
Antennaria sawyeri	Sawyer's pussy-toes	PDAST0H1S0	None	None	G2/S2	1B.2		No	Yes
Antennaria suffrutescens	evergreen everlasting	PDAST0H0S0	None	None	G4/S3	4.3		No	No
Anthoxanthum nitens ssp. nitens	vanilla-grass	PMPOA0F041	None	None	G5/S2	2B.3		No	Yes
Antirrhinum ovatum	oval-leaved snapdragon	PDSCR2K010	None	None	G3/S3	4.2		No	Yes
Antirrhinum subcordatum	dimorphic snapdragon	PDSCR2S070	None	None	G3/S3	4.3	USFS:S	No	Yes
Antirrhinum virga	twig-like snapdragon	PDSCR2S090	None	None	G3?/S3?	4.3		No	No
Aphanisma blitoides	aphanisma	PDCHE02010	None	None	G3G4/S2	1B.2		Yes	Yes
Arabis aculeolata	Waldo rockcress	PDBRA06010	None	None	G4/S2	2B.2		Yes	Yes
Arabis blepharophylla	coast rockcress	PDBRA06040	None	None	G4/S4	4.3		Yes	No
Arabis mcdonaldiana	McDonald's rockcress	PDBRA06150	Endangered	Endangered	G3/S3	1B.1		Yes	Yes
Arabis modesta	modest rockcress	PDBRA06180	None	None	G3/S3	4.3		No	No

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Arabis oregana	Oregon rockcress	PDBRA061A0	None	None	G3G4Q/S3	4.3		No	No
Arabis repanda var. greenei	Greene's rockcress	PDBRA061Q1	None	None	G5T3Q/S3	3.3		No	No
Arabis rigidissima var. demota	Galena Creek rockcress	PDBRA061R1	None	None	G3T3Q/S1	1B.2	USFS:S	No	Yes
Arabis rigidissima var. rigidissima	Trinity Mountains rockcress	PDBRA061R2	None	None	G3T3/S3	1B.3		No	Yes
Arctomecon merriamii	white bear poppy	PDPAP02030	None	None	G3/S3	2B.2		Yes	Yes
Arctostaphylos andersonii	Anderson's manzanita	PDERI04030	None	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos auriculata	Mt. Diablo manzanita	PDERI04040	None	None	G2/S2	1B.3		No	Yes
Arctostaphylos bakeri ssp. bakeri	Baker's manzanita	PDERI04221	None	Rare	G2T1/S1	1B.1		No	Yes
Arctostaphylos bakeri ssp. sublaevis	The Cedars manzanita	PDERI04222	None	Rare	G2T2/S2	1B.2	BLM:S	No	Yes
Arctostaphylos catalinae	Santa Catalina Island manzanita	PDERI04070	None	None	G2?/S2?	1B.2		Yes	Yes
Arctostaphylos confertiflora	Santa Rosa Island manzanita	PDERI040A0	Endangered	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos crustacea ssp. eastwoodiana	Eastwood's brittle-leaf manzanita	PDERI041H4	None	None	G4T2/S2	1B.1		No	Yes
Arctostaphylos crustacea ssp. insulicola	island manzanita	PDERI041H5	None	None	G4T3/S3	4.2		No	No
Arctostaphylos crustacea ssp. subcordata	Santa Cruz Island manzanita	PDERI041H7	None	None	G4T3/S3	4.2		Yes	No
Arctostaphylos cruzensis	Arroyo de la Cruz manzanita	PDERI040B0	None	None	G1G2/S1S2	1B.2	BLM:S USFS:S	Yes	Yes

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Arctostaphylos densiflora	Vine Hill manzanita	PDERI040C0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos edmundsii	Little Sur manzanita	PDERI04260	None	None	G2/S2	1B.2	USFS:S	No	Yes
Arctostaphylos franciscana	Franciscan manzanita	PDERI040J3	Endangered	None	GHC/S1	1B.1		Yes	Yes
Arctostaphylos gabilanensis	Gabilan Mountains manzanita	PDERI042X0	None	None	G1/S1	1B.2		No	Yes
Arctostaphylos glandulosa ssp. crassifolia	Del Mar manzanita	PDERI040E8	Endangered	None	G5T2/S2	1B.1		No	Yes
Arctostaphylos glandulosa ssp. gabrielensis	San Gabriel manzanita	PDERI042P0	None	None	G5T3/S3	1B.2	USFS:S	Yes	Yes
Arctostaphylos glutinosa	Schreiber's manzanita	PDERI040G0	None	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos hispidula	Howell's manzanita	PDERI04230	None	None	G4/S3	4.2		No	No
Arctostaphylos hookeri ssp. hearstiorum	Hearsts' manzanita	PDERI040J4	None	Endangered	G3T2/S2	1B.2		No	Yes
Arctostaphylos hookeri ssp. hookeri	Hooker's manzanita	PDERI040J1	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Arctostaphylos hooveri	Hoover's manzanita	PDERI040K0	None	None	G3/S3	4.3	USFS:S	Yes	No
Arctostaphylos imbricata	San Bruno Mountain manzanita	PDERI040L0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos klamathensis	Klamath manzanita	PDERI041R0	None	None	G2G3/S2S3	1B.2		Yes	Yes

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Arctostaphylos luciana	Santa Lucia manzanita	PDERI040N0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Arctostaphylos malloryi	Mallory's manzanita	PDERI042V0	None	None	G3/S3	4.3		No	No
Arctostaphylos manzanita ssp. elegans	Konocti manzanita	PDERI04271	None	None	G5T3/S3	1B.3		No	Yes
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	PDERI04273	None	None	G5T2/S2	1B.2		No	Yes
Arctostaphylos mewukka ssp. truei	True's manzanita	PDERI040Q2	None	None	G4?T3/S3	4.2		No	No
Arctostaphylos montana ssp. montana	Mt. Tamalpais manzanita	PDERI040J5	None	None	G3T3/S3	1B.3		Yes	Yes
Arctostaphylos montana ssp. ravenii	Presidio manzanita	PDERI040J2	Endangered	Endangered	G3T1/S1	1B.1		No	Yes
Arctostaphylos montaraensis	Montara manzanita	PDERI042W0	None	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos montereyensis	Toro manzanita	PDERI040R0	None	None	G2?/S2?	1B.2	BLM:S	Yes	Yes
Arctostaphylos morroensis	Morro manzanita	PDERI040S0	Threatened	None	G1/S1	1B.1		No	Yes
Arctostaphylos myrtifolia	Ione manzanita	PDERI04240	Threatened	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos nissenana	Nissenan manzanita	PDERI040V0	None	None	G1/S1	1B.2	BLM:S USFS:S	No	Yes
Arctostaphylos nortensis	Del Norte manzanita	PDERI04092	None	None	G2/S2	4.3		No	No
Arctostaphylos nummularia ssp. mendocinoensis	pygmy manzanita	PDERI04280	None	None	G3?T1/S1	1B.2		No	Yes

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Arctostaphylos obispoensis	Bishop manzanita	PDERI040X0	None	None	G3/S3	4.3	USFS:S	No	No
Arctostaphylos ohloneana	Ohlone manzanita	PDERI042Y0	None	None	G1/S1	1B.1		Yes	Yes
Arctostaphylos osoensis	Oso manzanita	PDERI042S0	None	None	G1/S1	1B.2		No	Yes
Arctostaphylos otayensis	Otay manzanita	PDERI040Y0	None	None	G1/S1	1B.2	BLM:S	Yes	Yes
Arctostaphylos pacifica	Pacific manzanita	PDERI040Z0	None	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos pajaroensis	Pajaro manzanita	PDERI04100	None	None	G1/S1	1B.1	BLM:S	No	Yes
Arctostaphylos pallida	pallid manzanita	PDERI04110	Threatened	Endangered	G1/S1	1B.1		No	Yes
Arctostaphylos parryana ssp. tumescens	interior manzanita	PDERI042A1	None	None	G4T3T4/S3S4	4.3	USFS:S	No	No
Arctostaphylos pechoensis	Pecho manzanita	PDERI04140	None	None	G2/S2	1B.2		No	Yes
Arctostaphylos pilosula	Santa Margarita manzanita	PDERI042Z0	None	None	G2?/S2?	1B.2	BLM:S USFS:S	Yes	Yes
Arctostaphylos pumila	sandmat manzanita	PDERI04180	None	None	G1/S1	1B.2	BLM:S	Yes	Yes
Arctostaphylos purissima	La Purisima manzanita	PDERI041A0	None	None	G2/S2	1B.1		Yes	Yes
Arctostaphylos rainbowensis	Rainbow manzanita	PDERI042T0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Arctostaphylos refugioensis	Refugio manzanita	PDERI041B0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Arctostaphylos regismontana	Kings Mountain manzanita	PDERI041C0	None	None	G2/S2	1B.2		No	Yes

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Arctostaphylos rudis	sand mesa manzanita	PDERI041E0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Arctostaphylos silvicola	Bonny Doon manzanita	PDERI041F0	None	None	G1/S1	1B.2		Yes	Yes
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	PDERI041G4	None	None	G3T1/S1	1B.1		No	Yes
Arctostaphylos stanfordiana ssp. raichei	Raiche's manzanita	PDERI041G2	None	None	G3T2/S2	1B.1	BLM:S	Yes	Yes
Arctostaphylos tomentosa ssp. daciticola	dacite manzanita	PDERI041HD	None	None	G4T1/S1	1B.1		No	Yes
Arctostaphylos virgata	Marin manzanita	PDERI041K0	None	None	G2/S2	1B.2		Yes	Yes
Arctostaphylos viridissima	white-haired manzanita	PDERI041L0	None	None	G4/S4	4.2		Yes	No
Arenaria lanuginosa var. saxosa	rock sandwort	PDCAR040E4	None	None	G5T5/S2	2B.3	USFS:S	Yes	Yes
Arenaria paludicola	marsh sandwort	PDCAR040L0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Argyrochosma limitanea ssp. limitanea	southwestern false cloak-fern	PPADI0N051	None	None	G4G5T3T4/S1	2B.1		No	Yes
Aristocapsa insignis	Indian Valley spineflower	PDPGN0U010	None	None	G1/S1	1B.2		No	Yes
Arnica cernua	serpentine arnica	PDAST0Q040	None	None	G5/S4	4.3		No	No
Arnica fulgens	hillside arnica	PDAST0Q090	None	None	G5/S3	2B.2		No	Yes
Arnica spathulata	Klamath arnica	PDAST0Q0M0	None	None	G3?/S3	4.3		No	No
Arnica venosa	Shasta County arnica	PDAST0Q0Q0	None	None	G3/S3	4.2		No	No
Arnica viscosa	Mt. Shasta arnica	PDAST0Q0R0	None	None	G4/S3	4.3		No	No
Artemisia nesiotica	island sagebrush	PDAST0S120	None	None	G3/S3	4.3		No	No

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Artemisia palmeri	San Diego sagewort	PDAST0S160	None	None	G3?/S3?	4.2		Yes	Yes
Artemisia tripartita ssp. tripartita	threetip sagebrush	PDAST0S1S2	None	None	G5T4T5/S2	2B.3		No	Yes
Asarum marmoratum	marbled wild-ginger	PDARI02070	None	None	G4?/S2	2B.3		No	Yes
Asclepias asperula ssp. asperula	antelope-horns	PDASC02051	None	None	G5T5/S3	4.3		Yes	No
Asclepias nyctaginifolia	Mojave milkweed	PDASC02190	None	None	G4?/S2	2B.1		No	Yes
Asclepias solanoana	serpentine milkweed	PDASC021R0	None	None	G3/S3	4.2		Yes	No
Aspidotis carlotta-halliae	Carlotta Hall's lace fern	PPADI07020	None	None	G3/S3	4.2		No	No
Asplenium septentrionale	northern spleenwort	PPASP021F0	None	None	G4G5/S3	2B.3		No	Yes
Asplenium trichomanes ssp. trichomanes	maidenhair spleenwort	PPASP021K2	None	None	G5T5/S1	2B.1		No	Yes
Asplenium vespertinum	western spleenwort	PPASP021P0	None	None	G4/S4	4.2		No	No
Asplenium viride	green spleenwort	PPASP02250	None	None	G5?/S1	2B.3		Yes	Yes
Astragalus agnicidus	Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2/S2	1B.1		Yes	Yes
Astragalus agrestis	field milk-vetch	PDFAB0F090	None	None	G5/S2	2B.2	BLM:S	No	Yes
Astragalus albens	Cushenbury milk-vetch	PDFAB0F0A0	Endangered	None	G1/S1	1B.1		Yes	Yes
Astragalus allochrous var. playanus	playa milk-vetch	PDFAB0F0C1	None	None	G4T4/S2	2B.2		No	Yes
Astragalus anxius	Ash Valley milk-vetch	PDFAB0FBD0	None	None	G1/S1	1B.3	BLM:S USFS:S	No	Yes

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Astragalus argophyllus var. argophyllus	silver-leaved milk-vetch	PDFAB0F0S1	None	None	G5T4/S2	2B.2	BLM:S	No	Yes
Astragalus atratus var. mensanus	Darwin Mesa milk-vetch	PDFAB0F0Z3	None	None	G4G5T2/S2	1B.1	BLM:S	No	Yes
Astragalus austiniae	Austin's astragalus	PDFAB0F120	None	None	G2G3/S2S3	1B.3		No	Yes
Astragalus bernardinus	San Bernardino milk-vetch	PDFAB0F190	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Astragalus bicristatus	crested milk-vetch	PDFAB0F1A0	None	None	G3/S3	4.3	USFS:S	Yes	No
Astragalus brauntonii	Braunton's milk-vetch	PDFAB0F1G0	Endangered	None	G2/S2	1B.1		Yes	Yes
Astragalus breweri	Brewer's milk-vetch	PDFAB0F1J0	None	None	G3/S3	4.2		No	No
Astragalus cimae var. cimae	Cima milk-vetch	PDFAB0F231	None	None	G3T2T3/S2?	1B.2		Yes	Yes
Astragalus cimae var. sufflatus	inflated Cima milk-vetch	PDFAB0F232	None	None	G3T3/S3	1B.3	BLM:S USFS:S	No	Yes
Astragalus claranus	Clara Hunt's milk-vetch	PDFAB0F240	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Astragalus clevelandii	Cleveland's milk-vetch	PDFAB0F250	None	None	G4/S4	4.3		No	No
Astragalus crotalariae	Salton milk-vetch	PDFAB0F2K0	None	None	G4G5/S4	4.3		Yes	No
Astragalus deanei	Dean's milk-vetch	PDFAB0F2R0	None	None	G1/S1	1B.1	BLM:S USFS:S	No	Yes
Astragalus didymocarpus var. milesianus	Miles' milk-vetch	PDFAB0F2X3	None	None	G5T2/S2	1B.2		No	Yes
Astragalus douglasii var. perstrictus	Jacumba milk-vetch	PDFAB0F303	None	None	G5T3?/S2S3	1B.2	BLM:S USFS:S	Yes	Yes

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Astragalus ertterae	Walker Pass milk-vetch	PDFAB0FB30	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Astragalus funereus	black milk-vetch	PDFAB0F3K0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Astragalus geyeri var. geyeri	Geyer's milk-vetch	PDFAB0F3M1	None	None	G4T4/S2	2B.2		No	Yes
Astragalus gilmanii	Gilman's milk-vetch	PDFAB0F3R0	None	None	G2/S2	1B.2		Yes	Yes
Astragalus hornii var. hornii	Horn's milk-vetch	PDFAB0F421	None	None	GUT1/S1	1B.1	BLM:S	No	Yes
Astragalus insularis var. harwoodii	Harwood's milk-vetch	PDFAB0F491	None	None	G5T4/S2	2B.2		Yes	Yes
Astragalus inversus	Susanville milk-vetch	PDFAB0F4A0	None	None	G4/S4	4.3		No	No
Astragalus inyoensis	Inyo milk-vetch	PDFAB0F4B0	None	None	G3/S3	4.2		Yes	No
Astragalus iodanthus var. diaphanoides	snake milk-vetch	PDFAB0F4C3	None	None	G4T4/S3	4.3		No	No
Astragalus jaegerianus	Lane Mountain milk-vetch	PDFAB0F4F0	Endangered	None	G2/S2	1B.1		Yes	Yes
Astragalus johannis-howellii	Long Valley milk-vetch	PDFAB0F4H0	None	Rare	G2/S1	1B.2	BLM:S USFS:S	No	Yes
Astragalus kentrophyta var. danaus	Sweetwater Mountains milk-vetch	PDFAB0F4J2	None	None	G5T4/S4	4.3		No	No
Astragalus kentrophyta var. elatus	spiny-leaved milk-vetch	PDFAB0F4J4	None	None	G5T4/S2	2B.2		No	Yes
Astragalus kentrophyta var. ungulatus	spiny milk-vetch	PDFAB0F4JB	None	None	G5T3T4/S1	2B.2		No	Yes
Astragalus lemmonii	Lemmon's milk-vetch	PDFAB0F4N0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

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Astragalus lentiformis	lens-pod milk-vetch	PDFAB0F4P0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus lentiginosus var. antonius	San Antonio milk-vetch	PDFAB0FB92	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Astragalus lentiginosus var. borreganus	Borrego milk-vetch	PDFAB0FB95	None	None	G5T5?/S4	4.3		Yes	No
Astragalus lentiginosus var. coachellae	Coachella Valley milk-vetch	PDFAB0FB97	Endangered	None	G5T1/S1	1B.2		Yes	Yes
Astragalus lentiginosus var. kernensis	Kern Plateau milk-vetch	PDFAB0FB98	None	None	G5T2?/S2	1B.2	USFS:S	No	Yes
Astragalus lentiginosus var. micans	shining milk-vetch	PDFAB0FB9C	None	None	G5T1/S1	1B.2		Yes	Yes
Astragalus lentiginosus var. piscinensis	Fish Slough milk-vetch	PDFAB0FB9E	Threatened	None	G5T1/S1	1B.1		Yes	Yes
Astragalus lentiginosus var. sesquimetralis	Sodaville milk-vetch	PDFAB0FB9K	None	Endangered	G5T1/S1	1B.1		No	Yes
Astragalus lentiginosus var. sierrae	Big Bear Valley milk-vetch	PDFAB0FB9L	None	None	G5T2/S2	1B.2	USFS:S	Yes	Yes
Astragalus leucolobus	Big Bear Valley woollypod	PDFAB0F4T0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Astragalus macrodon	Salinas milk-vetch	PDFAB0F520	None	None	G4/S4	4.3		No	No

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Astragalus magdalenae var. peirsonii	Peirson's milk-vetch	PDFAB0F532	Threatened	Endangered	G3G4T1/S1	1B.2		Yes	Yes
Astragalus miguelensis	San Miguel Island milk-vetch	PDFAB0F5C0	None	None	G4/S4	4.3		Yes	No
Astragalus mohavensis var. hemigyrus	curved-pod milk-vetch	PDFAB0F5J1	None	None	G3G4T2T3/S1	1B.1	BLM:S	Yes	Yes
Astragalus monoensis	Mono milk-vetch	PDFAB0F5N0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Astragalus nevinii	San Clemente Island milk-vetch	PDFAB0F5X0	None	None	G3/S3	1B.2		Yes	Yes
Astragalus nutans	Providence Mountains milk-vetch	PDFAB0F620	None	None	G3/S3	4.3		Yes	No
Astragalus nuttallii var. nuttallii	ocean bluff milk-vetch	PDFAB0F641	None	None	G4T4/S4	4.2		No	No
Astragalus nyensis	Nye milk-vetch	PDFAB0F660	None	None	G3?/S1	1B.1	BLM:S	No	Yes
Astragalus oocarpus	San Diego milk-vetch	PDFAB0F6B0	None	None	G2?/S2?	1B.2	BLM:S USFS:S	Yes	Yes
Astragalus oophorus var. lavinii	Lavin's milk-vetch	PDFAB0F6C4	None	None	G4T2/S1	1B.2	BLM:S	No	Yes
Astragalus oophorus var. oophorus	egg milk-vetch	PDFAB0F6C6	None	None	G4T4?/S3S4	4.3		No	No
Astragalus pachypus var. jaegeri	Jaeger's milk-vetch	PDFAB0F6G1	None	None	G4T1/S1	1B.1	USFS:S	Yes	Yes
Astragalus pauperculus	depauperate milk-vetch	PDFAB0F6N0	None	None	G4/S4	4.3		No	No
Astragalus platytropis	broad-keeled milk-vetch	PDFAB0F6X0	None	None	G5/S3	2B.2		No	Yes
Astragalus preussii var. laxiflorus	Lancaster milk-vetch	PDFAB0F721	None	None	G4T2/S1	1B.1		No	Yes

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Astragalus preussii var. preussii	Preuss' milk-vetch	PDFAB0F722	None	None	G4T4/S1	2B.1		Yes	Yes
Astragalus pseudiodanthus	Tonopah milk-vetch	PDFAB0F750	None	None	G2Q/S2	1B.2	BLM:S	No	Yes
Astragalus pulsiferae var. coronensis	Modoc Plateau milk-vetch	PDFAB0F784	None	None	G4T3/S3	4.2	USFS:S	No	No
Astragalus pulsiferae var. pulsiferae	Pulsifer's milk-vetch	PDFAB0F783	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus pulsiferae var. suksdorfii	Suksdorf's milk-vetch	PDFAB0F782	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Astragalus pycnostachyus var. lanosissimus	Ventura Marsh milk-vetch	PDFAB0F7B1	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2/S2	1B.2	BLM:S	Yes	Yes
Astragalus rattanii var. jepsonianus	Jepson's milk-vetch	PDFAB0F7E1	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Astragalus rattanii var. rattanii	Rattan's milk-vetch	PDFAB0F7E2	None	None	G4T4/S4	4.3		No	No
Astragalus ravenii	Raven's milk-vetch	PDFAB0F7F0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Astragalus sabulonum	gravel milk-vetch	PDFAB0F7R0	None	None	G4G5/S2	2B.2		No	Yes
Astragalus serenoi var. shockleyi	Shockley's milk-vetch	PDFAB0F802	None	None	G4T3/S3	2B.2		No	Yes
Astragalus shevockii	Shevock's milk-vetch	PDFAB0F850	None	None	G2/S2	1B.3	BLM:S	No	Yes
Astragalus subvestitus	Kern County milk-vetch	PDFAB0F8M0	None	None	G3/S3	4.3		No	No

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Astragalus tener var. ferrisiae	Ferris' milk-vetch	PDFAB0F8R3	None	None	G2T1/S1	1B.1		No	Yes
Astragalus tener var. tener	alkali milk-vetch	PDFAB0F8R1	None	None	G2T1/S1	1B.2		No	Yes
Astragalus tener var. titi	coastal dunes milk-vetch	PDFAB0F8R2	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Astragalus tidestromii	Tidestrom's milk-vetch	PDFAB0F8X0	None	None	G4/S2	2B.2	USFS:S	Yes	Yes
Astragalus traskiae	Trask's milk-vetch	PDFAB0F910	None	Rare	G3/S3	1B.2		No	Yes
Astragalus tricarinatus	triple-ribbed milk-vetch	PDFAB0F920	Endangered	None	G2/S2	1B.2		Yes	Yes
Astragalus umbraticus	Bald Mountain milk-vetch	PDFAB0F990	None	None	G4/S2	2B.2		No	Yes
Astragalus webberi	Webber's milk-vetch	PDFAB0F9J0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Astragalus whitneyi var. lenophyllus	woolly-leaved milk-vetch	PDFAB0F9L6	None	None	G5T4/S4	4.3		No	No
Astrolepis cochisensis ssp. cochisensis	scaly cloak fern	PPADI0P013	None	None	G5?T4/S2	2B.3		Yes	Yes
Atriplex argentea var. hillmanii	Hillman's silverscale	PDCHE04055	None	None	G5T4/S2	2B.2		No	Yes
Atriplex argentea var. longitrichoma	Pahrump orache	PDCHE04056	None	None	G5T2/S2	1B.1	BLM:S	Yes	Yes
Atriplex cordulata var. cordulata	heartscale	PDCHE040B0	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Atriplex cordulata var. erecticaulis	Earlimart orache	PDCHE042V0	None	None	G3T1/S1	1B.2		No	Yes
Atriplex coronata var. coronata	crownscale	PDCHE040C3	None	None	G4T3/S3	4.2		No	No
Atriplex coronata var. notatior	San Jacinto Valley crownscale	PDCHE040C2	Endangered	None	G4T1/S1	1B.1		Yes	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Atriplex coronata var. vallicola	Lost Hills crownscale	PDCHE04371	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Atriplex coulteri	Coulter's saltbush	PDCHE040E0	None	None	G3/S1S2	1B.2		Yes	Yes
Atriplex depressa	brittlescale	PDCHE042L0	None	None	G2/S2	1B.2		No	Yes
Atriplex flavida	Carrizo Plain crownscale	PDCHE04360	None	None	G3/S3	1B.3		Yes	Yes
Atriplex gardneri var. falcata	falcate saltbush	PDCHE040J0	None	None	G4T4Q/S2S3	2B.2		No	Yes
Atriplex minuscula	lesser saltscale	PDCHE042M0	None	None	G2/S2	1B.1		No	Yes
Atriplex pacifica	south coast saltscale	PDCHE041C0	None	None	G4/S2	1B.2		Yes	Yes
Atriplex parishii	Parish's brittlescale	PDCHE041D0	None	None	G1G2/S1	1B.1	USFS:S	Yes	Yes
Atriplex persistens	vernal pool smallscale	PDCHE042P0	None	None	G2/S2	1B.2		No	Yes
Atriplex pusilla	smooth saltbush	PDCHE041P0	None	None	G4/SH	2B.1		No	Yes
Atriplex serenana var. davidsonii	Davidson's saltscale	PDCHE041T1	None	None	G5T1/S1	1B.2		Yes	Yes
Atriplex subtilis	subtle orache	PDCHE042T0	None	None	G1/S1	1B.2		No	Yes
Atriplex tularensis	Bakersfield smallscale	PDCHE04240	None	Endangered	GX/SX	1A		No	Yes
Ayenia compacta	California ayenia	PDSTE01020	None	None	G4/S3	2B.3		Yes	Yes
Azolla microphylla	Mexican mosquito fern	PPAZO01030	None	None	G5/S4	4.2		No	No
Baccharis malibuensis	Malibu baccharis	PDAST0W0W0	None	None	G1/S1	1B.1		Yes	Yes
Baccharis plummerae ssp. glabrata	San Simeon baccharis	PDAST0W0D1	None	None	G3T1/S1	1B.2	USFS:S	No	Yes
Baccharis plummerae ssp. plummerae	Plummer's baccharis	PDAST0W0D2	None	None	G3T3/S3	4.3		Yes	No

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Baccharis vanessae	Encinitas baccharis	PDAST0W0P0	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Bahia neomexicana	many-flowered bahia	PDAST8C020	None	None	G5/S2S3	2B.3		No	Yes
Balsamorhiza lanata	woolly balsamroot	PDAST11047	None	None	G3/S3	1B.2	BLM:S	No	Yes
Balsamorhiza macrolepis	big-scale balsamroot	PDAST11061	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Balsamorhiza sericea	silky balsamroot	PDAST110C0	None	None	G4Q/S3	1B.3		Yes	Yes
Balsamorhiza serrata	serrated balsamroot	PDAST110A0	None	None	G5/S2	2B.3		No	Yes
Benitoa occidentalis	western lessingia	PDAST15010	None	None	G3G4/S3S4	4.3		No	No
Bensoniella oregona	bensoniella	PDSAX02010	None	Rare	G3/S2	1B.1	USFS:S	No	Yes
Berberis fremontii	Fremont barberry	PDBER06060	None	None	G5/S3	2B.3		Yes	Yes
Berberis harrisoniana	Kofa Mountain barberry	PDBER02030	None	None	G2/S1	1B.2	BLM:S	Yes	Yes
Berberis higginsiae	Higgin's barberry	PDBER06080	None	None	G3Q/S1	3.2		No	Yes
Berberis nevinii	Nevin's barberry	PDBER060A0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Berberis pinnata ssp. insularis	island barberry	PDBER060B2	Endangered	Endangered	G5T1/S1	1B.2		Yes	Yes
Bergerocactus emoryi	golden-spined cereus	PDCAC11010	None	None	G2G3/S2	2B.2		Yes	Yes
Betula glandulosa	dwarf resin birch	PDBET02030	None	None	G5/S2	2B.2		No	Yes
Blennosperma bakeri	Sonoma sunshine	PDAST1A010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Blennosperma nanum var. robustum	Point Reyes blennosperma	PDAST1A022	None	Rare	G4T2/S2	1B.2		No	Yes
Blepharidachne kingii	King's eyelash grass	PMPOA0X020	None	None	G4/S2	2B.3		No	Yes
Blepharizonia plumosa	big tarplant	PDAST1C011	None	None	G1G2/S1S2	1B.1		Yes	Yes

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Bloomeria clevelandii	San Diego goldenstar	PMLIL1H010	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Bloomeria humilis	dwarf goldenstar	PMLIL0B020	None	Rare	G1/S1	1B.2	USFS:S	Yes	Yes
Boechera bodiensis	Bodie Hills rockcress	PDBRA06240	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Boechera cobrensis	Masonic rockcress	PDBRA06080	None	None	G5/S3	2B.3		No	Yes
Boechera constancei	Constance's rockcress	PDBRA06090	None	None	G2/S2	1B.1	USFS:S	No	Yes
Boechera dispar	pinyon rockcress	PDBRA060F0	None	None	G3/S3	2B.3		Yes	Yes
Boechera evadens	hidden rockcress	PDBRA40030	None	None	G1/S1	1B.3	USFS:S	No	Yes
Boechera hirshbergiae	Hirshberg's rockcress	PDBRA064D0	None	None	G1Q/S1	1B.2		Yes	Yes
Boechera hoffmannii	Hoffmann's rockcress	PDBRA060V0	Endangered	None	G1G2/S1S2	1B.1		Yes	Yes
Boechera johnstonii	Johnston's rockcress	PDBRA060Y0	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Boechera koehleri	Koehler's stipitate rockcress	PDBRA060Z0	None	None	G3G4/S3	1B.3	USFS:S	No	Yes
Boechera lincolnensis	Lincoln rockcress	PDBRA061M3	None	None	G4G5/S3	2B.3	BLM:S	No	Yes
Boechera microphylla	small-leaved rockcress	PDBRA06162	None	None	G4Q/S3	3		No	No
Boechera parishii	Parish's rockcress	PDBRA061C0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Boechera peirsonii	San Bernardino rockcress	PDBRA06053	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Boechera pendulina	rabbit-ear rockcress	PDBRA061E0	None	None	G5/S2	2B.1		No	Yes
Boechera pinzliae	Pinzl's rockcress	PDBRA06270	None	None	G2/S1	1B.3	USFS:S	No	Yes
Boechera pygmaea	Tulare County rockcress	PDBRA061N0	None	None	G3/S3	4.3		No	No
Boechera rollei	Rolle's rockcress	PDBRA064H0	None	None	G1/S1	1B.1		No	Yes

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Boechera rubicundula	Mt. Day rockcress	PDBRA40100	None	None	G1/S1	1B.1		No	Yes
Boechera serpenticola	serpentine rockcress	PDBRA40110	None	None	G1/S1	1B.2		No	Yes
Boechera shevockii	Shevock's rockcress	PDBRA40120	None	None	G1/S1	1B.1	USFS:S	No	Yes
Boechera shockleyi	Shockley's rockcress	PDBRA061V0	None	None	G3/S2	2B.2	USFS:S	Yes	Yes
Boechera tiehmii	Tiehm's rockcress	PDBRA06280	None	None	G3/S3	1B.3	USFS:S	No	Yes
Boechera tularensis	Tulare rockcress	PDBRA40130	None	None	G3/S3	1B.3	USFS:S	No	Yes
Boechera ultraalsa	Snow Mountain rockcress	PDBRA40140	None	None	G1/S1	1B.1		No	Yes
Boechera yorkii	Last Chance rockcress	PDBRA40010	None	None	G1/S1	1B.3		No	Yes
Bolandra californica	Sierra bolandra	PDSAX03010	None	None	G4/S4	4.3		No	No
Botrychium ascendens	upswept moonwort	PPOPH010S0	None	None	G3G4/S2	2B.3	USFS:S	No	Yes
Botrychium crenulatum	scalloped moonwort	PPOPH010L0	None	None	G4/S3	2B.2	USFS:S	No	Yes
Botrychium lineare	slender moonwort	PPOPH01120	None	None	G3/S1	1B.1	USFS:S	No	Yes
Botrychium lunaria	common moonwort	PPOPH01080	None	None	G5/S2	2B.3	USFS:S	No	Yes
Botrychium minganense	Mingan moonwort	PPOPH010R0	None	None	G4G5/S3	2B.2	USFS:S	No	Yes
Botrychium montanum	western goblin	PPOPH010K0	None	None	G3/S2	2B.1	USFS:S	No	Yes
Botrychium paradoxum	paradox moonwort	PPOPH010J0	None	None	G3G4/S1	2B.1	USFS:S	No	Yes
Botrychium pedunculosum	stalked moonwort	PPOPH010T0	None	None	G3/S1	2B.1	USFS:S	No	Yes
Botrychium pinnatum	northwestern moonwort	PPOPH010V0	None	None	G4?/S2	2B.3	USFS:S	No	Yes

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Botrychium pumicola	pumice moonwort	PPOPH010D0	None	None	G3/S1	2B.2	USFS:S	No	Yes
Botrychium tunux	moosewort	PPOPH01240	None	None	G3/S1	2B.1	USFS:S	No	Yes
Botrychium yaaxudakeit	giant moonwort	PPOPH01180	None	None	G3G4/S1	2B.1	USFS:S	No	Yes
Botrypus virginianus	rattlesnake fern	PPOPH010H0	None	None	G5/S2	2B.2		No	Yes
Bouteloua eriopoda	black grama	PMPOA10080	None	None	G5/S4	4.2		Yes	No
Bouteloua trifida	three-awned grama	PMPOA100L0	None	None	G4G5/S3	2B.3		Yes	Yes
Brasenia schreberi	watershield	PDCAB01010	None	None	G5/S3	2B.3		No	Yes
Brodiaea filifolia	thread-leaved brodiaea	PMLIL0C050	Threatened	Endangered	G2/S2	1B.1		Yes	Yes
Brodiaea insignis	Kaweah brodiaea	PMLIL0C060	None	Endangered	G1/S1	1B.2	USFS:S	No	Yes
Brodiaea kinkiensis	San Clemente Island brodiaea	PMLIL0C080	None	None	G2/S2	1B.2		Yes	Yes
Brodiaea leptandra	narrow-anthered brodiaea	PMLIL0C022	None	None	G3?/S3?	1B.2		No	Yes
Brodiaea matsonii	Sulphur Creek brodiaea	PMLIL0C0H0	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Brodiaea orcuttii	Orcutt's brodiaea	PMLIL0C0B0	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Brodiaea pallida	Chinese Camp brodiaea	PMLIL0C0C0	Threatened	Endangered	G1/S1	1B.1		No	Yes
Brodiaea rosea	Indian Valley brodiaea	PMLIL0C0K3	None	Endangered	G2Q/S2	3.1	BLM:S USFS:S	No	Yes
Brodiaea rosea ssp. vallicola	valley brodiaea	PMLIL0C0K2	None	None	G5T3/S3	4.2		No	No
Brodiaea santarosae	Santa Rosa Basalt brodiaea	PMLIL0C0G0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Brodiaea sierrae	Sierra foothills brodiaea	PMLIL0C0J0	None	None	G3/S3	4.3		No	No

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Bulbostylis capillaris	thread-leaved beakseed	PMCYP02020	None	None	G5/S3	4.2		No	No
Bursera microphylla	little-leaf elephant tree	PDBUR01020	None	None	G4/S2	2B.3		Yes	Yes
Calamagrostis bolanderi	Bolander's reed grass	PMPOA17010	None	None	G4/S4	4.2		No	No
Calamagrostis crassiglumis	Thurber's reed grass	PMPOA17070	None	None	G3Q/S2	2B.1		No	Yes
Calamagrostis foliosa	leafy reed grass	PMPOA170C0	None	Rare	G3/S3	4.2		No	Yes
Calamagrostis ophitidis	serpentine reed grass	PMPOA170V0	None	None	G3/S3	4.3		No	No
Calandrinia breweri	Brewer's calandrinia	PDPOR01020	None	None	G4/S4	4.2		Yes	No
Calliandra eriophylla	pink fairy-duster	PDFAB0N040	None	None	G5/S3	2B.3		Yes	Yes
Callitropsis nootkatensis	Alaska cedar	PGCUP03020	None	None	G4G5/S3	4.3		No	No
Calochortus catalinae	Catalina mariposa-lily	PMLIL0D080	None	None	G3G4/S3S4	4.2		Yes	No
Calochortus clavatus var. avius	Pleasant Valley mariposa-lily	PMLIL0D095	None	None	G4T2/S2	1B.2	USFS:S	No	Yes
Calochortus clavatus var. clavatus	club-haired mariposa-lily	PMLIL0D091	None	None	G4T3/S3	4.3	USFS:S	Yes	No
Calochortus clavatus var. gracilis	slender mariposa-lily	PMLIL0D096	None	None	G4T2T3/S2S3	1B.2	USFS:S	Yes	Yes
Calochortus clavatus var. recurvifolius	Arroyo de la Cruz mariposa-lily	PMLIL0D098	None	None	G4T1/S1	1B.2		No	Yes
Calochortus dunnii	Dunn's mariposa-lily	PMLIL0D0C0	None	Rare	G2G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus excavatus	Inyo County star-tulip	PMLIL0D0F0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes

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Calochortus fimbriatus	late-flowered mariposa-lily	PMLIL0D1J2	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Calochortus greenei	Greene's mariposa-lily	PMLIL0D0H0	None	None	G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus longebarbatus var. longebarbatus	long-haired star-tulip	PMLIL0D0R1	None	None	G4T3/S3	1B.2	USFS:S	Yes	Yes
Calochortus monanthus	single-flowered mariposa-lily	PMLIL0D0W0	None	None	GX/SX	1A		No	Yes
Calochortus obispoensis	San Luis mariposa-lily	PMLIL0D110	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Calochortus palmeri var. munzii	San Jacinto mariposa-lily	PMLIL0D121	None	None	G3T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus palmeri var. palmeri	Palmer's mariposa-lily	PMLIL0D122	None	None	G3T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus panamintensis	Panamint mariposa-lily	PMLIL0D130	None	None	G3/S3	4.2		Yes	No
Calochortus persistens	Siskiyou mariposa-lily	PMLIL0D140	None	Rare	G1/S1	1B.2	USFS:S	Yes	Yes
Calochortus plummerae	Plummer's mariposa-lily	PMLIL0D150	None	None	G4/S4	4.2		Yes	Yes
Calochortus pulchellus	Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2/S2	1B.2		No	Yes
Calochortus raichei	The Cedars fairy-lantern	PMLIL0D1L0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Calochortus simulans	La Panza mariposa-lily	PMLIL0D170	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Calochortus striatus	alkali mariposa-lily	PMLIL0D190	None	None	G3?/S2S3	1B.2	BLM:S USFS:S	Yes	Yes
Calochortus syntrophus	Callahan's mariposa-lily	PMLIL0D1S0	None	None	G1/S1	1B.1		No	Yes

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Calochortus tiburonensis	Tiburon mariposa-lily	PMLIL0D1C0	Threatened	Threatened	G1/S1	1B.1		Yes	Yes
Calochortus umbellatus	Oakland star-tulip	PMLIL0D1E0	None	None	G3?/S3?	4.2		Yes	No
Calochortus uniflorus	pink star-tulip	PMLIL0D1F0	None	None	G4/S4	4.2		Yes	No
Calochortus weedii var. intermedius	intermediate mariposa-lily	PMLIL0D1J1	None	None	G3G4T2/S2	1B.2	USFS:S	Yes	Yes
Calochortus westonii	Shirley Meadows star-tulip	PMLIL0D1M0	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	G2/S2	1B.3		No	Yes
Calycadenia micrantha	small-flowered calycadenia	PDAST1P0C0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Calycadenia oppositifolia	Butte County calycadenia	PDAST1P070	None	None	G3/S3	4.2	USFS:S	No	No
Calycadenia villosa	dwarf calycadenia	PDAST1P0B0	None	None	G3/S3	1B.1	USFS:S	Yes	Yes
Calyptridium arizonicum	Arizona pussypaws	PDPOR09051	None	None	G3?/S1	2B.1		Yes	Yes
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2/S2	1B.1	BLM:S	No	Yes
Calyptridium pulchellum	Mariposa pussypaws	PDPOR09060	Threatened	None	G1/S1	1B.1		No	Yes
Calyptridium pygmaeum	pygmy pussypaws	PDPOR09070	None	None	G1G2/S1S2	1B.2	USFS:S	Yes	Yes
Calyptridium quadripetalum	four-petaled pussypaws	PDPOR09080	None	None	G4/S4	4.3		Yes	No
Calystegia atriplicifolia ssp. buttensis	Butte County morning-glory	PDCON04012	None	None	G5T3/S3	4.2		No	Yes

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Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	PDCON04032	None	None	G4T3/S3	4.2		No	Yes
Calystegia collina ssp. tridactylosa	three-fingered morning-glory	PDCON04036	None	None	G4T1/S1	1B.2	BLM:S	No	Yes
Calystegia collina ssp. venusta	South Coast Range morning-glory	PDCON04034	None	None	G4T4/S4	4.3		No	No
Calystegia felix	lucky morning-glory	PDCON040P0	None	None	G1Q/S1	1B.1		No	Yes
Calystegia macrostegia ssp. amplissima	island morning-glory	PDCON04081	None	None	G4G5T4/S4	4.3		Yes	No
Calystegia malacophylla var. berryi	Berry's morning-glory	PDCON040K2	None	None	G4G5T2Q/S2	3.3		No	Yes
Calystegia peirsonii	Peirson's morning-glory	PDCON040A0	None	None	G4/S4	4.2		No	Yes
Calystegia purpurata ssp. saxicola	coastal bluff morning-glory	PDCON040D2	None	None	G4T2T3/S2S3	1B.2	BLM:S	No	Yes
Calystegia sepium ssp. binghamiae	Santa Barbara morning-glory	PDCON040E6	None	None	G5TXQ/SX	1A		No	Yes
Calystegia stebbinsii	Stebbins' morning-glory	PDCON040H0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Calystegia subacaulis ssp. episcopalis	Cambria morning-glory	PDCON040J1	None	None	G3T2?/S2?	4.2		No	Yes
Calystegia vanzuukiae	Van Zuuk's morning-glory	PDCON040Q0	None	None	G2Q/S2	1B.3	BLM:S	No	Yes
Camissonia benitensis	San Benito evening-primrose	PDONA03030	Threatened	None	G2/S2	1B.1		Yes	Yes
Camissonia integrifolia	Kern River evening-primrose	PDONA030T0	None	None	G2/S2	1B.3		No	Yes

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Camissonia kernensis ssp. kernensis	Kern County evening-primrose	PDONA030V2	None	None	G4T3/S3	4.3		No	No
Camissonia sierrae ssp. alticola	Mono Hot Springs evening-primrose	PDONA031H1	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Camissonia sierrae ssp. sierrae	Yosemite evening-primrose	PDONA031H2	None	None	G3T3/S3	4.3		No	No
Camissoniopsis guadalupensis ssp. clementina	San Clemente Island evening-primrose	PDONA030M1	None	None	G3T2/S2	1B.2		Yes	Yes
Camissoniopsis hardhamiae	Hardham's evening-primrose	PDONA030N0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Camissoniopsis lewisii	Lewis' evening-primrose	PDONA030X0	None	None	G4/S4	3		No	No
Campanula californica	swamp harebell	PDCAM02060	None	None	G3/S3	1B.2	BLM:S	No	Yes
Campanula exigua	chaparral harebell	PDCAM020A0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Campanula scabrella	rough harebell	PDCAM020U0	None	None	G4/S4	4.3		Yes	No
Campanula sharsmithiae	Sharsmith's harebell	PDCAM02100	None	None	G1G2/S1S2	1B.2		No	Yes
Campanula shetleri	Castle Crags harebell	PDCAM020W0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Campanula wilkinsiana	Wilkin's harebell	PDCAM020Z0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Canbya candida	white pygmy-poppy	PDPAP05020	None	None	G3G4/S3S4	4.2	USFS:S	Yes	Yes
Cardamine angulata	seaside bittercress	PDBRA0K010	None	None	G4G5/S3	2B.1		No	Yes
Cardamine bellidifolia var. pachyphylla	fleshy toothwort	PDBRA0K022	None	None	G5T4/S3	4.3		No	No
Cardamine nuttallii var. gemmata	yellow-tubered toothwort	PDBRA0K0R3	None	None	G5T3Q/S2	3.3		No	Yes

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Cardamine pachystigma var. dissectifolia	dissected-leaved toothwort	PDBRA0K1B1	None	None	G3G5T2Q/S2	1B.2		No	Yes
Carex arcta	northern clustered sedge	PMCYP030X0	None	None	G5/S1	2B.2		No	Yes
Carex atherodes	wheat sedge	PMCYP03160	None	None	G5/S1	2B.2		No	Yes
Carex buxbaumii	Buxbaum's sedge	PMCYP032B0	None	None	G5/S3	4.2		No	No
Carex californica	California sedge	PMCYP032D0	None	None	G5/S2	2B.2		No	Yes
Carex comosa	bristly sedge	PMCYP032Y0	None	None	G5/S2	2B.1		No	Yes
Carex congdonii	Congdon's sedge	PMCYP03320	None	None	G4/S4	4.3		No	No
Carex cyrtostachya	Sierra arching sedge	PMCYP03M00	None	None	G2/S2	1B.2		No	Yes
Carex davyi	Davy's sedge	PMCYP033H0	None	None	G3/S3	1B.3		No	Yes
Carex duriuscula	spikerush sedge	PMCYP03GJ0	None	None	G5/S2	2B.3		No	Yes
Carex geyeri	Geyer's sedge	PMCYP03540	None	None	G5/S4	4.2		No	No
Carex halliana	Oregon sedge	PMCYP035M0	None	None	G4/S2	2B.3		No	Yes
Carex hystericina	porcupine sedge	PMCYP036D0	None	None	G5/S2	2B.1		No	Yes
Carex idahoa	Idaho sedge	PMCYP036E0	None	None	G3/S1	2B.3		No	Yes
Carex incurviformis	Mt. Dana sedge	PMCYP036G0	None	None	G5/S4	4.3		No	No
Carex klamathensis	Klamath sedge	PMCYP03L70	None	None	G2/S2	1B.2		No	Yes
Carex lasiocarpa	woolly-fruited sedge	PMCYP03720	None	None	G5/S2	2B.3		No	Yes
Carex lenticularis var. limnophila	lagoon sedge	PMCYP037A7	None	None	G5T5/S1	2B.2		No	Yes
Carex leptalea	bristle-stalked sedge	PMCYP037E0	None	None	G5/S1	2B.2		No	Yes
Carex limosa	mud sedge	PMCYP037K0	None	None	G5/S3	2B.2		No	Yes
Carex livida	livid sedge	PMCYP037L0	None	None	G5/SH	2A		No	Yes
Carex lyngbyei	Lyngbye's sedge	PMCYP037Y0	None	None	G5/S3	2B.2		No	Yes
Carex nardina	nard sedge	PMCYP03920	None	None	G4G5/S1	2B.2		No	Yes
Carex obispoensis	San Luis Obispo sedge	PMCYP039J0	None	None	G3?/S3?	1B.2	BLM:S USFS:S	Yes	Yes

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Carex occidentalis	western sedge	PMCYP039M0	None	None	G4/S3	2B.3		Yes	Yes
Carex petasata	Liddon's sedge	PMCYP03AE0	None	None	G5/S3	2B.3		No	Yes
Carex praticola	northern meadow sedge	PMCYP03B20	None	None	G5/S2	2B.2		No	Yes
Carex saliniformis	deceiving sedge	PMCYP03BY0	None	None	G2/S2	1B.2		No	Yes
Carex scabriuscula	Siskiyou sedge	PMCYP03C40	None	None	G4G5/S4	4.3		Yes	No
Carex scirpoidea ssp. pseudoscirpoidea	western single-spiked sedge	PMCYP03C85	None	None	G5T4/S2	2B.2		No	Yes
Carex scoparia var. scoparia	pointed broom sedge	PMCYP03C91	None	None	G5T5/SX	2A		No	Yes
Carex serpenticola	serpentine sedge	PMCYP03KM0	None	None	G4/S3	2B.3		No	Yes
Carex sheldonii	Sheldon's sedge	PMCYP03CE0	None	None	G4/S2	2B.2		No	Yes
Carex stevenii	Steven's sedge	PMCYP039D4	None	None	G4G5/S1	2B.2		No	Yes
Carex tahoensis	Tahoe sedge	PMCYP03DG0	None	None	G5/S4	4.3		No	No
Carex tiogana	Tioga Pass sedge	PMCYP03GP0	None	None	G2Q/S1	1B.3	USFS:S	No	Yes
Carex tompkinsii	Tompkins' sedge	PMCYP03DR0	None	Rare	G3G4/S3S4	4.3		No	Yes
Carex vallicola	western valley sedge	PMCYP03EA0	None	None	G5/S2	2B.3		No	Yes
Carex viridula ssp. viridula	green yellow sedge	PMCYP03EM5	None	None	G5T5/S2	2B.3		No	Yes
Carex xerophila	chaparral sedge	PMCYP03M60	None	None	G2/S2	1B.2	BLM:S	No	Yes
Carlowrightia arizonica	Arizona carlowrightia	PDACA07010	None	None	G4G5/S2	2B.2		No	Yes
Carlquistia muirii	Muir's tarplant	PDASTDU010	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Carnegiea gigantea	saguaro	PDCAC12010	None	None	G5/S1	2B.2		Yes	Yes
Carpenteria californica	tree-anemone	PDHDR04010	None	Threatened	G1?/S1?	1B.2	USFS:S	Yes	Yes
Cascadia nuttallii	Nuttall's saxifrage	PDSAX0U160	None	None	G4?/S1	2B.1		No	Yes
Castela emoryi	Emory's crucifixion-thorn	PDSIM03030	None	None	G3G4/S2S3	2B.2		Yes	Yes

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Castilleja affinis var. neglecta	Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1T2/S1S2	1B.2		Yes	Yes
Castilleja ambigua var. ambigua	johnny-nip	PDSCR0D401	None	None	G4T4/S3S4	4.2		No	No
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	PDSCR0D402	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Castilleja ambigua var. insalutata	pink Johnny-nip	PDSCR0D403	None	None	G4T2/S2	1B.1	BLM:S	No	Yes
Castilleja ambigua var. meadii	Mead's owls-clover	PDSCR0D404	None	None	G4T1/S1	1B.1		No	Yes
Castilleja brevilobata	short-lobed paintbrush	PDSCR0D181	None	None	G4/S3	4.2		No	No
Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	G4?T2T3/S2S3	1B.2		No	Yes
Castilleja cinerea	ash-gray paintbrush	PDSCR0D0H0	Threatened	None	G1G2/S1S2	1B.2		Yes	Yes
Castilleja densiflora var. obispoensis	San Luis Obispo owl's-clover	PDSCR0D453	None	None	G5T2/S2	1B.2		No	Yes
Castilleja elata	Siskiyou paintbrush	PDSCR0D213	None	None	G3/S2S3	2B.2		No	Yes
Castilleja gleasoni	Mt. Gleason paintbrush	PDSCR0D140	None	Rare	G2/S2	1B.2	USFS:S	Yes	Yes
Castilleja grisea	San Clemente Island paintbrush	PDSCR0D160	Threatened	Endangered	G3/S3	1B.3		Yes	Yes
Castilleja hololeuca	island white-felted paintbrush	PDSCR0D1L1	None	None	G3/S3	1B.2		No	Yes
Castilleja lasiorhyncha	San Bernardino Mountains owl's-clover	PDSCR0D410	None	None	G2?/S2?	1B.2	USFS:S	Yes	Yes
Castilleja lassenensis	Lassen paintbrush	PDSCR0D4L0	None	None	G3/S3	1B.3		No	Yes
Castilleja latifolia	Monterey Coast paintbrush	PDSCR0D1P0	None	None	G4/S4	4.3		No	No

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Castilleja leschkeana	Point Reyes paintbrush	PDSCR0D1R0	None	None	GX/SX	1A		No	Yes
Castilleja litoralis	Oregon coast paintbrush	PDSCR0D012	None	None	G3/S3	2B.2		No	Yes
Castilleja mendocinensis	Mendocino Coast paintbrush	PDSCR0D3N0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Castilleja mollis	soft-leaved paintbrush	PDSCR0D230	Endangered	None	G2/S2	1B.1		Yes	Yes
Castilleja montigena	Heckard's paintbrush	PDSCR0D3G0	None	None	G3/S3	4.3		No	No
Castilleja plagiotoma	Mojave paintbrush	PDSCR0D2J0	None	None	G4/S4	4.3	USFS:S	Yes	No
Castilleja rubicundula var. rubicundula	pink creamsacs	PDSCR0D482	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Castilleja schizotricha	split-hair paintbrush	PDSCR0D2Y0	None	None	G3/S3	4.3		Yes	No
Castilleja uliginosa	Pitkin Marsh paintbrush	PDSCR0D380	None	Endangered	GXQ/SX	1A		No	Yes
Catabrosa aquatica	water whorlgrass	PMPOA19010	None	None	G5/S1	2B.1		No	Yes
Caulanthus amplexicaulis var. barbarae	Santa Barbara jewelflower	PDBRA0M012	None	None	G4T2/S2	1B.1	USFS:S	No	Yes
Caulanthus californicus	California jewelflower	PDBRA31010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Caulanthus lemmonii	Lemmon's jewelflower	PDBRA0M0E0	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Caulanthus major var. nevadensis	slender jewelflower	PDBRA0M0F1	None	None	G4T3?/S3?	4.3		No	No
Caulanthus simulans	Payson's jewelflower	PDBRA0M0H0	None	None	G4/S4	4.2	USFS:S	No	Yes

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Ceanothus confusus	Rincon Ridge ceanothus	PDRHA04220	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Ceanothus cuneatus var. fascicularis	Lompoc ceanothus	PDRHA04066	None	None	G5T4/S4	4.2		Yes	No
Ceanothus cyaneus	Lakeside ceanothus	PDRHA04070	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Ceanothus decornutus	Nicasio ceanothus	PDRHA04440	None	None	G1/S1	1B.2		No	Yes
Ceanothus divergens	Calistoga ceanothus	PDRHA04240	None	None	G2/S2	1B.2		No	Yes
Ceanothus ferrisiae	Coyote ceanothus	PDRHA041N0	Endangered	None	G1/S1	1B.1		Yes	Yes
Ceanothus foliosus var. viejasensis	Viejas Mountain ceanothus	PDRHA040D7	None	None	G3T1/S1	1B.2		No	Yes
Ceanothus foliosus var. vineatus	Vine Hill ceanothus	PDRHA040D6	None	None	G3T1/S1	1B.1		No	Yes
Ceanothus fresnensis	Fresno ceanothus	PDRHA040E0	None	None	G4/S4	4.3		No	No
Ceanothus gloriosus var. exaltatus	glory brush	PDRHA040F4	None	None	G4T4/S4	4.3		No	No
Ceanothus gloriosus var. gloriosus	Point Reyes ceanothus	PDRHA040F5	None	None	G4T4/S4	4.3		Yes	No
Ceanothus gloriosus var. porrectus	Mt. Vision ceanothus	PDRHA040F7	None	None	G4T2/S2	1B.3		No	Yes
Ceanothus hearstiorum	Hearsts' ceanothus	PDRHA040J0	None	Rare	G1G2/S1S2	1B.2	BLM:S	No	Yes
Ceanothus impressus var. impressus	Santa Barbara ceanothus	PDRHA040L1	None	None	G3T3/S3	1B.2		No	Yes
Ceanothus impressus var. nipomensis	Nipomo Mesa ceanothus	PDRHA040L2	None	None	G3T2/S2	1B.2		No	Yes

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Ceanothus maritimus	maritime ceanothus	PDRHA040T0	None	Rare	G2/S2	1B.2		Yes	Yes
Ceanothus masonii	Mason's ceanothus	PDRHA04200	None	Rare	G1/S1	1B.2		Yes	Yes
Ceanothus megacarpus var. insularis	island ceanothus	PDRHA040W1	None	None	G5T4/S4	4.3		Yes	No
Ceanothus ophiochilus	Vail Lake ceanothus	PDRHA041M0	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Ceanothus otayensis	Otay Mountain ceanothus	PDRHA04430	None	None	G1G2/S1	1B.2	BLM:S	Yes	Yes
Ceanothus pendletonensis	Pendleton ceanothus	PDRHA04450	None	None	G1/S1	1B.2		No	Yes
Ceanothus pinetorum	Kern ceanothus	PDRHA04130	None	None	G3/S3	4.3		No	No
Ceanothus purpureus	holly-leaved ceanothus	PDRHA04160	None	None	G2/S2	1B.2		Yes	Yes
Ceanothus rigidus	Monterey ceanothus	PDRHA04067	None	None	G4/S4	4.2		Yes	No
Ceanothus roderickii	Pine Hill ceanothus	PDRHA04190	Endangered	Rare	G1/S1	1B.1		Yes	Yes
Ceanothus sonomensis	Sonoma ceanothus	PDRHA04420	None	None	G2/S2	1B.2		Yes	Yes
Ceanothus thyrsiflorus var. obispoensis	San Luis Obispo ceanothus	PDRHA04461	None	None	G5T1/S1	1B.1		No	Yes
Ceanothus verrucosus	wart-stemmed ceanothus	PDRHA041J0	None	None	G2/S2?	2B.2		Yes	Yes
Centromadia parryi ssp. australis	southern tarplant	PDAST4R0P4	None	None	G3T2/S2	1B.1		Yes	Yes
Centromadia parryi ssp. congdonii	Congdon's tarplant	PDAST4R0P1	None	None	G3T1T2/S1S2	1B.1	BLM:S	Yes	Yes

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Centromadia parryi ssp. parryi	pappose tarplant	PDAST4R0P2	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Centromadia parryi ssp. rudis	Parry's rough tarplant	PDAST4R0P3	None	None	G3T3/S3	4.2		No	No
Centromadia pungens ssp. laevis	smooth tarplant	PDAST4R0R4	None	None	G3G4T2/S2	1B.1		Yes	Yes
Cercocarpus betuloides var. blancheae	island mountain-mahogany	PDROS08022	None	None	G5T4/S4	4.3		Yes	No
Cercocarpus traskiae	Catalina Island mountain-mahogany	PDROS08030	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chaenactis carphoclinia var. peirsonii	Peirson's pincushion	PDAST20042	None	None	G5T2/S2	1B.3	BLM:S	Yes	Yes
Chaenactis douglasii var. alpina	alpine dusty maidens	PDAST20065	None	None	G5T5/S2	2B.3		No	Yes
Chaenactis glabriuscula var. orcuttiana	Orcutt's pincushion	PDAST20095	None	None	G5T1T2/S1	1B.1		Yes	Yes
Chaenactis parishii	Parish's chaenactis	PDAST200D0	None	None	G3G4/S3	1B.3	BLM:S	No	Yes
Chaenactis suffrutescens	Shasta chaenactis	PDAST200H0	None	None	G2G3/S2S3	1B.3	BLM:S USFS:S	Yes	Yes
Chaetadelpha wheeleri	Wheeler's dune-broom	PDAST21010	None	None	G4/S2	2B.2		No	Yes
Chamaebatia australis	southern mountain misery	PDROS0A010	None	None	G4/S4	4.2		No	No
Chenopodium littoreum	coastal goosefoot	PDCHE091Z0	None	None	G1/S1	1B.2		No	Yes
Chenopodium simplex	large-seeded goosefoot	PDCHE091P0	None	None	G5/S4	4.3		No	No

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Chlorogalum grandiflorum	Red Hills soaproot	PMLIL0G020	None	None	G3/S3	1B.2	BLM:S	No	Yes
Chlorogalum pomeridianum var. minus	dwarf soaproot	PMLIL0G042	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Chlorogalum purpureum var. purpureum	Santa Lucia purple amole	PMLIL0G051	Threatened	None	G2T2/S2	1B.1		Yes	Yes
Chlorogalum purpureum var. reductum	Camatta Canyon amole	PMLIL0G052	Threatened	Rare	G2T1/S1	1B.1		Yes	Yes
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	PDSCR0J0C2	Endangered	Endangered	G4?T1/S1	1B.2	BLM:S	Yes	Yes
Chloropyron maritimum ssp. palustre	Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2/S2	1B.2	BLM:S	No	Yes
Chloropyron molle ssp. hispidum	hispid salty bird's-beak	PDSCR0J0D1	None	None	G2T1/S1	1B.1		No	Yes
Chloropyron molle ssp. molle	soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1/S1	1B.2		No	Yes
Chloropyron palmatum	palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chloropyron tecopense	Tecopa bird's-beak	PDSCR0J0Q0	None	None	G2/S1	1B.2	BLM:S	Yes	Yes
Chorizanthe aphanantha	Irish Hills spineflower	PDPGN04110	None	None	G1/S1	1B.1		No	Yes
Chorizanthe biloba var. immemora	Hernandez spineflower	PDPGN04025	None	None	G3T1T2/S1S2	1B.2	BLM:S	No	Yes
Chorizanthe blakleyi	Blakley's spineflower	PDPGN04030	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes

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Chorizanthe breweri	Brewer's spineflower	PDPGN04050	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Chorizanthe cuspidata var. cuspidata	San Francisco Bay spineflower	PDPGN04081	None	None	G2T1/S1	1B.2		No	Yes
Chorizanthe cuspidata var. villosa	woolly-headed spineflower	PDPGN04082	None	None	G2T2/S2	1B.2		No	Yes
Chorizanthe douglasii	Douglas' spineflower	PDPGN040A0	None	None	G4/S4	4.3		Yes	No
Chorizanthe howellii	Howell's spineflower	PDPGN040C0	Endangered	Threatened	G1/S1	1B.2		No	Yes
Chorizanthe leptotheca	Peninsular spineflower	PDPGN040D0	None	None	G3/S3	4.2		No	No
Chorizanthe minutiflora	Fort Ord spineflower	PDPGN04100	None	None	G1/S1	1B.2		Yes	Yes
Chorizanthe orcuttiana	Orcutt's spineflower	PDPGN040G0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chorizanthe palmeri	Palmer's spineflower	PDPGN040H0	None	None	G4/S4	4.2		No	No
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	PDPGN040J1	None	Endangered	G2T1/S1	1B.1	USFS:S	Yes	Yes
Chorizanthe parryi var. parryi	Parry's spineflower	PDPGN040J2	None	None	G3T2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Chorizanthe polygonoides var. longispina	long-spined spineflower	PDPGN040K1	None	None	G5T3/S3	1B.2	BLM:S	Yes	Yes
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	PDPGN040M1	Endangered	None	G2T1/S1	1B.1		Yes	Yes
Chorizanthe pungens var. pungens	Monterey spineflower	PDPGN040M2	Threatened	None	G2T2/S2	1B.2	BLM:S	Yes	Yes

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Chorizanthe rectispina	straight-awned spineflower	PDPGN040N0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	PDPGN040Q1	Endangered	None	G2T1/S1	1B.1		No	Yes
Chorizanthe robusta var. robusta	robust spineflower	PDPGN040Q2	Endangered	None	G2T1/S1	1B.1		No	Yes
Chorizanthe spinosa	Mojave spineflower	PDPGN040R0	None	None	G4/S4	4.2		No	No
Chorizanthe valida	Sonoma spineflower	PDPGN040V0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Chorizanthe ventricosa	potbellied spineflower	PDPGN040W0	None	None	G3/S3	4.3		No	No
Chorizanthe wheeleri	Wheeler's spineflower	PDPGN040Y0	None	None	G3G4/S3S4	4.3		No	No
Chorizanthe xanti var. leucotheca	white-bracted spineflower	PDPGN040Z1	None	None	G4T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Chrysosplenium glechomifolium	Pacific golden saxifrage	PDSAX07020	None	None	G5?/S3	4.3		No	No
Chrysothamnus greenei	Greene's rabbitbrush	PDAST2C030	None	None	G5/S3?	2B.3		No	Yes
Chylismia arenaria	sand evening-primrose	PDONA03020	None	None	G4?/S2S3	2B.2		No	Yes
Chylismia claviformis ssp. cruciformis	cruciform evening-primrose	PDONA030D4	None	None	G5T4/S2	2B.3		No	Yes
Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	G5T4T5/S2?	2B.1		No	Yes
Cinna bolanderi	Bolander's woodreed	PMPOA1H040	None	None	G2G3/S2S3	1B.2	USFS:S	No	Yes
Cirsium andrewsii	Franciscan thistle	PDAST2E050	None	None	G3/S3	1B.2		No	Yes
Cirsium arizonicum var. tenuisectum	desert mountain thistle	PDAST2E083	None	None	G5T2/S2	1B.2		Yes	Yes
Cirsium ciliolatum	Ashland thistle	PDAST2E0P0	None	Endangered	G3/S1	2B.1		No	Yes

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Cirsium crassicaule	slough thistle	PDAST2E0U0	None	None	G1/S1	1B.1		No	Yes
Cirsium fontinale var. campylon	Mt. Hamilton thistle	PDAST2E163	None	None	G2T2/S2	1B.2		Yes	Yes
Cirsium fontinale var. fontinale	fountain thistle	PDAST2E161	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Cirsium fontinale var. obispoense	Chorro Creek bog thistle	PDAST2E162	Endangered	Endangered	G2T2/S2	1B.2		Yes	Yes
Cirsium hydrophilum var. hydrophilum	Suisun thistle	PDAST2E1G1	Endangered	None	G2T1/S1	1B.1		Yes	Yes
Cirsium hydrophilum var. vaseyi	Mt. Tamalpais thistle	PDAST2E1G2	None	None	G2T1/S1	1B.2		No	Yes
Cirsium occidentale var. compactum	compact cobwebby thistle	PDAST2E1Z1	None	None	G3G4T2/S2	1B.2	BLM:S	No	Yes
Cirsium occidentale var. lucianum	Cuesta Ridge thistle	PDAST2E1Z6	None	None	G3G4T2/S2	1B.2		No	Yes
Cirsium praeteriens	lost thistle	PDAST2E2B0	None	None	GX/SX	1A		No	Yes
Cirsium rhothophilum	surf thistle	PDAST2E2J0	None	Threatened	G1/S1	1B.2	BLM:S	Yes	Yes
Cirsium scariosum var. loncholepis	La Graciosa thistle	PDAST2E1N0	Endangered	Threatened	G5T1/S1	1B.1		Yes	Yes
Cistanthe maritima	seaside cistanthe	PDPOR09020	None	None	G3G4/S3	4.2		Yes	No
Cladium californicum	California saw-grass	PMCYP04010	None	None	G4/S2	2B.2	USFS:S	Yes	Yes
Clarkia amoena ssp. whitneyi	Whitney's farewell-to-spring	PDONA05025	None	None	G5T1/S1	1B.1		Yes	Yes
Clarkia australis	Small's southern clarkia	PDONA05040	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Clarkia biloba ssp. australis	Mariposa clarkia	PDONA05051	None	None	G4G5T3/S3	1B.2	USFS:S	Yes	Yes
Clarkia biloba ssp. brandegeeae	Brandegee's clarkia	PDONA05053	None	None	G4G5T4/S4	4.2		Yes	Yes

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Clarkia borealis ssp. arida	Shasta clarkia	PDONA05061	None	None	G4T2/S2	1B.1	BLM:S	Yes	Yes
Clarkia borealis ssp. borealis	northern clarkia	PDONA05062	None	None	G4T4/S4	4.3	BLM:S USFS:S	Yes	Yes
Clarkia breweri	Brewer's clarkia	PDONA05080	None	None	G4/S4	4.2		Yes	No
Clarkia concinna ssp. automixa	Santa Clara red ribbons	PDONA050A1	None	None	G5?T3/S3	4.3		No	Yes
Clarkia concinna ssp. raichei	Raiche's red ribbons	PDONA050A2	None	None	G5?T1/S1	1B.1		Yes	Yes
Clarkia delicata	delicate clarkia	PDONA050D0	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Clarkia exilis	slender clarkia	PDONA050G0	None	None	G3/S3	4.3		Yes	No
Clarkia franciscana	Presidio clarkia	PDONA050H0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Clarkia gracilis ssp. albicaulis	white-stemmed clarkia	PDONA050J1	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Clarkia gracilis ssp. tracyi	Tracy's clarkia	PDONA050J4	None	None	G5T3/S3	4.2		Yes	No
Clarkia imbricata	Vine Hill clarkia	PDONA050K0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Clarkia jolonensis	Jolon clarkia	PDONA050L0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Clarkia lewisii	Lewis' clarkia	PDONA050N0	None	None	G4/S4	4.3		Yes	No
Clarkia lingulata	Merced clarkia	PDONA050P0	None	Endangered	G1/S1	1B.1	USFS:S	Yes	Yes
Clarkia mildrediae ssp. lutescens	golden-anthered clarkia	PDONA050Q1	None	None	G3T3/S3	4.2		No	No
Clarkia mildrediae ssp. mildrediae	Mildred's clarkia	PDONA050Q2	None	None	G3T2T3/S2S3	1B.3	USFS:S	No	Yes
Clarkia mosquinii	Mosquin's clarkia	PDONA050S0	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	G2G3/S2S3	1B.3	BLM:S	Yes	Yes
Clarkia speciosa ssp. immaculata	Pismo clarkia	PDONA05111	Endangered	Rare	G4T1/S1	1B.1		Yes	Yes
Clarkia springvillensis	Springville clarkia	PDONA05120	Threatened	Endangered	G2/S2	1B.2		Yes	Yes

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Clarkia tembloriensis ssp. calientensis	Vasek's clarkia	PDONA05141	None	None	G3T1/S1	1B.1		Yes	Yes
Clarkia virgata	Sierra clarkia	PDONA05160	None	None	G3/S3	4.3		Yes	No
Clarkia xantiana ssp. parviflora	Kern Canyon clarkia	PDONA05181	None	None	G4T3?/S3?	4.2		Yes	Yes
Claytonia megarhiza	fell-fields claytonia	PDPOR030A0	None	None	G5/S2	2B.3		No	Yes
Claytonia obovata	Rydberg's spring beauty	PDPOR03150	None	None	G4/S3	4.3		No	No
Claytonia palustris	marsh claytonia	PDPOR030S0	None	None	G4/S4	4.3		No	No
Claytonia parviflora ssp. grandiflora	streambank spring beauty	PDPOR030D1	None	None	G5T3/S3	4.2		No	No
Claytonia peirsonii ssp. bernardinus	San Bernardino spring beauty	PDPOR03122	None	None	G2G3T1/S1	1B.1		No	Yes
Claytonia peirsonii ssp. californacis	Furnace spring beauty	PDPOR03123	None	None	G2G3T1/S1	1B.1		No	Yes
Claytonia peirsonii ssp. peirsonii	Peirson's spring beauty	PDPOR03121	None	None	G2G3T2/S2	1B.2	USFS:S	Yes	Yes
Claytonia peirsonii ssp. yorkii	York's spring beauty	PDPOR03124	None	None	G2G3T1/S1	1B.1		No	Yes
Claytonia serpenticola	serpentine spring beauty	PDPOR03140	None	None	G3/S3	4.3		No	No
Claytonia umbellata	Great Basin claytonia	PDPOR030P0	None	None	G4/S1	2B.3		No	Yes
Cleomella brevipes	short-pedicelled cleomella	PDCPP04020	None	None	G4/S3	4.2		No	No
Cleomella hillmanii var. hillmanii	Hillman's cleomella	PDCPP04030	None	None	G4G5T4T5/S2	2B.2		No	Yes
Clinopodium chandleri	San Miguel savory	PDLAM08030	None	None	G3/S2	1B.2	BLM:S USFS:S	Yes	Yes
Clinopodium mimuloides	monkey-flower savory	PDLAM1T040	None	None	G3/S3	4.2		No	No

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Cochlearia groenlandica	Greenland cochlearia	PDBRA0S020	None	None	G4/S1	2B.3		No	Yes
Collinsia antonina	San Antonio collinsia	PDSCR0H010	None	None	G2/S2	1B.2		No	Yes
Collinsia corymbosa	round-headed Chinese-houses	PDSCR0H060	None	None	G1/S1	1B.2		No	Yes
Collinsia multicolor	San Francisco collinsia	PDSCR0H0B0	None	None	G2/S2	1B.2		Yes	Yes
Collomia diversifolia	serpentine collomia	PDPLM02020	None	None	G4/S4	4.3		Yes	No
Collomia larsenii	talus collomia	PDPLM02014	None	None	G4/S2	2B.2	USFS:S	No	Yes
Collomia rawsoniana	Rawson's flaming trumpet	PDPLM02080	None	None	G2/S2	1B.2	USFS:S	No	Yes
Collomia tenella	slender collomia	PDPLM02090	None	None	G4/S1	2B.2		No	Yes
Collomia tracyi	Tracy's collomia	PDPLM020B0	None	None	G4/S4	4.3		No	No
Colubrina californica	Las Animas colubrina	PDRHA05030	None	None	G4/S2S3	2B.3		Yes	Yes
Comarostaphylis diversifolia ssp. diversifolia	summer holly	PDERI0B011	None	None	G3T2/S2	1B.2	BLM:S	Yes	Yes
Condalia globosa var. pubescens	spiny abrojo	PDRHA06031	None	None	G5T4/S3	4.2		No	No
Constancea nevinii	Nevin's woolly sunflower	PDAST3N090	None	None	G3/S3	1B.3		Yes	Yes
Convolvulus simulans	small-flowered morning-glory	PDCON05060	None	None	G4/S4	4.2		Yes	No
Coptis laciniata	Oregon goldthread	PDRAN0A020	None	None	G4?/S3?	4.2		No	Yes
Corallorhiza trifida	northern coralroot	PMORC0M050	None	None	G5/S1	2B.1		No	Yes
Cordylanthus capitatus	Yakima bird's-beak	PDSCR0J030	None	None	G4/S2	2B.2		No	Yes

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Cordylanthus eremicus ssp. eremicus	desert bird's-beak	PDSCR0J042	None	None	G3T3/S3	4.3		Yes	No
Cordylanthus eremicus ssp. kernensis	Kern Plateau bird's-beak	PDSCR0J043	None	None	G3T2/S2	1B.3	BLM:S USFS:S	No	Yes
Cordylanthus nidularius	Mt. Diablo bird's-beak	PDSCR0J0F0	None	Rare	G1/S1	1B.1		No	Yes
Cordylanthus parviflorus	small-flowered bird's-beak	PDSCR0J0K0	None	None	G4/S2	2B.3		Yes	Yes
Cordylanthus rigidus ssp. brevibracteatus	short-bracted bird's-beak	PDSCR0J0P3	None	None	G5T3/S3	4.3		Yes	No
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak	PDSCR0J0P2	None	Endangered	G5T2/S2	1B.1	BLM:S	Yes	Yes
Cordylanthus tenuis ssp. barbatus	Fresno County bird's-beak	PDSCR0J0S4	None	None	G4G5T3/S3	4.3		No	No
Cordylanthus tenuis ssp. brunneus	serpentine bird's-beak	PDSCR0J0S1	None	None	G4G5T3/S3	4.3		No	No
Cordylanthus tenuis ssp. capillaris	Pennell's bird's-beak	PDSCR0J0S2	Endangered	Rare	G4G5T1/S1	1B.2		Yes	Yes
Cordylanthus tenuis ssp. pallescens	pallid bird's-beak	PDSCR0J0S3	None	None	G4G5T1/S1	1B.2	USFS:S	Yes	Yes
Corethrogyne filaginifolia var. incana	San Diego sand aster	PDAST2M025	None	None	G4T1Q/S1	1B.1		No	Yes
Corethrogyne filaginifolia var. linifolia	Del Mar Mesa sand aster	PDAST2M027	None	None	G4T1Q/S1	1B.1		Yes	Yes
Corethrogyne leucophylla	branching beach aster	PDAST2M030	None	None	G3Q/S3	3.2		No	No

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Corispermum americanum var. americanum	American bugseed	PDCHE0A091	None	None	G5?T5?/S1	2B.2		No	Yes
Cornus canadensis	bunchberry	PDCOR01040	None	None	G5/S2	2B.2		No	Yes
Coryphantha alversonii	Alverson's foxtail cactus	PDCAC0X060	None	None	G3/S3	4.3		No	Yes
Coryphantha chlorantha	desert pincushion	PDCAC040J0	None	None	G4/S3	2B.1		Yes	Yes
Coryphantha vivipara var. rosea	viviparous foxtail cactus	PDCAC0X0G8	None	None	G5T3/S1	2B.2		No	Yes
Crataegus castlegarensis	Castlegar hawthorne	PDROS0H9E0	None	None	G5/S3?	3		No	No
Crepis runcinata	fiddleleaf hawksbeard	PDAST2R0K0	None	None	G5/S3	2B.2		No	Yes
Crocanthemum greenei	island rush-rose	PDCIS02090	Threatened	None	G3/S3	1B.2		Yes	Yes
Crocanthemum suffrutescens	Bisbee Peak rush-rose	PDCIS020F0	None	None	G2?Q/S2?	3.2		No	Yes
Crossosoma californicum	Catalina crossosoma	PDCRO02020	None	None	G3/S3	1B.2		Yes	Yes
Croton wigginsii	Wiggins' croton	PDEUP0H140	None	Rare	G2G3/S2	2B.2	BLM:S	Yes	Yes
Cryptantha celosioides	cocks-comb cat's-eye	PDBOR0A0F0	None	None	G5/S1	2B.3		No	Yes
Cryptantha clokeyi	Clokey's cryptantha	PDBOR0A3M0	None	None	G3/S3	1B.2		No	Yes
Cryptantha crinita	silky cryptantha	PDBOR0A0Q0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Cryptantha crymophila	subalpine cryptantha	PDBOR0A0R0	None	None	G3/S3	1B.3		No	Yes
Cryptantha dissita	serpentine cryptantha	PDBOR0A0H2	None	None	G3/S3	1B.2	BLM:S	No	Yes

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Cryptantha excavata	deep-scarred cryptantha	PDBOR0A0W0	None	None	G1/S1	1B.1	BLM:S	No	Yes
Cryptantha fendleri	sand dune cryptantha	PDBOR0A0X0	None	None	G5/S1	2B.2		No	Yes
Cryptantha ganderi	Gander's cryptantha	PDBOR0A120	None	None	G2G3/S1	1B.1		Yes	Yes
Cryptantha glomeriflora	clustered-flower cryptantha	PDBOR0A130	None	None	G4Q/S4	4.3		No	No
Cryptantha hooveri	Hoover's cryptantha	PDBOR0A190	None	None	GH/SH	1A		No	Yes
Cryptantha incana	Tulare cryptantha	PDBOR0A1D0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Cryptantha mariposae	Mariposa cryptantha	PDBOR0A1Q0	None	None	G2G3/S2S3	1B.3	BLM:S	No	Yes
Cryptantha rattanii	Rattan's cryptantha	PDBOR0A2H0	None	None	G4/S4	4.3		No	No
Cryptantha rostellata	red-stemmed cryptantha	PDBOR0A2M1	None	None	G4/S3	4.2		No	No
Cryptantha scoparia	gray cryptantha	PDBOR0A2Q0	None	None	G4?/S4	4.3		No	No
Cryptantha spithamaea	Red Hills cryptantha	PDBOR0A2M2	None	None	G2/S2	1B.3	BLM:S	No	Yes
Cryptantha traskiae	Trask's cryptantha	PDBOR0A370	None	None	G2/S2	1B.1		Yes	Yes
Cryptantha tumulosa	New York Mountains cryptantha	PDBOR0A380	None	None	G4/S4	4.3		Yes	No
Cryptantha wigginsii	Wiggins' cryptantha	PDBOR0A400	None	None	G2/S1	1B.2		No	Yes
Cuniculotinus gramineus	Panamint rock-goldenrod	PDAST2C0H0	None	None	G3G4/S3	2B.3		No	Yes
Cuscuta californica var. apiculata	pointed dodder	PDCUS01071	None	None	G5T3/S3?	3		No	No
Cuscuta jepsonii	Jepson's dodder	PDCUS011T0	None	None	G1/S1	1B.2		No	Yes

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Cuscuta obtusiflora var. glandulosa	Peruvian dodder	PDCUS01111	None	None	G5T4?/SH	2B.2		No	Yes
Cuscuta pacifica var. papillata	Mendocino dodder	PDCUS011A2	None	None	G5T1/S1	1B.2		No	Yes
Cusickiella quadricostata	Bodie Hills cusickiella	PDBRA2V010	None	None	G2/S2	1B.2	BLM:S	No	Yes
Cylindropuntia californica var. californica	snake cholla	PDCAC0D2Y1	None	None	G3T2/S1	1B.1	BLM:S	Yes	Yes
Cylindropuntia fosbergii	pink teddy-bear cholla	PDCAC0D2U0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Cylindropuntia munzii	Munz's cholla	PDCAC0D0V0	None	None	G3/S1	1B.3	BLM:S	Yes	Yes
Cylindropuntia wolfii	Wolf's cholla	PDCAC0D2R0	None	None	G4/S3	4.3		No	No
Cymopterus deserticola	desert cymopterus	PDAPI0U090	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Cymopterus gilmanii	Gilman's cymopterus	PDAPI0U0C0	None	None	G3/S2	2B.3		Yes	Yes
Cymopterus globosus	globose cymopterus	PDAPI0U0E0	None	None	G3G4/S1	2B.2		No	Yes
Cymopterus multinervatus	purple-nerve cymopterus	PDAPI0U0Q0	None	None	G4G5/S2	2B.2		No	Yes
Cymopterus ripleyi var. saniculoides	sanicle cymopterus	PDAPI0U0X1	None	None	G3G4T3Q/S1	1B.2	BLM:S	Yes	Yes
Cypripedium californicum	California lady's-slipper	PMORC0Q040	None	None	G4/S4	4.2		No	No
Cypripedium fasciculatum	clustered lady's-slipper	PMORC0Q060	None	None	G4/S4	4.2	BLM:S USFS:S	No	No
Cypripedium montanum	mountain lady's-slipper	PMORC0Q080	None	None	G4/S4	4.2	BLM:S USFS:S	No	No

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Cypripedium parviflorum var. makasin	northern yellow lady's slipper	PMORC0Q093	None	None	G5T4T5/S1	3.1		No	No
Dalea ornata	ornate dalea	PDFAB1A150	None	None	G4G5/S2	2B.1	BLM:S	No	Yes
Darlingtonia californica	California pitcherplant	PDSAR01010	None	None	G4/S4	4.2		Yes	No
Dedeckera eurekensis	July gold	PDPGN06010	None	Rare	G3/S3	1B.3	BLM:S USFS:S	Yes	Yes
Deinandra arida	Red Rock tarplant	PDAST4R010	None	Rare	G1/S1	1B.2		Yes	Yes
Deinandra bacigalupii	Livermore tarplant	PDAST4R0V0	None	Endangered	G1/S1	1B.1		No	Yes
Deinandra clementina	island tarplant	PDAST4R040	None	None	G4/S4	4.3		Yes	No
Deinandra conjugens	Otay tarplant	PDAST4R070	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Deinandra floribunda	Tecate tarplant	PDAST4R0B0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Deinandra halliana	Hall's tarplant	PDAST4R0C0	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Deinandra increscens ssp. villosa	Gaviota tarplant	PDAST4R0U3	Endangered	Endangered	G4G5T2/S2	1B.1		Yes	Yes
Deinandra minthornii	Santa Susana tarplant	PDAST4R0J0	None	Rare	G2/S2	1B.2		Yes	Yes
Deinandra mohavensis	Mojave tarplant	PDAST4R0K0	None	Endangered	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Deinandra paniculata	paniculate tarplant	PDAST4R0N0	None	None	G4/S4	4.2		No	No
Delphinium bakeri	Baker's larkspur	PDRAN0B050	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Delphinium californicum ssp. interius	Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3/S3	1B.2	BLM:S	Yes	Yes

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Delphinium gypsophilum ssp. parviflorum	small-flowered gypsum-loving larkspur	PDRAN0B0S2	None	None	G4T2T3Q/S2S3	3.2		No	No
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	PDRAN0B0T2	None	None	G4T3/S3	4.2		No	No
Delphinium hesperium ssp. cuyamacae	Cuyamaca larkspur	PDRAN0B0U1	None	Rare	G4T2/S2	1B.2	USFS:S	Yes	Yes
Delphinium hutchinsoniae	Hutchinson's larkspur	PDRAN0B0V0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Delphinium inopinum	unexpected larkspur	PDRAN0B0W0	None	None	G3/S3	4.3	USFS:S	No	Yes
Delphinium luteum	golden larkspur	PDRAN0B0Z0	Endangered	Rare	G1/S1	1B.1		Yes	Yes
Delphinium parishii ssp. subglobosum	Colorado Desert larkspur	PDRAN0B1A3	None	None	G4T4/S4	4.3		Yes	No
Delphinium parryi ssp. blochmaniae	dune larkspur	PDRAN0B1B1	None	None	G4T2/S2	1B.2		No	Yes
Delphinium parryi ssp. eastwoodiae	Eastwood's larkspur	PDRAN0B1B2	None	None	G4T2/S2	1B.2		No	Yes
Delphinium parryi ssp. purpureum	Mt. Pinos larkspur	PDRAN0B1B5	None	None	G4T4/S4	4.3	USFS:S	Yes	No
Delphinium purpusii	rose-flowered larkspur	PDRAN0B1G0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Delphinium recurvatum	recurved larkspur	PDRAN0B1J0	None	None	G2?/S2?	1B.2	BLM:S	Yes	Yes
Delphinium scaposum	bare-stem larkspur	PDRAN0B1M0	None	None	G5/S1	2B.3		No	Yes
Delphinium stachydeum	spiked larkspur	PDRAN0B1Q0	None	None	G5?/S3	2B.3		No	Yes
Delphinium uliginosum	swamp larkspur	PDRAN0B1V0	None	None	G3/S3	4.2		Yes	No

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Delphinium umbraculorum	umbrella larkspur	PDRAN0B1W0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Delphinium variegatum ssp. kinkiense	San Clemente Island larkspur	PDRAN0B1X3	Endangered	Endangered	G4T2/S2	1B.1		Yes	Yes
Delphinium variegatum ssp. thornei	Thorne's royal larkspur	PDRAN0B1X2	None	None	G4T1/S1	1B.1		Yes	Yes
Dendromecon harfordii var. harfordii	north island bush-poppy	PDPAP08020	None	None	G3T3Q/S3	3.2		Yes	No
Dendromecon harfordii var. rhamnoides	south island bush-poppy	PDPAP08012	None	None	G4T1Q/S1	3.1		No	Yes
Dicentra formosa ssp. oregana	Oregon bleeding heart	PDFUM04052	None	None	G5T4/S3	4.2		No	No
Dicentra nevadensis	Tulare County bleeding heart	PDFUM04060	None	None	G4?/S4?	4.3	USFS:S	No	No
Dichondra occidentalis	western dichondra	PDCON08060	None	None	G3G4/S3S4	4.2		No	No
Dicranostegia orcuttiana	Orcutt's bird's-beak	PDSCR0J0G0	None	None	G2G3/S1	2B.1		Yes	Yes
Dieteria asteroides var. lagunensis	Mt. Laguna aster	PDAST64131	None	Rare	G5T2T3/S1	2B.1	BLM:S USFS:S	No	Yes
Dieteria canescens var. ziegleri	Ziegler's aster	PDAST640B2	None	None	G5T1/S1	1B.2	USFS:S	Yes	Yes
Digitaria californica var. californica	Arizona cottontop	PMPOA27051	None	None	G5T5/S2	2B.3		No	Yes
Dimeresia howellii	doublet	PDAST2Z010	None	None	G4?/S3	2B.3		No	Yes
Diplacus aridus	low bush monkeyflower	PDSCR22040	None	None	G4/S3	4.3		Yes	No

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Diplacus brandegeei	Santa Cruz Island monkeyflower	PDSCR220G0	None	None	G1Q/SX	1A		No	Yes
Diplacus clevelandii	Cleveland's bush monkeyflower	PDSCR22010	None	None	G4/S4	4.2		Yes	No
Diplacus cusickioides	Cusick's monkeyflower	PDSCR220E0	None	None	G4G5/S2	2B.3		No	Yes
Diplacus johnstonii	Johnston's monkeyflower	PDSCR1B1H0	None	None	G4/S4	4.3		Yes	No
Diplacus mohavensis	Mojave monkeyflower	PDSCR1B1V0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Diplacus parryi	Parry's monkeyflower	PDSCR1B230	None	None	G4G5/S3	2B.3		No	Yes
Diplacus parviflorus	island bush monkeyflower	PDSCR22030	None	None	G4/S4	4.3		Yes	No
Diplacus pictus	calico monkeyflower	PDSCR1B240	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Diplacus pulchellus	yellow-lip pansy monkeyflower	PDSCR1B280	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Diplacus pygmaeus	Egg Lake monkeyflower	PDSCR1B2C0	None	None	G4/S3	4.2		No	Yes
Diplacus rupicola	Death Valley monkeyflower	PDSCR1B2H0	None	None	G4/S4	4.3		Yes	No
Diplacus traskiae	Santa Catalina Island monkeyflower	PDSCR1B2P0	None	None	GX/SX	1A		No	Yes
Diplacus vandenbergensis	Vandenberg monkeyflower	PDSCR1B381	Endangered	None	G1/S1	1B.1		Yes	Yes
Dirca occidentalis	western leatherwood	PDTHY03010	None	None	G2/S2	1B.2		Yes	Yes
Dissanthelium californicum	California dissanthelium	PMPOA29010	None	None	G2/S1	1B.2		Yes	Yes
Ditaxis claryana	glandular ditaxis	PDEUP080L0	None	None	G3G4/S2	2B.2		No	Yes

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Ditaxis serrata var. californica	California ditaxis	PDEUP08050	None	None	G5T3T4/S2?	3.2		No	Yes
Dithyrea maritima	beach spectaclepod	PDBRA10020	None	Threatened	G1/S1	1B.1		Yes	Yes
Dodecahema leptoceras	slender-horned spineflower	PDPGN0V010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Downingia concolor var. brevior	Cuyamaca Lake downingia	PDCAM06041	None	Endangered	G4T1/S1	1B.1		Yes	Yes
Downingia laeta	Great Basin downingia	PDCAM06080	None	None	G5/S3	2B.2		No	Yes
Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	GU/S2	2B.2		No	Yes
Downingia willamettensis	Cascade downingia	PDCAM060E0	None	None	G4/S2	2B.2		No	Yes
Draba asterophora var. asterophora	Tahoe draba	PDBRA110D1	None	None	G2T2?/S2?	1B.2	USFS:S	No	Yes
Draba asterophora var. macrocarpa	Cup Lake draba	PDBRA110D2	None	None	G2T1/S1	1B.1	USFS:S	No	Yes
Draba aureola	golden alpine draba	PDBRA110F0	None	None	G4/S2	1B.3		No	Yes
Draba californica	California draba	PDBRA11380	None	None	G3/S3	4.2		No	No
Draba cana	canescent draba	PDBRA110M0	None	None	G5/S2	2B.3		No	Yes
Draba carnosula	Mt. Eddy draba	PDBRA112T0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Draba cruciata	Mineral King draba	PDBRA110U0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Draba howellii	Howell's draba	PDBRA11150	None	None	G4/S4	4.3		Yes	No
Draba incrassata	Sweetwater Mountains draba	PDBRA113G0	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Draba lonchocarpa	spear-fruited draba	PDBRA111F0	None	None	G5/S1	2B.3		No	Yes
Draba monoensis	White Mountains draba	PDBRA113B0	None	None	G2/S2	1B.2	USFS:S	No	Yes

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Draba praealta	tall draba	PDBRA11210	None	None	G5/S3	2B.3		No	Yes
Draba pterosperma	winged-seed draba	PDBRA11230	None	None	G3/S3	4.3		No	No
Draba saxosa	Southern California rock draba	PDBRA110Q2	None	None	G2G3/S2S3	1B.3	USFS:S	Yes	Yes
Draba sharsmithii	Mt. Whitney draba	PDBRA113F0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Draba sierrae	Sierra draba	PDBRA112A0	None	None	G3/S3	1B.3		No	Yes
Draba subumbellata	mound draba	PDBRA11370	None	None	G3/S3	4.3		No	No
Drosera anglica	English sundew	PDDRO02010	None	None	G5/S2	2B.3		No	Yes
Drymocallis cuneifolia var. cuneifolia	wedgeleaf woodbeauty	PDROS2D011	None	None	G2T1/S1	1B.1	USFS:S	Yes	Yes
Drymocallis cuneifolia var. ewanii	Ewan's woodbeauty	PDROS1B0S3	None	None	G2T2/S2	1B.3	USFS:S	Yes	Yes
Dryopteris filix-mas	male fern	PPDRY0A0B0	None	None	G5/S2	2B.3		No	Yes
Dudleya abramsii ssp. affinis	San Bernardino Mountains dudleya	PDCRA04013	None	None	G4T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Dudleya abramsii ssp. bettinae	Betty's dudleya	PDCRA04011	None	None	G4T2/S2	1B.2		Yes	Yes
Dudleya abramsii ssp. calcicola	limestone dudleya	PDCRA040Y0	None	None	G4T4/S4	4.3		Yes	No
Dudleya abramsii ssp. murina	mouse-gray dudleya	PDCRA04012	None	None	G4T2/S2	1B.3	BLM:S	Yes	Yes
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	PDCRA040Z0	Endangered	None	G4T2/S2	1B.1		Yes	Yes
Dudleya alainae	Banner dudleya	PDCRA040X0	None	None	G2Q/S2	3.2		Yes	No
Dudleya attenuata ssp. attenuata	Orcutt's dudleya	PDCRA04032	None	None	G4T1T2/S1	2B.1		Yes	Yes

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Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya	PDCRA04051	None	None	G3T2/S2	1B.1		Yes	Yes
Dudleya blochmaniae ssp. insularis	Santa Rosa Island dudleya	PDCRA04052	None	None	G3T1/S1	1B.1		No	Yes
Dudleya brevifolia	short-leaved dudleya	PDCRA04053	None	Endangered	G1/S1	1B.1		Yes	Yes
Dudleya candelabrum	candleholder dudleya	PDCRA04080	None	None	G3/S3	1B.2		No	Yes
Dudleya cymosa ssp. agourensis	Agoura Hills dudleya	PDCRA040A7	Threatened	None	G5T1/S1	1B.2		Yes	Yes
Dudleya cymosa ssp. costatifolia	Pierpoint Springs dudleya	PDCRA040A2	None	None	G5T1/S1	1B.2	USFS:S	No	Yes
Dudleya cymosa ssp. crebrifolia	San Gabriel River dudleya	PDCRA040A8	None	None	G5T2/S2	1B.2	USFS:S	Yes	Yes
Dudleya cymosa ssp. marcescens	marcescent dudleya	PDCRA040A3	Threatened	Rare	G5T2/S2	1B.2		Yes	Yes
Dudleya cymosa ssp. ovatifolia	Santa Monica dudleya	PDCRA040A5	Threatened	None	G5T1/S1	1B.1		Yes	Yes
Dudleya densiflora	San Gabriel Mountains dudleya	PDCRA040B0	None	None	G2/S2	1B.1	USFS:S	Yes	Yes
Dudleya gnoma	munchkin dudleya	PDCRA040W0	None	None	G1/S1	1B.1		No	Yes
Dudleya greenei	Greene's dudleya	PDCRA040E0	None	None	G3/S3	4.2		Yes	No
Dudleya multicaulis	many-stemmed dudleya	PDCRA040H0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Dudleya nesiotica	Santa Cruz Island dudleya	PDCRA040J0	Threatened	Rare	G1/S1	1B.1		Yes	Yes
Dudleya parva	Conejo dudleya	PDCRA04016	Threatened	None	G1/S1	1B.2		Yes	Yes
Dudleya saxosa ssp. saxosa	Panamint dudleya	PDCRA040N2	None	None	G4T3/S3	1B.3	BLM:S	No	Yes

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Dudleya stolonifera	Laguna Beach dudleya	PDCRA040P0	Threatened	Threatened	G1/S1	1B.1		Yes	Yes
Dudleya traskiae	Santa Barbara Island dudleya	PDCRA040Q0	Endangered	Endangered	G1/S1	1B.2		No	Yes
Dudleya variegata	variegated dudleya	PDCRA040R0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Dudleya verityi	Verity's dudleya	PDCRA040U0	Threatened	None	G1/S1	1B.1		Yes	Yes
Dudleya virens ssp. hassei	Catalina Island dudleya	PDCRA040S1	None	None	G3?T2/S2	1B.2		Yes	Yes
Dudleya virens ssp. insularis	island green dudleya	PDCRA040S2	None	None	G3?T3/S3	1B.2		No	Yes
Dudleya virens ssp. virens	bright green dudleya	PDCRA040S3	None	None	G3?T2/S2	1B.2		No	Yes
Dudleya viscida	sticky dudleya	PDCRA040T0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Echinocereus engelmannii var. howei	Howe's hedgehog cactus	PDCAC06035	None	None	G5T1/S1	1B.1	BLM:S	No	Yes
Eleocharis parvula	small spikerush	PMCYP091G0	None	None	G5/S3	4.3		No	No
Eleocharis torticulmis	California twisted spikerush	PMCYP092E0	None	None	G1/S1	1B.3	USFS:S	No	Yes
Elymus californicus	California bottle-brush grass	PMPOA2H0W0	None	None	G4/S4	4.3		No	No
Elymus salina	Salina Pass wild-rye	PMPOA6P010	None	None	G4G5/S2S3	2B.3		Yes	Yes
Elymus scribneri	Scribner's wheat grass	PMPOA2H170	None	None	G5/S3	2B.3		No	Yes
Empetrum nigrum	black crowberry	PDEMP03020	None	None	G5/S1?	2B.2		No	Yes
Enceliopsis covillei	Panamint daisy	PDAST3G020	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Enceliopsis nudicaulis var. corrugata	Ash Meadows daisy	PDAST3G031	Threatened	None	G5T1T2Q/S1	3.3		No	Yes

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Enceliopsis nudicaulis var. nudicaulis	naked-stemmed daisy	PDAST3G032	None	None	G5T5/S3	4.3		Yes	No
Enneapogon desvauxii	nine-awned pappus grass	PMPOA2J010	None	None	G5/S3	2B.2		Yes	Yes
Ephedra torreyana	Torrey's Mormon-tea	PGEPH01080	None	None	G5/S1	2B.1		No	Yes
Epilobium howellii	subalpine fireweed	PDONA06180	None	None	G4/S4	4.3		No	Yes
Epilobium luteum	yellow willowherb	PDONA060H0	None	None	G5/S1	2B.3		No	Yes
Epilobium nivium	Snow Mountain willowherb	PDONA060M0	None	None	G2G3/S2S3	1B.2	USFS:S	No	Yes
Epilobium oreganum	Oregon fireweed	PDONA060P0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Epilobium palustre	marsh willowherb	PDONA060R0	None	None	G5/S2	2B.3		No	Yes
Epilobium rigidum	Siskiyou Mountains willowherb	PDONA060V0	None	None	G3G4/S3	4.3		No	No
Epilobium septentrionale	Humboldt County fuchsia	PDONA06110	None	None	G4/S4	4.3		No	No
Epilobium siskiyouense	Siskiyou fireweed	PDONA06100	None	None	G3/S3	1B.3		Yes	Yes
Equisetum palustre	marsh horsetail	PPEQU01050	None	None	G5/S1S3	3		No	No
Eremalche parryi ssp. kernensis	Kern mallow	PDMAL0C031	Endangered	None	G3G4T3/S3	1B.2		Yes	Yes
Eremogone cliftonii	Clifton's eremogone	PDCAR17010	None	None	G3/S3	1B.3	USFS:S	No	Yes
Eremogone congesta var. charlestonensis	Charleston sandwort	PDCAR0405B	None	None	G5T2?/S1	1B.3		No	Yes
Eremogone ursina	Big Bear Valley sandwort	PDCAR040R0	Threatened	None	G1/S1	1B.2		Yes	Yes

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Eremothera boothii ssp. alyssoides	Pine Creek evening-primrose	PDONA03051	None	None	G5T4/S4	4.3		No	No
Eremothera boothii ssp. boothii	Booth's evening-primrose	PDONA03052	None	None	G5T4/S3	2B.3		No	Yes
Eremothera boothii ssp. intermedia	Booth's hairy evening-primrose	PDONA03056	None	None	G5T3T4/S3	2B.3		No	Yes
Eremothera minor	Nelson's evening-primrose	PDONA03110	None	None	G4/S1S2	2B.3		No	Yes
Eriastrum brandegeeae	Brandegee's eriastrum	PDPLM03020	None	None	G1Q/S1	1B.1	BLM:S	No	Yes
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	PDPLM03035	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Eriastrum ertterae	Lime Ridge eriastrum	PDPLM030F0	None	None	G1/S1	1B.1		No	Yes
Eriastrum harwoodii	Harwood's eriastrum	PDPLM030B1	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Eriastrum hooveri	Hoover's eriastrum	PDPLM03070	Delisted	None	G3/S3	4.2		Yes	Yes
Eriastrum luteum	yellow-flowered eriastrum	PDPLM03080	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Eriastrum rosamondense	Rosamond eriastrum	PDPLM030G0	None	None	G1?/S1?	1B.1		Yes	Yes
Eriastrum sparsiflorum	few-flowered eriastrum	PDPLM030B2	None	None	G5/S4	4.3		Yes	No
Eriastrum tracyi	Tracy's eriastrum	PDPLM030C0	None	Rare	G3Q/S3	3.2	USFS:S	No	Yes
Eriastrum virgatum	virgate eriastrum	PDPLM030D0	None	None	G3/S3	4.3		Yes	No
Ericameria albida	white-flowered rabbitbrush	PDAST2C010	None	None	G4/S3	4.2		Yes	No
Ericameria cuneata var. macrocephala	Laguna Mountains goldenbush	PDAST3L062	None	None	G5T2T3/S2S3	1B.3		Yes	Yes

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Ericameria fasciculata	Eastwood's goldenbush	PDAST3L080	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Ericameria gilmanii	Gilman's goldenbush	PDAST3L0P0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Ericameria nana	dwarf goldenbush	PDAST3L0B0	None	None	G5/S4	4.3		No	No
Ericameria ophitidis	serpentine goldenbush	PDAST3L0S0	None	None	G4/S4	4.3		No	No
Ericameria palmeri var. palmeri	Palmer's goldenbush	PDAST3L0C1	None	None	G4T2?/S2	1B.1		Yes	Yes
Erigeron aequifolius	Hall's daisy	PDAST3M030	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Erigeron biolettii	streamside daisy	PDAST3M5H0	None	None	G3?/S3?	3		No	No
Erigeron blochmaniae	Blochman's leafy daisy	PDAST3M5J0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Erigeron bloomeri var. nudatus	Waldo daisy	PDAST3M0M2	None	None	G5T4/S3	2B.3		No	Yes
Erigeron breweri var. jacinteus	San Jacinto Mountains daisy	PDAST3M0P3	None	None	G5T3/S3	4.3		Yes	No
Erigeron calvus	bald daisy	PDAST3M5N0	None	None	G1Q/S1	1B.1		No	Yes
Erigeron cervinus	Siskiyou daisy	PDAST3M0U0	None	None	G4/S4	4.3		No	No
Erigeron compactus	compact daisy	PDAST3M5Z0	None	None	G3/S3	2B.3		No	Yes
Erigeron eatonii var. nevadincola	Nevada daisy	PDAST3M2U0	None	None	G5T2T3/S2S3	2B.3		No	Yes
Erigeron elegantulus	volcanic daisy	PDAST3M190	None	None	G4/S4	4.3		No	No
Erigeron greenei	Greene's narrow-leaved daisy	PDAST3M5G0	None	None	G3/S3	1B.2		No	Yes
Erigeron inornatus var. calidipetris	hot rock daisy	PDAST3M1Z1	None	None	G5T3/S3	4.3		No	No
Erigeron inornatus var. keilii	Keil's daisy	PDAST3M1Z2	None	None	G5T2/S2	1B.3		No	Yes
Erigeron lassenianus var. deficiens	Plumas rayless daisy	PDAST3M262	None	None	G3G4T2T3/S2S3	1B.3		No	Yes

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Erigeron maniopotamicus	Mad River fleabane daisy	PDASTE1050	None	None	G2?/S2?	1B.2	USFS:S	No	Yes
Erigeron mariposanus	Mariposa daisy	PDAST3M5L0	None	None	GX/SX	1A		No	Yes
Erigeron miser	starved daisy	PDAST3M2K0	None	None	G3?/S3?	1B.3	USFS:S	No	Yes
Erigeron multiceps	Kern River daisy	PDAST3M2N0	None	None	G2G3/S2S3	1B.2	USFS:S	Yes	Yes
Erigeron nivalis	snow fleabane daisy	PDASTE1060	None	None	G5/S3	2B.3		No	Yes
Erigeron oxyphyllus	wand-like fleabane daisy	PDAST3M2Z0	None	None	G4/S2	2B.3		No	Yes
Erigeron parishii	Parish's daisy	PDAST3M310	Threatened	None	G2/S2	1B.1		Yes	Yes
Erigeron petrophilus var. sierrensis	northern Sierra daisy	PDAST3M351	None	None	G4T4/S4	4.3		No	No
Erigeron petrophilus var. viscidulus	Klamath rock daisy	PDAST3M352	None	None	G4T4/S4	4.3		No	No
Erigeron robustior	robust daisy	PDAST3M134	None	None	G3/S3	4.3		No	No
Erigeron sanctarum	saints' daisy	PDAST3M3R0	None	None	G3/S3	4.2		No	No
Erigeron serpentinus	serpentine daisy	PDAST3M5M0	None	None	G2/S2	1B.3	BLM:S	Yes	Yes
Erigeron supplex	supple daisy	PDAST3M3Z0	None	None	G2/S2	1B.2		Yes	Yes
Erigeron uncialis var. uncialis	limestone daisy	PDAST3M452	None	None	G3G4T2/S2	1B.2	USFS:S	No	Yes
Erigeron utahensis	Utah daisy	PDAST3M480	None	None	G4/S2	2B.3		No	Yes
Eriodictyon altissimum	Indian Knob mountainbalm	PDHYD04010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eriodictyon angustifolium	narrow-leaved yerba santa	PDHYD04020	None	None	G5/S3	2B.3		No	Yes
Eriodictyon capitatum	Lompoc yerba santa	PDHYD04040	Endangered	Rare	G2/S2	1B.2		Yes	Yes
Eriodictyon sessilifolium	sessile-leaved yerba santa	PDHYD040A0	None	None	G4/S1	2B.1		Yes	Yes
Eriogonum alexanderae	Alexander's buckwheat	PDPGN084C5	None	None	G3Q/S1	1B.1		No	Yes

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Eriogonum alpinum	Trinity buckwheat	PDPGN08060	None	Endangered	G2/S2	1B.2	USFS:S	No	Yes
Eriogonum apricum var. apricum	Ione buckwheat	PDPGN080F1	Endangered	Endangered	G2T1/S1	1B.1		Yes	Yes
Eriogonum apricum var. prostratum	Irish Hill buckwheat	PDPGN080F2	Endangered	Endangered	G2T1/S1	1B.1		No	Yes
Eriogonum argillosum	clay buckwheat	PDPGN080J0	None	None	G3G4/S3S4	4.3		No	No
Eriogonum baileyi var. praebens	Bailey's woolly buckwheat	PDPGN080M2	None	None	G5T4/S4	4.3		No	No
Eriogonum bifurcatum	forked buckwheat	PDPGN080R0	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Eriogonum breedlovei var. breedlovei	Breedlove's buckwheat	PDPGN080V1	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Eriogonum breedlovei var. shevockii	The Needles buckwheat	PDPGN080V2	None	None	G3T3/S3	4.3		Yes	Yes
Eriogonum butterworthianum	Butterworth's buckwheat	PDPGN080X0	None	Rare	G2/S2	1B.3	USFS:S	No	Yes
Eriogonum callistum	Tehachapi buckwheat	PDPGN08790	None	None	G1/S1	1B.1		Yes	Yes
Eriogonum cedrorum	The Cedars buckwheat	PDPGN087A0	None	None	G1/S1	1B.3	BLM:S	Yes	Yes
Eriogonum collinum	hill buckwheat	PDPGN08160	None	None	G4/S3	4.3		No	No
Eriogonum congdonii	Congdon's buckwheat	PDPGN081A0	None	None	G4/S4	4.3		No	No
Eriogonum contiguum	Reveal's buckwheat	PDPGN081B0	None	None	G3/S2	2B.3	BLM:S	Yes	Yes
Eriogonum crocatum	conejo buckwheat	PDPGN081G0	None	Rare	G1/S1	1B.2		Yes	Yes
Eriogonum diclinum	Jaynes Canyon buckwheat	PDPGN081S0	None	None	G3/S3	2B.3		No	Yes

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Eriogonum eastwoodianum	Eastwood's buckwheat	PDPGN081V0	None	None	G2/S2	1B.3		No	Yes
Eriogonum elegans	elegant wild buckwheat	PDPGN081Y0	None	None	G4G5/S4S5	4.3		No	No
Eriogonum eremicola	Wildrose Canyon buckwheat	PDPGN08210	None	None	G1/S1	1B.3	BLM:S	Yes	Yes
Eriogonum evanidum	vanishing wild buckwheat	PDPGN08780	None	None	G2/S1	1B.1	USFS:S	Yes	Yes
Eriogonum giganteum var. compactum	Santa Barbara Island buckwheat	PDPGN082A1	None	Rare	G2T2/S2	1B.3		Yes	Yes
Eriogonum giganteum var. formosum	San Clemente Island buckwheat	PDPGN082A2	None	None	G3T3?/S3?	1B.2		Yes	Yes
Eriogonum giganteum var. giganteum	Santa Catalina Island buckwheat	PDPGN082A3	None	None	G3T3/S3	4.3		Yes	No
Eriogonum gilmanii	Gilman's buckwheat	PDPGN082B0	None	None	G3/S3	1B.3		No	Yes
Eriogonum gossypinum	cottony buckwheat	PDPGN082E0	None	None	G3G4/S3S4	4.2		No	No
Eriogonum grande var. grande	island buckwheat	PDPGN082J1	None	None	G4T4/S4	4.2		Yes	No
Eriogonum grande var. rubescens	red-flowered buckwheat	PDPGN082J2	None	None	G4T3/S3	1B.2		No	Yes
Eriogonum grande var. timorum	San Nicolas Island buckwheat	PDPGN082J3	None	Endangered	G4T1/S1	1B.1		No	Yes
Eriogonum heermannii var. floccosum	Clark Mountain buckwheat	PDPGN082P3	None	None	G5T4/S4	4.3		Yes	No

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Eriogonum heermannii var. occidentale	western Heermann's buckwheat	PDPGN082P6	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Eriogonum heracleoides var. heracleoides	parsnip-flowered buckwheat	PDPGN082R2	None	None	G5T5/S3	4.3		No	No
Eriogonum hirtellum	Klamath Mountain buckwheat	PDPGN082T0	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Eriogonum hoffmannii var. hoffmannii	Hoffmann's buckwheat	PDPGN082V1	None	None	G3T2/S2	1B.3	BLM:S	Yes	Yes
Eriogonum hoffmannii var. robustius	robust Hoffmann's buckwheat	PDPGN082V2	None	None	G3T3/S3	1B.3	BLM:S	Yes	Yes
Eriogonum intrafractum	jointed buckwheat	PDPGN08360	None	None	G3/S3	1B.3		No	Yes
Eriogonum kelloggii	Kellogg's buckwheat	PDPGN083A0	None	Endangered	G2/S2	1B.2	BLM:S	No	Yes
Eriogonum kennedyi var. alpigenum	southern alpine buckwheat	PDPGN083B1	None	None	G4T3/S3	1B.3	USFS:S	Yes	Yes
Eriogonum kennedyi var. austromontanum	southern mountain buckwheat	PDPGN083B2	Threatened	None	G4T2/S2	1B.2		Yes	Yes
Eriogonum kennedyi var. pinicola	Kern buckwheat	PDPGN083B4	None	None	G4T1/S1	1B.1	BLM:S	Yes	Yes
Eriogonum libertini	Dubakella Mountain buckwheat	PDPGN083M0	None	None	G4/S4	4.2		No	No
Eriogonum luteolum var. caninum	Tiburon buckwheat	PDPGN083S1	None	None	G5T2/S2	1B.2		No	Yes
Eriogonum luteolum var. saltuarium	Jack's wild buckwheat	PDPGN083S4	None	None	G5T1/S1	1B.2	USFS:S	No	Yes

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Eriogonum mensicola	Pinyon Mesa buckwheat	PDPGN084H1	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Eriogonum microthecum var. alpinum	alpine slender buckwheat	PDPGN083WA	None	None	G5T3/S3	4.3		No	No
Eriogonum microthecum var. johnstonii	Johnston's buckwheat	PDPGN083W5	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Eriogonum microthecum var. lacus-ursi	Bear Lake buckwheat	PDPGN083WF	None	None	G5T1/S1	1B.1	USFS:S	Yes	Yes
Eriogonum microthecum var. lapidicola	Inyo Mountains buckwheat	PDPGN083W6	None	None	G5T4/S2S3	4.3		No	No
Eriogonum microthecum var. panamintense	Panamint Mountains buckwheat	PDPGN083W9	None	None	G5T3/S3	1B.3	BLM:S	Yes	Yes
Eriogonum microthecum var. schoolcraftii	Schoolcraft's wild buckwheat	PDPGN083WG	None	None	G5T3/S3	1B.2	BLM:S USFS:S	No	Yes
Eriogonum nervulosum	Snow Mountain buckwheat	PDPGN08440	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Eriogonum nortonii	Pinnacles buckwheat	PDPGN08470	None	None	G2/S2	1B.3	BLM:S	No	Yes
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	PDPGN08492	None	None	G5T1/S1	1B.1		Yes	Yes
Eriogonum nudum var. indictum	protruding buckwheat	PDPGN08494	None	None	G5T4/S4	4.2		No	No
Eriogonum nudum var. murinum	mouse buckwheat	PDPGN08495	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Eriogonum nudum var. paralinum	Del Norte buckwheat	PDPGN08498	None	None	G5T2/S1	2B.2		No	Yes

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Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	PDPGN0849Q	None	None	G5T1/S1	1B.1		No	Yes
Eriogonum nudum var. regirivum	Kings River buckwheat	PDPGN0849F	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Eriogonum nutans var. nutans	Dugway wild buckwheat	PDPGN084B2	None	None	G5T3T4/S2?	2B.3		No	Yes
Eriogonum ochrocephalum var. ochrocephalum	ochre-flowered buckwheat	PDPGN084C6	None	None	G5T2T3/S2	2B.2		No	Yes
Eriogonum ovalifolium var. depressum	depressed wild buckwheat	PDPGN084FF	None	None	G5T4T5/S1	2B.1		No	Yes
Eriogonum ovalifolium var. eximium	brown-margined buckwheat	PDPGN084FD	None	None	G5T2/S2	4.3		No	No
Eriogonum ovalifolium var. monarchense	Monarch buckwheat	PDPGN084FJ	None	None	G5T1/S1	1B.1	USFS:S	No	Yes
Eriogonum ovalifolium var. vineum	Cushenbury buckwheat	PDPGN084F8	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Eriogonum pendulum	Waldo wild buckwheat	PDPGN084Q0	None	None	G4/S2S3	2B.2		No	Yes
Eriogonum polypodum	Tulare County buckwheat	PDPGN084U0	None	None	G4/S4	4.3		No	No
Eriogonum prattenianum var. avium	Kettle Dome buckwheat	PDPGN084V1	None	None	G4T3/S3	4.2		No	No
Eriogonum prociduum	prostrate buckwheat	PDPGN084W0	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes

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Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	PDPGN084Z2	None	None	G4T4/S3	2B.3		No	Yes
Eriogonum shockleyi var. shockleyi	Shockley's buckwheat	PDPGN085E2	None	None	G5T4?/S3	4.3		No	No
Eriogonum siskiyouense	Siskiyou buckwheat	PDPGN085F0	None	None	G3/S3	4.3		No	No
Eriogonum spectabile	Barron's buckwheat	PDPGN08750	None	None	G1/S1	1B.2	USFS:S	No	Yes
Eriogonum spergulinum var. pratense	mountain meadow wild buckwheat	PDPGN085J1	None	None	G4T3/S3	4.3		No	No
Eriogonum strictum var. greenei	Greene's buckwheat	PDPGN085L3	None	None	G5T4/S4	4.3		Yes	No
Eriogonum temblorense	Temblor buckwheat	PDPGN085P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Eriogonum ternatum	ternate buckwheat	PDPGN085R0	None	None	G4/S4	4.3		No	No
Eriogonum thornei	Thorne's buckwheat	PDPGN08233	None	Endangered	G1/S1	1B.2		No	Yes
Eriogonum tripodum	tripod buckwheat	PDPGN085Y0	None	None	G4/S4	4.2	USFS:S	No	No
Eriogonum truncatum	Mt. Diablo buckwheat	PDPGN085Z0	None	None	G1/S1	1B.1		Yes	Yes
Eriogonum twisselmannii	Twisselmann's buckwheat	PDPGN08610	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Eriogonum umbellatum var. ahartii	Ahart's buckwheat	PDPGN086UY	None	None	G5T3/S3	1B.2	USFS:S	No	Yes
Eriogonum umbellatum var. bahiiforme	bay buckwheat	PDPGN086UB	None	None	G5T3/S3	4.2		No	No

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Eriogonum umbellatum var. glaberrimum	Warner Mountains buckwheat	PDPGN086U2	None	None	G5T2?/S2	1B.3	USFS:S	No	Yes
Eriogonum umbellatum var. humistratum	Mt. Eddy buckwheat	PDPGN086U4	None	None	G5T4/S4	4.3		No	No
Eriogonum umbellatum var. juniporinum	juniper sulphur-flowered buckwheat	PDPGN086U6	None	None	G5T4/S3	2B.3		Yes	Yes
Eriogonum umbellatum var. lautum	Scott Valley buckwheat	PDPGN086UX	None	None	G5T1/S1	1B.1		No	Yes
Eriogonum umbellatum var. minus	alpine sulphur-flowered buckwheat	PDPGN086U7	None	None	G5T4/S4	4.3		Yes	No
Eriogonum umbellatum var. torreyanum	Donner Pass buckwheat	PDPGN086U9	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Eriogonum ursinum var. erubescens	blushing wild buckwheat	PDPGN08632	None	None	G3G4T3/S3	1B.3	USFS:S	Yes	Yes
Eriogonum vestitum	Idria buckwheat	PDPGN08640	None	None	G3/S3	4.3		No	No
Eriogonum wrightii var. olanchense	Olancha Peak buckwheat	PDPGN086D3	None	None	G5T2/S2	1B.3	USFS:S	No	Yes
Erioneuron pilosum	hairy erioneuron	PMPOA2S020	None	None	G5/S2	2B.3		Yes	Yes
Eriophorum gracile	slender cottongrass	PMCYP0A080	None	None	G5/S4	4.3		No	No
Eriophyllum confertiflorum var. tanacetiflorum	tansy-flowered woolly sunflower	PDAST3N0D0	None	None	G5T2?Q/S2?	4.3		No	No
Eriophyllum congdonii	Congdon's woolly sunflower	PDAST3N030	None	Rare	G2/S2	1B.2	USFS:S	No	Yes

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Eriophyllum jepsonii	Jepson's woolly sunflower	PDAST3N040	None	None	G3/S3	4.3		No	No
Eriophyllum lanatum var. hallii	Fort Tejon woolly sunflower	PDAST3N058	None	None	G5T1/S1	1B.1	USFS:S	No	Yes
Eriophyllum lanatum var. obovatum	southern Sierra woolly sunflower	PDAST3N05D	None	None	G5T4/S4	4.3		Yes	No
Eriophyllum latilobum	San Mateo woolly sunflower	PDAST3N060	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eriophyllum mohavense	Barstow woolly sunflower	PDAST3N070	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Eriophyllum nubigenum	Yosemite woolly sunflower	PDAST3N0A0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Eryngium aristulatum var. hooveri	Hoover's button-celery	PDAPI0Z043	None	None	G5T1/S1	1B.1		Yes	Yes
Eryngium aristulatum var. parishii	San Diego button-celery	PDAPI0Z042	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Eryngium constancei	Loch Lomond button-celery	PDAPI0Z0W0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Eryngium jepsonii	Jepson's coyote-thistle	PDAPI0Z130	None	None	G2/S2	1B.2		No	Yes
Eryngium pendletonense	Pendleton button-celery	PDAPI0Z120	None	None	G1/S1	1B.1		No	Yes
Eryngium pinnatisectum	Tuolumne button-celery	PDAPI0Z0P0	None	None	G2/S2	1B.2		No	Yes
Eryngium racemosum	Delta button-celery	PDAPI0Z0S0	None	Endangered	G1/S1	1B.1		No	Yes
Eryngium spinosepalum	spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Erysimum ammophilum	sand-loving wallflower	PDBRA16010	None	None	G2/S2	1B.2		Yes	Yes

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Erysimum capitatum var. angustatum	Contra Costa wallflower	PDBRA16052	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Erysimum capitatum var. lompocense	San Luis Obispo wallflower	PDBRA16057	None	None	G5T3/S3	4.2		Yes	No
Erysimum concinnum	bluff wallflower	PDBRA160E3	None	None	G3/S2	1B.2	BLM:S	No	Yes
Erysimum franciscanum	San Francisco wallflower	PDBRA160A0	None	None	G3/S3	4.2		Yes	No
Erysimum insulare	island wallflower	PDBRA160D1	None	None	G3/S3	1B.3		Yes	Yes
Erysimum menziesii	Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Erysimum suffrutescens	suffrutescent wallflower	PDBRA160D2	None	None	G3/S3	4.2		Yes	No
Erysimum teretifolium	Santa Cruz wallflower	PDBRA160N0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Erythranthe acutidens	Kings River monkeyflower	PDSCR1B010	None	None	G2G3/S2S3	3		No	No
Erythranthe calcicola	limestone monkeyflower	PDPHR01010	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Erythranthe carsonensis	Carson Valley monkeyflower	PDPHR01020	None	None	G2/S1	1B.1		Yes	Yes
Erythranthe diffusa	Palomar monkeyflower	PDSCR1B0Z0	None	None	G4/S3	4.3		Yes	No
Erythranthe exigua	San Bernardino Mountains monkeyflower	PDSCR1B140	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Erythranthe filicaulis	slender-stemmed monkeyflower	PDSCR1B150	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Erythranthe filicifolia	fern-leaved monkeyflower	PDPHR01150	None	None	G2/S2	1B.2		No	Yes
Erythranthe glaucescens	shield-bracted monkeyflower	PDSCR1B1B0	None	None	G3G4/S3S4	4.3		No	No

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Erythranthe gracilipes	slender-stalked monkeyflower	PDSCR1B1C0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Erythranthe grayi	Gray's monkeyflower	PDSCR1B1D0	None	None	G2G3Q/S2S3	4.3		No	No
Erythranthe hardhamiae	Santa Lucia monkeyflower	PDPHR01030	None	None	G1/S1	1B.1		No	Yes
Erythranthe inconspicua	small-flowered monkeyflower	PDSCR1B1F0	None	None	G4/S4	4.3		No	No
Erythranthe inflatula	ephemeral monkeyflower	PDSCR1B370	None	None	G3/S2	1B.2	BLM:S USFS:S	No	Yes
Erythranthe laciniata	cut-leaved monkeyflower	PDSCR1B1L0	None	None	G4/S4	4.3		No	No
Erythranthe marmorata	Stanislaus monkeyflower	PDPHR01130	None	None	G2?/S2?	1B.1		No	Yes
Erythranthe norrisii	Kaweah monkeyflower	PDSCR1B2Y0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Erythranthe nudata	bare monkeyflower	PDSCR1B200	None	None	G4/S4	4.3		No	No
Erythranthe percaulis	Serpentine Canyon monkeyflower	PDPHR01140	None	None	G1/S1	1B.1		No	Yes
Erythranthe purpurea	little purple monkeyflower	PDSCR1B2B0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Erythranthe rhodopetra	Red Rock Canyon monkeyflower	PDPHR01040	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Erythranthe shevockii	Kelso Creek monkeyflower	PDSCR1B2Z0	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Erythranthe sierrae	Sierra Nevada monkeyflower	PDPHR01060	None	None	G2/S2	4.2		Yes	No
Erythranthe taylorii	Shasta limestone monkeyflower	PDPHR01080	None	None	G2/S2	1B.1		No	Yes

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Erythranthe trinitiensis	pink-margined monkeyflower	PDPHR01070	None	None	G2/S2	1B.3		No	Yes
Erythranthe utahensis	Utah monkeyflower	PDPHR01160	None	None	G4G5/S1	2B.1		No	Yes
Erythronium citrinum var. citrinum	lemon-colored fawn lily	PMLIL0U041	None	None	G4T3T4/S3	4.3		No	No
Erythronium citrinum var. roderickii	Scott Mountains fawn lily	PMLIL0U042	None	None	G4T3T4/S3S4	4.3		Yes	Yes
Erythronium helenae	St. Helena fawn lily	PMLIL0U060	None	None	G3/S3	4.2		No	No
Erythronium hendersonii	Henderson's fawn lily	PMLIL0U070	None	None	G4/S2	2B.3	USFS:S	No	Yes
Erythronium howellii	Howell's fawn lily	PMLIL0U080	None	None	G3G4/S2	1B.3		No	Yes
Erythronium klamathense	Klamath fawn lily	PMLIL0U090	None	None	G4/S2	2B.2		Yes	Yes
Erythronium oregonum	giant fawn lily	PMLIL0U0C0	None	None	G4G5/S2	2B.2		No	Yes
Erythronium pluriflorum	Shuteye Peak fawn lily	PMLIL0U0Q0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Erythronium pusaterii	Kaweah fawn lily	PMLIL0U0R0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Erythronium revolutum	coast fawn lily	PMLIL0U0F0	None	None	G4G5/S3	2B.2		No	Yes
Erythronium shastense	Shasta fawn lily	PMLIL0U0V0	None	None	G2/S2	1B.2		No	Yes
Erythronium taylorii	Pilot Ridge fawn lily	PMLIL0U0S0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Erythronium tuolumnense	Tuolumne fawn lily	PMLIL0U0H0	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	Yes	Yes

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Eschscholzia androuxii	Joshua Tree poppy	PDPAP0A0E0	None	None	G3/S3	4.3		No	No
Eschscholzia hypecoides	San Benito poppy	PDPAP0A060	None	None	G4/S4	4.3		No	No
Eschscholzia lemmonii ssp. kernensis	Tejon poppy	PDPAP0A071	None	None	G5T2/S2	1B.1	BLM:S	Yes	Yes
Eschscholzia minutiflora ssp. twisselmannii	Red Rock poppy	PDPAP0A093	None	None	G5T2/S2	1B.2	BLM:S	Yes	Yes
Eschscholzia procera	Kernville poppy	PDPAP0A0B0	None	None	G1?Q/S1?	3		Yes	No
Eschscholzia ramosa	island poppy	PDPAP0A0C0	None	None	G4/S4	4.3		Yes	No
Eschscholzia rhombipetala	diamond-petaled California poppy	PDPAP0A0D0	None	None	G1/S1	1B.1		Yes	Yes
Eucephalus glabratus	Siskiyou aster	PDASTEC030	None	None	G4/S3	4.3		No	No
Eucephalus vialis	wayside aster	PDASTEC0A0	None	None	G3/S1	1B.2	USFS:S	No	Yes
Eucnide rupestris	annual rock-nettle	PDLOA02020	None	None	G3/S1	2B.2		No	Yes
Euphorbia abramsiana	Abrams' spurge	PDEUP0D010	None	None	G4/S2	2B.2		Yes	Yes
Euphorbia arizonica	Arizona spurge	PDEUP0D060	None	None	G5/S3	2B.3		No	Yes
Euphorbia exstipulata var. exstipulata	Clark Mountain spurge	PDEUP0Q0P1	None	None	G5T5?/S2	2B.1		Yes	Yes
Euphorbia hooveri	Hoover's spurge	PDEUP0D150	Threatened	None	G1/S1	1B.2		No	Yes
Euphorbia jaegeri	Orocopia Mountains spurge	PDEUP0Q440	None	None	G1/S1	1B.1	BLM:S	No	Yes
Euphorbia misera	cliff spurge	PDEUP0Q1B0	None	None	G5/S2	2B.2		Yes	Yes
Euphorbia ocellata ssp. rattanii	Stony Creek spurge	PDEUP0D1P1	None	None	G4T2?/S2?	1B.2	BLM:S	No	Yes
Euphorbia parryi	Parry's spurge	PDEUP0D1T0	None	None	G5/S1	2B.3		No	Yes

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Euphorbia platysperma	flat-seeded spurge	PDEUP0D1X0	None	None	G3/S1	1B.2		Yes	Yes
Euphorbia revoluta	revolute spurge	PDEUP0D230	None	None	G5/S4	4.3		Yes	No
Euphorbia vallis-mortae	Death Valley sandmat	PDEUP0D2G0	None	None	G3/S3	4.2		Yes	No
Euphrosyne acerosa	copperwort	PDAST58010	None	None	G4G5/S3	4.2		Yes	No
Euphrosyne nevadensis	Nevada wormwood	PDAST580D0	None	None	G4/S3	4.3		No	No
Eurybia merita	subalpine aster	PDASTEB030	None	None	G5/SH	2B.3		No	Yes
Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Fendlerella utahensis	yerba desierto	PDHDR08010	None	None	G5/S4	4.3		Yes	No
Ferocactus viridescens	San Diego barrel cactus	PDCAC08060	None	None	G3?/S2S3	2B.1		Yes	Yes
Festuca minutiflora	small-flowered fescue	PMPOA2V1M0	None	None	G5/S2	2B.3		No	Yes
Fimbristylis thermalis	hot springs fimbristylis	PMCYP0B0N0	None	None	G4/S1S2	2B.2		Yes	Yes
Frangula purshiana ssp. ultramafica	Caribou coffeeberry	PDRHA0H061	None	None	G4T2T3/S2S3	1B.2	USFS:S	No	Yes
Frankenia palmeri	Palmer's frankenia	PDFRA01040	None	None	G3?/S1	2B.1		No	Yes
Frasera albicaulis var. modocensis	Modoc green-gentian	PDGEN05018	None	None	G5T3T4/S2S3	2B.3		No	Yes
Frasera albomarginata var. albomarginata	desert green-gentian	PDGEN05021	None	None	G5T5/S3	2B.2		No	Yes
Frasera albomarginata var. induta	Clark Mountain green-gentian	PDGEN05022	None	None	G5T2/S1	1B.2		No	Yes
Frasera neglecta	pine green-gentian	PDGEN05080	None	None	G4/S4	4.3		Yes	No

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Frasera tubulosa	Coville's green-gentian	PDGEN050E0	None	None	G3/S3	4.3		No	No
Frasera umpquaensis	Umpqua green-gentian	PDGEN050F0	None	None	G3/S1	2B.2	USFS:S	No	Yes
Fraxinus parryi	chaparral ash	PDOLE040K0	None	None	G3?/S1	2B.2		Yes	Yes
Fremontodendron decumbens	Pine Hill flannelbush	PDSTE03030	Endangered	Rare	G1/S1	1B.2		Yes	Yes
Fremontodendron mexicanum	Mexican flannelbush	PDSTE03020	Endangered	Rare	G2/S1	1B.1		Yes	Yes
Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	G3/S3	4.2		No	Yes
Fritillaria biflora var. ineziana	Hillsborough chocolate lily	PMLIL0V031	None	None	G3G4T1/S1	1B.1		Yes	Yes
Fritillaria brandegeei	Greenhorn fritillary	PMLIL0V040	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Fritillaria eastwoodiae	Butte County fritillary	PMLIL0V060	None	None	G3Q/S3	3.2	USFS:S	No	Yes
Fritillaria falcata	talus fritillary	PMLIL0V070	None	None	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Fritillaria gentneri	Gentner's fritillary	PMLIL0V080	Endangered	None	G1/S1	1B.1		No	Yes
Fritillaria glauca	Siskiyou fritillaria	PMLIL0V090	None	None	G3G4/S3	4.2		No	No
Fritillaria lanceolata var. tristulis	Marin checker lily	PMLIL0V0P1	None	None	G5T2/S2	1B.1		No	Yes
Fritillaria liliacea	fragrant fritillary	PMLIL0V0C0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Fritillaria ojaiensis	Ojai fritillary	PMLIL0V0N0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Fritillaria pinetorum	pine fritillary	PMLIL0V0E0	None	None	G4/S4	4.3		Yes	No
Fritillaria pluriflora	adobe-lily	PMLIL0V0F0	None	None	G2G3/S2S3	1B.2	BLM:S	Yes	Yes
Fritillaria purdyi	Purdy's fritillary	PMLIL0V0H0	None	None	G4/S4	4.3		Yes	No
Fritillaria roderickii	Roderick's fritillary	PMLIL0V0M0	None	Endangered	G1Q/S1	1B.1		Yes	Yes
Fritillaria striata	striped adobe-lily	PMLIL0V0K0	None	Threatened	G1/S1	1B.1	USFS:S	Yes	Yes
Fritillaria viridea	San Benito fritillary	PMLIL0V0L0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Funastrum crispum	wavyleaf twinvine	PDASC0F020	None	None	G4/S1	2B.2		No	Yes

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Funastrum utahense	Utah vine milkweed	PDASC050M0	None	None	G4/S4	4.2		No	No
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	PDRUB0N032	None	None	G5T3/S3	4.2		No	No
Galium angustifolium ssp. borregoense	Borrego bedstraw	PDRUB0N042	None	Rare	G5T3?/S3?	1B.3	BLM:S	Yes	Yes
Galium angustifolium ssp. gabrielense	San Antonio Canyon bedstraw	PDRUB0N044	None	None	G5T3/S3	4.3		No	No
Galium angustifolium ssp. gracillimum	slender bedstraw	PDRUB0N04B	None	None	G5T4/S4	4.2		No	No
Galium angustifolium ssp. jacinticum	San Jacinto Mountains bedstraw	PDRUB0N04C	None	None	G5T2?/S2?	1B.3	BLM:S USFS:S	Yes	Yes
Galium angustifolium ssp. onycense	Onyx Peak bedstraw	PDRUB0N048	None	None	G5T3/S3	1B.3	BLM:S	Yes	Yes
Galium buxifolium	box bedstraw	PDRUB0N0D0	Endangered	Rare	G2G3/S2S3	1B.2		Yes	Yes
Galium californicum ssp. luciense	Cone Peak bedstraw	PDRUB0N0E3	None	None	G5T3/S3	1B.3	USFS:S	No	Yes
Galium californicum ssp. miguelense	San Miguel Island bedstraw	PDRUB0N0E5	None	None	G5T3/S3	4.2		No	No
Galium californicum ssp. primum	Alvin Meadow bedstraw	PDRUB0N0E6	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Galium californicum ssp. sierrae	El Dorado bedstraw	PDRUB0N0E7	Endangered	Rare	G5T1/S1	1B.2		Yes	Yes
Galium catalinense ssp. acrispum	San Clemente Island bedstraw	PDRUB0N0F1	None	Endangered	G4T3/S3	1B.3		Yes	Yes

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Galium catalinense ssp. catalinense	Santa Catalina Island bedstraw	PDRUB0N0F2	None	None	G4T2/S2	1B.3		Yes	Yes
Galium clementis	Santa Lucia bedstraw	PDRUB0N0H0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Galium cliftonsmithii	Santa Barbara bedstraw	PDRUB0N0J0	None	None	G4/S4	4.3		No	No
Galium glabrescens ssp. modocense	Modoc bedstraw	PDRUB0N0T2	None	None	G4T3/S3	1B.2	BLM:S USFS:S	No	Yes
Galium grande	San Gabriel bedstraw	PDRUB0N0V0	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Galium hardhamiae	Hardham's bedstraw	PDRUB0N0Y0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Galium hilendiae ssp. carneum	Panamint Mountains bedstraw	PDRUB0N0Z1	None	None	G4T3/S3	1B.3		Yes	Yes
Galium hilendiae ssp. kingstonense	Kingston Mountains bedstraw	PDRUB0N0Z3	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Galium hypotrichium ssp. tomentellum	Telescope Peak bedstraw	PDRUB0N126	None	None	G5T1/S1	1B.3		Yes	Yes
Galium jepsonii	Jepson's bedstraw	PDRUB0N130	None	None	G3/S3	4.3		No	No
Galium johnstonii	Johnston's bedstraw	PDRUB0N140	None	None	G4/S4	4.3		No	No
Galium munzii	Munz's bedstraw	PDRUB0N1G0	None	None	G4G5/S4	4.3		No	No
Galium nuttallii ssp. insulare	Nuttall's island bedstraw	PDRUB0N1K1	None	None	G5?T4/S4	4.3		No	No
Galium oreganum	Oregon bedstraw	PDRUB0N1N0	None	None	G4G5/S1S2	3		No	No
Galium proliferum	desert bedstraw	PDRUB0N1V0	None	None	G5/S2	2B.2		No	Yes
Galium serpenticum ssp. scotticum	Scott Mountain bedstraw	PDRUB0N1Y6	None	None	G4G5T2/S2	1B.2	BLM:S	No	Yes

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Galium serpenticum ssp. warnerense	Warner Mountains bedstraw	PDRUB0N1Y8	None	None	G4G5T2T3/S2	1B.2	USFS:S	No	Yes
Galium wrightii	Wright's bedstraw	PDRUB0N2F0	None	None	G5/S3	2B.3		No	Yes
Gambelia speciosa	showy island snapdragon	PDSCR2H010	None	None	G3/S3	1B.2		Yes	Yes
Gentiana affinis var. parvidentata	small-toothed prairie gentian	PDGEN06013	None	None	G5T2T4Q/S1S3	3		No	No
Gentiana fremontii	Fremont's gentian	PDGEN060Y0	None	None	G4/S2	2B.3	USFS:S	No	Yes
Gentiana plurisetosa	Klamath gentian	PDGEN060V0	None	None	G2G3/S2	1B.3		No	Yes
Gentiana prostrata	pygmy gentian	PDGEN060M0	None	None	G4G5/S1	2B.3		No	Yes
Gentiana setigera	Mendocino gentian	PDGEN060S0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Geraea viscida	sticky geraea	PDAST42020	None	None	G2G3/S2	2B.2		Yes	Yes
Geum aleppicum	Aleppo avens	PDROS0S010	None	None	G5/S2	2B.2		No	Yes
Gilia capitata ssp. chamissonis	blue coast gilia	PDPLM040B3	None	None	G5T2/S2	1B.1		Yes	Yes
Gilia capitata ssp. pacifica	Pacific gilia	PDPLM040B6	None	None	G5T3/S2	1B.2		No	Yes
Gilia capitata ssp. tomentosa	woolly-headed gilia	PDPLM040B9	None	None	G5T1/S1	1B.1		No	Yes
Gilia interior	inland gilia	PDPLM040Q0	None	None	G4/S4	4.3		No	No
Gilia latiflora ssp. cuyamensis	Cuyama gilia	PDPLM040T2	None	None	G5?T4/S4	4.3		No	No
Gilia leptantha ssp. leptantha	San Bernardino gilia	PDPLM040W1	None	None	G4T2/S2	1B.3	USFS:S	Yes	Yes
Gilia leptantha ssp. pinetorum	pine gilia	PDPLM040W2	None	None	G4T4/S4	4.3		No	No
Gilia mexicana	El Paso gilia	PDPLM04110	None	None	G4/S1	2B.3		No	Yes
Gilia millefoliata	dark-eyed gilia	PDPLM04130	None	None	G2/S2	1B.2	BLM:S	No	Yes
Gilia nevinii	Nevin's gilia	PDPLM04160	None	None	G4/S4	4.3		Yes	No

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Gilia ochroleuca ssp. lanosa	Sisquoc gilia	PDPLM04185	None	None	G4T3/S3	4.3		No	No
Gilia tenuiflora ssp. amplifaucalis	trumpet-throated gilia	PDPLM041P4	None	None	G3G4T3/S3	4.3		No	No
Gilia tenuiflora ssp. arenaria	Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2/S2	1B.2		Yes	Yes
Gilia tenuiflora ssp. hoffmannii	Hoffmann's slender-flowered gilia	PDPLM041P3	Endangered	None	G3G4T1/S1	1B.1		Yes	Yes
Gilia yorkii	Monarch gilia	PDPLM04230	None	None	G2/S2	1B.1	USFS:S	No	Yes
Gilmania luteola	golden-carpet gilmania	PDPGN0A010	None	None	G2G3/S2S3	1B.3		Yes	Yes
Githopsis diffusa ssp. filicaulis	Mission Canyon bluecup	PDCAM07023	None	None	G5T1Q/S1	3.1	USFS:S	No	Yes
Githopsis pulchella ssp. serpentinicola	serpentine bluecup	PDCAM07053	None	None	G4T3/S3	4.3		No	No
Githopsis tenella	delicate bluecup	PDCAM07070	None	None	G2/S2	1B.3	BLM:S	No	Yes
Glehnia littoralis ssp. leiocarpa	American glehnia	PDAPI13011	None	None	G5T5/S2S3	4.2		No	No
Glossopetalon pungens	pungent glossopetalon	PDCRO04020	None	None	G2/S1	1B.2	BLM:S	No	Yes
Glyceria grandis	American manna grass	PMPOA2Y080	None	None	G5/S3	2B.3		No	Yes
Goodmania luteola	golden goodmania	PDPGN0B010	None	None	G3/S3	4.2		No	No
Gratiola heterosepala	Boggs Lake hedge-hyssop	PDSCR0R060	None	Endangered	G2/S2	1B.2	BLM:S	No	Yes
Greeneocharis circumscissa var. rosulata	rosette cushion cryptantha	PDBOR0A0G3	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Grindelia fraxinipratensis	Ash Meadows gumplant	PDAST47080	Threatened	None	G2/S1	1B.2		Yes	Yes

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Grindelia hallii	San Diego gumplant	PDAST470D4	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Grindelia hirsutula var. maritima	San Francisco gumplant	PDAST470D3	None	None	G5T1Q/S1	3.2		Yes	Yes
Grusonia parishii	Parish's club-cholla	PDCAC0D2H0	None	None	G3G4/S2	2B.2		No	Yes
Grusonia pulchella	beautiful cholla	PDCAC0D120	None	None	G4/S2	2B.2		No	Yes
Hackelia amethystina	amethyst stickseed	PDBOR0G010	None	None	G4/S4	4.3		No	No
Hackelia brevicula	Poison Canyon stickseed	PDBOR0G040	None	None	G3/S3	3.3		No	Yes
Hackelia cusickii	Cusick's stickseed	PDBOR0G090	None	None	G4/S3S4	4.3		No	No
Hackelia sharsmithii	Sharsmith's stickseed	PDBOR0G0Q0	None	None	G3/S3	2B.3		No	Yes
Harmonia doris-nilesiae	Niles' harmonia	PDAST650L0	None	None	G2G3/S2S3	1B.1	USFS:S	No	Yes
Harmonia guggolziorum	Guggolz's harmonia	PDAST650M0	None	None	G1/S1	1B.1		No	Yes
Harmonia hallii	Hall's harmonia	PDAST650A0	None	None	G2?/S2?	1B.2	BLM:S	Yes	Yes
Harmonia nutans	nodding harmonia	PDAST650D0	None	None	G3/S3	4.3		Yes	No
Harmonia stebbinsii	Stebbins' harmonia	PDAST650K0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Harpagonella palmeri	Palmer's grapplinghook	PDBOR0H010	None	None	G4/S3	4.2		Yes	Yes
Hazardia cana	San Clemente Island hazardia	PDAST4H020	None	None	G3/S3	1B.2		No	Yes
Hazardia detonsa	northern islands hazardia	PDAST4H030	None	None	G4/S4	4.3		Yes	No
Hazardia orcuttii	Orcutt's hazardia	PDAST4H070	None	Threatened	G1/S1	1B.1		Yes	Yes
Hecastocleis shockleyi	prickle-leaf	PDAST4J010	None	None	G4/S4	3		No	No

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Hedeoma drummondii	Drummond's false pennyroyal	PDLAM0M060	None	None	G5/S1	2B.2		No	Yes
Hedeoma nana ssp. californica	California mock pennyroyal	PDLAM0M0S1	None	None	G5T4/S4	4.3		Yes	No
Helianthella castanea	Diablo helianthella	PDAST4M020	None	None	G2/S2	1B.2		No	Yes
Helianthus exilis	serpentine sunflower	PDAST4N1J0	None	None	G3/S3	4.2		Yes	No
Helianthus inexpectatus	Newhall sunflower	PDAST4N250	None	None	G1/S1	1B.1		Yes	Yes
Helianthus niveus ssp. tephrodes	Algodones Dunes sunflower	PDAST4N0Z2	None	Endangered	G4T2T3/S1	1B.2	BLM:S	Yes	Yes
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	PDAST4N102	None	None	G5TX/SX	1A		No	Yes
Helianthus winteri	Winter's sunflower	PDAST4N260	None	None	G2?/S2?	1B.2	BLM:S	No	Yes
Hemieva ranunculifolia	buttercup-leaf suksdorfia	PDSAX0W010	None	None	G5/S2	2B.2		No	Yes
Hemizonia congesta ssp. calyculata	Mendocino tarplant	PDAST4R063	None	None	G5T4/S4	4.3		No	No
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	PDAST4R065	None	None	G5T2/S2	1B.2		Yes	Yes
Hemizonia congesta ssp. tracyi	Tracy's tarplant	PDAST4R067	None	None	G5T4/S4	4.3		No	No
Herissantia crispa	curly herissantia	PDMAL0F010	None	None	G5/S1	2B.3		No	Yes
Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	G3/S3	4.2		No	No
Hesperevax sparsiflora var. brevifolia	short-leaved evax	PDASTE5011	None	None	G4T3/S3	1B.2	BLM:S	No	Yes
Hesperidanthus jaegeri	Jaeger's hesperidanthus	PDBRA0N010	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

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Hesperocyparis abramsiana var. abramsiana	Santa Cruz cypress	PGCUP04081	Threatened	Endangered	G1T1/S1	1B.2		Yes	Yes
Hesperocyparis abramsiana var. butanoensis	Butano Ridge cypress	PGCUP04082	Threatened	Endangered	G1T1/S1	1B.2		Yes	Yes
Hesperocyparis bakeri	Baker cypress	PGCUP04020	None	None	G3/S3	4.2		Yes	No
Hesperocyparis forbesii	Tecate cypress	PGCUP040C0	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Hesperocyparis goveniana	Gowen cypress	PGCUP04031	Threatened	None	G1/S1	1B.2		Yes	Yes
Hesperocyparis macrocarpa	Monterey cypress	PGCUP04060	None	None	G1/S1	1B.2		Yes	Yes
Hesperocyparis nevadensis	Piute cypress	PGCUP04012	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Hesperocyparis pygmaea	pygmy cypress	PGCUP04032	None	None	G1/S1	1B.2	BLM:S	Yes	Yes
Hesperocyparis stephensonii	Cuyamaca cypress	PGCUP040B0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Hesperolinon adenophyllum	glandular western flax	PDLIN01010	None	None	G2G3/S2S3	1B.2	BLM:S	No	Yes
Hesperolinon bicarpellatum	two-carpellate western flax	PDLIN01020	None	None	G2/S2	1B.2	BLM:S	No	Yes
Hesperolinon breweri	Brewer's western flax	PDLIN01030	None	None	G2/S2	1B.2		No	Yes
Hesperolinon congestum	Marin western flax	PDLIN01060	Threatened	Threatened	G1/S1	1B.1		Yes	Yes
Hesperolinon didymocarpum	Lake County western flax	PDLIN01070	None	Endangered	G1/S1	1B.2		No	Yes
Hesperolinon drymarioides	drymaria-like western flax	PDLIN01090	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

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Hesperolinon sharsmithiae	Sharsmith's western flax	PDLIN010E0	None	None	G2Q/S2	1B.2	BLM:S	Yes	Yes
Hesperolinon tehamense	Tehama County western flax	PDLIN010C0	None	None	G2/S2	1B.3	BLM:S	No	Yes
Heteranthera dubia	water star-grass	PMPON03010	None	None	G5/S2	2B.2		No	Yes
Heterotheca monarchensis	Monarch golden-aster	PDAST4V0U0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Heterotheca sessiliflora ssp. sessiliflora	beach goldenaster	PDAST4V0K2	None	None	G4T2T3/S1	1B.1		Yes	Yes
Heterotheca shevockii	Shevock's golden-aster	PDAST4V0T0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Heuchera abramsii	Abrams' alumroot	PDSAX0E010	None	None	G3/S3	4.3	USFS:S	Yes	No
Heuchera brevistaminea	Laguna Mountains alumroot	PDSAX0E050	None	None	G2/S2	1B.3	BLM:S	No	Yes
Heuchera caespitosa	urn-flowered alumroot	PDSAX0E1C0	None	None	G3/S3	4.3	USFS:S	Yes	No
Heuchera hirsutissima	shaggy-haired alumroot	PDSAX0E0J0	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Heuchera maxima	island alumroot	PDSAX0E0M0	None	None	G3/S3	1B.2		Yes	Yes
Heuchera parishii	Parish's alumroot	PDSAX0E0S0	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Heuchera rubescens var. versicolor	San Diego County alumroot	PDSAX0E106	None	None	G5T4/S2	3.3		No	Yes
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	G5T3/S3	1B.2		Yes	Yes
Hoita strobilina	Loma Prieta hoita	PDFAB5Z030	None	None	G2?/S2?	1B.1		No	Yes
Holmgrenanthe petrophila	rock lady	PDSCR2J010	None	Rare	G1/S1	1B.2		Yes	Yes
Holocarpha macradenia	Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Holocarpha virgata ssp. elongata	curving tarplant	PDAST4X041	None	None	G5T3/S3	4.2		Yes	No

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Hordeum intercedens	vernal barley	PMPOA380E0	None	None	G3G4/S3S4	3.2		Yes	No
Horkelia bolanderi	Bolander's horkelia	PDROS0W011	None	None	G1/S1	1B.2	BLM:S	No	Yes
Horkelia congesta var. nemorosa	Josephine horkelia	PDROS0W032	None	None	G4T4?/S1	2B.1		No	Yes
Horkelia cuneata var. puberula	mesa horkelia	PDROS0W045	None	None	G4T1/S1	1B.1	USFS:S	No	Yes
Horkelia cuneata var. sericea	Kellogg's horkelia	PDROS0W043	None	None	G4T1?/S1?	1B.1	USFS:S	Yes	Yes
Horkelia daucifolia var. indicta	Jepson's horkelia	PDROS0W053	None	None	G4T1/S1	1B.1		No	Yes
Horkelia hendersonii	Henderson's horkelia	PDROS0W090	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Horkelia hispidula	White Mountains horkelia	PDROS0W0A0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Horkelia marinensis	Point Reyes horkelia	PDROS0W0B0	None	None	G2/S2	1B.2		No	Yes
Horkelia parryi	Parry's horkelia	PDROS0W0C0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Horkelia sericata	Howell's horkelia	PDROS0W0D0	None	None	G4/S3	4.3		No	No
Horkelia tenuiloba	thin-lobed horkelia	PDROS0W0E0	None	None	G2/S2	1B.2		Yes	Yes
Horkelia truncata	Ramona horkelia	PDROS0W0G0	None	None	G3/S3	1B.3	BLM:S USFS:S	Yes	Yes
Horkelia tularensis	Kern Plateau horkelia	PDROS0W0H0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Horkelia wilderae	Barton Flats horkelia	PDROS0W0J0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Horkelia yadonii	Santa Lucia horkelia	PDROS0W0K0	None	None	G3/S3	4.2	USFS:S	No	No

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Horsfordia alata	pink velvet-mallow	PDMAL0J010	None	None	G5/S4	4.3		Yes	No
Horsfordia newberryi	Newberry's velvet-mallow	PDMAL0J020	None	None	G5/S4	4.3		Yes	No
Hosackia crassifolia var. otayensis	Otay Mountain lotus	PDFAB2A092	None	None	G5T1/S1	1B.1	BLM:S	Yes	Yes
Hosackia gracilis	harlequin lotus	PDFAB2A0D0	None	None	G3G4/S3	4.2		Yes	No
Hosackia oblongifolia var. cuprea	copper-flowered bird's-foot trefoil	PDFAB2A0W1	None	None	G5T2/S2	1B.3		Yes	Yes
Hosackia yollabolliensis	Yolla Bolly Mtns. bird's-foot trefoil	PDFAB2A1F0	None	None	G2/S2	1B.2		No	Yes
Howellanthus dalesianus	Scott Mountain howellanthus	PDHYD0C140	None	None	G3/S3	4.3		No	Yes
Howellia aquatilis	water howellia	PDCAM0A010	Threatened	None	G3/S2	2B.2		No	Yes
Hulsea brevifolia	short-leaved hulsea	PDAST4Z020	None	None	G3/S3	1B.2	USFS:S	No	Yes
Hulsea californica	San Diego sunflower	PDAST4Z030	None	None	G3/S3	1B.3	BLM:S	Yes	Yes
Hulsea mexicana	Mexican hulsea	PDAST4Z050	None	None	G3G4/S1	2B.3		Yes	Yes
Hulsea nana	little hulsea	PDAST4Z060	None	None	G4/S3	2B.3		Yes	Yes
Hulsea vestita ssp. callicarpha	beautiful hulsea	PDAST4Z074	None	None	G5T4/S4	4.2		Yes	No
Hulsea vestita ssp. gabrielensis	San Gabriel Mountains hulsea	PDAST4Z075	None	None	G5T3/S3	4.3	USFS:S	Yes	No
Hulsea vestita ssp. inyoensis	Inyo hulsea	PDAST4Z073	None	None	G5T2T3/S1S2	2B.2		No	Yes
Hulsea vestita ssp. parryi	Parry's hulsea	PDAST4Z076	None	None	G5T4/S4	4.3		Yes	No
Hulsea vestita ssp. pygmaea	pygmy hulsea	PDAST4Z077	None	None	G5T1/S1	1B.3	USFS:S	No	Yes

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Hymenopappus filifolius var. eriopodus	hairy-podded fine-leaf hymenopappus	PDAST51032	None	None	G5T3/S2S3	2B.3		Yes	Yes
Hymenopappus filifolius var. nanus	little cutleaf	PDAST5103H	None	None	G5T4/S3	2B.3		No	Yes
Hymenothrix wrightii	Wright's hymenothrix	PDAST52030	None	None	G5/S3	4.3		Yes	No
Hymenoxys lemmonii	alkali hymenoxys	PDAST530C0	None	None	G4/S2S3	2B.2		No	Yes
Hymenoxys odorata	bitter hymenoxys	PDAST530E0	None	None	G5/S2	2B.1		No	Yes
Iliamna bakeri	Baker's globe mallow	PDMAL0K010	None	None	G4/S3	4.2		No	Yes
Iliamna latibracteata	California globe mallow	PDMAL0K040	None	None	G2G3/S2	1B.2	USFS:S	Yes	Yes
Imperata brevifolia	California satintail	PMPOA3D020	None	None	G4/S3	2B.1	USFS:S	Yes	Yes
Ipomopsis effusa	Baja California ipomopsis	PDPLM060U0	None	None	G3?/SH	2B.1		Yes	Yes
Ipomopsis tenuifolia	slender-leaved ipomopsis	PDPLM060J0	None	None	G4/S2	2B.3		Yes	Yes
Iris bracteata	Siskiyou iris	PMIRI09020	None	None	G4G5/S3	3.3		No	No
Iris hartwegii ssp. columbiana	Tuolumne iris	PMIRI090D2	None	None	G4T1/S1	1B.2	BLM:S USFS:S	No	Yes
Iris innominata	Del Norte County iris	PMIRI090F0	None	None	G4G5/S3	4.3		No	No
Iris longipetala	coast iris	PMIRI092E0	None	None	G3/S3	4.2		No	No
Iris munzii	Munz's iris	PMIRI090M0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Iris tenax ssp. klamathensis	Orleans iris	PMIRI090Z2	None	None	G4G5T4/S4	4.3		No	No
Iris thompsonii	Thompson's iris	PMIRI09120	None	None	G3/S3	4.3		No	No
Isocoma arguta	Carquinez goldenbush	PDAST57050	None	None	G1/S1	1B.1		No	Yes

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Isocoma menziesii var. decumbens	decumbent goldenbush	PDAST57091	None	None	G3G5T2T3/S2	1B.2	BLM:S	Yes	Yes
Isocoma menziesii var. diabolica	Satan's goldenbush	PDAST57092	None	None	G3G5T3/S3	4.2		No	No
Iva hayesiana	San Diego marsh-elder	PDAST580A0	None	None	G3/S2	2B.2		Yes	Yes
Ivesia aperta var. aperta	Sierra Valley ivesia	PDROS0X011	None	None	G2T2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia aperta var. canina	Dog Valley ivesia	PDROS0X012	None	None	G2T1/S1	1B.1	USFS:S	No	Yes
Ivesia argyrocoma var. argyrocoma	silver-haired ivesia	PDROS0X021	None	None	G2T2/S2	1B.2	USFS:S	Yes	Yes
Ivesia arizonica var. arizonica	yellow ivesia	PDROS0X0R1	None	None	G3T3/S1	2B.3		No	Yes
Ivesia baileyi var. baileyi	Bailey's ivesia	PDROS0X031	None	None	G5T4/S2	2B.3		No	Yes
Ivesia baileyi var. beneolens	Owyhee ivesia	PDROS0X032	None	None	G5T4/S1	2B.3		No	Yes
Ivesia callida	Tahquitz ivesia	PDROS0X040	None	Rare	G1/S1	1B.3	USFS:S	Yes	Yes
Ivesia campestris	field ivesia	PDROS0X050	None	None	G3/S3	1B.2		No	Yes
Ivesia jaegeri	Jaeger's ivesia	PDROS0X080	None	None	G2G3/S1	1B.3	BLM:S	Yes	Yes
Ivesia kingii var. kingii	alkali ivesia	PDROS0X092	None	None	G4T3Q/S2	2B.2	BLM:S	No	Yes
Ivesia longibracteata	Castle Crags ivesia	PDROS0X0U0	None	None	G1/S1	1B.3	USFS:S	Yes	Yes
Ivesia paniculata	Ash Creek ivesia	PDROS0X0S0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Ivesia patellifera	Kingston Mountains ivesia	PDROS0X0Z0	None	None	G2/S2	1B.3	BLM:S	Yes	Yes
Ivesia pickeringii	Pickering's ivesia	PDROS0X0D0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Ivesia sericoleuca	Plumas ivesia	PDROS0X0K0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Ivesia unguiculata	Yosemite ivesia	PDROS0X0N0	None	None	G3/S3	4.2		No	Yes
Ivesia webberi	Webber's ivesia	PDROS0X0Q0	Threatened	None	G1/S1	1B.1	USFS:S	Yes	Yes

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Jamesia americana var. rosea	rosy-petalled cliffbush	PDHDR02019	None	None	G5T4/S4	4.3		Yes	No
Jensia yosemitana	Yosemite tarplant	PDAST650J0	None	None	G3/S3	3.2		No	No
Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	G3/S3	4.3		No	No
Jepsonia malvifolia	island jepsonia	PDSAX0J020	None	None	G4/S4	4.2		No	No
Johanneshowellia puberula	downy buckwheat	PDPGN084X0	None	None	G4?/S1	2B.3		No	Yes
Johnstonella costata	ribbed cryptantha	PDBOR0A0M0	None	None	G4G5/S4	4.3		Yes	No
Johnstonella holoptera	winged cryptantha	PDBOR0A180	None	None	G4G5/S4	4.3		No	No
Juglans californica	southern California black walnut	PDJUG02020	None	None	G4/S4	4.2		Yes	No
Juncus acutus ssp. leopoldii	southwestern spiny rush	PMJUN01051	None	None	G5T5/S4	4.2		Yes	No
Juncus cooperi	Cooper's rush	PMJUN010T0	None	None	G4/S3	4.3		Yes	No
Juncus digitatus	finger rush	PMJUN013E0	None	None	G1/S1	1B.1		No	Yes
Juncus dudleyi	Dudley's rush	PMJUN01390	None	None	G5/S1	2B.3		No	Yes
Juncus duranii	Duran's rush	PMJUN013T0	None	None	G3/S3	4.3		No	No
Juncus hemiendytus var. abjectus	Center Basin rush	PMJUN011F1	None	None	G5T5/S4	4.3		No	No
Juncus interior	inland rush	PMJUN011J0	None	None	G4/S1	2B.2		No	Yes
Juncus leiospermus var. ahartii	Ahart's dwarf rush	PMJUN011L1	None	None	G2T1/S1	1B.2		No	Yes
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush	PMJUN011L2	None	None	G2T2/S2	1B.1	BLM:S USFS:S	No	Yes
Juncus luciensis	Santa Lucia dwarf rush	PMJUN013J0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Juncus nevadensis var. inventus	Sierra rush	PMJUN011Z5	None	None	G5T3T4/S1	2B.2		No	Yes
Juncus nodosus	knotted rush	PMJUN01210	None	None	G5/S3	2B.3		No	Yes
Juncus regelii	Regel's rush	PMJUN012D0	None	None	G4/S1	2B.3		No	Yes

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Juncus supiniformis	hair-leaved rush	PMJUN012R0	None	None	G5/S1	2B.2		No	Yes
Kallstroemia parviflora	warty caltrop	PDZYG03050	None	None	G5/S3	4.2		No	No
Kobresia myosuroides	seep kobresia	PMCYP0F010	None	None	G5/S2	2B.2		No	Yes
Koeberlinia spinosa var. tenuispina	slender-spined all thorn	PDCPP05012	None	None	G4T4?/S2	2B.2		No	Yes
Kopsiopsis hookeri	small groundcone	PDORO01010	None	None	G4?/S1S2	2B.3		No	Yes
Ladeania lanceolata	lance-leaved scurf-pea	PDFAB5M030	None	None	G5/S2	2B.3		No	Yes
Lagophylla diabolensis	Diablo Range hare-leaf	PDAST5J060	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Lagophylla dichotoma	forked hare-leaf	PDAST5J070	None	None	G2/S2	1B.1		No	Yes
Lasthenia burkei	Burke's goldfields	PDAST5L010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lasthenia californica ssp. bakeri	Baker's goldfields	PDAST5L0C4	None	None	G3T1/S1	1B.2		No	Yes
Lasthenia californica ssp. macrantha	perennial goldfields	PDAST5L0C5	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Lasthenia chrysantha	alkali-sink goldfields	PDAST5L030	None	None	G2/S2	1B.1		No	Yes
Lasthenia conjugens	Contra Costa goldfields	PDAST5L040	Endangered	None	G1/S1	1B.1		Yes	Yes
Lasthenia ferrisiae	Ferris' goldfields	PDAST5L070	None	None	G3/S3	4.2		No	No
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	PDAST5L0A1	None	None	G4T2/S2	1B.1	BLM:S	Yes	Yes
Lasthenia leptalea	Salinas Valley goldfields	PDAST5L0B0	None	None	G3/S3	4.3		No	No
Lathyrus biflorus	two-flowered pea	PDFAB25180	None	None	G1/S1	1B.1	USFS:S	No	Yes
Lathyrus delnorticus	Del Norte pea	PDFAB25070	None	None	G4/S3	4.3		Yes	No
Lathyrus glandulosus	sticky pea	PDFAB251A0	None	None	G3/S3	4.3		Yes	No

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Lathyrus hitchcockianus	Bullfrog Mountain pea	PDFAB250A0	None	None	G2/S1	1B.3		No	Yes
Lathyrus japonicus	seaside pea	PDFAB250C0	None	None	G5/S2	2B.1		No	Yes
Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	G5T2/S2	1B.2		Yes	Yes
Lathyrus palustris	marsh pea	PDFAB250P0	None	None	G5/S2	2B.2		No	Yes
Lathyrus rigidus	rigid pea	PDFAB250W0	None	None	G5/S1	2B.2		No	Yes
Lathyrus splendens	pride-of-California	PDFAB250Z0	None	None	G4/S4	4.3		Yes	No
Lathyrus sulphureus var. argillaceus	dubious pea	PDFAB25101	None	None	G5T1T2Q/S1S2	3		No	Yes
Lavatera assurgentiflora ssp. assurgentiflora	island mallow	PDMAL0N021	None	None	G1T1/S1	1B.1		Yes	Yes
Lavatera assurgentiflora ssp. glabra	southern island mallow	PDMAL0N022	None	None	G1T1/S1	1B.1		Yes	Yes
Layia carnosa	beach layia	PDAST5N010	Endangered	Endangered	G2/S2	1B.1		Yes	Yes
Layia discoidea	rayless layia	PDAST5N030	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Layia heterotricha	pale-yellow layia	PDAST5N070	None	None	G2/S2	1B.1	BLM:S USFS:S	Yes	Yes
Layia jonesii	Jones' layia	PDAST5N090	None	None	G2/S2	1B.2	USFS:S	No	Yes
Layia leucopappa	Comanche Point layia	PDAST5N0A0	None	None	G1/S1	1B.1		Yes	Yes
Layia munzii	Munz's tidy-tips	PDAST5N0B0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Layia septentrionalis	Colusa layia	PDAST5N0F0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Legenere limosa	legenere	PDCAM0C010	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Lepechinia cardiophylla	heart-leaved pitcher sage	PDLAM0V020	None	None	G3/S2S3	1B.2	USFS:S	Yes	Yes
Lepechinia fragrans	fragrant pitcher sage	PDLAM0V030	None	None	G3/S3	4.2	USFS:S	Yes	No
Lepechinia ganderi	Gander's pitcher sage	PDLAM0V040	None	None	G3/S3	1B.3	BLM:S	Yes	Yes

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Lepechinia rossii	Ross' pitcher sage	PDLAM0V060	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Lepidium flavum var. felipense	Blair Valley pepper-grass	PDBRA1M0B1	None	None	G5T1/S1	1B.2		Yes	Yes
Lepidium jaredii ssp. album	Panoche pepper-grass	PDBRA1M0G2	None	None	G2G3T2T3/S2S3	1B.2	BLM:S	Yes	Yes
Lepidium jaredii ssp. jaredii	Jared's pepper-grass	PDBRA1M0G1	None	None	G2G3T1T2/S1S2	1B.2	BLM:S	Yes	Yes
Lepidium latipes var. heckardii	Heckard's pepper-grass	PDBRA1M0K1	None	None	G4T1/S1	1B.2		No	Yes
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	PDBRA1M114	None	None	G5T3/S3	4.3		No	Yes
Leptosiphon acicularis	bristly leptosiphon	PDPLM09010	None	None	G4?/S4?	4.2		No	No
Leptosiphon ambiguus	serpentine leptosiphon	PDPLM09020	None	None	G4/S4	4.2		No	No
Leptosiphon croceus	coast yellow leptosiphon	PDPLM09170	None	Endangered	G1/S1	1B.1		Yes	Yes
Leptosiphon floribundus ssp. hallii	Santa Rosa Mountains leptosiphon	PDPLM090J3	None	None	G4T1T2/S1S2	1B.3	BLM:S USFS:S	No	Yes
Leptosiphon grandiflorus	large-flowered leptosiphon	PDPLM090K0	None	None	G3G4/S3S4	4.2		No	No
Leptosiphon jepsonii	Jepson's leptosiphon	PDPLM09140	None	None	G2G3/S2S3	1B.2		Yes	Yes
Leptosiphon latisectus	broad-lobed leptosiphon	PDPLM09150	None	None	G4/S4	4.3		No	No
Leptosiphon nuttallii ssp. howellii	Mt. Tedoc leptosiphon	PDPLM090V4	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Leptosiphon oblanceolatus	Sierra Nevada leptosiphon	PDPLM090W0	None	None	G4/S4	4.3		No	No

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Leptosiphon pygmaeus ssp. pygmaeus	pygmy leptosiphon	PDPLM09102	None	None	G4T1/S1	1B.2		No	Yes
Leptosiphon rattanii	Rattan's leptosiphon	PDPLM09110	None	None	G4/S4	4.3		No	No
Leptosiphon rosaceus	rose leptosiphon	PDPLM09180	None	None	G1/S1	1B.1		No	Yes
Leptosiphon serrulatus	Madera leptosiphon	PDPLM09130	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Leptosyne hamiltonii	Mt. Hamilton coreopsis	PDAST2L0C0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Leptosyne maritima	sea dahlia	PDAST2L0L0	None	None	G2/S1S2	2B.2		Yes	Yes
Lessingia arachnoidea	Crystal Springs lessingia	PDAST5S0C0	None	None	G2/S2	1B.2		Yes	Yes
Lessingia germanorum	San Francisco lessingia	PDAST5S010	Endangered	Endangered	G1/S1	1B.1		No	Yes
Lessingia glandulifera var. tomentosa	Warner Springs lessingia	PDAST5S022	None	None	G4?T2/S2	1B.1	BLM:S USFS:S	No	Yes
Lessingia hololeuca	woolly-headed lessingia	PDAST5S030	None	None	G2G3/S2S3	3		No	No
Lessingia micradenia var. glabrata	smooth lessingia	PDAST5S062	None	None	G2T2/S2	1B.2		Yes	Yes
Lessingia micradenia var. micradenia	Tamalpais lessingia	PDAST5S063	None	None	G2T2/S2	1B.2		Yes	Yes
Lessingia tenuis	spring lessingia	PDAST5S0B0	None	None	G4/S4	4.3		No	No
Lewisia brachycalyx	short-sepaled lewisia	PDPOR04010	None	None	G4/S2	2B.2	USFS:S	No	Yes
Lewisia cantelovii	Cantelow's lewisia	PDPOR04020	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Lewisia congdonii	Congdon's lewisia	PDPOR04040	None	Rare	G2/S2	1B.3	USFS:S	No	Yes

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Lewisia cotyledon var. heckneri	Heckner's lewisia	PDPOR04052	None	None	G4T3/S3	1B.2	BLM:S	Yes	Yes
Lewisia cotyledon var. howellii	Howell's lewisia	PDPOR04053	None	None	G4T4Q/S3	3.2		No	No
Lewisia disepala	Yosemite lewisia	PDPOR04060	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Lewisia kelloggii ssp. hutchisonii	Hutchison's lewisia	PDPOR04071	None	None	G3G4T3Q/S3	3.2	USFS:S	No	No
Lewisia kelloggii ssp. kelloggii	Kellogg's lewisia	PDPOR040M1	None	None	G3G4T2T3Q/S2S3	3.2	USFS:S	No	No
Lewisia longipetala	long-petaled lewisia	PDPOR040K0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Lewisia oppositifolia	opposite-leaved lewisia	PDPOR040B0	None	None	G3/S2	2B.2	USFS:S	No	Yes
Lewisia serrata	saw-toothed lewisia	PDPOR040E0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Lewisia stebbinsii	Stebbins' lewisia	PDPOR040G0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	G2/S2	1B.1		No	Yes
Lilium bolanderi	Bolander's lily	PMLIL1A010	None	None	G4/S3S4	4.2		No	No
Lilium humboldtii ssp. humboldtii	Humboldt lily	PMLIL1A071	None	None	G4T3/S3	4.2		No	No
Lilium humboldtii ssp. ocellatum	ocellated humboldt lily	PMLIL1A072	None	None	G4T4?/S4?	4.2		Yes	No
Lilium kelloggii	Kellogg's lily	PMLIL1A0A0	None	None	G3/S3	4.3		No	No
Lilium maritimum	coast lily	PMLIL1A0C0	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Lilium occidentale	western lily	PMLIL1A0G0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	PMLIL1A0H3	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Lilium pardalinum ssp. vollmeri	Vollmer's lily	PMLIL1A0H2	None	None	G5T4/S3	4.3		No	No
Lilium pardalinum ssp. wigginsii	Wiggins' lily	PMLIL1A0S0	None	None	G5T3/S3	4.3		No	No

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Lilium parryi	lemon lily	PMLIL1A0J0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Lilium rubescens	redwood lily	PMLIL1A0N0	None	None	G3/S3	4.2		Yes	No
Lilium washingtonianum ssp. purpurascens	purple-flowered Washington lily	PMLIL1A0R2	None	None	G4T4/S3S4	4.3		No	No
Limnanthes alba ssp. parishii	Parish's meadowfoam	PDLIM02052	None	Endangered	G4T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Limnanthes bakeri	Baker's meadowfoam	PDLIM02020	None	Rare	G1/S1	1B.1		Yes	Yes
Limnanthes douglasii ssp. ornduffii	Ornduff's meadowfoam	PDLIM02039	None	None	G4T1/S1	1B.1		Yes	Yes
Limnanthes douglasii ssp. sulphurea	Point Reyes meadowfoam	PDLIM02038	None	Endangered	G4T1/S1	1B.2		No	Yes
Limnanthes floccosa ssp. bellingeriana	Bellinger's meadowfoam	PDLIM02041	None	None	G4T2T3/S1	1B.2	USFS:S	No	Yes
Limnanthes floccosa ssp. californica	Butte County meadowfoam	PDLIM02042	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Limnanthes floccosa ssp. floccosa	woolly meadowfoam	PDLIM02043	None	None	G4T4/S3	4.2		Yes	Yes
Limnanthes vinculans	Sebastopol meadowfoam	PDLIM02090	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Limosella australis	Delta mudwort	PDSCR10030	None	None	G4G5/S2	2B.1		No	Yes
Linanthus bellus	desert beauty	PDPLM09070	None	None	G2G3/S2	2B.1		Yes	Yes
Linanthus bernardinus	Pioneertown linanthus	PDPLM09190	None	None	G1/S1	1B.2		Yes	Yes
Linanthus californicus ssp. tomentosus	fuzzy prickly-phlox	PDPLM08021	None	None	G5T3/S3	4.2		No	No
Linanthus concinnus	San Gabriel linanthus	PDPLM090D0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes

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Linanthus jaegeri	San Jacinto linanthus	PDPLM08030	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Linanthus killipii	Baldwin Lake linanthus	PDPLM090N0	None	None	G1/S1	1B.2	USFS:S	Yes	Yes
Linanthus maculatus ssp. emaculatus	Jacumba Mountains linanthus	PDPLM041Y2	None	None	G2T1/S1	1B.1	BLM:S	Yes	Yes
Linanthus maculatus ssp. maculatus	Little San Bernardino Mtns. linanthus	PDPLM041Y1	None	None	G2T2/S2	1B.2	BLM:S	Yes	Yes
Linanthus orcuttii	Orcutt's linanthus	PDPLM090X0	None	None	G3/S2	1B.3	USFS:S	Yes	Yes
Linum puberulum	plains flax	PDLIN020P0	None	None	G5/S2	2B.3		Yes	Yes
Listera cordata	heart-leaved twayblade	PMORC1N060	None	None	G5/S4	4.2		No	No
Lithophragma maximum	San Clemente Island woodland star	PDSAX0M070	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lithospermum incisum	plains stoneseed	PDBOR0L070	None	None	G5/S1	2B.3		No	Yes
Loeflingia squarrosa var. artemisiarum	sagebrush loeflingia	PDCAR0E011	None	None	G5T3/S2	2B.2	BLM:S	No	Yes
Loeseliastrum depressum	depressed standing-cypress	PDPLM06040	None	None	G4/S3	4.3		No	No
Lomatium canbyi	Canby's lomatium	PDAPI1B060	None	None	G5/S3S4	4.3		No	No
Lomatium congdonii	Congdon's lomatium	PDAPI1B0B0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Lomatium engelmannii	Engelmann's lomatium	PDAPI1B0K0	None	None	G4/S3	4.3		Yes	No
Lomatium foeniculaceum ssp. inyoense	Inyo lomatium	PDAPI1B0M4	None	None	G5T3/S3	4.3		No	No

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Lomatium foeniculaceum ssp. macdougalii	Macdougal's lomatium	PDAPI1B0M5	None	None	G5T4T5/S3	2B.2		No	Yes
Lomatium grayi	Gray's lomatium	PDAPI1B0Q0	None	None	G5/S1S2	2B.3		No	Yes
Lomatium hendersonii	Henderson's lomatium	PDAPI1B0T0	None	None	G5?/S2	2B.3		No	Yes
Lomatium hooveri	Hoover's lomatium	PDAPI1B2K0	None	None	G3/S3	4.3		No	No
Lomatium howellii	Howell's lomatium	PDAPI1B0U0	None	None	G4G5/S4	4.3		No	No
Lomatium insulare	San Nicolas Island lomatium	PDAPI1B0W0	None	None	G3/S2S3	1B.2		Yes	Yes
Lomatium martindalei	Coast Range lomatium	PDAPI1B140	None	None	G5/S2	2B.3		No	Yes
Lomatium observatorium	Mt. Hamilton lomatium	PDAPI1B2J0	None	None	G1/S1	1B.2		Yes	Yes
Lomatium parvifolium	small-leaved lomatium	PDAPI1B1F0	None	None	G3/S3	4.2		Yes	No
Lomatium peckianum	Peck's lomatium	PDAPI1B1G0	None	None	G4/S1	2B.2		No	Yes
Lomatium ravenii var. paiutense	Paiute lomatium	PDAPI1B1L1	None	None	G4T4/S2?	2B.3		No	Yes
Lomatium ravenii var. ravenii	Raven's lomatium	PDAPI1B1L2	None	None	G4T2/S2	1B.3	BLM:S	No	Yes
Lomatium repostum	Napa lomatium	PDAPI1B1M0	None	None	G3/S3	4.3		Yes	No
Lomatium rigidum	stiff lomatium	PDAPI1B1N0	None	None	G3/S3	4.3		No	No
Lomatium roseanum	adobe lomatium	PDAPI1B2G0	None	None	G2G3/S2	1B.2	BLM:S USFS:S	No	Yes
Lomatium shevockii	Owens Peak lomatium	PDAPI1B2C0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Lomatium stebbinsii	Stebbins' lomatium	PDAPI1B1V0	None	None	G2/S2	1B.1	USFS:S	No	Yes
Lomatium tracyi	Tracy's lomatium	PDAPI1B1Y0	None	None	G4/S4	4.3		No	No

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Lonicera subspicata var. subspicata	Santa Barbara honeysuckle	PDCPR030R3	None	None	G5T2?/S2?	1B.2	USFS:S	No	Yes
Lupinus albifrons var. abramsii	Abrams' lupine	PDFAB2B010	None	None	G5T3?Q/S3?	3.2		No	No
Lupinus albifrons var. johnstonii	interior bush lupine	PDFAB2B1J4	None	None	G4T4/S4	4.3		No	No
Lupinus albifrons var. medius	Mountain Springs bush lupine	PDFAB2B1J5	None	None	G4T2/S2	1B.3	BLM:S	Yes	Yes
Lupinus antoninus	Anthony Peak lupine	PDFAB2B0C0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Lupinus arboreus var. eximius	San Mateo tree lupine	PDFAB2B570	None	None	G2Q/S2	3.2		No	No
Lupinus cervinus	Santa Lucia lupine	PDFAB2B0X0	None	None	G3/S3	4.3		No	No
Lupinus citrinus var. citrinus	orange lupine	PDFAB2B103	None	None	G2T2/S2	1B.2	USFS:S	No	Yes
Lupinus citrinus var. deflexus	Mariposa lupine	PDFAB2B102	None	Threatened	G2T1T2/S1S2	1B.2		No	Yes
Lupinus constancei	The Lassics lupine	PDFAB2B490	None	Endangered	G1/S1	1B.1	USFS:S	Yes	Yes
Lupinus croceus var. pilosellus	saffron-flowered lupine	PDFAB2B162	None	None	G3T3/S3	4.3		No	No
Lupinus dalesiae	Quincy lupine	PDFAB2B1A0	None	None	G3/S3	4.2		No	Yes
Lupinus duranii	Mono Lake lupine	PDFAB2B1E0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Lupinus elatus	silky lupine	PDFAB2B1F0	None	None	G4/S4	4.3		No	No
Lupinus elmeri	South Fork Mountain lupine	PDFAB2B1G0	None	None	G2/S2	1B.2		No	Yes
Lupinus gracilentus	slender lupine	PDFAB2B1R0	None	None	G3/S3	1B.3		No	Yes
Lupinus guadalupensis	Guadalupe Island lupine	PDFAB2B1T0	None	None	G3/S3	4.2		Yes	Yes
Lupinus holmgrenianus	Holmgren's lupine	PDFAB2B1Y0	None	None	G2/S2	2B.3		No	Yes

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Lupinus lapidicola	Heller's Mt. Eddy lupine	PDFAB2B280	None	None	G4/S4	4.3		No	No
Lupinus latifolius var. barbatus	bearded lupine	PDFAB2B29H	None	None	G5T2Q/S2	3.2	USFS:S	No	Yes
Lupinus lepidus var. culbertsonii	Hockett Meadows lupine	PDFAB2B171	None	None	G5T3/S3	1B.3	USFS:S	No	Yes
Lupinus lepidus var. utahensis	stemless lupine	PDFAB2B0V2	None	None	G5T5?/S3	4.3		No	No
Lupinus ludovicianus	San Luis Obispo County lupine	PDFAB2B2G0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Lupinus magnificus var. glarecola	Coso Mountains lupine	PDFAB2B2K1	None	None	G3T4/S4	4.3		No	No
Lupinus magnificus var. hesperius	Mcgee Meadows lupine	PDFAB2B2K2	None	None	G3T1Q/S1	1B.3	BLM:S	No	Yes
Lupinus magnificus var. magnificus	Panamint Mountains lupine	PDFAB2B2K3	None	None	G3T3/S3	1B.2	BLM:S	No	Yes
Lupinus milo-bakeri	Milo Baker's lupine	PDFAB2B4E0	None	Threatened	G1Q/S1	1B.1		Yes	Yes
Lupinus nevadensis	Nevada lupine	PDFAB2B500	None	None	G4/S4	4.3		No	No
Lupinus nipomensis	Nipomo Mesa lupine	PDFAB2B550	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Lupinus padre-crowleyi	Father Crowley's lupine	PDFAB2B2Z0	None	Rare	G2/S2	1B.2	USFS:S	No	Yes
Lupinus paynei	Payne's bush lupine	PDFAB2B580	None	None	G1Q/S1	1B.1		No	Yes
Lupinus peirsonii	Peirson's lupine	PDFAB2B330	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Lupinus pusillus var. intermontanus	intermontane lupine	PDFAB2B3B1	None	None	G5T5?/S2	2B.3		No	Yes
Lupinus sericatus	Cobb Mountain lupine	PDFAB2B3J0	None	None	G2?/S2?	1B.2	BLM:S	Yes	Yes
Lupinus spectabilis	shaggyhair lupine	PDFAB2B3P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Lupinus tidestromii	Tidestrom's lupine	PDFAB2B3Y0	Endangered	Endangered	G1/S1	1B.1		No	Yes

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Lupinus tracyi	Tracy's lupine	PDFAB2B3Z0	None	None	G4/S3	4.3		Yes	No
Lupinus uncialis	lilliput lupine	PDFAB2B410	None	None	G4/S2	2B.2	BLM:S	No	Yes
Lycium brevipes var. hassei	Santa Catalina Island desert-thorn	PDSOL0G0N0	None	None	G5T1Q/S1	3.1		No	Yes
Lycium californicum	California box-thorn	PDSOL0G050	None	None	G4/S4	4.2		Yes	No
Lycium exsertum	Arizona desert-thorn	PDSOL0G090	None	None	G4G5/S1	2B.1		No	Yes
Lycium parishii	Parish's desert-thorn	PDSOL0G0D0	None	None	G4/S1	2B.3		No	Yes
Lycium torreyi	Torrey's box-thorn	PDSOL0G0K0	None	None	G4G5/S3	4.2		No	No
Lycium verrucosum	San Nicolas Island desert-thorn	PDSOL0G0M0	None	None	GXQ/SX	1A		No	Yes
Lycopodiella inundata	inundated bog-clubmoss	PPLYC03060	None	None	G5/S1	2B.2		No	Yes
Lycopodium clavatum	running-pine	PPLYC01080	None	None	G5/S3	4.1		No	Yes
Lycopus uniflorus	northern bugleweed	PDLAM0X080	None	None	G5/S4	4.3		No	No
Lyonothamnus floribundus ssp. aspleniifolius	Santa Cruz Island ironwood	PDROS12011	None	None	G3T3/S3	1B.2		Yes	Yes
Lyonothamnus floribundus ssp. floribundus	Santa Catalina Island ironwood	PDROS12012	None	None	G3T2/S2	1B.2		Yes	Yes
Lyrocarpa coulteri	Palmer's lyrepod	PDBRA1R010	None	None	G4G5/S4	4.3		No	No
Lysimachia europaea	arctic starflower	PDPRI0A020	None	None	G5/S1	2B.2		No	Yes
Lysimachia thyrsiflora	tufted loosestrife	PDPRI070S0	None	None	G5/S1?	2B.3		No	Yes

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Madia radiata	showy golden madia	PDAST650E0	None	None	G3/S3	1B.1	BLM:S	Yes	Yes
Malacothamnus abbottii	Abbott's bush-mallow	PDMAL0Q010	None	None	G1/S1	1B.1		No	Yes
Malacothamnus aboriginum	Indian Valley bush-mallow	PDMAL0Q020	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Malacothamnus arcuatus	arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q/S2	1B.2		Yes	Yes
Malacothamnus clementinus	San Clemente Island bush-mallow	PDMAL0Q030	Endangered	Endangered	G2G3/S2S3	1B.1		Yes	Yes
Malacothamnus davidsonii	Davidson's bush-mallow	PDMAL0Q040	None	None	G2/S2	1B.2		Yes	Yes
Malacothamnus fasciculatus var. catalinensis	Santa Catalina Island bush-mallow	PDMAL0Q062	None	None	G4T2Q/S2	4.2		No	No
Malacothamnus fasciculatus var. nesioticus	Santa Cruz Island bush-mallow	PDMAL0Q061	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Malacothamnus gracilis	slender bush-mallow	PDMAL0Q0J0	None	None	G1Q/S1	1B.1		Yes	Yes
Malacothamnus hallii	Hall's bush-mallow	PDMAL0Q0F0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Malacothamnus helleri	Heller's bush-mallow	PDMAL0Q0G0	None	None	G2Q/S2	3.3		No	No
Malacothamnus jonesii	Jones' bush-mallow	PDMAL0Q090	None	None	G4/S4	4.3		Yes	No
Malacothamnus mendocinensis	Mendocino bush-mallow	PDMAL0Q0D0	None	None	GXQ/SX	1A		No	Yes
Malacothamnus palmeri var. involucratus	Carmel Valley bush-mallow	PDMAL0Q0B1	None	None	G3T2Q/S2	1B.2	BLM:S USFS:S	No	Yes

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Malacothamnus palmeri var. lucianus	Arroyo Seco bush-mallow	PDMAL0Q0B2	None	None	G3T1Q/S1	1B.2	BLM:S USFS:S	Yes	Yes
Malacothamnus palmeri var. palmeri	Santa Lucia bush-mallow	PDMAL0Q0B5	None	None	G3T2Q/S2	1B.2	USFS:S	Yes	Yes
Malacothamnus parishii	Parish's bush-mallow	PDMAL0Q0C0	None	None	GXQ/SX	1A		No	Yes
Malacothrix foliosa ssp. crispifolia	wavy-leaved malacothrix	PDAST66066	None	None	G4T1/S1	1B.2		No	Yes
Malacothrix foliosa ssp. foliosa	leafy malacothrix	PDAST66064	None	None	G4T3/S3	4.2		No	No
Malacothrix foliosa ssp. philbrickii	Philbrick's malacothrix	PDAST66065	None	None	G4T1/S1	1B.2		No	Yes
Malacothrix foliosa ssp. polycephala	many-headed malacothrix	PDAST66067	None	None	G4T3/S3	4.2		Yes	No
Malacothrix incana	dunedelion	PDAST66070	None	None	G3G4/S3S4	4.3		Yes	No
Malacothrix indecora	Santa Cruz Island malacothrix	PDAST660J0	Endangered	None	G2/S2	1B.1		Yes	Yes
Malacothrix junakii	Junak's malcothrix	PDAST660Q0	None	None	G1/S1	1B.1		No	Yes
Malacothrix phaeocarpa	dusky-fruited malacothrix	PDAST66090	None	None	G3/S3	4.3		No	No
Malacothrix saxatilis var. arachnoidea	Carmel Valley malacothrix	PDAST660C2	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Malacothrix saxatilis var. saxatilis	cliff malacothrix	PDAST660C5	None	None	G5T4/S4	4.2		No	No
Malacothrix similis	Mexican malacothrix	PDAST660D0	None	None	G2G3/SH	2A		No	Yes
Malacothrix squalida	island malacothrix	PDAST660K0	Endangered	None	G1/S1	1B.1		Yes	Yes
Malaxis monophyllos var. brachypoda	white bog adder's-mouth	PMORC1R010	None	None	G4?T4/S1	2B.1	USFS:S	No	Yes
Malperia tenuis	brown turbans	PDAST67010	None	None	G4?/S2?	2B.3		Yes	Yes

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Mammillaria grahamii var. grahamii	Graham fishhook cactus	PDCAC0A021	None	None	G4T4/S2	2B.2		Yes	Yes
Marina orcuttii var. orcuttii	California marina	PDFAB2F031	None	None	G2G3T1T2/S2?	1B.3	USFS:S	Yes	Yes
Matelea parvifolia	spear-leaf matelea	PDASC0A0J0	None	None	G5/S3	2B.3	USFS:S	No	Yes
Maurandella antirrhiniflora	violet twining snapdragon	PDSCR2M010	None	None	G5/S2	2B.3		Yes	Yes
Meconella oregana	Oregon meconella	PDPAP0G030	None	None	G2G3/S2	1B.1		No	Yes
Melica spectabilis	purple onion grass	PMPOA3X0G0	None	None	G5/S4	4.3		No	No
Menodora scabra var. scabra	rough menodora	PDOLE09045	None	None	G5T4T5/S3	2B.3		Yes	Yes
Menodora spinescens var. mohavensis	Mojave menodora	PDOLE09061	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Mentzelia eremophila	solitary blazing star	PDLOA030G0	None	None	G4/S3S4	4.2		Yes	No
Mentzelia hirsutissima	hairy stickleaf	PDLOA030K0	None	None	G4?/S3	2B.3		Yes	Yes
Mentzelia inyoensis	Inyo blazing star	PDLOA032Z0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Mentzelia monoensis	Mono Craters blazing star	PDLOA032B0	None	None	G2/S2	4.3		No	No
Mentzelia polita	polished blazing star	PDLOA031D0	None	None	G2G3/S2?	1B.2	BLM:S	Yes	Yes
Mentzelia pterosperma	wing-seed blazing star	PDLOA031E0	None	None	G4/S1S2	2B.2		Yes	Yes
Mentzelia puberula	Darlington's blazing star	PDLOA031F0	None	None	G5/S2	2B.2		Yes	Yes
Mentzelia torreyi	Torrey's blazing star	PDLOA031S0	None	None	G4/S2	2B.2		No	Yes

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Mentzelia tricuspis	spiny-hair blazing star	PDLOA031T0	None	None	G4/S2	2B.1		No	Yes
Mentzelia tridentata	creamy blazing star	PDLOA031U0	None	None	G3/S3	1B.3		Yes	Yes
Mertensia bella	Oregon bluebells	PDBOR0N040	None	None	G4/S1	2B.2		No	Yes
Mertensia cusickii	Toiyabe bluebells	PDBOR0N0M0	None	None	G4?/S2	2B.2		No	Yes
Mertensia longiflora	long bluebells	PDBOR0N0D0	None	None	G4?/S2	2B.2		No	Yes
Mertensia oblongifolia var. amoena	beautiful sagebrush bluebells	PDBOR0N0G1	None	None	G5T5/S2	2B.2		No	Yes
Mertensia oblongifolia var. oblongifolia	sagebrush bluebells	PDBOR0N0G2	None	None	G5T5/S3	2B.2		No	Yes
Micranthes howellii	Howell's saxifrage	PDSAX0U0T0	None	None	G4/S3	4.3		No	No
Micranthes marshallii	Marshall's saxifrage	PDSAX0U0X0	None	None	G5/S3	4.3		No	No
Micromonolepis pusilla	dwarf monolepis	PDCHE0F020	None	None	G5/S3?	2B.3		No	Yes
Micropus amphibolus	Mt. Diablo cottonweed	PDAST6D030	None	None	G3G4/S3S4	3.2		Yes	No
Microseris borealis	northern microseris	PDAST6E030	None	None	G5/S1	2B.1		No	Yes
Microseris douglasii ssp. platycarpha	small-flowered microseris	PDAST6E062	None	None	G4T4/S4	4.2		Yes	No
Microseris laciniata ssp. detlingii	Detling's silverpuffs	PDAST6E0A1	None	None	G4T3/S1	2B.2		No	Yes
Microseris paludosa	marsh microseris	PDAST6E0D0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Microseris sylvatica	sylvan microseris	PDAST6E0E0	None	None	G4/S4	4.2		No	No
Mimulus rattanii ssp. decurtatus	Santa Cruz County monkeyflower	PDSCR1B2D2	None	None	G4T1T3Q/S1S3	4.2		Yes	No
Mimulus subsecundus	one-sided monkeyflower	PDSCR1B2K0	None	None	G3G4Q/S3S4	4.3		No	No

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Minuartia obtusiloba	alpine sandwort	PDCAR0G0N0	None	None	G5/S4	4.3		No	No
Mirabilis coccinea	red four o'clock	PDNYC0A090	None	None	G4G5/S2	2B.3		Yes	Yes
Mirabilis greenei	Greene's four o'clock	PDNYC0A0N0	None	None	G3/S3	4.2		No	No
Mirabilis tenuiloba	slender-lobed four o'clock	PDNYC0A150	None	None	G5/S4	4.3		No	No
Mitellastra caulescens	leafy-stemmed mitrewort	PDSAX0N020	None	None	G5/S4	4.2		No	Yes
Monarda pectinata	plains bee balm	PDLAM170A0	None	None	G5/SH	2B.3		No	Yes
Monardella antonina ssp. antonina	San Antonio Hills monardella	PDLAM18011	None	None	G4T1T3Q/S1S3	3		No	No
Monardella antonina ssp. benitensis	San Benito monardella	PDLAM18012	None	None	G4T3/S3	4.3		No	No
Monardella australis ssp. cinerea	gray monardella	PDLAM18060	None	None	G4T3/S3	4.3		Yes	No
Monardella australis ssp. jokerstii	Jokerst's monardella	PDLAM18112	None	None	G4T1?/S1?	1B.1	USFS:S	No	Yes
Monardella beneolens	sweet-smelling monardella	PDLAM180U0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Monardella boydii	Boyd's monardella	PDLAM18120	None	None	G1?Q/S1?	1B.2	BLM:S	Yes	Yes
Monardella candicans	Sierra monardella	PDLAM18050	None	None	G4/S4	4.3		No	No
Monardella eremicola	Clark Mountain monardella	PDLAM18130	None	None	G3Q/S3	1B.3	BLM:S	Yes	Yes
Monardella follettii	Follett's monardella	PDLAM180W0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Monardella hypoleuca ssp. hypoleuca	white-veined monardella	PDLAM180A5	None	None	G4T3/S3	1B.3		No	Yes

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Monardella hypoleuca ssp. intermedia	intermediate monardella	PDLAM180A4	None	None	G4T2?/S2?	1B.3		No	Yes
Monardella hypoleuca ssp. lanata	felt-leaved monardella	PDLAM180A2	None	None	G4T3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Monardella leucocephala	Merced monardella	PDLAM180C0	None	None	GX/SX	1A		No	Yes
Monardella linoides ssp. oblonga	Tehachapi monardella	PDLAM180D2	None	None	G5T2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Monardella macrantha ssp. hallii	Hall's monardella	PDLAM180E1	None	None	G5T3/S3	1B.3	USFS:S	Yes	Yes
Monardella nana ssp. leptosiphon	San Felipe monardella	PDLAM180F2	None	None	G4G5T2Q/S2	1B.2	USFS:S	Yes	Yes
Monardella palmeri	Palmer's monardella	PDLAM180H0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Monardella pringlei	Pringle's monardella	PDLAM180J0	None	None	GX/SX	1A		No	Yes
Monardella robisonii	Robison's monardella	PDLAM180K0	None	None	G3/S3	1B.3	BLM:S	No	Yes
Monardella saxicola	rock monardella	PDLAM180Q1	None	None	G3/S3	4.2	USFS:S	No	No
Monardella sinuata ssp. gerryi	Gerry's curly-leaved monardella	PDLAM18163	None	None	G3T1/S1	1B.1		No	Yes
Monardella sinuata ssp. nigrescens	northern curly-leaved monardella	PDLAM18162	None	None	G3T2/S2	1B.2		Yes	Yes
Monardella sinuata ssp. sinuata	southern curly-leaved monardella	PDLAM18161	None	None	G3T2/S2	1B.2		No	Yes
Monardella stebbinsii	Stebbins' monardella	PDLAM180L0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Monardella stoneana	Jennifer's monardella	PDLAM180Y0	None	None	G2/S1	1B.2	BLM:S	Yes	Yes

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Monardella undulata ssp. arguelloensis	Point Arguello monardella	PDLAM18151	None	None	G3T1/S1	1B.1		No	Yes
Monardella undulata ssp. crispa	crisp monardella	PDLAM18070	None	None	G3T2/S2	1B.2	BLM:S	No	Yes
Monardella undulata ssp. undulata	San Luis Obispo monardella	PDLAM180X0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Monardella venosa	veiny monardella	PDLAM18082	None	None	G1/S1	1B.1		Yes	Yes
Monardella viminea	willowy monardella	PDLAM18140	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Monardella viridis	green monardella	PDLAM180Q2	None	None	G3/S3	4.3		No	No
Moneses uniflora	woodnymph	PDPYR02010	None	None	G5/S2	2B.2		No	Yes
Monolopia congdonii	San Joaquin woollythreads	PDASTA8010	Endangered	None	G2/S2	1B.2		Yes	Yes
Monolopia gracilens	woodland woollythreads	PDAST6G010	None	None	G3/S3	1B.2		No	Yes
Monotropa uniflora	ghost-pipe	PDMON03030	None	None	G5/S2	2B.2		No	Yes
Montia howellii	Howell's montia	PDPOR05070	None	None	G3G4/S2	2B.2		No	Yes
Mortonia utahensis	Utah mortonia	PDCEL09030	None	None	G4G5/S3?	4.3		Yes	No
Mucronea californica	California spineflower	PDPGN0F010	None	None	G3/S3	4.2		Yes	No
Muhlenbergia appressa	appressed muhly	PMPOA48020	None	None	G4/S3	2B.2		No	Yes
Muhlenbergia arsenei	tough muhly	PMPOA48060	None	None	G4/S2?	2B.3		No	Yes
Muhlenbergia californica	California muhly	PMPOA480A0	None	None	G4/S4	4.3		No	Yes
Muhlenbergia emersleyi	bullgrass	PMPOA480K0	None	None	G5/S1	2B.2		No	No
Muhlenbergia fragilis	delicate muhly	PMPOA480Q0	None	None	G5/S2	2B.3		No	Yes

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Muhlenbergia jonesii	Jones' muhly	PMPOA480X0	None	None	G3/S3	4.3		No	No
Muhlenbergia pauciflora	few-flowered muhly	PMPOA48170	None	None	G5/S2	2B.3		No	Yes
Muhlenbergia utilis	aparejo grass	PMPOA481X0	None	None	G4/S2S3	2B.2		No	Yes
Muilla coronata	crowned muilla	PMLIL1H020	None	None	G3/S3	4.2		No	No
Munroa squarrosa	false buffalo-grass	PMPOA49010	None	None	G5/S2	2B.2		No	Yes
Munzothamnus blairii	Blair's munzothamnus	PDAST8U0K0	None	None	G3/S3	1B.2		No	Yes
Myosurus minimus ssp. apus	little mousetail	PDRAN0H031	None	None	G5T2Q/S2	3.1		Yes	Yes
Myrica hartwegii	Sierra sweet bay	PDMCC02050	None	None	G4/S4	4.3		No	No
Myriopteris wootonii	Wooton's lace fern	PPADI090S0	None	None	G5/S2	2B.3		No	Yes
Nama demissa var. covillei	Coville's purple mat	PDHYD0A031	None	None	G5T3/S3	1B.3	BLM:S	No	Yes
Nama dichotoma var. dichotoma	forked purple mat	PDHYD0A061	None	None	G5T5?/S1	2B.3		No	Yes
Nama stenocarpa	mud nama	PDHYD0A0H0	None	None	G4G5/S1S2	2B.2		No	Yes
Nasturtium gambelii	Gambel's water cress	PDBRA270V0	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Navarretia cotulifolia	cotula navarretia	PDPLM0C040	None	None	G4/S4	4.2		No	No
Navarretia eriocephala	hoary navarretia	PDPLM0C060	None	None	G4?/S4?	4.3		No	No
Navarretia fossalis	spreading navarretia	PDPLM0C080	Threatened	None	G2/S2	1B.1		Yes	Yes
Navarretia gowenii	Lime Ridge navarretia	PDPLM0C120	None	None	G1/S1	1B.1		Yes	Yes
Navarretia heterandra	Tehama navarretia	PDPLM0C0A0	None	None	G4/S4	4.3		No	No
Navarretia jepsonii	Jepson's navarretia	PDPLM0C0D0	None	None	G4/S4	4.3		No	No

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Navarretia leucocephala ssp. bakeri	Baker's navarretia	PDPLM0C0E1	None	None	G4T2/S2	1B.1		No	Yes
Navarretia leucocephala ssp. pauciflora	few-flowered navarretia	PDPLM0C0E4	Endangered	Threatened	G4T1/S1	1B.1	BLM:S	Yes	Yes
Navarretia leucocephala ssp. plieantha	many-flowered navarretia	PDPLM0C0E5	Endangered	Endangered	G4T1/S1	1B.2		Yes	Yes
Navarretia linearifolia ssp. pinnatisecta	pinnate-leaved navarretia	PDPLM04211	None	None	G4G5T4/S4	4.3		No	No
Navarretia miwukensis	Mi-Wuk navarretia	PDPLM0C210	None	None	G1G2/S1S2	1B.2		No	Yes
Navarretia myersii ssp. deminuta	small pincushion navarretia	PDPLM0C0X2	None	None	G2T1/S1	1B.1		No	Yes
Navarretia myersii ssp. myersii	pincushion navarretia	PDPLM0C0X1	None	None	G2T2/S2	1B.1		No	Yes
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	PDPLM0C0J1	None	None	G4T3/S3	4.2		No	No
Navarretia nigelliformis ssp. radians	shining navarretia	PDPLM0C0J2	None	None	G4T2/S2	1B.2	BLM:S	No	Yes
Navarretia ojaiensis	Ojai navarretia	PDPLM0C130	None	None	G2/S2	1B.1	USFS:S	Yes	Yes
Navarretia panochensis	Panoche navarretia	PDPLM0C220	None	None	G3/S3	1B.3		No	Yes
Navarretia paradoxiclara	Patterson's navarretia	PDPLM0C150	None	None	G2/S2	1B.3	BLM:S	No	Yes
Navarretia paradoxinota	Porter's navarretia	PDPLM0C160	None	None	G2/S2	1B.3	BLM:S	No	Yes

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Navarretia peninsularis	Baja navarretia	PDPLM0C0L0	None	None	G3/S2	1B.2	USFS:S	Yes	Yes
Navarretia prolifera ssp. lutea	yellow bur navarretia	PDPLM0C0N1	None	None	G4T3/S3	4.3	USFS:S	No	No
Navarretia prostrata	prostrate vernal pool navarretia	PDPLM0C0Q0	None	None	G2/S2	1B.2		No	Yes
Navarretia rosulata	Marin County navarretia	PDPLM0C0Z0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Navarretia setiloba	Piute Mountains navarretia	PDPLM0C0S0	None	None	G2/S2	1B.1	BLM:S USFS:S	No	Yes
Navarretia subuligera	awl-leaved navarretia	PDPLM0C0U0	None	None	G4/S4	4.3		No	No
Nemacaulis denudata var. denudata	coast woolly-heads	PDPGN0G011	None	None	G3G4T2/S2	1B.2		Yes	Yes
Nemacaulis denudata var. gracilis	slender cottonheads	PDPGN0G012	None	None	G3G4T3?/S2	2B.2		No	Yes
Nemacladus calcaratus	Chimney Creek nemacladus	PDCAM0F0E0	None	None	G1/S1	1B.2	BLM:S USFS:S	Yes	Yes
Nemacladus gracilis	graceful nemacladus	PDCAM0F030	None	None	G4/S4	4.3		No	No
Nemacladus secundiflorus var. robbinsii	Robbins' nemacladus	PDCAM0F0B2	None	None	G3T2/S2	1B.2	USFS:S	No	Yes
Nemacladus secundiflorus var. secundiflorus	large-flowered nemacladus	PDCAM0F0B1	None	None	G3T3?/S3?	4.3		No	No
Nemacladus twisselmannii	Twisselmann's nemacladus	PDCAM0F0D0	None	Rare	G1/S1	1B.2	USFS:S	No	Yes
Nemophila breviflora	Great Basin nemophila	PDHYD0B020	None	None	G4G5/S3	2B.3		No	Yes

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Nemophila parviflora var. quercifolia	oak-leaved nemophila	PDHYD0B073	None	None	G5T4/S4	4.3		No	No
Neostapfia colusana	Colusa grass	PMPOA4C010	Threatened	Endangered	G1/S1	1B.1		No	Yes
Neviusia cliftonii	Shasta snow-wreath	PDROS14020	None	Candidate Endangered	G2/S2	1B.2	USFS:S	Yes	Yes
Nitrophila mohavensis	Amargosa nitrophila	PDCHE0G010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Noccaea fendleri ssp. californica	Kneeland Prairie pennycress	PDBRA2P041	Endangered	None	G5?T1/S1	1B.1		No	Yes
Nolina cismontana	chaparral nolina	PMAGA080E0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Nolina interrata	Dehesa nolina	PMAGA08070	None	Endangered	G2/S2	1B.1		Yes	Yes
Oenothera californica ssp. eurekensis	Eureka Dunes evening-primrose	PDONA0C071	Delisted	Rare	G4?T2/S2	1B.2		Yes	Yes
Oenothera cavernae	cave evening-primrose	PDONA0C090	None	None	G2G3/S1	2B.1		Yes	Yes
Oenothera cespitosa ssp. crinita	caespitose evening-primrose	PDONA0C063	None	None	G5T4/S4?	4.2		No	No
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Oenothera longissima	long-stem evening-primrose	PDONA0C0T0	None	None	G4/S1	2B.2		No	Yes
Oenothera wolfii	Wolf's evening-primrose	PDONA0C1K0	None	None	G2/S1	1B.1		Yes	Yes
Ophioglossum californicum	California adder's-tongue	PPOPH020G0	None	None	G4/S4	4.2		No	No
Ophioglossum pusillum	northern adder's-tongue	PPOPH020F0	None	None	G5/S1	2B.2	USFS:S	No	Yes
Opuntia basilaris var. brachyclada	short-joint beavertail	PDCAC0D053	None	None	G5T3/S3	1B.2	BLM:S USFS:S	Yes	Yes

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Opuntia basilaris var. treleasei	Bakersfield cactus	PDCAC0D055	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes
Opuntia fragilis	brittle prickly-pear	PDCAC0D0H0	None	None	G5/S1	2B.1		No	Yes
Opuntia wigginsii	Wiggins' cholla	PDCAC0D1P0	None	None	G3?Q/S1?	3.3		No	Yes
Opuntia xcurvispina	curved-spine beavertail	PDCAC0D270	None	None	G2G3/S1	2B.2		No	Yes
Orcuttia californica	California Orcutt grass	PMPOA4G010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	G1/S1	1B.1		No	Yes
Orcuttia pilosa	hairy Orcutt grass	PMPOA4G040	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Orcuttia tenuis	slender Orcutt grass	PMPOA4G050	Threatened	Endangered	G2/S2	1B.1		Yes	Yes
Orcuttia viscida	Sacramento Orcutt grass	PMPOA4G070	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Oreocarya roosiorum	bristlecone cryptantha	PDBOR0A2L0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Oreocarya schoolcraftii	Schoolcraft's cryptantha	PDBOR0A3H0	None	None	G3/S1	2B.2		No	Yes
Oreonana purpurascens	purple mountain-parsley	PDAPI1G020	None	None	G3/S3	1B.2	USFS:S	No	Yes
Oreonana vestita	woolly mountain-parsley	PDAPI1G030	None	None	G3/S3	1B.3	BLM:S USFS:S	Yes	Yes
Oreostemma elatum	tall alpine-aster	PDASTEA020	None	None	G2/S2	1B.2	USFS:S	No	Yes
Ornithostaphylos oppositifolia	Baja California birdbush	PDERI0W010	None	Endangered	G3/S1	2B.1		Yes	Yes
Orobanche ludoviciana var. arenosa	Suksdorf's broom-rape	PDORO04073	None	None	G5T5/S2	2B.3		No	Yes
Orobanche parishii ssp. brachyloba	short-lobed broomrape	PDORO040A2	None	None	G4?T4/S3	4.2		No	Yes

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Orobanche valida ssp. howellii	Howell's broomrape	PDORO040G1	None	None	G4T3/S3	4.3		No	No
Orobanche valida ssp. valida	Rock Creek broomrape	PDORO040G2	None	None	G4T2/S2	1B.2	USFS:S	No	Yes
Orthocarpus cuspidatus ssp. cuspidatus	Siskiyou Mountains orthocarpus	PDSCR1H081	None	None	G5T3/S3	4.3		No	No
Orthocarpus pachystachyus	Shasta orthocarpus	PDSCR1H0L0	None	None	G1/S1	1B.1		No	Yes
Oryctes nevadensis	Nevada oryctes	PDSOL0Q010	None	None	G3/S2	2B.1		No	Yes
Osmorhiza depauperata	blunt-fruited sweet-cicely	PDAPI1K050	None	None	G5/S1	2B.3		No	Yes
Oxalis suksdorfii	Suksdorf's wood-sorrel	PDOXA010U0	None	None	G4/S3	4.3		No	No
Oxytheca watsonii	Watson's oxytheca	PDPGN0J070	None	None	G3?/S1	2B.2		No	Yes
Oxytropis deflexa var. sericea	blue pendent-pod oxytrope	PDFAB2X053	None	None	G5T5/S1	2B.1		No	Yes
Oxytropis oreophila var. oreophila	rock-loving oxytrope	PDFAB2X0H3	None	None	G5T4T5/S2	2B.3	USFS:S	No	Yes
Oxytropis parryi	Parry's oxytrope	PDFAB2X0J0	None	None	G5/S4	4.3		No	No
Packera bernardina	San Bernardino ragwort	PDAST8H0E0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Packera bolanderi var. bolanderi	seacoast ragwort	PDAST8H0H1	None	None	G4T4/S2S3	2B.2		No	Yes
Packera eurycephala var. lewisrosei	Lewis Rose's ragwort	PDAST8H182	None	None	G4T2/S2	1B.2	BLM:S USFS:S	No	Yes
Packera ganderi	Gander's ragwort	PDAST8H1F0	None	Rare	G2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Packera hesperia	western ragwort	PDAST8H1L0	None	None	G3/S1	2B.2	USFS:S	No	Yes
Packera indecora	rayless mountain ragwort	PDAST8H1R0	None	None	G5/S2?	2B.2		No	Yes
Packera ionophylla	Tehachapi ragwort	PDAST8H1T0	None	None	G4/S4	4.3		No	No

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Packera layneae	Layne's ragwort	PDAST8H1V0	Threatened	Rare	G2/S2	1B.2		Yes	Yes
Packera macounii	Siskiyou Mountains ragwort	PDAST8H1Z0	None	None	G5?/S3	4.3		No	No
Palafoxia arida var. gigantea	giant spanish-needle	PDAST6T012	None	None	G5T3?/S2	1B.3	BLM:S	Yes	Yes
Panicum acuminatum var. thermale	Geysers panicum	PMPOA24028	None	Endangered	G5T2Q/S2	1B.2		No	Yes
Panicum hirticaule ssp. hirticaule	roughstalk witch grass	PMPOA4K170	None	None	G5T5/S2	2B.1		Yes	Yes
Parkinsonia microphylla	little-leaved palo verde	PDFAB2Z030	None	None	G5/S3	4.3		Yes	No
Parnassia cirrata var. cirrata	San Bernardino grass-of-Parnassus	PDSAX0P030	None	None	G5T2/S2	1B.3	USFS:S	Yes	Yes
Parnassia cirrata var. intermedia	Cascade grass-of-Parnassus	PDSAX0P044	None	None	G5T4/S3	2B.2	USFS:S	No	Yes
Parnassia parviflora	small-flowered grass-of-Parnassus	PDSAX0P0A0	None	None	G5?/S2	2B.2		No	Yes
Paronychia ahartii	Ahart's paronychia	PDCAR0L0V0	None	None	G3/S3	1B.1	BLM:S	No	Yes
Pedicularis bracteosa var. flavida	yellowish lousewort	PDSCR1K044	None	None	G5T4/S3	4.3		No	No
Pedicularis centranthera	Great Basin lousewort	PDSCR1K070	None	None	G4/S2	2B.3	BLM:S	No	Yes
Pedicularis contorta	curved-beak lousewort	PDSCR1K090	None	None	G5/S3	4.3		No	No
Pedicularis crenulata	scalloped-leaved lousewort	PDSCR1K0A0	None	None	G4/S1	2B.2		No	Yes
Pedicularis dudleyi	Dudley's lousewort	PDSCR1K0D0	None	Rare	G2/S2	1B.2	USFS:S	Yes	Yes

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Pedicularis howellii	Howell's lousewort	PDSCR1K0J0	None	None	G4/S3	4.3	USFS:S	No	No
Pediomelum castoreum	Beaver Dam breadroot	PDFAB5L050	None	None	G3/S2	1B.2	BLM:S	Yes	Yes
Pellaea truncata	spiny cliff-brake	PPADI0H0C0	None	None	G5/S3	2B.3		No	Yes
Penstemon albomarginatus	white-margined beardtongue	PDSCR1L070	None	None	G2/S1	1B.1	BLM:S	Yes	Yes
Penstemon barnebyi	Barneby's beardtongue	PDSCR1L0Q0	None	None	G3G4/S1	2B.1		No	Yes
Penstemon bicolor ssp. roseus	rosy two-toned beardtongue	PDSCR1L0S2	None	None	G3T3Q/S1	1B.1	BLM:S	Yes	Yes
Penstemon calcareus	limestone beardtongue	PDSCR1L100	None	None	G3?/S3?	1B.3		No	Yes
Penstemon californicus	California beardtongue	PDSCR1L110	None	None	G3/S2	1B.2	USFS:S	Yes	Yes
Penstemon cinereus	ashy-gray beardtongue	PDSCR1L7F0	None	None	G4Q/S4	4.3		Yes	No
Penstemon cinicola	ash beardtongue	PDSCR1L1B0	None	None	G4/S3	4.3		No	No
Penstemon clevelandii var. connatus	San Jacinto beardtongue	PDSCR1L1D2	None	None	G5T4/S3	4.3		Yes	No
Penstemon filiformis	thread-leaved beardtongue	PDSCR1L2A0	None	None	G4/S4	4.2		No	Yes
Penstemon fruticiformis var. amargosae	Amargosa beardtongue	PDSCR1L2F2	None	None	G4T3/S2	1B.3	BLM:S	Yes	Yes
Penstemon heterodoxus var. shastensis	Shasta beardtongue	PDSCR1L5Q0	None	None	G5T3/S3	4.3		Yes	No
Penstemon janishiae	Janish's beardtongue	PDSCR1L3A0	None	None	G4/S1	2B.2	BLM:S	No	Yes

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Penstemon newberryi var. sonomensis	Sonoma beardtongue	PDSCR1L483	None	None	G4T3/S3	1B.3	BLM:S	No	Yes
Penstemon pahutensis	Pahute beardtongue	PDSCR1L4H0	None	None	G3/S1	2B.3		No	Yes
Penstemon papillatus	Inyo beardtongue	PDSCR1L4L0	None	None	G3/S3	4.3		No	No
Penstemon personatus	closed-throated beardtongue	PDSCR1L4Y0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Penstemon pseudospectabilis ssp. pseudospectabilis	desert beardtongue	PDSCR1L562	None	None	G4G5T4/S3	2B.2		No	Yes
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	PDSCR1L5B1	None	None	G4T2/S2	1B.2		No	Yes
Penstemon scapoides	pinyon beardtongue	PDSCR1L5J0	None	None	G3/S3	4.3		Yes	No
Penstemon stephensii	Stephens' beardtongue	PDSCR1L5W0	None	None	G3?/S3?	1B.3	BLM:S	Yes	Yes
Penstemon sudans	Susanville beardtongue	PDSCR1L620	None	None	G4/S4	4.3	BLM:S USFS:S	No	Yes
Penstemon thompsoniae	Thompson's beardtongue	PDSCR1L670	None	None	G4/S1	2B.3		Yes	Yes
Penstemon thurberi	Thurber's beardtongue	PDSCR1L680	None	None	G5/S3	4.2		Yes	No
Penstemon tracyi	Tracy's beardtongue	PDSCR1L6A0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Penstemon utahensis	Utah beardtongue	PDSCR1L6G0	None	None	G4/S2	2B.3		No	Yes
Pentachaeta aurea ssp. allenii	Allen's pentachaeta	PDAST6X021	None	None	G4T1/S1	1B.1		No	Yes

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Pentachaeta aurea ssp. aurea	golden-rayed pentachaeta	PDAST6X022	None	None	G4T3/S3	4.2		Yes	No
Pentachaeta bellidiflora	white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Pentachaeta exilis ssp. aeolica	San Benito pentachaeta	PDAST6X041	None	None	G5T2/S2	1B.2	BLM:S USFS:S	Yes	Yes
Pentachaeta fragilis	fragile pentachaeta	PDAST6X050	None	None	G3/S3	4.3		No	No
Pentachaeta lyonii	Lyon's pentachaeta	PDAST6X060	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Perideridia bacigalupii	Bacigalupi's yampah	PDAPI1N020	None	None	G3/S3	4.2		No	No
Perideridia gairdneri ssp. gairdneri	California Gairdner's yampah	PDAPI1N062	None	None	G5T3T4/S3S4	4.2		Yes	No
Perideridia leptocarpa	narrow-seeded yampah	PDAPI1N0A0	None	None	G3Q/S3	4.3		No	No
Perideridia parishii ssp. parishii	Parish's yampah	PDAPI1N0C2	None	None	G4T3T4/S2	2B.2		No	Yes
Perideridia pringlei	adobe yampah	PDAPI1N0D0	None	None	G4/S4	4.3		Yes	No
Perityle inyoensis	Inyo rock daisy	PDAST700F0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Perityle villosa	Hanaupah rock daisy	PDAST700V0	None	None	G2/S2	1B.3		No	Yes
Petalonyx linearis	narrow-leaf sandpaper-plant	PDLOA04010	None	None	G4/S3?	2B.3		No	Yes
Petalonyx thurberi ssp. gilmanii	Death Valley sandpaper-plant	PDLOA04041	None	None	G5T2/S2	1B.3	BLM:S	No	Yes
Peteria thompsoniae	spine-noded milk vetch	PDFAB32020	None	None	G4/S1	2B.1		No	Yes
Petradoria pumila ssp. pumila	rock goldenrod	PDAST72022	None	None	G5T4/S4?	4.3		Yes	No

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Petrophytum caespitosum ssp. acuminatum	marble rockmat	PDROS18010	None	None	G5T2/S2	1B.3	USFS:S	No	Yes
Phacelia amabilis	Saline Valley phacelia	PDHYD0C040	None	None	GHQ/SH	3.3		No	Yes
Phacelia anelsonii	Aven Nelson's phacelia	PDHYD0C060	None	None	G3/S2	2B.3		Yes	Yes
Phacelia argentea	sand dune phacelia	PDHYD0C070	None	None	G2/S1	1B.1		Yes	Yes
Phacelia barnebyana	Barneby's phacelia	PDHYD0C0C0	None	None	G3?/S2	2B.3		No	Yes
Phacelia ciliata var. opaca	Merced phacelia	PDHYD0C0S2	None	None	G5TH/SH	3.2		No	Yes
Phacelia coerulea	sky-blue phacelia	PDHYD0C0U0	None	None	G5/S2	2B.3		No	Yes
Phacelia cookei	Cooke's phacelia	PDHYD0C0Y0	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Phacelia exilis	Transverse Range phacelia	PDHYD0C4Y0	None	None	G4Q/S4	4.3		Yes	No
Phacelia floribunda	many-flowered phacelia	PDHYD0C1G0	None	None	G2/S2	1B.2		No	Yes
Phacelia greenei	Scott Valley phacelia	PDHYD0C1V0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes
Phacelia gymnoclada	naked-stemmed phacelia	PDHYD0C1X0	None	None	G4/S2	2B.3		No	Yes
Phacelia hubbyi	Hubby's phacelia	PDHYD0C0R4	None	None	G4/S4	4.2		No	No
Phacelia insularis var. continentis	North Coast phacelia	PDHYD0C2B1	None	None	G2T2/S2	1B.2		Yes	Yes
Phacelia insularis var. insularis	northern Channel Islands phacelia	PDHYD0C2B2	Endangered	None	G2T1/S1	1B.2		Yes	Yes
Phacelia inundata	playa phacelia	PDHYD0C2E0	None	None	G2/S2	1B.3	BLM:S USFS:S	No	Yes
Phacelia inyoensis	Inyo phacelia	PDHYD0C2F0	None	None	G2/S2	1B.2	BLM:S USFS:S	No	Yes

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Phacelia keckii	Santiago Peak phacelia	PDHYD0C4G1	None	None	G1/S1	1B.3	USFS:S	Yes	Yes
Phacelia leonis	Siskiyou phacelia	PDHYD0C2N0	None	None	G3/S2?	1B.3		No	Yes
Phacelia mohavensis	Mojave phacelia	PDHYD0C310	None	None	G4Q/S4	4.3		Yes	No
Phacelia monoensis	Mono County phacelia	PDHYD0C4V0	None	None	G3/S2	1B.1	BLM:S USFS:S	No	Yes
Phacelia mustelina	Death Valley round-leaved phacelia	PDHYD0C330	None	None	G3/S2	1B.3		No	Yes
Phacelia nashiana	Charlotte's phacelia	PDHYD0C350	None	None	G3/S3	1B.2	BLM:S	Yes	Yes
Phacelia novenmillensis	Nine Mile Canyon phacelia	PDHYD0C3A0	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	No	Yes
Phacelia orogenes	Sierra phacelia	PDHYD0C3C0	None	None	G3/S3	4.3		No	No
Phacelia parishii	Parish's phacelia	PDHYD0C3G0	None	None	G2G3/S1	1B.1	BLM:S	Yes	Yes
Phacelia peirsoniana	Peirson's phacelia	PDHYD0C3N0	None	None	G4/S4	4.3		No	No
Phacelia perityloides var. jaegeri	Jaeger's phacelia	PDHYD0C1M0	None	None	G4T2/S2	1B.3	BLM:S	No	Yes
Phacelia phacelioides	Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Phacelia pulchella var. gooddingii	Goodding's phacelia	PDHYD0C3V1	None	None	G5T3/S2	2B.2		No	Yes
Phacelia ramosissima var. austrolitoralis	south coast branching phacelia	PDHYD0C416	None	None	G5?T3Q/S3	3.2		No	No
Phacelia sericea var. ciliosa	blue alpine phacelia	PDHYD0C4A1	None	None	G5T4T5/S3	2B.2		No	Yes
Phacelia stebbinsii	Stebbins' phacelia	PDHYD0C4D0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Phacelia stellaris	Brand's star phacelia	PDHYD0C510	None	None	G1/S1	1B.1		Yes	Yes
Phaseolus filiformis	slender-stem bean	PDFAB330P0	None	None	G5/S1	2B.1		No	Yes
Phlox dispersa	High Sierra phlox	PDPLM0D0M0	None	None	G3/S3	4.3		No	No

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Phlox dolichantha	Big Bear Valley phlox	PDPLM0D0P0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Phlox hirsuta	Yreka phlox	PDPLM0D100	Endangered	Endangered	G1/S1	1B.2		Yes	Yes
Phlox muscoides	squarestem phlox	PDPLM0D115	None	None	G4G5/S3	2B.3		No	Yes
Pholisma sonorae	sand food	PDLNN02020	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Pholistoma auritum var. arizonicum	Arizona pholistoma	PDHYD0D011	None	None	G5T4?/S3	2B.3		Yes	Yes
Physalis lobata	lobed ground-cherry	PDSOL0T010	None	None	G5/S1S2	2B.3		Yes	Yes
Physaria chambersii	Chambers' physaria	PDBRA22050	None	None	G5/S3	2B.3		Yes	Yes
Physaria kingii ssp. bernardina	San Bernardino Mountains bladderpod	PDBRA1N0W1	Endangered	None	G5T1/S1	1B.1		Yes	Yes
Physaria ludoviciana	silver bladderpod	PDBRA1N110	None	None	G5/S1	2B.2		No	Yes
Physocarpus alternans	Nevada ninebark	PDROS19010	None	None	G4/S3	2B.3		No	Yes
Picea engelmannii	Engelmann spruce	PGPIN03030	None	None	G5/S2	2B.2		No	Yes
Pickeringia montana var. tomentosa	woolly chaparral-pea	PDFAB34012	None	None	G5T3T4/S3S4	4.3		Yes	No
Pilostyles thurberi	Thurber's pilostyles	PDRAF01010	None	None	G5/S4	4.3		No	Yes
Pinguicula macroceras	horned butterwort	PDLNT01040	None	None	G4/S2	2B.2		No	Yes
Pinus contorta ssp. bolanderi	Bolander's beach pine	PGPIN04081	None	None	G5T2/S2	1B.2		No	Yes
Pinus edulis	two-needle pinyon pine	PGPIN040C0	None	None	G5/S3	3.3		No	No
Pinus longaeva	bristlecone pine	PGPIN04180	None	None	G4/S3S4	4.3		Yes	No
Pinus radiata	Monterey pine	PGPIN040V0	None	None	G1/S1	1B.1		Yes	Yes
Pinus torreyana ssp. insularis	Santa Rosa Island Torrey pine	PGPIN04151	None	None	G1T1/S1	1B.2		Yes	Yes

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Pinus torreyana ssp. torreyana	Torrey pine	PGPIN04152	None	None	G1T1/S1	1B.2		Yes	Yes
Piperia candida	white-flowered rein orchid	PMORC1X050	None	None	G3/S3	1B.2		No	Yes
Piperia colemanii	Coleman's rein orchid	PMORC1X080	None	None	G4/S4	4.3		No	No
Piperia cooperi	chaparral rein orchid	PMORC1X090	None	None	G3G4/S3S4	4.2		Yes	No
Piperia elegans ssp. decurtata	Point Reyes rein orchid	PMORC1X011	None	None	G4T1/S1	1B.1		No	Yes
Piperia leptopetala	narrow-petaled rein orchid	PMORC1X100	None	None	G4/S4	4.3		No	No
Piperia michaelii	Michael's rein orchid	PMORC1X110	None	None	G3/S3	4.2		Yes	No
Piperia yadonii	Yadon's rein orchid	PMORC1X070	Endangered	None	G1/S1	1B.1		No	Yes
Pityopus californicus	California pinefoot	PDMON05010	None	None	G4G5/S4	4.2		No	No
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	PDBOR0V061	None	None	G3T1Q/S1	1B.2	BLM:S	Yes	Yes
Plagiobothrys chorisianus var. hickmanii	Hickman's popcornflower	PDBOR0V062	None	None	G3T3Q/S3	4.2		Yes	No
Plagiobothrys diffusus	San Francisco popcornflower	PDBOR0V080	None	Endangered	G1Q/S1	1B.1		Yes	Yes
Plagiobothrys glaber	hairless popcornflower	PDBOR0V0B0	None	None	GX/SX	1A		No	Yes
Plagiobothrys glyptocarpus var. modestus	Cedar Crest popcornflower	PDBOR0V0C2	None	None	G3THQ/SH	3		No	No
Plagiobothrys hystriculus	bearded popcornflower	PDBOR0V0H0	None	None	G2/S2	1B.1		No	Yes

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Plagiobothrys lithocaryus	Mayacamas popcornflower	PDBOR0V0P0	None	None	GX/SX	1A		No	Yes
Plagiobothrys mollis var. vestitus	Petaluma popcornflower	PDBOR0V0Q2	None	None	G4?TX/SX	1A		No	Yes
Plagiobothrys nitens	shiny-nutlet popcornflower	PDBOR0V1B0	None	None	GNR/S1	2B.1		No	Yes
Plagiobothrys parishii	Parish's popcornflower	PDBOR0V0U0	None	None	G1/S1	1B.1	BLM:S USFS:S	Yes	Yes
Plagiobothrys salsus	desert popcornflower	PDBOR0V0X0	None	None	G2G3/S1	2B.2		No	Yes
Plagiobothrys strictus	Calistoga popcornflower	PDBOR0V120	Endangered	Threatened	G1/S1	1B.1		Yes	Yes
Plagiobothrys torreyi var. perplexans	chaparral popcornflower	PDBOR0V153	None	None	G4T3?/S3?	4.3		No	No
Plagiobothrys torreyi var. torreyi	Yosemite popcornflower	PDBOR0V152	None	None	G4T3Q/S3	1B.2		No	Yes
Plagiobothrys uncinatus	hooked popcornflower	PDBOR0V170	None	None	G2/S2	1B.2	USFS:S	No	Yes
Plagiobothrys verrucosus	warty popcornflower	PDBOR0V1D0	None	None	G4G5/S1	2B.1		No	Yes
Platanthera stricta	slender bog-orchid	PMORC1Y0P0	None	None	G5/S3	4.2		No	No
Platanthera yosemitensis	Yosemite bog orchid	PMORC1Y1B0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Platystemon californicus var. ciliatus	Santa Barbara Island cream cups	PDPAP0J022	None	None	G5T1Q/S1	1B.2		No	Yes
Pleuropogon californicus var. davyi	Davy's semaphore grass	PMPOA7Y012	None	None	G5T3/S3	4.3		No	No
Pleuropogon hooverianus	North Coast semaphore grass	PMPOA4Y070	None	Threatened	G2/S2	1B.1		Yes	Yes

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Pleuropogon refractus	nodding semaphore grass	PMPOA4Y080	None	None	G4/S4	4.2		No	No
Poa abbreviata ssp. marshii	Marsh's blue grass	PMPOA4Z013	None	None	G5T2/S1	2B.3		No	Yes
Poa abbreviata ssp. pattersonii	Patterson's blue grass	PMPOA4Z015	None	None	G5T5/S1	2B.3		No	Yes
Poa atropurpurea	San Bernardino blue grass	PMPOA4Z0A0	Endangered	None	G2/S2	1B.2		Yes	Yes
Poa diaboli	Diablo Canyon blue grass	PMPOA4Z390	None	None	G2/S2	1B.2		No	Yes
Poa lettermanii	Letterman's blue grass	PMPOA4Z1H0	None	None	G4/S3	2B.3		No	Yes
Poa napensis	Napa blue grass	PMPOA4Z1R0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Poa piperi	Piper's blue grass	PMPOA4Z200	None	None	G4/S3	4.3		No	No
Poa rhizomata	timber blue grass	PMPOA4Z250	None	None	G4?/S3S4	4.3		No	No
Poa sierrae	Sierra blue grass	PMPOA4Z310	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Podistera nevadensis	Sierra podistera	PDAPI1T030	None	None	G4/S4	4.3		No	No
Pogogyne abramsii	San Diego mesa mint	PDLAM1K010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Pogogyne clareana	Santa Lucia mint	PDLAM1K020	None	Endangered	G2/S2	1B.2		Yes	Yes
Pogogyne floribunda	profuse-flowered pogogyne	PDLAM1K070	None	None	G3G4/S3?	4.2		No	Yes
Pogogyne nudiuscula	Otay Mesa mint	PDLAM1K040	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Polemonium carneum	Oregon polemonium	PDPLM0E050	None	None	G3G4/S2	2B.2		No	Yes
Polemonium chartaceum	Mason's sky pilot	PDPLM0E0T0	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Polemonium eddyense	Mt. Eddy sky pilot	PDPLM0E0S0	None	None	G1/S1	1B.2		Yes	Yes

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Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	PDPLM0E0J4	None	None	G5T2/S2	1B.2		No	Yes
Poliomintha incana	frosted mint	PDLAM1L020	None	None	G5/SH	2A		No	Yes
Polyctenium fremontii var. fremontii	Fremont's combleaf	PDBRA23012	None	None	G4T4/S4	4.3		No	No
Polyctenium williamsiae	Williams' combleaf	PDBRA23030	None	None	G2Q/S1	1B.2	BLM:S USFS:S	No	Yes
Polygala acanthoclada	thorny milkwort	PDPGL02020	None	None	G4/S2S3	2B.3		No	Yes
Polygala cornuta var. fishiae	Fish's milkwort	PDPGL020B2	None	None	G5T4/S4	4.3		No	No
Polygala heterorhyncha	notch-beaked milkwort	PDPGL02270	None	None	G2/S2	2B.3		No	Yes
Polygala intermontana	intermountain milkwort	PDPGL021U0	None	None	G4/S2	2B.1		No	Yes
Polygala subspinosa	spiny milkwort	PDPGL021Q0	None	None	G4?/S3	2B.2		No	Yes
Polygonum bidwelliae	Bidwell's knotweed	PDPGN0L0C0	None	None	G4/S4	4.3		No	No
Polygonum hickmanii	Scotts Valley polygonum	PDPGN0L310	Endangered	Endangered	G1/S1	1B.1		No	Yes
Polygonum marinense	Marin knotweed	PDPGN0L1C0	None	None	G2Q/S2	3.1		No	Yes
Polygonum polygaloides ssp. esotericum	Modoc County knotweed	PDPGN0L1Y2	None	None	G4G5T3/S3	1B.3	BLM:S	No	Yes
Polystichum kruckebergii	Kruckeberg's sword fern	PPDRY0R0C0	None	None	G4/S4	4.3		No	No
Polystichum lonchitis	northern holly fern	PPDRY0R0F0	None	None	G5/S3	3		No	No

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Populus angustifolia	narrow-leaved cottonwood	PDSAL01020	None	None	G5/S2	2B.2		No	Yes
Portulaca halimoides	desert portulaca	PDPOR06040	None	None	G5/S3	4.2		Yes	No
Potamogeton epihydrus	Nuttall's ribbon-leaved pondweed	PMPOT03080	None	None	G5/S2S3	2B.2		No	Yes
Potamogeton foliosus ssp. fibrillosus	fibrous pondweed	PMPOT030B1	None	None	G5T2T4/S1S2	2B.3		No	Yes
Potamogeton praelongus	white-stemmed pondweed	PMPOT030V0	None	None	G5/S2	2B.3		No	Yes
Potamogeton robbinsii	Robbins' pondweed	PMPOT030Z0	None	None	G5/S3	2B.3		No	Yes
Potamogeton zosteriformis	eel-grass pondweed	PMPOT03160	None	None	G5/S3	2B.2		No	Yes
Potentilla basaltica	Black Rock potentilla	PDROS1B270	None	None	G1/S1	1B.3	BLM:S USFS:S	No	Yes
Potentilla concinna var. proxima	early cinquefoil	PDROS1B0F8	None	None	G5?T4T5/S1	2B.3		No	Yes
Potentilla cristae	crested potentilla	PDROS1B2F0	None	None	G2/S2	1B.3		No	Yes
Potentilla hickmanii	Hickman's cinquefoil	PDROS1B0U0	Endangered	Endangered	G1/S1	1B.1		No	Yes
Potentilla morefieldii	Morefield's cinquefoil	PDROS1B2R0	None	None	G2/S2	1B.3	USFS:S	No	Yes
Potentilla multijuga	Ballona cinquefoil	PDROS1B120	None	None	GX/SX	1A		No	Yes
Potentilla newberryi	Newberry's cinquefoil	PDROS1B130	None	None	G3G4/S2S3	2B.3		No	Yes
Potentilla pulcherrima	beautiful cinquefoil	PDROS1B2P0	None	None	G5/S1	2B.2		No	Yes
Potentilla rimicola	cliff cinquefoil	PDROS1B2G0	None	None	G2/S1	2B.3	USFS:S	Yes	Yes
Potentilla uliginosa	Cunningham Marsh cinquefoil	PDROS1B4A0	None	None	GX/SX	1A		No	Yes

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Primula pauciflora	beautiful shootingstar	PDPRI030D0	None	None	G5/S3	4.2		No	No
Proboscidea althaeifolia	desert unicorn-plant	PDPED06010	None	None	G5/S4	4.3		Yes	No
Prosartes parvifolia	Siskiyou bells	PMLIL0R014	None	None	G2/S2	1B.2	USFS:S	No	Yes
Prunus eremophila	Mojave Desert plum	PDROS1C1Q0	None	None	G2/S2	1B.2		Yes	Yes
Prunus fasciculata var. punctata	sand almond	PDROS1C0E2	None	None	G5T4/S4	4.3		No	No
Pseudobahia bahiifolia	Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Pseudobahia peirsonii	San Joaquin adobe sunburst	PDAST7P030	Threatened	Endangered	G1/S1	1B.1		Yes	Yes
Pseudognaphalium leucocephalum	white rabbit-tobacco	PDAST440C0	None	None	G4/S2	2B.2		No	Yes
Pseudorontium cyathiferum	Deep Canyon snapdragon	PDSCR2R010	None	None	G4G5/S1	2B.3		No	Yes
Pseudostellaria sierrae	Sierra starwort	PDCAR13020	None	None	G3G4/S3	4.2		No	No
Psilocarphus brevissimus var. multiflorus	Delta woolly-marbles	PDAST7R012	None	None	G4T3/S3	4.2		No	No
Psilocarphus elatior	tall woolly-marbles	PDAST7R020	None	None	G4/S2S3	4.3		No	No
Psorothamnus arborescens var. arborescens	Mojave indigo-bush	PDFAB3C011	None	None	G5T4/S4	4.3		Yes	No
Psorothamnus fremontii var. attenuatus	narrow-leaved psorothamnus	PDFAB3C031	None	None	G5T4?/S3	2B.3		No	Yes
Puccinellia howellii	Howell's alkali grass	PMPOA531A0	None	None	G1/S1	1B.1		Yes	Yes

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Puccinellia parishii	Parish's alkali grass	PMPOA530T0	None	None	G3/S1	1B.1		No	Yes
Puccinellia pumila	dwarf alkali grass	PMPOA531L0	None	None	G4?/SH	2B.2		No	Yes
Puccinellia simplex	California alkali grass	PMPOA53110	None	None	G3/S2	1B.2	BLM:S	No	Yes
Pyrrocoma lucida	sticky pyrrocoma	PDASTDT0E0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Pyrrocoma racemosa var. congesta	Del Norte pyrrocoma	PDASTDT0F4	None	None	G5T4/S2	2B.3		No	Yes
Pyrrocoma racemosa var. pinetorum	pine pyrrocoma	PDASTDT0F2	None	None	G5T3/S3	4.2		No	No
Pyrrocoma uniflora var. gossypina	Bear Valley pyrrocoma	PDASTDT0K1	None	None	G5T1/S1	1B.2	USFS:S	Yes	Yes
Quercus cedrosensis	Cedros Island oak	PDFAG05650	None	None	G3/S1	2B.2		No	Yes
Quercus dumosa	Nuttall's scrub oak	PDFAG050D0	None	None	G3/S3	1B.1	BLM:S USFS:S	Yes	Yes
Quercus durata var. gabrielensis	San Gabriel oak	PDFAG050G2	None	None	G4T3/S3	4.2		No	No
Quercus engelmannii	Engelmann oak	PDFAG050K0	None	None	G3/S3	4.2		No	No
Quercus pacifica	island scrub oak	PDFAG05620	None	None	G4/S4	4.2		No	No
Quercus parvula var. parvula	Santa Cruz Island oak	PDFAG051Q1	None	None	G4T3/S3	4.2		No	No
Quercus parvula var. tamalpaisensis	Tamalpais oak	PDFAG051Q3	None	None	G4T2/S2	1B.3		No	Yes
Quercus tomentella	island oak	PDFAG05250	None	None	G3G4/S3S4	4.2		No	No
Quercus turbinella	shrub live oak	PDFAG05270	None	None	G5/S4	4.3		No	No
Raillardella pringlei	showy raillardella	PDAST7X030	None	None	G2G3/S2S3	1B.2	USFS:S	Yes	Yes
Ranunculus hydrocharoides	frog's-bit buttercup	PDRAN0L190	None	None	G4/S1	2B.1		No	Yes

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Ranunculus lobbii	Lobb's aquatic buttercup	PDRAN0L1J0	None	None	G4/S3	4.2		No	No
Ranunculus macounii	Macoun's buttercup	PDRAN0L1M0	None	None	G5/S1	2B.2		No	Yes
Rhamnus alnifolia	alder buckthorn	PDRHA0C010	None	None	G5/S3	2B.2		No	Yes
Rhamnus pirifolia	island redberry	PDRHA0C0A0	None	None	G4/S4	4.2		Yes	No
Rhus aromatica var. simplicifolia	single-leaved skunkbrush	PDANA080B5	None	None	G5T5/S2	2B.3		No	Yes
Rhynchospora alba	white beaked-rush	PMCYP0N010	None	None	G5/S2	2B.2		No	Yes
Rhynchospora californica	California beaked-rush	PMCYP0N060	None	None	G1/S1	1B.1		No	Yes
Rhynchospora capitellata	brownish beaked-rush	PMCYP0N080	None	None	G5/S1	2B.2		No	Yes
Rhynchospora globularis	round-headed beaked-rush	PMCYP0N0W0	None	None	G4/S1	2B.1		No	Yes
Ribes amarum var. hoffmannii	Hoffmann's bitter gooseberry	PDGRO02012	None	None	G4?T3/S3	3		No	No
Ribes canthariforme	Moreno currant	PDGRO02070	None	None	G2/S2	1B.3	USFS:S	Yes	Yes
Ribes divaricatum var. parishii	Parish's gooseberry	PDGRO020F3	None	None	G5TX/SX	1A		No	Yes
Ribes hudsonianum var. petiolare	western black currant	PDGRO020N2	None	None	G5T5/S2	2B.3		No	Yes
Ribes laxiflorum	trailing black currant	PDGRO020V0	None	None	G5?/S3	4.3		No	No
Ribes marshallii	Marshall's gooseberry	PDGRO020Z0	None	None	G4/S4	4.3		No	No
Ribes menziesii var. ixoderme	aromatic canyon gooseberry	PDGRO02104	None	None	G4T2/S2	1B.2		No	Yes
Ribes roezlii var. amictum	hoary gooseberry	PDGRO021B1	None	None	G5T4/S4	4.3		No	No
Ribes sericeum	Santa Lucia gooseberry	PDGRO021F0	None	None	G4/S4	4.3		No	No

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Ribes thacherianum	Santa Cruz Island gooseberry	PDGRO02109	None	None	G2/S2	1B.2		Yes	Yes
Ribes tularense	Sequoia gooseberry	PDGRO021L0	None	None	G1/S1	1B.3	BLM:S	No	Yes
Ribes viburnifolium	Santa Catalina Island currant	PDGRO021P0	None	None	G2?/S2?	1B.2		Yes	Yes
Ribes victoris	Victor's gooseberry	PDGRO021Q0	None	None	G3G4/S3S4	4.3		No	No
Robinia neomexicana	New Mexico locust	PDFAB3G070	None	None	G4/S1	2B.3		No	Yes
Romanzoffia tracyi	Tracy's romanzoffia	PDHYD0E030	None	None	G4/S2	2B.3		No	Yes
Romneya coulteri	Coulter's matilija poppy	PDPAP0L010	None	None	G4/S4	4.2		Yes	No
Rorippa columbiae	Columbia yellow cress	PDBRA27060	None	None	G3/S2	1B.2	USFS:S	No	Yes
Rorippa subumbellata	Tahoe yellow cress	PDBRA270M0	None	Endangered	G1/S1	1B.1	USFS:S	Yes	Yes
Rosa gymnocarpa var. serpentina	Gasquet rose	PDROS1J1V1	None	None	G5T3T4/S2	1B.3		Yes	Yes
Rosa minutifolia	small-leaved rose	PDROS1J1B0	None	Endangered	G2G3/SXC	2B.1		Yes	Yes
Rosa pinetorum	pine rose	PDROS1J0W0	None	None	G2/S2	1B.2		No	Yes
Rosa woodsii var. glabrata	Cushenbury rose	PDROS1J191	None	None	G5T1/S1	1B.1		No	Yes
Rubus glaucifolius var. ganderi	Cuyamaca raspberry	PDROS1K2N1	None	None	G5T1Q/S1	3.1		No	Yes
Rubus nivalis	snow dwarf bramble	PDROS1K4S0	None	None	G4?/S1	2B.3		No	Yes
Rumex venosus	winged dock	PDPGN0P1K0	None	None	G5?/S3	2B.3		No	Yes
Rupertia hallii	Hall's rupertia	PDFAB62010	None	None	G2G3/S2S3	1B.2	BLM:S USFS:S	No	Yes
Rupertia rigida	Parish's rupertia	PDFAB62030	None	None	G4/S4	4.3		No	No

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Sabulina decumbens	The Lassics sandwort	PDCAR0G0Y0	None	None	G1/S1	1B.2	USFS:S	No	Yes
Sabulina howellii	Howell's sandwort	PDCAR0G0F0	None	None	G4/S3	1B.3		No	Yes
Sabulina rosei	peanut sandwort	PDCAR0G0R0	None	None	G3/S3	4.2	USFS:S	No	No
Sabulina stolonifera	Scott Mountain sandwort	PDCAR0G110	None	None	G2/S2	1B.3	USFS:S	No	Yes
Sabulina stricta	bog sandwort	PDCAR0G0U0	None	None	G5/S3	2B.3		No	Yes
Sagittaria sanfordii	Sanford's arrowhead	PMALI040Q0	None	None	G3/S3	1B.2	BLM:S	No	Yes
Salix bebbiana	Bebb's willow	PDSAL020E0	None	None	G5/S2S3	2B.3		No	Yes
Salix brachycarpa var. brachycarpa	short-fruited willow	PDSAL02531	None	None	G5T5/S2	2B.3		No	Yes
Salix delnortensis	Del Norte willow	PDSAL023F0	None	None	G4/S4	4.3		No	No
Salix nivalis	snow willow	PDSAL024K0	None	None	G5/S2	2B.3		No	Yes
Saltugilia caruifolia	caraway-leaved woodland-gilia	PDPLM040C0	None	None	G4/S4	4.3		Yes	No
Saltugilia latimeri	Latimer's woodland-gilia	PDPLM0H010	None	None	G3/S3	1B.2	BLM:S USFS:S	Yes	Yes
Salvia brandegeei	Brandegee's sage	PDLAM1S080	None	None	G3/S2	1B.2		Yes	Yes
Salvia dorrii var. incana	fleshy sage	PDLAM1S0G8	None	None	G5T4/S2	3		No	No
Salvia eremostachya	desert sage	PDLAM1S0K0	None	None	G4/S3	4.3		Yes	No
Salvia funerea	Death Valley sage	PDLAM1S0M0	None	None	G4/S4	4.3		No	No
Salvia greatae	Orocopia sage	PDLAM1S0P0	None	None	G2G3/S2S3	1B.3	BLM:S	Yes	Yes
Salvia munzii	Munz's sage	PDLAM1S140	None	None	G2/S2	2B.2		Yes	Yes
Sanguisorba officinalis	great burnet	PDROS1L060	None	None	G5?/S2	2B.2		No	Yes
Sanicula hoffmannii	Hoffmann's sanicle	PDAPI1Z090	None	None	G3/S3	4.3		Yes	No
Sanicula maritima	adobe sanicle	PDAPI1Z0D0	None	Rare	G2/S2	1B.1	USFS:S	Yes	Yes
Sanicula peckiana	Peck's sanicle	PDAPI1Z0E0	None	None	G4/S3	4.3		No	No
Sanicula saxatilis	rock sanicle	PDAPI1Z0H0	None	Rare	G2/S2	1B.2		No	Yes

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Sanicula tracyi	Tracy's sanicle	PDAPI1Z0K0	None	None	G4/S4	4.2	USFS:S	No	Yes
Sanvitalia abertii	Abert's sanvitalia	PDAST89010	None	None	G5/S2S3	2B.2		Yes	Yes
Sarcobatus baileyi	Bailey's greasewood	PDCHE0L020	None	None	G4/S1	2B.3		No	Yes
Saussurea americana	American saw-wort	PDAST8B020	None	None	G5/S1	2B.2		No	Yes
Saxifraga cespitosa	tufted saxifrage	PDSAX0U0C0	None	None	G5/S1	2B.3		No	Yes
Scheuchzeria palustris	American scheuchzeria	PMSCH02010	None	None	G5/S1	2B.1	USFS:S	No	Yes
Schoenoplectus heterochaetus	slender bulrush	PMCYP0Q0T0	None	None	G5/S1	2B.1		No	Yes
Schoenoplectus subterminalis	water bulrush	PMCYP0Q1G0	None	None	G4G5/S3	2B.3		No	Yes
Schoenus nigricans	black bog-rush	PMCYP0P010	None	None	G4/S2	2B.2	USFS:S	No	Yes
Scirpus pendulus	pendulous bulrush	PMCYP0Q160	None	None	G5/S1	2B.2		No	Yes
Sclerocactus johnsonii	Johnson's bee-hive cactus	PDCAC0J0H0	None	None	G3/S2	2B.2		Yes	Yes
Sclerocactus polyancistrus	Mojave fish-hook cactus	PDCAC0J050	None	None	G3/S3	4.2		Yes	No
Scleropogon brevifolius	burro grass	PMPOA5G010	None	None	G5/S1S2	2B.3		No	Yes
Scrophularia atrata	black-flowered figwort	PDSCR1S010	None	None	G2?/S2?	1B.2		Yes	Yes
Scrophularia villosa	Santa Catalina figwort	PDSCR1S0D0	None	None	G3/S3	1B.2		Yes	Yes
Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	PDLAM1U0A1	None	None	G4T3/S3	1B.2	USFS:S	Yes	Yes
Scutellaria galericulata	marsh skullcap	PDLAM1U0J0	None	None	G5/S2	2B.2		No	Yes
Scutellaria holmgreniorum	Holmgren's skullcap	PDLAM1U1C0	None	None	G3Q/S3	3.3		No	Yes

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Scutellaria lateriflora	side-flowering skullcap	PDLAM1U0Q0	None	None	G5/S2	2B.2		No	Yes
Sedella leiocarpa	Lake County stonecrop	PDCRA0F020	Endangered	Endangered	G1/S1	1B.1		No	Yes
Sedum albomarginatum	Feather River stonecrop	PDCRA0A030	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Sedum citrinum	Blue Creek stonecrop	PDCRA0A200	None	None	G2/S2	1B.2		No	Yes
Sedum divergens	Cascade stonecrop	PDCRA0A0B0	None	None	G5?/S2	2B.3		No	Yes
Sedum laxum ssp. eastwoodiae	Red Mountain stonecrop	PDCRA0A0L1	None	None	G5T2/S2	1B.2	BLM:S	No	Yes
Sedum laxum ssp. flavidum	pale yellow stonecrop	PDCRA0A0L2	None	None	G5T3Q/S3	4.3		No	Yes
Sedum laxum ssp. heckneri	Heckner's stonecrop	PDCRA0A0L3	None	None	G5T4Q/S4	4.3		No	No
Sedum niveum	Davidson's stonecrop	PDCRA0A0R0	None	None	G3/S3	4.2	USFS:S	Yes	No
Sedum oblanceolatum	Applegate stonecrop	PDCRA0A0T0	None	None	G3/S1	1B.1		Yes	Yes
Sedum obtusatum ssp. paradisum	Canyon Creek stonecrop	PDCRA0A0U3	None	None	G4G5T3/S3	1B.3	BLM:S USFS:S	No	Yes
Sedum pinetorum	Pine City sedum	PDCRA0A0Z0	None	None	GUGHQ/SUSH	3		No	No
Selaginella asprella	bluish spike-moss	PPSEL01060	None	None	G4/S4	4.3		No	No
Selaginella cinerascens	ashy spike-moss	PPSEL01090	None	None	G3G4/S3	4.1		No	No
Selaginella eremophila	desert spike-moss	PPSEL010G0	None	None	G4/S2S3	2B.2		No	Yes
Selaginella leucobryoides	Mojave spike-moss	PPSEL010P0	None	None	G4/S3S4	4.3		No	No
Selaginella scopulorum	Rocky Mountain spike-moss	PPSEL010C2	None	None	G4G5/S2S3	3		No	No
Senecio aphanactis	chaparral ragwort	PDAST8H060	None	None	G3/S2	2B.2		Yes	Yes

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Senecio astephanus	San Gabriel ragwort	PDAST8H090	None	None	G3/S3	4.3		Yes	No
Senecio blochmaniae	Blochman's ragwort	PDAST8H0G0	None	None	G3/S3	4.2		No	No
Senecio clevelandii var. clevelandii	Cleveland's ragwort	PDAST8H0R1	None	None	G4?T3Q/S3	4.3		No	No
Senecio clevelandii var. heterophyllus	Red Hills ragwort	PDAST8H0R2	None	None	G4?T2Q/S2	1B.2	BLM:S	No	Yes
Senecio hydrophiloides	sweet marsh ragwort	PDAST8H400	None	None	G5/S3	4.2		No	No
Senecio pattersonensis	Mt. Patterson senecio	PDAST8H2C0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Senna covesii	Cove's cassia	PDFAB491X0	None	None	G5/S3	2B.2		Yes	Yes
Shepherdia canadensis	Canadian buffalo-berry	PDELG03020	None	None	G5/S1	2B.1		No	Yes
Sibara deserti	desert winged-rockcress	PDBRA2A010	None	None	G4/S4	4.3		No	No
Sibara filifolia	Santa Cruz Island winged-rockcress	PDBRA2A020	Endangered	None	G2/S2	1B.1		Yes	Yes
Sibaropsis hammittii	Hammitt's clay-cress	PDBRA32010	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	PDMAL11012	None	None	G5T2/S2	1B.2		No	Yes
Sidalcea celata	Redding checkerbloom	PDMAL110FG	None	None	G2G3/S2S3	3		No	No
Sidalcea covillei	Owens Valley checkerbloom	PDMAL11040	None	Endangered	G2/S2	1B.1	BLM:S	No	Yes
Sidalcea elegans	Del Norte checkerbloom	PDMAL110F5	None	None	G4?/S2?	3.3		No	No
Sidalcea gigantea	giant checkerbloom	PDMAL110T0	None	None	G3/S3	4.3		No	No

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Sidalcea hickmanii ssp. anomala	Cuesta Pass checkerbloom	PDMAL110A1	None	Rare	G3T1/S1	1B.2	USFS:S	Yes	Yes
Sidalcea hickmanii ssp. hickmanii	Hickman's checkerbloom	PDMAL110A2	None	None	G3T2/S2	1B.3	USFS:S	Yes	Yes
Sidalcea hickmanii ssp. napensis	Napa checkerbloom	PDMAL110A6	None	None	G3T1/S1	1B.1		Yes	Yes
Sidalcea hickmanii ssp. parishii	Parish's checkerbloom	PDMAL110A3	None	Rare	G3T1/S1	1B.2	USFS:S	Yes	Yes
Sidalcea hickmanii ssp. pillsburiensis	Lake Pillsbury checkerbloom	PDMAL110A5	None	None	G3T1/S1	1B.2	USFS:S	No	Yes
Sidalcea hickmanii ssp. viridis	Marin checkerbloom	PDMAL110A4	None	None	G3TH/SH	1B.1		No	Yes
Sidalcea keckii	Keck's checkerbloom	PDMAL110D0	Endangered	None	G2/S2	1B.1		Yes	Yes
Sidalcea malachroides	maple-leaved checkerbloom	PDMAL110E0	None	None	G3/S3	4.2		No	Yes
Sidalcea malviflora ssp. dolosa	Bear Valley checkerbloom	PDMAL110FH	None	None	G5T2/S2	1B.2	USFS:S	Yes	Yes
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2/S2	1B.2		No	Yes
Sidalcea malviflora ssp. purpurea	purple-stemmed checkerbloom	PDMAL110FL	None	None	G5T1/S1	1B.2	BLM:S	No	Yes
Sidalcea multifida	cut-leaf checkerbloom	PDMAL110G0	None	None	G3/S2	2B.3		Yes	Yes
Sidalcea neomexicana	salt spring checkerbloom	PDMAL110J0	None	None	G4/S2	2B.2	USFS:S	No	Yes
Sidalcea oregana ssp. eximia	coast checkerbloom	PDMAL110K9	None	None	G5T1/S1	1B.2		No	Yes
Sidalcea oregana ssp. hydrophila	marsh checkerbloom	PDMAL110K2	None	None	G5T2/S2	1B.2		No	Yes
Sidalcea oregana ssp. valida	Kenwood Marsh checkerbloom	PDMAL110K5	Endangered	Endangered	G5T1/S1	1B.1		Yes	Yes

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Sidalcea pedata	bird-foot checkerbloom	PDMAL110L0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Sidalcea robusta	Butte County checkerbloom	PDMAL110P0	None	None	G2/S2	1B.2	BLM:S	No	Yes
Sidalcea stipularis	Scadden Flat checkerbloom	PDMAL110R0	None	Endangered	G1/S1	1B.1		Yes	Yes
Sidotheca caryophylloides	chickweed oxytheca	PDPGN0J010	None	None	G4/S4	4.3	USFS:S	No	No
Sidotheca emarginata	white-margined oxytheca	PDPGN0J030	None	None	G3/S3	1B.3	USFS:S	Yes	Yes
Silene aperta	Tulare campion	PDCAR0U050	None	None	G4/S4	4.3		No	No
Silene campanulata ssp. campanulata	Red Mountain catchfly	PDCAR0U0A2	None	Endangered	G5T3Q/S3	4.2	BLM:S	No	Yes
Silene krantzii	Krantz's catchfly	PDCAR0U2H0	None	None	G1/S1	1B.2		Yes	Yes
Silene marmorensis	Marble Mountain campion	PDCAR0U0Z0	None	None	G2/S2	1B.2		No	Yes
Silene occidentalis ssp. longistipitata	long-stiped campion	PDCAR0U161	None	None	G4T2Q/S2	1B.2	USFS:S	No	Yes
Silene occidentalis ssp. occidentalis	western campion	PDCAR0U162	None	None	G4T3/S3	4.3		No	No
Silene oregana	Oregon campion	PDCAR0U170	None	None	G4/S2	2B.2		No	Yes
Silene salmonacea	Klamath Mountain catchfly	PDCAR0U2D0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Silene scouleri ssp. scouleri	Scouler's catchfly	PDCAR0U1MC	None	None	G5T4T5/S2S3	2B.2		No	Yes
Silene serpentinicola	serpentine catchfly	PDCAR0U2B0	None	None	G3/S3	1B.2	USFS:S	No	Yes
Silene suksdorfii	Cascade alpine campion	PDCAR0U1W0	None	None	G4/S3	2B.3		No	Yes
Silene verecunda ssp. verecunda	San Francisco campion	PDCAR0U213	None	None	G5T1/S1	1B.2		Yes	Yes

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Sisyrinchium funereum	Death Valley blue-eyed grass	PMIRI0D0L0	None	None	G2/S2	1B.3		Yes	Yes
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass	PMIRI0D0S0	None	None	G2/S1	1B.1		No	Yes
Sisyrinchium longipes	timberland blue-eyed grass	PMIRI0D0Y0	None	None	G3G4/S1	2B.2	USFS:S	No	Yes
Smelowskia ovalis	alpine smelowskia	PDBRA2D040	None	None	G5/S1	1B.2		No	Yes
Smilax jamesii	English Peak greenbrier	PMSMI010D0	None	None	G3G4/S3S4	4.2		No	Yes
Solanum clokeyi	island nightshade	PDSOL0Z450	None	None	G3/S3	4.2		No	No
Solanum wallacei	Wallace's nightshade	PDSOL0Z280	None	None	G3Q/S2	1B.1		Yes	Yes
Solidago guiradonis	Guirado's goldenrod	PDAST8P0T0	None	None	G3/S3	4.3		No	No
Solidago lepida var. salebrosa	Rocky Mountains Canada goldenrod	PDAST8P2D3	None	None	G5T5/S1	3.2		No	Yes
Sparganium natans	small bur-reed	PMSPA01090	None	None	G5/S3	4.3		No	No
Spartina gracilis	alkali cord grass	PMPOA5S060	None	None	G5/S3	4.2		No	No
Spergularia canadensis var. occidentalis	western sand-spurrey	PDCAR0W032	None	None	G5T4/S1	2B.1		No	Yes
Spergularia macrotheca var. longistyla	long-styled sand-spurrey	PDCAR0W062	None	None	G5T2/S2	1B.2		No	Yes
Spermolepis gigantea	desert scaleseed	PDAPI05020	None	None	G2G3/SH	2B.1		No	Yes
Spermolepis infernensis	Hellhole scaleseed	PDAPI23070	None	None	G1/S1	1B.2		Yes	Yes
Spermolepis lateriflora	western bristly scaleseed	PDAPI23080	None	None	G5/SH	2A		No	Yes
Sphaeralcea grossulariifolia	currant-leaved desert mallow	PDMAL14090	None	None	G4G5/S2	2B.3		No	Yes

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Sphaeralcea munroana	Munro's desert mallow	PDMAL140F0	None	None	G4/S1	2B.2		No	Yes
Sphaeralcea rusbyi var. eremicola	Rusby's desert-mallow	PDMAL140L1	None	None	G4T2/S2	1B.2	BLM:S	Yes	Yes
Sphaeromeria potentilloides var. nitrophila	alkali tansy-sage	PDAST8S061	None	None	G5T4?/S2	2B.2		No	Yes
Sphenopholis obtusata	prairie wedge grass	PMPOA5T030	None	None	G5/S2	2B.2		No	Yes
Stachys pilosa	hairy marsh hedge-nettle	PDLAM1X1A0	None	None	G5/S3	2B.3		No	Yes
Stanleya viridiflora	green-flowered prince's plume	PDBRA2E060	None	None	G4/S2	2B.3		No	Yes
Stebbinsoseris decipiens	Santa Cruz microseris	PDAST6E050	None	None	G2/S2	1B.2		Yes	Yes
Stellaria littoralis	beach starwort	PDCAR0X0L0	None	None	G3/S3	4.2		No	No
Stellaria longifolia	long-leaved starwort	PDCAR0X0M0	None	None	G5/S2	2B.2		No	Yes
Stellaria obtusa	obtuse starwort	PDCAR0X0U0	None	None	G5/S4	4.3		No	Yes
Stemodia durantifolia	purple stemodia	PDSCR1U010	None	None	G5/S2	2B.1		Yes	Yes
Stenotus lanuginosus var. lanuginosus	woolly stenotus	PDASTCX012	None	None	G5T5/S3	2B.2	BLM:S	No	Yes
Stipa arida	Mormon needle grass	PMPOA5X010	None	None	G5/S3?	2B.3		Yes	Yes
Stipa diegoensis	San Diego County needle grass	PMPOA5X0B0	None	None	G4/S4	4.2		Yes	No
Stipa divaricata	small-flowered rice grass	PMPOA4J070	None	None	G5/S2	2B.3		No	Yes
Stipa exigua	little ricegrass	PMPOA80030	None	None	G4G5/S2	2B.3	BLM:S	No	Yes

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Stipa lemmonii var. pubescens	pubescent needle grass	PMPOA5X0F2	None	None	G5T1?Q/S1?	3.2		No	No
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	PDBRA2G011	Endangered	None	G2T1/S1	1B.1		Yes	Yes
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	PDBRA2G012	None	None	G2T2/S2	1B.2	USFS:S	Yes	Yes
Streptanthus barbiger	bearded jewelflower	PDBRA2G040	None	None	G3/S3	4.2		Yes	No
Streptanthus batrachopus	Tamalpais jewelflower	PDBRA2G050	None	None	G2/S2	1B.3		Yes	Yes
Streptanthus bernardinus	Laguna Mountains jewelflower	PDBRA2G060	None	None	G3G4/S3S4	4.3		Yes	Yes
Streptanthus brachiatus ssp. brachiatus	Socrates Mine jewelflower	PDBRA2G072	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus brachiatus ssp. hoffmanii	Freed's jewelflower	PDBRA2G071	None	None	G2T2/S2	1B.2	BLM:S	No	Yes
Streptanthus callistus	Mt. Hamilton jewelflower	PDBRA2G0A0	None	None	G1G2/S1S2	1B.3		No	Yes
Streptanthus campestris	southern jewelflower	PDBRA2G0B0	None	None	G3/S3	1B.3	BLM:S USFS:S	No	Yes
Streptanthus cordatus var. piutensis	Piute Mountains jewelflower	PDBRA2G0D2	None	None	G5T1/S1	1B.2	BLM:S USFS:S	Yes	Yes
Streptanthus drepanoides	sickle-fruit jewelflower	PDBRA2G200	None	None	G4/S4	4.3		No	No
Streptanthus farnsworthianus	Farnsworth's jewelflower	PDBRA2G0G0	None	None	G4/S4	4.3		Yes	No
Streptanthus fenestratus	Tehipite Valley jewelflower	PDBRA2G0H0	None	None	G2/S2	1B.1	USFS:S	No	Yes

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Streptanthus glandulosus ssp. hoffmanii	Hoffman's bristly jewelflower	PDBRA2G0J4	None	None	G4T2/S2	1B.3		Yes	Yes
Streptanthus glandulosus ssp. niger	Tiburon jewelflower	PDBRA2G0T0	Endangered	Endangered	G4T1/S1	1B.1		Yes	Yes
Streptanthus glandulosus ssp. pulchellus	Mt. Tamalpais bristly jewelflower	PDBRA2G0J2	None	None	G4T2/S2	1B.2		Yes	Yes
Streptanthus gracilis	alpine jewelflower	PDBRA2G0K0	None	None	G3/S3	1B.3	USFS:S	No	Yes
Streptanthus hesperidis	green jewelflower	PDBRA2G510	None	None	G2G3/S2S3	1B.2	BLM:S	No	Yes
Streptanthus hispidus	Mt. Diablo jewelflower	PDBRA2G0M0	None	None	G2/S2	1B.3		No	Yes
Streptanthus howellii	Howell's jewelflower	PDBRA2G0N0	None	None	G2G3/S2	1B.2	USFS:S	No	Yes
Streptanthus insignis ssp. lyonii	Arburua Ranch jewelflower	PDBRA2G0Q1	None	None	G3G4T2/S2	1B.2	BLM:S	No	Yes
Streptanthus longisiliquus	long-fruit jewelflower	PDBRA2G400	None	None	G3/S3	4.3		No	No
Streptanthus morrisonii ssp. elatus	Three Peaks jewelflower	PDBRA2G0S1	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus morrisonii ssp. hirtiflorus	Dorr's Cabin jewelflower	PDBRA2G0S2	None	None	G2T1/S1	1B.2		No	Yes
Streptanthus morrisonii ssp. kruckebergii	Kruckeberg's jewelflower	PDBRA2G0S4	None	None	G2T1/S1	1B.2	BLM:S	No	Yes
Streptanthus morrisonii ssp. morrisonii	Morrison's jewelflower	PDBRA2G0S3	None	None	G2T1?/S1?	1B.2	BLM:S	No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Streptanthus oblanceolatus	Trinity River jewelflower	PDBRA2G500	None	None	G1/S1	1B.2	USFS:S	No	Yes
Streptanthus oliganthus	Masonic Mountain jewelflower	PDBRA2G0V0	None	None	G3/S3	1B.2	BLM:S USFS:S	No	Yes
Streptanthus tortuosus ssp. truei	True's mountain jewelflower	PDBRA2G108	None	None	G5T1T2/S1S2	1B.1		No	Yes
Streptanthus vernalis	early jewelflower	PDBRA2G120	None	None	G1/S1	1B.2	BLM:S	No	Yes
Stuckenia filiformis ssp. alpina	slender-leaved pondweed	PMPOT03091	None	None	G5T5/S2S3	2B.2		No	Yes
Stylocline citroleum	oil neststraw	PDAST8Y070	None	None	G3/S3	1B.1	BLM:S	No	Yes
Stylocline masonii	Mason's neststraw	PDAST8Y080	None	None	G1/S1	1B.1	USFS:S	No	Yes
Stylocline sonorensis	mesquite neststraw	PDAST8Y060	None	None	G3G5/SX	2A		No	Yes
Suaeda californica	California seablite	PDCHE0P020	Endangered	None	G1/S1	1B.1		No	Yes
Suaeda esteroa	estuary seablite	PDCHE0P0D0	None	None	G3/S2	1B.2		No	Yes
Suaeda occidentalis	western seablite	PDCHE0P080	None	None	G5/S2	2B.3		No	Yes
Suaeda taxifolia	woolly seablite	PDCHE0P0L0	None	None	G4/S4	4.2		Yes	No
Subularia aquatica ssp. americana	water awlwort	PDBRA2H012	None	None	G5T5/S4	4.3		No	No
Swallenia alexandrae	Eureka Valley dune grass	PMPOA5Y010	Threatened	Rare	G2/S2	1B.2		Yes	Yes
Symphyotrichum defoliatum	San Bernardino aster	PDASTE80C0	None	None	G2/S2	1B.2	USFS:S	Yes	Yes
Symphyotrichum greatae	Greata's aster	PDASTE80U0	None	None	G2/S2	1B.3		Yes	Yes
Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	G2/S2	1B.2		Yes	Yes
Synthyris missurica ssp. missurica	kitten-tails	PDSCR1W042	None	None	G4G5T4T5/S3	2B.3		Yes	Yes
Syntrichopappus lemmonii	Lemmon's syntrichopappus	PDAST90020	None	None	G4/S4	4.3		Yes	No

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Systenotheca vortriedei	Vortriede's spineflower	PDPGN0W010	None	None	G3/S3	4.3		Yes	No
Taraxacum californicum	California dandelion	PDAST93050	Endangered	None	G1G2/S1S2	1B.1		Yes	Yes
Taraxacum ceratophorum	horned dandelion	PDAST930Y1	None	None	G5/S1	2B.1		No	Yes
Tauschia glauca	glaucous tauschia	PDAPI27020	None	None	G4/S4	4.3		No	No
Tauschia howellii	Howell's tauschia	PDAPI27050	None	None	G2G3/S2S3	1B.3	USFS:S	No	Yes
Tetracoccus dioicus	Parry's tetracoccus	PDEUP1C010	None	None	G2G3/S2	1B.2	BLM:S USFS:S	Yes	Yes
Tetracoccus hallii	Hall's tetracoccus	PDEUP1C021	None	None	G4/S4	4.3		Yes	No
Tetracoccus ilicifolius	holly-leaved tetracoccus	PDEUP1C030	None	None	G2/S2	1B.3		No	Yes
Tetradymia argyraea	striped horsebrush	PDAST95010	None	None	G4?/S4	4.3		Yes	No
Tetradymia tetrameres	dune horsebrush	PDAST950A0	None	None	G4/S2	2B.2		No	Yes
Teucrium cubense ssp. depressum	dwarf germander	PDLAM20032	None	None	G4G5T3T4/S2	2B.2		No	Yes
Teucrium glandulosum	desert germander	PDLAM20040	None	None	G4/S2	2B.3		No	Yes
Thalictrum alpinum	arctic meadow-rue	PDRAN0M010	None	None	G5/S3	4.3		No	No
Thelypodium brachycarpum	short-podded thelypodium	PDBRA2N010	None	None	G3/S3	4.2		No	No
Thelypodium howellii ssp. howellii	Howell's thelypodium	PDBRA2N051	None	None	G1T1/S1	1B.2	BLM:S USFS:S	No	Yes
Thelypodium integrifolium ssp. complanatum	foxtail thelypodium	PDBRA2N062	None	None	G5T4T5/S2	2B.2		No	Yes
Thelypodium milleflorum	many-flowered thelypodium	PDBRA2N0A0	None	None	G5/S3?	2B.2		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Thelypodium stenopetalum	slender-petaled thelypodium	PDBRA2N0F0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Thelypteris puberula var. sonorensis	Sonoran maiden fern	PPTHE05192	None	None	G5T3/S2	2B.2	USFS:S	No	Yes
Thermopsis californica var. argentata	silvery false lupine	PDFAB3Z011	None	None	G4T4/S4	4.3		No	No
Thermopsis californica var. semota	velvety false lupine	PDFAB3Z013	None	None	G4T2/S2	1B.2	USFS:S	Yes	Yes
Thermopsis gracilis	slender false lupine	PDFAB3Z0C1	None	None	G4/S4	4.3		No	No
Thermopsis macrophylla	Santa Ynez false lupine	PDFAB3Z0E0	None	Rare	G1/S1	1B.3	USFS:S	Yes	Yes
Thermopsis robusta	robust false lupine	PDFAB3Z0D0	None	None	G2/S2	1B.2	USFS:S	No	Yes
Thysanocarpus conchuliferus	Santa Cruz Island fringepod	PDBRA2Q060	Endangered	None	G2?/S2?	1B.2		Yes	Yes
Thysanocarpus rigidus	rigid fringepod	PDBRA2Q070	None	None	G1G2/S1	1B.2	USFS:S	No	Yes
Tiarella trifoliata var. trifoliata	trifoliate laceflower	PDSAX10031	None	None	G5T5/S2S3	3.2		No	No
Tidestromia eliassoniana	Eliasson's woolly tidestromia	PDAMA0J070	None	None	G5/S2	2B.2		No	Yes
Tiquilia canescens var. pulchella	Chocolate Mountains tiquilia	PDBOR0Y012	None	None	G5T3T4/S3	3.2		No	No
Tonestus eximius	Tahoe tonestus	PDASTE0030	None	None	G3/S3	4.3		No	No
Tonestus lyallii	Lyall's tonestus	PDASTE0050	None	None	G5/S1	2B.3		No	Yes
Tonestus peirsonii	Peirson's tonestus	PDASTE0070	None	None	G3/S3	4.3		No	No
Townsendia condensata	cushion townsendia	PDAST9C040	None	None	G4/S3	2B.3		No	Yes
Townsendia leptotes	slender townsendia	PDAST9C0F0	None	None	G4/S2	2B.3		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Toxicoscordion fontanum	marsh zigadenus	PMLIL28050	None	None	G3/S3	4.2		No	No
Tracyina rostrata	beaked tracyina	PDAST9D010	None	None	G2/S2	1B.2	USFS:S	No	Yes
Tragia ramosa	desert tragia	PDEUP1D090	None	None	G5/S4	4.3		No	No
Transberingia bursifolia ssp. virgata	virgate halimolobos	PDBRA1A040	None	None	G4T4/S2	2B.3		No	Yes
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	PDAST9F031	None	None	G4T3/S1	2B.1		No	Yes
Trichophorum pumilum	little bulrush	PMCYP0Q250	None	None	G5/S3	2B.2		No	Yes
Trichostema austromontanum ssp. compactum	Hidden Lake bluecurls	PDLAM22022	Delisted	None	G3G4T1/S1	1B.1		Yes	Yes
Trichostema micranthum	small-flowered bluecurls	PDLAM22080	None	None	G4/S3	4.3		No	No
Trichostema ovatum	San Joaquin bluecurls	PDLAM220A0	None	None	G3/S3	4.2		No	No
Trichostema rubisepalum	Hernandez bluecurls	PDLAM220C0	None	None	G4/S4	4.3		Yes	No
Trichostema ruygtii	Napa bluecurls	PDLAM220H0	None	None	G1G2/S1S2	1B.2		Yes	Yes
Trifolium amoenum	two-fork clover	PDFAB40040	Endangered	None	G1/S1	1B.1		Yes	Yes
Trifolium andersonii ssp. andersonii	Anderson's clover	PDFAB40055	None	None	G5T5/S4	4.3		Yes	No
Trifolium bolanderi	Bolander's clover	PDFAB400G0	None	None	G3/S3	1B.2	USFS:S	Yes	Yes
Trifolium buckwestiorum	Santa Cruz clover	PDFAB402W0	None	None	G2/S2	1B.1	BLM:S	Yes	Yes
Trifolium dedeckerae	Dedecker's clover	PDFAB400Q0	None	None	G2/S2	1B.3	BLM:S USFS:S	Yes	Yes
Trifolium gymnocarpon ssp. plummerae	Plummer's clover	PDFAB40112	None	None	G5T4/S2	2B.3		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Trifolium howellii	Howell's clover	PDFAB40140	None	None	G4/S4	4.3		No	No
Trifolium hydrophilum	saline clover	PDFAB400R5	None	None	G2/S2	1B.2		No	Yes
Trifolium jokerstii	Butte County golden clover	PDFAB40310	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Trifolium lemmonii	Lemmon's clover	PDFAB401C0	None	None	G3/S3	4.2		Yes	No
Trifolium palmeri	southern island clover	PDFAB40102	None	None	G4/S4	4.2		Yes	No
Trifolium piorkowskii	maverick clover	PDFAB40410	None	None	G2/S2	1B.2		No	Yes
Trifolium polyodon	Pacific Grove clover	PDFAB402H0	None	Rare	G1/S1	1B.1	BLM:S	Yes	Yes
Trifolium siskiyouense	Siskiyou clover	PDFAB402S0	None	None	GH/SH	1B.1		No	Yes
Trifolium trichocalyx	Monterey clover	PDFAB402J0	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Triglochin palustris	marsh arrow-grass	PMJCG02040	None	None	G5/S2	2B.3		No	Yes
Trillium ovatum ssp. oettingeri	Salmon Mountains wakerobin	PMLIL200M1	None	None	G5T4/S4	4.2		No	No
Triphysaria floribunda	San Francisco owl's-clover	PDSCR2T010	None	None	G2?/S2?	1B.2		No	Yes
Tripterocalyx crux-maltae	Kellogg's sand-verbena	PDNYC0G020	None	None	G4?/S1	2B.2		Yes	Yes
Tripterocalyx micranthus	small-flowered sand-verbena	PDNYC0G030	None	None	G5/S1	2B.2		No	Yes
Triteleia clementina	San Clemente Island triteleia	PMLIL21020	None	None	G2/S2	1B.2		Yes	Yes
Triteleia crocea var. crocea	yellow triteleia	PMLIL21031	None	None	G4T4/S3S4	4.3		No	No
Triteleia crocea var. modesta	Trinity Mountains triteleia	PMLIL21032	None	None	G4T3/S3	4.3		Yes	No
Triteleia grandiflora	large-flowered triteleia	PMLIL21060	None	None	G4G5/S1	2B.1		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Triteleia hendersonii	Henderson's triteleia	PMLIL21070	None	None	G4/S1	2B.2		No	Yes
Triteleia ixioides ssp. cookii	Cook's triteleia	PMLIL210A2	None	None	G5T2T3/S2S3	1B.3	BLM:S USFS:S	Yes	Yes
Triteleia lugens	dark-mouthed triteleia	PMLIL210D0	None	None	G4?/S4?	4.3		No	No
Triteleia piutensis	Piute Mountains triteleia	PMLIL210H0	None	None	G1/S1	1B.1	BLM:S	Yes	Yes
Tropidocarpum californicum	Kings gold	PDBRA33010	None	None	G1/S1	1B.1	BLM:S	No	Yes
Tropidocarpum capparideum	caper-fruited tropidocarpum	PDBRA2R010	None	None	G1/S1	1B.1	USFS:S	Yes	Yes
Tuctoria greenei	Greene's tuctoria	PMPOA6N010	Endangered	Rare	G1/S1	1B.1		No	Yes
Tuctoria mucronata	Crampton's tuctoria or Solano grass	PMPOA6N020	Endangered	Endangered	G1/S1	1B.1		Yes	Yes
Utricularia intermedia	flat-leaved bladderwort	PDLNT020A0	None	None	G5/S3	2B.2		No	Yes
Utricularia minor	lesser bladderwort	PDLNT020D0	None	None	G5/S3	4.2		No	No
Utricularia ochroleuca	cream-flowered bladderwort	PDLNT020E0	None	None	G4G5/S1	2B.2		No	Yes
Vaccinium coccineum	Siskiyou Mountains huckleberry	PDERI181N0	None	None	G3Q/S2S3	3.3		No	No
Vaccinium scoparium	little-leaved huckleberry	PDERI180Y0	None	None	G5/S3	2B.2		No	Yes
Vaccinium shastense ssp. shastense	Shasta huckleberry	PDERI181Z1	None	None	G4T3/S3	1B.3	BLM:S	No	Yes
Vahlodea atropurpurea	mountain hair grass	PMPOA6M010	None	None	G5/S3	4.3		No	No
Valeriana occidentalis	western valerian	PDVAL03080	None	None	G5/S1	2B.3		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Vancouveria chrysantha	Siskiyou inside-out-flower	PDBER09010	None	None	G4/S3	4.3		No	No
Veratrum fimbriatum	fringed false-hellebore	PMLIL25030	None	None	G3/S3	4.3		No	No
Veratrum insolitum	Siskiyou false-hellebore	PMLIL25040	None	None	G4/S4	4.3		No	No
Verbena californica	Red Hills vervain	PDVER0N050	Threatened	Threatened	G2/S2	1B.1		Yes	Yes
Verbesina dissita	big-leaved crownbeard	PDAST9R050	Threatened	Threatened	G1G2/S1	1B.1		Yes	Yes
Veronica copelandii	Copeland's speedwell	PDSCR200B0	None	None	G3/S3	4.3		No	No
Veronica cusickii	Cusick's speedwell	PDSCR200C0	None	None	G5/S4	4.3		Yes	No
Viburnum ellipticum	oval-leaved viburnum	PDCPR07080	None	None	G4G5/S3?	2B.3		No	Yes
Viguiera laciniata	San Diego County viguiera	PDAST9T060	None	None	G4/S4	4.3		Yes	No
Viguiera purisimae	La Purisima viguiera	PDAST9T0S0	None	None	G4/S1	2B.3		No	Yes
Viola howellii	Howell's violet	PDVIO040U0	None	None	G4/S1	2B.2		No	Yes
Viola langsdorffii	Langsdorf's violet	PDVIO04100	None	None	G4/S1	2B.1		No	Yes
Viola palustris	alpine marsh violet	PDVIO041G0	None	None	G5/S1S2	2B.2		No	Yes
Viola pinetorum ssp. grisea	grey-leaved violet	PDVIO04431	None	None	G4G5T3/S3	1B.2	BLM:S	No	Yes
Viola primulifolia ssp. occidentalis	western white bog violet	PDVIO040Y2	None	None	G5T2/S2	1B.2	USFS:S	No	Yes
Viola purpurea ssp. aurea	golden violet	PDVIO04420	None	None	G5T2/S2	2B.2		No	Yes
Viola tomentosa	felt-leaved violet	PDVIO04280	None	None	G3/S3	4.2		No	Yes
Wislizenia refracta ssp. palmeri	Palmer's jackass clover	PDCPP09015	None	None	G5T3T5/S1	2B.2		No	Yes

Scientific Name	Common Name	Element Code	Federal Listing Status	State Listing Status	Heritage Rank	Rare Plant	Other Status	Seed Banked	Records in CNDDB?
Wislizenia refracta ssp. refracta	jackass-clover	PDCPP09013	None	None	G5T5?/S1	2B.2		No	Yes
Wolffia brasiliensis	Brazilian watermeal	PMLEM03020	None	None	G5/S2	2B.3		No	Yes
Woodsia plummerae	Plummer's woodsia	PPDRY0U0A0	None	None	G5/S2	2B.3		No	Yes
Wyethia elata	Hall's wyethia	PDAST9X050	None	None	G4/S4	4.3		No	No
Wyethia longicaulis	Humboldt County wyethia	PDAST9X0A0	None	None	G4/S4	4.3		No	No
Wyethia reticulata	El Dorado County mule ears	PDAST9X0D0	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Xanthisma gracile	annual bristleweed	PDAST640E0	None	None	G5/S4	4.3		Yes	No
Xanthisma junceum	rush-like bristleweed	PDAST641A0	None	None	G5/S4	4.3		Yes	No
Xylorhiza cognata	Mecca-aster	PDASTA1010	None	None	G2/S2	1B.2	BLM:S	Yes	Yes
Xylorhiza orcuttii	Orcutt's woody-aster	PDASTA1040	None	None	G3?/S2	1B.2	BLM:S	Yes	Yes

Exhibit 10

CONSERVATION ELEMENT

OF THE

CITY OF LOS ANGELES GENERAL PLAN

City Plan Case No. 2001-0413-GPA
Council File No. 01-1094

Adopted by the City Council September 26, 2001
Approved by the City Planning Commission March 10, 2001

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TABLE OF CONTENTS

INTRODUCTION..... vii

CHAPTER I - BACKGROUND..... I-1
- Planning area..... I-1
- Demographics..... I-1
- California General Plan Requirements..... I-1
  - Mandated elements and zoning
  - General plan consistency and relationship to other elements
  - Scope of element
  - Requirements and related issues addressed by other elements
  - Implementation
- Technical references..... I-3
- Format..... I-3

CHAPTER II: RESOURCE CONSERVATION AND MANAGEMENT..... II-1
- Introduction: goal, explanation of(*) program references

Section 1: Agricultural Lands..... II-1
- Conclusion and continuing issue
- Objectives, policies and programs
- Related information

Section 2: Animal Keeping, Nurseries, Crop Gardens.... II-2
- Continuing issues
- Objectives, policies and programs
- Related information

Section 3: Archaeological and Paleontological..... II-3
- Archaeological
  - Site protection
- Paleontological
  - Site protection
- Conclusion and continuing issues
- Objectives, policies and programs
- Related information

Section 4: Conservation..... II-5

Section 5: Cultural and Historical..... II-5
- Conservation and protection
  - Historic-cultural Monuments
  - Historic Preservation Overlay Zones

Conclusion and continuing issues
Objective, policy and programs
Related information

Section 6: Endangered Species..... II-9
Definitions
Species protection
Protection/propagation enhancement programs
Other wild animal protection
Conclusion and continuing issues
Objectives, policies and programs
Related information

XX. Energy (electrical and other resources): see General Plan Infrastructure Systems Element

Section 7: Equine Areas..... II-13
Zoning/K supplemental use district
Trails
Equine oriented parks
Equine population
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 8: Erosion..... II-17
Inland erosion
Beach erosion
Beach erosion management
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 9: Fisheries..... II-21
Fisheries protection
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 10: Forest..... II-23
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 11: Geologic Hazard..... II-25

Section 12: Habitats..... II-26

Definitions
Habitat types within Los Angeles
Inland habitats
Significant Ecological Areas (SEAs)
Wildlife corridors
Ocean habitat
Coastal wetlands
Habitat protection legislation
California Environmental Quality Act
Natural Community Conservation Act
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 13: Habitats and Scenic Areas Outside the City II-32
Grand Canyon-Colorado River Plateau
Owens Lake and Owens Valley
Mono Lake
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 14: Hazardous Materials..... II-39
Unified program
Landfill regulation
Brownfields
NPDES
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 15: Land Form and Scenic Vistas..... II-41
Land form protection
Scenic features protection
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 16: Ocean..... II-44
Ocean protection
Clean Water Act/NPDES permits
Point pollution sources
Nonpoint pollution sources
Chemical pollution
Trash pollution
California Environmental Quality Act
Santa Monica Bay cleanup

San Pedro Bay cleanup
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 17: Open Space/Parks..... II-50

Section 18: Resource Management: Mineral Resources (Sand and Gravel)..... II-51
Resource protection/extraction regulation
California Surface Mining and Reclamation Act
California Environmental Quality Act
City regulation/management
General plan references
Conservation
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 19: Resource Management (Fossil Fuels): Oil... II-54
Resource protection/extraction regulation
Federal
State
Consolidated Coastal Sanctuary Act
Coastal Act
California Environmental Quality Act
City
Conservation
Other considerations
Air quality
Safety
Conclusion and continuing issues
Objectives, policies and programs
Related information

Section 20: Resource Management (Fossil Fuels): Gas... II-58
Secondary local sources of gas
Primary distributor/supplies
Conservation
Industry deregulation
Conclusion and continuing issues
Objectives, policies and programs
Related information

XX. Water: see General Plan Infrastructure Systems Element

EXHIBITS (AT END OF TEXT):

Exhibit Sources And Explanatory Notes

Exhibit A: Mineral Resources

Exhibit B: SEAs And Other Resources

INTRODUCTION

The state (1970 and 1971) requires that conservation and open space elements be included in city and county general plans. The latter is to address conservation, protection, development, utilization and reclamation of natural resources. The former is to address the remaining natural and other open space resources. The emphasis of state law is on "natural" resources. Guidelines prepared by the Governor's Office of Planning and Research make clear that subject areas to be addressed by these and other general plan elements often overlap. Jurisdictions are allowed to organize their general plans in accordance with their unique needs and conditions. Los Angeles has opted to place the conservation aspects of open space within its Conservation Element.

In the interim since the adoption of the city's first conservation and open space plans (1973) much has changed. The environmental movement of the 1970s and 80s and concerns about public health, quality of life, environmental protection and other issues spawned laws, court actions and requirements which changed jurisdictional authority and mandated implementation programs to protect natural resources. Consequently, many of the areas to be addressed by the elements are now more fully addressed by other legal requirements and other mandated plans.

This Conservation Element surveys laws, requirements and procedures which have been established for protection of natural resources. It primarily is an informational document which is designed to help readers understand the context, history and opportunities for protection and improvement of the city's natural resources.

The alphabetical topical organization of the element is to assist people in finding information about subjects that relate to their areas of interest. Each topical section includes references to related sections and plans. Given the scope of the topics covered, the element is intended as a general reference, not a comprehensive encyclopedia of information about all related laws and programs.

CHAPTER I: BACKGROUND

PLANNING AREA

The element relates to the entire city of Los Angeles.

DEMOGRAPHICS

The 1990 federal census estimated that the city's population was 3,485,399 individuals.

CALIFORNIA GENERAL PLAN REQUIREMENTS

Mandated elements and zoning. In 1970-71 the State of California required cities and counties to adopt general plan conservation and open space elements by 1973 (Government Code Section 65302). The Los Angeles conservation and open space plans were adopted in 1973. They were deemed by the state to be in compliance with its laws.

The requirements for the conservation and open space elements are among the most detailed and complex of any of the seven mandated elements. The other mandated elements are land use, circulation, housing, noise and safety.

General plan consistency and relationship to other elements. State law recognizes that state requirements regarding the content of one element may overlap the requirements for another. Therefore, it allows the required information to be contained in one element and to be incorporated by reference in another. State law also allows local jurisdictions to organize their general plans in a manner that is appropriate to the jurisdiction and needs, providing that all general plan requirements are met.

All elements and parts of a general plan are required to be integrated, internally consistent and compatible (Government Code Section 65300.5). The Conservation is consistent with all adopted elements of the city's general plan.

Scope of element. State law intends that conservation elements address "conservation, development, and utilization of natural resources including water and hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources." State general plan legislation was amended (1995) to require that preparation of the water portion of the general plan address water and land reclamation, water (including ocean) pollution,

regulation and use of land in stream beds, erosion, watershed protection, flood control and rock, sand and gravel resources.

Open space, as defined by the California Government Code (Section 65560), is "any parcel or area of land or water that essentially is unimproved and devoted to an open-space use," including:

(1) preservation of natural resources, e.g., preservation of flora and fauna (animal habitats), bird flyways, ecologic and other scientific study areas, watershed;

(2) managed production of resources, e.g., recharge of ground water basins or containing mineral deposits that are in short supply;

(3) outdoor recreation, e.g., beaches, waterways, utility easements, trails, scenic highway corridors; and/or

(4) public health and safety, e.g., flood, seismic, geologic or fire hazard zones, air quality enhancement.

Identification, preservation, protection and management of the natural resources is a primary thrust of the state open space and conservation element requirements. As is allowed by state law, Los Angeles has organized its general plan to meet its own particular circumstances and needs. It has opted to incorporate natural open space, agricultural and other open space features of the state's open space requirements into this Conservation Element. The Conservation Element references other city plans that address mandated subjects, including water supply and demand, which is addressed by city water plans and the general plan Infrastructure Systems Element. The Conservation Element primarily addresses preservation, conservation, protection and enhancement of the city's natural resources.

Requirements and related issues addressed by other elements. Conservation and open space subjects that are required or suggested by state law and the Governor's Office of Planning and Research Guidelines, and which are not addressed or only in part by this element, are included in other general plan elements, such as:

-- air quality (Air Quality Element);

-- bicycle paths (Transportation and Open Space elements);

-- equestrian and hiking trails (Public Facilities and Services Element and Open Space Element);

-- electrical energy resources and systems (Infrastructure Systems Element);

-- fire, flood, geologic and seismic hazard (Safety Element);

-- landfills (Infrastructure Systems Element);

-- parks (Public Facilities and Services Element and Open Space Element);

-- rivers and streams (open space aspects by Open Space Element; drainage systems by Infrastructure Systems Elements; flood hazard also by Safety Element);

-- scenic highways (Transportation and Open Space elements);

-- water resources (Infrastructure Systems Element).

Implementation. This element is implemented by the various city regulations and programs described herein, consistent with the implementation requirements of state general plan law (Government Code Section 65400). In addition, some of the above listed elements and individual community plans, which comprise the Land Use Element, address conservation related land use and systems issues.

TECHNICAL REFERENCES. During the preparation of this element the primary sources for technical information were enforcement and resources management agencies. Exhibits were prepared from the planning department's geographic information system (GIS).

FORMAT. Chapter II surveys resources that are to be conserved. It is organized alphabetically according to topic. The table of contents provides subheadings to assist the reader with subject searches. The text includes general historic, legislative and program information, along with cross references to related plans and information sources and a summary of continuing issues that need to be addressed by city government.

The objectives, policies and programs are those that are within the jurisdiction of the City of Los Angeles. Programs related to matters outside the authority of the city are not listed. The element contains a single goal which applies to all topics.

The "General Plan Guidelines" issued by the Governor's Office of Planning and Research (1998) advises that a general plan should contain goals, objectives, policies, programs and implementation monitoring. Goals are described as a general setting of direction, objectives as

intermediate steps in attaining the goal, policies as specific guides to decision making and programs as specific means of achieving the policies. Each policy is to have at least one corresponding implementation measure. The element complies with these guidelines.

CHAPTER II: RESOURCE CONSERVATION AND MANAGEMENT

Topics are addressed alphabetically. The emphasis, in keeping with state law, is on conservation and preservation of natural resources. Facilities and systems, including standards relating thereto, will be addressed by the Public Facilities and Services, Infrastructure Systems or other elements of the general plan.

Goal, objectives, policies and programs (an asterisk * indicates the program lead agency, if any). One goal applies to all sections.

Goal 1: a city that preserves, protects and enhances its existing natural and related resources.

SECTION 1: AGRICULTURAL LANDS

A few parcels of land in the city is deemed significant farmland by the state geologist (Exhibit B), e.g., a significant commercial crop or animal producing site. the largest of these is the Open Space Zone portion of Pierce College (Woodland Hills). Its agricultural use is related to the state community college's educational curriculum.

Until World War II the city was an important center for agriculture in California. Los Angeles was established by Spain in 1781 as an agricultural way station to provide supplies for Spanish military forces. By the time California achieved statehood (1850), the Los Angeles economy was primarily cattle ranches, vineyards, wineries and grain fields. Following statehood, immigrants, mostly from the midwestern and eastern United States, began establishing fruit and vegetable farms. A series of droughts (1864-76) killed thousands of cattle and caused ranchers to subdivide and sell their large holdings for conversion to orchards, vineyards, wineries and vegetable farms. By 1876 the city's economy had shifted from a ranch to a farm economy and sheep raising had been introduced. With the opening of the Los Angeles aqueduct (1913) agricultural uses expanded, particularly in the San Fernando Valley where irrigation turned desert lands into rich farmlands. By World War II Los Angeles was the home of the largest dairy and egg farms in the nation and one of the principal sources for lima beans. New vineyards and wineries, citrus groves and fruit orchards continued to be established.

City planners were so confident that agriculture would remain a permanent part of the city's economy that they planned (1944) new Valley urban centers surrounded by agricultural lands. The plan was radically changed when the county tax assessor reassessed the Valley farmlands to "higher" uses, envisioning the need for housing to

accommodate the rapidly growing population. By the time the city's new zoning ordinance was adopted to implement the plan (1947), farmers already were selling their holdings and moving their businesses outside the city. Zone changes and subdivisions rapidly transformed farmlands into residential tracts to provide homes for workers in the burgeoning aeronautics and other industries that were established during and following World War II.

Between the 1940s and 1960s the Los Angeles economy shifted from an agricultural to an industrial and commercial economy. Today only the Pierce College parcel remains. The college master plan, approved in 2000, designates the parcel for agricultural and related uses.

Conclusion. The largest significant agricultural site in the city is within Pierce College. Reuse of the site is under consideration by the state, which owns the property.

Continuing issue: potential conversion of the Pierce College agricultural resource site to other uses.

Agricultural lands objective, policy and program:

Objective: retain in agricultural use, as appropriate, the last state-designated significant agricultural parcel within the city, the Pierce College parcel.

Policy: continue to work with the college and neighbors to encourage the retention of the parcel in agricultural use for educational and related purposes, which are compatible with neighboring uses.

Program: periodic Canoga Park-Winnetka-Woodland Hills Community Plan review and revision.

Responsibility: *Department of City Planning.

For related information see: Animal Keeping, Nurseries, Crop Gardens Section.

SECTION 2: ANIMAL KEEPING, NURSERIES, CROP GARDENS

Some lands, mostly in the San Fernando Valley, are zoned for agricultural or animal keeping uses and are improved with small garden plots and/or animal oriented uses (e.g., equine boarding, petting zoos, private animal keeping). These uses and the equine trail systems help preserve the historic rural character of sections of the city. Commercial nurseries still exist throughout Los Angeles. Through planning and infrastructure decisions, Los Angeles has encouraged

establishment and retention of rural uses. For example, small parcels of public land have been formally or informally opened for neighborhood gardens tended by local residents; special overlay districts and equine oriented parks and trails have been established to encourage equine uses; and power system rights-of-way and other public lands have been leased for nurseries.

Continuing issue: loss of the last remaining animal keeping, nursery and crop gardening uses.

Animal keeping, nurseries, crop gardens objective, policy and program:

Objective: retain, to the extent feasible, the last remaining agricultural features of the city as part of the city's heritage and economy.

Policy: continue to encourage the retention of parcels in agricultural and low density land use and zoning categories that will encourage their retention in agricultural and related uses.

Program: community plan review and revision.

Responsibility: *Department of City Planning.

For related information see:

N Agricultural Lands Section and

N Equine Areas Section.

SECTION 3: ARCHAEOLOGICAL AND PALEONTOLOGICAL

Archaeological. Pre-historic and historic archaeological sites exist throughout the city. Hunter-gatherer Indians inhabited the Los Angeles region long before Europeans arrived. Remnants of their various cultures continue to be unearthed and documented. The oldest find is the partial skeleton of La Brea Woman, among the oldest human bones ever found in California. She is believed to have been buried approximately 9,000 years ago. Her grave became engulfed in tar and was discovered in 1914, during an excavation for tar ("brea") in what is now called La Brea Tar Pits in the Wilshire community.

Site protection. Various federal, state and local regulations have been promulgated to protect archaeological sites and resources. Although the state general plan law calls for mapping of the sites, all mapping of pre-historic sites is confidential, pursuant to California Government

Code Section 6254.10. This is to protect sites from disturbance, scavenging and vandalism.

The federal Archaeological Resources Protection Act of 1979 (Public Law 96-95) protects archaeological resources and sites on federal and Indian lands, including requirements for issuance of permits by federal land managers to excavate or remove archaeological resources. The Native American Graves and Repatriation Act (1990) and the Native American Heritage Act (1984 and 1992) provide guidelines for protection of Native American remains and artifacts.

The California Environmental Quality Act (CEQA) provides guidelines for identification and protection of archaeological sites and artifacts as a part of local development permit processing. CEQA guidelines define an archaeological resource as "significant," i.e., to be protected if: (1) it is associated with an event or person of recognized significance to California or American history or of recognized scientific importance in pre-history, including culturally significant Native American sites; (2) it can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable archaeological research questions; (3) it has a special or particular quality, such as the oldest, best, largest or last surviving example of its kind; (4) it is at least one hundred years old and possesses substantial stratigraphic integrity; or (5) it involves important research questions that historical research has shown can be answered only with archaeological methods.

If it is determined that a development project may disrupt or damage such a site, the project is required to provide mitigation measures to protect the site or enable study and documentation of the site, including funding of the study by the applicant. The city's environmental guidelines require the applicant to secure services of a bona fide archaeologist to monitor excavations or other subsurface activities associated with a development project in which all or a portion is deemed to be of archaeological significance. Discovery of archaeological materials may temporarily halt the project until the site has been assessed, potential impacts evaluated and, if deemed appropriate, the resources protected, documented and/or removed.

Under CEQA, discovery of human remains requires evaluation by the county coroner of the nature of the remains and cause of death. If the remains are determined to be of Native American origin, the Native American Heritage Commission is asked to determine the descendants who are to be notified or, if unidentifiable, to establish procedures for burial.

The state-designated repository in the Los Angeles area for archaeological data is the South Central Coastal Information Center. Reports concerning archaeological investigations are to be filed with the center. Other academic institutions, research facilities and museums in the area also have archaeological resource information and expertise.

Paleontological. Los Angeles is rich in paleontological sites. Fossils have been found mostly in sedimentary rock that has been uplifted, eroded or otherwise exposed. Most of the sites are in local mountains. However, the best known and most abundant fossil resource are La Brea Tar Pits, which are owned and operated by the County of Los Angeles. They are within and surround the 23-acre Hancock Park, which includes an art museum and the Page Museum (tar pit related displays and activities). The tar pits have provided an abundance of animal and plant fossils. Most are from the Pleistocene epoch (Ice Age) and date as far back as 40,000 years. Finds include mammoths, saber-tooth cats, insects and birds.

Site protection. Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. If significant paleontological resources are uncovered during project execution, authorities are to be notified and the designated paleontologist may order excavations stopped, within reasonable time limits, to enable assessment, removal or protection of the resources. For Los Angeles city and county, the Los Angeles County Museum of Natural History, including the George C. Page Museum, provides advice concerning paleontological resources.

Conclusion. The city has a primary responsibility in protecting significant archaeological and paleontological resources.

Continuing issues: loss of or damage to archaeological and paleontological sites due to development, unauthorized removal and vandalism.

Archaeological and paleontological objective, policy and program:

Objective: protect the city's archaeological and paleontological resources for historical, cultural, research and/or educational purposes.

Policy: continue to identify and protect significant archaeological and paleontological sites and/or resources known to exist or that are

identified during land development, demolition or property modification activities.

Program: permit processing, monitoring, enforcement and periodic revision of regulations and procedures.

Responsibility: departments of *Building and Safety, *City Planning and Cultural Affairs and/or the *lead agency responsible for project implementation.

For related information see: Cultural and Historical Section.

SECTION 4: CONSERVATION

Conservation is the managed or controlled use of natural, cultural and historical resources. In Los Angeles it includes a diversity of programs, including acquiring, preserving and protecting large tracts of open space for habitat conservation, species protection, watershed maintenance and other purposes; acquiring, preserving and protecting cultural and historical resources; reducing the demand for nonrenewable mineral and petroleum resources, water and other natural resources; recycling water, wood products, metals, glass and other materials. Conservation is addressed by various sections of this element in relation to particular subject matter.

SECTION 5: CULTURAL AND HISTORICAL

The city's form, institutions and culture have been shaped by a diversity of events, individuals and groups and the city's environmental setting. Modern cultural history of Los Angeles dates to the establishment of the pueblo (town) in 1781 by a Spanish expedition which originated in Sonora of Lower California (now Mexico). With the establishment of the Republic of Mexico (1821) Los Angeles came under Mexican rule. From 1847 to 1850 it was occupied by United States military forces. In 1850 California became a state of the United States and Los Angeles became a U.S. city. A combination of the gold rush and the opening of California spurred immigration, mostly by settlers from the midwest and eastern United States. Population growth continued almost unabated until the 1970s. Settlers, merchants and imported workers brought new cultural traditions or reinforced old traditions. Today over 100 languages and dialects are spoken in the local schools, over 42% of the population is of Hispanic origin, over 12% of African American origin, slightly under 10% of Asian and Pacific Islander origin and one percent is Native American.

To identify, protect and preserve historic sites and structures for the enrichment of future generations various city, state and federal

procedures have been promulgated. The most significant for Los Angeles are described in the following. The general plan Historic Preservation and Cultural Resources Element will address historic and cultural protection issues in greater detail.

Conservation and protection. Five types of historic protection designations apply in the city: (1) Historic-Cultural Monument designation by the city's Cultural Heritage Commission and approved by the City Council; (2) placement on the California Register of Historical Resources or (3) the National Register of Historic Places (1980 National Historic Preservation Act); (4) designation by the Community Redevelopment Agency (CRA) as being of cultural or historical significance within a designated redevelopment area; and (5) classification by the City Council (recommended by the planning commission) as an Historic Preservation Overlay Zone. Designations help protect structures and support rehabilitation fund requests.

The California Environmental Quality Act (CEQA) also protects significant cultural and historic resources. CEQA was revised in 1998 to redefine "historic resource" to include resources that are presumed to be significant, unless the preponderance of evidence is to the contrary. A property no longer must be designated officially as a landmark or of historic importance to be considered under CEQA review. The lead agency for permit processing may deem properties not formally listed and not included in historic surveys as "historically significant," if they meet criteria for listing in the California Register.

Under the city's CEQA guidelines, an environmental assessment must be prepared for any proposed demolition, destruction or significant modification of an Historic-Cultural Monument or resource listed on the national or state registers, or on the CRA list, or cited as a proposed historical resource by a community plan or historic preservation overlay zone survey, or which are over 50 years old and are substantially intact examples of an architectural style important in Los Angeles or are associated with an architect or other person of importance in Los Angeles history. Under the 1998 amendment, buildings less than 50 years old may also be considered.

Historic-Cultural Monuments. In 1962, at the request of the Los Angeles Chapter of the American Institute of Architects, the city drafted and approved an ordinance designed to protect and/or identify architectural, historical and cultural buildings, structures and sites of importance in the city's history and/or cultural heritage. In the intervening 30 years the Cultural Heritage Commission (CHC) has designated almost 700 sites as Historic-Cultural Monuments.

The list of the designated sites is maintained by the CHC. It includes historic buildings, corridors (tree lined streets) and geographic areas. In some instances plaques have been erected on sites of historic events or former structures that were of cultural or historic significance. Sites are mapped on the city's zoning maps to guide permit processing. The building department will not issue permits for modification of a designated monument unless authorized to do so by the CHC, which may impose conditions of permit approval.

Additional protections apply to structures or sites that are listed on the state or national registers. The National Park Service administers the National Register of Historic Places and the California Office of Historic Preservation administers the state register. Criteria applied to determine qualification for the registers includes context (importance to an historic theme, place, time), integrity (location, design, setting, workmanship, materials) and, if a recent resource, exceptional importance.

The Community Redevelopment Agency maintains a list of buildings and structures of historical significance for purposes of project planning and evaluating neighborhood improvement proposals.

Historic Preservation Overlay Zones (HPOZ). The HPOZ provision of the zone code, Los Angeles Municipal Code (LAMC) Section 12.20.3, was adopted in 1979; amended 2001. It contains procedures for designation and protection of areas that have structures, natural features or sites of historic, architectural, cultural or aesthetic significance. Fourteen areas of the city are classified as HPOZs and twelve other areas are under study. HPOZ areas contain significant examples of architectural styles characteristic of different periods in the city's history. They may be a few blocks or a few square miles in area.

Property owners are encouraged to make property improvements that will enhance the historic character of the HPOZ area. Neighbors often join together to secure period street lights and other features that will contribute to historic and cultural emphasis. Alleys may be converted to park-like uses or street signs or circulation modified to support the HPOZ area goals. Street fairs and other activities generate community involvement and general public awareness of the unique area and help raise funds for neighborhood and property improvement.

A consultant to the planning department prepared (1997) a general survey of all pre-1950s structures within five community plan areas of the city. It provides a primary data resource for establishing future HPOZ areas and for guiding public and private efforts to preserve individual structures. The consultant also prepared a computerized survey, including digital photos, of historic structures within the

Highland Park HPOZ. Using the same techniques, staff are preparing similar surveys for other HPOZ areas. The data is used to assist city personnel and citizen design review boards in evaluating proposed projects and building modifications and to help them assess trends and devise preservation strategies.

Conclusion. The city has primary responsibility for identifying and protecting its cultural and historical heritage.

Continuing issues: loss of significant, important or contributory cultural and historical sites and structures to neglect, site redevelopment or damage.

Cultural and historical objective, policy and programs:

Objective: protect important cultural and historical sites and resources for historical, cultural, research, and community educational purposes.

Policy: continue to protect historic and cultural sites and/or resources potentially affected by proposed land development, demolition or property modification activities.

Program 1: development permit processing, monitoring, enforcement and periodic revision of regulations and procedures.

Responsibility: departments of *Building and Safety, *City Planning, *Cultural Affairs and *Community Redevelopment Agency and/or the *lead agency responsible for project implementation.

Program 2: prepare the Historic Preservation and Cultural Resources Element of the general plan.

Responsibility: departments of *City Planning and Cultural Affairs.

Program 3: continue to survey buildings and structures of any age in neighborhoods throughout the city in order to develop a record that can be used in the present and future for evaluating their historic and cultural value as individual structures and within the context of surrounding structures.

Responsibility: departments of Building and Safety, *City Planning, and *Cultural Affairs and the *Community Redevelopment Agency.

Program 4: continue to establish Historical Preservation Overlay Zones throughout the city.

Responsibility: departments of Building and Safety, *City Planning and Cultural Affairs and the Community Redevelopment Agency.

For related information see:

N Archaeological/Paleontological Section;

N "Cultural and Historical Monuments Plan, an Element of the Master Plan of the City of Los Angeles," Department of City Planning and Cultural Heritage Board, 1969.

N "Cultural Heritage Master Plan," under preparation by the Cultural Affairs Department.

N Historic-Cultural Monuments list, Cultural Heritage Commission, City of Los Angeles Cultural Affairs Department;

N "Historic Preservation and Cultural Resources Element," City of Los Angeles General Plan (to be prepared); and

N "Public Facilities and Services Element," City of Los Angeles General Plan (under preparation) for cultural and historical facilities within city parks.

SECTION 6: ENDANGERED SPECIES

Without protection of habitats suitable for species propagation, entire species of native plants and animals gradually will decline or become extinct. A couple of hundred plants and animals that live in Los Angeles habitats are listed on the federal and/or state endangered, threatened or species of special concern lists. Within the Santa Monica Mountains National Recreation Area alone 26 plants and animals are classified as rare, threatened or endangered and 58 more have been placed on the list of species of special concern by the National Park Service. Within the city more than 180 plant and animal species are listed by the Environmental Affairs Department for the city as a whole.

Definitions:

Endangered species. In danger of extinction throughout all or a significant portion of their range.

Sensitive species. All the plant and animal species classified as endangered, threatened, rare or of special concern.

Threatened species. Likely to become an endangered species in the foreseeable future.

Species of special concern. Rare, very restricted distribution, declining or at a critical life cycle stage when residing in California.

Species protection. Under the federal Endangered Species Act of 1973 (Public Law 93-205, 16 United States Code 1531 et seq.) the Secretary of the Interior or Secretary of Commerce determines which species are to be listed on the endangered or threatened species registers. Any species on these lists is protected. The current registries are available from the U.S. Fish and Wildlife Service which also maintains lists of sensitive species and species of special concern. Some of the animal species are further protected through international treaties, such as the migratory bird treaties that have been signed between the United States and Canada, Mexico and Japan and the Migratory Bird Treaty Act, which is administered by the U.S. Fish and Wildlife Service. The latter protects all common wild birds except house sparrows, starlings, feral pigeons and resident game birds. Under this act it is unlawful to kill, capture, collect, possess, import or export any migratory bird or items associated with them, such as feathers, parts, nests and eggs, except by permit for scientific purposes, falconry, Native American ceremonial purposes or taxidermy.

Under the California Endangered Species Act (Fish and Game Code, Division 3, Chapter 1.5) the California Fish and Game Commission establishes endangered and threatened species lists and lists of species classified as "of special concern."

The California Native Plant Protection Act (NPPA) prohibits the taking, import or sale of rare, threatened or endangered plant species, except as exempted by the act. Even where exceptions apply, where the Department of Fish and Game (DFG) has notified a property owner of the presence of such a plant, the property owner must notify the DFG before destroying the plant. This provides an opportunity for the state to salvage the plant.

With the passage of the National Environmental Policy Act (NEPA) in 1969, protection of significant features of the natural environment was mandated. NEPA applies only to projects in which federal funds are involved or where a major federal permit is required. The California Environmental Quality Act (CEQA) of 1970 established environmental protection procedures for processing land development projects within

the state. It provides the primary local means of identifying and protecting species listed in any of the sensitive species categories; protecting local species diversity and numbers; and evaluating potential impacts on and protecting habitats, wildlife dispersal and migration corridors.

If a protected species is identified as potentially impacted by a proposed development project, the developer is required by CEQA to provide protection of the species. Protection may involve project design to avoid disturbing, damaging or destroying the habitat; acquisition of all or part of the site by an environmental conservation or governmental agency for purposes of resource management; agreement to contribute to the protection of a habitat at another site; or some other mitigation measure. The DFG and/or U.S. Fish and Wildlife Service, often with the assistance of local environmental conservation organizations, works with the developer and city to devise a mitigation plan.

Protection/propagation enhancement programs. A few examples of sensitive species protection and propagation enhancement programs that exist within the city are described below.

Belding's Savannah Sparrow. The endangered sparrow lives in the Ballona wetlands. The Playa Vista development project mitigation measures include restoration of the wetlands. Restoration will include increasing the flow of water which will enhance the survival and growth of pickleweed upon which the sparrow depends for foraging, breeding and perching.

California condor and other endangered captive species. Zoos, including the Los Angeles Zoo, have joined with other organizations in efforts to research and carry out programs for propagation of endangered species, some of which no longer exist in the wild. For example, the Los Angeles and San Diego zoos have joined with the Peregrine Fund and U.S. Fish and Wildlife Service in a condor breeding program. The program includes mating of birds in captivity, hatching eggs, raising young condors, releasing captive birds into local mountain ranges, monitoring their survival, and evaluating carcasses of dead condors to assess how to better protect them in the wild.

California Least Tern. The endangered terns nest at two sites within the city, on the Venice Beach and within the Los Angeles Harbor. Both sites are restricted to public access during nesting season. It is estimated that the breeding pairs at the Venice beach site have increased from 165 pairs to 375 pairs since 1988.

California native oaks. The only plant group specifically protected by city ordinance is native oaks. The ordinance prohibits destruction of the Valley oak (Quercus lobata) and California live oak (Quercus agrifolia) and any tree of the oak genus indigenous to California which measures eight inches or more in diameter four and one-half feet above the ground (Ordinance No. 153,478). It excludes scrub oaks (Quercus dumosa aka Quercus herberidifolia) and nursery grown oaks. The Department of Public Works enforces the ordinance. The Department of City Planning may authorize removal or relocation relative to subdivision permits. Public works, as the primary enforcement agency, has the authority to authorize relocation or removal under certain circumstances, such as public endangerment.

El Segundo Blue butterfly. The largest known population of the endangered butterfly is located in a portion of El Segundo Dunes, which lie west of the Los Angeles International Airport. The butterfly was threatened with extinction due to urban encroachment, including homes and introduction of non-native plants that threatened to eliminate the buckwheat and other native vegetation on which the butterfly thrives. Two preserves were created on airport and Chevron refinery lands in the 1980s. The sites are restricted from general public access. They have been cleared of much of the introduced vegetation and replanted, resulting in a regeneration of the native plants. The airport department estimates that the butterfly population on its property has increased from 500 to between 40,000 and 50,000 El Segundo Blues since 1985. The figure fluctuates annually depending upon the weather and growth of the plants on which the blues depend.

Conclusion. The city has a primary role in protecting endangered and other at risk plant and animal species.

Continuing issues:

N Loss of native species unique to the Los Angeles environs.

N Loss of sensitive species.

N Loss of habitats that contribute to the healthy propagation of unique native and migratory species.

Endangered species objective, policies and programs (see also Habitats Section):

Objective: protect and promote the restoration, to the greatest extent practical, of sensitive plant and animal species and their habitats.

Policy 1: continue to require evaluation, avoidance, and minimization of potential significant impacts, as well as mitigation of unavoidable significant impacts on sensitive animal and plant species and their habitats and habitat corridors relative to land development activities.

Program: Permit processing, monitoring, enforcement and periodic revision of regulations and procedures.

Responsibility: departments of *Building and Safety and *City Planning, Environmental Affairs and the *lead agency responsible for city project implementation.

Policy 2: continue to administer city-owned and managed properties so as to protect and/or enhance the survival of sensitive plant and animal species to the greatest practical extent.

Program 1: environmentally sensitive property management.

Responsibility: *agencies responsible for property management, especially the departments of Airports, Harbor, Public Works and Recreation and Parks, and Water and Power.

Program 2: local, state and international endangered species protection, propagation and survival enhancement programs.

Responsibility: *Los Angeles Zoo and *agencies that participate specific programs (e.g., departments of Airports and Harbor).

Policy 3: continue to support legislation that encourages and facilitates protection of endangered, threatened, sensitive and rare species and their habitats and habitat corridors.

Program: City legislative program.

Responsibility: *Mayor and *City Council (and City Legislative Analyst).

For related information see: Habitats Section.

SECTION 7: EQUINE AREAS

One of the unique features of highly urbanized Los Angeles is its equine areas, which are located mostly on the fringes of the San Fernando Valley and Santa Monica Mountains, where there is access to mountain trail systems. Horsepower was the primary means of locomotion until the early part of the 20th century when automotive and rail

transportation rapidly transformed Los Angeles from a rural to an urban economy. Ranches and farmlands disappeared. Equine routes were paved or abandoned. Equines for work uses gave way to equines for show, film, recreational, therapeutic and educational purposes. Throughout the century the number and size of equine keeping areas continued to shrink until they were threatened with extinction, largely due to encroachment from development, especially development of non-animal keeping residential projects.

Zoning/K supplemental use district. To protect the equine uses and to encourage establishment of new uses, equines (horses, donkeys, mules) were specifically permitted by right on lots zoned for agricultural uses and on certain large lot (17,500 square feet or more) residential uses. However, zoning and county health code regulations contributed to a continuing loss of equine uses. The laws were intended to protect non-equine residential uses from animal impacts, e.g., odor, dust, health and safety concerns.

To reduce the impact of health code regulations on existing equine uses, the 'K' Equinekeeping District enabling provisions (LAMC Section 13.05) were enacted (1964). The intent of the K District supplemental use designation is to better protect existing equine areas and to encourage establishment of new equinekeeping areas. The provisions have been amended many times to strengthen equine protection and make it easier to establish K Districts. Less restrictive land use regulations apply to lots in K Districts than to those in non-K areas. A new district can be as small as five acres and may include several contiguous ownerships. For current K Districts see Exhibit B.

Today equine uses have recognized rights vis-a-vis residential uses and improved dust control and odor technology enables them to be more compatible with residential uses. Prior to the 1970s, health and other regulations required that equine uses be moved 75 feet from dwellings, even if they were established prior to the dwelling. If the equine use could not be moved, it was terminated. Forced termination threatened the viability of some K Districts and eliminated many other equine uses.

In the 1970s zoning laws were changed to protect legally established equine uses from encroachment. Equine uses in K Districts may remain and the use may be modified if a dwelling is located between 75 and 35 feet of the equine use. In non-K Districts a legal equine was permitted to remain but became nonconforming. Nonconformity limits modification of the equine use.
In 1986 discretionary permits were required for dwellings proposed for location closer than the health department's 35-foot limit to a legal equine use. A zoning administrator must consider the hardship to both

the dwelling and the equine use properties; whether either can be relocated. If the zoning administrator permits the dwelling to be built closer than 35 feet to the equine use, the equine use must move or be terminated.

Trails. There are over 90 miles of equine trails within the city. Riding trails, especially around the north rim of the San Fernando Valley and in and around the Santa Monica Mountains reinforces the existing equine uses and makes their expansion more viable. Careful planning and maintenance of equine trails is important for the protection of the watershed and natural environments.

New subdivisions within a K District typically are required by decision makers to provide equestrian trails, as are subdivisions that are proposed adjacent to equinekeeping uses and the Rim of the Valley Trail Corridor. However, this requirement is discretionary. Sometimes the development's homeowners' association is required to maintain the trails or volunteer groups arrange to maintain trails. Sometimes the Department of Recreation and Parks accepts responsibility for trail upkeep, provided the land developer pays an initial maintenance fee. Usually the fee is insufficient to pay for long term maintenance and repair of the trails, thereby placing a financial burden on the city.

"Guide to Existing and Potential Equestrian Trails" (adopted 1977, revised 1991) guides trail and equine area development and protection in the northwest San Fernando Valley. Equine trails will be more fully addressed by the Open Space Element of the general plan. In addition, some of the community plans identify equine areas and trails and contain equine policies.

Equine oriented parks. Some city parks have equine oriented trail features, such as rest areas with hitching posts and watering troughs. Griffith Park has 54 miles of riding trails, a pony ring and an 80 acre Equestrian Center. The Center has been the site of important local, national and international events, including the 1984 Olympic Games and 1995 World Cup Dressage. It has a 4,300 seat covered arena, several uncovered arenas, training facilities, 520 boarding stalls and related facilities. Stetson Ranch Park in Sylmar is an equine oriented park with two equestrian rings. Hansen Dam in Lake View Terrace is crisscrossed by riding trails and has a 40 acre equestrian center with 17 arenas and several hundred boarding stalls. Orcus Park near Hansen Dam was converted to an equestrian park in 1999 and renamed Gabrielino Equestrian Park. It has staging areas and parking for recreational vehicles with overnight use by groups allowed by reservation. All of these city parks are linked by trails to the Angeles National Forest and Rim of the Valley Corridor trail systems. The Hansen Dam and

Griffith Park equestrian centers are managed by private operators, through leases with the Department of Recreation and Parks.

Equine population. The number of licensed equines has remained fairly stable during recent years. The annual license fee goes into the Equestrian Facilities Trust Fund for acquisition, construction and maintenance of equine trails and facilities on City properties. It is estimated that less than a third of all equines stabled in the city are licensed. In 1996-97 the Department of Animal Regulation issued 1,622 equine permits; 1,505 in 1997-98; and 1,695 in 1998-99. Most of the equines are boarded privately. Some are stabled in one of 52 private boarding stables, most of which are in the San Fernando Valley. In addition, equines stabled in the immediate environs utilize the city's equine trails and facilities. The largest concentration (approximately 1,500 equines) is located north of Griffith Park in Burbank and Glendale.

Conclusion. The city has a primary role in encouraging and enabling the retention and expansion of equine uses.

Continuing issues:

N Loss of equine sites due to change in use and encroachment.

N Lack of city standards for equine trail dedication, development, maintenance, safety and protection of the environment.

N Lack of city funds to maintain existing trails that are within the city's responsibility.

N Funding to accelerate the implementation of the Rim of the Valley Corridor and other trail and facility systems before opportunities are lost to acquire land for connecting trails and systems.

N Safe interface of trails with city streets.

Equine areas objective, policies and programs:

Objective: retain equine oriented uses as a part of the city's heritage and for recreational, educational and economic purposes.

Policy 1: continue to encourage the establishment of new equine uses and K districts and to protect existing significant areas from encroachment.

Program 1: designation of equine oriented policies, areas, trails and related information in community plans.

Responsibility: departments of *Building and Safety and *City Planning.

Program 2: as a part of community plan and/or other city plan preparation, identify equinekeeping areas that would be suitable for new K Districts and recommend that the City Council or planning commission initiate said districts.

Responsibility: departments of Animal Regulation, *City Planning, and Recreation and Parks.

Program 3: periodic review and revision of the equine provisions of the Los Angeles Municipal Code.

Responsibility: departments of *Animal Regulation, *City Planning, and *Recreation and Parks.

Policy 2: establish standards and procedures for a comprehensive equine trail system, similar to the bikeways system, including provisions for protection of watershed and natural environments.

Program: with the assistance of a citizen-technical advisory committee, develop requirements, guidelines, standards and procedures for equine trail dedications and maintenance and prepare a trail system plan.

Responsibility: departments of Animal Regulation, *City Planning, Public Works, *Recreation and Parks, and Transportation.

Policy 3: continue to expand and maintain trail linkages which will reinforce the viability of equine uses.

Program 1: street dedication, improvement and maintenance.

Responsibility: departments of *City Planning, *Public Works, Recreation and Parks and *Transportation.

Program 2: city park and cooperative trail development and linkage programs.

Responsibility: departments of City Planning, Environmental Affairs, and *Recreation and Parks.

Policy 4: continue to increase funding for equine trails and facilities acquisition, construction, maintenance and equine related city activities.

Program: exploration and development, with the assistance of private equine interests, of potential funding sources for equine related facilities and activities.

Responsibility: departments of *Animal Regulation, Office of Administration and Resource Services, *Recreation and Parks, other agencies as appropriate.

For related information about trails see:

N Community plans of the Los Angeles City General Plan, Los Angeles Department of City Planning (especially for communities in the north San Fernando Valley).

N "Guide to Existing and Potential Equestrian Trails," Los Angeles Department of City Planning, revised February 1991.

N "Major Equestrian and Hiking Trails Plan, an Element of the Master Plan of the City of Los Angeles," Department of City Planning and Department of Recreation and Parks, 1968.

N "Open Space Element," Los Angeles City General Plan (under preparation).

SECTION 8: EROSION

Wind, water and human activity cause erosion of land surfaces. Erosion can result in the loss of valuable ground surface materials, depositing them into basins and the ocean, and can result in the reduction in air quality due to wind carried dust. Erosion, especially water erosion, can damage the watershed and contribute to hillside instability and flooding. Following brush fires, the threat of erosion is great due to loss of ground cover.

Inland erosion. Since 1952, when Los Angeles became the first city in the nation to regulate hillside grading, the city has promulgated regulations that enable evaluation of slope stability and imposition of mitigation measures. The building code (LAMC Sections 91.700 et seq.) and Specific Plan for the Management of Flood Hazards (Ordinance 172,081) regulate grading, excavations, landfill and other construction activities that might cause or be impacted by slope or ground instability, erosion or flooding. Other development permits, such as subdivision permits, for projects on hillsides or in unstable areas

typically contain conditions for mitigation of potential slope instability and erosion, including slope reinforcement, planting, irrigation and drainage requirements. To hold the soil and protect watersheds from erosion following major brush fires, federal or state agencies sometimes seed denuded areas with wild plant seeds which rapidly germinate. However, such seeding may introduce plants which damage the local ecological balance and may increase brush density. Some botanists recommend no seeding and, instead, reliance on the natural regeneration of existing plants, some of which are assisted in their germination by fire conditions.

Beach erosion. Beaches within the boundaries of the city include Will Rogers and Dockweiler state beaches and Venice beach. City beaches are leased to Los Angeles county. The county maintains them and their related facilities and provides life guards and other services. Beaches are part of the ocean related ecological system. In addition, they provide a buffer which protects coastal areas and infrastructure (e.g., adjacent neighborhoods and streets) and they are a prime recreational and visual attraction for tourists and local residents. The loss of beaches could have a direct impact on the ecosystem, safety and the economy.

Los Angeles is affected by seasonal storms, generally between October and April. The storms can dump several inches of rain in a few hours. A 100-year capital storm can drop as much as 24 inches within 24-hours. Storms wash the land and carry debris, sediments, waste and other matter to the ocean. Over the millennia changes in river courses and geologic structures have resulted from earthquakes, erosion and other natural phenomenon. These natural actions have changed the shape and character of the coastline. They continue to operate but, in some cases, human activity has interceded to contain, redirect or redefine the coastline and natural events in ways that have impacted the beaches.

Apart from the flood control system, probably the most significant human intervention was the development of the Los Angeles-Long Beach harbors in the San Pedro Bay. In 1891 the U.S. Congress selected the bay as the site for a deep water port to serve southern California. The U.S. Army Corps of Engineers completed the port in 1914. Construction and expansion of the port and creation of the adjoining port at Long Beach required dredging of existing sediments, creation of new land forms and beaches and installation of structures within the bay. These activities caused significant changes in the ecology of the bay and adjacent coast. The initial channeling of the Los Angeles River (1921) was to divert water away from the harbor to protect it from flood damage. Channeling local rivers and streams and capturing sediments

before they reached the ocean reduced replenishment of ocean sediments and modified natural erosion and sedimentation patterns.

Harbor dredging and other development created and eroded beaches by changing tidal patterns or adding sand that created new beaches or replenished existing beaches. For example, in 1928 more than one million cubic yards of sand was dredged from the harbor and used to create what became Cabrillo Beach in San Pedro.

In the 1930s, the engineering bureau's hydraulic research laboratory evaluated sand migration in order to identify causes of erosion which were damaging roads and public systems. The study concluded that the primary cause of beach erosion was breakwaters and other army corps projects that had modified wave action along the coast. Flood control and drainage projects blocked the natural discharge of sediments into the ocean, virtually eliminating the natural replenishment of beach sands. Dredging removed sediments from the migration stream. Mitigation of beach erosion eventually was recognized by the federal government as being beyond the expertise, resources and authority of local jurisdictions.

Beach erosion management. An Act For the Improvement and Protection of the Beaches Along the Shores of the United States was enacted by Congress in 1936. It provided funding for federal construction of facilities to prevent coastal erosion in areas where federal interests were involved. The 1946 the Shore Protection Cost Sharing Act (Public Law 79-727) provided for up to one-third federal cost sharing for construction of shore protection projects on publicly-owned lands. But more was needed. By 1956 beach erosion was so endemic to large bodies of water within the United States that Congress placed the army corps in charge of beach erosion management in an effort to establish more comprehensive oversight. In 1962 the River and Harbor and Flood Control Act (PL 87-874) provided for the federal government to pay up to 70% of the beach erosion and shore protection construction costs.

The 1986 Water Resources Development Act (WARDA; PL 99-662) recognized hurricane and storm damage reduction and recreation as the primary purposes of beach erosion control projects. A 1996 amendment to WARDA added environmental restoration. WARDA is reenacted every two years. It delegates beach erosion management, in part, to the U.S. Army Corps of Engineers. WARDA provides federal cost sharing up to 65% and provides federal participation in periodic renourishment projects for up to 50 years, when protective dunes or sacrificial sand is employed to protect against storm and wave damage.

With reduction of beach renourishment funding in the mid-1990s, the beach erosion management program was severely curtailed. Migration of

sand and lack of sand replenishment has resulted in the virtual disappearance of some beaches in California. To address the issue, the American Coastal Coalition was formed to lobby for fund reinstatement and acceleration of beach renourishment programs. The coalition is comprised of representatives of coastal jurisdictions, including the Los Angeles County Beaches and Harbors Department, and interested groups throughout the nation. The county has initiated efforts to involve local jurisdictions in coalition activities which will help protect and renourish local beaches.

Conclusion. Although the city does not have primary jurisdiction over beach management, it has primary responsibility over dredging and construction in the harbor and land use actions on shore that can affect sedimentation patterns and result in erosion or replenishment of beaches. In addition, the city can lobby for state and federal legislation and programs that will protect beaches.

Continuing issues:

N Erosion of hillsides resulting in loss of natural watershed and features, flooding and endangerment to structures and people.

N Loss of beach sands resulting in loss of beaches; undermining or loss of natural features and endangerment to structures and people.

Erosion objective, policies and programs (for landslide and flood, see the Safety Element):

Objective: protect the coastline and watershed from erosion and inappropriate sedimentation that may or has resulted from human actions.

Policy 1: support legislation and efforts to secure and retain federal funding for Pacific coast beach protection and renourishment programs.

Program: include beach protection and renourishment in the city's federal and state legislative (lobbying) programs.

Responsibility: *Mayor and *City Council (and City Legislative Analyst).

Policy 2: continue to prevent or reduce erosion that will damage the watershed or beaches or will result in harmful sedimentation that might damage beaches or natural areas.

Program 1: permit processing and enforcement, especially mitigation of potential beach and soil erosion and protection of hillside and coastal terrain.

Responsibility: departments of *Building and Safety, City Planning and/or *any city agencies that have responsibility for planning, construction or maintenance of projects that could affect beach sediments and erosion.

Program 2: community plan land use provisions, especially protection of hillsides, watershed, beaches and the coastline.

Responsibility: *Department of City Planning.

Program 3: information dissemination about erosion abatement and landscaping.

Responsibility: departments of *Building and Safety, *City Planning, *Public Works, and *Water and Power.

Program 4: researching and continuing to improve Municipal Code regulations regarding soil stability and erosion abatement.

Responsibility: *Department of Building and Safety.

For related information see:

N Ocean Section (contamination and cleanup);

N "Infrastructure Systems Element" (wastewater discharge into the ocean), Los Angeles City General Plan (under preparation); and

N "Safety Element" (flood hazard, erosion), Los Angeles City General Plan, Los Angeles Department of City Planning, 1996.

SECTION 9: FISHERIES

A fishery is a water body containing a population or populations of fish, including shellfish. The only fisheries in the city are ocean fisheries. All lakes within the city are reservoirs. Most natural water courses are contained within flood control channels, which do not contain significant fish populations. Completion of the Donald C. Tillman Reclamation Plant in the Sepulveda Dam basin resulted in continuous discharge of treated water down the river, creating the first year-round Los Angeles River flow since the 1930s. Regeneration of the river environment due to the flow can support fish along the natural bottom stretches of the river, which now are rich in plant

life. The river fish tend to be introduced fish, like carp. Naturally occurring fish may be washed into the river from streams during storms.

Sport and commercial fishing takes place in freshwater and ocean environments. Pleasure fishing occurs at large local lakes that have been stocked by the California Department of Fish and Game (DFG). The program was initiated locally between 1993 and 1995. The lakes are stocked with catfish from May through November and with rainbow trout from November through April. In 1999, the DFG gave the city's Department of Recreation and Parks authority to contract with private suppliers, approved by the DFG, to stock city lakes with Channel Cat Fish.

Sport or recreational ocean fishing occurs from piers, beaches and boats. Commercial fishing boats ply the off-shore waters. Weather and other factors can affect the fishing industry and fisheries. In 1997-98 El Niño conditions warmed local waters, driving large communities of anchovies, squid and rock fish to cooler waters and attracting increased populations of sea bass, yellow tail and barracuda from Mexican waters. Until the early 1970s tuna canning was a major industry in California and in San Pedro. By 1985 the industry had shifted to American Samoa and Puerto Rico, partially due to international competition, labor costs and costs associated with the upgrading of aging plants to meet waste discharge cleanup regulations. During the same period in California the sea urchin industry expanded from 77,000 pounds (1972) to 51 million pounds (1981), largely for processing and export to Japan. In 1975 Mexico excluded U.S. fishing boats from its territorial waters and restricted access to white bass, yellowtail and other fish off the Baja coast, thereby significantly curtailing the local fishing industry. Contaminants also can affect fisheries. Chemical contaminants can make fish and shellfish hazardous to eat and can cause mutations to and death of entire populations. For information about contaminant impacts on the Santa Monica and San Pedro bays see the Ocean Section.

Fisheries protection. Too much harvesting can damage ocean animal populations. Market forces periodically shift due to changing culinary demands associated with shifts in food fads, local ethnic populations and international markets, sometimes resulting in damaging over harvesting of particular populations or species.

Under regulations promulgated by the state legislature, state Fish and Game Commission and the U.S. Fishery Management Council, the California Department of Fish and Game (DFG) sets catch limits and other regulations designed to protect marine populations from over harvesting. The DFG is responsible for state fisheries management. To protect the local fisheries, DFG restricts commercial fishing in 62% of

Santa Monica Bay, from Rocky Point (Palos Verdes Peninsula) to Malibu Point. It prohibits use of gill nets, trammel nets, purse seines and trawling in near shore areas and sets minimum size limits for some species, including the California halibut. The state legislature in 1998 directed the DFG, under the authority of the Marine Life Management Act, to develop comprehensive management plans to conserve and sustain designated classifications of threatened fish.

Fisheries are impacted by contaminants. Pollution discharge management is discussed in the Ocean Section.

Conclusion. Fisheries management is outside city authority. However the city has stewardship responsibility relative to discharges into the Santa Monica and San Pedro bays.

Continuing issues:

N Reduction and loss of remaining fisheries due to human activities and contaminants.

N Restoring native fisheries that have been lost or significantly reduced by over harvesting, contamination or loss of habitat.

N Contaminants that make local fish and shell fish a health hazard to humans and other animals if eaten.

Fisheries objectives, policies and programs:

Objective 1: protect and restore ocean fisheries (habitats).

Policies and programs: see the Ocean Section.

Objective 2: protect fisheries and enhance, restore or create fisheries for native fish populations and for sport fishing or harvesting in city managed waters.

Policy 1: continue to implement and to cooperate with lake fish stocking or enhancement programs.

Program 1: Coordination of the California Department of Fish and Game park lake fish stocking program.

Responsibility: *Department of Recreation and Parks.

Program 2: stocking or management of fisheries at Lake Crowley and other city-owned or managed lakes and fisheries outside the city boundaries.

Responsibility: *Department of Water and Power.

Policy 2: continue to consider and implement measures that will mitigate potential damage to and will encourage maintenance or restoration of fisheries.

Program: development permit processing and city property management and development.

Responsibility: departments of *Building and Safety and *City Planning, *lead agencies responsible for city development project implementation and *agencies that own or manage properties.

For related information see:

N Habitats and Scenic Areas Outside the City Section;

N Ocean Section (contamination, restoration and NPDES permit); and

N "Infrastructure Systems Element" (wastewater discharge into water bodies), City of the Los Angeles General Plan (under preparation).

SECTION 10: FOREST

The only remaining substantial conifer and big tree forests within the immediate Los Angeles city area are located outside the city's boundaries within the Angeles National Forest (aka Angeles Forest) and on the north slope of the Santa Susana Mountains (mostly within the Santa Clarita Woodlands Park). The park, noted for its Big Cone Spruce, is managed by the Santa Monica Mountains Conservancy. Plans are underway to develop an access-habitat corridor connecting the park to O'Melveny Park within the City of Los Angeles.

Angeles Forest contains natural flora ranging from desert to alpine growth, including 2,000 year old limber pines. Approximately 3,500 acres of Angeles Forest lands are located within the northern portions of the Sunland and Tujunga communities of the city. The forest reserve was established in response to a petition from the citizens of Los Angeles under the 1891 Forest Reserve Act. On December 20, 1892 President Benjamin Harrison announced the creation of the "San Gabriel Timberland Reserve" and placed it under the authority of the U.S. Department of Interior. The reserve was renamed the San Gabriel National Forest (1907) and then the Angeles National Forest (1908). It was the first national forest established in California and the eighth in the nation. The reserve was set aside to protect the watershed for development of farmlands in the Los Angeles and San Gabriel valley

basins. Today Angeles Forest comprises one-fourth of the land area of Los Angeles County, provides 35% of the Los Angeles basin's total ground water supply and continues to play a significant role in reducing flood hazards in the region, controlling erosion and providing large habitats for propagation and protection of native plants and wildlife.

Angeles Forest is comprised of two large sections that are separated by Soledad Canyon. It extends from the Tehachapi Mountains (near Kern County) to the San Bernardino National Forest (San Bernardino County). It is bounded by the Mojave Desert (north) and by Los Angeles, Pasadena and other cities and unincorporated areas (south). Its land area rises from the desert to one of the highest peaks in southern California, 10,064-foot high Mount Baldy. It contains over 690,000 acres of land, including most of the San Gabriel Mountains. Over 650,000 acres are managed by the U.S. Forest Service. Some 40,000 acres are privately owned parcels which the forest service is attempting to acquire. The city for decades has cooperated with the forest service in zoning private lands within and adjacent to the forest in very low density zoning, protecting equine and hiking trail linkages to the forest system and by supporting the forest service's efforts to acquire private lands within the forest boundaries and periphery of the forest.

While watershed protection is the primary purpose of the reserve, from before its inception it has been a major recreation resource for the region. Hikers and equestrians blazed trails through the forest beginning in the 1880s. The introduction of roads in the 1920s opened it to greater public access, leading to construction of camping facilities and private resorts. After World War II it became an increasingly important recreation area for Los Angeles.

It is one of the few national forests that is located close to the cities it serves. It provides recreational opportunities for over 12 million people in the region and ranks second to beaches in outdoor recreation popularity within the region. In addition to hiking, equine and off-road vehicle trails, within the forest boundaries are wilderness areas, fishing and other water recreation, the Mount Wilson observatory complex, campsites, youth camps, skiing facilities, experimental forestry sites, dams and other flood control facilities, reservoirs, protected historical and archaeological sites, fire service facilities, and other recreational, research, maintenance and educational sites and facilities. More than 16 threatened and endangered species are protected by habitats of the Angeles Forest.

Conclusion. The city does not have jurisdiction over the national forest. However it works cooperatively with the forest service in

integrating land use and trail systems, providing fire fighting assistance and other cooperative relationships.

Continuing issues:

N Acquisition of private lands within and adjacent to Angeles Forest for watershed, habitat protection, recreation and other forest compatible purposes.

N Coordination of public and private sectors to develop trail and habitat linkages that connect with the Angeles Forest systems.

Forest objective, policy and programs:

Objective: retain the forests as primary watershed, open space and recreational resources for the region.

Policy: continue to support the preservation and protection of Angeles Forest and Santa Clarita Woodlands.

Program 1: community plans, zoning and other land use policies and controls designed to prevent inappropriate development and uses adjacent to Angeles Forest.

Responsibility: *Department of City Planning.

Program 2: development of park lands adjoining, in proximity to or which link with the Angeles Forest and Santa Clarita woodlands with uses that are compatible with forest habitat protection, trail and corridor systems and forest facilities.

Responsibility: *Department of Recreation and Parks.

For related information see:

N "Infrastructure Systems Element" (groundwater, watershed), Los Angeles City General Plan (under preparation);

N "Open Space Element" (urban forest), Los Angeles City General Plan (under preparation); and

N "Safety Element" (fire protection agreements), Los Angeles City General Plan, Los Angeles Department of City Planning, 1996.

SECTION 11: GEOLOGIC HAZARD

The general plan Safety Element addresses seismic, geologic, flood, fire and other natural hazards, including identified risk areas within fault zones, potential liquefaction and landslide areas and flood plains. The general plan Infrastructure Systems Element will address associated facilities and systems.

SECTION 12: HABITATS

Los Angeles has a rich biodiversity, principally within mountain and coastal habitats. Many of the natural areas are threatened by urbanization which encroaches upon, reduces and fragments them and severs connecting habitat corridors that are essential for the survival of some species.

Definitions:

Habitat. Areas that support the survival of wild animals and native plants. These include native plant environments, (e.g., coastal sage scrub, oak woodlands, dunes and stream fed woodlands) and trees throughout the city that serve as stopovers and nesting places for migratory birds.

Biodiversity. The variety of living things, both plant and animal, in the environment.

Ecology. The relationship between living things and their environment. A balanced environment enables maintenance of healthy habitats which perpetuate biodiversity.

Habitat types within Los Angeles.

Inland habitats. Inland habitats are natural or artificially created refuges or water bodies. They provide habitats for resident species or stopovers for migratory birds. These include undeveloped areas, especially in the mountains, flood plains and other protected, restricted or private undeveloped lands; created lakes, reservoirs and dam sites and associated park and open space lands; and parks, golf courses, cemeteries and other lands with extensive natural or introduced vegetation.

Until the 1970s, acquisition generally was for development purposes, such as for expansion of the infrastructure (reservoirs, power transmission-rights-of-way, schools), for recreational or aesthetic purposes (parks and scenic parkways) or for protection of watersheds (national forests). In the 1970s local open space acquisition began to emphasize protection of biodiversity.

The emphasis began to shift due to national public interest in protection of the environment. This concern made possible one of the most significant measures for protection of habitats and establishment of public parks in U.S. history, the National Parks and Recreation Act of 1978, which was engineered by Congressman Philip Burton of San Francisco. It provided funds for hundreds of parks, trail linkages, wilderness areas, historic and cultural sites and facilities, seashores, scenic and wild rivers and other sites throughout the United States and its territories, including $150 million for the establishment of the Santa Monica Mountains National Recreation Area (SMMNRA).

Until the mid-1990s public land acquisition and dedications often were opportunistic, resulting in some parcels being isolated from public access and lacking in wildlife corridors to interconnect habitats, further species propagation or link recreational uses. A scarcity of funding, increasing demands for conveniently accessible recreational opportunities and continuing encroachment into open space areas resulted in a shift in emphasis from opportunistic acquisition to securing lands that provide the greatest amount of habitat preservation and human values.

Today a variety of entities and organizations in the region are working together to link the existing parcels of public and quasi-public forest and park land in order to provide permanent wildlife habitats and habitat corridors, protect native plants and scenic areas, provide trails and other open space-compatible recreation, enhance the public's access to views and use of open space, provide research and educational opportunities, and protect historical, paleontological and archaeological sites. The largest collection of publicly owned natural habitats in the city are the parks and publicly owned open spaces in the San Gabriel, Santa Monica, Verdugo and Santa Susana Mountains.

Significant Ecological Areas (SEAs). SEAs are significant habitats identified by Los Angeles County as important for the preservation and maintenance of biodiversity. They were identified and formally documented by the Regional Planning Commission (1976) to elaborate the "significant ecological area" provisions contained in the 1972 interim county general plan (finalized 1980). Each SEA was selected on the basis of existing known habitats of sensitive or endangered species as well as sites containing a diversity of native plant and animal resources. Within the City of Los Angeles all or part of some of the sites (Exhibit B) are privately owned, some of which have been developed with structures or other uses. Publicly owned portions of SEAs generally have been classified in the Open Space Zone and often are part of public park sites. SEA designations provide an informational basis for analysis of private projects relative to CEQA

review and guide public and private efforts to develop strategies for protecting and acquiring existing habitats. For example, in October 1999 the Department of Water and Power agreed to maintain the Chatsworth reservoir as a natural reserve. Designation of the site as a SEA assisted efforts to protect it from sale and possible development. The county is in the process of revising its general plan and the SEA designations.

Wildlife corridors. Wildlife corridors are land segments that connect two or more large habitat areas and provide a habitat for movement of animals between those areas. They encourage protection and health of animal populations by enabling access to food and broader animal interchange for healthy species propagation. Loss of corridors especially impacts large carnivores that need extensive territory for survival. As freeways and other barriers block corridors and as habitats shrink, large animals are forced from the city or are unable to survive.

The most extensive local effort to establish corridor linkages is the Rim of the Valley Trail Corridor. The corridor plan is based on the masters thesis of California State University at Northridge student Marge Feinberg (1974). Her plan was adopted into state law (Public Resources Code Section 33204.3) in 1990. The act authorizes the Santa Monica Mountains Conservancy, a state agency, to work with counties and cities within the greater Los Angeles area to acquire land and coordinate efforts to create a continuous necklace of public parks, habitat corridors and trails which will link the entire mountain system around the San Fernando and La Crescenta Valleys. One of the prime features of the plan is creation of permanent habitat corridors to protect endangered and threatened native plant and animal species.

Another important corridor project is the carnivore study (begun 1996), which is sponsored by the National Park Service in coordination with UCLA, the University of Massachusetts and other entities. It is monitoring large carnivores (including cougars, bobcats and coyotes) within a 30 square mile portion of the central Santa Monica Mountains National Recreation Area (SMMNRA) to estimate their chances of long-term survival in an urbanized environment. The study is providing field data on which to base protection and management actions and is assisting in identifying and evaluating additional properties needed for habitat and corridor preservation and restoration. It has identified several corridors, including corridors between the Santa Susana Mountains and the Simi Hills and between the Simi Hills and the Santa Monica Mountains. Other corridors include connections between the Santa Monica Mountains and the Verdugo and San Gabriel Mountains.

The study has found that, although SMMNRA is a largely undeveloped area, wildlife corridors and habitats have been encroached upon and fragmented by urbanization. Some corridors have been eliminated, forcing animals to cross roads or use culverts and roadway underpasses to access their territories. The study is monitoring the use of such introduced passageways. Other studies have arrived at the same conclusion. In recognition of the impact new transportation systems can have on wildlife corridors, the U.S. Congress (1998) authorized funding under the Transportation Equity Act for the 21st Century (TEA-21) for wildlife corridor protection relative to proposed federally funded transportation projects, including mitigation of potential vehicle and animal conflicts, e.g., construction of animal tunnels.

Ocean habitat. See Ocean Section.

Coastal wetlands. Wetlands are transitional lands between water and land systems where the water table is usually at or near the surface or the land is covered by shallow water, e.g., marshes and bogs. Wetlands in the city are associated with springs, streams, rivers (e.g., Tujunga Wash) and lakes, as well as the ocean. Among the largest and most threatened wetlands are the coastal wetlands. Wetlands filter and cleanse water of pollutants and provide wildlife habitats. During the 20th century an estimated 95% of the wetlands along the Los Angeles coast disappeared, largely due to water being diverted by flood control and drainage systems, development of wetlands, encroachment, water contamination and other impacts associated with urbanization.

Only remnants of coastal wetlands have survived in the city. The largest is in the Westchester-Playa del Rey community. It is the Ballona wetlands, an identified SEA. Approximately 374 acres of the wetlands are within the Playa Vista development project. Much of the wetlands, Ballona Creek Channel and associated dune and habitat areas are proposed by the project for habitat enhancement, including wetlands restoration, creation of a freshwater marsh and establishment of a riparian corridor.

Within the Venice community is the Venice Canal System, which is an SEA, a city historic monument and an important part of the wetlands system. The Venice Local Coastal Program, Venice Community Plan and Venice Coastal Zone Specific Plan contain policies and regulations to guide public and private canal enhancement and protection.

The Ballona Lagoon is part of the system. It connects the canals to the Pacific Ocean. Over the century since the canals were built as a part of a unique subdivision (1905), accumulated sediments have impacted water circulation and pollutants and human activity have damaged the ecology of the canal system. In 1988, concerned citizens formed the

Ballona Lagoon Marine Preserve (BLMP) to protect and restore the lagoon. BLMP's efforts led to the lagoon restoration and enhancement project (1997), which is nearing completion. To gain greater control of the lagoon, the city swapped city-owned lands for private land on the west bank and, along with the California Coastal Conservancy, acquired additional land control through easements. Upon completion of the project the city's Bureau of Street Services will assume responsibility for maintenance of the lagoon. Plans for additional enhancements and public access improvements are under consideration.

In 1993 the Bureau of Engineering completed the Venice Canals rehabilitation project. Begun in 1991, it included dredging of the canals to improve water circulation, construction of new canal banks, reconstruction of several bridges, replanting canal banks with indigenous and compatible vegetation and improvement of public access, including construction of bikeways and pedestrian paths. Upon completion of the project the Bureau of Street Services assumed responsibility for canal maintenance.

Habitat protection legislation.

California Environmental Quality Act (CEQA). CEQA requires evaluation of potential impacts of proposed projects on biodiversity, habitats, wildlife dispersal and migration corridors. Potential negative impacts are to be avoided, minimized or mitigated to a level of insignificance. Off-site mitigation may be employed to reduce on-site mitigation burdens on a project.

The Bolsa Chica Restoration Project in neighboring Orange County is an example of the application of off-site mitigation for a Los Angeles based project. Bolsa Chica is a combined federal-state management project headed by the California Coastal Conservancy. The project includes the purchase of approximately 880 acres of oil fields and restoration of almost 600 acres of wetlands to establish a habitat preserve. Although a variety of agencies and private parties are contributing funds to the project, the bulk of the funding for land purchase and restoration is from the ports of Los Angeles and Long Beach. They have contributed millions of dollars, as part of their CEQA mitigation requirements, to compensate for natural resources lost within the harbor due to harbor expansion.

Development of the city's Geographic Information System (GIS) will greatly assist in CEQA evaluation and the mapping of environmental data. In a cooperative effort, the planning department and other public agencies are recording data from a variety of information sources for every parcel of land in the city. Environmental and other geographically based data will be accessible by system users, including

the general public, via the Internet. GIS already is providing invaluable information to agencies for land use planning, development projects and CEQA analysis. The exhibits that are a part of this element were generated from the city's GIS data base.

Natural Community Conservation Act (NCCA). Following complaints by developers and property owners that protection of identified species unduly delayed projects and constituted a taking of their land, the state enacted the Natural Community Conservation Act of 1991 (Fish and Game Code Chapter 10, Division 3, Sections 2800 et seq.). The NCCA is administered by the Department of Fish and Game (DFG). Its goal is to identify and secure habitat areas for protection of biodiversity. Habitat areas are identified by the DFG and plans are prepared for habitat protection. The pilot program for southern California is the coastal sage scrub habitat area, including the Palos Verdes Peninsula, the only site near Los Angeles city. The coastal sage scrub is the home of the California gnatcatcher and approximately 100 other potentially threatened or endangered species.

When a development project is proposed, a determination is made concerning the potential impacts of the project on biodiversity and the best means of avoiding or mitigating them. The NCCA allows local, state or federal agencies to enter into agreements with public and private entities to implement a "natural community conservation plan" (NCCP), e.g., habitat and species protection within a specified geographic area. Participation in an NCCP does not exempt a development project from CEQA. Mitigation measures pursuant to CEQA may, as an alternative, include participation in an NCCP in order to reduce the burden for on-site mitigation. As far as can be ascertained, no projects within the City of Los Angeles are utilizing the NCCA.

Conclusion. The city has an important role in preserving, protecting, enhancing, creating and monitoring habitats to ensure the maintenance of the rich local biodiversity. Its primary means are acquisition, management of publicly owned sites, permit processing, data collection, regulatory authority and cooperative efforts with other entities.

Continuing issues:

N Loss or degradation of the last remaining SEAs.

N Loss or severing of habitats, habitat corridors and migratory bird stopover sites that are essential for the healthy propagation and maintenance of native and migratory species.

Habitats/ecological areas objective, policies, programs (see also Endangered Species, Fisheries, Ocean and Wetlands sections):

Objective: preserve, protect, restore and enhance natural plant and wildlife diversity, habitats, corridors and linkages so as to enable the healthy propagation and survival of native species, especially those species that are endangered, sensitive, threatened or species of special concern.

Policy 1: continue to identify significant habitat areas, corridors and buffers and to take measures to protect, enhance and/or restore them.

Program 1: development permit environmental review and other applicable processes that identify and/or require evaluation, avoidance, minimization and mitigation of potential significant impacts on natural habitats, corridors and linkages.

Responsibility: departments of *Building and Safety and *City Planning, *lead agencies responsible for city development project implementation and *agencies that own or manage properties.

Program 2: community plan land use classification of significant habitats in categories that will encourage their retention.

Responsibility: *Department of City Planning.

Policy 2: continue to protect, restore and/or enhance habitat areas, linkages and corridor segments, to the greatest extent practical, within city owned or managed sites.

Program: City property management.

Responsibility: *city agencies that own or manage lands and/or are responsible for project implementation.

Policy 3: continue to work cooperatively with other agencies and entities in protecting local habitats and endangered, threatened, sensitive and rare species.

Program: property acquisition and providing support or assistance to other public and private entities in acquiring habitat areas and corridors and for habitat recovery efforts for species protection and recreational uses.

Responsibility: *Mayor, *City Council (and City Legislative Analyst), *Department of Recreation and Parks.

Policy 4: continue to support legislation that encourages and facilitates protection of local native plant and animal habitats.

Program: City legislative program.

Responsibility: *Mayor and *City Council (and City Legislative Analyst).

For related information see:

N Endangered Species Section;

N Fisheries Section;

N Habitats/Scenic Lands Outside the City Section;

N Ocean Section; and

N "Open Space Element," Los Angeles City General Plan (under preparation).

SECTION 13: HABITATS AND SCENIC AREAS OUTSIDE THE CITY

The city, by virtue of its facility and utility sites outside city boundaries, has a habitat stewardship role beyond its borders. Its land holdings and its facility and land agreements include park, recreation, airport, dam, power transmission rights-of-way, power plant, aqueduct and other facilities, systems and sites. Most of the lands and facilities are under the ownership or management of the Department of Water and Power (DWP). The remainder are owned or managed by the airports department, or other city agencies.

The city's environmental stewardship has occasionally been challenged. Challenges recently have resulted in commitments to protect, restore and/or enhance four significant habitat and scenic areas: the Grand Canyon-Colorado River Plateau, Owens Valley, Owens Lake and Mono Lake. The four cases and related commitments are summarized below.

Grand Canyon-Colorado River Plateau. One of the nation's most important open space resource areas is the Colorado River Plateau, which includes the Grand Canyon and Glen Canyon. In recent decades there has been national concern about increased visibility pollution which sometimes obliterates views of vistas and nearby landmarks. Over a century ago the haze was due largely to wind swept dust and lightning caused forest fires. Recent studies identified a variety of sources, including sulfur dioxide emitted from coal fired generating stations. Sulfur dioxide combines with moisture to form tiny, visible sulfate particles that discolor the air, contributing to the haze. Polluted air is sucked into Grand Canyon by cold air, which drains from the high plateaus and

settles in the canyon, impairing the spectacular views tourists travel thousands of miles to see.

The Navajo Generating Station, owned by the Salt River Project consortium, which includes the DWP, was identified as one source of the haze. It is located near Page, Arizona, south and east of the Glen Canyon National Park and at the northeast edge of Grand Canyon National Park, 80 miles from the main Grand Canyon visitor center. This coal fired facility was constructed in 1975, before sulfur dioxide scrubbers became available.

A series of studies were conducted (1987-89) to identify the sources of Grand Canyon haze. Chemical tracers used in a National Park Service study, partially funded by the consortium, identified some of the haze as originating from the Navajo plant. Based on the study, the Environmental Defense Fund sued the EPA for failing to enforce the visibility provision of the Clean Air Act. An EPA study concluded that in the winter, between November and March, haze reduced visibility at the Grand Canyon from 150 miles to under 10 miles and that the Navajo plant was a significant source. A verification study by the National Academy of Sciences found that the winter haze was caused primarily by automotive vehicle exhausts, that the Navajo plant "contributed significantly" and that ore smelters, pollution from near and distant urban areas (including Mexico) and other sources also contributed. Based on the study, the EPA (1989) contended that the Navajo plant contributed 40% of the introduced haze. It issued an order requiring the consortium to install scrubbers.

The consortium agreed (1991) to reduce visibility impacts by installing scrubbers designed to remove 90% of the sulfur dioxide emissions. These were in service by August 1999. The historic agreement marked the first time the EPA had enforced the Clean Air Act provisions requiring protection of visibility at national parks and wilderness areas. For the first time it acted solely to protect visibility and aesthetic values, not health quality. The scrubbers may improve visibility at the Grand Canyon by 7% on an average winter day. They are not expected to improve visibility during summer months when air pollution from the Los Angeles basin is the principal source of Colorado Plateau haze.

Another potential source of sulfur dioxide pollution affecting the Colorado Plateau region is the Mohave Generating Station in Laughlin, Nevada. The station is operated by the Southern California Edison Company and is partially owned by the DWP. It was constructed in 1971 and has partial emission controls. As a result of negotiations, which were concluded in 1999 to settle pending litigation, an agreement was reached requiring the station to install additional emission controls

by 2005, or to cease operation in its present form, e.g., coal fired facility.

Owens Lake and Owens Valley. City of Los Angeles and federal ownership of almost all the lands in the Owens Valley, including mountain slopes on both sides of the valley, has kept the area free from commercial development, providing an almost unbroken view from Highway 395 of the magnificent Sierra Nevada and White Mountains. Public ownership also has enabled public access for hiking, hunting, fishing and winter sports. But the city's diversion of the Owens River waters before they reach Owens Lake and tapping of underground valley water have contributed to impaired air quality and other impacts on the valley.

Owens Lake. The air quality issue associated with the drying of the lake, primarily due to water diversion, resulted in dust mitigation measures. These, in turn, resulted in side benefits to habitat and wildlife enhancement. The majority of Owens Lake (95%) is owned by the State of California and is under the authority of the State Lands Commission.

The lake is a remnant of a large prehistoric freshwater lake which at one time extended some 60 miles up and down Owens Valley, reaching a depth of 320 feet. By the time settlers entered the valley in the mid-19th century, Owens Lake had shrunk to a fraction of that size, to a shallow, salty desert sink. Dissolved minerals and salts, which had flowed into the lake for millennia, had become so concentrated by evaporation that only algae, brine shrimp, brine flies and other primitive life could survive.

By 1905, diversion of Owens River water by local farmers and an extended drought shrank the lake even more. Shrinkage was accelerated by the Los Angeles River Aqueduct. Completed in 1913, the aqueduct diverted most of the remaining river water before it reached the lake.

By the late 1920s, the lake had become a dry lake, one of the largest dry lakes in California. Its rapid shrinking had left shallow brine pools within the dry lake bed and springs and seeps around its edges. These wetlands supported remnants of the primitive marine ecosystem, some of which remain to this day.

Due to the accelerated drying of the lake caused by the aqueduct diversion, an alkaline crust of dissolved and crystallized minerals and salts was created over much of the lake bed. Winds and shifting sands lacerated the crust, resulting in dust becoming airborne during windy periods.

Passage of the federal Clean Air Act (1963), and its subsequent amendments, and formation (1979) of the Great Basin Unified Air Pollution Control District (APCD) lead to efforts to implement federal clean air standards. In 1983, legislation (California Health and Safety Code Section 42316) was enacted which allowed Los Angeles to continue exercising its water rights in the Owens Valley, providing it complied with state and federal air quality standards by mitigating documented air quality impacts resulting from the city's water withdrawals from the valley.

In 1990 an amendment to the federal Clean Air Act identified the area as a "non-attainment" area in meeting clean air standards for particulate matter. It required attainment by 2001, with a five-year extension option. The 1997 State Implementation Plan (SIP) for achieving attainment required Los Angeles to use specified measures to mitigate the dust relative to Owens Lake. Because the measures had not been fully tested in the Owens Lake environment and conditions of the lake crust varied from site to site and with changes in the climate, Los Angeles challenged the plan. It was concerned about being required to expend money and effort implementing measures that might not work. To assess the situation, Mayor Richard Riordan and other Los Angeles officials toured the valley and met with APCD officials in August 1997. Riordan was the first Los Angeles mayor to officially visit Owens Valley since the first aqueduct was completed.

In response to the city's challenge, the California Air Resources Board directed it and the APCD to work out a compromise. The negotiations resulted (1998) in a memorandum of agreement (MOA). Provisions of the MOA were incorporated into the revised SIP (1998) and approved by the federal Environmental Protection Agency (1999) for attainment of air quality standards by a new date, 2006.

The MOA addresses dust abatement and allows phased and flexible implementation. It requires that ten square miles of the 110-square mile lake bed be treated by the end of 2001, an additional 3.5 square miles in the year 2002 and three more in 2003. At least two square miles per year are to be treated each year, or until the APCD deems that the federal standards have been met. The plan will be reviewed in 2003 to determine if the pace should be quickened to achieve the air quality standards by 2006. The DWP may use a variety of strategies, including shallow flooding, planting of vegetation, covering areas with gravel.

The lake will not be refilled. Instead, sections will be treated with water or vegetation, or covered with gravel to control dust. Initially, ten square miles will be flooded with a few inches of water, permanently covering or saturating sections of the lake bed crust, a

measure that, as a side benefit to air quality improvement, will contribute to habitat restoration and enhancement. In June and July of each year, additional water will be provided to specified locations for maintenance of food and water sources suitable for sustaining nesting and fledgling shorebirds. Native and other designated plant species will be encouraged in designated areas. Incompatible species, e.g., salt cedar, will be removed. Berm and access roads will be provided with snowy plover crossings to allow free movement of adult and chick plovers. To protect human health, a mosquito abatement program will be implemented.

The DWP estimates that the initial shallow flooding phase will cost $100 million to implement. The total project will result in an estimated loss of 40,000 acre feet of aqueduct water per year (equal to service to 80,000 households), which will be replaced through water purchases and other means.

Owens Valley. Vegetation protection evolved out of the Owens Valley groundwater pumping issue. The protections relate to those sections of the valley that are owned by the City of Los Angeles, roughly between Lone Pine and Bishop, not including Owens Lake.

The city's plan for a second aqueduct and enactment of the California Environmental Quality Act of 1970 (CEQA) prompted a suit (1972) by Inyo County to restrict the city's groundwater pumping in Owens Valley. Inyo alleged that the city's plan to increase flows for the second aqueduct by pumping additional ground water violated CEQA. After a decade of suits, counter suits and negotiations, the city and Inyo agreed to jointly prepare an environmental impact report (EIR) that would address existing and potential impacts associated with the pumping. Completed in 1991, the EIR identified two separate time periods (1970-90 and 1990 onward) of mitigation measures for implementation by the DWP. The measures related to impacts associated with prior pumping (1970-90) and to potential impacts associated with planned future pumping.

Challenges to the EIR, its process and authority resulted in the court inviting testimony from interested parties. Subsequently, Los Angeles and Inyo entered into a memorandum of understanding (MOU) which affirmed the EIR and included additional mitigation measures. Based on the MOU, the court ruled (1997) that the EIR met legal requirements.

The EIR contains mitigation measures, goals for vegetation protection and procedures for preparation of annual plans to address future potential vegetation impacts. Mitigation measures include transfer of town water systems to local control and annual payment by the city to Inyo County of funds for local programs and services, including park

acquisition and maintenance, salt cedar plant nuisance abatement and for county water department environmental programs.

Mono Lake. In 1940 the DWP extended its aqueduct system to Mono Basin, diverting snow melt waters from Lee Vining, Walker, Parker and Rush creeks, the main sources that feed Mono Lake. The 65 square mile salty, alkaline lake lies 6,000 feet above sea level in the high desert of the eastern Sierra, below the Tioga Pass entry to Yosemite National Park. More than 250,000 people a year from all over the world arrive by road, foot or on skis to enjoy the eerie volcanic beauty and magnificent views. The lake is believed to be a million year old remnant of an inland sea. Minerals carried by waters that flow through volcanic and geologic formations maintain the high saline content of the lake, which provides a unique ecosystem that supports millions of rare brine shrimp and other organisms. The organisms provide food for migratory birds and are harvested commercially. Two large volcanic islands (Paoha and Negit) provide migratory stop-over and nesting sites for thousands of ocean feeding birds, including phalaropes, which arrive in midsummer on their way from the arctic to nesting grounds in Baja, California. An estimated 90% (50,000 birds) of the California and 20% of the world sea gull population nest on the islands.

Diversion by the DWP of as much as 95,000 acre feet of water annually, along with Owens Valley resources, provides Los Angeles with its least expensive and purest sources of water. But diversion has severely impacted the Mono Basin, causing the lake to drop as much as 40 feet since 1941. The drop exposed 21 square miles of lake bed. This resulted in a doubling of the water's salinity (three times saltier than the ocean) and left a residue of dry salt and mineral crystals, similar to that of Owens Lake, that was stirred into dust clouds by high winds.

In the late 1970s, continued low snowfall in the eastern Sierra, combined with the DWP's diversion of stream water caused the level of the lake to drop significantly, exposing land bridges to Negit Island. Coyotes traversed the exposed land, destroying a colony of nesting gulls (1978). The Audubon Society and the Mono Lake Committee petitioned the court to prohibit the diversion of creek waters, contending it was causing irreversible ecological damage.

Heavy snowfall during the winters of 1983 and 1984 led to another court action. The abundant snow melt following the heavy snowfalls caused the two DWP dams to overflow, sending water and trout down the dry stream beds that fed the lake. When the DWP resumed its stream diversion, California Trout, Inc., a sport fishing organization, and the Mono Lake Committee filed suit requesting enforcement of a state fisheries law that prohibits killing of fisheries to supply water to an aqueduct.

After a decade of litigation and negotiation, the state Water Resources Control Board (1994) issued Decision No. 1631, which establishes a schedule of stream flows; fixes the amount of water the DWP can divert from the basin, based on the elevation of the lake; and requires preparation of a stream and waterfowl habitat restoration plan. Following a settlement agreement between Los Angeles and interested parties concerning the monitoring program, the board (1998) approved the stream and waterfowl habitat plan.

The plan permits the DWP to export 16,000 acre feet of water a year from the basin. This figure will increase to 30,000 acre feet per year when Mono Lake reaches an elevation of 6,391 feet. The lake had risen to 6,385 feet by 2000, sufficiently covering the land bridges between Negit Island to ward off coyotes. It is anticipated that it will take approximately 20 years for the 6,391 level to be achieved.

To assist Los Angeles in replacing aqueduct water due to the reduced diversion, the state legislature (1994) approved a bill allocating $36 million for water projects in Los Angeles, primarily for the East Valley Reclamation Project in the San Fernando Valley. The East Valley Project will provide an estimated one-third of the amount of Mono Lake water lost as a result of the settlement. The DWP will supply remaining water needs by purchase and from other sources.

Conclusion. The city is responsible, in whole or in part, for management of facilities and properties it owns or operates outside its borders. Its stewardship includes consideration of potential impacts on and management of natural areas and scenic resources.

Continuing issues:

N Meeting the city's water, power and other needs while at the same time striving to be a good steward of natural resources and to minimize impacts on the environment.

N Compliance with environmental protection legal agreements involving City owned or operated facilities which are located beyond the city's borders.

Habitats and scenic areas outside the city objective, policies and programs:

Objective: protect important natural habitats and scenic sites outside the city which are owned by the city or are impacted by city facilities.

Policy 1: continue striving to meet the city's water, power and other needs while at the same time striving to be a good steward of natural resources and minimizing impacts on the environment.

Program: City facility and property management programs.

Responsibility: departments of *Airports, *Public Works and *Water and Power.

Policy 2: continue striving to meet legal mandates to avoid, mitigate or abate potential significant environmental impacts associated with city facilities that are located outside the city's borders.

Program: operating agency facility and property management programs.

Responsibility: departments of *Airports, *Public Works, *Recreation and Parks, and *Water and Power.

For related information see:

N "Infrastructure Systems Element" (including water and power facilities and systems), Los Angeles City General Plan (under preparation) and

N "Public Facilities and Services Element" (parks and other city facilities), Los Angeles City General Plan (under preparation).

SECTION 14: HAZARDOUS MATERIALS

The general plan Safety Element addresses hazardous materials. However, after the element was drafted, several important changes took place that warrant mentioning. These involve the state Unified Program and landfill, brownfields and NPDES programs.

Unified Program. In an effort to streamline hazardous materials management the state adopted the Unified Hazardous Waste and Materials Management Regulatory Program (aka Unified Program). The program (California Health and Safety Code, Division 20 and Code of Regulations, Titles 19, 22, 24 and 27) consolidates and makes six existing state hazardous waste and materials management programs consistent with each other and mandates their coordination. The Los Angeles City Fire Department applied for and was designated the Certified Unified Program Agency (CUPA) for the city (1997), making it the single point contact for Unified Program activities. As the city's CUPA, the Fire Department accepts applications from regulated facilities, issues permits, performs inspections, coordinates with

other regulatory agencies, enforces regulations within its jurisdiction and provides information regarding hazardous materials regulations and management. The Fire Department, as described in the Safety Element, already was performing many of the tasks assigned by state legislation.

In 1995 the non-regulatory Hazardous and Toxic Materials Office was transferred from the Department of Public Works to the Environmental Affairs Department (EAD). The office works primarily with businesses and city agencies, disseminating information, providing technical assistance and coordinating city efforts to promote proper hazardous materials management and prevention of hazardous materials pollution.

Landfill regulation. Pursuant to state law (Public Resources Code Division 30 and Code of Regulations Titles 14 and 27) cities and counties are authorized to enforce solid waste management regulations at all landfill, transfer station and composting facilities. In 1993, the city established (Ordinance No. 168,508) a local enforcement agency (LEA) within EAD. The LEA monitors approximately 100 solid waste facilities, including open and closed disposal sites and potential former disposal sites that have been identified by the California State Integrated Waste Management Board (IWMB). The disposal sites are located throughout the city. Most were established prior to government landfill siting regulations. Some may have been established in the 19th century. Landfill sites deemed to have existing or potential health or safety problems are inspected by the LEA. Redevelopment of a site requires LEA approval prior to issuance of a building permit. The LEA evaluates proposed plans and the site. It can require soils reports and may impose conditions to abate any potential health or safety problems. Sites deemed not to have been a landfill or to have no health or safety problems are recommended by the LEA to the IWMB for removal from the site inspection list.

Brownfields. The U.S. Environmental Protection Agency (EPA) defines brownfields as abandoned, inactive or underutilized industrial and commercial properties where expansion or redevelopment is complicated by real or perceived environmental contamination. The EPA provides funds for site assessment and revitalization of sites that are contaminated with hazardous materials.

The city's brownfields program is a collaborative approach to redevelopment of individual or groups of old industrial parcels. Soil contamination often is a major deterrent to redevelopment because owners lack the funds to cleanup the contaminants which are impeding property sale or improvement. Most of the sites are located within communities which grew up around industries, some of which were established before World War I. The goal of the city program is to assist property owners in resolving contamination related problems

(e.g., legal, financial, bureaucratic) so that contaminated properties cleaned up and redeveloped, thereby providing a catalyst for community revitalization.

Primary agencies involved in the city's brownfields program are the Community Redevelopment Agency (CRA), the EAD, Community Development Department, the Mayor's Office of Economic Development and City Council offices of districts in which the projects are located. Other agencies join to provide technical expertise, help secure funding, coordinate infrastructure improvements and assist in site redevelopment.

One of the city's first brownfields demonstration projects was the Goodyear Tract, a 208-acre, multi-ownership industrial area located in South Central Los Angeles near the Alameda rail corridor. For over a decade the area was the focus of debate regarding the appropriate mechanism to achieve neighborhood-compatible reuse. The mechanism selected was designation of the area, including the Goodyear Tract, as a redevelopment project area, under the administration of the CRA. The Goodyear Tract portion will be redeveloped primarily with industrial uses.

Another project is the former Crown Coach site, a 20-acre vacant contaminated parcel that is owned by the State of California and is located less than three miles from the Los Angeles civic center. Under agreement with the state, Los Angeles conducted a site assessment. It subsequently completed soil cleanup and has issued a request for proposal for site development which will maximize community and economic benefit of the site. The developer will collaborate with the state to accomplish groundwater cleanup.

The innovative collaborative approach and success of the Goodyear Tract and other brownfields projects helped the city win selection as one of 16 communities around the nation to be designated (1998) by the federal government as Brownfields Showcase Communities. The designation made the city eligible for special funding and technical assistance from federal agencies which have joined to address brownfields issues in Los Angeles. The city's program provides direct technical and other assistance to over 30 sites throughout the city (2000).

NPDES. The Bureau of Sanitation has regulatory authority over discharge of hazardous and non-hazardous materials into sewer and stormwater systems. In 1998 responsibility for coordination of the city's compliance with the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit was transferred from the engineering to the sanitation bureau.

Conclusion. The city has a primary regulatory, informational and catalytic role in hazardous materials management, cleanup and brownfields site revitalization.

Continuing issues:

- Reduce the amount of release of toxic waste into air, land and water.

- Existing contaminated sites that pose a threat to public or environmental health, or discourage site redevelopment.

- Improper use, storage, transport or disposal of hazardous materials.

- Accidental release of hazardous materials.

Hazardous materials goals, objectives, policies and programs: see the Safety Element. The new information identified in this element is covered by the objectives and policies of the Safety Element.

For related information see:

- "Infrastructure Systems Element" (wastewater, solid waste and water resources management), Los Angeles City General Plan (under preparation);

- Ocean Section (NPDES permit); and

- "Safety Element" (hazardous materials), Los Angeles City General Plan, Los Angeles Department of City Planning, 1996.

SECTION 15: LAND FORM AND SCENIC VISTAS

The city encompasses 467 square miles of land area, including approximately 214 square miles of hills and mountains. The San Gabriel and Santa Susana Mountains bound the city on the north, the Santa Monica Mountains extend across the middle of the city, and the Palos Verdes Hills and Pacific Ocean are on the south and west. The topography rises from sea level to 5,074 feet (Sister Elsie station in the San Gabriel Mountain foothills in Tujunga). The Santa Monica Mountains are the most visible feature from many areas of the city. They are 60 miles long and stretch from Elysian and Griffith parks in Los Angeles to Point Mugu State Park in Ventura County. The Los Angeles River and its associated tributaries and flood plains also are prominent topographic features.

Land form protection. Several sections of the Los Angeles Municipal Code (LAMC) are specifically intended to encourage retention of

existing land forms. These include the residential planned development supplemental district (LAMC Section 13.04), which encourages clustering of development in order to reduce grading and preserve existing natural terrain; the slope-density regulations (LAMC Section 17.50-E), which restrict density on the basis of the calculated average of the ungraded slopes at selected contours within a parcel that is proposed for divisions of land; the hillside overlay zone (LAMC 12.21-A.17) within which restricted densities and other requirements for neighborhood and environmental compatibility apply; and the Specific Plan For The Management of Flood Hazards (Ordinance 172,081), which contains hazard protection requirements. In addition, some community plans contain land form protection provisions. Under the California Environmental Quality Act, project design adjustments may be required to mitigate potential significant impacts on landform and unique site features. The California Coastal Act requires minimization of natural landform alteration by new development projects within the coastal zone, including minimization of activities that would contribute to erosion and geologic instability. Flood plain management is addressed by the general plan Safety Element.

Scenic features protection. Scenic views or vistas are the panoramic public view access to natural features, including views of the ocean, striking or unusual natural terrain, or unique urban or historic features. Public access to these views is from park lands, private and publicly owned sites and public rights-of-way.

The Transportation Element contains provisions regulating scenic highways which are not regulated by specific plans. The element contains a map of the designated scenic highways and guidelines for protection of natural scenic features and for aesthetic enhancement of the highways. Scenic protection provisions also are contained in the community plans. The LAMC contains provisions which potentially protect views. These include height limits and building setback requirements. Some scenic highways, including the Mulholland Drive Scenic Parkway, are regulated by specific plan ordinances that contain design provisions intended to protect natural ridge tops, neighborhood visual ambience, public views and other features.

The California Environmental Quality Act mandates identification and protection of scenic resources. Identified resources include trees, historic buildings, rock outcroppings and similar features that are located within a designated state scenic highway. Under CEQA and the LAMC, decision makers have been able to require retention and protection of scenic features.

Conclusion. Through acquisition, park development and land use planning and development requirements the city has a major role in protecting

land forms and scenic features and in making scenic features accessible to the public.

Continuing issues:

N Loss of natural features of the terrain, especially in mountain and hillside areas.

N Loss of scenic features.

N Loss of visual or physical accessibility to view corridors, scenic features and areas.

Land form and scenic vistas objective, policy and programs:

Objective: protect and reinforce natural and scenic vistas as irreplaceable resources and for the aesthetic enjoyment of present and future generations.

Policy: continue to encourage and/or require property owners to develop their properties in a manner that will, to the greatest extent practical, retain significant existing land forms (e.g., ridge lines, bluffs, unique geologic features) and unique scenic features (historic, ocean, mountains, unique natural features) and/or make possible public view or other access to unique features or scenic views.

Program 1: permit processing, enforcement and periodic revision, especially environmental review, grading, large lot zoning, clustering of structures, building height limits and other project design and construction methods for protecting natural terrain and features and protecting public view access.

Responsibility: departments of *Building and Safety, *City Planning and *Public Works and other agencies involved in city development permit review and/or processing.

Program 2: planning and construction of roads, utilities and other public projects, especially projects that are within or impact natural terrain and/or scenic areas.

Responsibility: *Bureau of Engineering and/or the *agency that owns or manages the land and/or is responsible for project implementation.

For related information see:

N "Historic Preservation and Cultural Resources Element," Los Angeles City General Plan (to be prepared) and

N "Transportation Element" (scenic highway provisions), Los Angeles City General Plan, Los Angeles Department of City Planning, 1999.

SECTION 16: OCEAN

The Pacific Ocean bounds portions of the city to the west (Santa Monica Bay) and South (San Pedro Bay). The San Pedro Bay contains the Long Beach and Los Angeles harbors. The bays are rich in plant and animal life. They and their associated beaches are among the most important recreational and tourist resources in the region. Commercial and recreational fishing also occur in the bays, especially in the Santa Monica Bay. Damage to the ecology of the bays has a direct effect on the environment and the economy of the city and region. Many factors affect the local marine ecology including natural storm runoff, waste discharge and construction of harbor, flood control and other structures.

Ocean protection. The state has jurisdiction over waters, tidelands and off-shore lands to a point three miles from shore. The federal government has jurisdiction over lands and waters that lie beyond the three-mile limit. The city has land management jurisdiction on shore and is responsible for managing discharges into the ocean from land based sources and systems.

Clean Water Act/NPDES permits. The primary legislation affecting water quality, including the quality of ocean waters, is the federal Clean Water Act. It was amended in 1972 to establish regulations and requirements for implementation by state and local governments "to restore and maintain the chemical, physical, and biological integrity of the nation's water" (Pollution Control Act, Section 101). The amendments made it unlawful to discharge waterborne pollutants into any navigable waters of the United States from any point source, except as allowed by a National Pollutant Discharge Elimination System (NPDES) permit. A "point source" is any identifiable source of discharge, such as a sewage discharge or a leaking pipe or storage container. "Navigable waters" relative to the city means the Pacific Ocean and the Los Angeles River. A "non-point" source is water runoff that contains pollutants from a source that is not readily identifiable, e.g., pollutants that accumulate on streets.

The U.S. Environmental Protection Agency (EPA) issues interpretive guidelines for implementation of the Clean Water Act. The regulatory mechanism for compliance with the guidelines are the NPDES permits which must be filed by local jurisdictions. The state Water Resources

Control Board administers the Clean Water Act in California. It delegates authority to regional water quality control boards. The Los Angeles Regional Water Quality Control Board (RWQCB) administers the Los Angeles county NPDES permits.

The Clean Water Act was amended (1987) to require reduction in the discharge of pollutants into the stormwater system. However, the EPA, recognizing the difficulty in assessing non-point source pollution and the need for further study, postponed compliance by Los Angeles county with stormwater runoff requirements.

Point pollution sources. The major city controlled point source was identified as wastewater and sludge (waste solids) discharge. The primary source of sludge dumping in the Santa Monica Bay was the city's Hyperion Wastewater Treatment Plant.

The Hyperion plant serves an area of 514 square miles, including 83 square miles of contractual area outside of the city's boundaries. It is the largest wastewater treatment facility in the city. The plant processes sludge from the Hyperion, Donald C. Tillman and Los Angeles-Glendale wastewater treatment plants. The sludge is used to create methane gas or is reduced to powder, both of which are used to create electrical energy. It also is used for fertilizer for non-food crops, landfill cover and other purposes. The ash produced during sludge reprocessing is reused in copper smelting in Arizona. An outfall pipe discharges treated wastewater five miles off shore.

In compliance with a federal ninth circuit court consent decree, Hyperion stopped dumping sludge into the bay in 1987. By that time, sludge from the plant had spread over an estimated two square mile area of the ocean floor from several decades of dumping. Five years after the dumping ceased, marine life was regenerating and pollution of beaches had declined to almost no posting of health hazard warnings. Full operation of the Hyperion energy recovery system sludge processing facilities began in 1989. Interim effluent limits were instituted to coincide with phased improvements at the plant. Full secondary treatment was achieved by December 31, 1998, enabling the city to meet the federal Clean Water Act standards. The plant can provide secondary treatment for 450 million gallons of wastewater per day and its new equipment has reduced the plant's air polluting emissions by 80 percent. Facilities are being constructed to expand plant capacity to meet the city's projected wastewater treatment needs to the year 2010.

The first Los Angeles County municipal NPDES permit was approved by the RWQCB in 1990. It was a five-year permit requiring specific compliance with point source pollution measures. The Hyperion, Donald C. Tillman and Los Angeles-Glendale wastewater treatment plants were major point

sources that underwent facility upgrades to achieve compliance with the permit.

Non-point pollution sources. With effective monitoring and control of point sources, storm related, non-point source pollution became the major source of bay pollution. Bacterial, trash and other water borne pollution is the greatest during the first heavy storms of the rainy season. Debris and sediments from air pollution and other sources that accumulate during the dry season on roofs, vegetation and other surfaces are flushed by storms into the drainage systems and then into the bays. Overflow or damage to wastewater systems is most likely to occur during heavy storms.

The Clean Water Act was clarified (1990) concerning non-point sources and general stormwater runoff. Requirements are being implemented by the second County of Los Angeles municipal NPDES municipal stormwater permit (1996). The goal of the second permit is to reduce pollutants in storm water and urban runoff in order to achieve compliance with federal standards and improve the water quality of the bays. The county is the principal permittee, the 86 cities within the county are co-permittees. Identified potential pollution sources, ranging from restaurants to harbors, must use "best management practices" (BMPs) to the maximum extent practicable to reduce or eliminate water borne pollutants.

The permit BMPs are any programs or technology used to reduce or eliminate water borne pollutants associated with stormwater runoff. City of Los Angeles BMPs include installation of systems to capture, divert and/or clean the water; installation of drainage systems to divert rain water from gutters to other beneficial uses (e.g., irrigation); and increased stormwater diversion (e.g., expansion of water spreading grounds). Municipal code amendments (adopted 1999), modification of city procedures and new guidelines were prepared by the Bureau of Sanitation, the city's lead agency for NPDES compliance, in coordination with other city agencies.

In January 1999, the EPA directed the RWQCB to establish more stringent standards for eliminating contaminants (trash, chemicals, metals) that are carried by stormwater into local creeks, rivers and drainage systems and are discharged into the ocean. The RWQCB was instructed by the EPA to establish standards for targeted water bodies, including the Los Angeles River, Ballona Creek and Santa Monica Bay.

The current phase of water cleanup includes assessment of "total maximum daily loads" (TMDL) of particular contaminants for specific water bodies. A TMDL is the maximum amount of a pollutant that a water body can tolerate and still maintain the designated beneficial uses.

Beneficial uses include drinking water sources, fishing, habitat maintenance, recreation. The first TMDL program selected by the RWQCB that affects the city is trash pollution of the bays.

Chemical pollution. For over a century, oil, raw sewage and chemical waste have been discharged into the ocean from land sources and ocean vessels. Sometimes contamination has been so bad that it has resulted in injury to wildlife and quarantine of beaches. Chemical contamination of coastal waters and sediments can have long term detrimental effects on plant and animal life. Harmful chemical compounds are carried through the food chain from silt feeding creatures to fish, then to birds and land animals, including humans, that eat fish. Contamination has caused genetic mutations and reduced the numbers plants and animals in some areas, especially near sewer outfalls and chemical concentrations. Some contaminants, like DDT, if ingested can cause cancer, respiratory problems and other illnesses in humans and may contaminate ocean sediments for decades.

The Clean Water Act prohibits dumping of chemicals into water bodies. The Bureau of Sanitation monitors the city's drainage systems, investigates illegal dumping and cites identified offenders. However, existing toxic deposits still threaten human health and the ecological systems of the bays. It will take years for some sediment communities to recover. Some bottom feeding fish continue to carry contaminants at concentration levels that are considered hazardous for human consumption.

The main source of chemical contaminants is from chemicals deposited on the Palos Verdes Shelf between 1949 and 1971 when chemical companies dumped DDT and other toxic chemical waste into the sewer system. The 110 tons of DDT, the world's largest known deposit, is spread over a 17 square mile area of the Palos Verdes Shelf. The dumping was discovered after seals and other marine life began to be affected by chemical poisoning. Commercial fishing of the white croaker has been banned since 1990 from the near shore waters of the shelf, including the Los Angeles harbor, due to high levels of hazardous chemicals in its tissues.

Systematic cleanup of the shelf began in 1998 when the Los Angeles County Sanitation Districts and 155 municipalities agreed to a court settlement. They will pay $45.7 million to a "superfund" operated by the EPA for the cleanup. During the summer of 2000, the EPA began covering 180 acres of the shelf near the White's Point sewer outfall with sand and silt. The controversial experimental program is intended to abate the contamination impacts of the chemical pollutants. The EPA will increase enforcement of the no-fishing zone around the shelf and will expand public information and warnings to consumers, urging them

not to eat white croakers caught off the Palos Verdes Peninsula. Federal and state lawsuits have been filed to recover damage, abatement and restoration costs from companies that allegedly dumped the wastes.

Trash pollution. Trash is a major part of stormwater pollution. In anticipation of major storms, the county erects trash fences or nets at flood control channel outlets to capture debris before it can disperse into the ocean. Some 13 tons of trash was captured at the Ballona Creek outlet during a single heavy early season storm in the fall of 1997. The most common debris is plastic, probably due to the effectiveness of recycling of glass and metal, the common use of plastics and limited plastic recycling programs. The NPDES permit requires improvement of street cleaning to keep debris from ending up in storm drains and improvement of public information programs in the schools and elsewhere to encourage appropriate trash disposal and recycling. The city's NPDES public information program informs people about the damage debris can cause to marine life and encourages use of trash containers. Abatement measures will be expanded under the TMDL related program.

California Environmental Quality Act (CEQA). CEQA requires that potential runoff associated with proposed development projects be evaluated. Stormwater questions are included in the CEQA initial studies checklist in order to assure evaluation of potential impacts, consistent with the 1996 NPDES permit. If potentially significant impacts are identified, imposition of mitigation measures is required to reduce the volume of water that will flow into drainage and flood control systems and bodies of water, to assure maintenance of water quality and to protect against or mitigate potential negative changes in the surface water flow. City CEQA procedures also require evaluation for diversion and capture of water runoff, as required by the NPDES permit.

Santa Monica Bay cleanup. The bay stretches from Point Dume (west of Malibu) to Point Fermin (San Pedro). The federal Water Quality Act designated the bay an "estuary of national significance" (1987). The Santa Monica Bay Restoration Project (SMBRP), a partnership of governmental officials, environmentalists, scientists and representatives of the industrial sector, was established by the state and federal government to prepare a plan for protection and management of the bay. The plan was approved in 1995. Propositions 12 and 13, approved by California voters in March 2000, include funding for plan implementation.

The SMBRP report "Taking the Pulse of the Bay - State of the Bay 1998," assessed the effectiveness of cleanup actions and issues. It estimated that, since the early 1970s, pollution from heavy metals decreased by 67 to 99 percent and pollution from suspended solids decreased by 83

percent (from 250,000 to 43,000 metric tons), in spite of a 25 percent increase in the population of the metropolitan area. Between 1988 and 1997 the annual number of beach closures due to wastewater spills decreased from 46 to 6 events. Even the unusually heavy January and February 1998 storms resulted in spills that closed the beaches for only 27 days. The SMBRP report concluded that overall improvement of the bay was due primarily to cessation of sludge dumping from the city's Hyperion wastewater treatment plant, improved city and county wastewater treatment and efficiency and cessation of chemical dumping.

During the 20-year period there has been a regeneration of plant and animal life along the entire Los Angeles coast. Of particular significance is the regeneration of kelp beds. Kelp attaches to rocky ocean bottoms off Malibu and the Palos Verdes Peninsula. The beds are considered the rain forest of the southern California marine environment. They support over 800 species of fish and invertebrates, some of which live only in kelp communities. The beds were reduced significantly from 1940 to 1974, primarily due to wastewater discharge, sea urchin grazing and oceanographic conditions. With cleaner water and sediments and the replanting of kelp, the beds regenerated and enlarged. Kelp growth leveled off in 1990, possibly due to ocean warming and increased sea urchin grazing. The increase in fish and invertebrate populations associated with the beds contributed to increases in the marine animal populations of the bay, including sea lions, which numbered 150 animals in the mid-1980s and now are estimated to number over 700 animals.

No major changes occurred in the intertidal communities, i.e., the beaches and rocky areas that are exposed by low tides. Invertebrate colonies remained stable, except for black abalone which virtually disappeared from the bay and California coast, probably due to over harvesting and disease. In 1997 the state legislature enacted a 10-year ban on abalone fishing south of San Francisco Bay.

In short, the general health of the Santa Monica Bay improved over the past 20 years but continuing cleanup of contaminated sediments and discharges into the bay is needed. The goal of NPDES and related programs is to reduce contaminants at their source or to capture or divert contaminants before they reach the bay.

San Pedro Bay cleanup. The same type of measures that improved the Santa Monica Bay contributed to cleanup of the San Pedro Bay. The Terminal Island wastewater treatment plant and county outfall system were upgraded (1980s). The Los Angeles and Long Beach harbor authorities enforce dumping and contain spills from sites and facilities over which they have authority. The U.S. Coast Guard is

responsible for management of tanker spills, other spills and ocean vessel discharge incidents within the harbors.

Conclusion. Although the city does not have primary authority over ocean waters, it has a major responsibility in protecting the ocean from water borne contamination from land-based sources.

Continuing issues:

N Contamination of the Santa Monica and San Pedro bays.

N Restoration of the bays.

Ocean objective, policies and programs.

Objective: protect and enhance the diversity and sustainability of the natural ecologies of the Santa Monica and San Pedro bays, including the bay fishery populations.

Policy 1: continue to reduce pollutant discharge into the bays from both natural and human sources.

Program 1: National Pollution Discharge Elimination System (NPDES) permit implementation.

Coordinating agency: *Bureau of Sanitation, with the assistance of all other city agencies.

Program 2: compliance with laws prohibiting discharge of contaminants into the bays and their tributaries.

Responsibility: *Bureau of Sanitation.

Program 3: research and experimentation with methods to upgrade and improve the efficiency of wastewater processing facilities in maintaining high water quality standards.

Responsibility: *Bureau of Sanitation.

Program 4: management of the Los Angeles Harbor in an ecologically sensitive manner.

Responsibility: *Harbor Department.

Policy 2: continue to support legislation and to seek funding and legislation intended for bay and coastal protection, enhancement and habitat restoration.

Program: City legislative program.

Responsibility: *Mayor and *City Council (and City Legislative Analyst).

Policy 3: continue to support and/or participate in programs to clean bay sediments and/or mitigate potentially harmful effects of contaminants in the sediments and waters of the bays.

Program: Palos Verdes shelf cleanup and other programs.

Responsibility: *As appropriate to or designated by the program.

For related information see:

- Erosion Section (beaches);
- Fisheries Section;
- Habitats Section (wetlands);
- "Infrastructure Systems Element" (wastewater discharge into the ocean), Los Angeles City General Plan (under preparation);
- "Port of Los Angeles Plan, an Element of the Los Angeles City General Plan," Los Angeles Department of City Planning, 1982;
- Resource Management Section: Oil; and
- Safety Element (harbor spillage management, hazardous materials, flooding, drainage) of the General Plan, Los Angeles Department of City Planning, 1996.

SECTION 17: OPEN SPACE/PARKS

It is important to conserve natural open space lands and enhance urban open spaces. "Open space" is a broad term that can include virtually anything from a sidewalk or lawn to the mountains and ocean. It is defined by the California general plan law (Government Code Section 65560) as "any parcel or area of land or water that essentially is unimproved and devoted to an open-space use," whether for preservation and protection of natural resources or for human activity. Virtually every section of this element includes some aspect of open space protection, conservation or enhancement. The general plan Open Space Element will discuss the open space aspects of the city, including park sites and urbanized spaces, e.g., streets. The Public Facilities

Element will address the human use aspects of city park sites. The Conservation Element primarily addresses conservation aspects of the natural open spaces that are addressed by the various subjects contained in this element.

SECTION 18: RESOURCE MANAGEMENT: MINERAL RESOURCES (SAND AND GRAVEL)

Natural mineral deposits are nonrenewable resources that cannot be replaced once they are depleted. The primary mineral resources within the city are rock, gravel and sand deposits. Sand and gravel deposits follow the Los Angeles River flood plain, coastal plain and other water bodies and courses. Significant potential deposit sites have been identified by the state geologist. They lie along the flood plain from the San Fernando Valley through the downtown (Exhibit A). Much of the area identified has been developed with structures and is inaccessible for mining extraction.

Mining of sand and gravel began in Los Angeles around 1900 when concrete became popular as a building material. Extraction began in the Arroyo Seco and the Big Tujunga Wash. From 1920 to the present, the demand for sand and gravel has been spurred by construction associated with growth in California and the southwestern United States. The only currently available deposit site in the city is the Tujunga alluvial fan, which is rich in accumulations of high quality sand and gravel washed from the adjacent mountains.

No on- or off-shore mining of beach or ocean sand is permitted by the State of California within the coastal zone or adjoining ocean of the southern California area. This is to protect the beaches and coastline within the region.

Resource protection/extraction regulation. Authority over mining is divided between state and local jurisdictions. The California Lands Commission has permitting authority over mining relative to off-shore lands and inland lands associated with navigable bodies of water. The California Coastal Commission has permitting authority relative to on- and off-shore lands within the coastal zone (extending inland 1,000 yards from the mean high tide line of the Pacific Ocean). The federal Surface Mining Control and Reclamation Act of 1977 is less comprehensive and less restrictive than the state act. Therefore, the California act is the primary regulator of surface mining within the state. However, mine operators must comply with federal, state and local regulations.

California Surface Mining and Reclamation Act of 1975 (SMARA). SMARA (Public Resources Code Section 2710 et seq.; subsequently amended) is the primary regulator of on-shore surface mining in the state. It

delegates specific regulatory authority to local jurisdictions. The act requires the state geologist (Division of Mines and Geology) to identify all mineral deposits within the state and to classify them as: (1) containing little or no mineral deposits, (2) significant deposits or (3) deposits identified but further evaluation needed. Local jurisdictions are required to enact specific plan procedures to guide mineral conservation and extraction at particular sites and to incorporate mineral resource management policies into their general plans. A particular concern of the state legislators in enacting SMARA was premature loss of minerals and protection of sites threatened by development practices which might preclude future mineral extraction.

In 1979 the state Board of Mining and Geology adopted guidelines for the management of mineral resources and preparation of local plans. The guidelines require local general plans to reference the state-identified mineral deposits and sites that are identified by the state geologist for conservation and/or future mineral extraction. Subsequently the board identified urbanized areas where irreversible land uses precluded mineral extraction. Much of Los Angeles was deemed urbanized and, therefore, exempt from SMARA.

The state geologist classified Mineral Resources Zone-2 (MRZ-2) sites within the city (Exhibit A). MRZ-2 sites contain potentially significant sand and gravel deposits which are to be conserved. Any proposed development plan must consider access to the deposits for purposes of extraction. Much of the area within the MRZ-2 sites in Los Angeles was developed with structures prior to the MRZ-2 classification and, therefore, are unavailable for extraction.

California Environmental Quality Act (CEQA). CEQA requires that impacts on non-renewable mineral resources be evaluated relative to proposed development projects. Where significant mineral deposits are known or are believed to exist, evaluation must be made concerning whether the proposed project will preclude extraction activity and whether the project will cause permanent loss of the mineral resource. If a potential negative impact is identified, measures must be considered for mitigation of the impact.

City regulation/management. To comply with SMARA, Los Angeles adopted (1975) the 'G' Surface Mining supplemental use provisions (LAMC Section 13.03). Subsequent amendments have brought the city's provisions into consistency with new state requirements. The 'G' provisions are land use, not mineral conservation regulations. They regulate the establishment of sand and gravel districts, extraction operations, mitigation of potential noise, dust, traffic and other potential impacts, as well as post-extraction site restoration. Other conditions may be imposed by the city if deemed appropriate.

General plan references. SMARA requires that the general plan identify the MRZ-2 sites and contain resource management provisions. In addition to this element (Exhibit A), MRZ-2 sites are identified in two community plan elements of the city's general plan, the Sun Valley and the Sunland-Tujunga-Lake View Terrace-Shadow Hills-East La Tuna Canyon community plans. All three elements contain resource management provisions.

Conservation. It is the city's policy that construction materials, such as concrete and rock, be recycled to reduce the amount of solid waste that goes into local landfills, thereby extending the life of the landfills. Recycling has a secondary benefit of reducing the demand for sand and gravel and produces recycled materials, which can be substituted for the natural materials.

Conclusion. The city is responsible for implementing the California Surface Mining and Reclamation Act requirements, as they apply to Los Angeles. It does so primarily through land use controls and permit issuance and monitoring.

Continuing issues:

N Loss of remaining, accessible sand and gravel deposits.

N Potential future temporary or permanent loss of important ecological sites, especially in the Tujunga Wash, due to mining.

N Environmental and neighborhood compatible extraction and site reclamation.

Resource management - mineral resources (sand and gravel) objective, policies and programs:

Objective: conserve sand and gravel resources and enable appropriate, environmentally sensitive extraction of sand and gravel deposits.

Policy 1: continue to implement the provisions of the California Surface Mining and Reclamation Act (Public Resources Code Section 2710 et seq.) so as to establish extraction operations at appropriate sites; to minimize operation impacts on adjacent uses, ecologically important areas (e.g., the Tujunga Wash) and ground water; to protect the public health and safety; and to require appropriate restoration, reclamation and reuse of closed sites.

Program 1: administration and periodic updating of the 'G' Surface Mining District overlay zone provisions (LAMC 13.03).

Responsibility: departments of Building and Safety and *City Planning.

Program 2: community plan identification of state designated Mineral Resources Zone-2 sites and including of related resource management provisions.

Responsibility: *Department of City Planning.

Policy 2: continue to encourage the reuse of sand and gravel products, such as concrete, and of alternative materials use in order to reduce the demand for extraction of natural sand and gravel.

Program: recycling of construction materials.

Responsibility: *Bureau of Sanitation and city agencies that conduct or oversee construction projects.

For related information see:

N "Infrastructure Systems Element" (landfills), Los Angeles City General Plan (under preparation) and

N Sun Valley and Sunland-Tujunga-Lake View Terrace-Shadow Hills-East La Tuna Canyon community plan elements of the Los Angeles City General Plan, Los Angeles Department of City Planning.

SECTION 19: RESOURCE MANAGEMENT (FOSSIL FUELS): OIL

In 1769 a Spanish expedition led by Captain Gaspar de Portolá explored the area now known as Los Angeles. The men discovered "pitch" bubbling from the earth. The pitch was oil tar which still bubbles to the surface in the vicinity of the Los Angeles County Museum of Art and La Brea Tar Pits. Native Indians used the tar as glue and a waterproofing agency. Early settlers and ranchers mined it for a variety of purposes, including for road surfacing. Oil (petroleum) extraction began in 1892 after E.L. Doheny discovered oil near what is now Glendale Boulevard and Second Street. Petroleum extraction and refining continue to be important industries in Los Angeles. Deposits (Exhibit A) underlie portions of downtown and west Los Angeles, the harbor area and the Santa Monica and San Pedro bays. Twenty producing oil fields lie wholly or partially within the city. The Wilmington field is one of the largest in the state. Its 1,332 wells produce 54,612 barrels of oil per day (1996).

Since the early days of oil rigs and open gushers, technology has made drilling, extraction and refining operations safer, more compatible

with surrounding communities and more efficient. Slant drilling and extraction from multiple lines can be accomplished from a single relatively unobtrusive site. For decades the sites have been camouflaged within buildings or behind walls that are designed to make them look like houses, office buildings or other neighborhood compatible structures. State and local regulations protect surrounding neighborhoods from potential odors, noise, hazardous spills, explosions and fires.

Resource protection/extraction regulation.

Federal. The federal government owns submerged lands extending seaward beyond the three-mile state land limit. In 1981 the U.S. Congress began issuing moratoria on expenditure of funds for processing leases within designated offshore tracts (3-mile quadrants). This effectively prohibited issuance of new oil drilling leases by the U.S. Department of Interior within the tracts. In 1984, the moratorium was expanded to include the Santa Monica Bay. All of the southern California shoreline was added in 1985. The ban currently applies to all unleased tracts off the entire west coast, the east coast and parts of Florida and Bristol Bay in Alaska. It is renewed annually by Congress. Various bills were under discussion (1999) to modify the Outer Continental Shelf Lands Act, including modifying or lifting the moratorium.

President George Bush issued an executive order prohibiting the Department of Interior from offering unleased tracts for lease in the same general areas as the expenditure ban. The order expires in 2002. Any President may change a presidential order.

State. The state has regulatory authority over inland lands and owns tidelands and submerged lands extending seaward three miles from the shoreline. Oil and gas deposits within the three-mile limit and on-shore are under the authority of the California Department of Conservation's Division of Oil and Gas. The division regulates extraction of oil and gas, extraction operations and management of oil, gas and geothermal reserves. Drilling permits and off-shore leases are issued by the California Lands Commission.

Consolidated Coastal Sanctuary Act. To protect the coastal ecology, the state legislature (1994) enacted the Consolidated California Coastal Sanctuary Act (Public Resources Code 6240 et seq.). The act consolidated previous coastal protection regulations that had temporarily prohibited issuance of oil drilling leases along individual sections of the California coast. It prohibits offshore drilling within California coastal waters and lands, which were not already leased for drilling. The ban has applied to the Santa Monica Bay since the 1950s. Exceptions allow the commission to issue leases related to national

emergencies and to any company that has a federal lease on adjoining lands, if drilling within the leased three-mile federal quadrant could result in draining an oil reserve that extends into state owned lands.

Coastal Act. The California Coastal Act initiative was approved by state voters (1976) to protect the coastal environment and ensure equitable public access to the beaches and ocean. It invests the California Coastal Commission with the authority of overseeing the coastal zone. The zone is depicted on maps on file with the commission and the city. It extends seaward to the city's outer limit jurisdiction and inland 1,000 yards from the mean high tide line, or further where significant habitats, recreational areas or estuaries exist. The commission establishes policies, standards and procedures for coastal development. It reviews and issues permits for proposed development, including drilling and extraction, within the zone. It can impose conditions on projects or deny permits for projects that are not consistent with the city's local coastal plans (community plans) or that would harm or would interfere with public enjoyment of the coastal environment.

California Environmental Quality Act (CEQA). CEQA requires consideration of potential impacts (e.g., oil spills) of proposed land development projects on the environment. For a project to proceed, potentially negative impacts must be avoided or mitigated to a level of insignificance.

City. For several decades the city has supported the ban on off-shore oil drilling. Its position is due to concern about potential oil spills that could damage the beaches and ecology of the bays.

The city has regulatory authority over on-shore land use within its borders, including issuance of drilling permits, protection of underground water supplies (wells and aquifers), safety considerations relative to hazardous materials management and construction of facilities, consistent with state and federal law. The issue of safety relative to hazardous materials management is addressed in the general plan Safety Element.

The 'O' Oil Drilling supplemental use district provisions of the Municipal Code (Section 13.01) were initially enacted in 1953. They delineate the boundaries within which surface operations for drilling, deepening or operation of an oil well or related facilities are permitted, subject to conditions and requirements set forth in the code and by a Department of City Planning zoning administrator, the Fire Department and city's petroleum administrator of the Office of Administrative and Research Services. The conditions protect surrounding neighborhoods and the environment from potential impacts,

e.g., noise, hazard, spills and visual blight. In addition, the Department of Water and Power monitors drilling operations to assure protection of water wells and aquifers. Property owners, including the city, receive oil production royalties from lands (e.g., city streets) that lie within oil drilling districts (Exhibit A).

Conservation. Petroleum is a non-renewable resource. Many fields in the city already are depleted and extraction from them has been discontinued. Measures related to energy conservation and reducing the city's reliance on oil are addressed by the general plan Infrastructure Systems Element. The city also is experimenting with electric battery vehicles, operates a food container (petroleum product) recycling program and is exploring other ways to reduce reliance on oil and oil products and, thereby, to slow the depletion of petroleum resources.

Other considerations.

Air quality. Oil extracted from the Los Angeles area is heavy in sulfur and other materials that contribute to air pollution. Therefore, Los Angeles oil generally is exported because it is unsuitable for automotive and other local uses, due to potential air quality impacts. Air quality impacts, including petroleum refining operations, are regulated under state and federal law.

Safety issues are addressed by the general plan Safety Element.

Conclusion. The city has primary authority over the issuance and monitoring of land use permits for drilling and drill site restoration. It has an important role to play in lobbying for state and federal concerning permitting and activities that are outside the regulatory authority of the city.

Continuing issues:

N Protection of the Santa Monica and San Pedro bays and inland neighborhoods from potential spills and other hazards potentially associated with oil drilling, production and transport.

N Safe use, storage, transmission and transport.

N Drilling, extraction and site restoration that is compatible with surrounding neighborhoods.

N Depletion of nonrenewable petroleum reserves.

N Reliance on imported oil for electrical energy generation, vehicles and other use which makes the city vulnerable to changes in the international petroleum markets.

N Subsidence.

Resource management (fossil fuels) - petroleum (oil and gas) objective, policies and programs: For storage, accidental release and containment of hazardous materials see the Safety Element and the Hazardous Materials Section of this chapter.

Objective: conserve petroleum resources and enable appropriate, environmentally sensitive extraction of petroleum deposits located within the city's jurisdiction so as to protect the petroleum resources for the use of future generations and to reduce the city's dependency on imported petroleum and petroleum products.

Policy 1: continue to encourage energy conservation and petroleum product reuse.

Program 1: public information and energy conservation incentives programs.

Responsibility: *Department of Water and Power and city agencies that own and/or operate energy generated equipment.

Program 2: petroleum products recycling.

Responsibility: *Bureau of Sanitation and city agencies that use petroleum fueled and lubricated vehicles and equipment.

Program 3: alternative fuel and energy sources research and use.

Responsibility: *Department of Water and Power in cooperation with other agencies that produce alternate energy (e.g., Bureau of Sanitation) and/or operate facilities that have the capability of being converted to alternative energy use.

Policy 2: continue to support state and federal bans on drilling in the Santa Monica Bay and on new drilling along the California coast in order to protect the San Pedro and Santa Monica bays from potential spills associated with drilling, extraction and transport operations.

Program: City legislative program.

Responsibility: *Mayor and *City Council (and City Legislative Analyst).

Policy 3: continue to protect neighborhoods from potential accidents and subsidence associated with drilling, extraction and transport operations, consistent with California Department of Conservation, Division of Oil and Gas requirements.

Program: administer and periodically update the city's 'O' Oil Drilling District provisions.

Responsibility: Office of Administrative and Research Services and departments of *City Planning, Building and Safety, Fire and Water and Power.

For related information see:

N Hazardous Materials Section (site cleanup);

N "Infrastructure Systems Element" (fuel conservation), City of the Los Angeles General Plan (under preparation);

N Ocean Section (ocean ecology, contamination and cleanup);

N Resource Management Section: Gas; and

N "Safety Element" (hazardous materials and safety), Los Angeles City General Plan, Los Angeles Department of City Planning, 1996.

SECTION 20: RESOURCE MANAGEMENT (FOSSIL FUELS): GAS

The Southern California Gas Company supplies gas for the city. The city does not distribute or regulate natural gas, apart from petroleum extraction activities and gas generated at its landfills, sewage treatment plants and similar facilities. The same regulatory provisions that apply to oil generally apply to gas drilling and extraction, with the city's authority limited to land use and safety. The Department of Water and Power (DWP) purchases gas for electrical generation, but does not sell gas to its customers. Through its electrical energy conservation program it encourages efficient use of natural gas which is one of its fuel resources for production of electricity. Energy efficiency results not only in reducing use demand to protect nonrenewable natural gas resources but reduces energy costs and contributes to improvement of air quality. The issue of safety relative to hazardous materials management is addressed by the Hazardous Materials Section and the general plan Safety Element.

Secondary local sources of gas. In addition to the potential and known sources associated with oil deposits, a minor local source of methane gas is landfills, including city operated landfills. Landfill gas is generated during the fill decomposition process. Due to the hot, dry local climate, it takes an estimated 40 years for decomposition to be completed sufficiently for landfill sites to be converted to public uses. In the interim, the city recovers the gas and either burns it off at the site or converts it to electrical energy for sale to electrical utilities. Methane gas also is produced during the city's sewage treatment process. It is used to generate electrical energy for the treatment plants.

Primary distributor/supplies. The Southern California Gas Company (SCGC) is the largest distributor of natural gas in the nation. It supplies gas to 4.7 million customers, including 4.5 million residential customers within the approximately 32,000 square mile area of southern and central California. The SCGC provides over 937.7 billion cubic feet (Bcf) of natural gas to its southern California customers. At the present rate of usage, average temperature and anticipated growth of population and business, the SCGC projects an increase in demand to 1,033.8 Bcf by the year 2010. An estimated 237 million cubic feet (Mcf) per year will be for Los Angeles city customers, compared to 155 Mcf feet in 1990. The highest demand occurs in colder winter months, usually peaking for residential users in January. Economic and political situations, such as the 1970s oil embargo, also can affect supply and demand.

Most of the SCGC gas comes from on- and off-shore production in California, the San Juan Basin in northwestern New Mexico and southwestern Colorado, the Rocky Mountain region of southwestern Wyoming and from western Canada (primarily the Province of Alberta). The Permian Basin of southeastern New Mexico and west Texas and the Anadarko Basin in western Oklahoma and the Texas panhandle provide alternative sources. The gas is distributed through a network of underground pipelines.

Conservation. Conservation is encouraged by all levels of government. The California Code of Regulations Title 24 requires energy conservation measures in new development projects. The California Environmental Quality Act requires that impacts on nonrenewable energy resources be considered and that potential significant negative impacts be mitigated to a level of insignificance. Mitigation measures typically require development projects to include gas conservation measures to the satisfaction of the SCGC.

Air quality requirements continue to affect the demand for natural gas. New federal automotive gasoline fuel specifications (1995) resulted in

an increase in refinery production. State and federal requirements for reduction in air pollutants have spurred the development of alternative low emission fuels for automotive vehicles including development of vehicles fueled by natural gas and powered by electrical systems. The first natural gas vehicles were introduced into southern California in 1992. As natural gas vehicles become more reliable, versatile, cost-efficient, readily available and less expensive to buy and maintain, demand for natural gas fuel is anticipated to increase significantly.

To encourage efficient use of gas, SCGC provides free information and consultation to its customers. It provides analyses of homes and facilities concerning how to reduce energy costs through efficient use of electrical and natural gas systems, including selection and financing of energy efficient equipment, building materials and project design. To low income households SCGC offers to install basic weatherization measures at no cost.

Industry deregulation. Deregulation of the gas industry has resulted in an increase in gas providers who compete with the SCGC. It is anticipated that deregulation of the California electric industry will result in increased demand for gas used in generation of electrical energy and will impact gas recovery approaches. For example, enhanced oil recovery (injection of steam into oil-bearing geologic areas to enhance extraction by lowering oil viscosity), which has been a declining technology, is anticipated to continue declining due to restructuring, resulting in alternate, less costly, fuel sources for the southern California market.

Conclusion. The city has little regulatory authority over gas production and distribution, except relative to land use (e.g., drilling), safety issues (e.g., storage facilities) and gas that is produced at wastewater processing facilities and city landfill sites. It works cooperatively with the SCGC to provide information to the public regarding energy conservation and safety.

Continuing issues:

N Depletion of nonrenewable natural gas resources.

N Safe use, storage, transmission and transport of gas.

Resource management (fossil fuels) - petroleum (oil and gas) objectives, policies and programs: see prior section (oil).

For related information see:

- "Infrastructure Systems Element" (electrical and other city managed energy resources and conservation), Los Angeles City General Plan (under preparation);

- Hazardous Materials Section;

- Resource Management Section: Oil; and

- "Safety Element" (hazardous materials), City of the Los Angeles General Plan, Los Angeles Department of City Planning, 1996.

Caveat Exhibit B: the exhibit identifies Open Space Zone (OS) sites that are of sufficient size, scale or linear extension to qualify as features of city wide significance. Along with parks they are provided for purposes of showing the relationship of the sites to Significant Ecological Areas and other conservation resource areas. The OS Zone only applies to publicly owned open space.

Exhibit sources and explanatory notes:

1. Note: only significantly large parcels or geographic areas that are classified on the Los Angeles City Comprehensive Zoning Ordinance as 'OS' Open Space Zone, 'O' Oil Drilling District, 'G' Surface Mining District or 'K' Equinekeeping District are shown on these exhibits.

2. Source: "Farmland Mapping and Monitoring Program," California Department of Conservation, 1998.

   Note: the site identified is a portion of Pierce College. "Unique Farmland" is denoted by the state as "Lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the two update cycles prior to the mapping date."

   Other lands identified by the Department of Conservation but not depicted on this exhibit are "Urban and Built Up Land," i.e., land which is occupied by structures of at least one unit to 1.5 acres or approximately six structures to a 10-acre parcel and is no longer primarily in farming use.

3. Source: "Los Angeles County General Plan Conservation and Open Space Element," Los Angeles County Regional Planning Department, 1980 (currently under revision).

4. Source: "The Thomas Guide: Los Angeles County Street Guide and Directory, 1997 Edition," Thomas Brothers Maps, Los Angeles, California, 1997.

   Note: only significantly large parks are shown.

5. Source: "The Los Angeles General Plan Framework: Draft Environmental Impact Report," City of Los Angeles Planning Department, January 19, 1996.

   Note: relative to "Mineral Resource Zone-2," the MRZ-2 "zone" is a California State Geologist classification. It denotes an area in which deposits, in this case sand and gravel, are of significance to the state.

6. Source: "Transportation Element of the General Plan," City of Los Angeles Planning Department, 1999.

   Note: the 1999 plan supersedes previously adopted community plans. Therefore, scenic highways on the 1999 element may differ from those shown on previously adopted community plans.

[Exhibits A and B, attached.]

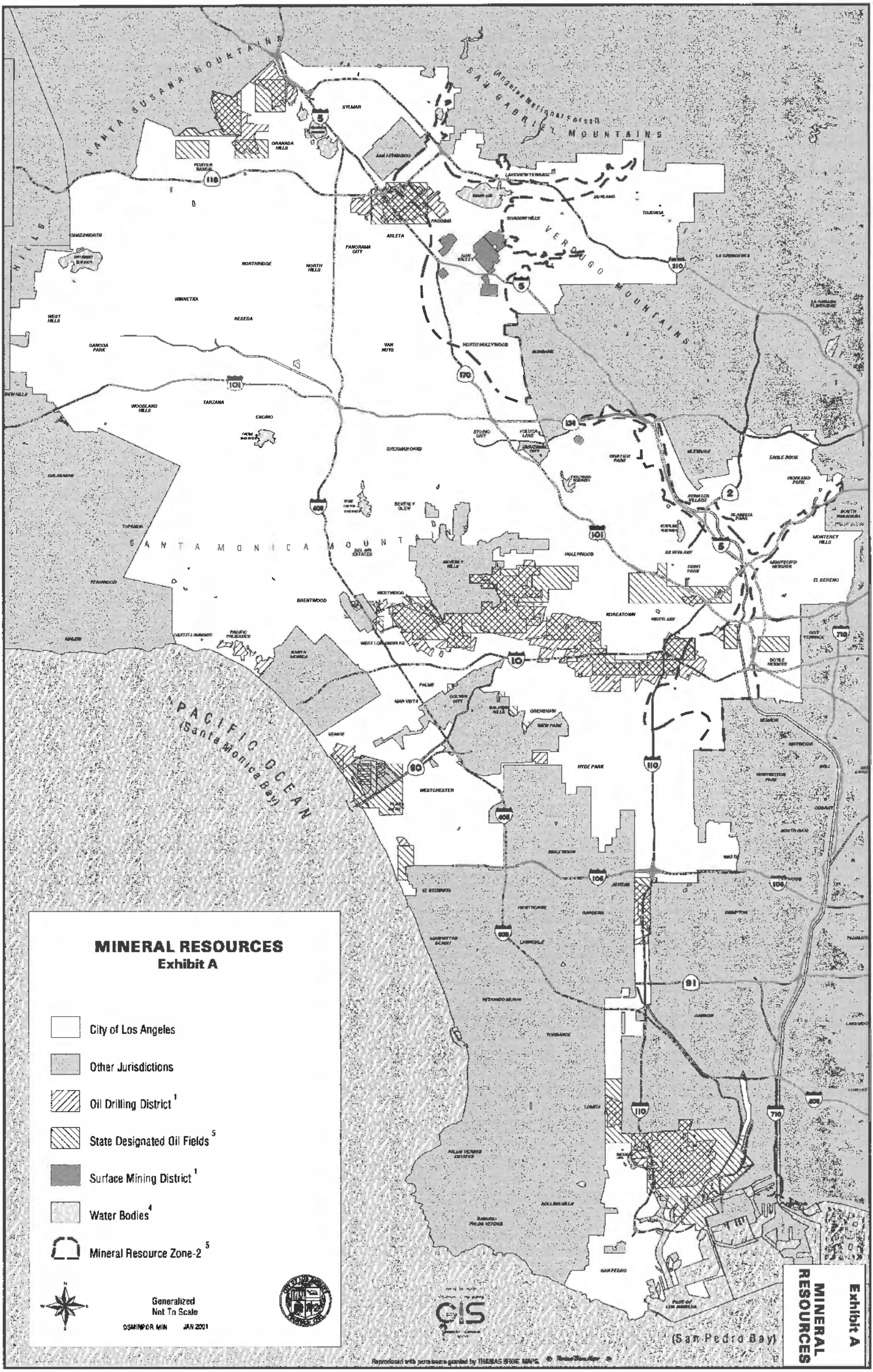

SANTA SUSANA MOUNTAINS
SAN GABRIEL MOUNTAINS
VERDUGO MOUNTAINS
SANTA MONICA MOUNTAINS
PACIFIC OCEAN
(Santa Monica Bay)
(San Pedro Bay)
SYLMAR
GRANADA HILLS
PACOIMA
ARLETA
PANORAMA CITY
NORTHRIDGE
NORTH HILLS
WINNETKA
RESEDA
WEST HILLS
CANOGA PARK
VAN NUYS
NORTH HOLLYWOOD
WOODLAND HILLS
TARZANA
ENCINO
SHERMAN OAKS
STUDIO CITY
BEVERLY GLEN
BEVERLY HILLS
HOLLYWOOD
BRENTWOOD
WESTWOOD
KOREATOWN
PALMS
MAR VISTA
VENICE
HYDE PARK
WESTCHESTER
EL SEGUNDO
TORRANCE
LOMITA
SAN PEDRO
GLENDALE
EAGLE ROCK
MONTEREY HILLS
EL SERENO
BOYLE HEIGHTS
MISSION
HUNTINGTON PARK
SOUTH GATE
COMPTON
LYNWOOD
PARAMOUNT
LAKEWOOD
LONG BEACH
CARSON
WILMINGTON
HARBOR
SAN PEDRO
Port of Los Angeles
Los Angeles National Forest
Griffith Park
Hollywood Bowl
Dodger Stadium
Forest Lawn
Getty Center
Pacific Palisades
Santa Monica
Malibu
Topanga
Chatsworth
Porter Ranch
Granada Hills
Sunland
Tujunga
Lake View Terrace
Shadow Hills
Sun Valley
La Crescenta
La Canada Flintridge
Altadena
Pasadena
South Pasadena
San Marino
Alhambra
Monterey Park
Rosemead
Pico Rivera
Whittier
Norwalk
Bellflower
Lakewood
Redondo Beach
Hawthorne
Gardena
Inglewood
Culver City
Beverly Hills
Encino
Tarzana
Woodland Hills
Canoga Park
Chatsworth
Reseda
Winnetka
Northridge
Panorama City
Arleta
Pacoima
Sylmar
Granada Hills
Porter Ranch

Exhibit B1

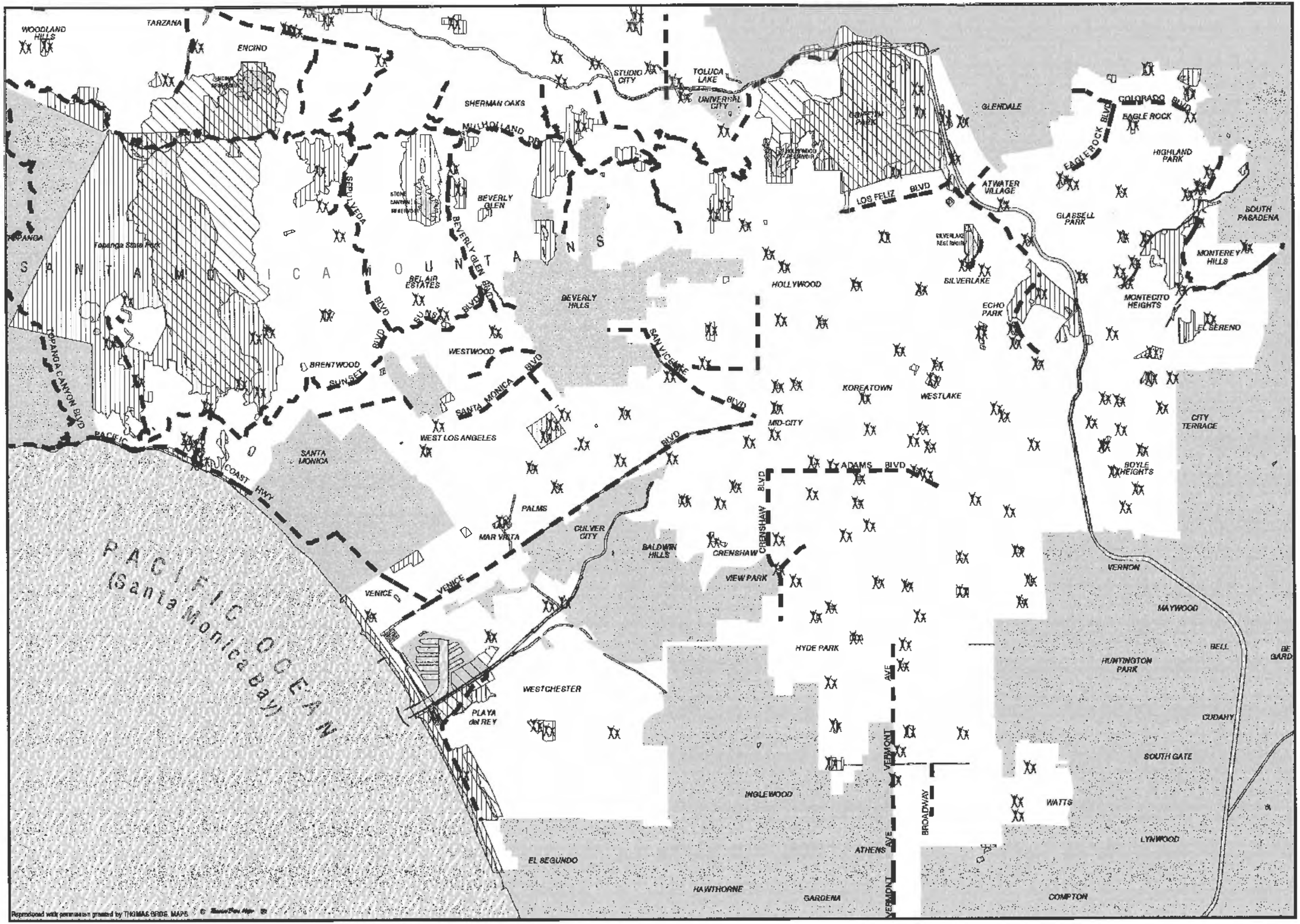
SEAs and Other Resources

- City of Los Angeles
- Other Jurisdictions
- Open Space Zone [1]
- County of Los Angeles [3] Significant Ecological Area (SEAs)
- Water Bodies [4]
- City Park [4]
- Equinekeeping District [1]
- Unique Farmland [2]
- Scenic Highway [6]

GIS

Generalized
Not To Scale
DSCVAL-CON
JAN 2001

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Exhibit B2

SEAs and Other Resources

- City of Los Angeles
- Other Jurisdictions
- Open Space Zone[1]
- County of Los Angeles[3] Significant Ecological Area (SEAs)
- Water Bodies[4]
- City Park[4]
- Equinekeeping District[1]
- Unique Farmland[2]
- Scenic Highway[6]

GIS

Generalized
Not To Scale
OSCMID-CON
JAN 2001



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Exhibit B3

SEAs and Other Resources

- City of Los Angeles
- Other Jurisdictions
- Open Space Zone[1]
- County of Los Angeles[3] Significant Ecological Area (SEAs)
- Water Bodies[4]
- City Park[4]
- Equinekeeping District[1]
- Unique Farmland[2]
- Scenic Highway[5]

GIS

Generalized
Not To Scale
DSCHAR-CON
JAN 2001

Exhibit 11

SR-241/SR-91 Tolled Express Lanes Connector Project

ORANGE COUNTY, CALIFORNIA
DISTRICT 12
12-ORA-241 PM 36.1/39.1
12-ORA-91 PM 14.7/18.9
08-RIV-91 PM 0.0/1.5
EA No. 12-0K9700
Project No. 1200020097
SCH No. 1989010410

Draft Supplemental Environmental Impact Report/Environmental Impact Statement and Section 4(f) Evaluation



Prepared by the
State of California Department of Transportation

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

Caltrans will issue a single document that consists of the Final Environmental Impact Statement and Record of Decision pursuant to Pub. L. 112-141, 126 Stat. 405, Section 1319(b) unless it is determined that statutory criteria or practicability considerations preclude issuance of such a combined document.

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

October 2016

3.17 Plant Species

3.17.1 Regulatory Setting

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) have regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are provided varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see the Threatened and Endangered Species section 3.19 in this document for detailed information about these species.

This section of the document discusses all the other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at 16 United States Code (USC), Section 1531, et seq. See also 50 Code of Federal Regulations (CFR) Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et seq. Department projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act (CEQA), CA Public Resources Code, Sections 2100–21177.

3.17.2 Affected Environment

This section is based on the *Natural Environment Study* (NES; December 2015), the *Supplemental Natural Environment Study* (Supplemental NES; April 2016), and the *Biological Assessment* (BA; April 2016) prepared for the Proposed Project.

A literature review and a records search were conducted to identify the existence or potential occurrence of special-status plant species located within or in the vicinity of the Biological Study Area (BSA). The most recent records of the California Natural Diversity Data Base (CNDDB) (Commercial Version) and the California Rare Plant Rank (CRPR; formerly the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California) (2011, 2013, and 2014) were reviewed for the quadrangles containing and surrounding the BSA (i.e., the *Orange, Yorba Linda,*

Black Star Canyon, and *Prado Dam, California,* United States Geological Survey [USGS] 7.5-minute quadrangles). These databases contain records of reported occurrences of federal- or State-listed endangered, threatened, proposed endangered or threatened species; California Species of Special Concern (SSC); or otherwise special-status species or habitat that may occur within or in the immediate vicinity of the BSA. In addition, a list of species occurring in the County of Orange was obtained from the USFWS Information, Planning, and Conservation (IPaC) System online database on May 19 and June 15, 2011, September 9, 2013, and December 1, 2014. Official species lists were obtained from the USFWS on January 22, 2014, February 2, 2015, February 11, 2016, and September 16, 2016.

Reconnaissance-level surveys and plant community mapping were conducted on May 10, 2011, March 17, 2015, and March 19, 2015. A full season of focused botanical surveys within the BSA were conducted on May 10 and June 28, 2011. A late season botanical survey was conducted on August 22, 2013, and early season focused botanical surveys were conducted on May 15, 16, 20, and 27, 2014, which completed a full season plant survey. In addition, botanical surveys of the recently added slope area south of SR-91 were conducted on March 17 and 19, 2015.

The results of the literature review indicated that a total of 39 special-status plant species have the potential to occur within or in the vicinity of the BSA. Seven are Federal- and/or State-listed as threatened or endangered species and are discussed in Section 3.19, Threatened and Endangered Species.

Of the remaining 32 special-status plant species identified through the literature review as potentially occurring in the BSA, it was determined that the BSA does not contain suitable habitat for the following 16 species:

- Coulter's saltbush (*Atriplex coulteri*)
- South Coast saltscale (*Atriplex pacifica*)
- Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)
- Malibu baccharis (*Baccharis malibuensis*)
- Lucky morning-glory (*Calystegia felix*)
- Smooth tarplant (*Centromadia pungens* ssp. *laevis*)
- Long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)
- White-bracted spineflower (*Chorizanthe xanti* var. *leucotheca*)
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)
- Heart-leaved pitcher sage (*Lepechinia cardiophylla*)

- Jokerst's monardella (*Monardella australis* ssp. *jokerstii*)
- Hall's monardella (*Monardella macrantha* ssp. *hallii*)
- Mud nama (*Nama stenocarpum*)
- California beardtongue (*Penstemon californicus*)
- Santiago Peak phacelia (*Phacelia keckii*)
- Salt Spring checkerbloom (*Sidalcea neomexicana*)

None of these 16 special-status plant species were observed or otherwise detected in the BSA at the time of the surveys. Therefore, these species are considered absent from the BSA and are not discussed further in this section.

Suitable habitat for the remaining 16 special-status plant species occurs or potentially occurs in the BSA. These special-status plant species are:

- Chaparral sand-verbena (*Abronia villosa* var. *aurita*)
- Intermediate mariposa lily (*Calochortus weedii* var. *intermedius*)
- Lewis' evening-primrose (*Camissoniopsis lewisii*)
- Southern tarplant (*Centromadia parryi* ssp. *australis*)
- Many-stemmed dudleya (*Dudleya multicaulis*)
- Tecate cypress (*Hesperocyparis forbesii*)
- Vernal barley (*Hordeum intercedens*)
- Southern California black walnut (*Juglans californica*)
- Intermediate mondardella (*Monardella hypoleuca* ssp. *intermedia*)
- Felt-leaved monardella (*Monardella macrantha* ssp. *hallii*)
- Chaparral nolina (*Nolina cismontane*)
- Allen's pentachaeta (*Pentachaeta aurea* ssp. *allenii*)
- White rabbit-tobacco (*Pseudognaphalium leucocephalum*)
- Coulter's matilija poppy (*Romneya coulteri*)
- Chaparral ragwort (*Senecio aphanactis*)
- San Bernardino aster (*Symphyotrichum defoliatum*)

However, with the exception of California black walnut and Coulter's matilija poppy, none of these species was found in the BSA during botanical surveys conducted in 2011, 2013, and 2014, which were performed during the appropriate blooming period for these species when they would have been observed. Therefore, those 14 species are also considered absent from the BSA. California black walnut and Coulter's matilija poppy are the only special status species present in the BSA and are discussed further below.

3.17.2.1 California Black Walnut

Southern California black walnut (California walnut or California black walnut) is not federally and/or State-listed and has no official status. However, California walnut merits consideration under CEQA because of the relatively limited distribution of California walnut woodland, and it is a CNPS CRPR 4 species (plants of limited distribution). California walnut is only found in Southern California. Recent construction has removed this habitat in many areas, and its future is uncertain. California walnut prefers very loose, moist soil on steep hillsides with northern and eastern exposures at elevations below 900 feet (ft), although it is not confined to these areas. California walnut occurs within many other plant communities and is often a component of grassland, coastal sage scrub (CSS), chaparral, riparian woodland, oak woodland, and mixed canyon woodland.

California walnut trees were observed in the BSA during botanical surveys conducted in 2011, 2013, and 2014. Figure 3.15.1, provided earlier, shows the locations where California walnut trees were observed.

- Approximately 3 individual California black walnut trees were observed in the median of the SR-241/SR-91 junction, specifically the median in the north end of SR-241 (Sheet 6 of Figure 3.15.1). All of these individuals were saplings less than 5 ft tall, with trunk diameters less than 5 inches.
- Approximately 10 individual trees were observed north of SR-91, adjacent to the SR-91 westbound off-ramp at Gypsum Canyon Road (Sheet 6 of Figure 3.15.1).
- Approximately 10 to 20 scattered mature individual trees were observed on the north side of a sound wall northwest of the SR-91 /Gypsum Canyon Road interchange adjacent to the Canyon RV Park, which is located within the boundaries of Featherly Regional Park(Sheets 5 and 6 of Figure 3.15.1).

3.17.2.2 Coulter's Matilija Poppy

Coulter's Matilija poppy is not federally and/or State listed and has no official status. However, Coulter's Matilija poppy merits consideration because of its relatively limited distribution in California. Coulter's Matilija poppy is a perennial shrub that grows to up to 8 ft tall. It has large paper mâché-like flowers that are white with a yellow center. It occurs in CSS and chaparral habitats up to 4,000 ft in elevation. This species is a California Special Plant and a CNPS 4 species (plants of limited distribution).

Suitable habitat exists for this species in the BSA and it was observed in the BSA during the August 2013 and May 2014 botanical surveys. Figure 3.15.1 (Sheets 7 and 8) shows the locations where Coulter's Matilija poppies were observed in the BSA. During the focused surveys in 2013, approximately 100 individuals were observed south of SR-91, east of SR-241. Two additional individuals were observed approximately 0.25 mile farther east. In spring 2014, poppies were found at these 2013 locations, with 45 additional individuals found in the vicinity. In 2013 and 2014, a total of 147 plants were identified in the BSA.

3.17.3 Environmental Consequences

3.17.3.1 Temporary Impacts

Build Alternative (Two-Lane Express Lanes Connector) (Preferred Alternative)

California Black Walnut

The California black walnut trees at the Gypsum Canyon off-ramp and those at the adjacent Canyon RV Park would not be directly impacted by the Proposed Project because they are outside the proposed temporary impact area and some are protected by an existing sound wall. There may be temporary indirect impacts to the Gypsum Canyon off-ramp trees due to potential fuel spills from construction equipment and activities of equipment or personnel outside designated construction areas and Environmentally Sensitive Areas (ESAs) in the vicinity of the trees. The Canyon RV Park walnut trees are outside of the proposed temporary impact area and are protected by an existing sound wall.

Measure PS-1, provided later in this section, which requires barriers to be installed around the protected zone of any California black walnut tree, would avoid and/or minimize temporary impacts to California black walnut trees.

Coulter's Matilija Poppy

There may be direct temporary impacts to Coulter's Matilija poppy. Potential temporary indirect impacts to this plant include potential fuel spills from construction equipment and activities of equipment or personnel outside designated construction areas and ESAs. This plant may be partially and/or fully removed during soil disturbance. To the extent feasible, this plant would be protected in place, once the full extent of the soil disturbance is known. Coulter's Matilija poppy is not protected by any federal, State, or local regulations, and project impacts to this CNPS CRPR 4 species are relatively limited. Therefore, no compensatory mitigation is required. Measure PS-3, provided later in this section, which requires barriers to be installed

around the protected zone of any Coulter's Matilija poppies, would avoid and/or minimize temporary impacts to Coulter's Matilija poppy.

No Build Alternative

The No Build Alternative does not include any improvements to SR 241 or SR-91 in the Project Area. Therefore, no temporary impacts to special-status plant species would occur as a result of the No Build Alternative.

3.17.3.2 Permanent Impacts

Build Alternative (Two-Lane Express Lanes Connector) (Preferred Alternative)

California Black Walnut

California black walnut trees are not protected by any federal, State, or local regulations. As shown in Figure 3.15.2 (Sheets 5 and 6 of Figure 3.15.2), the Proposed Project may result in permanent direct impacts to three California black walnut saplings, a CNPS CRPR 4 species, in the median of the SR-241/SR-91 interchange (at the north end of SR-241). Permanent impacts may include complete removal, heavy encroachment, or extensive branch removal that may have substantial detrimental impacts to the long-term viability of the trees due to the placement of the overhead connector. These three saplings would be protected in place, to the extent feasible. While these three saplings may be permanently impacted by the Proposed Project, the complete removal of these three saplings is not expected to substantially affect the long-term viability of this species because it is a CNPS CRPR 4 species. They are young trees, and they occur outside a native woodland habitat.

The California black walnut trees at the Gypsum Canyon off-ramp and the adjacent Canyon RV Park are not expected to be directly impacted by the Proposed Project. Permanent indirect impacts due to increased storm water runoff, traffic, litter, or through enhancing the germination and proliferation of nonnative invasive plant species is highly unlikely due to the location of these walnut trees adjacent to the Gypsum Canyon off-ramp. The Gypsum Canyon off-ramp and Canyon RV Park walnut trees are outside the Project Area, and some of the trees are protected by an existing sound wall.

Furthermore, the California black walnut trees that may be permanently impacted by the Proposed Project consist of a few individual saplings located within a median. These three saplings are not in a natural walnut woodland setting. Therefore, potential removal of these few individuals by the Proposed Project does not require any

compensatory mitigation. Measure PS-1, provided later in this section, which requires barriers to be installed around the protected zone of any California black walnut tree, and Measure PS-2, which requires the relocation of the California black walnut saplings located in the median of the SR-241/SR-91 interchange (if feasible), would avoid and/or minimize permanent impacts to California black walnut.

Coulter's Matilija Poppy

The Coulter's Matilija poppies within the slope area south of SR-91 would be removed to accommodate drainage improvements and an access road. Figure 3.15.2 illustrates where the Proposed Project would impact Coulter's Matilija poppies. While some or all of these individuals may be permanently impacted by the Proposed Project, even the complete removal of these populations is not expected to substantially affect the long-term viability of this species as it is a CNPS CRPR 4 species that is growing in marginal quality habitat adjacent to SR-91.

Coulter's Matilija poppy is not protected by any federal, State, or local regulations, and project impacts to this CNPS CRPR 4 species are relatively limited. Therefore, no compensatory mitigation is required. Measure PS-3, which requires barriers to be installed around the protected zone of any Coulter's Matilija poppies, would minimize permanent impacts to Coulter's Matilija poppy.

No Build Alternative

The No Build Alternative does not include any improvements to the SR-241 or SR-91 in the Project Area. Therefore, no permanent impacts to special-status plant species would occur as a result of the No Build Alternative.

3.17.4 Avoidance, Minimization, and/or Mitigation Measures

The following measure would avoid and/or minimize impacts to California black walnut trees:

Measure PS-1 **California Black Walnut Environmentally Sensitive Areas.** Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any southern California black walnut tree and designated as an Environmentally Sensitive Area (ESA) to be preserved for those trees not within the footprint of project structures or areas of ground disturbance. The protected zone will extend 5 feet (ft) outside of the drip line or 15 ft from the trunk of the tree, whichever is greater. No grading or fill

activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby California black walnut trees. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where trees are immediately adjacent to planned grading activities.

Measure PS-2 **California Black Walnut Sapling Relocations.** The California black walnut saplings in the median of the SR-241/ SR-91 interchange will be assessed at the time of construction and relocated within Caltrans right-of-way, if feasible.

The following measure would avoid and/or minimize impacts to Coulter's Matilija poppies:

Measure PS-3 **Coulter's Matilija Poppies Environmentally Sensitive Areas.** Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any Coulter's Matilija poppies and designated as an ESA to be preserved to the extent feasible. The protected zone will extend 5 ft outside of the vegetation edge. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby Coulter's Matilija poppies. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where Coulter's Matilija poppies are adjacent to planned grading activities.

Exhibit 12

Fire Effects Information System (FEIS)

FEIS Home Page

Index of Species Information

SPECIES: Juglans californica

- Introductory
- Distribution and Occurrence
- Management Considerations
- Botanical and Ecological Characteristics
- Fire Ecology
- Fire Effects
- References

Introductory

SPECIES: Juglans californica

AUTHORSHIP AND CITATION:
Esser, Lora. 1993. Juglans californica. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/plants/tree/jugcal/all.html [2020, November 21].

ABBREVIATION:
JUGCAL

SYNONYMS:
Juglans californica S. Watson var. californica

NRCS PLANT CODE:
JUCA

COMMON NAMES:
southern California walnut
California walnut
California black walnut
southern California black walnut

TAXONOMY:
The scientific name of southern California walnut is Juglans californica S. Watson [19,25,37]. Southern California walnut hybridizes readily

with black walnut (J. nigra) and English walnut (J. regia).

LIFE FORM:
Tree

FEDERAL LEGAL STATUS:
None [37]

OTHER STATUS:
Southern California walnut woodland is severely threatened by urbanization. The Nature Conservancy, in cooperation with the state of California, is giving high priority to aquiring vegetative/habitat data on the woodland. They list it as one of California's rare and imperiled natural communities [1,5].

DISTRIBUTION AND OCCURRENCE

SPECIES: Juglans californica

GENERAL DISTRIBUTION:
Southern California walnut is endemic to California [10]. The current distribution of southern California walnut-dominated forests and woodlands is limited to the Santa Clarita River drainage in the vicinity of Sulphur Mountain, small stands in the Simi Hills and Santa Susana Mountains, the north slope of the Santa Monica Mountains, and the San Jose, Puente, and Chino hills. The best remaining stands are in the San Jose Hills [8]. Outside of this range, southern California walnut occurs in Santa Barbara, western San Bernardino, and northern San Diego counties [25]. It is conspicuously absent from the coastal foothills of the Santa Ana Mountains, San Diego County [33].

Southern california walnut is cultivated in Hawaii [38].

ECOSYSTEMS:
FRES28 Western hardwoods
FRES34 Chaparral - mountain shrub

STATES:
CA HI

BLM PHYSIOGRAPHIC REGIONS:
3 Southern Pacific Border
7 Lower Basin and Range

KUCHLER PLANT ASSOCIATIONS:
K030 California oakwoods

K033 Chaparral
K035 Coastal sagebrush

SAF COVER TYPES:
246 California black oak
248 Knobcone pine
249 Canyon live oak
250 Blue oak - gray pine
255 California coast live oak

SRM (RANGELAND) COVER TYPES:
NO-ENTRY

HABITAT TYPES AND PLANT COMMUNITIES:
Southern California walnut woodland may be monospecific or mixed. Coast live oak (Quercus agrifolia) frequently codominants in the walnut woodland [13]. Between Santa Barbara and Orange counties, southern California walnut is locally dominant or codominant in the coast live oak phase of oak woodland [1,8]. Narrow, isolated stands of southern California walnut sometimes occur in chaparral [29]. Occasionally, southern California walnut is found in coastal sage scrub [9].

Classifications naming southern California walnut as a dominant or indicator species are as follows:

Community ecology and distribution of California hardwood forests and woodlands [1]
Californian evergreen forest and woodland [5]
Oak woodland [8]
Vegetation types of the San Gabriel Mountains [9]
Demographic structure of southern California walnut (Juglans californica; Juglandaceae) woodlands in southern California [13]
An introduction to the plant communities of the Santa Ana and San Jacinto Mountains [33].

Associated species not previously mentioned include arroyo willow (Salix lasiolepis), California sycamore (Platanus racemosa), white alder (Alnus rhombifolia), California bay (Umbellularia californica), laurel sumac (Malosma laurina), sugar sumac (Rhus ovata), toyon (Heteromeles arbutifolia), Mexican elder (Sambucus mexicana), redberry (Rhamnus crocea), coffeeberry (R. californica), hollyleaf cherry (Prunus ilicifolia), birchleaf mountain-mahogany (Cercocarpus betuloides), California scrub oak (Quercus dumosa), poison-oak (Toxicodendron diversilobum), spiny ceanothus (Ceanothus spinosus), bigpod ceanothus (C. megacarpus), California sagebrush (Artemisia californica), California buckwheat (Eriogonum fasciculatum), black sage (Salvia mellifera), fuschia-flower gooseberry (Ribes speciosum), brome (Bromus spp.), wild oat (Avena fatua), sweetscented bedstraw (Galium triflorum), rape mustard (Brassica rapa), wildrye (Elymus spp.), and Mexican whorled milkweed (Asclepias fascicularis) [9,13,14,18,24,28].

MANAGEMENT CONSIDERATIONS

SPECIES: Juglans californica

IMPORTANCE TO LIVESTOCK AND WILDLIFE:
Southern California walnut forests and woodlands provide favorable habitat for a number of vertebrates and invertebrates. A 2-year survey in a southern California walnut woodland in the San Jose Hills found 29 species of diurnal birds [25]. Many rodents, including California ground squirrels and western gray squirrels, eat the nuts [11,25]. The nuts are rarely eaten by deer [25].

PALATABILITY:
NO-ENTRY

NUTRITIONAL VALUE:
NO-ENTRY

COVER VALUE:
Larger southern California walnut trees provide excellent cover for deer, nesting birds, and rodents [25]. Raptors such as owls use the upper reaches of trees as roosts and nesting places. California ground squirrels dig burrows at the bases of old trees [25].

VALUE FOR REHABILITATION OF DISTURBED SITES:
Southern California walnut has been successfully planted for erosion control on road slopes with deep soil at elevations below 3,500 feet (1,066 m). Best growth is achieved in partial shade [11]. In Los Angeles County, southern California walnut was planted in brush wattles during construction of a road fill. Trees reached heights of 12 feet (3.7 m) in 10 years [11].

OTHER USES AND VALUES:
Humans eat the nuts of southern California walnut, but the nuts are not grown commercially [25]. Chumash Indians ate the walnuts and used the nutshells for dice. They used the bark for making baskets [31]. Southern California walnut is suitable for ornamental landscaping and is widely planted in urban forestry projects [11,13].

OTHER MANAGEMENT CONSIDERATIONS:
Southern California walnut communities are in decline [5,10]. Threats include urban and rural development, overgrazing, and increased recreational use of walnut woodlands [14,25]. In Aliso Creek, Chino Hills State Park, cattle grazing initiated dry conditions, which were worsened by a 5-year drought. The resulting very dry environment hindered survival of walnut seedlings [14]. Grazing has been the principal economic activity in California walnut forests and woodlands for 200 years. The species composition of the southern California walnut woodland understory in the Puente and San Jose hills is

attributed to overgrazing by cattle [25].

Pathogens: Southern California walnut is highly susceptible to crown (Phytophthora spp.) rots. Walnuts planted in soil infested with P. citricola and flooded for 48 hours biweekly showed reduced growth and high rates of mortality [17].

In the San Jose Hills, southern California walnut develop heart rot between 20 to 30 years of age. Portions of the trunk and older limbs subsequently become infested with termites and wood-boring beetles. Older multistemmed trees often have some stems that are healthy, some with heart rot, and others that are dead [25].

BOTANICAL AND ECOLOGICAL CHARACTERISTICS

SPECIES: Juglans californica

GENERAL BOTANICAL CHARACTERISTICS:
Southern California walnut is a native, deciduous tree that grows from 20 to 49 feet (6-15 m) tall [15,21]. It varies considerably in morphology according to the age of the tree and site characteristics. Trees in savanna woodland tend to have multiple trunks which grow outward from a ring at the base, giving younger trees the appearance of "V"-shaped shrubs. Trees in more dense stands tend to be single-stemmed and taller [13,25]. The strongly scented trunk is blackish brown and becomes deeply furrowed with age [15]. The root system is extensive, often with a deep taproot [11]. The leaves are 1.5 to 3 inches (3.5-7.5 cm) long [15]. Southern California walnut trees live to be about 100 years old [11].

Southern California walnut is monoecious [15,21]. Slender staminate catkins develop on the wood of the previous year. Pistillate flowers are borne singly or in clusters in short terminal spikes on the current year's growth [4]. The globose fruit is contained in an indehiscent husk or shell that does not open at maturity [4,15].

RAUNKIAER LIFE FORM:
Phanerophyte

REGENERATION PROCESSES:
Sexual reproduction: Southern California walnut produces seed at 5 to 8 years of age [4]. Variations in precipitation from year to year can affect fruit production and seedling establishment. In drought years little or no fruit is produced [13]. Seeds do not have a dormancy period and usually germinate within 4 weeks of dispersal [4,13]. In the spring in the San Jose Hills, densities of 4,742 seedlings per acre (2,000/ha) have been reported [25]. The western gray squirrel may be an important dispersal agent for walnut seed [25].

Vegetative reproduction: Southern California walnut sprouts from the root crown and trunk following cutting or burning [25,29].

SITE CHARACTERISTICS:
Southern California walnut occurs in a mediterranean climate, characterized by mild, wet winters and hot, dry summers [12]. Trees generally occur on mesic sites such as north slopes, creekbeds, canyon bottoms, and alluvial terraces [5,19,25]. Trees grow best in deep, alluvial soils with high water-holding capacity. Soils are high in clay content [10,25]. At California State Polytechnic University, soils beneath walnut forests are 3.3 feet (1 m) deep [25].

Elevation: Although southern California walnut has been successfully planted at elevations up to 3,500 feet (1,066 m), it usually occurs from 500 to 2,500 feet (150-760 m) elevation [1,25].

SUCCESSIONAL STATUS:
NO-ENTRY

SEASONAL DEVELOPMENT:
Southern California walnut leaves appear in January and February, with all trees in full leaf by March [25]. Trees on warmer or drier sites develop leaves several weeks earlier than those in cooler, more mesic locations. Flowering begins about the same time as leaf production, with fruits developing to full size during spring. By late summer fruits have matured. Fruit abscission begins in October and November, but some fruits remain on the tree throughout winter [25].

FIRE ECOLOGY

SPECIES: Juglans californica

FIRE ECOLOGY OR ADAPTATIONS:
Southern California walnut has large woody platforms at the soil surface. The platforms shield the meristematic tissue beneath them from fire. After fire, sprouts surround the platforms, resulting in multiple trunks [25]. According to Quinn [25], the basal platforms are an adaptation to fire similar to the lignotuber.

Most southern California walnut woodlands are subject to periodic fires. Fire is an annual possibility in most locations, where dead annual grasses are present beneath and between the trees during the summer fire season [25].

FIRE REGIMES:
Find fire regime information for the plant communities in which this species may occur by entering the species name in the FEIS home page under "Find Fire Regimes".

POSTFIRE REGENERATION STRATEGY:
Tree with adventitious-bud root crown/soboliferous species root sucker

FIRE EFFECTS

SPECIES: Juglans californica

IMMEDIATE FIRE EFFECT ON PLANT:
Southern California walnut trees are top-killed by most fires [25].

PLANT RESPONSE TO FIRE:
Southern California walnut recovers well from fire. It sprouts vigorously from the trunk and root crown when top-killed by fire, but does not produce seedlings, an indication that most seeds are killed by fire [11]. In Los Angeles County, 10-year-old southern California walnuts were severely burned. Sprouts from the root crowns reached 5 feet (1.5 m) during postfire year 1 [11]. Southern California walnut was sprouting from the root crown 3 years and 8 months after a fire in Big Sycamore Canyon, Ventura County, in the fall of 1973 [29].

Several hundred trees were burned in July 1989 at California State Polytechnic University. One year after fire there was no evidence of dead trees, even though most of the branches and stems had been top-killed. Almost all of the trees sprouted from the root crown within 6 weeks of the fire [25].

FIRE MANAGEMENT CONSIDERATIONS:
In plant communities near urban areas, the overstory of oak and walnut is a special resource that managers usually protect from fire. However, the understory of these forests can be burned during cool weather to eliminate accumulated ground fuels and produce a shaded fuelbreak [28].

Quinn [25] suggested that prescribed fires of low intensity, at intervals of several years, be tested for their effects on southern California walnut communities.

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SPECIES: Juglans californica

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FEIS Home Page

Exhibit 13

VOLUME 37, NUMBER 4 OCTOBER–DECEMBER 1990

QK
1
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Contents

GROWTH DYNAMICS OF TWO CHAPARRAL SHRUB SPECIES WITH TIME AFTER FIRE
Anne Larigauderie, Terry W. Hubbard, and *Jochen Kummerow* 225

DEMOGRAPHIC STRUCTURE OF CALIFORNIA BLACK WALNUT (*JUGLANS CALIFORNICA*; JUGLANDACEAE) WOODLANDS IN SOUTHERN CALIFORNIA
Jon E. Keeley 237

HABITAT RELATIONSHIPS OF THE PACIFIC COAST SHRUB *OEMLERIA CERASIFORMIS* (ROSACEAE)
Joseph A. Antos and *Geraldine A. Allen* 249

DISTRIBUTION, ECOLOGY, AND TAXONOMY OF *ERYTHRONIUM* (LILIACEAE) IN THE SIERRA NEVADA OF CALIFORNIA
James R. Shevock, Jim A. Bartel, and *Geraldine A. Allen* 261

CYTOLOGICAL, MORPHOLOGICAL, ECOLOGICAL AND PHENOLOGICAL SUPPORT FOR SPECIFIC STATUS OF *CRATAEGUS SUKSDORFII* (ROSACEAE)
Steven J. Brunsfeld and *Frederic D. Johnson* 274

BERBERIS PIMANA (BERBERIDACEAE): A NEW SPECIES FROM NORTHWESTERN MEXICO
Joseph E. Laferrière and *Jorge S. Marroquín* 283

A NEW *GENTIANA* (GENTIANACEAE) FROM NORTHERN CALIFORNIA AND SOUTHERN OREGON
Charles T. Mason, Jr. 289

THELESPERMA CAESPITOSUM (ASTERACEAE), A NEW SPECIES FROM WYOMING AND UTAH
Robert D. Dorn 293

A NEW SUBSPECIES OF *CIRSIUM PARRYI* (ASTERACEAE: CARDUEAE) FROM ARIZONA AND COMMENTS ON THE *CIRSIUM PARRYI* COMPLEX
C. G. Schaack and *Gregory A. Goodwin* 299

A NEW SUBSPECIES OF *CLARKIA CONCINNA* (ONAGRACEAE) FROM MARIN COUNTY, CALIFORNIA
G. A. Allen, V. S. Ford, and *L. D. Gottlieb* 305

NOTES

HERBARIA OF NEW MEXICO
Carolyn Dodson 311

NOTEWORTHY COLLECTIONS

MEXICO: BAJA CALIFORNIA SUR 236

REVIEW 314

ANNOUNCEMENTS

NEW MADRONO EDITOR 282

(continued on back cover)

PUBLISHED QUARTERLY BY THE CALIFORNIA BOTANICAL SOCIETY

DEMOGRAPHIC STRUCTURE OF CALIFORNIA BLACK WALNUT (*JUGLANS CALIFORNICA*; JUGLANDACEAE) WOODLANDS IN SOUTHERN CALIFORNIA

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ABSTRACT

Three woodlands dominated by California black walnut were studied. At one site, *Quercus agrifolia* was a co-dominant whereas at the other two sites *Juglans californica* dominated >90% of the relative areal coverage. *Heteromeles arbutifolia* was a significant component of all three woodlands. At two of the sites most of the walnuts were single-stemmed and some of them exceeded 15 m in height. Another site was a more open savanna type woodland and many trees had multiple stems; 40% had 4 or more stems per plant and one had 16 stems. The age structure of the three *Juglans* populations is presented. At all sites there were stems at least 70 years of age. All populations had substantial seedling recruitment and densities ranged from 275 to 1975 seedlings (defined as stems ≤ 5 years of age and not attached to a mature tree) per hectare. It is hypothesized that irregularities in annual seedling establishment and seedling mortality play an important role in structuring these populations.

California black walnut (*Juglans californica*, nomenclature according to Munz 1974) is a low growing hardwood tree endemic to southern California. Woodlands dominated by this walnut occur in the southern Santa Inez and Santa Susana Mountains of Ventura Co. and the eastern-most portion of the Santa Monica Mountains and foothills of eastern Los Angeles Co. Most of these woodlands occur below 500 m although well-developed walnut woodlands may extend up to 1000 m (e.g., the north side of Oat Mt. in the Santa Susana Mts.). Outside of this range, *J. californica* occurs more often as scattered individuals amongst other hardwoods which form the Southern Oak Woodland Community. *Juglans californica* extends eastward to the western flanks of the San Bernardino Mts. and south to northern San Diego Co. (Beauchamp 1986). The northern limit of distribution appears to be central Santa Barbara Co.; reports of the species in San Luis Obispo Co. are considered to be either ascribable to *J. hindsii* (Jeps.) Jeps. (Hoover 1970) or plantings (Griffin and Critchfield 1972). The tree has been used in southern California as a rootstock for commercial walnut crops, and it has been widely planted in urban forestry projects, e.g., in the western Santa Monica Mountains (Radtke 1978).

Despite widespread current interest in California hardwoods, *Ju-*

MADROÑO, Vol. 37, No. 4, pp. 237–248, 1990

glans californica woodlands have not received much attention. Apart from a few papers on the systematic affinities (Jepson 1908, 1917; Thomsen 1963) the only studies are two unpublished master's theses (Swanson 1967; Leskinen 1972). Throughout its range this species tends to be best developed on N-facing slopes with deep, well developed soils with high water-holding capacity derived from Tertiary marine shales. On many sites it is closely associated with two other tree species, *Quercus agrifolia* and *Heteromeles arbutifolia* (the latter is often associated with adjacent chaparral communities where, due to frequent fires, it is a shrub). Swanson (1967) reported that *Juglans* seedling reproduction was absent in the Los Angeles Co. population he studied and suggested this was due to low precipitation.

Due to urban sprawl much of the California black walnut woodland has been destroyed or is threatened, and it is considered to be one of California's rare and imperiled natural communities (Jones & Stokes Associates 1987). An understanding of the age structure of such woodlands is an important first step towards evaluating the reproductive status and, thus, the future health of the remaining remant woodland stands. The focus of this study was to assess the age structure of three *Juglans californica* stands.

Study Sites and Methods

Study sites. Three sites of one to several hectares of walnut woodland were located as follows. 1, N-facing slope of Sulphur Mt. (350 m elev.) W of Hwy 150, 10 km N of Santa Paula, Ventura Co.; 2, N-facing slope of Mt. Washington (250 m), 3 km NE of Elysisan Park, city of Los Angeles, Los Angeles Co.; 3, E-facing slope (225 m) in Montecito Park, 5 km SW of South Pasadena, city of Los Angeles, Los Angeles Co.

Methods. At each site, 18 10 × 10 m plots were randomly located and the basal diameter of stems of all tree and large shrub species within the plots was recorded. Stems connected to the same root-crown were indicated and the height and diameter of the canopy of each individual was recorded. Heights of trees beyond the reach of a 4 m pole were determined by calculation from the geometric relationship between angle to the top of the tree (measured with an inclinometer) and distance to the tree along the same contour. At each site nine to 10 *Juglans* trees were cored at 25 cm above the ground with an increment borer and the basal diameter, areal diameter and height were recorded. Also, 18 seedlings and saplings, too small to be cored, were cut and a section of the stem near the base was removed. The increment cores and stem sections were returned to the lab for ring counts.

The quadrat data were analyzed for community indices of density and coverage for all woody species. Basal coverage and areal cov-

TABLE 1. RELATIVE AREAL COVERAGE, BASAL AREA COVERAGE, AND DENSITY FOR *JUGLANS CALIFORNICA* DOMINATED WOODLAND ON THE NORTH-FACING SLOPE OF SULPHUR MT., VENTURA COUNTY, CALIFORNIA.

Species	Relative areal coverage (%)	Basal area coverage (m^2/ha)	Density (no./ha)	
			Stems	Individuals
Juglans californica				
Alive	49	11.4	3925	3500
Dead	<1	<0.1	50	50
Quercus agrifolia	39	38.2	1390	1240
Heteromeles arbutifolia	12	1.6	1450	1140
Sambucus mexicana	<1	<0.1	90	80
Rhamnus crocea	<1	<0.1	30	30

erage were calculated by assuming the trunks and canopies approximated a circle. Densities of stems (ramets) as well as individuals (genets) were calculated. The *Juglans* cores and stem sections were sanded and the number of rings determined. On older stems the coloration of the heartwood made ring counts impossible without first bleaching with a 5% solution of sodium hypochlorite. It was assumed that rings were laid down annually, a reasonable assumption for a temperate climate deciduous tree, and true for other trees in southern California (Schulman 1947). A regression analysis of age and basal diameter was done using a linear regression and polynomial regression program available on BMDP (Brown 1977). The equation giving the best fit was used to predict the ages of all *Juglans* stems recorded in the quadrats.

RESULTS

There were marked differences in the community characteristics of the three walnut woodlands. At the Sulphur Mt. Site (Table 1) *Quercus agrifolia* (coast live oak) was a co-dominant whereas at the other two sites (Tables 2 and 3) *Juglans californica* was the only dominant. At Sulphur Mt. areal coverage was estimated to be greater for walnut but due to the massive trunks of several of the live oaks, basal area coverage was substantially greater for that species. At this site the *J. californica* were nearly all single stemmed and thus the number of individual genets was similar to the number of stems (ramets) (Table 1). Although *Juglans* was the only dominant at the other two sites (Tables 2 and 3) there were marked differences between these two stands. At the Mt. Washington Site *J. californica* basal area coverage was double that recorded at Montecito Park whereas the latter site had more than double the number of stems as the Mt. Washington Site. In other words the Mt. Washington Site

TABLE 2. RELATIVE AREAL COVERAGE, BASAL AREA COVERAGE, AND DENSITY FOR *JUGLANS CALIFORNICA* DOMINATED WOODLAND ON THE NORTH-FACING SLOPE OF MT. WASHINGTON, LOS ANGELES COUNTY, CALIFORNIA.

Species	Relative areal coverage (%)	Basal area coverage (m^2/ha)	Density (no./ha)	
			Stems	Individuals
Juglans californica				
Alive	90	38.4	1360	1130
Dead	<1	0.1	50	50
Heteromeles arbutifolia	8	3.4	410	150
Prunus ilicifolia	2	0.6	220	200

was a woodland of large, mostly single-stemmed, trees whereas the Montecito Park Site was a more open woodland with many smaller, multiple-stemmed trees and a greater number of dead *Juglans* trunks. At all sites *Heteromeles arbutifolia* was a significant component of these woodlands. *Sambucus mexicana, Rhamnus ilicifolia, Prunus ilicifolia,* and *Toxicodendron diversilobum* were present at all three sites, although they were not always recorded from the plots. Swanson (1967) reported putative hybrids between *J. californica* × *J. regia* from an area on Sulphur Mt.; however, I did not observe any at the Sulphur Mt. Site.

The distribution of stem diameters of the three co-dominants at Sulphur Mt. showed marked differences. For *J. californica* (Fig. 1) there was more continuous distribution of size classes (up to 85 mm) compared to that for *Q. agrifolia* (Fig. 1). This coast live oak population had 90% of the stems in the smallest size class and very few greater than 25 mm. The maximum stem diameter was 1000 mm for *Q. agrifolia* which was nearly three times greater than the largest *J. californica* and six times greater than the largest *H. arbutifolia* (Fig. 1).

The tallest *J. californica* trees were 11 m although only 10% of the population was greater than 5 m. *Quercus agrifolia* reached 18 m and 10% were taller than 10 m. Several of the *Heteromeles arbutifolia* were 10 m in height.

At the Sulphur Mt. Site, 27 *Juglans* stems were aged and the oldest was 98 years. Age was significantly correlated with all of the parameters measured: basal diameter (Fig. 2), areal diameter (Fig. 2) and height (Fig. 2). The relationship between age and areal canopy diameter was best described by a linear equation whereas the relationship between age and basal diameter or age and height best fit a higher order polynomial equation. The regression equation relating age and basal diameter was used to estimate the ages of the

TABLE 3. RELATIVE AREAL COVERAGE, BASAL AREA COVERAGE, AND DENSITY FOR *JUGLANS CALIFORNICA* DOMINATED WOODLAND ON AN EAST-FACING SLOPE IN MONTECITO HEIGHTS, LOS ANGELES COUNTY, CALIFORNIA.

Species	Relative areal coverage (%)	Basal area coverage (m^2/ha)	Density (no./ha)	
			Stems	Individuals
Juglans californica				
Alive	95	19.6	2790	1710
Dead	3	4.2	478	100
Heteromeles arbutifolia	1	0.1	78	20
Prunus ilicifolia	1	<0.1	20	10

Juglans stems recorded from the quadrats and these are shown in Fig. 3. The oldest trees encountered in the sampling were estimated to be about 73 years of age. Fifty percent of the population, or 1975/ha, were estimated to be seedlings (defined as stems ≤ 5 years of age and not attached to a matured tree). This seedling pool had an areal canopy diameter of ≤ 0.5 m and 20% of this cohort exceeded 1.0 m in height. There were gaps in some age classes but most were represented and the decrease in density with age best fit a negative third order polynomial relationship ($p < 0.001$, $r = 0.95$).

At the Mt. Washington Site stem diameters of *Juglans* were significantly larger than those observed at Sulphur Mt. with the largest being 900 mm. Heights of these trees were also greater; one tree was 15.5 m and 10% of the population exceeded 8 m. The same pattern of larger trees at this site was observed for *H. arbutifolia*. One stem had a basal diameter of 575 mm and a height of 11 m. The only other woody species recorded was *Prunus ilicifolia* although many of the specimens appeared to be hybrids with *P. lyonii* (a Channel Island endemic) which grew at the site and may have escaped from cultivation or been planted by aerial spraying (Radtke 1978). At this site the largest *Juglans* stem cored was rotted in the middle so the exact age was unknown. From the intact cores, a linear model was the best fit between age and basal diameter. Using this equation the largest *Juglans* stem encountered in the quadrat sampling was estimated to be 132 years of age (Fig. 3). Only 25% of the stems (275/ha) were 1–5 year old seedlings and the decrease in density of older age classes approximated a second order polynomial curve ($p < 0.01$, $r = 0.94$).

At the Montecito Park Site the largest *Juglans* stem had a diameter of 675 mm and was 10 m tall. The largest *Heteromeles* stem had a basal diameter of only 71 mm. The oldest *Juglans* stem aged was 81 years of age and a linear model was the best fit for the age/

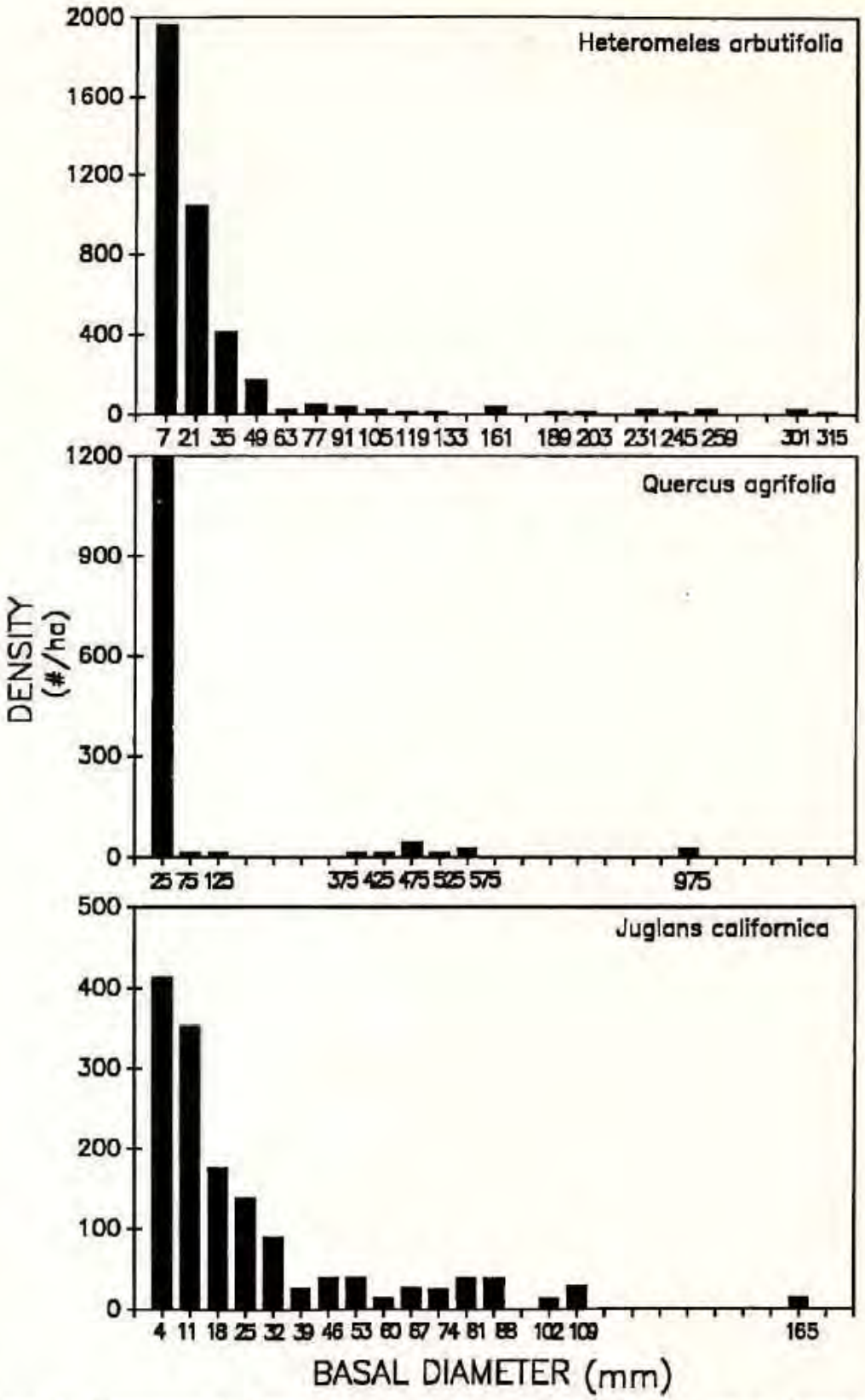


FIG. 1. Frequency distribution of stem diameters for *Juglans californica, Quercus agrifolia,* and *Heteromeles arbutifolia* at the Sulphur Mt. Site.

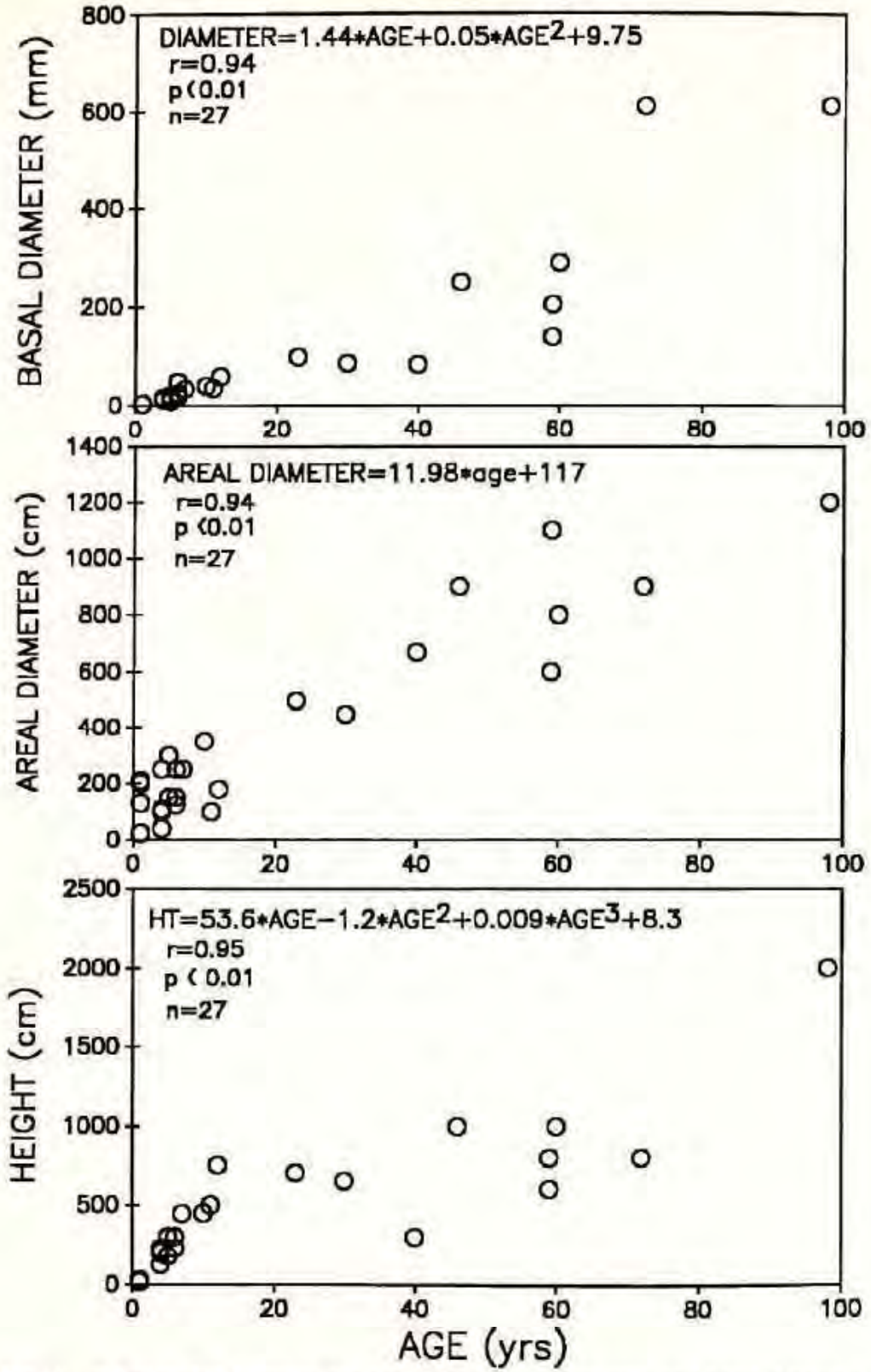


FIG. 2. Relationship between age and height, areal diameter, and basal diameter, for *Juglans californica* at the Sulphur Mt. Site.

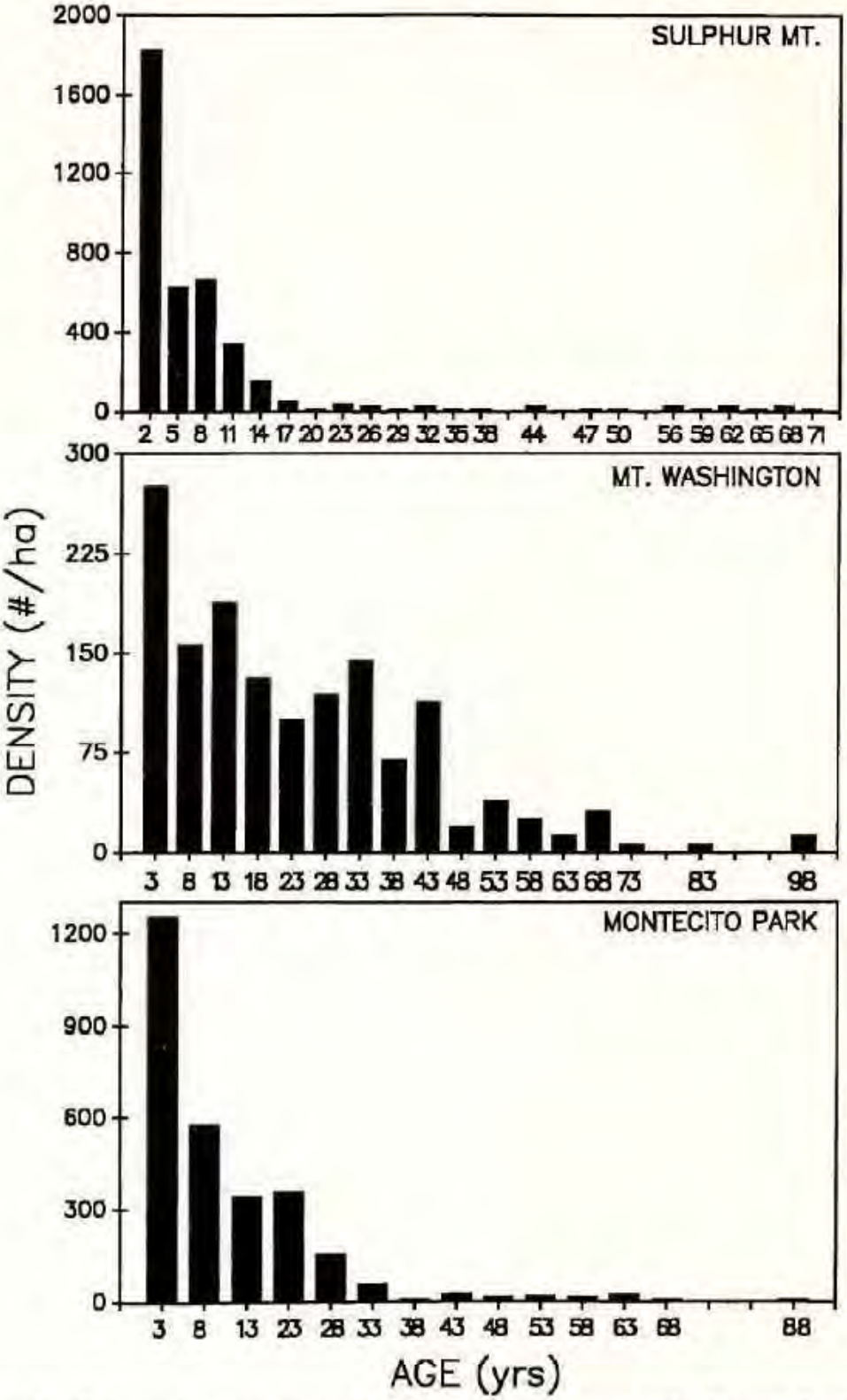


FIG. 3. Estimated age structure of *Juglans californica* stems at the three study sites (live = solid bar, dead = open bar). Age of stems recorded in the random quadrat sampling was predicted from the equations: Sulphur Mt. Site: Age = 0.313·Diameter

diameter relationship. This equation predicted the oldest tree sampled in the quadrats was 77 years (Fig. 3) and that 45% of the population of *Juglans* stems (1250/ha) were ≤ 5 years of age. There was a very rapid drop in density of older age classes which approximated a third order polynomial curve ($p < 0.001$, $r = 0.97$). As can be seen in Table 3, there were many more stems than individual genets at this site. Seedlings and saplings were seldom multiple-stemmed, rather these were generally the larger trees. Of these, 40% had four or more stems and one tree had 16 stems. The age-structure of individual genets, as reflected in a histogram of the oldest stem on each genet (not shown), was compared with the histogram for all stems (Fig. 3). The shape of these histograms was remarkably similar and the number of individual genets ≤5 years (i.e., seedlings) was 51% of the population or 860/ha.

Discussion

Black walnut woodlands in southern California may be dominated by *Juglans californica* alone or walnuts associated with sclerophyllous evergreen trees. The most common ones reported in this study, *Quercus agrifolia* and *Heteromeles arbutifolia,* have also been reported from other studies (Swanson 1967; Leskinen 1972; Campbell 1980). Axelrod (1977) contends that this *Juglans* dominated woodland is quite ancient, dating back to at least the Miocene when it was associated with an even greater array of evergreen broadleaf trees.

A number of the evergreen trees and shrubs currently associated with *Juglans* woodlands, e.g., *Heteromeles arbutifolia, Prunus ilicifolia,* and *Rhamnus ilicifolia,* are common elements in the widespread chaparral community which is often juxtaposed with walnut woodlands. These evergreens persist in the fire-prone chaparral due to their proclivity to resprout after fire. The reproductive biology of these evergreens, however, is poorly adapted to this community in that the seeds have no imposed dormancy and thus germinate readily after dispersal. These seedlings do not survive in most chaparral stands; consequently, seedling reproduction by these species is seldom observed in chaparral. Reports of reproduction are usually restricted to extremely old chaparral (Keeley and Keeley 1988) or woodlands, as observed in this study. These taxa persist in walnut woodlands, as well as other broadleaf woodlands (Campbell 1980), as "gap-phase" species, which is consistent with the fact that these

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$- 0.00029 \cdot \text{Diameter}^2 + 0.08$ ($p < 0.001$, $r = 0.96$, $n = 27$); Mt. Washington Site: $\text{Age} = 0.141 \cdot \text{Diameter} + 4.77$ ($p < 0.001$, $r = 0.91$, $n = 25$); Montecito Park Site: $\text{Age} = 0.126 \cdot \text{Diameter} + 3.59$ ($p < 0.001$, $r = 0.93$, $n = 23$).

species produce bright, red, bird-dispersed berries unlike most other chaparral taxa. These evergreen taxa have been part of oak woodlands and the mixed evergreen forest since at least Miocene (Axelrod 1977) and today are still considered to be "characteristic components" of four different woodland communities in California (Barbour and Major 1977).

The three sites studied here describe woodlands of quite different structure. The Montecito Park Site was the most open savanna-like woodland of the three sites. Total dominance of all woody species (as measured by basal area coverage) was less than half that observed at the other two sites. Records of prior disturbance in this area are non-existent. Observations of the surrounding hills, which are dominated by *Brassica nigra* and other non-native annuals with remnants of a few resprouting chaparral shrubs, suggests this area has burned frequently in the past; a characteristic of much of the Los Angeles Basin (Freudenberger et al. 1987). The savanna-like aspect of the Montecito Park Site may be due to such disturbance. The multiple-stem character of most of the walnut trees at that site would be consistent with that hypothesis since this species resprouts readily after burning. In addition, the significant number of sizeable dead *Juglans* at this site (Table 3) compared to very few at the older Mt. Washington Site (Table 2) also supports the idea that fires have been a part of the Montecito Site's history.

The Mt. Washington Site is an example of a more closed-canopy type woodland with a much greater dominance of *Juglans*. The structure of this woodland suggests it has been free from disturbance for an extended period of time. Most of the walnuts are single-stemmed and there are many large specimen trees, both *J. californica* and *H. arbutifolia*, of extraordinary size. There was no obvious evidence of fire at this site in recent decades as was true of the Sulphur Mt. Site, which likewise had mostly single-stemmed walnut trees.

Seedling regeneration of *Juglans* was evident at all three sites. The density of seedlings at Sulphur Mt. was similar to that observed by Swanson (1967) for a site near our Sulphur Mt. site. Neither of the Los Angeles Co. sites described here lacked seedling reproduction as Swanson (1967) reported for his Brea Canyon site in eastern Los Angeles Co. He hypothesized that this lack of *Juglans* seedling establishment was due to the lower precipitation in the southern part of its range. His hypothesis seems unlikely in light of the continuous seedling establishment apparent over the past several decades in the two Los Angeles Co. sites described here (Fig. 3). Intensive cattle grazing present at Swanson's (1967) Brea Canyon Site may account for lack of seedling recruitment there; grazing in recent decades has not been a factor at any of the sites described here. The large seedling population observed at the Montecito Park Site suggests that, if protected from fire, eventually this savanna-like woodland may develop into a denser woodland.

Interpretation of the age structures reported here requires careful analysis. If we assume that all three populations have constant rates of annual recruitment, and mortality is constant with age, we could conclude that these populations are relatively stable. That is, barring disturbance, recruitment and survival of seedlings and saplings is sufficient to maintain these populations in the future. If these assumptions were true one could account for gaps in certain age classes by a low intensity disturbance such as a ground fire which selectively eliminated seedlings during those years but failed to kill older age classes. Such a hypothesis seems unlikely since, due to the low canopies and lack of self-pruning in these walnuts, fires generally are much more intense and consume the entire canopy of the forest.

In general, a model of constant recruitment and constant mortality is probably a poor one for interpreting age structure of walnut populations. The shape of age-structures (Fig. 3) could be explained by an increase in fruit production as the trees in the forest age. This is an unlikely explanation since abundant fruit production is observed on trees after about 20 years (pers. obs.) plus the Mt. Washington stand with the largest and oldest trees did not have greater seedling production than the other two younger stands.

I suggest reproduction and mortality are not constants in these walnut populations and that they vary in a stochastic rather than a deterministic manner. Although no quantitative data exist on *Juglans californica* reproduction, one can readily observe years of little or no fruit production, commonly in drought years, in contrast to mast years of very heavy walnut production during wetter years. Since the seeds of this species have no imposed dormancy and germinate readily after dispersal (Keeley 1987), it follows that seedling establishment would not be constant from year to year. Due to the potentially lethal effect of occasional severe droughts, it seems likely that mortality is also not constant for all age cohorts. Thus, I hypothesize that gaps in certain age classes in some of the age structures presented here are due to annual variations in recruitment and mortality, resulting from annual differences in climate, especially precipitation.

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ANNOUNCEMENT

CHANGE IN SUBSCRIPTION RATE FOR *MADROÑO*

The Council of the California Botanical Society has voted to increase the institutional subscription rate for *Madroño* to $50.00 per year. Individual ($22.00), student ($12.00), and family ($25.00) membership dues for the California Botanical Society are unchanged.

Exhibit 14

CALIFORNIA ALL Your Actions Save Lives COVID-19 UPDATES

CDFW is temporarily closing its high public use areas, including visitor centers and license counters, to help slow the spread of COVID-19 (coronavirus). Before heading to a CDFW facility, contact the **regional headquarters office** to determine if that facility is open. Information on purchasing licenses, permits, tags and other entitlements, can be found on CDFW's **Online License Site**.

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Natural Communities

On this page:

- Natural Communities
- Sensitive Natural Communities
- Natural Communities Lists
- Addressing Sensitive Natural Communities in Environmental Review
- Semi-Natural Stands and Addressing Grasslands and Flower Fields
- Unclassified Areas of the State
- Legacy Sensitive Natural Communities in CNDDB
- Jurisdictional Determinations
- References

VegCAMP

- VegCAMP Background
- Reports and Maps
- Publications, Protocols, and Standards
- Natural Communities
- Submitting Natural Communities Information
- Vegetation-related Resources

Natural Communities

Natural Communities have been part of the Natural Heritage conservation triad, along with plants and animals, since the inception in 1979 of California's natural heritage program, the California Natural Diversity Data Base (CNDDB). Natural Community elements were at first classified according to "Preliminary Descriptions of the Terrestrial Natural Communities of California" (Holland 1986). Since the mid-1990s, however, CDFW and our partners, including the California Native Plant Society (CNPS), have been working on classifying vegetation types using the state standards embodied in the Survey of California Vegetation, which comply with the National Vegetation Classification Standard (NVCS). We now use the terms "Natural Communities" and "vegetation types" interchangeably.

NVCS is a hierarchical classification, with the most granular level being the Association. Associations are grouped into Alliances, Alliances into Groups, and upward, as follows:

- Formation Class
    - Formation Subclass
        - Formation
            - Division
                - Macrogroup
                    - Group
                        - Alliance
                            - Association

The classification for California was first published as the Manual of California Vegetation in 1995, updated in the second edition of the Manual (Sawyer et al. 2009), and is now most easily accessed in the Manual of California Vegetation Online. However, because we are continually updating the classification based on new projects, much information is also in project-specific classification and mapping reports.

Semi-natural Alliances and Special Stands

The classification also includes **Semi-natural Alliances** and **Special Stands**. Semi-natural Alliances are strongly dominated by non-native plants that have become naturalized in the state. **Special Stands** are specific patches of vegetation in the landscape that are unique from other patches, which may appear structurally

that are unique from other patches, which may appear structurally distinctive as well as rare. These are usually defined by the presence of locally-dominant but globally or regionally rare plant taxa, including plants on the California Native Plant Society's Inventory of Rare and Endangered Plants of California or the Department's Special Plants List. The rare species typically defines the type (e.g., Callitropsis abramsiana), and stands usually establish in less redundancy (e.g., less than 10 stands) across the landscape than other vegetation types. Certain rare plants establish with a unique set of species within certain climatic and edaphic conditions, and they typically co-dominate with a rare assemblage of species. In the case of certain more widespread taxa, the stands in California may be so isolated from other stands in the species range that we don't know whether they represent an alliance, association or an outlier stand. **Provisional Alliances** and **Provisional Semi-natural Alliances** are types for which we have fewer than 10 stands sampled, but which we expect will prove to be more widespread.

Sensitive Natural Communities

Natural Communities are evaluated using NatureServe's Heritage Methodology, the same system used to assign global and state rarity ranks for plant and animal species in the CNDDB. VegCAMP has been ranking California Natural Communities by their rarity and threat since the inception of the program. However, since 2012 the ranking methodology has become more transparent and defensible through the advent of a rank calculator. VegCAMP and the California Native Plant Society's Vegetation Program now use this calculator to rank Natural Communities; rankings are reviewed by both programs.

The basic ranking concepts of rarity and threats used in the "Heritage Methodology" since the 1970's remain the same, using the best and most recent scientific information available. However, as a result of better definitions based on classification and mapping of California's Natural Communities, we can apply standardized quantitative rarity and threat parameters and compute weighted scores for rarity and threats. For rarity, the

ranking involves the knowledge of range and distribution of a given type of vegetation, and the proportion of occurrences that are of good ecological integrity. Threats and trends are likewise considered in categories such as residential and commercial development, agriculture, energy production and mining, and invasive and other problematic species and genes (among others). Threat scope (typically assessed within a 20-year timeframe for vegetation) and severity are used to calculate an overall threat score, which is added to the overall rarity score for a single rank of 1 through 5. Evaluation is done at both the Global (full natural range within and outside of California) and State (within California) levels resulting in a single G (global) and S (state) rank ranging from 1 (very rare and threatened) to 5 (demonstrably secure). For more details on the components of ranking see the “factor reference sheet” on the conservation rank calculator mentioned above.

Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of CEQA and its equivalents. A question mark (?) denotes an inexact numeric rank because we know we have insufficient samples over the full expected range of the type, but existing information points to this rank; it is the equivalent of the NatureServe rank calculator's "range of rankings" option.

We have not provided the G and S rank for all associations in the current version of the list. However, associations currently designated as being of S3 or rarer are indicated with a Y in the Sensitive column. For alliances with State ranks of S1-S3, all associations within them are also considered Sensitive. Note that Alliances that are not considered sensitive may contain associations that are marked with a Y in the Sensitive column. Membership rules for associations can be found in project-level reports as referenced in the MCV Online Alliance descriptions. If you have questions about these please contact VegCAMP staff.

Ranking is an ongoing process and we expect to provide association level ranks for all of the S3 or rarer entities in the future. Please note that Semi-natural Alliances are not ranked, as these are defined by non-native species.

As of 2018, about half of California has been mapped and classified according to the state and national standard. Accordingly, not all Sensitive Natural Communities have been described, and the ranks of some current communities may change as we refine their known distributions. However, rankings are based on the best available information.

Our mapping standards call for a minimum mapping unit (MMU) of not greater than 10 acres for upland communities, but usually 1 or 2 acres, with wetlands and other special types such as sensitive natural communities being mapped at a MMU of ¼ acre. These MMUs are used for regional-scale projects and are based on the available imagery or other data and the budget or speed at which the mapping must be done. For project-level review maps, the MMUs will likely be smaller; higher resolution imagery and the ability of ecologists to visit all or most of the stands on the ground can allow a higher resolution map. MMUs may also vary by lifeform, with even very small MMUs for sensitive herbaceous communities, for example, Selaginella bigelovii stands on a rock outcrop. They may also be smaller for types of concern such as invading Arundo donax stands that will need treatment, depending on the purpose of the map. MMUs will depend on the needs or requirements of the lead and trustee agencies and the needs for impact assessment and mitigation planning. A consideration related to this is the separation distances between trees and shrubs, which can help determine, for a particular landscape, what is a stand of shrub or tree vegetation vs. emergent shrubs or trees over a stand in a different life form.

As noted above, some associations are considered sensitive even though the alliance in which they nest are not. Thus, an alliance-level regional map may not portray stands of association-level sensitive natural communities. For project-level maps for environmental review, all sensitive natural communities should be mapped, even if at the association level.

Natural Communities Lists

The documents below provide the Vegetation Classification and

Mapping Program's current list of vegetation Alliances, Associations, and Special Stands, and their Global and State rarity ranks. We have not ranked all associations with specific G and S ranks, except those defined from specific projects where they are well-understood geographically and so are more accurately ranked than placed within the broader "Sensitive" category. Natural Communities with ranks of 1-3 are considered sensitive and marked with a Y in the rightmost column. A "?" indicates our best estimate of the rank when we know we have insufficient samples over the full expected range of the type, but existing information points to this rank. Semi-Natural Stands are included but not ranked. Pending additions are at the bottom of the list. For previous lists, contact any VegCAMP staff.

- Natural Communities List Arranged Alphabetically by Life Form (PDF)
- Natural Communities List Arranged Alphabetically by Life Form (Excel)
- Sensitive Natural Communities Only by Life Form (PDF)
- Sensitive Natural Communities Only by Life Form (Excel)
- Recent changes in Natural Communities (PDF)
- Recent changes in Natural Communities Rarity (PDF)

Addressing Sensitive Natural Communities in Environmental Review

- Identify all Natural Communities within the project footprint using the best means possible, for example, keying them out in the Manual of California, Second Edition (Sawyer et al. 2009) or in classification or mapping reports from the region, available on VegCAMP's Reports and Maps page.
- Refer to the current standard list of Natural Communities to determine if any of these types are ranked Sensitive (S1-S3 rank); if so, see CEQA Guidelines checklist at IVb.
- Other considerations when assessing potential impacts to Sensitive Natural Communities from a project include:
    1. Compliance with state and federal wetland and

1. Compliance with state and federal wetland and riparian policies and codes, as certain Natural Communities are restricted to wetlands or riparian settings.
2. Compliance with the Native Plant Protection Act and the state and federal Endangered Species Acts, as some Natural Communities either support rare species or are defined by the dominance or presence of such species.
3. Compliance with CEQA Guidelines Section 15065(a), which mandates completion of an EIR if a project would threaten to eliminate a plant community.
4. Compliance with local regional plans, regulations, or ordinances that call for consideration of impacts to Natural Communities.
5. Vegetation types that are not on the state's sensitive list but that may be considered rare or unique to the region under CEQA Guidelines Section 15125(c).

- If a Natural Community in the project area has not previously been described, it may be a rare type. In this case, please contact VegCAMP (Rachelle Boul) about documenting the Natural Community.
- If there are Sensitive Natural Communities on your project site and you need guidance regarding their significance, assessment of quality or value, and potential impacts, contact the appropriate regional staff person through the local CDFW Regional Office. These staff have local knowledge and context.
- The Department's document Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (PDF) provides information on reporting.

Semi-Natural Stands and Addressing Grasslands and Flower Fields

Semi-natural alliances have their own membership rules, that is, the minimum percent relative or absolute cover of the non-native to define a stand, which can be ecosystem-dependent. However, California's grasslands and flower fields vegetation types are among the most difficult to analyze and study. The greatest challenge comes from the variation in species composition and abundance from early to late season and between years. Researchers and consultants have tended to underestimate the significance of native herbaceous plants because they are frequently at their highest cover either very early or very late in the season and may have very low cover during the spring and summer, when non-native grasses dominate and when field work is often performed. Additionally, in some years, a given area may be characterized by an abundance of non-native forbs and grasses, while in other years native herbs may dominate. This inter-seasonal and inter-annual variance of cover between the diagnostic species and the less diagnostic species leads us to conclude that rules for an herbaceous vegetation type's identification should be more broadly inclusive for nativity, with relative cover as low as 10% natives determining a native stand.

Use of the Manual of California Vegetation requires looking closely to determine if native indicator species are evenly distributed and interspersed with non-native plants while visiting the sites throughout the growing season. Although this often makes for more difficult field identification, detection of native plants ensures a proper assessment of the stand's conservation and biodiversity value.

There are indeed many grasslands or herbaceous stands populated almost entirely by non-natives; some have been heavily disturbed in the past and others invaded by exotics that can preclude natives almost completely, such as medusa-head (Elymus caput-medusae) and perennial pepperweed (Lepidium latifolium). Vegetation scientists at NatureServe, the California Native Plant Society, and CDFW determine non-native stands based on a rule of at least 90% cover of non-native species without evenly distributed or diverse native forbs and grasses at any time in the growing season. Conversely, a stand is considered native if 10% or more relative cover consists of native taxa that are evenly distributed in

the stand and present at any time during growing season. For example, the Sonoma County Vegetation Key (PDF) includes this rule for the Deschampsia caespitosa alliance: Deschampsia cespitosa, Danthonia californica, and/or Eryngium armatum dominate or co-dominate individually or in combination (if Holcus lanatus has the highest cover, but these three species have at least 10% combined cover, key to Deschampsia).

Unclassified Areas of the State

For parts of the state that have not been classified according to state standards (the inverse of this map (PDF)), it may be appropriate to use the vegetation types as described in "Preliminary Descriptions of the Terrestrial Natural Communities of California" (Holland 1986 (Excel)). This is particularly true for sensitive natural community types. In some unclassified areas, common types may already be described at the Alliance level. Check the membership rules in the Manual of California Vegetation Online and use these types whenever possible. Refer to Holland types only when a current type does not exist.

Legacy Sensitive Natural Communities in CNDDB

At the time funding for the Natural Communities part of the CNDDB program was halted in the mid-1990s, approximately 2,500 occurrences of 96 sensitive natural community types had been entered in CNDDB, all based on Holland's classification. No new occurrences have been added since then, and our focus is now on completing an updated statewide classification, element ranking, and map. Once the entire state is classified and mapped, we will be able to review the existing occurrences in CNDDB and update them individually by existence, type, and global and state rarity ranking. We think it imprudent to remove these Holland-based elements from the CNDDB before assessing them and reclassifying them in terms of the currently accepted state and national standards for

vegetation classification. Their existence should be addressed in the environmental review processes of CEQA and its equivalents, along with occurrences of plants and animals tracked by the CNDDB. To convert between Holland and current types see http://vegetation.cnps.org/classifications

Jurisdictional Determinations

Vegetation maps produced under the state standards do not imply regulatory jurisdictional determinations under Section 404 of the Federal Clean Water Act, Section 10 of the Rivers and Harbors Act, Section 1600 of the California Fish and Game Code (Lake and Streambed Alteration Program), Sustainable Ground Water Act (see https://gis.water.ca.gov/app/NCDatasetViewer/) or the lack thereof. Such determinations usually require a site visit to assess the current conditions on the ground and to map boundaries at a finer scale than the state vegetation map standard. Similarly, terms such as “riparian” and “wetland” in the vegetation keys and type descriptions may inform but do not imply or assert regulatory jurisdiction or the lack thereof.

References

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California (PDF).

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp.

Biogeographic Data Branch
(916) 322-2493 | BDB@wildlife.ca.gov

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Exhibit 15

Los Angeles City Planning Commission

200 North Spring Street, Room 532, City Hall, Los Angeles, CA 90012
www.cityofla.org/PLN/index.htm

January 18, 2006

Los Angeles City Council
City Hall, Room 395
Los Angeles, CA 90012

ATTN: Barbara Greaves, Legislative Analyst
Planning and Land Use Management Committee

CITY PLAN CASE NO. 2004-2290 CA

Transmitted herewith is an ordinance (Appendix A), which amends the Los Angeles Municipal Code to add certain native trees to the class of "protected tree" (formerly solely oak tree), reduces the size protected, eliminates the minimum lot size, expands the universe of people who can perform tree reports, and clarifies and enhances the enforcement provisions.

On January 12, following a public hearing, the City Planning Commission adopted the Planning Department staff report and findings, and **approved the proposed ordinance (Appendix A) with recommendations**. The recommendations included that the City Attorney ensure that the penalty for illegal removal of protected trees run with the land, that building permits are withheld as part of the enforcement procedure, that the enforcement language be clarified if possible, and that a maintenance fee for trees planted as a mitigation be included in the Public Works section of the Municipal Code. The Commission also requested staff to develop guidelines to assist applicants in understanding the requirements and procedures.

This action was taken by the following vote:

Moved:	Usher
Seconded:	Freer
Ayes:	Cardoso, Hughes, Kay, Kezios, Roschen, Woo
Absent:	Iriando

Vote: 6-0

G. Williams

Gabriele Williams, Commission Executive Assistant II
City Planning Commission

Attachments: Findings, Appendix A (Ordinance)

cc: Keith Pritsker, Deputy City Attorney

FINDINGS

That the City Council:

Adopt the staff report of November 10, 2005, as its report on the subject;

Adopt the findings in the staff report dated November 10, 2005.

The City Planning Department recommends that the City Council, in accordance with Charter Section 558, find that the attached, proposed ordinance (Appendix A) is:

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species. RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

Exhibit 16

FILE COPY

Los Angeles City Planning Department
RECOMMENDATION REPORT

CITY PLANNING COMMISSION	CASE NO:	CPC-2004-2290-CA
	CEQA:	ENV-2004-2201-CE
	LOCATION:	Citywide
DATE: January 12, 2006	COUNCIL DISTRICTS:	All
TIME: after 8:30a.m. *	PLAN AREAS:	All
PLACE: Room 1010 City Hall 200 North Spring St., Los Angeles, CA 90012	RELATED FILES:	n/a

PUBLIC HEARING REQUIRED—CONTINUED FROM MEETING OF NOVEMBER 10, 2005

REQUEST: Continued consideration of staff report and proposed amendments to the Zoning Code first heard November 10, 2005, regarding amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Los Angeles Municipal Code.

SUMMARY: The proposed amendments to the Zoning Code will bring the provisions of the Code regarding Oak Trees in conformance with revisions to Section 46 (Oak Tree Regulations) and 96.303.5 of the Municipal Code.

RECOMMENDATION:

1. Adopt the staff report as its report on the subject.
2. Adopt the attached findings.
3. Approve the proposed amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, and 17.52 I (Appendix A) and recommend their adoption by the City Council.

CONTACT INFORMATION: Michael O'Brien, City Planning Associate, 213-482-7077

Table of Contents

		Page
I	Summary	2
II	Findings	2
III	Staff Report	4
	Request	4
	Discussion	4
	Conclusion	5

Appendix A—Staff report and proposed Amendments to Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I, and 46.00 through 46.06, and 96.303.5 of the Municipal Code from November 10, 2005.

ADVICE TO PUBLIC: *The exact time this report will be considered during the meeting is uncertain since there may be several other items on the agenda. Written communications may be mailed to the Commission Secretariat, 200 North Main Street, Room 532, Los Angeles, CA 90012 (Phone No.213/978-1300). While all written communications are given to the Commission for consideration, the initial packets are sent the week prior to the Commission's meeting date. If you challenge these agenda items in court, you may be limited to raising only those issues you or someone else raised at the public hearing, or in written correspondence on these matters delivered to this agency at or prior to the public hearing. As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability, and upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. Sign language interpreters, assistive listening devices, or other auxiliary aids and/or other services may be provided upon request. To ensure availability of services, please make your request no later than three working days (72 hours) prior to the meeting by calling the Commission Secretariat at 213/978-1300.

SUMMARY

On November 10, 2005, the Commission considered a staff report and proposed ordinance amending Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code. These Sections need to be revised to be consistent with the revisions proposed for Sections 46.00 through 46.06 and 96.303.5 of the Los Angeles Municipal Code under the Authority of the Board of Public Works and the Department of Building and Safety. These latter sections contain the City's oak tree regulations (proposed to be changed to the "protected tree regulations") and are not under the purview of the Department of City Planning nor the City Planning Commission.

Considerable testimony was given at the Commission meeting. The commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

This report addresses the issues raised at the November 10 meeting and recommends adoption of the attached ordinance, Appendix A.

FINDINGS

1. In accordance with Charter Section 556, the proposed ordinance (Appendix A) is in substantial conformance with the purposes, intent, and provisions of the General Plan. It implements Policy 3 of Section 6: Endangered Species of the Conservation Element of the General Plan by revising regulations concerning endangered species; and Policy 4 of Section 10: Habitats of the Conservation Element of the General Plan by creating legislation that encourages and facilitates protection of local native plant and animal habitats. It also implements the California Environmental Quality Act by designating *Juglans californica* var. *californica* as a protected species, consistent with the recommendations of the California Native Plant Society (6th Inventory of Endangered Species, RED Code 4-4-4) that this "locally significant" species be "evaluated for consideration during the preparation of environmental documents relating to CEQA"; and

2. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) will have no adverse effect upon the General Plan, specific plans, or any other plans being created by the Department of City Planning because the proposed ordinance is consistent with the General Plan and carries out the General Plan goals, policies and objectives discussed above. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code; and

3. In accordance with Charter Section 558 (b)(2), the proposed ordinance (Appendix A) is in conformity with the public necessity, convenience, general welfare and good zoning practice. These amendments to the Zoning Code are for the purpose of eliminating conflicts and ensuring consistency in the Municipal Code. By inclusion of the Certified Arborist in the list of "Tree Expert," the revisions will help streamline permit processing by affording applicants a greater choice of experts to prepare tree reports; and

4. The proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City's

CEQA Guidelines (ordinances which do not of themselves have an impact on the physical environment). The proposed amendments to the Zoning Code apply only to future development projects. All projects are still subject to zoning, environmental, and land use laws that regulate development throughout the City at the time the applications are filed. Each individual project will have its own environmental review.

MARK WINOGROND
Interim Director of Planning

APPROVED BY:

Jane Blumenfeld
Principal City Planner

PREPARED BY:

Michael O'Brien
City Planning Associate

STAFF REPORT

REQUEST

On November 10, 2005, the Commission considered the staff report and proposed ordinance to add protections to certain trees (in addition to oak trees) and to revise the existing protections to oak trees. The ordinance amends Sections 12.21 A 12, 17.02, 17.05 H 7, 17.05 R, 17.06 B 13, 17.06 C, 17.51 D, 17.52 I of the Zoning Code, all of which make reference to oak trees. The Commission directed staff to report back on the following topics: species to be protected, size of trees to be protected, any hardships accruing to developers, the status of trees on adjoining properties, the oversight of the regulations, the enforcement of the regulations, the urgency of adopting the proposed regulations, options for "replacement" of trees, and whether a citation for non-permitted removal of protected trees continues with a change of ownership.

DISCUSSION

Species to be protected. The task force during its deliberations in 2003 considered all local species of native trees for possible protection. The task force settled on the addition of only three trees to the list of protected trees, because these three trees, the Southern California Black Walnut (Juglans californica var. californica), the Western Sycamore (Platanus racemosa), and the California Bay (Umbellularia californica), formed a suite of trees diagnostic of the Southern California environment. Only in Southern California do these three trees grow together. Other trees considered have a greater natural range and are not typical solely of Southern California. In addition, the Southern California Black Walnut is already protected under the Mt. Washington Specific Plan, and it is listed as a species of concern whose existence on a project should be considered under the California Environmental Quality Act.

Size. The committee recognized that protecting only trees 8" or more in diameter have the result of protecting only large trees, and would be purely aesthetic in nature. In order to ensure continuing existence of these trees in the area, smaller sizes need to be protected. Four inches was arrived at by considering the case of the Southern California Black Walnut, which typically grows as a multi-trunk tree after fires. Establishing a diameter size of four inches would protect walnuts; a larger size would miss almost all walnuts that survived after fires.

Hardships accruing to developers. Developers are already familiar with the current requirements to survey trees eight inches or more in diameter. The proposed amendment would merely mandate a slightly longer report. For a typical single family residence, which usually would have only one protected tree on the property, a consultant's report would cost less than $200.00, which is only a fraction of building fees and typical project costs.

Status of trees on adjoining properties. Since adjoining properties are not typically surveyed for development purposes, trees on adjoining properties would not be required to be identified as a part of the development application package for any property. Development on a property may require a neighboring tree to be pruned, ground to be cut or filled, etc. In such a case, the property owner has the general legal right to prune both above ground and below ground parts of a tree that extend over and under his property, to cut and fill ground, etc., provided that these actions do not cause the tree to die. Section 46 defines "removed" or "removal" as "any act which will cause a protected tree to

die." If a property owner wished to undertake such extensive pruning, grading, etc., that would cause a protected tree to die, then that property owner would need a permit to undertake such an action. The property owner might also be liable to the adjacent property owner for destruction of a tree on the neighboring property.

Oversight of the regulations and enforcement of the regulations. The Street Tree Division of the Board of Public Works is responsible for oversight of the regulations. Enforcement comes in several ways. One, applicants for building permits are required to list protected trees on their site plans. Two, as part of any required environmental review, a plot plan of the site showing all trees must be submitted, and a mitigation for removal of any protected trees is required, in accordance with Code requirements. Three, citizen complaints to the Street Tree Division may cause the Street Tree Division itself to survey the trees on an affected parcel. Building permits will be withheld until the applicant evidences compliance with the protected tree regulations—usually, a sign-off from the Street Tree Division.

Enforcement is ultimately under the purview of both the Board of Public Works and the Department of Building and Safety. The Board can request the Department to withhold building permits on a property for violation of the protected tree regulations, or revoke a permit issued for which construction has not commenced, after a public hearing on the matter. This penalty can be for up to ten years, depending on the severity of violation of the protected tree regulations.

Urgency of adopting the proposed regulations. The proposed regulations are not urgently required to prevent an imminent threat to any particular tree or group of trees. However, the regulations should be adopted as soon as possible, in order to dovetail with the Mayor's "million trees" initiative.

Options for "replacement" of trees. The remover of trees can replace the trees on the site from which the trees were removed, provided that there is enough space on the site for them to be planted. If there is not enough space, the remover can purchase replacement trees and donate them to the Street Tree Division, which will plant them in available, appropriate, places. Alternatively, as a policy matter, the Street Tree Division will accept a monetary donation that approximates the value of the trees removed.

Whether a citation for non-permitted removal of protected trees continues with a change of ownership. Section 46.06 states that "the authority of the Bureau to act [to request that Building and Safety withhold or revoke building permits] shall not apply to a purchaser... who in good faith and for valuable consideration has acquired title subsequent to the illegal removal or relocation of any protected trees and prior to the recordation of the notice of intent [of the Bureau to act.]"

CONCLUSION

The proposed ordinance (included in Appendix A) provides technical corrections to the "Oak Tree" (now "Protected Tree") provisions of the Zoning Code, to bring them into consistency with the amended provisions of Section 46 of the Municipal Code.

ENVIRONMENTAL IMPACT

The attached proposed ordinance (Appendix A) is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article II, Section 2, Subsection (m) of the City of Los

Angeles CEQA Guidelines (ordinances which have no negative impact on the physical environment). Individual projects will continue to undergo specific environmental review at the time of their proposal.

Exhibit 17

ENDANGERED PLANT COMMUNITIES

OF

SOUTHERN CALIFORNIA



PROCEEDINGS OF THE 15th ANNUAL SYMPOSIUM

SOUTHERN CALIFORNIA BOTANISTS

SPECIAL PUBLICATION No. 3

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ENDANGERED PLANT COMMUNITIES

OF

SOUTHERN CALIFORNIA

PROCEEDINGS OF THE 15th ANNUAL SYMPOSIUM

PRESENTED BY

SOUTHERN CALIFORNIA BOTANISTS

IN ASSOCIATION WITH

DEPARTMENT OF BIOLOGICAL SCIENCES

CALIFORNIA STATE UNIVERSITY, FULLERTON

OCTOBER 28, 1989

ALLAN A. SCHOENHERR, EDITOR

SOUTHERN CALIFORNIA BOTANISTS

SPECIAL PUBLICATION No. 3

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Cover: Riparian community on the Santa Ana River below Prado Dam. The proposed All River Plan of the Army Corps of Engineers calls for channelization of this stretch of river, replacing the native vegetation with a concrete-lined ditch. (Photograph by Allan A. Schoenherr)

TABLE OF CONTENTS

INTRODUCTION
by Dr. Allan A. Schoenherr 1

THE CALIFORNIA VALLEY GRASSLAND
by Dr. Jon E. Keeley 3

CALIFORNIAN COASTAL SAGE SCRUB: GENERAL CHARACTERISTICS AND CONSIDERATIONS FOR BIOLOGICAL CONSERVATION
by Dr. John F. O'Leary 24

THE STATUS OF WALNUT FORESTS AND WOODLANDS (*Juglans californica*) IN SOUTHERN CALIFORNIA
by Dr. Ronald D. Quinn 42

RECENT RESEARCH ON AND NEW NAMAGEMENT ISSUES FOR SOUTHERN CALIFORNIA ESTUARINE WETLANDS
by Wayne R. Ferren Jr 55

RIPARIAN WOODLANDS: AN ENDANGERED HABITAT IN SOUTHERN CALIFORNIA
by Dr. Peter A. Bowler 80

RIPARIAN HABITAT AND BREEDING BIRDS ALONG THE SANTA MARGARITA AND SANTA ANA RIVERS OF SOUTHERN CALIFORNIA
by Richard Zembal 98

ENDANGERED PLANT COMMUNITIES OF SOUTHERN CALIFORNIA

Saturday, October 28, 1989
California State University at Fullerton
Room 121, McCarthy Hall

INTRODUCTION

Dr. Allan A. Schoenherr
Division of Biological Sciences
Fullerton College
Fullerton, CA 92634

California is a marvelous place, with a greater range of landforms, a greater variety of habitats, and more kinds of plants and animals than anywhere else in continental North America. There are more endemic plants and animals here than in any area of equivalent size in the United States. When whites first arrived in California, it was a scene of unparalleled, almost unimaginable, natural richness. Unfortunately, this richness coupled with the region's delightful Mediterranean climate soon attracted an unprecedented number of people that encroached upon the landscape to such a degree that California is the state with the greatest number of endangered species.

Nevertheless, California also has the greatest amount of open space in the lower 48 states, and an increasingly devoted proportion of citizens attempting to protect it. These people have won great victories, but many Californians still fail to appreciate the intricate and beautiful natural order of things, and/or that human activities are capable of spoiling it all.

Long-time residents of southern California have watched as the cow, the plow, and the bulldozer have altered the landscape. We have watched as urban sprawl, like some huge ameba, has gobbled up the native terrain; beaches, wetlands, coastal bluffs, valleys, canyons, and hill-tops. Not only have buildings covered the land, but we have watched developers convert native communities to athletic fields, golf courses, and parklands landscaped with non-native vegetation; all in the name of "open space."

Humans are merely one of the living organisms in the system, but unlike other organisms, they are capable of thinking and analyzing. Those that choose not to think about California's natural treasures have already altered the face of California forever. This symposium is dedicated to all those thoughtful people who are willing to devote time and energy to promote the concept of preservation and/or restoration of native landscapes. It is also dedicated to the change in attitude that is essential if future generations are to enjoy and appreciate California's natural beauty and diversity.

THE STATUS OF WALNUT FORESTS AND WOODLANDS (*Juglans californica*) IN SOUTHERN CALIFORNIA

Dr.Ronald D. Quinn
Department of Biological Sciences
California State Polytechnic University
Pomona, CA 91768

INTRODUCTION

Juglandaceae, a plant family of the Northern Hemisphere, contains 8 living genera and approximately 60 species (Manchester and Dilcher, 1982). The genus Juglans is represented by 21 species, 18 in the Western Hemisphere, 16 in North America, 5 in the United States, and 2 in the state of California (Manning, 1978). Natural stands of the species occurring in northern California, Juglans hindsii Jeps., are located in a few places in the lower Sacramento River drainage. This paper deals only with Juglans californica Wats., the walnut tree of southern California.

California walnut forests and woodlands are found only in southern California, with a very limited distribution within that range. All walnut stands are within or near urban areas, and the rapid expansion of metropolitan southern California is further reducing the limited extent of this species. This paper is intended to draw attention to this little-known tree, review the extremely limited literature on the species, and promote its conservation.

DISTRIBUTION

The most extensive stands of Juglans californica are found in the foothills around inland valleys of Ventura, Los Angeles, and northern Orange counties at elevations below 900 meters (Griffin and Critchfield, 1972; Swanson, 1967). The current distribution of walnut-dominated woodlands and forests is limited to the Santa Clarita River drainage in the vicinity of Sulphur Mountain, small stands in the Simi Hills and Santa Susana Mountains, the north slope of the Santa Monica Mountains, the San Jose Hills, Puente Hills, and Chino Hills (Griffin and Critchfield, 1972; Swanson, 1967). Outside of this range in Santa Barbara County, western San Bernardino County, and south to San Diego County, walnuts occur mixed with other species of trees, especially oaks. The best-developed stands are found on steep hillsides with northern exposures, almost exclusively on soils derived from Miocene-Pliocene marine shales (Keeley, in review; Leskinen, 1972). This parent material weathers to deep soils high in clay content, with a high water holding capacity (Pomerening, 1990). On the campus of California State Polytechnic University the soils beneath walnut forests are a meter deep (Pomerening 1990). Presumably it is the combination of north slope aspect and soils with unusually high ability to retain moisture which allows this tree to remain physiologically active through the rainless summer.

DESCRIPTION

The walnuts of California were first mentioned by Richard Brindsley Hinds, a botanist with the British exploring ship Sulphur, which entered the lower Sacramento River in 1837 (Jepson, 1910). The California walnut (Figure 1) was named by Sereno Watson in 1875. He described it as growing around San Francisco Bay and southward to Santa Barbara, but gave no type locality (Watson, 1875). Early in this century Willis Linn Jepson (1908) recognized a number of morphological differences between the northern and southern forms of Juglans, and concluded from the original description and the specimens Watson had before him that the type locality of those trees must have been southern California. Consequently he distinguished the northern form as the variety hindsii. Later Jepson (1917) pointed out that there was a wide gap between the distributions of the southern and northern forms of walnuts. This and other evidence led him to separate the two populations as distinct species, J. californica (southern) and J. hindsii (northern). Because the tree of southern California retained the species name "californica", it is referred to herein as the California walnut.

The California walnut varies considerably in morphology, according to the age of the tree and site characteristics. In Los Angeles and Orange Counties trees tend to have multiple trunks which grow outward from a ring at the base, giving younger plants the appearance of "V"-shaped shrubs. In an Orange County sample of 50 trees, the mean number of trunks per tree was 4.4, with a range of 1-17 (Swanson, 1967). On drier sites and locations with thinner soils even older individuals may retain the proportions and stature of a shrub, never growing taller than 4-5 meters. When trees on more mesic sites grow larger, the several trunks and projecting branches tend to arch away from the center with the outermost branches touching the ground, giving the tree as a whole a hemispherical shape (Figure 2). The interior of these large rounded trees can be free of low branches and understory vegetation, thereby providing excellent cover at its center for deer, nesting birds, and other vertebrates.

Near canyon bottoms and in the northern portion of its natural distribution, J. californica tends to have fewer trunks, growing to a height of 15 meters and assuming the proportions of an upright tree. In some cases large limbs emerge from a single trunk, curving first upward and then toward the ground.

COMPOSITION OF CALIFORNIA WALNUT WOODLAND

California walnuts can occur singly, in mixtures with other species of trees, and in nearly pure stands. The plant community of which they are a part has been classified as "southern oak woodland" by Munz and Keck (1959), while Griffin (1977) placed it in the "coast live oak phase" of a southern oak woodland. This nomenclature implies that evergreen oaks (Quercus spp.) dominate these communities, although Griffin (1977) recognized that the California walnut can be locally dominant. In fact, in stands on many north facing slopes in the Puente and San Jose Hills of Los Angeles County, it is the only tree



Figure 1. Pinnately compound leaves of California walnut, *Juglans californica*. (Photograph by Allan A. Schoenherr)



Figure 2. California walnut woodland in Chino Hills near Los Angeles- Orange County border. Note the shape of the trees with outer branches hanging to the ground. Also note intermixed dark-colored coast live oaks and annual grasses. (Photograph by Allan A. Schoenherr)

present, and attains vegetative cover of 100 percent. In such places it would be accurate and useful to call this plant community a California walnut forest. The California Natural Diversity Data Base uses this name, placing it within the category of broadleaved upland forests.

A vegetation map made 50 years ago of the San Jose Hills of Los Angeles County, located at the edges of the present cities of Pomona, Covina, Walnut, and La Verne, shows an unbroken walnut forest extending for a distance of 5 km (Weislander, 1934). As shown on that map the boundaries of this forest had a highly convoluted and irregular shape. In the complex topography of these hills they were found on north and northeast facing slopes, while other slopes were dominated by annual grasses. This general pattern remains today, although it has been interrupted in many places by subsequent urbanization.

There is considerable variation in the structure and species composition of California walnut woodlands. Near the southern end of its range, in the Puente Hills of Orange County, Swanson (1967) found that trees occurred in a density of 84 per ha, produced a 40% canopy cover, and grew with a small number of coast live oaks (Quercus agrifolia) (Table 1). Near the northern end of the range, on Sulphur Mountain in Ventura County, Swanson (1967) measured a tree density almost four times higher (306/ha), and canopy cover more than twice as great (90%). There he reported that California walnuts grow with Juglans hybrids (J. californica x J. regia), tree-sized Sambucus mexicana, and a few coast live oaks. Despite these differences in openness and associated species of trees, the importance value of California walnuts was nearly identical in both tree communities (Table 1).

A comparison of understory plants at the Ventura county and Orange county sites studied by Swanson (1967) shows that the introduced Old World grass Avena fatua is most frequent at both places (Table 2). This species and all others listed for the Orange county site are indicators of disturbance, and most of them originated in Eurasia. I attribute the species composition of this understory plant community to cattle grazing, which has been the principal economic activity in the California walnut forests and woodlands of both the Puente and San Jose Hills for the past two centuries. With the exception of the ubiquitous A. fatua and Galium triflorum, the Ventura county site shows no evidence of the botanical changes associated with prolonged disturbance, and it is distinct in this respect from the southern site.

PHENOLOGY

Juglans californica is a winter-deciduous tree. In Los Angeles County I have observed that leaves appear in January or February, with all trees in full leaf by March. Trees on warmer or drier sites develop leaves several weeks earlier than those in cooler, more mesic locations. Leaflets begin to lose their green color in October, and leaf abscission is completed in November or December. Thus the trees are leafless for a period of 2-3 months. Flowering begins about the same time as leaf production, with fruits developing to full size during the spring. By late summer the fruits have fully matured. Fruit abscission

TABLE 1. Characteristics of Juglans californica woodlands. Data from Swanson, 1967.

Variable	Orange County	Ventura County
Trees per hectare	84	306
Importance value	203	192
Canopy cover (%)	40	90
Other tree species	Quercus agrifolia	Juglans hybrids Sambucus mexicana Quercus agrifolia

TABLE 2. Frequency of occurrence of understory plants in Juglans californica woodlands. Data from Swanson, 1967.

Orange County		Ventura County	
Species	Frequency (%)	Species	Frequency (%)
Avena fatua	100	Avenua fatua	100
Eremocarpus setigerus	75	Galium triflorum	95
Galium triflorum	70	Juglans seedlings	60
Brassica rapa sylvestris	35	Stachys bullata	30
Elymus spp.	10	Toxicodendron diversiloba	20
Asclepias fascicularis	5	Ribes speciosum	15
		Osmorhiza brachypoda	5

begins slightly before or at the same time as leaf abscission, but some fruits remain on the tree through the winter.

Mature walnut fruits are actively sought and eaten by both California ground squirrels (Spermophilus beecheyi Richardson) and western gray squirrels (Sciurus griseus Ord.). They are also edible to humans, with a sweet meat that tastes very like the commercially grown English walnut (Juglans regia). The nuts have never been grown commercially, however, because the shell is very thick and the meat is difficult to remove from numerous small chambers within the shell. Even so, the California walnut has found some economic use in agriculture. Its roots are more resistant to New World diseases and more suited to California soils than the roots of the English walnut tree, so commercial walnut trees have been produced by grafting scions of English walnut to root-stock of California walnut (Swanson, 1967). Native walnut has also been planted in urban forestry projects in the western Santa Monica Mountains and elsewhere (Radtke, 1978).

In some years, California walnut seedlings appear in great numbers in the spring. Seedling densities of 2000 per hectare have been measured in Ventura County (Swanson, 1967). Germination rates of 20-50 percent are achieved in cultivation, using standard nursery procedures (R. Walsh, personal communication). In nature, young California walnuts on favorable sites grow quite rapidly. In the San Jose Hills, trees older than 20 to 30 years tend to develop heart rot, with the interior portions of the trunk and older limbs becoming infested with termites, wood-boring beetles, and fungi. As they grow larger, portions of trees so affected may die or break during winter storms, particularly if they carry heavy burdens of mistletoe on their limbs. Older, multi-trunked trees often have some trunks that are healthy, some with heart rot, and others that are dead. I have observed that when a trunk dies, breaks, or is cut, sprouting will often occur at its base. Thus older trees frequently have collections of trunks of various sizes, ages, and states of vigor.

Because of heart rot it is difficult or impossible to determine the age of most mature trees through counts of annual rings. By use of an increment borer near the base of approximately 30 trees, Swanson (1967) was able successfully to age 10 individuals. Regression analysis of these 10 trees showed a close relationship between trunk diameter and ring number (Figure 3, $r = 0.849$). The oldest tree so measured was 68 years old, with a basal diameter of 35.6 cm (Figure 3). In Swanson's samples the most frequent size classes of trunk diameters at breast height (DBH) were 7.7 - 15.2 cm, and 15.3 - 22.9 cm (Table 3), but trees with basal diameters as large as 140 cm (Ventura County) and 87 cm (Los Angeles County) have been reported (Jepson, 1910). Presumably these unusually large trees were also unusually old. Since trees increase in diameter more slowly as they age, an individual with twice the girth of a 68 year old tree might be several times the age of the smaller tree. Unfortunately we may never know, since most or all of these record-sized individuals are gone.

FIRE ECOLOGY

California walnut woodlands are

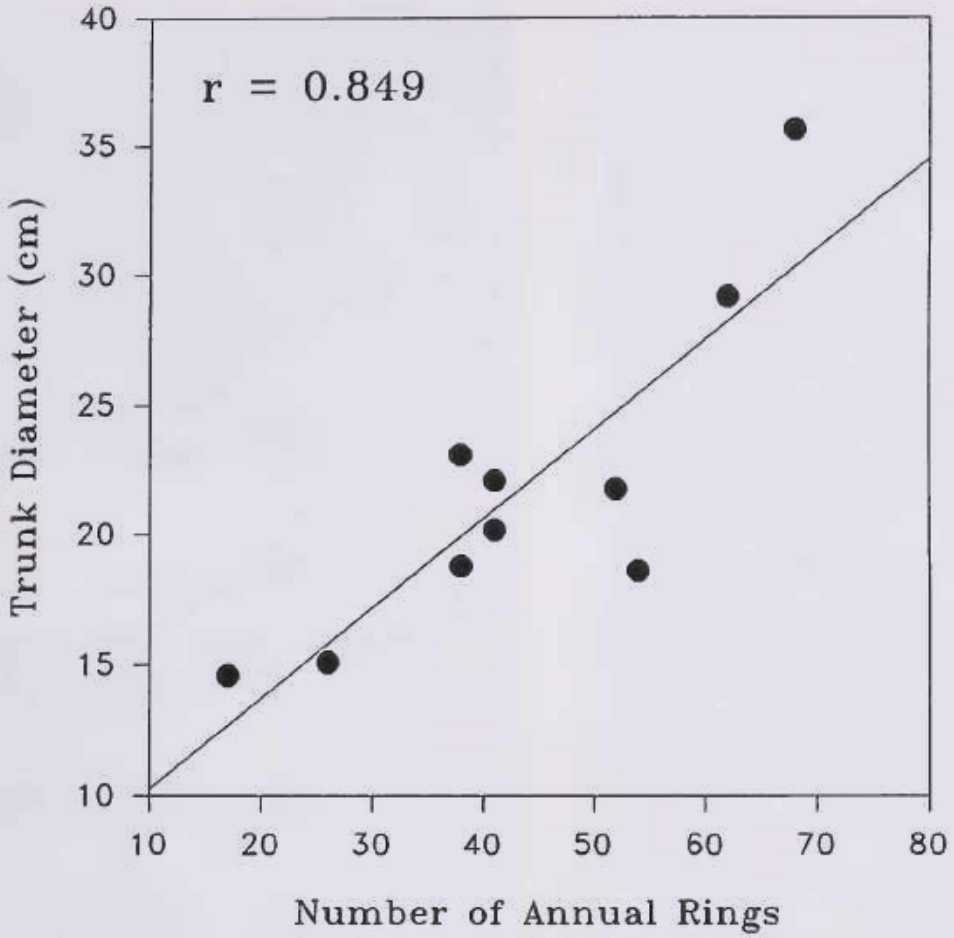


Figure 3. Annual growth rings vs trunk diameter of 10 Juglans californica trees.

TABLE 3. Size classes of trunks of 50 Juglans californica trees in Brea Canyon, OrangeCounty. Data from Swanson, 1967.

DBH (cm)	Percent Total (N = 211)
0 - 7.6	10
7.7 - 15.2	29
15.3 - 22.9	29
23.0 - 30.5	24
> 30.5	8

subject to periodic fires. Because most populations of trees are surrounded by annual grasslands, which extend as an understory beneath the trees, fires of low intensity are possible each summer after the grasses die. The dry grasses provide a highly flammable pathway for summer fires to follow between and beneath the trees. The bark of the trees is thin, and even moderate amounts of heat will kill above ground portions of the plant. The ends of the outer branches often touch the ground, so that approaching fires can spread into the tree canopy easily. Burned trees almost invariably resprout from the base, eventually producing a ring of new trunks growing outward from the fire-killed trunks. Several hundred walnut trees in and around the Voorhis Ecological Reserve of California State Polytechnic University, Pomona were burned in a wildfire in July, 1989. One year after this fire there is no evidence that any of these trees were killed, even though most branches and stems died. Almost all individuals sprouted from the base within 6 weeks of the burn.

Repeated fires are sufficient to explain why most trees have multiple trunks. It may be that the trees of Ventura County have been subjected to fires less frequently. As a whole they have fewer trunks per tree than those of Orange County (Swanson, 1967). Older California walnuts have large woody platforms at the surface of the ground, from which living trunks arise. Some of these platforms are quite large, more than a meter across, presumably increasing in size each time a fire kills living trunks and new ones sprout ever farther from the original center. Thus a ring of trunks may surround a basal platform that is many times older than any living trunk. Since the platform is largely buried beneath the soil it shields meristematic tissue from the heat of passing fires, and post-fire sprouts arise from its lower portions. I interpret the basal platform as an adaptation to fire, and as evidence of the long existence of California walnuts in the fire environment of southern California. It is similar in form and analogous in function to the lignotuber at the base of many species of chaparral shrubs.

ANIMAL COMMUNITY

Walnut forests and woodlands provide favorable habitat for a number of vertebrates and invertebrates. The rich foliage, present for 9-10 months of the year in a landscape with relatively few trees overall, combined with the many hollow trunks and limb holes produced by heart rot, provides sustenance for many wood- and foliage-feeding invertebrates. The annual leaf fall generates considerable litter, providing another habitat for invertebrates. These animals, in turn, can attract insectivorous vertebrates to the woodland. A two year survey in a walnut woodland in the San Jose hills found 29 species of diurnal birds (C. Shannon, unpublished data). The presence of more than half of these bird species is attributable to the walnut trees. Older walnuts provide numerous nesting cavities for birds and rodents, and the upper reaches of the tallest trees are used as roosts and nesting places for raptors and owls. The hollow bases of old trees are preferred burrow sites for California ground squirrels, and probably for various species of reptiles and

invertebrates as well. The walnut fruits are avidly sought by both California ground squirrels and western gray squirrels. Since some of the walnuts persist on the trees into winter, they are a continuing source of food for the tree squirrels. In areas where both walnut woodlands and collections of introduced trees are present, western gray squirrels forage preferentially in the walnuts. It is very likely that the gray squirrels are an important dispersal agent for walnut seeds. This would be analogous to the eastern woodlands of North America, where there is evidence that the fox squirrel, a species which is ecologically similar to the gray squirrel, has coevolved with J. nigra, the black walnut (Stapanian and Smith, 1978).

MANAGEMENT OF WALNUT FORESTS AND WOODLANDS

The distribution of the California walnut described by Jepson (1908, 1917) was limited to a relatively few foothill areas of southern California. The largest trees reported in Los Angeles County were located along Walnut Creek in the eastern San Gabriel Valley (Jepson, 1910). Even before this watercourse was channelized, these trees had apparently vanished (Weislander, 1934). The best remaining stands of these trees south of Ventura County are found in the Puente and San Jose Hills, and these are being rapidly fragmented and destroyed by the rapid urbanization of hillsides in eastern Los Angeles and northern Orange Counties.

One of the most extensive walnut woodlands in the Puente Hills is located in Tonner Canyon. At this writing there are proposals to remove thousands of walnut trees in the upper part of Tonner Canyon in the Puente Hills of Los Angeles County to construct a golf course, and a second proposal would bulldoze many more in the lower part of the canyon in Orange County for a subdivision. A third proposal suggests the construction of expressways along the full lengths of Tonner and Soquel Canyons (Chang, 1990). Soquel Canyon is also in the Puente Hills, and contains walnut woodlands. In the San Jose Hills the best developed walnut forest in the vicinity of Cal Poly University was destroyed by expansion of a landfill. This rapidly vanishing plant community has received little attention from either the scientific or environmental community. The first and, to my knowledge, only comprehensive study of California walnut woodlands is an unpublished master's thesis completed more than 20 years ago (Swanson, 1967).

Interest in the hardwood tree communities of California has been increasing since the 1970's. This interest, however, is focused almost exclusively on oaks. A detailed vegetation classification system for southern california made no mention of Juglans, not even in the species index (Payson, et al, 1980). That same year a symposium on California oaks dealt with other tree species associated with oaks, but not walnuts (Plumb et al, 1980). An introductory paper at a recent symposium on California hardwoods stated that most research continues to focus on oaks, with little attention given to other widespread hardwood species (Conard and Griffin, 1987). A single sentence in the symposium proceedings mentioned the increasing disturbance and rarity of

California walnut woodlands due to human activity (Barbour, 1987). The most recent volume on the hardwoods of California, which includes extensive statistical data on most minor hardwood species, does not discuss Juglans at all, although the genus is listed in the species index (Bolsinger, 1988). In 1987 the Integrated Hardwood Range Management Program was formed, a statewide organization with the goal of creating a program of research, education, and management of California hardwoods (Scott, 1987). It is described as a vehicle for promoting oak conservation. The conference on California hardwoods scheduled for late 1990, like all those that have preceded it, will be concerned almost exclusively with oaks (Standiford, personal communication).

There are 2 problems to be addressed concerning management of California walnut woodlands; 1. the outright disappearance of the community in the face of rapid urbanization, and 2. reversal of ecological changes within the community due to overgrazing, increased fire frequency, and introduced species of understory plants. The first problem is the most important and urgent; if it is not dealt with, the second problem is moot. There are several de facto reserves for California walnut woodlands in the San Jose and Puente Hills. Examples of such reserves are Bonelli Regional County Park, California State Polytechnic University, Mt. San Antonio College, canyon areas of Forest Lawn, and the Firestone Boy Scout Reservation. These places do not have the protection and preservation of walnut woodlands as an explicit management goal, but in the course of their other activities they do accord incidental (or accidental) protection to the trees. There are two exceptions to this pattern. The first is Mt. San Antonio College, which has established the first and only California walnut reserve on campus agricultural lands. The second is Chino Hills State Park, between Orange and San Bernardino Counties. Walnut trees are not as abundant there as elsewhere, but the park does have the goal of protecting and restoring native plant communities, including walnut woodlands.

It is important to recognize that California walnuts are rapidly approaching the status of a custodial species, which I define as a species with remnant natural populations found only within reserves of limited size, where protection of the population is an explicit management goal. Free ranging herds of American bison (Bison bison) in natural parks are an example of a custodial species. The Engelmann oak (Quercus engelmannii) is another example of a southern California tree that is approaching the status of a custodial species. A major reason for the establishment of the Nature Conservancy's reserve on the Santa Rosa Plateau of Riverside County was the conservation of this species of tree and other rare plant populations. The fact that California walnuts can be grown readily outside their natural range (Swanson, 1967), or regrown on disturbed sites (Leskinen, 1972), does not lessen the importance of protecting natural populations any more than the ease of propagating coast redwoods in urban parks and gardens makes it less important to conserve natural populations on the north coast of California. The genetic composition of natural tree populations is the product of

thousands of generations of natural selection. Such a population is attuned to the site at which it occurs in countless and subtle ways that we are unequipped to understand fully. Moreover, by virtue of their size and longevity, walnut trees provide the framework for an ecosystem containing innumerable species of microorganisms, animals, and other plants. At present we lack the resources to document the presence and understand the importance of all these many life forms, and it is tragically certain that if the trees disappear so too will a host of companion species.

It is encouraging to note that the conservation and propagation of California walnuts is beginning to receive attention. Nurseries in Los Angeles, Orange, and Riverside Counties that specialize in native plants now purchase hundred- pound quantities of California walnut seeds gathered from the wild (R. Walsh, personal communication). Each 100 pounds contains roughly 10,000 seeds. If even a small percentage of these are successfully germinated, potted, and planted, then thousands of walnut seedlings are growing somewhere each spring. Chino Hills State Park plans to use this species in revegetation programs.

Most of the plants in the understory of California walnut forests and woodlands in Los Angeles and Orange Counties are alien species favored by overgrazing, frequent fire, and other disturbances. The ubiquitous Avena fatua (wild oats) and other introduced species dominate the understory of walnut woodlands, almost to the exclusion of the native species they have displaced. It would be desirable within reserves to extirpate alien species from the understory of California walnuts and to replace them with those native species most likely to have been present prior to arrival of Europeans. The extirpation phase could be quite difficult, and might be practical only on small plots, but when successful, reintroductions of stable associations of native understory species would be possible.

As discussed above, fire plays a role in the ecological structure and function of walnut woodlands, as it does in most californian plant communities. The prehuman (or pre-European) fire frequency is unknown. Fire today is frequent; it is an annual possibility in most locations, where dead annual grasses are present beneath and between the trees during the summer fire season. Fire in the past may have been less frequent, since the original grasses were mostly perennial rather than annual, and would have produced a less flammable summer ground cover. As California walnuts become a custodial species, and therefore subject to a managed fire regime, I suggest that prescribed fires of low intensity, at intervals of several years, be tested for their effects on the walnut community, particularly in places where an understory of native plants has been reestablished.

This paper has reviewed the limited amount of information available about the California walnut. It is my hope that it will help to emphasize the increasingly precarious status of remaining natural populations, and encourage positive action to conserve this element of the natural heritage of southern California. The juggernaut of urban growth is at the doorstep of most of the remaining walnut woodlands. We have

precious few native species of trees, and native stands of this one cannot be allowed to vanish.

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Exhibit 18

TITLE-APPROVAL PAGE FOR GRADUATE THESIS OR PROJECT

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APPROVED: Richard J. Vogl
Wesley D. Giesel
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DATE: May 23, 1967



California State College at Los Angeles

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A Thesis Submitted to

The Faculty of Biological Sciences

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TABLE OF CONTENTS

Page

INTRODUCTION 1

DISTRIBUTION 2

TAXONOMY 14

STUDY AREAS. 15

METHODS. 17

VEGETATIONAL ANALYSIS. 17

PHENOLOGY. 21

FRUIT AND FRUIT DISPERSAL. 23

SEEDLINGS. 26

PRECIPITATION. 28

SOIL SITE REQUIREMENTS 30

FIRE HISTORY 31

AGE OF THE TREE. 32

MISTLETOE INCIDENCE. 33

JUGLONE INHIBITION 35

DISEASE AND DROUGHT RESISTANCE 38

FUTURE OF THE TREE 39

SUMMARY AND CONCLUSIONS. 42

FIGURES. 45

TABLES 64

PLATES 73

APPENDIX A 95

APPENDIX B 104

APPENDIX C 109

LITERATURE CITED 112

LIST OF FIGURES

FIGURE		PAGE
1	Present distribution of *Juglans californica* Wats. in counties of Southern California	47
2	Distribution of *J. californica* in San Luis Obispo County	49
3	Distribution of *J. californica* in Santa Barbara County .	51
4	Distribution of *J. californica* in Ventura County	53
5	Distribution of *J. californica* in Los Angeles County . .	55
6	Distribution of *J. californica* in Orange County.	57
7	Distribution of *J. californica* in San Bernardino County.	59
8	Distribution of *J. californica* in Riverside County . . .	61
9	Graph showing rainfall data at Ojai and Yorba Linda. . .	63

LIST OF TABLES

TABLE		PAGE
1	Mistletoe incidence on *Juglans californica* in Brea Canyon	65
2	Tree analysis - Brea Canyon	66
3	Understory analysis - Brea Canyon	67
4	Tree analysis - Sulphur Mountain.	68
5	Understory analysis - Sulphur Mountain.	69
6	Inhibition of seed germination by hydrojuglone glucoside.	70-1
7	Walnut tree ring analysis	72

LIST OF PLATES

PLATE		PAGE
	Typical multiple-trunked walnut tree . . . . . .Frontispiece	
1	Roadcut at Brea Canyon showing calcareous sedimentary rock beds.	75
2	Typical understory vegetation at Brea Canyon	77
3	Branch of walnut showing young male catkins.	79
4	The mature fruit of J. californica	81
5	Seedling of J. californica	83
6	Uprooted seedling showing characteristic U-shaped bend in root and attached cotyledons.	85
7	Rock samples from Brea Canyon, Monterey Pass, Piru Creek, Wheeler Springs, Sulphur Mountain, and Lake Casitas.	87
8	Typical sized swelling produced on walnut branches by haustoria of mistletoe	89
9	Unusually large swelling produced on a walnut branch by haustoria of mistletoe	91
10	Destruction of a good stand of J. californica in a suburban area of Los Angeles	93

INTRODUCTION

An ecological study of the Southern California black walnut (Juglans californica Wats.) was undertaken to determine the 1) present distribution, 2) vegetational associations, 3) age composition, 4) edaphic and climatic relationships, and 5) future of the tree. Only the more important ecological factors were investigated, and no attempt was made to ascertain the total ecology of the species. This tree was studied because the walnut is presently being eliminated throughout its range by urbanization in all of its varied forms. A record of the ecological requirements of this vanishing species might be of use in future forestry and horticulture.

No pertinent work has been completed on the tree,with the possible exception of the discussion by Jepson (1910). The walnut is endemic to Southern California and is known mainly for its use as a root-stock for the commerical English (Persian) walnut. The wood has no present economic value, and the tree has thus been ignored as a lumber source.

Extensive travel was made to determine the present distribution of the tree. In addition, information on herbarium specimens from many California institutions was utilized. Field work was carried out in two localities to determine the ecological interrelationships between the walnut and associated native species.

DISTRIBUTION

The present distribution of J. californica was determined because of the absence of recent distribution studies. Sudworth (1908) stated that the tree grew in the Santa Barbara National Forest from 800 to 4,000 feet elevation and in watersheds of the Santa Maria, Santa Ynez, Santa Barbara, Matilija, Piru-Sespe, and Newhall Rivers. He stated that its range extended to the south and west slopes of the San Bernardino Mountains up to 3,000 feet elevation, and the tree was present in Waterman Canyon at 2,000 feet. Jepson (1910) was more conservative in defining the northern limits of the species and maintained that the tree grew from Santa Barbara, Torrey, and the Ojai Valley to San Fernando and the Sierra Santa Monica, thence eastwardly along the foothills of the Sierra Madre to the San Bernardino Range and southward to the Sierra Santa Ana. A recent flora (Munz, 1959) states that J. californica ranges from Ventura County to west cismontane San Bernardino County and the Santa Ana Mountains, Orange County.

The present distribution was determined by making field surveys of all known and suspected areas of distribution and by utilizing the annotations made on herbarium specimens of the major herbaria of California (Appendix A), including Stanford University, Universities of California at Berkeley, Santa Barbara, and Los Angeles, University of Southern California, Los Angeles County Museum of Natural History, California State College at Los Angeles, Pomona College, and Rancho Santa Ana Botanic Garden. It was found that the present distribution of the native walnut extends north of Santa Barbara County (Fig. 1), with specimens located in San Luis Obispo County, inland from Cambria.

To the south and east, specimens were found along the Santa Ana River in Orange County, eastward to Riverside County, and as far east as Yucaipa in San Bernardino County. In terms of elevation, specimens ranged from near sea level at Malibu and Cypress, California, to 3,000 feet in the San Gabriel Mountains north of La Canada (Los Angeles County) and in Lone Pine Canyon (San Bernardino County).

DISTRIBUTION BY COUNTIES

San Luis Obispo County

Juglans californica was reported in the foothills east of Cambria in San Luis Obispo County (Dieter Wilken, personal communication, 1966). A survey was made of this area on March 28, 1967. Two mature trees and three saplings were found along Santa Rosa Creek, 3.2 miles east of the junction of Highway 1 and Highway 41 (Fig. 2). In addition, many seedlings were found along the creek bed, and other trees were found growing 10.3 miles east of this location. On the basis of the 1) multiple-trunked growth form, 2) number and shape of the leaflets, and 3) size and shape of the fruit these trees were classified as J. californica. Herbarium specimens were collected and placed in the herbaria at California State College at Los Angeles, Stanford University, and Rancho Santa Ana Botanic Garden. Other specimens were found growing along San Luis Obispo Creek approximately five miles south of San Luis Obispo, near the coast. These trees were multiple-trunked and were considered to be J. californica. A specimen from the herbarium of the University of California at Berkeley dated 1889 was also collected in the county (Appendix A), but the exact location was not given.

Santa Barbara County

Walnuts were found three miles east of Solvang. Other specimens were collected along Highway 101 between Santa Barbara and Carpinteria near the immediate coastline. Good stands were found along the intermittent Casitas Creek, inland from Montecito and Carpinteria. Specimens from the University of California at Santa Barbara herbarium show that the tree also grows along Jalama Creek near Point Conception at an elevation of 100 feet and near the school grounds at Figueroa Mountain Road north of Los Olivos, California.

Within the county, native walnut favors the canyon bottoms at the southeast end of the Santa Ynez Mountains and the broad, deep-soiled intermountain valleys near Los Olivos in the northwest (Fig. 3). J. californica is absent throughout most of the ranges north of Santa Barbara, due possibly to the steepness of the slopes, lack of well established soil, and severe competition by chaparral species.

Ventura County

The walnut grows well in the hills surrounding Lake Casitas and along the Sespe Creek north of Ojai. Specimens were found 14 miles north of Ojai in moist canyon bottoms. The best walnut stand in Southern California was found on the north slope of Sulphur Mountain along Santa Paula Creek, north of Santa Paula. Another smaller stand was located between Moorpark and Fillmore along Grimes Canyon Creek.

The walnut appears to be absent on the coastal plain between Camarillo and Ventura, probably as a result of the extensive agricultural use of this fertile region. In the western Santa Monica

Mountains, walnut trees were observed in the hills between Newbury Park and Lake Sherwood. In the eastern portion of the county, specimens were found in the canyons around Lake Piru and along Sespe Creek north of Fillmore, but none were found along the wide floodplain of the Santa Paula River. No specimens of J. californica were found beyond a point 14.2 miles north of Ojai. However, a single herbarium specimen exists from the University of California at Berkeley which has the annotation, "Tejon, Ventura Co., May 11, 1935," (Appendix A). The extreme northern part of the county contains the Topatopa Mountains, Mount Pinos, and Mount Frazier, whose surfaces are dominated by chaparral at the lower elevations and by coniferous species at the higher elevations.

Within Ventura County, as in Santa Barbara County, the walnut favors cool, moist canyon bottoms, north-facing slopes, and water-courses of intermittent streams (Fig. 4). Good stands of trees are the exception, most specimens being widely separated from one another.

Los Angeles County

In Los Angeles County the walnut favors the canyon bottoms of the Santa Monica Mountains on the west and the rolling foothills of the Puente Hills on the east. Several specimens were found on the ocean side of the Santa Monica Mountains in Malibu and Topanga Canyons near the town of Malibu. They grew mainly in the cool canyons with access to streams which flow during the winter months.

Farther east, the number of trees generally tends to increase from Topanga Canyon to Cahuenga Pass. Throughout this area the trees favor north-facing slopes, but specimens were also noted in the canyons

on the south side of this range. Across the San Fernando Valley, the walnut follows the remaining streams and the Los Angeles River, even though the majority of these have recently been paved with concrete. Presently there is approximately one native tree per square mile in this valley, although they are not regularly distributed.

At the eastern end of the Santa Monica Mountains walnut is present in the Griffith Park hills, where it grows almost exclusively on north and east slopes. Specimens were also found in Elysian Park and in the sheltered canyons on Mount Washington. Other specimens occur on the west side of the Arroyo Seco at Avenue 60 and on the east side at Monterey Pass. Three trees were found on the west rim of the Arroyo Seco at the eastern end of the San Rafael Hills. In the San Gabriel Mountains trees grow on northeast-facing slopes up to 3,000 feet elevation above the Arroyo Seco. This arroyo appears to have served as an avenue of dispersal in the past.

With the exception of three specimens found above Foothill Boulevard in Little Tujunga Canyon and those on the west rim of the Arroyo Seco, no trees were found in the region of Glendale, Burbank, La Crescenta, Tujunga, Sunland, or San Fernando. Included in this area are the San Rafael Hills and the Verdugo Mountains, which appear to be able to support walnut but contain no specimens. These observations agree with those of W. O. Griesel, who has made extensive collections in this region (W. O. Griesel, personal communication, 1966).

A few specimens were found northwest of San Fernando along Interstate Highway 5 between the junctions of Highway 14 and Highway 126. Specimens reported along Soledad Canyon Road on the desert side of the San Gabriel Mountains were identified as the introduced

Juglans nigra L.

No specimens were found in the Los Angeles basin proper during field or herbaria surveys. One specimen from the University of Southern California herbarium was found near the campus, but it appeared to be a planted J. californica X J. regia hybrid or J. regia L. itself. Disturbance within the metropolitan area has destroyed almost all native vegetation, making it impossible to reconstruct the walnut's past distribution.

East of metropolitan Los Angeles, walnuts were found along the railroad tracks north of the San Bernardino Freeway between Soto Street and Eastern Avenue. Additional specimens were noted in Whittier Narrows, south of El Monte. A good stand exists in the San Jose hills, west of Pomona. J. californica follows these hills north in the San Dimas-Glendora area near Puddingstone Reservoir. Herbarium specimens (Appendix A) show that along the San Gabriel Mountains east of the Arroyo Seco walnut trees have been found in Pasadena (G. B. Grant Collection, May 5, 1905), northeast of Glendora, and in San Dimas Canyon, but these localities were not personally verified.

Southeast of La Puente, walnut trees were found in the Puente Hills near Hacienda Boulevard and along San Jose Creek south of Valley Boulevard from La Puente to Spadra. Southwest of Pomona, specimens were found near the intersection of 5th Avenue and the Corona Freeway. The best stands in Los Angeles County exist along Brea Canyon Road north of the town of Brea in the Puente Hills. The trees appear to thrive on the soil developed from the sedimentary beds of these hills. They grow principally in canyon bottoms and have the characteristic

multiple-trunks (Jepson, 1910) of the Southern California species.

Within the county, J. californica appears to be somewhat restricted to watercourses, canyon bottoms and rolling foothills (Fig. 5). This is shown by the manner in which the tree follows the Santa Monica Mountains, the Los Angeles River, and the Arroyo Seco. Before disturbance occurred, the tree may have flanked the Los Angeles River south across the coastal flatlands to the port of San Pedro. The widespread presence of the tree within the county in the past is suggested by the number of streets, creeks, washes, and even a town containing the name "walnut" or "nogales" (Spanish for walnut).

Orange County

The walnut is confined mainly to the northern and eastern portions of Orange County (Fig. 6). The most abundant specimens were found along the lower or south ends of Brea Canyon and Carbon Canyon. In Brea Canyon walnuts dominate the hills surrounding the property of the Firestone Boy Scout Camp, the defunct Diamond Bar Ranch, and miscellaneous oil field lands. In Carbon Canyon chaparral prevails, with walnut generally restricted to canyon bottoms and upper plateaus. Here it does not have the density displayed in Brea Canyon.

Southwest of this area, J. californica was found near the intersection of State College Boulevard and Orangethorpe Avenue in Fullerton. Other specimens were found along the wash east of the intersection of Imperial Highway and Telegraph Road. Several trees also occur on the coastal plain near the town of Cypress. Two specimens were found along the Santa Ana River at Esperanza (near the old site of the Rancho Santa

Ana Botanic Garden). A few trees were also noted up-canyon to the Riverside County line. This area and the northern edge of the Santa Ana Mountains appear to be able to support more walnuts, but field surveys and herbarium specimens (Appendix A) revealed no other stands within the county.

Field surveys between Santa Ana and San Clemente revealed no specimens in this area. The Santa Ana Mountains, with their dense chaparral, provide a barrier to the walnut tree, yet several coastal valleys between Santa Ana and San Clemente seemingly could support the tree. The area west of Santa Ana also poses a restriction to the walnut, since it once consisted of many fresh and salt water marshes, and the soil is sandy or poorly drained.

San Bernardino County

Specimens were found along Riverside Drive east of Chino, but these may represent stump sprouts from old planted J. regia. Other trees were noted on the east side of Interstate Highway 15 between San Bernardino and Cajon Pass. A specimen from the Dudley Herbarium of Stanford University was collected by Abrams and McGregor in Lone Pine Canyon on the desert slopes of the San Gabriel Mountains on July 5, 1908 (Appendix A). A field survey in the spring of 1967 showed that walnut is still present in this area. Several trees were found in Lone Pine Canyon, 1-2 miles northwest of Lost Lake. Other trees were found on the ocean side of the range along Lytle Creek and at the mouth of Lytle Creek Canyon north of Devore Road. In addition, specimens were noted along Sevaine Canyon Creek and Deer Canyon Wash.

The trees follow these streams which meander across the floodplain below the San Gabriel Mountains.

East of San Bernardino three trees were found near Wilson Creek on the road from Mentone to Yucaipa. This location is the farthest east in California that any specimens of J. californica have been personally verified. Herbarium specimens (Appendix A) show that the tree has been found at Arrowhead Springs, Waterman Canyon, Mill Creek, Cajon Pass, San Antonio Canyon, Etiwanda, Colton, Fontana, northern Carbon Canyon, and Aliso Canyon.

Within the county, the Southern California black walnut is found only sparingly (Fig. 7). It may exist in some unsurveyed side canyons of the San Gabriel or San Bernardino Mountains. The majority of the area between Ontario and San Bernardino consists of vineyards. The soil is a coarse alluvium of rock and sand, which does not appear ideal for the growth of the walnut tree except along water courses and washes. Most of the county north of the San Gabriel and San Bernardino Mountains contains the Mojave Desert, a present limitation to the distribution of the walnut.

Other Locations

A specimen from the University of California at Berkeley herbarium has the annotation "Corona, Orange Co., March 1934." Strictly speaking, Corona is in Riverside County (Fig. 8). A field survey revealed no native trees in this area, however. In Riverside, California, several specimens of J. nigra exist, and along the wash that runs west of the University of California at Riverside several specimens of Carya were

found. From a distance these Carya specimens resemble J. californica.

Specimens from the herbaria of the Los Angeles County Museum of Natural History and Rancho Santa Ana Botanic Garden show that J. californica was introduced to Santa Catalina Island several years ago. The trees now grow in Hamilton Canyon and along the road from Avalon to the airport (Appendix A).

Distribution Summary

The Southern California black walnut shows a locally discontinuous distribution across cismontane Southern California. The transverse mountain ranges and the Mojave Desert appear to limit its extension to the north. To the west the barrier is ultimately the Pacific Ocean. The southern limits of the range appear to be the Santa Ana Mountains and the other Peninsular Ranges. Reasons for these limits are unclear, but possible factors are chaparral competition and poorly developed soils. The eastern limits appear to be the cismontane foothills of the San Bernardino and San Jacinto Mountains and the Colorado Desert.

Several factors made the distribution study difficult. In the metropolitan portions of Los Angeles and the San Fernando Valley, mass housing, freeways, and concrete river beds have destroyed many specimens and restricted the range of this species. The second problem involved the identification of native walnuts. Thirty to forty years ago much of the San Fernando Valley was occupied by groves of the English walnut (J. regia), and this species is still used extensively for a street tree. The northern California walnut, Juglans hindsii (Jeps.) Jeps., and the Southern California walnut, J. californica

were frequently root-grafted to scions of the English walnut, because of their disease resistance and root adaptations to native soils. Later when the aerial portion of the trees (J. regia)was removed or died back from neglect, sucker trunks would appear which resembled either J. californica or J. hindsii. Because of this, identification became a problem, and it was often difficult to differentiate native trees from native stock. In many parts of the San Fernando Valley Eastern black walnut (J. nigra L.) is used as a street tree. Thus, at least four species of walnut (J. nigra, J. regia, J. hindsii, and J. californica) are present in this one area. Two of these, J. californica and J. hindsii, are morphologically indistinct, thus making species identification difficult.

Native walnuts have been planted outside of their present range and appear to tolerate environmental conditions beyond their present distribution. Planted trees were observed at Clear Creek in Kern County near the town of Havilah, approximately 100 miles northeast of their present limits. At Ice House Canyon on Mount San Antonio (Los Angeles County) the tree occurs 3,000 feet above the highest elevation of natural occurrence, and planted trees have been found in Escondido (San Diego County), 80 miles south of the trees natural limits. The Arizona walnut, Juglans major (Torrey) Heller, grows well on the Mogollon Rim in the Weaver Mountains of Arizona, in canyons of the Santa Catalina Mountains, and in the washes around Nogales, Arizona. Thus, remnant stands of Juglans in the Southwest may have wider amplitudes of tolerance for climatic and edaphic factors than would be expected (Sudworth, 1908; Jepson, 1908).

Northwest of Santa Barbara County, an area exists (200-250 miles between stations at Los Olivos and Mount Diablo) which is devoid of native Juglans, with the exception of the J. californica observed inland from Cambria. This major discontinuity between the distributions of J. californica and J. hindsii has been explained by a recent investigator (H. H. Thomsen, 1963) on the basis of paleontological evidence. Thomsen maintains that from one of several possible Miocene or Pliocene ancestors present in the vicinity of the Sierra Nevadas

> "...there may have been a separation as early as Miocene time, with the result that J. californica Wats. was derived perhaps through J. nevadensis Berry, J. rupestris Engelm., J. beaumontii Axelrod emend., or other similar small-leaved, small-fruited species, which tolerated the more xeric environment of the southern parts of the United States, whereas the ancestors of J. hindsii (Jeps.) Jeps., may well have advanced coastward before the cold, following down the streams of the Central Valley, never approaching the coast beyond the edge of the fog-drip belt, retaining its mesic characters of lofty height, lush foliage, and smooth, faintly grooved flattened nut."

Local climate and physiography then allowed for the independent evolution of the two species. This is contrary to the theory proposed by Jepson (1910), which maintained that the northern specimens were introduced from Southern California by the trading of native Indian tribes.

In Southern California the native walnut appears to exist in

remnant stands occurring mainly in cool, moist areas, such as canyons of north-facing slopes and riparian woodlands. It apparently is able to move out onto the coastal floodplains by following washes and subterranean rivers. The tree's survival is perhaps aided during the summer by the frequent fogs that cover the coastal flatlands and inundate the foothill ranges (Griffith Park, Puente, San Jose, Brea, Chino, etc.) which the walnut favors. J. californica is endemic to Southern California, and its distribution is steadily being restricted.

TAXONOMY

The genus Juglans is one of two genera of the family Juglandaceae occurring in North America. The other genus is Carya, which occurs mainly in eastern United States. The family contains six genera and approximately 40 species of the northern temperate zone and the northern Andes (Munz, 1959; Good, 1947; Jepson, 1951). The generic name Juglans literally means "nut of Jupiter."

Members of the genus Juglans are deciduous trees or shrubs with alternate, pinnate, astipulate leaves and chambered pith (Abrams, 1917, 1923; Baerg, 1955). There are two species native to California. Juglans hindsii occurs in the foothill valleys around Walnut Creek and Mount Diablo near San Francisco Bay. The tree was first discovered in 1837 by Richard Brinsley Hinds, the botanist of the British Exploring Ship Sulphur (Jepson, 1910). It was considered varietally distinct from the Southern California species by Willis Jepson in 1909. Later, because of the 200-300 mile gap between the distributions of the two native California walnuts, he designated it as a distinct allopatric

species.

The Southern California black walnut (J. californica) was named by Sereno Watson in 1875; however, no type locality was cited (Watson, 1875). It is taxonomically distinguished from other species of the genus on the basis of the number and size of the leaflets, shape and margin of the leaflets, size of the fruit, growth form of the tree, and distribution. There are 11-15 (rarely 19) leaflets per leaf, and they are described as oblong-lanceolate, acute or acuminate, glabrous, finely serrate, cuneate or rounded at base (Munz, 1959; Sargent, 1922; Peattie, 1953). Juglans hindsii has 15-19 (usually 19) leaflets per leaf, which are ovate-lanceolate to lanceolate long-pointed, often falcate, serrate with remote teeth except toward the usually rounded cuneate or rarely cordate base (Munz, 1959; Sargent, 1922).

In addition to the two native species, the Eastern black walnut (J. nigra) and the English walnut (J. regia) have been introduced to the state. Natural hybrids occasionally result between these species and the native trees. Mr. Luther Burbank artificially created the hybrid J. californica X J. nigra which he called "Royal" and the hybrid J. californica X J. regia which he called "Paradox" (Jepson, 1910).

STUDY AREAS

One of the purposes of this study was to determine the vegetational composition of the few remaining good stands of the native walnut. Therefore, the two study areas were chosen because of their comparatively dense stands of trees. In this respect the areas represent

superior groves, as the walnut trees usually grow widely scattered in open formations (Sudworth, 1908; Jepson, 1910).

One study area was located on the southeast side of Brea Canyon at the boundary between Los Angeles and Orange Counties. It consists of rolling foothills, ranging in elevation from 700 to 1,400 feet. The underlying rocks of this area (Plate 1) consist of gray to white, platy siltstone with white limy concretions, and diatomaceous marine shale (Durham and Yerkes, 1964). According to the plant community concept (Munz, 1959), the flora can be described as a southern oak woodland dominated by Southern California black walnut and coast live oak. Chaparral exists on the steeper slopes.

This area is presently controlled by the Firestone Boy Scout Camp. However, in the past heavy cattle grazing has taken place, and the effects are still evident (Plate 2). Indicators of the disturbance include species of Brassica, Rhaphanus, Avena, Bromus, and Festuca (Appendix B). At present wild asses, which were released several years ago, roam and graze the hills.

The second study area was located on a north-facing slope of Sulphur Mountain along the Santa Paula Creek approximately six miles north of Santa Paula (Ventura County). The elevation ranges from 1,000 to 2,000 feet. The geology consists of dark brown grainy siltstone and marine shale. The vegetation forms a southern oak woodland, yet the understory differs widely from that found at Brea Canyon (Appendix C). The walnut forms a thick stand approaching the density of an eastern hardwood forest. Limited grazing presently occurs but signs of heavy disturbance are not yet evident.

METHODS

The vegetational analysis of the two study areas was made using three sampling techniques. Trees were sampled with circular quadrats, each quadrat one-fortieth acre in size. Twenty quadrats were placed at random in each of the study areas. The understory of shrubs and herbs was sampled with 4 twenty-five foot line-intercepts and 20 one-meter square quadrats.

At both Sulphur Mountain and Brea Canyon north-facing slopes were sampled. Trees were recorded by their specific names, and basal areas were determined. For multiple-trunked specimens of Juglans, the basal area of each trunk was recorded. Sambucus mexicana Presl. was included as a tree whenever it complied with Sargent's tree definition (Sargent, 1922). Seedlings were also counted.

In view of the large amount of Phoradendron flavescens var. macrophyllum Engelm. in Rothr. parasitic on the walnut in Brea Canyon Hills, a survey was made to determine the incidence of mistletoe. Fifty trees were selected at random. The trunks were placed in size classes according to diameter at 4.5 ft. above ground (d.b.h.), and mistletoe counts were made for each trunk (Table 1). Since mistletoe grows in clones, each clump of mistletoe was considered to be a single specimen, regardless of size.

VEGETATIONAL ANALYSIS OF THE STUDY AREAS

Brea Canyon and Sulphur Mountain differ markedly in vegetational composition, even though both areas were dominated by walnut. In Brea Canyon the tree canopy cover was approximately 40% (Table 2), and there

were no walnut seedlings present; whereas, at Sulphur Mountain the canopy cover was 80-90% (Table 4), and there was an average of 800-900 seedlings per acre.

At Brea Canyon the relative and absolute frequencies of J. californica and Q. agrifolia were coincidentally the same (70% and 30% respectively). Their relative densities of 68% and 32% and their relative dominance of 65.4% and 34.6% did not differ greatly from their frequencies.

In the understory at Brea Canyon Avena fatua showed a frequency of occurrence of 100% (Table 3), while Eremocarpus setigerus and Galium triflorum had frequencies of 75% and 70% respectively. The next most frequent species was Brassica campestris (35%), and the least frequent species were Elymus sp. (10%) and Asclepias fascicularis (5%). A. fatua and B. campestris are introduced species.

Brea Canyon can thus be described as a good southern oak woodland community. Although some species of Alnus, Platanus, and Salix grow along the creek that passes through the canyon, the area is predominately a Juglans californica-Quercus agrifolia association. The two dominant trees have a somewhat aggregate distribution with oaks occurring in the steep canyon draws and walnuts dominating the more gentle slopes, plateaus, and canyon bottoms. The Galium triflorum in the north-slope understories is replaced by Brassica, Rhaphanus, and Astragalus on the south-facing slopes.

The vegetational composition at Brea Canyon represents a typical stand of J. californica. The trees are well separated from each other and form an open forest or savanna. The absolute density (34 trees

per acre) is in sharp contrast to that encountered at Sulphur Mountain. The absolute dominance of the walnut (6,844 sq.in. per acre) is also much less than at Sulphur Mountain.

In surveying the trees at Sulphur Mountain a distinction was made between the two types of walnuts present. Here the native tree grows within five miles of large orchards of the English walnut (J. regia). On the basis of the number and size of the leaflets and texture and color of the bark, many of the naturally occurring trees (32.6%) in the study area were determined to be hybrids of the two species. They were therefore referred to as J. californica X J. regia (Jepson, 1910).

Four tree species occur at Sulphur Mountain--J. californica, J. californica X J. regia, Sambucus mexicana, and Quercus agrifolia. The native walnut and the hybrid species had relative frequencies of 51.4% and 34.3% respectively (Table 4). In contrast, S. mexicana and Q. agrifolia had relative frequencies of 8.6% and 5.7%. The absolute density of native walnuts and hybrids was 124 and 60 trees per acre. The density of walnut at Sulphur Mountain was four times as great as its density at Brea Canyon. Hybrid trees were observed at Brea Canyon also, but they were not encountered in the sampling. The densities of S. mexicana and Q. agrifolia were 6 and 4 trees per acre.

The relative dominance was 76.8% for native walnut, 7.1% for the hybrid, 0.9% for S. mexicana, and 15.2% for Q. agrifolia. J. californica had an absolute dominance of 15,326 sq.in. per acre, while the hybrid had a dominance of only 1,422 sq.in. per acre. The dominance of the native tree in this area is over twice as great as it is in Brea Canyon. Most trees at Sulphur Mountain were single-trunked, while those at Brea Canyon usually had two or more main trunks. The

absolute dominance of S. mexicana and Q. agrifolia were 164 and 3,032 sq. in. per acre.

In the understory at Sulphur Mountain Avena fatua had a 100% frequency (Table 5), while Galium triflorum had a 95% frequency. Seedlings of Juglans (60%) and Stachys bullata (30%) were next most frequent. The species encountered with the least frequency were Rhus diversiloba (20%), Ribes speciosum (15%), and Osmorhiza brachypoda (5%).

This portion of Sulphur Mountain might well be described as a Southern California black walnut forest community, because of the high frequency, density, and dominance of native walnut. The trees form a closed forest in comparison to the stand at Brea Canyon. With its verdant understory and closed canopy, the area approximates an eastern forest complex. Eastern affinities present in the understory include species of Dentaria, Elymus, Erysimum, Geranium, Lathyrus, Rubus, Sambucus, Silene, Stachys, Stellaria and Symphoricarpos.

Many species were found in only one of the study areas. At Brea Canyon significant species include Asclepias fascicularis, Encelia californica, Brassica campestris, Rhaphanus sativus, Eremocarpus setigerus, Salvia mellifera, Astragalus sp., Lupinus succulentus, Eriogonum fasciculatum, Solanum Xantii, and Nicotiana glauca (Appendix 8). Significant species present only at Sulphur Mountain include Symphoriocarpus mollis, Silene gallica, Dentaria californica, Euphorbia peplus, Geranium molle, Stachys bullata, Lathyrus tingitanus, Zauschneria cana, Ranunculus californicus, Rubus ursinus, Lithophragma cymbalaria, and Osmorhiza brachypoda (Appendix C).

PHENOLOGY

The Southern California black walnut is a deciduous tree and remains leafless throughout the winter months. Leaves appear in late January or early February, apparently depending upon the frequency and timing of the winter rains. The leaves are alternate, pinnate, and without stipules (Munz, 1959). In 1966 approximately 30% of the trees at Brea Canyon were in leaf by February 8. In 1967, 30% of the trees were in leaf on February 26.

Field studies also revealed that the timing of leaf production appears to be related to the specific microclimate of particular stands. Trees on south-facing slopes or other drier locations produce leaves as much as six to eight weeks before trees on cool, moister sites in protected canyons or north-facing slopes. Possible "ecotypes" were found in the cooler canyons on the coastal side of Topanga and Malibu Canyons and also in side canyons of the Arroyo Seco in the San Gabriel Mountains. They had a characteristic red bark differing from the usual gray to dark-brown bark of the tree (Munz, 1959; Jepson, 1909) and did not produce leaves until late March or early April. With the exception of these "ecotypes", all other trees are in leaf by early March.

The bark of young trees is gray and smooth. Older trees develop dark-brown bark which is deeply furrowed. The wood has a specific gravity of 0.4086 and weighs 25.46 pounds per cubic foot (Hough, 1899). In contrast, the wood of the Eastern black walnut has a specific gravity of 0.52 (Fuller, 1955).

The leaves remain on the trees throughout the summer months. In

late August and early September the leaflets turn yellow, then dull-orange or brown, and leaf abscission begins. Field studies have shown that two types of abscission occur. In some cases the leaflets abscise, while the leaves are still on the trees. In other cases the leaf itself abscises with the leaflets intact. The latter type appears to be more common. The tree remains leafless from early October to late January. Some trees were observed in the Griffith Park area which are artificially watered and appeared to retain their leaves until late November or early December.

Flowering begins at approximately the same time as leaf production. The flowers are monoecious (Munz, 1959), and the male catkins are evident in early February on twigs of the previous year and sometimes appear before the leaves (Plate 3). Various authors (Munz, 1959; Wolf, 1941) state that flowering occurs from April through May; however, field observation has shown that flowering usually begins in early February, except in the "ecotypes" mentioned above.

The female flowers may appear in early February at the ends of shoots of the season but usually are not in abundance until late February. Terotological flowers, usually pistillate flowers with stamens or abnormal stigmas, have been reported (Jepson, 1910), but none were observed in the field. By the middle and latter part of March the flowers are mature and wind pollination occurs.

By late April and throughout May enlargement of the fruit occurs. At this time the shell and husk are both soft and green. The fruit is drupaceous, forming a nut when mature. Field studies have shown that the mature fruits appear on their peduncles singly, in two's, or

in three's (Plate 4), although single fruits are more common. Abnormal fruit with fused husks has been found on several trees at Brea Canyon.

By the end of July the shell hardens and turns brown; however, the husks are still green, and the nut-meat is not fully developed. In early and middle September the husks turn brown, the nut-meats ripen, and fruit abscission occurs.

FRUIT AND FRUIT DISPERSAL

The fruit of J. californica has been described as being roundish, 2.5-3 cm. in diameter, with a dark brown pubescent husk, the nut globose, thick-shelled, and longitudinally shallowly grooved (Munz, 1959). In contrast the fruit of J. hindsii is 3.5-5 cm. in diameter and more faintly grooved than that of J. californica.

By September most of the fruit is ripe and abscission begins. Fruit abscission is not completed immediately, as many of the nuts remain on the tree for several weeks or months. Field surveys at Brea Canyon in the spring of 1966 and 1967 revealed that occasional trees still held some nuts from the previous season.

Several investigators mention that the fruit is used as a food source by many rodents (Wolfe, 1941; Sudworth, 1908). This fact has not been verified throughout the entire study area. At Brea Canyon dominant rodents are the Valley pocket gopher (Thomomys bottae Eydoux and Garvais) and the California ground squirrel (Citellus beecheyi

Richardson). Neither of these rodents were seen gathering or eating fruit of the native walnut. The thick shell of the nut may pose an insurmountable barrier for its use as a food source by these species. By the time the nut cracks of its own accord, fungi mycelia have usually made the nut-meat inedible.

The situation is different in the San Fernando Valley, since the Eastern fox squirrel (Sciurus niger L.) has been introduced there (R. C. Ross, personal communication, 1966). This squirrel is able to break the hard shell of the native walnut with its strong jaws. It may also aid dispersal of the nut by burying it across this valley in the remaining open lands. Western gray squirrels (Sciurus griseus Ord.) were seen at Sulphur Mountain and may aid in the burial of walnuts. The scrub jay (Aphelocoma coerylescens Bosc.) has been reported to be an inveterate uphill planter of any object resembling a sphere. This bird may play an important role in dispersing walnuts to upland sites (Grinnell, 1932).

Without the aid of birds or rodents, the main methods of dispersal for the fruit are gravity and water transport. Gravity can only provide short-distance dispersal. However, the husk of the walnut is impermeable to water, and the nut will readily float. When the walnut is transported by water, the abrasive action of streambed gravels may enhance germination. This is probably the best long-distance dispersal mechanism of the species. Except in moist situations such as the understory at Sulphur Mountain, all seedlings encountered during field surveys were found along creek

beds or river floodplains. The wet sandy soils are ideal for germination and root development of the embryo. With the advent of cement river beds in the Los Angeles basin, many seeds are undoubtedly deposited in the ocean each year. Generally, wide-range dispersal is slow for this species, but when moisture and soil conditions are proper many hearty seedlings develop.

SEEDLINGS

Sudworth (1908) stated that seedlings of native walnut were scarce and seedling habit was undetermined. He went on to note that much of the seed is eaten by rodents and carried by flood waters to places unfavorable to germination. He also concluded that the seedlings were intolerant of shade. Baker (1948) stated that in a 1948 survey of foresters 60% agreed that black walnut (J. nigra) should be classed as intolerant of shade. This corresponds to a "class four" rating according to the tolerance table set up by Zon and Graves in 1911 (Baker, 1948).

Seedlings were uncommon in the present study. They were found only in moist soils or in full sunlight along streams and creeks. They occurred along Grimes Canyon Creek between Moorpark and Fillmore, at Sulphur Mountain (Plate 5), and along Santa Rosa Creek inland from Cambria in San Luis Obispo County. In contrast, Brea Canyon contains an almost pure stand of J. californica, yet no seedlings were found here in two years of field work.

An area at Sulphur Mountain was selected in order to study the degree of shade tolerance for the species. The area was ideal for this purpose, as it had a tree canopy cover of 80-90%. An average of 800-900 seedlings per acre were found. These figures are admittedly out of proportion for the entire area, because other portions of Sulphur Mountain contained only 100-150 seedlings per acre. Tree squirrels and scrub jays present in the area have apparently enhanced fruit dispersal. Twenty first-year seedlings were marked in the spring of 1966 and rechecked in the spring of 1967. These seedlings occurred

directly under the tree canopy. All the marked seedlings had survived and showed vigorous growth.

An experiment was carried out to test the germination percentage of native walnut. Many trees of a temperate zone origin need a cold treatment for enhanced germination (U. S. Dept. Agric., 1961). Therefore one group of 20 nuts was stratified at 0^{o}-5^{o}C for three months and then placed in seedbeds in a greenhouse. Another group of 20 nuts (unstratified) was immediately placed in the greenhouse. By April of 1967, 10% of the unstratified nuts and 20% of the stratified nuts had germinated. The walnut does not receive freezing temperatures in its native habitat; however, the temperature does approach 0^{o}C during many winter nights in Southern California (and temperatures below 0^{o}C are not really essential for stratification).

When the seed does germinate, the cotyledons remain within the nut shell (Wolf, 1941). The shell itself splits partially along the mid-line allowing the hypocotyl and epicotyl to elongate. Field studies indicate that this splitting takes place by way of a physical drying and contraction of the two halves of the shell or through the aid of the mycelia of various fungi. When carried down-stream, the outer husk is worn off, and the shell of the nut may be split by physical abrasion. The developing embryo probably also exerts pressure from within the shell, as it begins to imbibe water.

As growth of the seedling occurs, a characteristic U-shaped bend appears in the root just below the point of emergence from the shell. The nut shell remains attached to the seedling throughout most of the first year's growth (Plate 6). The initial leaves are pinnate, but

vary in number and shape of the leaflets. On the basis of the field work carried out at Sulphur Mountain it is felt that this species is either shade tolerant or else the cooler temperatures and high humidity or soil moisture under the tree canopy outweigh the effects of shade on the seedlings. The basic requirement for germination is apparently moisture.

PRECIPITATION

The amount of annual precipitation in Southern California varies from place to place and from year to year. For many plant species the total annual rainfall may be critical, while for others the timing of the rains is most significant (Went, 1949). The native walnut appears to compete directly with chaparral species Quercus agrifolia and understory species for the limited water available throughout most years. Its winter-deciduous habit apparently offers no advantage, for in Southern California the growing season occurs during the rainy winter and spring months.

Rainfall data for the two study areas was secured for the past ten-year period (Fig. 9). At the Ojai recording station near Sulphur Mountain relatively high amounts of rainfall occurred in 1958 (31.3 inches), 1962 (24.8 inches), and 1965 (29.6 inches). At the Yorba Linda station near Brea Canyon, rainfall during the ten-year period never exceeded that at Ojai. The average difference in precipitation for this period at the two stations was 7.58 inches (U. S. Dept. Commerce, 1961, 1962, 1963, 1964a, 1964b, 1965).

Precipitation appears to be particularly important for germination and subsequent growth of seedlings. The husk of the walnut is impermeable to water, and only after it is broken or removed will water uptake occur. Field studies showed that seedlings at Sulphur Mountain were 1-2 years old, while no seedlings were found at Brea Canyon. When precipitation records are correlated with seedling age and occurrence, it appears that germination takes place only in years of higher than average rainfall (25-30+ inches per year). Survival of seedlings during the first years of growth also depends on subsequent precipitation.

The amount of annual rainfall may affect the growth form of the trees at the two study sites. Most of the trees at Brea Canyon are multiple-trunked (94%), of old age, and frequently show branch-wilt due to long periods of drought. In contrast, the trees at Sulphur Mountain are mostly single-trunked (64%), hearty, and without branch-wilt.

This species is able to survive in the semi-arid Southwest perhaps by persisting through years of low rainfall, until years of higher rainfall when it is able to reproduce. It may also compensate for the limited rainfall by being restricted to local sites with surface springs, high water tables, or adjacent creeks. A related species from Arizona and New Mexico, Juglans microcarpa Berlandier, has been classed as a phreatophyte (Robinson, 1958).

SOIL SITE REQUIREMENTS

Although some authors state that native walnut grows in alluvial washes (Jepson, 1910; Sudworth, 1908), they all agree that the best growth is obtained in areas with deep soils. Auten (1945) stated that for Eastern black walnut, soil with slow drainage and excessively dry soils should be avoided. Clay and silty clay are not nearly as desirable as are sandy loams, loams, and silt loams. Lime-derived acid soils are best for the tree (Auten, 1945; Curtis, 1959; U. S. Dept. Agric., 1965).

Field surveys have shown that the walnut grows consistently in areas with a common bedrock type, with only minor exceptions. Rock samples were taken at Brea Canyon, Monterey Pass (Arroyo Seco), Piru Creek, Sulphur Mountain, Wheeler Springs (north of Ojai), and Lake Casitas (Plate 7). In each of these areas the predominant rock type is diatomaceous or non-diatomaceous shale and limy siltstone. This fact may indicate a high calcium requirement for the native tree. Exceptions to this rock type are noted in the San Fernando Valley where the tree admittedly grows along alluvial washes. Another exception exists in the San Gabriel Mountains above La Canada, where the tree grows over igneous granitic bedrock. The non-calcareous sites all had water immediately available, however.

The root system is directly affected by the soil and rock type. In sandy areas or regions with deep soils, much branching of the root system occurs. In areas with coarser soils or alluvium, thick taproots develop.

FIRE HISTORY

It was recognized in the early 1900's (Jepson, 1908, 1909) that native walnut resprouts after fires. Field studies show that most trees are multiple-trunked. The walnut develops a basal plate or "grub" just below the ground. This serves as a reservoir for carbohydrates and over the years attains tremendous proportions. When aerial portions are injured due to cutting or fire, the tree sends up numerous new shoots from this basal plate.

In the field, old trees were found with as many as 17 main trunks (Table 1). In growth form, these trunks arch out and hang low to the ground at their periphery. Jepson (1910) mentioned this habit when he described a tree from the upper Ojai Valley which had a crown diameter of 92 feet, and all the lower limbs crept on the ground. Since most walnuts occur in southern oak woodland communities with a grass understory, grassland fires have undoubtedly had a pronounced effect on increasing the number of main trunks by killing the older trunks and burning off the accumulated litter on the ground. The bark of the tree is thin and not fire resistant. Thus, fires have an apparent pruning effect on older trees.

Several problems are encountered when trying to correlate the fire history of this species. City and county fire records are inadequate in the areas concerned. Most fire stations keep records for only five or ten years. There are no nature preserves for the native walnut at the present time. Age determinations for the tree are difficult because of the high incidence of heart-rot in the various trunks of older trees. Therefore, little correlation can be made

between the number and age of the trunks and the past fire history.

AGE OF THE TREE

Sudworth (1908) stated that the native walnut is a very rapid growing tree in youth and gives evidence of being short lived, probably not exceeding 150 years. He found that trees from 12 to 15 inches in diameter were from 13 to 17 years old, and one tree 15.5 inches in diameter showed an age of 15 years.

Jepson (1910) mentioned that the largest trees average 25-50 feet in height and measure four to nine feet around the trunk at one foot above the ground. He stated that the largest trees were found in an area near Covina known locally as Walnut Wash. A search of the West Covina-Covina area known today as Walnut Wash indicates that these trees have since been eliminated. Wolf (1941) in speaking of J. californica planted at Rancho Santa Ana, stated that trees from 7 to 12 years of age attained a height of over 20 feet, while volunteer seedlings which sprang up in favored spots had almost equalled this growth in three or four years.

Attempts were made to ascertain the age of the main trunks of native walnut trees. An 18-inch Swedish increment borer was used in this work. Approximately 30 trees were bored. One of the main difficulties in attempting age determinations for these trees is that almost all older walnut trunks are attacked by wood-boring beetles, termites, and fungal heart-rot. Accurate age determinations are therefore impossible. Only minimum ages were obtained.

Ten successful increment borings were made, and the data from these samples are presented in Table 7. These trunks were bored as close to ground level as possible, and basal areas and diameters were recorded. The number of rings per inch varied from 9 to 21. Trees with basal areas of 26 and 28 square inches had minimum ages of 17 and 26 years respectively, while trees with basal areas of 104 and 154 square inches had minimum ages of 62 and 68 years. These represent the youngest and oldest trees sampled.

Microclimate and edaphics play an important role in growth rates and are responsible for the varying sizes of annual rings within the same trunk or for comparable rings on different trees. Further work is necessary to determine the ages of the various trunks of each tree and compare their growth with precipitation and temperature records of the past. No such attempt was made in the present study. More work with tree ring analysis is needed before an age/basal area growth curve can be constructed with any accuracy for the native walnut.

MISTLETOE INCIDENCE

It has been established that Phoradendron flavescens variety macrophyllum Engelm. in Rothr. is host specific and parasitizes species of Platanus, Populus, Salix, Fraxinus, Juglans, Prosopis, and Diospyros (Munz, 1959). Field surveys have shown that while some areas containing J. californica are heavily infested with this species, other areas are virtually without mistletoe.

The walnut trees in Brea Canyon are heavily infested with this species. A survey of 50 trees was made to determine the extent of

this infestation (Table 1). The exposure of each host tree was recorded during the field work. Since the number of trunks per tree had a range of 1-17, mistletoe counts were made for the main trunks of each tree, rather than total counts per tree. A total of 211 main trunks were sampled, and these trunks were parasitized by 1,926 individual clones of mistletoe (Table 1).

Trunks with diameters of 0.0-3.0 inches made up 9.9% of the trunks surveyed, yet they contained only 1.4% of the mistletoe. Trunks with diameters of 3.1-6.0 inches made up 29.3% of those surveyed and contained only 8.8% of the mistletoe. Trunks with diameters of more than 12.0 inches made up only 7.8% of the survey yet contained 31.3% of the mistletoe. This same group contained the most mistletoe per trunk, averaging 40.1 clones.

This study indicated that generally the larger the trunk diameter, the greater is the mistletoe infestation. Data on tree exposure showed that this factor was insignificant. Mistletoe is apparently disseminated chiefly by birds and involves chance dispersal. Over the years the larger (and generally older) branches would be more heavily infested than the smaller (younger) branches.

The effects of P. flavescens on the walnut tree are great. As the haustoria of the parasite penetrate the branches of the tree, they produce abnormal swellings and alter the growth of the woody tissues. Some of these swellings are the size of insect galls, while others attain much larger proportions (Plates 8, 9). Some branches attacked by mistletoe had sent out numerous new shoots from the affected areas. In other cases mistletoe at the tips of branches had caused a club- or knuckle-shaped callous to appear, thus ending any further linear

growth of the branch.

There may also be physical effects on the direction of growth caused by the weight of many clones on a branch. The older tree limbs, which are already considerably weakened by heart rot, may be subject to breakage under the added weight of the mistletoe. Two average-sized clones were cut from a single branch, and they weighed 1,300 and 1,125 grams, for a combined weight of 2,425 grams (5.34 pounds).

Species of the genus Phoradendron possess chlorophyll and are able to carry out limited photosynthesis (Fuller, 1955). This fact correlates well with the general field observation that most mistletoe was restricted to the periphery of the branches,where they may obtain sunlight (Frontispiece). In this peripheral position the mistletoe can have a pronounced effect on the morphology and general growth form of the walnut tree.

JUGLONE INHIBITION

It has long been known that species of Juglans produce a natural growth inhibitor (Daglish, 1950; Davis, 1928; Went, 1965). Daglish mentioned an amorphous compound $C_{16}H_{18}O_8$ which was isolated from extracts of the walnut (J. nigra). This compound yielded glucose and α-hydrojuglone on hydrolysis. Further chemical and spectroscopic evidence suggested that this compound was the 5-glucoside of 1:4:5-trihydroxynaphthalene.

Experiments were carried out to determine whether juglone was present in the native walnut and to determine the effects of extracts

from various plant parts on the seeds of four garden plants. Seeds of carrot, cucumber, radish, and tomato (Northrup King brand) were placed in petri dishes and treated with distilled water and extracts from the husks, roots, and leaves of the native walnut.

When the extracts were prepared, it was noted that the walnut husks were impermeable to water until they were crushed, and when crushed they emitted copious amounts of dark brown stain, presumably containing juglone. Some of the husk extract was boiled to determine if the contents were heat labile. The petri dishes were checked every 24 hours to determine germination success.

The results of the distilled water control showed that the vegetable seeds were at least 90% viable (Table 6). Results of the boiled walnut husk extract showed that all contents were apparently heat labile, as the germination percentages approached or equalled those of the controls. The unboiled husk extract inhibited the germination of all the tomato seeds and all but 10% of the carrot seeds over a seven-day period. Little or no inhibition occurred with the cucumber and radish seeds indicating differential inhibition on the part of juglone.

Walnut roots of seedlings were cut into small sections and placed in two samples. One sample was leached for 24 hours in distilled water. The other sample was placed directly in petri dishes unleached and distilled water was added to this dish. The root extract from the first sample exhibited only minor inhibition on the carrot and tomato seeds and little or no inhibition for the cucumber and radish seeds. The unleached roots from the second sample showed excellent

inhibition up to 72 hours; thereafter, mold developed in all cultures.

Finally, abscissed leaves were leached, and the extract was placed on the seed cultures. Mold developed within 24 hours in all samples. Three successive attempts in separate petri dishes gave the same results. The ubiquitous nature of soil fungi and mycorhizae associated with walnuts and filberts has been noted (Schuster, Stephensen, and Evenden, 1944). Although the specific fungi were not identified, these investigators stated that the mycorhizae are always present, regardless of pH or soil type.

It has thus been demonstrated that a differential growth inhibitor, presumably juglone, is present in varying concentrations in several organs of the native walnut. A determination of the specific chemical make-up of the inhibitor was felt to be beyond the scope of this study. Likewise, data on the exact concentrations of the inhibitor from various plant parts was not determined, but each extract was obtained by leaching the husks, leaves, or roots for the same time period (24 hours) in distilled water. Also, since no special leaching techniques other than distilled water treatment were employed, it is assumed that this same process would take place in nature.

The presence of a natural growth inhibitor allows the walnut an advantage in its competition with other trees, chaparral species, and herbaceous understory species. The fact that the greatest inhibition occurred with the extract of the walnut husks indicates a unique survival mechanism for walnut seedlings. This is supported by the observation that the inhibitor is apparently only emitted after

the husk has been crushed or removed, so that release of juglone and germination occur together.

DISEASE AND DROUGHT RESISTANCE

The native walnut has attained some degree of disease resistance. It was commonly used as a root-stock for scions of the English (Persian) walnut, because of its resistance to the attacks of the oak root fungus (Jepson, 1910; Bailey, 1928). The roots are also better suited to Southern California soils than those of the English walnut.

Young walnut trees are hearty and exhibit rapid growth. After the tree reaches 20 to 30 years of age, however, it commonly develops heart-rot and becomes easily infested with bark beetles, termites, and fungi. Basal plates on some of the older trees at Brea Canyon were heavily infested with the bracket fungus Pleurotus ostreatus Jacq. Attacks by this fungus and Armillaria mellea Vahl. are apparently very common on species of Juglans in the eastern United States, and infestations are referred to as "mushroom root rot" (U. S. Dept. Agric., 1953). Older branches appear more susceptible to attacks by mistletoe than younger branches, and the mistletoe often results in branch damage and breakage.

Wolf (1941) stated that J. californica is probably the most drought resistant of the various kinds of walnuts planted in Southern California. H. W. Shepherd (in McMinn and Maino, 1935) included the tree in lists of drought-tolerant and heat-tolerant trees native to California.

Field surveys during 1966 at Brea Canyon revealed that the walnut will succumb to considerable branch-wilt, when spring rains are

followed by a hot, dry summer. The leaflets wilt while still attached to the petiole, and leaf abscission does not occur. This is a temporary condition, for by the following spring these leaves have abscissed and are replaced by new leaves. When entire branches or trunks are removed from the tree, the walnut shows considerable vitality by developing numerous resprouts in the affected area.

Open-grown trees are susceptible to mistletoe and heart-rot. Older branches of the tree break off and add to the accumulated fuel of the understory. When fires occur in walnut stands, they destroy the accumulated fuel, mistletoe, and heart-rot trunks, leaving behind a clean growth of rejuvenated trees with many resprouts.

FUTURE OF THE TREE

Examination of the paleontological record for California walnut helps one predict the future of this species. Cain (1944) mentioned that woodland elements containing species of Juglans were present across much of the Southwest during the Pliocene in areas now occupied by deserts. The predecessor of J. californica was probably J. nevadensis Berry (Axelrod, 1939, 1950a, 1950b; Condit, 1944; MacGinitie, 1941) which occurred in the Mount Eden Flora near Mount San Jacinto and the Truckee Flora of the Northern Sierra Nevada-Great Basin region. These were Tertiary Floras of the middle Pliocene, which were scattered during periods of mountain up-lift. The distribution of J. californica apparently underwent several local accordian movements during more recent (Pleistocene) periods of glaciation.

These trees have survived in the summer-foggy coastal valleys and canyons of the Santa Monica Mountains and the Puente Hills. The walnut is now endemic to Southern California (Munz, 1935).

If the climate of future years should be warmer and more arid than in the past (Clark and Stearn, 1960; Flint, 1957), the walnut will perhaps migrate to the north or to higher elevations. Possible pathways for these movements include the Southern Coastal mountain ranges north of the Los Angeles basin, the Tehachapi Mountains, the Sierra Nevadas. Since native walnut presently occurs in canyons of the San Gabriel and San Bernardino Mountains, the tree would probably advance to higher elevations in these ranges.

The tree's distribution is presently being restricted by man. Unfortunately, walnut is located on economically valuable real estate adjacent to spreading urban centers. Many of the better stands occur on land now being converted into residential areas, such as the Diamond Bar section of Brea Canyon (Plate 10) and the Santa Monica Mountains from Cahuenga Pass to Malibu Canyon. Another fine stand of walnut is being removed in the San Jose Hills west of Pomona, to be replaced by a cemetery. Many of the trees mentioned by Jepson (1910) have long since been eliminated. The only stand that is presently being protected is located at the lower end of Brea Canyon at the Firestone Boy Scout Camp.

The bulldozing and cementing in of the river beds of the San Gabriel, Rio Hondo, and Los Angeles Rivers have destroyed existing stands and presently restrict the distributional expansion of this tree. Smog and other forms of air pollution interfere with the

physiology of many trees in Southern California (Kramer and Kozlowski, 1960), including J. californica. The reaction of unsaturated hydrocarbons with the ozone in the atmosphere reduces photosynthesis and increases respiration. Todd (1958) feels that smog has direct effects on other growth processes of trees.

Grazing is extensive in areas where good stands exist and may eliminate walnut seedlings. With increasing aridity, chaparral species are better able to compete with the native walnut. The winter-deciduous habit of the tree serves no apparent purpose, for in California the growing season occurs during the winter months. If the tree were to revert to a summer-deciduous habit in the distant future, its chances of survival might be greatly enhanced. Severe restriction or extinction of the species appears to be a more probably fate, however.

SUMMARY AND CONCLUSIONS

The Southern California walnut was studied over a two-year period from an ecological standpoint. Its present distribution was ascertained and compared with that of the past. Major factors affecting the distribution were determined, and from this information the future of the tree was predicted. The interrelationships of various edaphic, climatic, and biological agents were evaluated with regard to their effects on the tree. The phenology of the native walnut was observed and recorded. As a result of this study, the following conclusions can be made:

1) The specimens found along Santa Rosa Creek inland from Cambria in San Luis Obispo County extend the range of the tree approximately 100 miles beyond the reported northern limits for the species.

2) In terms of elevation, the tree can grow from near sea level to 3,000-3,500 feet.

3) Planted trees found in unnatural locations indicate that the native walnut may have greater amplitudes of tolerance for climatic and edaphic factors than might be expected.

4) The distribution of the tree is presently being restricted by the urbanization of Southern California. The tree is naturally restricted to cool canyon bottoms, riparian woodlands, or summer-foggy coastal flatlands with deep, well-established soils.

5) The number, size, and shape of the leaflets appear to be the best taxonomic characters for field identification; however, variation in these factors has been noted.

6) The native walnut will apparently freely hybridize with

several other species of Juglans introduced to Southern California, including J. nigra, J. regia, and J. hindsii. The common hybrids appear to have no ecological site-preference but may require more moisture than J. californica.

7) Because the tree will readily hybridize with other species, some doubt is cast on the contention that it is a species distinct from J. hindsii. The only valid criterion for this distinction is the completely allopatric nature of the distributions for the two species.

8) The walnut usually grows in southern oak woodland communities, in a Juglans californica-Quercus agrifolia association.

9) The understory of typical stands of walnut is usually disturbed and made up of introduced grasses and herbaceous annuals.

10) The walnut will readily stump sprout after fires. The bark is not fire resistant. The ability to resprout assures the tree's place in fire-swept Southern California. Fire may serve to rejuvenate disease weakened trunks.

11) Vegetative reproduction by means of basal stump-sprouts may partially compensate for the lack of sexual reproduction.

12) Throughout Southern California, sexual reproduction of the tree appears to be much less than its potential. The main factor which restricts the germination of seedlings is apparently lack of sufficient rainfall.

13) The walnut grows consistently on soils with sedimentary bedrock of limestone or siltstone and apparently has a high calcium requirement.

14) In spite of the results of past work on species of Juglans, the native walnut was found to be quite shade tolerant, or else the

moisture content of the particular micro-niche was enough to outweigh the effects of shade on the seedlings.

15) The husk of the walnut is impermeable to water, and the best dispersal mechanism for the nuts is water transport, aided by gravity.

16) Native walnut is apparently not used as a main food source by any of the rodents of the understory. In some areas, squirrels and scrub jays may play a role in the tree's reproduction by burying the nuts.

17) The particular micro-climate of each tree has tremendous effects on its growth form. "Ecotypes" may result from the conditions present in the various micro-environments.

18) Heavy infestations of mistletoe which affect growth form are present in some stands of native walnut, while others are free of this parasite.

19) Juglone was found to be present in various organs of the tree, and this chemical inhibited the growth of several garden plants. Concentrated amounts of juglone are emitted at the time of germination and may eliminate plant competition for an extended period of time.

FIGURES

Fig. 1. The present distribution of Juglans californica Wats. in counties of southern California.



Distribution of Juglans californica Wats.
in Counties of Southern California

Present Natural Distribution ▩

Fig. 2. The distribution of J. californica in San Luis Obispo County, as determined by field observation and surveys of herbarium specimens.

San Luis Obispo County

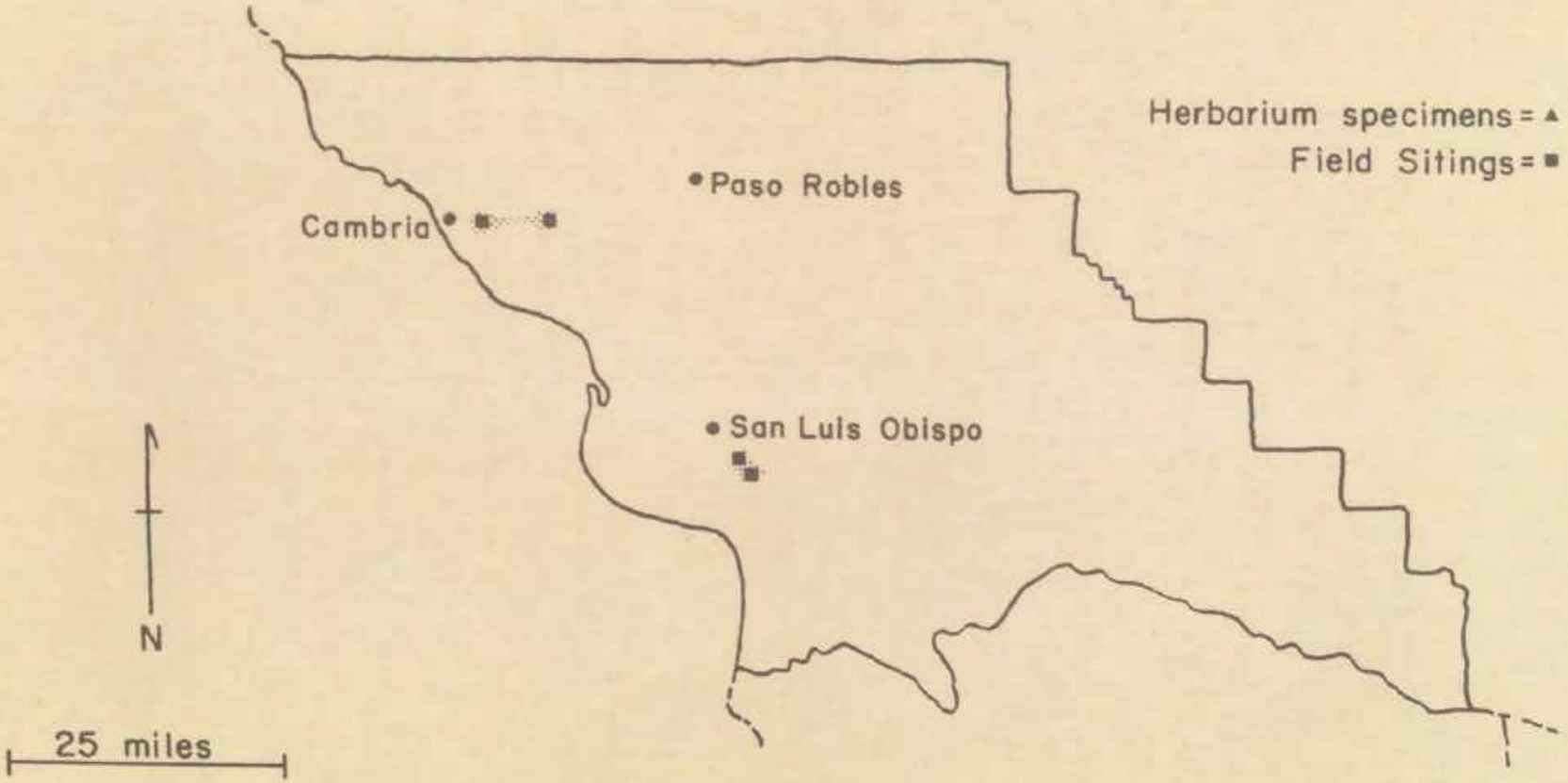


Fig. 3. The distribution of J. californica in Santa Barbara County, as determined by field observation and surveys of herbarium specimens.

Santa Barbara County

Herbarium specimens = ▲

Field Sitings = ■



Fig. 4. The distribution of J. californica in Ventura County, as determined by field observation and surveys of herbarium specimens.

Ventura County

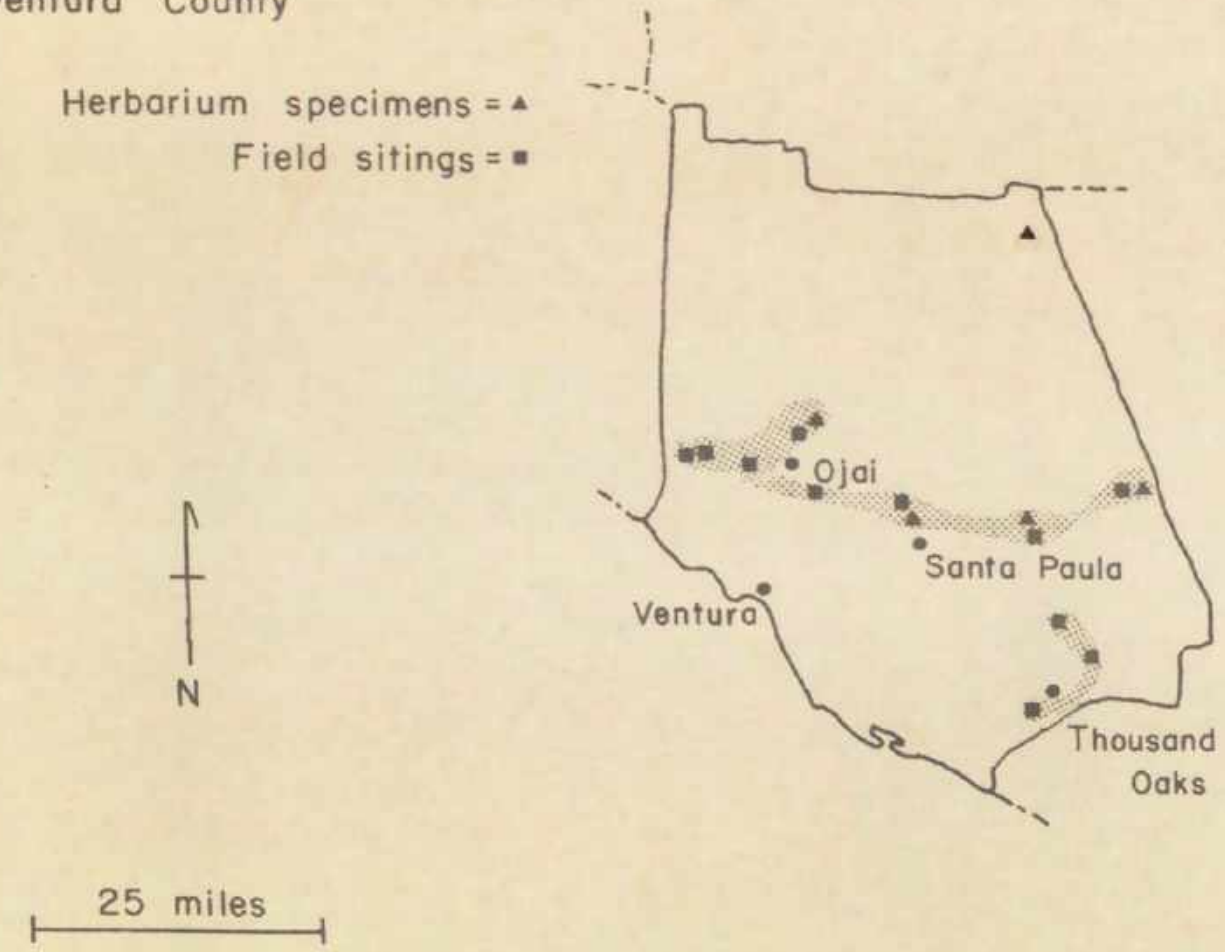


Fig. 5. The distribution of J. californica in Los Angeles County, as determined by field observations and surveys of herbarium specimens.

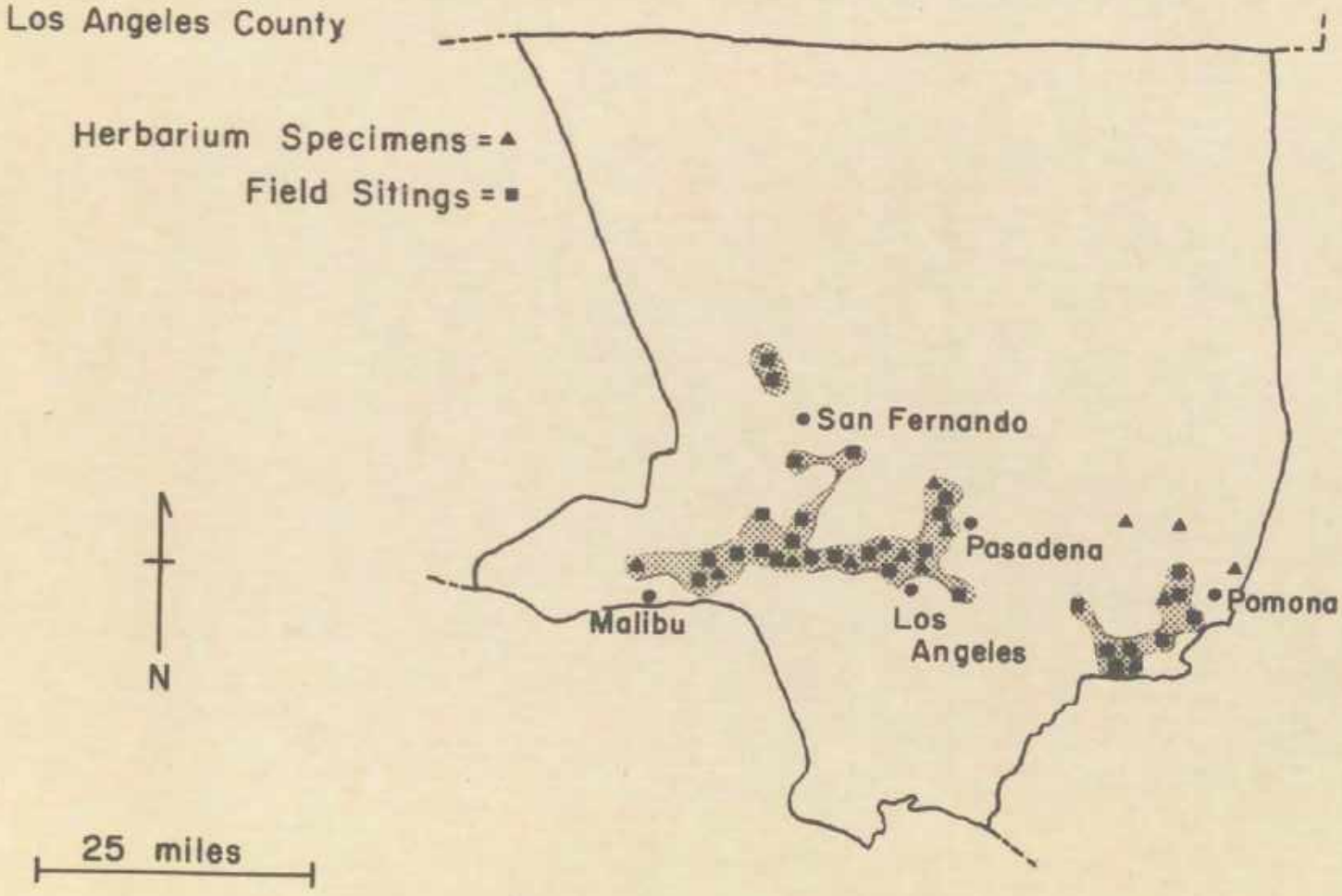

Los Angeles County
Herbarium Specimens = ▲
Field Sitings = ■
San Fernando
Pasadena
Pomona
Malibu
Los Angeles
N
25 miles

Fig. 6. The distribution of J. californica in Orange County, as determined by field observation and surveys of herbarium specimens.

Orange County

Herbarium Specimens = ▲
Field Sitings = ■





25 miles

Fig. 7. The distribution of J. californica in San Bernardino County, as determined by field observations and surveys of herbarium specimens.

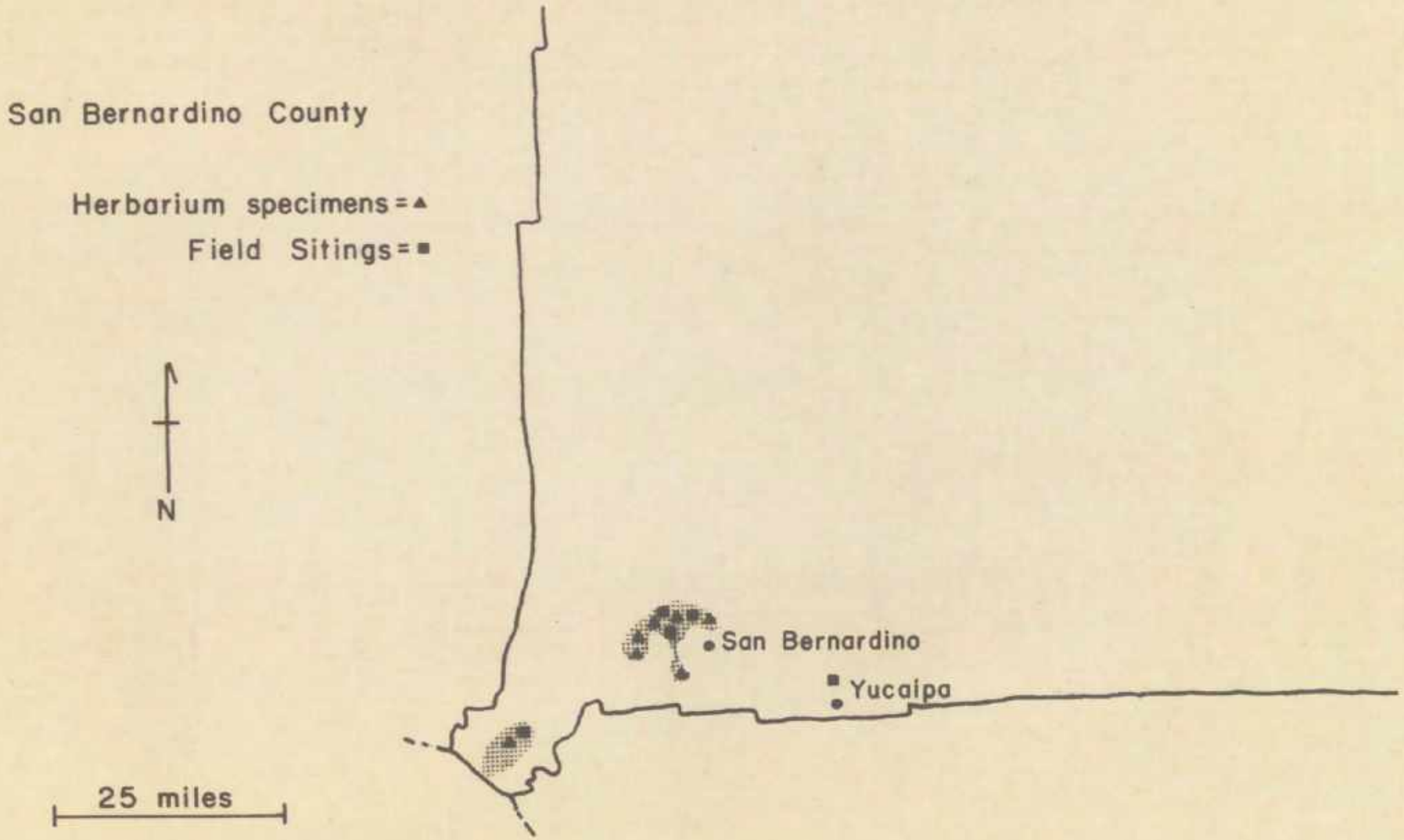

San Bernardino County
Herbarium specimens = ▲
Field Sitings = ■
N
San Bernardino
Yucaipa
25 miles

Fig. 8. The distribution of J. californica in Riverside County, as determined by field observation and surveys of herbarium specimens.

Riverside County

Herbarium specimens = ▲

Field Sitings = ■

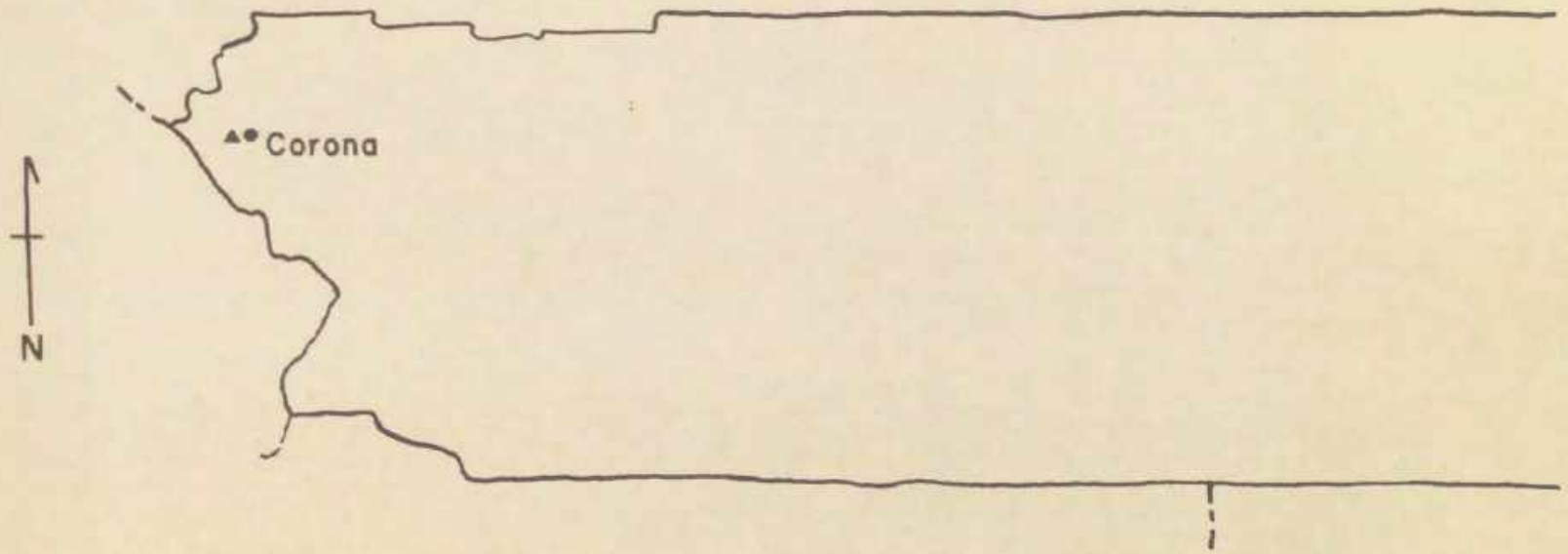
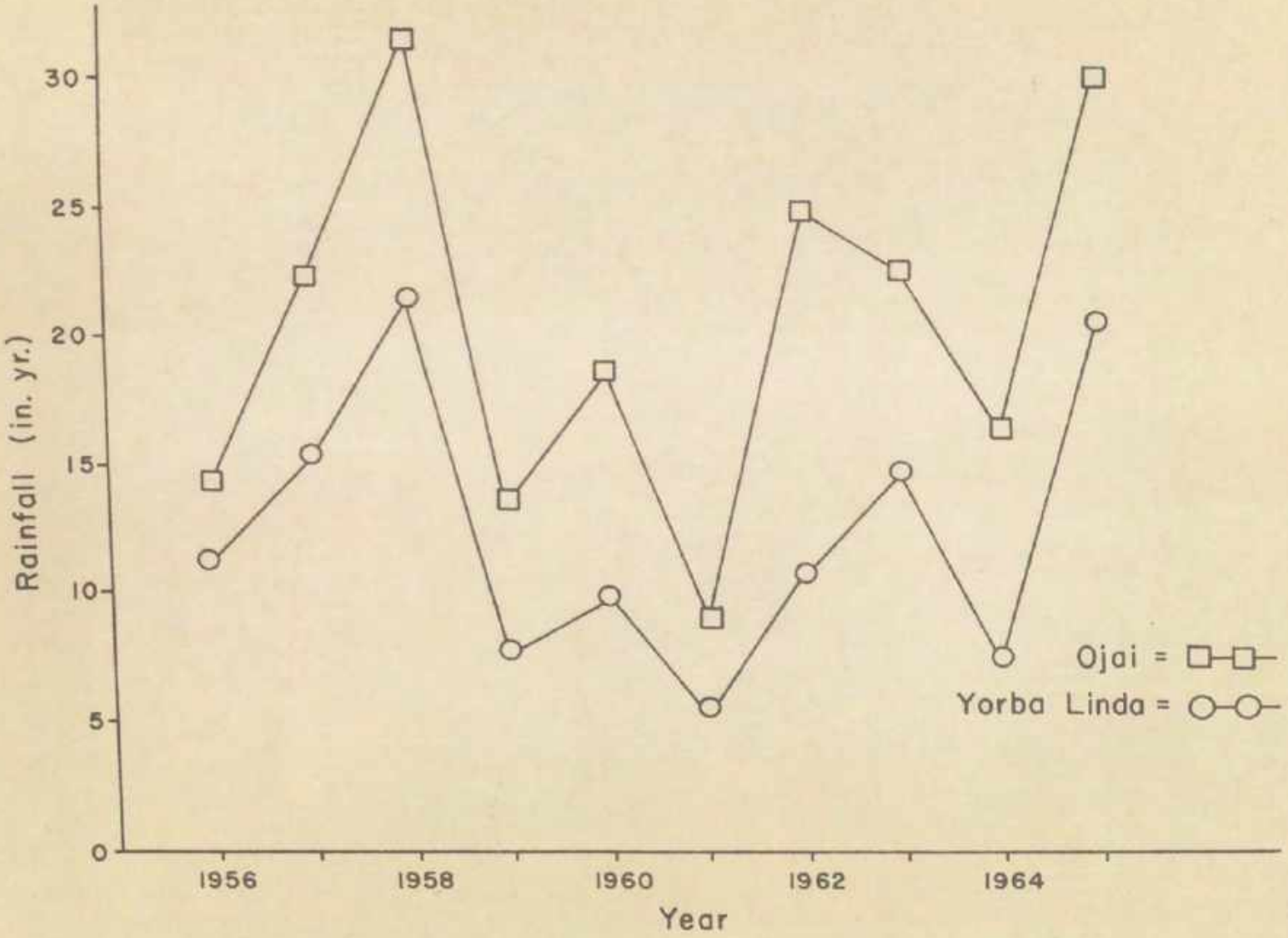


Fig. 9. Graph showing rainfall data at Ojai and Yorba Linda for the ten year period preceding the field work at the two study areas.


Rainfall (in. yr.)
30
25
20
15
10
5
0
1956
1958
1960
1962
1964
Year
Ojai =
Yorba Linda =

TABLES

Table 1. Mistletoe Incidence on *Juglans californica* in Brea Canyon

Total trees surveyed = 50

Total number of trunks = 211

Total number of mistletoe = 1,926

Number of trunks per tree: Range = 1-17 Mean = 4.4

Number of mistletoe per tree: Range = 0-280 Mean = 38.7

Number of mistletoe per trunk: Range = 0-112 Mean = 9.1

Trunks classed in terms of d.b.h.:

Class I = 0.0-3.0 inches d.b.h.	21	9.9%
Class II = 3.1-6.0 inches d.b.h.	62	29.3
Class III = 6.1-9.0 inches d.b.h.	63	29.4
Class IV = 9.1-12.0 inches d.b.h.	50	23.6
Class V = 12.1+ inches d.b.h.	15	7.8
Totals	211	100.0

Trunk Class	Total No. Mistletoe	Mean (per trunk)	Mistletoe Percent
I	27	1.3	1.4%
II	170	2.8	8.8
III	404	6.4	20.9
IV	724	14.5	37.6
V	601	40.1	31.3
Totals	1,926		100.0

Table 2. Tree Analysis - Brea Canyon

Sample size = 20 one-fortieth acre quadrats

Tree canopy cover = 40%

	Quadrats of Occurrence	No. of Trees	Basal Areas (sq. in.)
Juglans californica	14	17	3,422
Quercus agrifolia	6	8	1,812
Totals	20	25	5,234

	Relative Frequency	Relative Density	Relative Dominance	I.V.
Juglans californica	70%	68%	65.4%	203.4
Quercus agrifolia	30%	32%	34.6%	96.6
Totals	100%	100%	100.0%	300.0

	Absolute Frequency	Absolute Density (trees/acre)	Absolute Dominance (sq.in/acre)
Juglans californica	70%	34	6,844
Quercus agrifolia	30%	16	3,624

Table 3. Understory Analysis - Brea Canyon

Four 25-foot Line-intercepts Combined:

Eremocarpus setigerus	0.6%
Elymus sp.	1.9%
Urtica holosericea	1.9%
Bare ground	4.1%
Artemesia californica	5.8%
Brassica campestris	20.7%
Avena fatua	94.1%

Frequency of Occurrence

Twenty 1-meter^2 Quadrats Combined:

Asclepias fascicularis	5%
Elymus sp.	10%
Brassica campestris	35%
Galium triflorum	70%
Eremocarpus setigerus	75%
Avena fatua	100%

Table 4. Tree Analysis - Sulphur Mountain

Sample size = 20 one-fortieth acre quadrats

Tree canopy cover = 80-90%

	Quadrats of Occurrence	No. of Trees	Basal Areas (sq. in.)
Juglans californica	18	62	7,663
J. calif. X J. regia	12	30	711
Sambucus mexicana	3	3	82
Quercus agrifolia	2	2	1,516
Totals	35	97	9,972

	Relative Frequency	Relative Density	Relative Dominance	I.V.
Juglans californica	51.4%	63.9%	76.8%	192.1
J. calif. X J. regia	34.3%	30.9%	7.1%	72.3
Sambucus mexicana	8.6%	3.1%	0.9%	12.6
Quercus agrifolia	5.7%	2.1%	15.2%	23.0
Totals	100.0%	100.0%	100.0%	300.0

	Absolute Frequency	Absolute Density (trees/acre)	Absolute Dominance (sq.in./acre)
Juglans californica	90.0%	124	15,326
J. calif. X J. regia	60.0%	60	1,422
Sambucus mexicana	15.0%	6	164
Quercus agrifolia	10.0%	4	3,032

Table 5. Understory Analysis - Sulphur Mountain

Four 25-foot Line-intercepts Combined:

Rhus diversiloba	3.2%
Stachys bullata	3.3%
Juglans seedlings	4.2%
Bare ground	4.4%
Ribes speciosum	11.9%
Avena fatua	69.9%
Galium triflorum	83.3%

Frequency of Occurrence

Twenty 1-meter^2 Quadrats Combined:

Osmorhiza brachypoda	5%
Ribes speciosum	15%
Rhus diversiloba	20%
Stachys bullata	30%
Juglans seedlings *	60%
Galium triflorum	95%
Avena fatua	100%

* seedlings averaged 880 per acre

Table 6. Inhibition of Seed Germination by Hydrojuglane Glucoside (Expressed as a Percentage Germination)

Distilled Water Control:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot	0%	10%	45%	70%	90%	90%	90%
Cucumber	100%	100%	100%	100%	100%	100%	100%
Radish	90%	100%	100%	100%	100%	100%	100%
Tomato	0%	0%	30%	75%	85%	95%	95%

Boiled Walnut Husk Extract:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot	0%	10%	40%	60%	70%	70%	75%
Cucumber	100%	100%	100%	100%	100%	100%	100%
Radish	85%	100%	100%	100%	100%	100%	100%
Tomato	0%	5%	65%	90%	90%	90%	90%

Unboiled Walnut Husk Extract:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot	0%	0%	0%	10%	10%	10%	10%
Cucumber	30%	100%	100%	100%	100%	100%	100%
Radish	40%	80%	85%	95%	95%	95%	95%
Tomato	0%	0%	0%	0%	0%	0%	0%

Table 6 (cont.).

Unboiled Walnut Root Extract:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot	0%	10%	15%	35%	40%	50%	65%
Cucumber	95%	100%	100%	100%	100%	100%	100%
Radish	10%	60%	75%	85%	85%	90%	95%
Tomato	0%	0%	5%	55%	65%	70%	75%

Walnut Roots Unleached:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot	0%	0%	0%				
Cucumber	0%	10%	20%	Mold developed in			
Radish	45%	70%	70%	all cultures			
Tomato	0%	0%	0%				

Unboiled Abscissed Walnut Leaf Extract:

	Time in hours						
Seed Type	24	48	72	96	120	144	168
Carrot							
Cucumber							
Radish	Mold developed in all cultures						
Tomato							

Table 7. Walnut Tree Ring Analysis

Basal Areas (sq. in.)	Trunk Diameters (in.)	Age of Tree (years)
26	5.75	17
28	5.95	26
42	7.34	54
43	7.40	38
50	7.96	41
58	8.60	52
60	8.72	41
65	9.10	38
104	11.48	62
154	14.00	68

PLATES

Plate 1. Roadcut at Brea Canyon showing calcareous sedimentary rock beds.



Plate 2. Typical understory vegetation at Brea Canyon, indicative of past disturbance.



Plate 3. Branch of walnut showing young male catkins, which appear on the branch at the same time that leaf production occurs.



Plate 4. The mature fruit of J. californica as they appear on their peduncles singly, in two's, or in groups of three.

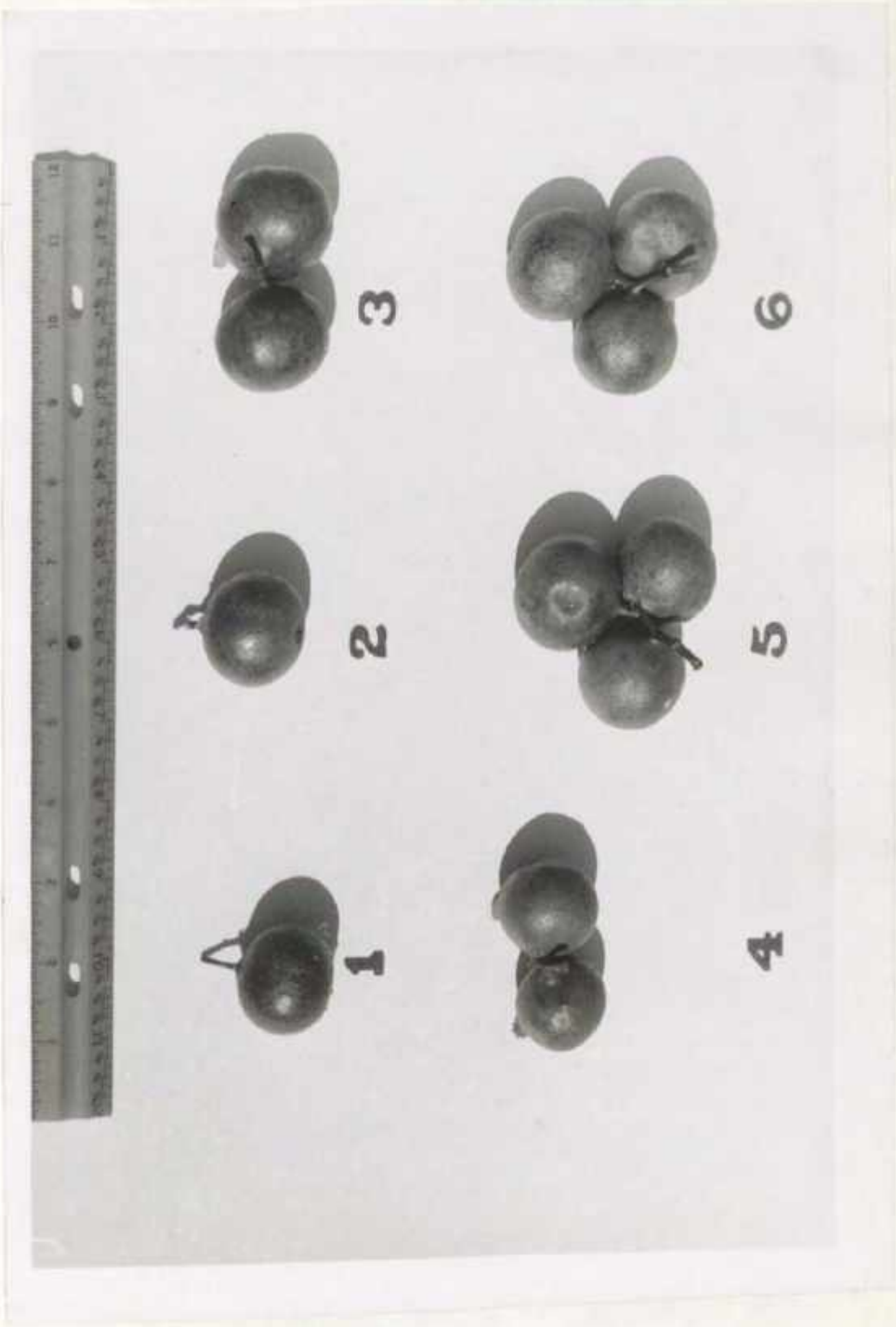

1
2
3
4
5
6

Plate 5. Seedling of J. californica growing along Santa Paula Creek, six miles north of Santa Paula, California.



Plate 6. Uprooted seedling showing characteristic U-shaped bend in root and attached cotyledons within the shells.



Plate 7. Rock samples from 1) Brea Canyon, 2) Monterey Pass (Arroyo Seco), 3) Piru Creek, 4) Wheeler Springs (north of Ojai), 5) Sulphur Mountain, and 6) Lake Casitas showing the sedimentary bedrock type which is characteristic of good walnut sites.

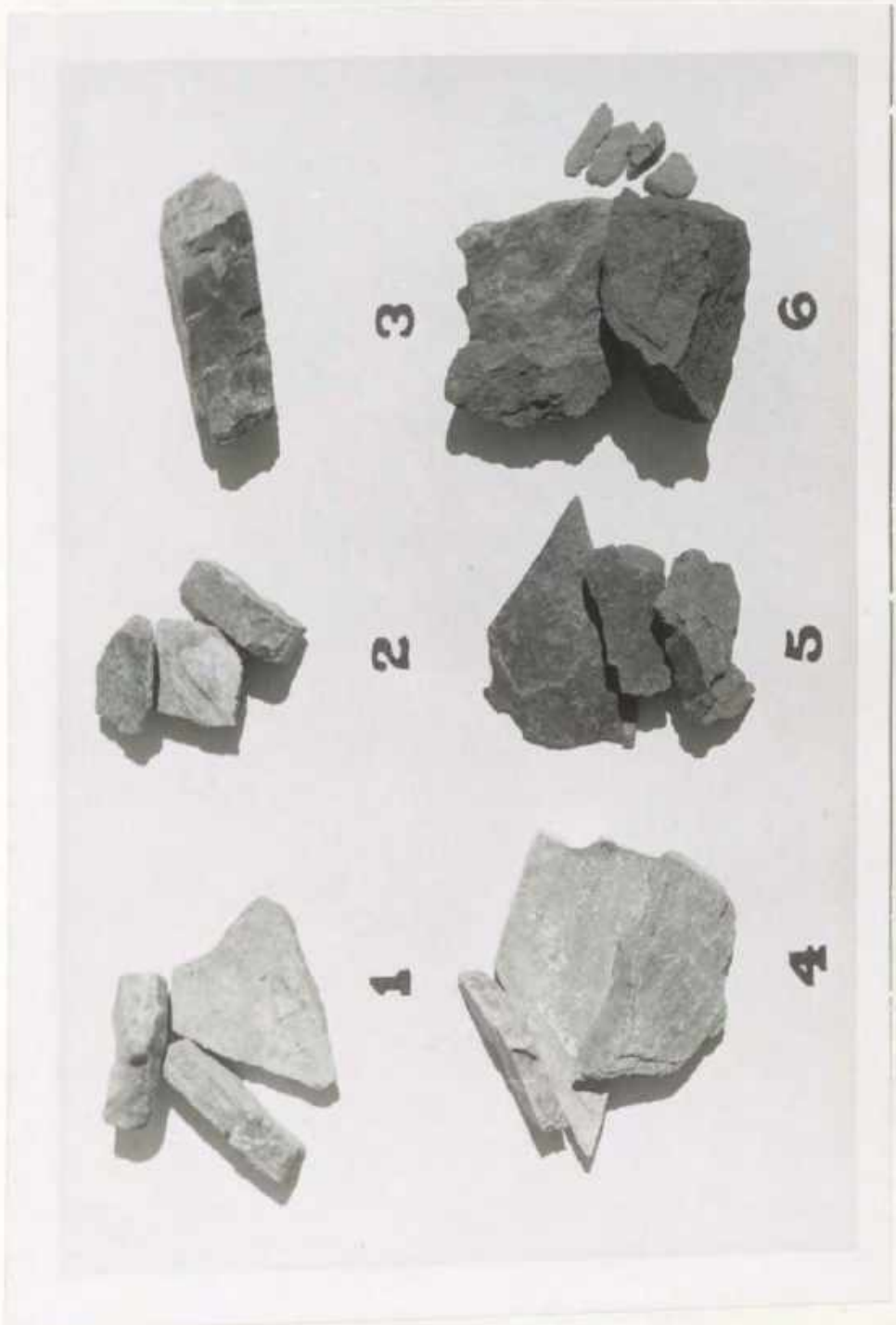

1
2
3
4
5
6

Plate 8. Typical sized swelling produced on walnut branches, when the haustoria of mistletoe penetrate the tissue.

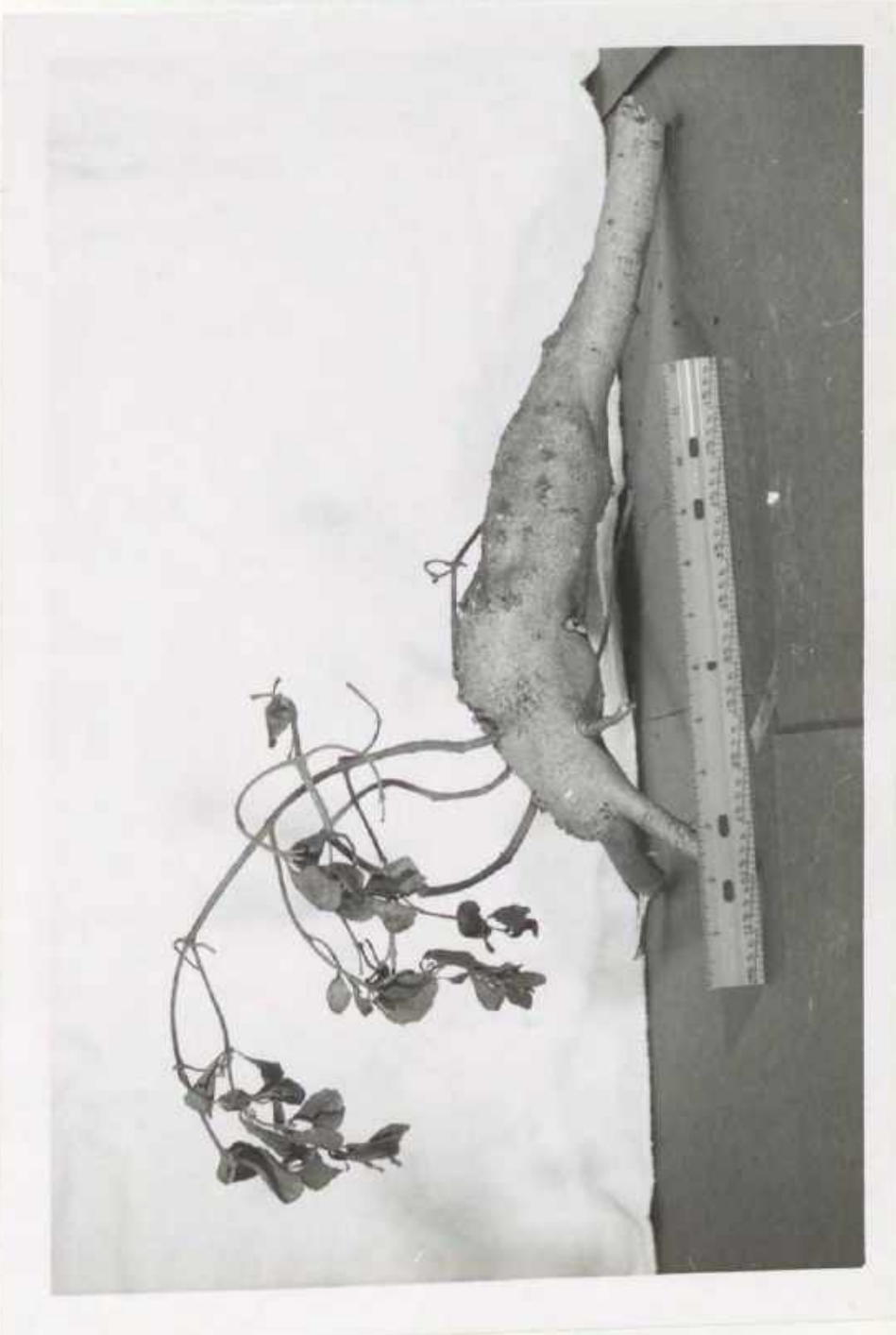


Plate 9. Unusually large swelling produced on a walnut branch by the haustoria of mistletoe.



Plate 10. Destruction of a good stand of *J. californica* in a suburban area of Los Angeles.



APPENDICES

Appendix A. Herbarium Specimens of *Juglans californica* Wats.

Arranged by Counties

San Luis Obispo County

U. C. Berkeley Herbarium:

1. *J. californica*-San Luis Obispo Co., March 1889.

Santa Barbara County

U. C. Berkeley Herbarium:

1. *J. calif.*-Santa Barbara, Santa Barbara Co., March 9, 1935.

Stanford University Dudley Herbarium:

1. *J. calif.*-Jalama Creek, Santa Barbara Co., April 28, 1962.

U. C. Santa Barbara Herbarium:

1. *J. calif.*-along Jalama Creek, 2.3 mi. east of Jalama Beach; elev. 100 ft., Santa Barbara Co., April 28, 1962.
2. " " -near school grounds on Figueroa Mt. Rd. north of Los Olivos, Santa Barbara Co., no date.

Ventura County

U. C. Berkeley Herbarium:

1. *J. calif.*-Tejon, Ventura Co., May 11, 1935.

Stanford University Dudley Herbarium:

1. *J. calif.*-Piru Creek, $\frac{1}{4}$ mi. above ranger station, Ventura Co., May 13, 1931.
2. " " -Sulphur Mt., elev. 1-2,000 ft., Ventura Co. Leroy Abrams Collection, June 1-2, 1908.
3. " " -1 mi. east of Moorpark, Ventura Co., March 29, 1924.

Appendix A. (cont.)

4. J. calif.-common on open slopes & ridges between Pipe and Sespe Creek, just south of Oat Mt., elev. 3,000 ft., Ventura Co., Nov. 15, 1941.

5. " " -between Moorpark & Simi, Ventura Co., May 23, 1919.

U. C. Santa Barbara Herbarium:

1. J. calif.-summit of Hwy. 150 between Santa Paula & Ojai, elev. 2,000 ft., Ventura Co., July 12, 1959.

2. " " -abundant in canyon along Hwy. 150, 7 mi. north of Santa Paula, elev. 1,000 ft., Ventura Co., April 3, 1960.

L. A. Co. Museum Herbarium:

1. J. calif.-open foothills, Ventura Co., April 14, 1929.

U. So. California Herbarium:

1. J. calif.-alluvial thicket near mouth of Ventura River, Ventura Co., April 6, 1944.

U. C. Los Angeles Herbarium:

1. J. calif.-semishade, sandy soil, along Piru Creek $\frac{1}{4}$ mi. above ranger station, 1,200 ft. elev. Ventura Co., May 13, 1931.

2. " " -Rincon Creek, elev. 1,500 ft., Ventura Co., April 19, 1943.

3. " " -lower Sespe Creek, Santa Barbara Natl. Forest, Ventura Co., April 14, 1929.

Pomona College Herbarium:

1. J. calif.-Foster Park, Ventura Co., April 26, 1923.

2. " " -Sulphur Spring, Sulphur Mt., Ventura Co., June 2, 1909.

Appendix A. (cont.)

Rancho Santa Ana Herbarium:

1. J. calif.-1-3/4 mi. south of Blue Peak on Piru Creek, elev. 1,100 ft., Ventura Co., June 9, 1935.
2. " " -sandy soil along Piru Creek, $\frac{1}{4}$ mi. above ranger station, Ventura Co., elev. 1,200 ft., May 13, 1931.
3. " " -San Antonio Creek, Ventura Co., Sept. 23, 1945.
4. " " -upper Coyote Creek, Ventura Co., May 17, 1947.

Los Angeles County

U. C. Berkeley Herbarium:

1. J. calif.-Triunfo Pass, L. A. Co., April 23, 1934.
2. " " -G. B. Grant Collection, Pasadena, L. A. Co., May 5, 1905.

Stanford University Dudley Herbarium:

1. J. calif.-Lincoln Park, Arroyo Seco, L. A. Co., March 12, 1900.
2. " " -G. B. Grant Collection, Pasadena, L. A. Co., May 5, 1905.
3. " " -north side of Santa Monica Mts. opposite Franklin Canyon, elev. 1,200 ft., L. A. Co., Nov. 11, 1931.
4. " " -Santa Monica Mts., L. A. Co., April 1901.
5. " " -Santa Monica Mts. at Cahuenga Pass, L. A. Co., July 7, 1912.
6. " " -Sepulveda Pass, Santa Monica Mts., L. A. Co., March 11, 1902.
7. " " -Brea Canyon, L. A. Co., April 25, 1924.

Appendix A. (cont.)

8. J. calif.-Glendora, L. A. Co., April 10, 1909.
9. " " -Cahuenga Pass, L. A. Co., April 2, 1901.
10. " " -Pasadena, G. B. Grant Collection, L. A. Co., May 5, 1905.
11. " " -west of Pomona, L. A. Co., March 16, 1926.
12. " " -near Seminole Hot Springs, chaparral edge, L. A. Co., May 7, 1964.

U. C. Santa Barbara Herbarium:

1. J. calif.-creek side, Big Tujunga Creek, 3.5 mi. west of guard station, San Gabriel Mts., L. A. Co., March 5, 1961.
2. " " -$\frac{1}{4}$ mi. north of 18000 Bull Canyon Rd., Granada Hills, elev. 1,500 ft., L. A. Co., March 29, 1953.
3. " " -in wash, Claremont, L. A. Co., June 2, 1953.
4. " " -Santa Monica Mts., dirt road between Sepulveda and Mulholland Dr., elev. 1,250 ft. fairly moist north slope, L. A. Co., May 29, 1950.
5. " " -growing in Pomona College wash, Claremont, L. A. Co., May 4, 1954.

L. A. Co. Museum Herbarium:

1. J. calif.-Mandeville Canyon, Santa Monica Mts., L. A. Co., May 1929.
2. " " -Laurel Canyon, L. A. Co., Febr. 24, 1929.
3. " " -open hilltop, foothills n.e. of Glendora, L. A. Co., April 14, 1929.
4. " " -Topanga Canyon, Santa Monica Mts., L. A. Co., Febr.

Appendix A. (cont.)

3, 1929.

5. J. calif.-G. B. Grant Collection, Pasadena, L. A. Co., May 5, 1905.

U. So. California Herbarium:

1. J. calif.-Tuna Canyon, Verdugo Hills, L. A. Co., March 15, 1931.

2. " " -San Dimas Canyon, north slope, loam soil, elev. 1,500 ft., March 26, 1943.

U. C. Los Angeles Herbarium:

1. J. calif.-Devil Canyon on dry hillside, 1,200 ft. elev., L. A. Co., April 30, 1939.

2. " " -Santa Monica Mts., L. A. Co., no date.

3. " " -Mt. Washington, North Los Angeles, L. A. Co., April 1948.

Cal State Los Angeles Herbarium:

1. J. calif.-Hollywood Camp, L. A. Co., April 6, 1953.

2. " " -Griffith Park, L. A. Co., Febr. 21, 1958.

3. " " -Hwy. 2, 3 mi. above Foothill Blvd., 2,000 ft. elev., L. A. Co., April 5, 1962.

4. " " -Puddingstone Dam, San Dimas, L. A. Co., March 8, 1965.

Pomona College Herbarium:

1. J. calif.-Mandeville Canyon, Santa Monica Mts., alluvial soil, elev. 750 ft., L. A. Co., June 1929.

2. " " -north slope Santa Monica Mts. near Cuhuenga Pass,

Appendix A. (cont.)

L. A. Co., July 7, 1912.

Rancho Santa Ana Herbarium:

1. J. calif.-Saddle Rock Ranch, near Seminole Hot Springs, Santa Monica Mts., edge of chaparral, L. A. Co., May 7, 1964.
2. " " -in sandstone outcrop 1.2 mi. sw of Seminole Hot Springs, elev. 1,300 ft., L. A. Co., March 31, 1959.
3. " " -oak wdld., 2.1 mi. east of Rambla Pacifica, L. A. Co., May 15, 1960.
4. " " -Hwy. 2, ca. 3 mi. above Foothill Blvd., elev. 2,000 ft., L. A. Co., April 5, 1962.
5. " " -Live Oak Canon, Claremont, L. A. Co., July 16, 1915.
6. " " -Sepulveda Canyon, West Los Angeles, L. A. Co., April 4, 1942.
7. " " -Cahuenga Pass, L. A. Co., April 2, 1901.
8. " " -dry slope, Puddingstone Canyon, elev. 1,000 ft., L. A. Co., April 2, 1934.
9. " " -Glendora, L. A. Co., April 10, 1909.
10. " " -Topanga Canyon, $\frac{1}{2}$ mi. from ocean, L. A. Co., March 22, 1947.
11. " " -sedimentary hill, n. side Santa Monica Mts. opposite Franklin Canyon, elev. 1,200 ft., L. A. Co., Nov. 11, 1934.
12. " " -sedimentary formation, head Mandeville Canyon, Santa Monica Mts., elev. 1,600 ft., L. A. Co., April 2, 1932.

Appendix A. (cont.)

Orange County

U. C. Berkeley Herbarium:

1. J. calif.-Corona, Orange Co., March 1934.

Stanford University Dudley Herbarium:

1. J. calif.-lower end of Brea Canyon, Orange Co., Sept. 21, 1934.

U. So. California Herbarium:

1. J. calif.-Carbon Canyon, Orange Co., May 30, 1933.

U. C. Los Angeles Herbarium:

1. J. calif.-lower end of Brea Canyon, 600 ft. elev., Orange Co., Sept. 21, 1934.

Rancho Santa Ana Herbarium:

1. J. calif.-near ranch houses, old Rancho Santa Ana, Orange Co., July 27, 1927.
2. " " -sun, black adobe hillsides at lower end of Brea Canyon, Puente Hills, Orange Co., 1935.

San Bernardino County

U. C. Berkeley Herbarium:

1. J. calif.-Arrowhead Springs, San Bernardino Co., March 22, 1933.

Stanford University Dudley Herbarium:

1. J. calif.-Colton, San Bernardino Co., April 28, 1882.
2. " " -Waterman Canyon, San Bernardino Co., May 9, 1918.
3. " " -Lone Pine Canyon, desert slopes of the San Gabriel Mts., elev. 3,000 ft., collected by Abrams & McGregor, July 5, 1908.

Appendix A. (cont.)

U. C. Santa Barbara Herbarium:

1. J. calif.-near stream, west of Interstate 15, 2.6 mi. south of Cajon Junction on dirt road to Applewhite Campground, elev. 2,500 ft., San Bernardino Co., May 3, 1963.

Pomona College Herbarium:

1. J. calif.-Mill Creek, San Bernardino Co., May 11, 1940.
2. " " -Colton, San Bernardino Co., April 28, 1882.

Rancho Santa Ana Herbarium:

1. J. calif.-Etiwanda, a few trees in a wash, elev. 1,200 ft., San Bernardino Co., April 21, 1918.
2. " " -Waterman Canyon, San Bernardino Co., May 9, 1918.
3. " " -Cajon Pass, Marcus E. Jones Collection, San Bernardino Co., Aug. 19, 1924.
4. " " -San Antonio Canyon, San Bernardino Co., Aug. 19, 1937.
5. " " -north of Fontana in small canyon, San Bernardino Co., March 23, 1938.
6. " " -sedimentary hills with Quercus agrifolia north side Puente Hills opposite Carbon Canyon, San Bernardino Co., June 22, 1932.
7. " " -Aliso Canyon, Rancho Santa Ana, San Bernardino Co., April 14, 1928.
8. " " -Aliso Canyon, Rancho Santa Ana, ca. 600 ft. elev., San Bernardino Co., Jan. 8, 1944.

Appendix A. (cont.)

Santa Catalina Island

L. A. Co. Museum Herbarium:

1. J. calif.-Hamilton Canyon, elev. 200 meters, Santa Catalina Island, May 12, 1931.

Rancho Santa Ana Herbarium:

1. J. calif.-introduced to Catalina Island, chaparral near circle on summit road from Avalon to airport, elev. ca. 300 ft., Santa Catalina Island, May 11, 1965.

Specimen annotations are verbatim.

Appendix B. Species List Arranged by Plant Families - Walnut Study Area, Brea Canyon

1. Anacardiaceae:

   Rhus diversiloba T. and G.

   R. integrifolia (Nutt.) Benth. & Hook.

   R. laurina Nutt. in T. and G.

   R. ovata Wats.

   Schinus Molle L.

2. Amarantheaceae:

   Amaranthus graecizans L.

3. Amaryllidaceae:

   Brodiaea pulchella (Salisb.) Greene

4. Asclepiadaceae:

   Asclepias fascicularis Dene. in A. DC.

5. Betulaceae:

   Alnus rhombifolia Nutt.

6. Caprifoliaceae:

   Sambucus caerulea Raf.

7. Caryophyllaceae:

   Stellaria media (L.) Vill.

8. Compositae:

   Artemisia californica Less.

   Baccharis pilularis ssp. consanguinea (DC.) C.B. Wolf

   Cirsium vulgare (Savi) Ten.

   Encelia californica Nutt.

8. Compositae (cont.):

Gnaphalium palustre Nutt.

Hemizonia fasciculata (DC.) T. & G.

Senecio Douglasii DC.

Sonchus oleraceus L.

9. Convolvulaceae:

Convolvulus arvensis L.

10. Cruciferae:

Brassica campestris L.

Capsella Bursa-pastoris (L.) Medic.

Lepidium nitidum Nutt.

Nasturtium officinale R. Br.

Rhaphanus sativus L.

11. Cucurbitaceae:

Cucurbita foetidissima HBK.

Marah macrocarpus (Greene) Greene

12. Euphorbiaceae:

Euphorbia albomarginata T. & G.

Eremocarpus setigerus (Hook.) Benth.

13. Fagaceae:

Quercus agrifolia Nee

Q. dumosa Nutt.

14. Gramineae:

Avena fatua L.

Bromus sp. L.

Elymus sp. L.

14. Gramineae (cont.):

Festuca sp. L.

Poa annua L.

15. Juglandaceae:

Juglans californica Wats.

J. californica X J. regis ex Burbank

16. Labiatae:

Lamium amplexicaule L.

Marrubium vulgare L.

Salvia mellifera Greene

Trichostema lanatum Benth.

17. Lauraceae:

Umbellularia californica (H. & A.) Nutt.

18. Leguminosae:

Astragalus sp. L.

Lotus Heermanii (Dur. & Hilg.) Greene

Lupinus succulentus Dougl. ex Koch.

Medicago lupulina L.

Melilotus indicus (L.) All.

19. Lemnaceae:

Lemna sp. L.

20. Loranthaceae:

Phoradendron flavescens var. macrophyllum Engelm. in Rothr.

21. Meliaceae:

Melia Azedarach var. umbraculiformis Berckmans

22. Papaveraceae:

Dendromecon rigida Benth.

Eschscholtzia californica Cham.

23. Plantagineaceae:

Plantago major L.

24. Platanaceae:

Platanus racemosa Nutt.

25. Polygonaceae:

Eriogonum fasciculatum Benth.

Polygonum aviculare L.

Rumex crispus L.

26. Portulacaceae:

Montia perfoliata (Donn) Howell.

27. Primulaceae:

Anagallis arvensis L.

28. Pteridaceae:

Pteridium aquilinum var. *lanuginosum* (Bong.) Fern.

29. Rosaceae:

Adenostoma fasciculatum H. & A.

Heteromeles arbutifolia M. Roem.

Rosa californica Cham. & Schlecht.

30. Rubiaceae:

Galium triflorum Michx.

31. Salicaceae:

Salix laevigata Bebb.

32. Scrophulariaceae:

Mimulus cardinalis Dougl. ex Benth.

Penstemon sp. Mitch.

33. Solanaceae:

Datura meteloides A. DC.

Nicotiana glauca Grah.

Solanum Xantii Gray

34. Typhaceae:

Typha sp. L.

35. Umbelliferae:

Conium maculatum L.

Foeniculum vulgare Mill.

36. Urticaceae:

Urtica holosericea Nutt.

37. Vitaceae:

Vitus californica Benth.

Appendix C. Species List Arranged by Plant Families - Walnut Study Area, Sulphur Mountain

1. Anacardiaceae:

   Rhus diversiloba T. & G.

2. Caprifoliaceae:

   Sambucus mexicana Presl.

   Symphoricarpos mollis Nutt. in T. & G.

3. Caryophyllaceae:

   Silene gallica L.

   Stellaria media (L.) Vill.

4. Compositae:

   Artemesia californica Less.

   Baccharis pilularis ssp. consanguinea (D.C.) C. B. Wolf

5. Cruciferae:

   Dentaria californica Nutt.

   Erysimum Cheiri (L.) Crantz.

6. Euphorbiaceae:

   Euphorbia Peplus L.

7. Fegaceae:

   Quercus agrifolia Nee.

8. Geraniaceae:

   Geranium molle L.

9. Gramineae:

   Avena fatua L.

   Elymus sp. L.

   Festuca sp. L.

10. Juglandaceae:

Juglans californica Wats.

J. californica X *J. regia* ex Burbank

11. Labiatae:

Marrubium vulgare L.

Stachys bullata Benth.

12. Leguminosae:

Lathyrus tingitanus L.

L. vestitus ssp. *puberulus* (White ex Greene) C. L. Hitchc.

13. Onagraceae:

Clarkia Xantiana Gray.

Zauschneria cana Greene

14. Portulacaceae:

Montia perfoliata (Donn) Howell.

15. Pteridaceae:

Adiantum Jordani C. Muell.

Pellaea mucronata (D.C. Eat.) D.C. Eat.

16. Rannunculaceae:

Ranunculus californicus Benth.

17. Rosaceae:

Heteromeles arbutifolia M. Roem.

Rubus ursinus Cham. & Schlecht.

18. Rubiaceae:

Galium triflorum Michx.

19. Saxifragaceae:

Lithophragma Cymbalaria T. & G.

Ribes speciosum Pursh.

20. Scrophulariaceae:

Castilleja affinis H. & A.

Penstemon cordifolius Benth.

21. Umbelliferae:

Osmorhiza brachypoda Torr.

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Exhibit 19

Vegetation Classification and Mapping Program

The Vegetation Classification and Mapping Program (VegCAMP) develops and maintains California's expression of the National Vegetation Classification System. We implement its use through assessment and mapping projects in high-priority conservation and management areas, through training programs, and through working continuously on best management practices for field assessment, classification of vegetation data, fine-scale vegetation mapping, and archiving of vegetation data. Completing a state-wide vegetation map and classification in collaboration with other agencies and organizations is the current goal of the program.

VegCAMP

- VegCAMP Background
- Reports and Maps
- Publications, Protocols, and Standards
- Natural Communities
- Submitting Natural Communities Information
- Vegetation-related Resources

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Exhibit 20

Vegetation Classification of the Santa Monica Mountains National Recreation Area and Environs in Ventura and Los Angeles Counties, California

Version 1—Association Level and Specific Alliances

A Report Submitted To

National Park Service
John Tizler, Plant Ecologist
Santa Monica Mountains National Recreation Area
401 West Hillcrest Drive
Thousand Oaks, CA 91360

By

California Department of Fish and Game
Wildlife and Habitat Data Analysis Branch
and
The California Native Plant Society
Vegetation Program
Sacramento, California

And

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and
Julie Evens

With Assistance From

Sau San
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January 2006

Table of Contents

INTRODUCTION 1

Background and Standards 2
Figure 1: SPOT 2002 Satellite Image of Santa Monica Mountains with study area boundary in yellow. Note large expanse of urban to NE and SE, and mix of agriculture and urban to W and N, best viewed at 300-400% of current scale. 4
NPS Field Crew and Supporting Staff 7
Timeline 8

METHODS 10

Gradient Directed Sample Allocation 10
Figure 2. Ecological regions identified for vegetation assessment. 13
Vegetation Sampling and Classification 17
Data analysis process 18

RESULTS 31

Figure 3. An example of the cluster analysis dendrogram using Sorensen's distance measure and flexible beta linkage method, showing the relationship of individual samples and their final alliance names to the cluster breaks. 34
Table 1 35

KEY 53

Table 2: Field key to the defined vegetation associations of The Santa Monica Mountains and Simi Hills area, Ventura and Los Angeles Counties, California. 54

TREE OVERSTORY VEGETATION DESCRIPTIONS 94

Alnus rhombifolia-Platanus racemosa Woodland/Forest Association 94
Eucalyptus Woodland/Forest Alliance 98
Juglans californica/Annual Grass-Herb Woodland/Forest Association 101
Juglans californica/Artemisia californica/Leymus condensatus Woodland/Forest Association 104
Juglans californica/Ceanothus spinosus Woodland/Forest Association 107
Juglans californica/Heteromeles arbutifolia Woodland/Forest Association 110
Juglans californica/Malosma laurina Woodland/Forest Association 113

Platanus racemosa South Coast Intermittent Stream Woodland/Forest Association 116
Platanus racemosa/Annual Grass-Herb Woodland/Forest Association 119
Platanus racemosa-Quercus agrifolia South Coast Woodland/Forest Association 123
Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana South Coast Woodland/Forest Association 126
Platanus racemosa-Quercus agrifolia-Salix lasiolepis Woodland/Forest Association 130
Quercus agrifolia South Coastal Woodland/Forest Association 134
Quercus agrifolia/Adenostoma fasciculatum Woodland/Forest Association .. 137
Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association 140
Quercus agrifolia/Ceanothus spinosus Woodland/Forest Association 144
Quercus agrifolia/Heteromeles arbutifolia Woodland/Forest Association 147
Quercus agrifolia/Quercus berberidifolia Woodland/Forest Association 150
Quercus agrifolia/Salvia leucophylla-Artemisia californica Woodland/Forest Association 153
Quercus agrifolia/Toxicodendron diversilobum Woodland/Forest Association 156
Quercus agrifolia-Juglans californica Woodland/Forest Association 160
Quercus agrifolia-Salix lasiolepis Woodland/Forest Association 163
Quercus agrifolia-Umbellularia californica Woodland/Forest Association 166
Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association 170
Quercus lobata/Annual Grass-Herb Woodland/Forest Association 174
Quercus lobata-Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association 177
Quercus lobata-Salix lasiolepis Woodland/Forest Association 180
Salix laevigata-Salix lasiolepis Woodland/Forest Sub-alliance 184
Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/Annual Grass-Herb Woodland/Forest Association 187
Salix laevigata-Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association 191
Salix lasiolepis Woodland/Forest Alliance 194
Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association 198
Salix lasiolepis/Malosma laurina Woodland/Forest Association 201
Schinus molle Woodland/Forest Alliance 204
Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association 207
Umbellularia californica-Alnus rhombifolia Woodland/Forest (provisional) Association 210
Umbellularia californica-Juglans californica/Ceanothus spinosus Woodland/Forest Association 214
Umbellularia californica-Platanus racemosa Woodland/Forest Association .. 217

SHRUB OVERSTORY VEGETATION DESCRIPTIONS 220

Adenostoma fasciculatum-Ceanothus megacarpus Shrubland Association .. 223
Adenostoma fasciculatum-Eriogonum fasciculatum Shrubland Association . 226
Adenostoma fasciculatum-Malosma laurina Shrubland Association 229
Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium/ Annual Grass-Herb Shrubland Association 232
Adenostoma fasciculatum-Mimulus aurantiacus Shrubland Association 235
Adenostoma fasciculatum-Salvia leucophylla Shrubland Association 238
Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius Shrubland Association 241
Adenostoma fasciculatum-Arctostaphylos glandulosa Shrubland Association 244
Adenostoma fasciculatum-Arctostaphylos glauca Shrubland Association 247
Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina Shrubland Association 250
Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina Shrubland Association 253
Adenostoma fasciculatum-Salvia mellifera Shrubland Association 256
Adenostoma fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association 259
Adenostoma fasciculatum-Salvia mellifera-Rhus ovata Shrubland Association 262
Adenostoma sparsifolium Shrubland Alliance 265
Arctostaphylos glandulosa Shrubland Alliance 268
Arctostaphylos glauca Shrubland Alliance 271
Artemisia californica Shrubland Association 274
Artemisia californica/Leymus condensatus Shrubland Association 278
Artemisia californica-Eriogonum cinereum Shrubland Association 281
Artemisia californica-Mimulus aurantiacus Shrubland Association 284
Artemisia californica-Eriogonum fasciculatum/Annual Grass-Herb Shrubland Association 288
Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla Shrubland Association 292
Artemisia californica-Eriogonum fasciculatum-Salvia mellifera Shrubland Association 295
Atriplex lentiformis Shrubland Alliance 298
Baccharis pilularis/Annual Grass-Herb Shrubland Association 301
Baccharis pilularis-Artemisia californica Shrubland Association 304
Baccharis salicifolia Riparian Shrubland Association 308
Ceanothus crassifolius Shrubland Association 311
Ceanothus crassifolius-Malosma laurina Shrubland Association 314
Ceanothus cuneatus-Quercus berberidifolia Shrubland Association 317
Ceanothus megacarpus Shrubland Association 320
Ceanothus megacarpus-Adenostoma fasciculatum Shrubland Association .. 324

Ceanothus megacarpus-Adenostoma sparsifolium Shrubland Association ..327
Ceanothus megacarpus-Cercocarpus betuloides Shrubland Association 330
Ceanothus megacarpus-Malosma laurina Shrubland Association 333
Ceanothus megacarpus-Salvia mellifera Shrubland Association 336
Ceanothus oliganthus Shrubland Association 339
Ceanothus oliganthus-Adenostoma sparsifolium Shrubland Association.....342
Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata Shrubland Association.....345
Ceanothus oliganthus-Quercus berberidifolia Shrubland Association 348
Ceanothus spinosus Shrubland Association 351
Ceanothus spinosus-Ceanothus megacarpus Shrubland Association 355
Cercocarpus betuloides Shrubland Association 358
Cercocarpus betuloides-Adenostoma fasciculatum Shrubland Association ..361
Cercocarpus betuloides-Ceanothus spinosus Shrubland Association.....364
Cercocarpus betuloides-Malosma laurina-Artemisia californica Shrubland Association.....367
Coreopsis gigantea-Artemisia californica-Eriogonum cinereum Shrubland Association.....370
Coreopsis gigantea-Ericameria ericoides-Encelia californica Shrubland Association.....373
Dendromecon rigida Shrubland Alliance 376
Encelia californica Shrubland Association.....379
Encelia californica-Artemisia californica Shrubland Association.....382
Encelia californica-Eriogonum cinereum Shrubland Association.....386
Encelia californica-Malosma laurina-Salvia mellifera Shrubland Association 389
Encelia californica-Rhus integrifolia Shrubland Association 392
Eriogonum cinereum Shrubland Association.....395
Eriogonum fasciculatum Shrubland Association.....398
Eriogonum fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association.....402
Eriogonum fasciculatum-Salvia apiana Shrubland Alliance.....405
Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata Shrubland 409
Hazardia squarrosa-Artemisia californica Shrubland Association 412
Heteromeles arbutifolia-Malosma laurina Shrubland Association 415
Lepidospartum squamatum Shrubland Alliance 419
Lotus scoparius Shrubland Association.....422
Malacothamnus fasciculatus Shrubland Association.....425
Malacothamnus fasciculatus-Ceanothus megacarpus Shrubland Association 428
Malacothamnus fasciculatus-Ceanothus spinosus Shrubland Association ...431
Malacothamnus fasciculatus-Malosma laurina Shrubland Association 434
Malacothamnus fasciculatus-Salvia leucophylla Shrubland Association 437
Malacothamnus fasciculatus-Salvia mellifera Shrubland Association 440
Malosma laurina Shrubland Association 443
Malosma laurina-Artemisia californica Shrubland Association 447

Malosma laurina-Eriogonum cinereum Shrubland Association 450
Malosma laurina-Eriogonum fasciculatum Shrubland Association 454
Malosma laurina-Rhus ovata-Ceanothus megacarpus Shrubland Association 457
Malosma laurina-Salvia mellifera Shrubland Association 460
Mesembryanthemum spp. - Carpobrotus spp. Semi-natural Shrubland Alliance 463
Mimulus aurantiacus Shrubland Association 467
Opuntia spp.-Mixed Coastal Sage Scrub Shrubland Association 471
Prunus ilicifolia-Heteromeles arbutifolia Shrubland Association 475
Quercus berberidifolia Shrubland Association 479
Quercus berberidifolia-Ceanothus spinosus Shrubland Association 483
Quercus berberidifolia-Adenostoma fasciculatum Shrubland Association.....486
Quercus berberidifolia-Cercocarpus betuloides Shrubland Association 490
Quercus wislizenii var. frutescens Shrubland Alliance 494
Rosa californica Shrubland Alliance 497
Rhus integrifolia Shrubland Association 500
Rhus integrifolia-Artemisia californica-Eriogonum cinereum Shrubland Association 504
Rhus integrifolia-Opuntia spp.-Eriogonum cinereum Shrubland Association 507
Rhus ovata Shrubland Association.....510
Rhus ovata-Salvia leucophylla-Artemisia californica Shrubland Association.513
Salix exigua Shrubland Alliance 516
Salvia leucophylla Shrubland Association 520
Salvia leucophylla- Artemisia californica Shrubland Association 524
Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella spp. Shrubland Association 528
Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb Shrubland Association 532
Salvia mellifera Shrubland Association 535
Salvia mellifera-Eriogonum cinereum Shrubland Association 539
Salvia mellifera-Malosma laurina Shrubland Association 542
Salvia mellifera-Rhus ovata Shrubland Association 546
Salvia mellifera-Artemisia californica Shrubland Association 549
Sambucus mexicana/Leymus condensatus-Annual Herb Shrubland Association 552
Sambucus mexicana-Heteromeles arbutifolia/Annual Grass-Herb Shrubland Association 556
Spartium junceum Shrubland Alliance.....559
Toxicodendron diversilobum-Artemisia californica/Leymus condensatus Shrubland Association 562
Toxicodendron diversilobum-Mimulus aurantiacus Shrubland Association ...565
Venegasia carpesioides Shrubland Alliance 568

HERBACEOUS VEGETATION DESCRIPTIONS 572

Arundo donax Herbaceous Alliance 572
Avena fatua Herbaceous Association 575
California Annual Grassland/Herbaceous Alliance 578
Brassica nigra Herbaceous Association 579
Brassica nigra-Bromus diandrus Herbaceous Association 582
Brassica nigra-Centaurea melitensis Herbaceous Association 586
Bromus diandrus Herbaceous Association 590
Bromus diandrus-Avena spp. Herbaceous Association 593
Distichlis spicata-Ambrosia chamissonis Herbaceous Association 597
Distichlis spicata-Salicornia virginica-Jaumea carnosa Herbaceous Association 600
Euphorbia terracina Herbaceous Stands 603
Foeniculum vulgare Herbaceous Alliance 607
Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia spp. Herbaceous Association 610
Juncus effusus Herbaceous Alliance 613
Lepidium latifolium Herbaceous Association 616
Leymus condensatus Herbaceous Association 619
Leymus triticoides Herbaceous Alliance 622
Lolium multiflorum Herbaceous Association 626
Nassella lepida Herbaceous Alliance 629
Nassella pulchra Herbaceous Alliance 632
Nassella pulchra-Hazardia squarrosa Herbaceous Association 633
Pennisetum setaceum Herbaceous Alliance 637
Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina Herbaceous Association 638
Phalaris aquatica Herbaceous Alliance 641
Salicornia virginica/Algae Herbaceous Association 644
Salicornia virginica-Brassica nigra Herbaceous Association 647
Salicornia virginica-Frankenia salina-Suaeda taxifolia (synonym Suaeda californica var. taxifolia) Herbaceous Association 650
Salicornia virginica-Salicornia subterminalis Herbaceous Association 653
Scirpus acutus-Scirpus californicus Herbaceous Alliance 656
Selaginella bigelovii/Eriogonum fasciculatum Association 659
Typha sp. Herbaceous Alliance 663

LITERATURE CITED 666

APPENDIX 1. Vegetation sampling protocols and field forms. 677

INTRODUCTION

The U.S. Geological Survey (USGS) and National Park Service (NPS) formed a partnership in 1994 to map the vegetation of the United States National Park system units using The Nature Conservancy's National Vegetation Classification, a standard for reporting vegetation information among federal agencies (Grossman et al. 1998). Goals of the projects include providing baseline ecological information to resource managers in the parks; putting the data into regional and national contexts; and providing opportunities for future inventory, monitoring, and research activities. Each park developing a vegetation map follows a standardized field sampling and vegetation classification protocol to document the various vegetation types found in that park. This information is used by photointerpreters to delineate polygons of vegetation communities, which are subsequently subjected to an accuracy assessment process (USGS 1994). The final products consist of a vegetation map, descriptions of each vegetation type, a key to each type, and all related data and metadata files (original field forms, plot database, accuracy assessment points, etc.). This report presents the work at the Santa Monica Mountains National Recreation Area (NRA) (park code: SAMO) and environs conducted from 2001 to 2005.

The Santa Monica Mountains in Context

The Santa Monica Mountains are not only the most accessible and largest piece of natural land adjacent to the western Los Angeles Basin but also play an important role in the panoply of vegetation in southern coastal California. Fire history, soil differences, a variety of moisture regimes, and topography all combine to create complex patterns of woodland, chaparral, coastal scrub, and grassland vegetation. The mountains are home to several locally common but regionally restricted species (such as *Ceanothus spinosus, C. megacarpus, Eriogonum cinereum,* and *Coreopsis gigantean*), each because of its high sociability and abundance defines its own suite of vegetation types. Other alliances defined by *Encelia californica, Salvia leucophylla, Juglans californica,* and *Rhus integrifolia* are widespread in southern coastal California but display a concentrated distribution and a broader variation of vegetation associations here than anywhere else.

The Santa Monica Mountains are the westernmost and lowest of the transverse ranges of southern California. They have small stands of high-elevation chaparral alliances such as *Quercus wislizeni* var. *frutescens* and *Arctostaphylos glandulosa,* remnants of a cooler and perhaps moister climate. However, they are tall enough to sustain a more extensive presence of some higher-elevation chaparral alliances such as *Ceanothus oliganthus* and *Adenostoma sparsiflora*.

They also contain the southernmost viable stands of *Quercus lobata* woodlands in California and among the largest remaining woodlands of *Juglans californica*.

The seaward bases of the mountains have Baja, California-like succulent coastal scrub including stands of *Opuntia littoralis, O. oricola,* and *O. prolifera* along with drought deciduous scrubs including *Salvia leucophylla, Artemisia californica,* and the largely insular *Coreopsis gigantea.* The core of the mountains includes thousands of acres and varied examples of *Ceanothus spinosus* and *C. megacarpus* alliances, both representing the center of their world distribution.

Riparian vegetation includes extensive woodlands of *Platanus racemosa, Salix lasiolepis,* and *S. laevigata,* which often interface with lower slope woodlands of *Quercus agrifolia, Juglans californica,* and *Umbellularia californica*. Further south, the latter two alliances diminish significantly, thus signifying the biogeographic role of the Santa Monica Mountains as crossroads between northern and southern California coastal vegetation.

Background and Standards

The U.S. National Vegetation Classification (USNVC) applied throughout this report was developed by NatureServe in partnership with the network of State Natural Heritage Programs (under the guidance of The Nature Conservancy). Additional support was provided by federal agencies and the Ecological Society of America. A first edition of the classification has been released that provides a thorough introduction to the classification, its structure, and the list of vegetation units known in the United States as of April 1997 (Grossman et al. 1998). Refinements to the classification have been occurring in the application process, leading to ongoing proposed revisions that are reviewed both locally and nationally. These refinements are best seen using the NatureServe Web site at http://www.natureserve.org/explorer/.

Vegetation mapping in national parks has been done under the auspices of the NPS Inventory and Monitoring Program, in close cooperation with the USGS Biological Resources Division. The mapping is done in accordance with standards established by the Federal Geographic Data Committee (FGDC) for vegetation mapping on federal lands. The FGDC Web site (http://www.fgdc.gov/standards/standards_publications/index_html) explains the development of the classification standards currently used for mapping and classifying vegetation in national park. The USGS Biological Resources Division—NPS Vegetation Mapping project Web site (http://biology.usgs.gov/npsveg/standards.html) has additional information on vegetation mapping in national parks.

The development of a vegetation classification and concomitant map is a complex project. Not all vegetation types are equally mappable at a certain scale. Coordination between the vegetation classification team and the aerial photointerpreters is needed to resolve the best way to map the types, whether directly at the finest association level, at the higher-classification levels (such as at the alliance), or as a mosaic or complex. Thus, not all types described in this report are necessarily mapped directly. A separate report documents the link between the mapping and the field-based vegetation classification (AIS 2005, in preparation).

Initially in the mid 1990s, several California parks were chosen by USGS-NPS to be part of the prototype phase of the program representing different regions, environmental conditions, and vegetation types. The initial goal of the prototype phase is to "develop, test, refine, and finalize the standards and protocols" to be used during the production phase of the project. The program includes the development of a standardized vegetation classification system for each park and the establishment of photointerpretation, field sampling, and accuracy assessment procedures. Following initial projects of classification and mapping of Point Reyes National Seashore (2003), Golden Gate National Recreation Area (2003), Yosemite National Park (2003), Joshua Tree National Park (2005), and Sequoia National Park (2004), the decision to develop a map was made by SAMO staff based on (1) a desire to maintain consistency with the work done at these other parks, (2) the quality of the work performed at these parks, and (3) sufficient development and testing (proven application) of protocols and procedures.

SAMO is situated in an urban-wildland interface in the south coastal portion of Southern California. As such, it is the first national park unit to be mapped and classified in California where fire management and fuels prediction attain such a critical level. Funding for this project came largely from the NPS Fire Management Program. Results from this report and the associated vegetation map are expected to inform fire management decisions for SAMO and the adjacent areas. Because ownership is complex in the Santa Monica Mountains, the park determined that a complete classification and map of the environs of the entire area were necessary to properly deal with integrated management issues.

The area in this study covers approximately 350,000 acres and stretches from Point Mugu and the associated Mugu Lagoon tidal marsh on the west to Griffith Park in the city of Los Angeles to the east. It reaches from Point Dume and Malibu on the south to the Simi Hills and Montcleff Ridge on the north (figure 1).

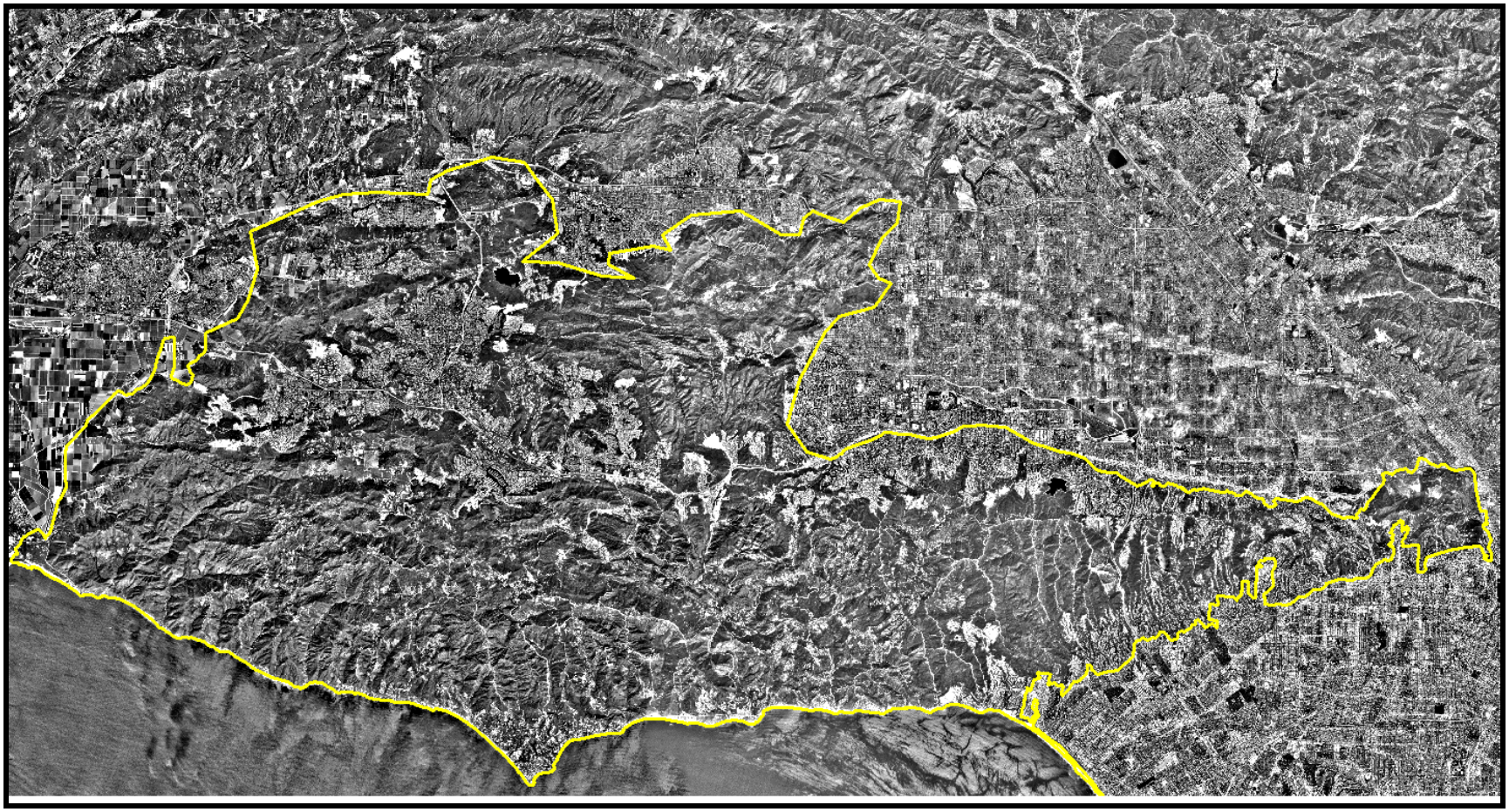


Figure 1: Shown is a SPOT 2002 satellite image of Santa Monica Mountains with the study area boundary in yellow. Note the large expanse of urban to the northeast and southeast and mix of agriculture and urban to the west and north. This image is best viewed at 300–400 percent of current scale.

The Santa Monica Mountains NRA extends 46 miles from the Hollywood Bowl to Point Mugu in Ventura County. It also runs along the coastline from the Santa Monica Pier west past Malibu. The U.S. Congress created the Santa Monica Mountains National Recreation Area in 1978 and charged NPS with supporting a shared management of the park. NPS, State Parks, and the Santa Monica Mountains Conservancy jointly administer the public parklands of the area. In the immediate vicinity of the park live approximately 17 million people.

With respect to landowners, the California State Parks is the largest landowner within the recreation area with 42,000 acres. However, approximately half the land in the recreation area is privately owned and more than 70 government entities have jurisdiction within the boundary. The city of Malibu is entirely within the park's boundary. The recreation area is approximately154,000 acres. However, in an effort to develop an ecologically realistic and managerially usefull map, more than double that area has been included in this study.

This report outlines and describes the project timeline, vegetation classification methodologies, sampling criteria, and data analysis procedures implemented in creating the final vegetation layer for SAMO. It describes the result of this classification process in terms of a formal classification list, key, and description of all vegetation types identified during this process.

Funds for this project were provided by the National Park Service Fire Management Program, National Park Service Inventory and Monitoring Program, Mountains Recreation and Conservation Authority (Santa Monica Mountains Conservancy), United States Army Corps of Engineers, and the Resource Management Agency of Ventura County. Initial funding for the project was received in 2001 and a contract was entered into with ESRI to develop a vegetation classification and map. Primary responsibility for development of the classification was assigned to Todd Keeler-Wolf (California Department of Fish and Game [CDFG], California Heritage Program senior vegetation ecologist) and Julie Evens (California Native Plant Society [CNPS] vegetation ecologist). John Tiszler served as the NPS contracting officer's technical representative and project manager. NPS assumed responsibility for field data collection, vegetation database management, and statistical analyses.

As the contract for the classification and portion of the project was developed, NPS worked with ESRI as the principal contractor and ESRI subcontracted with the California Native Plant Society via the California Heritage Program ecologist (housed at California Department of Fish and Game), representing NatureServe in California. ESRI also subcontracted with Aerial Information Systems of

Redlands, California, to produce the map driven by the classification developed by CNPS and CDFG.

The primary motivation for this project was to produce a new vegetation classification and map that meets NPS and USNVC standards and to provide the information base necessary to develop effective fire hazard management strategies while fully protecting natural resource values. In addition, we anticipate the classification and map will have many uses for the numerous public planning and land conservation agencies with jurisdiction in the Santa Monica Mountains and Simi Hills. The classification and map will provide a highly detailed spatial assessment of native vegetation and, as such, will be a valuable planning tool where habitat connectivity, sensitive vegetation types, and protection of designated Ecologically Significant Habitat Areas are of concern. The capacity to make local vegetation management and other land-use decisions will be greatly improved.

The principal needs for this mapping project were the following:

- Implement a GIS-based, gradient-directed transect (GRADSECT) approach for sampling.

- Integrate the vegetation sampling process with the photointerpretation process so a seamless, mutually beneficial feedback loop would develop, with the field crews providing information to the mapping team at the same time mappers would be supporting decisions by field crews about where and what to sample.

- Integrate any existing or ongoing vegetation data with the necessary field data to be collected during this project into a unified vegetation classification that would be used for the final vegetation description and vegetation mapping products.

- Work with the unique characteristics of a chaparral and coastal sage scrub and develop the best methods for detailed classification and mapping of this vegetation.

- Work within a complex urban-wildland area surrounded on all sides by major population centers to develop a detailed classification and map that would address many key issues of urban-wildland vegetation management.

The scientific purpose of developing the classification for the area to be mapped was to integrate a large amount of new information into California's vegetation

classification and USNVC. This report provides the basis to achieve that goal. By standardizing the reporting structure of each new classification unit, NatureServe will be able to integrate this information into the national vegetation classification.

This project was the first effort to extensively employ the CNPS Rapid Assessment Vegetation Sampling Protocol, as seen through the following link: http://www.cnps.org/programs/vegetation/protocol.htm. This technique was selected in addition to the standard accuracy assessment sampling protocol and the relevé sampling protocol used regularly by the National Park vegetation program because of its ability to represent large numbers of vegetation stands quickly, thus increasing the sample size and range of sampling locations for all types of vegetation. The rapid assessment protocol was expected to be an efficient way to inventory many dense and difficult to penetrate stands of chaparral and coastal scrub, where the species indicative of particular ecological settings are primarily in the shrub layer and not in the understory herb and grass layer. It was used extensively in virtually all types of vegetation in this project except for the species-rich riparian, oak, and other hardwood woodlands; coastal sage scrub; and grasslands in which releves were used to augment the samples. The diversity of species and the more significant variation of understory species in these situations require a full sample of all species present to more accurately classify and understand the variations in these types of vegetation. For a thorough explanation of the protocol see appendix 1.

NPS Field Crew and Supporting Staff

Five crew members were hired or reassigned by the park in the summer of 2003. They were James Anderson, Rachel Buchwalter, Julie Christian, Charles Hohn, and Mike McGraw. Park staff Brendan Clark and Tarja Sagar also assisted with surveys on an intermittent basis. Christian served as crew leader and was responsible for scheduling and assignment of all field and laboratory activities. Buchwalter left the project in 2003, and the crew continued as four members with intermittent staff support until field sampling was completed. In total, more than 6,700 vegetation stands were visited to obtain information necessary for classification and photointerpreter training.

Christian was responsible for management of the vegetation databases including data quality assurance and control. She maintained and updated the metadata that recorded changes to the evolving classification. She also organized data into formats suitable for statistical analysis. Park GIS analyst Robert Taylor performed the statistical analyses with support from Christian.

Timeline

2001

From June 18–20, an initial reconnaissance of the SAMO area was conducted by the CDFG state ecologist and the principal ecologist of the park. An initial classification list was developed following that meeting. Aerial photography was acquired in July 2001.

On November 8, a meeting was held at SAMO to bring together the project team members from the NatureServe, ESRI, AIS, and CDFG as well as other outside participants knowledgeable in the vegetation of the Santa Monica Mountains. This meeting focused primarily on discussing the Vegetation Inventory and Mapping Program, existing park data, logistics, and park-specific issues. A general overview of the project and processes involved was outlined.

2002

In February, the CDFG state ecologist met with the SAMO GIS staff to begin developing a gradient-directed approach to identifying initial sampling and mapping areas in the park. This work was continued through mid-March by the SAMO GIS staff.

Beginning in March, reconnaissance trips including the photointerpreters from AIS, park ecologists, and CDFG state ecologist began. These were two- to three-day trips that were intended to augment the preliminary vegetation classification and familiarize the air photointerpreters with the vegetation of the region. Each trip focused on a separate portion of the study area.

The second reconnaissance trip was conducted from April 22–24, followed by the subsequent revision of the preliminary classification. The CNPS vegetation ecologist joined the team of AIS, CDFG state ecologist, and the SAMO field team and associated park ecologists. The third reconnaissance trip was conducted in June and consisted of the same members.

The vegetation sampling field crew was hired in July 2002 and served through completion of the vegetation classification in January 2005. Training of crews in the use of the rapid assessment sampling protocol was conducted in July by the CDFG state ecologist and assistant ecologist, Diana Hickson.

The fourth reconnaissance trip was conducted in early September, followed by subsequent revision of the preliminary classification. Training for releve and accuracy assessment sampling protocols was conducted in early December.

2003

In March, the fifth reconnaissance trip was conducted, followed by subsequent revision of the preliminary classification.

In July, the first intensive analysis of 11 months (1,807 individual samples) of rapid assessment plots was conducted. Data was prepared by Julie Christian, and initial TWINSPAN and cluster analyses were run by Robert Taylor with assistance from Julie Evens and Todd Keeler-Wolf. Three days of intensive analysis were conducted by this group with assistance in local interpretation by all members of the field crew. Following this classification, a meeting with the photointerpreters was held to translate the vegetation classification to an updated mapping classification.

In August, a revised classification list was produced using the existing and newly adjusted recommended sample sizes of vegetation types to fully represent the vegetation categories established and assumed to occur.

In the last five months of 2003 and the first few months of 2004, vegetation data collection emphasized more accuracy assessment and releve samples.

2004

In June, an intensive analysis of the full dataset of 3,790 rapid assessments, accuracy assessments, and 122 releves was undertaken in a meeting between CDFG, CNPS, and SAMO ecologists. Prior to the meeting, Taylor and Christian undertook the data preparation and initial cluster analysis runs for the rapid assessment data, and CNPS ecologists Klein and Evens undertook the analysis for the relevé data. This analysis meeting was followed by several more days of intensive analysis by CDFG and CNPS to produce the full classification. In November and December, this classification was simplified and some initial types were reduced to synonymy or subcategories of associations called phases, with consulatation with Gwen Kittel, NatureServe's regional ecologist.

2005

In January, the classification was finalized, and description format was decided upon by all of the collaborators. Descriptions were begun by CNPS with assistance from NatureServe (and Nature Conservancy subcontractor) and CDFG. In April, all initial description data was summarized.

In June, all full descriptions were written and submitted for review, and in July to December 2005, the report was reviewed by SAMO staff and finalized January 2006.

METHODS

Gradient-Directed Sample Allocation

To strategically assess the vegetation of the area, an interactive process was developed between the SAMO field sampling team and the aerial photointerpreters at AIS. This revolved around the selection of individual subareas centered on 180 aerial photos at 1:12,000 scale from the study area. Each of these subareas was selected through a GIS analysis of the environmental variables thought to drive the distribution of the principal vegetation types in the area. Denise Kamradt and Robert Taylor of SAMO and Todd Keeler-Wolf of CDFG met and developed the criteria based on a combination of geologic, precipitation, temperature, and solar insolation (based on slope and aspect) information available in the SAMO GIS files. Specifically the process included three main components:

1. Classifiying a March solar radiation layer into three classes. A 900-meter grid was created over the study area with all grid cells that did not contain all three solar radiation classes removed. This is the radiation_variety grid.

2. Classifiying and combining layers for (a) fire history, (b) geology, (c) average annual precipitation, and (d) average maximum July temperature.

   The resulting layer was a raster with a 30-meter cell that was modified in the following way:

   - Masked out cells that were not on public land
   - Masked out cells that fell within the larger 900-meter radiation_variety, where not all three solar radiation categories were represented

3. From the resulting layer, a list of all unique combinations of the four input layers was developed and modified in the following way:

   - Masked out cells for unique combinations with fewer than 900 cells each
   - Converted grid to point layer

The result is the GRADSECT layer. From the GRADSECT layer, one point was randomly selected for each unique combination of the four input layers.The result was a table of 93 "GRADSECT" points. These points became the core of initial sample selection for the field crew and also were expanded upon for further sampling later in the field seasons of 2002 and 2003. Broader interpretation of the environmental variables developed from the GRADSECT analysis resulted in the development of an ecological subregionalization of the study area.

The first cut of climate and geology produced a total of seven general subregions (figure 2). These regions are briefly described below. The photointerpretation team selected 180 aerial photographs that were considered representative of each of these subregions. For each of 180 aerial photos selected as the first phase of development, a number of possible sampling locations in parklands were selected representing the range of environmental conditions found in the analysis.

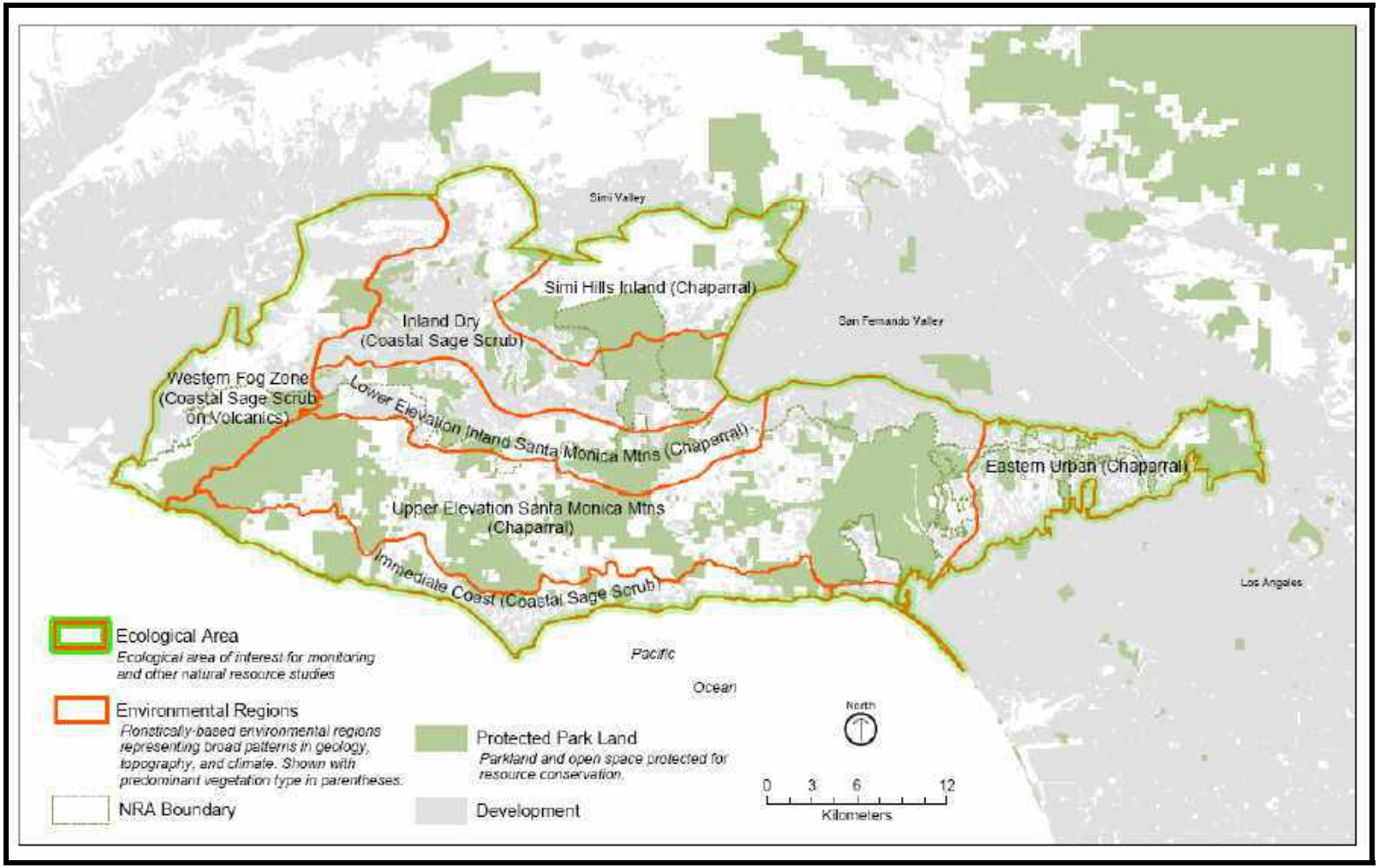

Simi Valley
Simi Hills Inland (Chaparral)
Inland Dry
(Coastal Sage Scrub)
San Fernando Valley
Western Fog Zone
(Coastal Sage Scrub
on Volcanics)
Lower Elevation Inland Santa Monica Mtns (Chaparral)
Eastern Urban (Chaparral)
Upper Elevation Santa Monica Mtns
(Chaparral)
Immediate Coast (Coastal Sage Scrub)
Los Angeles
Pacific
Ocean
Ecological Area
Ecological area of interest for monitoring and other natural resource studies
Environmental Regions
Floristically-based environmental regions representing broad patterns in geology, topography, and climate. Shown with predominant vegetation type in parentheses.
NRA Boundary
Protected Park Land
Parkland and open space protected for resource conservation.
Development
North
0 3 6 12
Kilometers

Figure 2. Ecological Regions Identified for Vegetation Assessment

The following descriptions serve as brief characterizations of each of these seven regions.

Region 1

Title: Western Fog Zone (CSS on Volcanics)
General Location: Far West End of Range as Hits Oxnard Plain
Ave-Hi/Low Summer Temp: (Camarillo) 75/55
Ave-Hi/Low Winter Temp: 65/45, Records Below 32
Fog Description: Often Foggy, Possible Year-Round
Precipitation: 10–15", Lower than Region 2
Geology: Igneous > Quaternary >> Low Sedimentary
Soil: Incomplete, Coastal Sage > Igneous Chaparral
Elevation Range: 0–1800'

Region 2

Title: Immediate Coast (CSS)
General Location: East-West Band along Immediate Coast, South-Facing Slope of Mountains
Ave-Hi/Low Summer Temp: (Malibu) 70/60
Ave-Hi/Low Winter Temp: 65/50, No Record Lows Below 32
Fog Description: Often Foggy, Possible Year-Round
Precipitation: 15–18", Higher than Region 1
Geology: Sedimentary >> Quaternary ~ Igneous
Soil: Coastal Sage > Sedimentary Chaparral > Coastal Terrace > Sandstone Chamise/Chaparral > Igneous Chaparral
Elevation Range: 0–1500'

Region 3

Title: Upper Elevation Santa Monica Mountains (Chaparral)
General Location: South-Facing Slope of Mountains, Mid to Top
Ave-Hi/Low Summer Temp:
Ave-Hi/Low Winter Temp:
Fog Description: Mostly Spring
Precipitation: 18–23", 28" at Highest Elevations
Geology: Sedimentary > Igneous >> Quaternary
Soil: Sedimentary Chaparral ~ Sandstone Chamise/Chaparral ~ Igneous Chaparral
Elevation Range: 1000–3100'

Region 4

Title: Lower Elevation Inland Santa Monica Mountains (Chaparral)
General Location: North-Facing Slope of Mountains, Mid-Lower
Ave-Hi/Low Summer Temp: (Newbury Park) 80/50, Record Highs in 100s
Ave-Hi/Low Winter Temp: 70/40, Record Lows in Lower 20s
Fog Description: Usually in Spring
Precipitation: 18"
Geology: Igneous > Sedimentary > Quaternary
Soil: Incomplete, Igneous Chaparral > Marine Sedimentary >> Coastal Terrace
Elevation Range: 1000–2000'

Region 5

Title: Inland Dry (CSS)
General Location: South-Facing Slope of Simi Hills, Lower Slope
Ave-Hi/Low Summer Temp: (Thousand Oaks + Moorpark) 90/55, Record Highs in 110s
Ave-Hi/Low Winter Temp: 70/40, Record Lows in 20s (Moorpark is a bit more mild.)
Fog Description: Spring Only
Precipitation: 13–18"
Geology: Sedimentary > Quaternary > Igneous
Soil: Incomplete, Marine Sedimentary
Elevation Range: 900–1800'

Region 6

Title: Simi Hills Inland (Chaparral)
General Location: Simi Hills, Mid to Top Slope
Ave-Hi/Low Summer Temp:
Ave-Hi/Low Winter Temp:
Fog Description: Spring, Early Summer
Precipitation: 18"
Geology: Almost Exclusively Sedimentary >>> Igneous = Quaternary
Soil: Incomplete, Marine Sedimentary
Elevation Range: 900–2400'

Region7

Title: Eastern Urban (Chaparral)
General Location: Far East, Urban
Ave-Hi/Low Summer Temp: (Beverly Hills) 75/60, Record Highs in 100s

Ave-Hi/Low Winter Temp: 65/50, Record Lows in Mid 30s
Fog Description: Unknown
Precipitation: 18–22"
Geology: Sedimentary > Igneous > Metamorphic >> Quaternary
Soil: Incomplete, Sedimentary Chaparral/Urban Land, Urban Land
Elevation Range: 400–1750'

Sources used to define these regions include the following:

Precipitation

This layer represents lines of equal rainfall (isohyets) based on long-term mean annual precipitation data compiled from USGS, California Department of Water Resources, and California Division of Mines map and information sources. Source maps are based primarily on U.S. Weather Service (USWS) data for approximately 800 precipitation stations. In the Los Angeles and San Francisco Bay areas, the USWS data has been supplemented by county and local agency precipitation data. The data was collected over a 60-year period (1900-1960). Minimum mapping unit is 1,000+ acres. The isohyetal contour intervals differ because of the degree of variation of annual precipitation with horizontal distance.

Geology

Existing USGS digital ArcInfo coverages were downloaded from the Southern California Aerial Mapping Project (SCAMP) subheading on the Western Region Digital Geologic home page (http://geology.wr.usgs.gov/wgmt/scamp/la/laquad.html) and imported into ArcInfo. Each quadrangle on the SCAMP page has separate digital data layers available describing the bedrock and superficial geology, structural geology, and paleontological resources of the area. Only bedrock and superficial geologic information was acquired and processed by the National Park Service.

Soil

1970, USDA Soil Conservation Service, "Soil Survey, Ventura Area, California"
1967, USDA Soil Conservation Service, "Soils of the Malibu Area, California"

Temperature
www.weather.com

Within each of these seven regions, a representative proportion of the total 180 photos was selected based on the aerial extent and ecological diversity of each

subregion. Within each of the areas covered by these individual air photos, a random selection of points was made that focused on the variety of solar insolation settings within them. These points were given to the field crews as a set of possible choices to visit for individual field sampling. All selected sample locations were restricted to parkland.

Field Sampling

A preliminary classification was developed (see Existing Literature Review section below) following the reconnaissance trips and given to the Park vegetation sampling crew to assist them in identifying individual stands for rapid assessment or releve sampling. This classification list was used in conjunction with the ongoing photointerpretation work by the photointerpretation contractor, Aerial Information Systems. The interplay between the photointerpreters and the field crew included requests by AIS for field identification of representative photo signatures. These were accomplished in either rapid assessment or less complete reconnaissance-level field checks, where the main species and the preliminary classification name of individual stands were delivered to AIS. The data sharing between the field crews and the photointerpreters was one of the key points in this vegetation mapping effort. Compared to earlier National Park mapping efforts in California, it attained much higher levels of refinement and cooperation.

Field crews relied on the photointerpreters for preliminary delineations to assist them in targeting stands to be sampled. Thus, as individual aerial photos were delineated and labeled, field crews would focus on a particular aerial photo to field check, dividing their efforts between rapid assessment, releve, reconnaissance and, as the process ramped-up in the later phases of fieldwork, more accuracy assessment fieldwork. The latter sampling was done and then withheld from the photointerpreters until the completion of their work to apply a nonbiased way to test the accuracy of their work. More detailed descriptions of this process may be found in the final report by the photointerpreters.

Vegetation Sampling and Classification

Existing Literature Review

Beginning in early April 2003, information from a California vegetation classification (Sawyer and Keeler-Wolf 1995), recent classifications for adjacent areas of southern California (CDFG 1998, Borchert et al. 2004, then in draft form, Gordon and White 1994), and other existing literature were reviewed to obtain a current view of the local vegetation with respect to the National Vegetation Classification (Grossman et al. 1998). This information was compiled into a

preliminary, floristic classification of vegetation at the alliance and association levels. Further, the initial reconnaissance of the study area supplemented this classification. The initial inventory included nearly 100 associations and suggested about 150 alliances in the mapping area.

Data Analysis Process

The sample dataset used for the classification included 3,790 vegetation rapid assessments, which were completed year-round from July 2002 to April 2004, and 122 releve samples, which were completed in the phenologically active periods of spring and summer from February to June 2003. The very large number of samples collected for this project far exceeded any previous study for a given National Park unit. Thus, special techniques were employed to analyze the data. This included an intermediate analysis that informed and refocused the final phase of data collection.

In June 2003, following the first full season of data collection, 1,807 rapid assessment samples were analyzed. This involved three intensive days of progressive fragmentation of cluster analysis and individual plot-by-plot inspection of the results. In addition to Julie Evens and Todd Keeler-Wolf, data analysis was assisted and or performed by Robert Taylor of SAMO, who initially ran the data through TWINSPAN and cluster analysis, and Julie Christian, who performed queries in MS Access to summarize the data and facilitate its interpretation. The 1,807 samples were broken into seven major groups based on their broad relationships within cluster analysis. Each of these major groups was further analyzed, and preliminary association names were revised or substantiated for many of these groups. Following this analysis, it was also possible to review the entire preliminary classification and determine how many samples had been collected for each of the types, and conversely, how many more samples needed to be collected for remaining types not yet adequately sampled.

One year later, more than twice as many samples had been collected by the field crews. Another classification marathon for one week was set up, where the principal data analysis personnel reconvened to analyze approximately 3,915 vegetation samples. In addition to Evens and Keeler-Wolf, Anne Klein, CNPS vegetation ecologist, was employed to assist in the analysis. A similar process was conducted including individual analysis of each plot after they had been divided into progressively smaller and smaller groups based on cluster analysis. A database was built by Christian specifically for tracking the classification results. In this session, approximately 90 percent of the samples were assigned to vegetation types defined by their relationships and similarities.

Following this meeting, another meeting to refine the classification and define the classification units in terms of mapping units for AIS was held at the AIS office in Redlands. The translation of vegetation units to mappable units was largely accomplished. However, additional refinement was needed to finalize the classification.

Keeler-Wolf, Klein, and Evens (the classification team) continued to refine the classification in the fall of 2004. They refined the classification and adjusted some of the finer cluster units of the analysis, proposing that some be aggregated into larger units instead of remaining individual associations. Several detailed meetings of the SAMO ecologists and the CNPS and CDFG ecologists ensued, also involving the regional NatureServe ecologists. In December 2004, a final classification was agreed upon enabling the formal description writing and key development associated with this report.

Cluster Analyses for Vegetation Classification

Following the 2002–2003 sampling effort by the field staff, the rapid assessment and releve data were statistically analyzed. The classification team worked with Robert Taylor and Julie Christian from the SAMO team to classify the data. The analysis was undertaken using the PC-ORD software suite of classification and ordination tools (McCune and Mefford 1997). PC-ORD performs multivariate analyses to place vegetation plot samples into a formalized classification of community types. Using programs such as TWINSPAN (Hill 1979), cluster analysis, and ordination (McCune and Mefford 1997), groups are defined by similarities in species composition and abundance. Since plant community datasets are inherently complex and more than one environmental axis determines the heterogeneity in plant patterns, a hierarchical agglomerative cluster analysis technique was employed with Sorenson distance and flexible beta linkage method at -0.25 (McCune and Grace 2002). The cluster analysis technique was based on abundance (cover) values converted to seven different classes using the following modified Braun-Blanquet (1932/1951) cover categories: 1 = < 1%, 2 = 1–5%, 3 = > 5–15%, 4 = > 15–25%, 5 = > 25–50%, 6 = > 50–75%, 7 = > 75%. The majority of the species values fell within the first four cover classes. Prior to these analyses, data was screened for outliers (extreme values of sampled stands or species), and these outliers were removed to reduce heterogeneity and increase normality in the dataset. Samples that were more than three standard deviations away from the mean were removed using outlier analysis in PC-ORD, and species that were in fewer than three samples were removed.

Because of the size and heterogeneity of the initial dataset, a first-order cluster analysis was used to partition the dataset into more manageable subsets. Thus, the main dataset was broken into distinct, smaller subsets of around 100–200 samples, and these smaller subsets were then individually analyzed by 2–3 teams of ecologists. Subsets of individual smaller cluster groupings usually included distinctly different vegetation types or habitats. A cluster analysis was run separately for the releve data because the species data was collected differently for the releve than for the rapid assessment method (i.e., data on all species found in defined plots for relevés as compared to data on the 10–20 main species found in stands for the other assessments).

After the cluster analyses, Indicator Species Analysis (ISA) was employed to decide objectively what group level(s) to "cut" from the dendrogram and explicitly interpret the groups. Further, ISA was used to designate species that indicate the different groups. ISA produced indicator values for each species in each of the groups within the dendrogram, and these species were tested for statistical significance using a Monte Carlo technique (Dufrene and Legendre 1997). In this case, indicator species with the highest values are the ones that show the highest fidelity for a particular cluster grouping. To attain a high-indicator value, they may be strongly dominant in a particular group or they may be just present consistently in low cover in a group. In general, species with low-indicator values are found commonly in multiple groups and are restricted to none.

For the rapid assessment and accuracy assessment dataset, ISA was repeated at group levels 100 and 250. Group level 100 represents a more generalized view (e.g., indicating only 100 groupings for all of the samples) while group level 250 is a more detailed view of the way all samples are arranged into 250 clusters of related stands. These analyses were evaluated to the total number of significant indicator species (p-value ≤ 0.5) within each group level and the mean p-value for all species. The group level that had the highest number of significant indicators and lowest overall mean p-value was selected for the final evaluations of the community classification (McCune and Grace 2002). At this grouping level, plant community names within floristic classes were applied to the samples of the different groups.

Naming conventions followed the floristic units of "associations," as defined by the National Vegetation Classification System (Grossman et al. 1998) and the California Native Plant Society (Sawyer and Keeler-Wolf 1995). An association is defined by a group of samples that have similar dominant and characteristic species in the overstory and other important and indicator species, whereby these species are distinctive for a particular environmental setting. Further, significant indicator species were drawn from the analysis and applied to the associations. A set of similar associations are grouped hierarchically to the next

level in the classification, the alliance defined as the basic, generic unit of floristic classification, usually by the dominant and/or characteristic plant species in the upper layer of vegetation. For example, different types of coast live oak woodland are classified to the association level depending on the characteristic overstory and understory species (e.g., Coast live oak/Chamise as opposed to Coast live oak/Scrub oak), while there is a coast live oak alliance based on the characteristic presence of coast live oak in the overstory.

The environmental field data collected on rapid assessment surveys is basic and tends to focus on general "hard" variables such as elevation, slope, aspect, soil texture, geology, and so forth (see the protocol in appendix 1).

Associations are usually differentiated by environmental factors as well as floristic characteristics. In vegetation, the arrangement of certain groups of species defining a category of vegetation correlates with a particular set of ecological situations, which may include "hard" or specific climatic and other environmental differences related to temperature, moisture, or soil nutrition; however, it may also imply more vague ecological characteristics such as modes, frequency, and intensity of disturbance. The environmental field data collected on rapid assessment and releve surveys is basic and tends to focus on general "hard" variables such as elevation, slope, aspect, soil texture, geology, and so forth (see the protocols in appendix 1). As definitions were developed, the data analysis team used the correlates to ascertain environmental variables, or lack thereof, to help determine whether or not a particular cluster grouping should be ranked as an association.

These environmental correlates were summarized following the species cluster analysis and are reported for each of the final definitions in this report. As many of the vegetation types defined in this report related to the "softer" variables that may be correlated with successional history following fire or other disturbance, it was difficult to draw specific, strong environmental correlations with many of the types. However, anecdotal comments in the descriptions focus on these when appropriate In cases where there was a group of vegetation samples that appeared somewhat floristically distinct but shared the same environmental characteristics with a larger group of samples, the term "phase" was used. A phase is an informal unit of classification that accommodates local floristic variation that tends to not have obvious correlations with certain environmental conditions, and it is best considered a part of a more definitive association. It probably results from very localized variation in the climate or site history, resulting from local relief, soil texture, geology, fire history, and so forth.

Each sample was revisited within the context of the cluster to which it had been assigned to quantitatively define membership rules for each association. The

membership rules were defined by species constancy, indicator species, and species cover values. Upon revisiting each sample, a few samples were found to be misclassified in earlier fusions of the cluster analysis, and these samples were reclassified based on the membership rules. The set of data collected throughout the study area was used as the principal means for defining the association composition and membership rules; however, existing classifications and floras were consulted to locate analogous/similar classifications or descriptions of vegetation. A summary of the analysis process is provided in the following steps.

1. Screen all sample-by-species data for outliers. Samples (each releve or rapid assessment was considered a "sample") that were more than three standard deviations away from the mean were removed, and species that were in fewer than three samples were removed.

2. Run presence-absence cluster analysis to determine general arrangement of samples.

3. Run cover category cluster analysis to display a more specific arrangement of samples based on species presence and abundance.

4. Run Indicator Species Analysis at each of the successive group levels in the cluster analysis output from two groups up to the maximum number of groups (all groups have at least 2 samples).

5. Settle on the final representative grouping level of each cluster analysis to use in the preliminary labeling.

6. Preliminarily label alliance and association for each of the samples and denote indicator species from the Indicator Species Analysis.

7. Develop decision rules for each association and alliance based on most conservative group membership possibilities based on review of species cover on a sample-by-sample basis.

8. Relabel final alliance for each sample and arrange in table of database.

9. Use decision rules developed in the new data to assign alliance and association names to all analyzed data and all outlier samples removed from the dataset.

Some rare vegetation types were underrepresented in the sampling effort. They were often the only representatives of rare alliances known from areas within the

study boundaries, or they were the only representatives of alliances that occur in other areas beyond the study boundaries in California. In addition, it was not possible to survey the full spectrum of vegetation because the study area had mixed ownership and accessibility. For these reasons, adequate data may not be available in this report for all vegetation types. However, any relatively unique samples are considered important and are described separately in the results. In some cases, they represent unusual species groupings not described but were viewed as affording perspective into unusual vegetation types that deserve additional sampling. These types are either described at a more generic alliance/habitat level or as unique stands.

Classification and Key

The classification and key were produced to identify all vegetation types detected in the fieldwork for this project. They are based on the standard floristic hierarchy of the U.S. National Vegetation Classification as supported by NatureServe (see www.natureserve.org or NatureServe 2004). They are based on species composition, abundance, and habitat/environment.

The key provides general choices and information on the physiognomy of the vegetation and the different environments based on wetland/upland position. This approach in the key was chosen to (1) reduce the length and redundancy that is common in dichotomous keys and (2) be a guide that can be easily used by nonbotanists/plant ecologists. The vegetation key can be used as a guide to the descriptions of vegetation within this report. It is written from two perspectives: (1) a field team attempting to identify vegetation and (2) an office team attempting to place field samples into the proper category. Thus, heavy reliance is placed on correct identification of characteristic plant species and of estimation of cover of these species.

The key is first broken into major units based on dominant plant life-form: trees, shrubs, and herbs. Within these groups, the key is further divided by coniferous/ broadleaf evergreen, chaparral/soft-leaved shrubs, wetland/upland distinctions, graminoid/forb distinctions, and so forth. The key and descriptions hopefully will afford further refinement to the understanding of the Santa Monica Mountains area and surrounding regions from the standpoint of both classification and mapping.

Philosophy of Vegetation Classification in This Report

The developing philosophy of vegetation classification in California has benefited a large number of recent classification projects centered in southern coastal California (DeSimone and Burk 1992, Gordon and White 1994, White et al. 1994,

Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005). These, in conjunction with a growing understanding of statewide vegetation, have enabled the classification of the vegetation in the current project to proceed within a broader and better framework than would have been possible as little as five years ago. The natural development of most taxonomies, whether they be of species or vegetation, work their way through what can be called an expansive phase and then a synthetic phase. The first is characterized by the proliferation of many taxa based on local description without the benefit of broad comparison of related types. The second is based on a retrospective and broader view of more studies where related taxa can be compared and often shown to be related, thus ultimately synonymized. This latter phase has begun to take place in much of California, especially with the preparation of the second edition of the *Manual of California Vegetation* (Sawyer et al. 2006 MS).

For example, chaparral alliances defined in previous studies included several mixed species types including *Eriogonum fasciculatum-Encelia farinosa* (Gordon and White 1994)*, Ceanothus megacarpus-Cercocarpus betuloides* (Borchert et al. 2004), and *Ceanothus megacarpus-Rhamnus ilicifolia* (Borchert et al. 2004). These were named by the characteristic codominance of shrub species and were thought initially to represent fundamentally different entities than stands of vegetation dominated singly by individual species, for example, *Encelia farinosa* (without significant cover of *Eriogonum fasciculatum*) or *Ceanothus megacarpus* (without significant cover of *Cercocarpus betuloides*). However, now with a broader regional perspective, it is becoming clear that these entities are really more generally defined by the presence of a single characteristic species that may or may not have shared dominance with a less characteristic species. In the above examples, *E. fasciculatum-E. farinosa* has been subsumed under the *E. farinosa* Alliance, the *C. megacarpus-C. betuloides* Alliance has been subsumed under the *C. megacarpus* Alliance, and the *Ceanothus megacarpus-Rhamnus ilicifolia* Alliance has been subsumed under the *C. megacarpus* Alliance.

There are various lines of reasoning used to make these decisions. However, central to most of them are a broader understanding of the geographic distribution and internal variation of each of the associations defined within these alliances. If a single mixed alliance has been named, it would have to have a broad regional distribution of the codominant species with further subregional variations of the associations to be substantiated as a codominant alliance. One example of this is the *Artemisia californica–Eriogonum fasciculatum* Alliance, which occurs from San Diego County and northwestern Baja, north to the Diablo Range of Alameda County in California.

One of the great benefits of collecting so many samples of vegetation stands in this current project is that we can now see a more complete approximation in the range of cover of species and environmental conditions for each alliance and association. Thus, we have a better sense of where the important "breaks" in species composition are in these patterns. We can also compare similar vegetation samples from other similar areas away from the Santa Monica Mountains and determine if the characteristics are indeed different or the same. Using these kinds of comparisons for many parts of southern California, we have begun to synthesize some of the complicated patterns that were first described from earlier quantitative efforts and, in some cases, simplify them.

Thus, although *Salvia leucophylla* forms single species dominant stands and codominant stands with *Artemisia californica* in the Santa Monica Mountains, we now believe that both of these situations can be encapsulated within the *Salvia leucophylla* Alliance, rather than establishing a separate alliance for the single dominant and codominant situations. This is a result of *Salvia leucophylla* being relatively geographically restricted, whereby it only dominates in the "Ventura" coastal scrub zone between Santa Barbara and Orange counties (Westman 1981 and Malanson 1984). When *S. leucophylla* makes up an important component of the shrub cover, whether it is the dominant species or is codominant with another species, it is sufficient to define the alliance. On the other hand, a mixed alliance such as *Artemisia californica-Salvia mellifera* has a much broader distribution up and down the California coast ranges and into Baja California. It occurs under different ecological conditions than either the single species alliances *Salvia mellifera* or *Artemisia californica.* For example, in the central coast ranges, there is an association of *A. californica-S. mellifera* defined by codominance of the two shrubs (Evens and San 2004). This same association is also defined for western Riverside County (Klein and Evens 2005) and Orange County (DeSimone and Burke 1992). The wide-ranging consistency of this vegetation is a strong factor in maintaining it as a separate entity from either the *Artemisia californica* or the *Salvia mellifera* Alliance.

The philosophy of this report is consistent with others that have been written for other national parks in California. We require a relatively large number of samples to set high confidence for the existence of an association. In general, we have accepted n = 10 or more as a threshold for high confidence. Any less would set lower confidence, unless the same characteristics of species composition and environmental variables have been previously well-defined in studies elsewhere.

Further revisions are bound to occur in the California state classification as more data is analyzed and compared. As a result of the relatively rigorous definitions at the association level upheld to begin with, it is likely that these modifications

will be made at the alliance level. The associations that are defined currently in this report are well substantiated by large sample sizes with consistent species compositions and relative cover values. The separation of associations into different alliances would only be reasonable if we saw major environmental differences in these alliances. Further revisions could also occur as datasets from different regions are analyzed together to identify and differentiate major environmental patterns of the alliances.

One further refinement of classification rules realized in this project was the treatment of large "emergent" shrubs. In earlier efforts in the California deserts and desert transition areas (Keeler-Wolf et al. 1998 and Thomas et al. 2004), tall shrubs or "dwarf trees," such as *Juniperus californica, Rhus ovata, Cercidium (Parkinsonia) florida, Olneya tesota*, and others, were emphasized in numerical classification when they occurred in association with shorter-statured drought-deciduous desert and semidesert shrubs such as *Encelia farinosa, Salvia apiana, Viguiera parishii,* and *Eriogonum fasciculatum*. Thus, despite a possible higher overall cover of individuals of the shorter drought-deciduous species, the larger, evenly spaced emergent species were found to "drive" the classification by their presence rather than by their total percent cover in a stand. This meant alliances and associations were often named by the larger, less dense emergent species.

Structurally similar situations exist in the Santa Monica Mountains where *Rhus ovata,* and especially *Malosma laurina* occur at relatively low density and cover over a shorter, but higher cover layer of drought-deciduous shrubs such as *Artemisia californica, Encelia californica, Salvia mellifera, S. leucophylla, Eriogonum cinereum,* and *E. fasciculatum*. Thus, the initial classification developed for SAMO before extensive data analysis stressed the presence of such species as *Malosma laurina,* even if they occurred at much lower cover than the associated shorter drought-deciduous shrubs.

This structural relationship was not borne out in the first phase of data analysis. Instead, it became clear that the presence of shrubs such as *Malosma laurina* was often ubiquitous, occurring in many situations that were better defined in many cases by the associated shorter-stature drought-deciduous shrubs. The concept of the *Malosma laurina* Alliance was thus refined to include only those stands where *Malosma* was dominant or codominant with other shrubs (regardless of their stature) in the stand. This is one of many cautionary tales revolving around vegetation classification assumptions based on extrapolating data from seemingly similar situations in different geographies and environments.

Description Writing

Following the analysis of field data and development of the classification and key, association-level descriptions were written and based on field data and available literature. Scientific names of plants follow Hickman (1993) and UCB (2004). Common names follow these sources and USDA (2004). The primary compilers and developers of the data queries were Julie Evens and Anne Klein (California Native Plant Society) and Julie Christian (Santa Monica Mountains NRA). CNPS and TNC staff wrote local descriptions. Todd Keeler-Wolf (California Department of Fish and Game) wrote the keys, introductory material, and edited the description text. Todd Keeler-Wolf and Julie Evens wrote the descriptive sections on range and local and regional comments for descriptions. SAMO staff and Julie Evens edited the introduction, key, and final descriptions.

The following definitions and conventions were used in developing the descriptions and the keys.

1. **Cover:** The primary metric used to quantify the importance/abundance of a particular species or a particular vegetation layer within a stand. It is measured by estimating the aerial extent of the living plants, or the bird's-eye view looking from above, for each category. Cover in this and other California National Park Service vegetation classification and mapping projects uses the concept of "porosity" or foliar cover rather than "opacity" or crown cover. Thus, field crews are trained to estimate the amount of shade produced by the canopy of a plant or a stratum by taking into account the amount of shade it casts excluding the openings it may have in the interstitial spaces (e.g., between leaves or branches). This is assumed to provide a more realistic estimate of the actual amount of shade cast by the individual or stratum which, in turn, relates to the actual amount of light available to individual species or strata beneath it.

2. **Relative cover:** Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50 percent relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are proportional numbers and, if added, total 100 percent for each stand (sample).

3. **Absolute cover:** Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pinus sabiniana* covers between 5 percent and 10 percent of the

stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100 percent because it is not a proportional number.

4. **Dominant:** Must be in at least 75 percent of the samples, with at least 50 percent relative cover in all samples.

5. **Codominant:** Must be in at least 75 percent of the samples, with at least 30 percent relative cover in all samples.

6. **Consistent/Characteristic/Diagnostic species:** Must be present in at least 75 percent of the samples, with no restriction on cover.

7. **Abundant species:** Must be present in at least 50 percent of the samples, with an average of at least 30 percent relative cover in all samples.

8. **Frequently/Often/Usually occurring species:** Must be present in at least 50 percent of the samples, with no restriction on cover.

9. **Infrequently occurring:** Present in less than 25 percent of the samples.

10. **Sparse:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 8 percent absolute cover.

11. **Open:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is generally less than 33 percent absolute cover.

12. **Intermittent:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is 33–66 percent absolute cover.

13. **Continuous:** Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is greater than 66 percent absolute cover.

14. **Emergent:** A plant (or vegetation layer) is considered emergent if it includes a sparse cover of the plant, which rises above a predominant vegetation layer, and is considered a member of the next tallest layer but has an absolute cover < 10%. For example, individual *Quercus agrifolia* trees may comprise an emergent tree layer of 5 percent over a more

dense layer of *Artemisia californica* shrubs; the stand would be considered within the *Artemisia californica* Shrubland Alliance because the total tree cover is < 10% and the shrub cover is > 10%. Further, medium to tall shrubs are not considered emergent over shorter shrubs, but short trees are considered emergent over tall shrubs.

15. **Stand:** Is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:

    a. It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.

    b. It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species but has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep, more moist soil and the same species.

16. **Woody plant:** Is any species of plant that has noticeably woody stems. It does not include herbaceous species with woody underground portions such as tubers, roots, or rhizomes.

17. **Tree:** Is a one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multiple stemmed following ramifying after fire or other disturbance, but the size of mature plants is typically greater than 5 meters. Undisturbed individuals of these species are usually single stemmed.

18. **Shrub:** Is normally a multistemmed woody plant that is usually between 0.2 meters and 5 meters tall. Definitions are blurred at the low and high ends of the height scales. At the tall end, shrubs may approach trees based on disturbance frequencies (e.g., old-growth resprouting chaparral species such as *Cercocarpus betuloides, Fraxinus dipetala, Heteromeles arbutifolia, Prunus ilicifolia,* and so forth, may frequently attain "tree size"). At the short end, woody perennial herbs or subshrubs of various species are often difficult to categorize into a consistent life-form.

19. **Herbaceous plant:** Is any species of plant that has no main woody stem development and includes grasses, forbs, and dieback perennial species.

20. **Forest:** In the National Vegetation Classification, a forest is defined as a tree-dominated stand of vegetation with 60 percent or greater cover of trees. Most forest alliances tend to have average cover of trees > 60%, but individual stands under certain conditions may drop lower than 60 percent. This is reflective of the "modal" concept of the characteristics of a particular alliance.

21. **Woodland:** In the National Vegetation Classification, woodland is defined as a tree-dominated stand of vegetation with between 25 percent and 60 percent cover of trees. The same notion of "modality" that applies to forest types (#20) also applies here and to the sparsely wooded category (#22).

22. **Sparsely wooded:** These are stands with conspicuous trees (generally at least 10% absolute cover), but less than 25 percent cover may occur over shrubs as the dominant canopy (sparsely wooded shrubland) or herbaceous cover (sparsely wooded herbaceous).

23. **Other Noteworthy Species:** These are listed in the CNPS (2005) Online Inventory of Rare and Endangered Plants and per SAMO (2004). Species were listed in descending order of occurrence within the vegetation type.

24. **Distribution and Nonnative Species:** Local ecological regions and nonnative species were listed in descending order of occurrence within the sample dataset for each vegetation type.

25. **Conservation rank:** Listed by the state NatureServe Heritage Programs. All communities were ranked, though ones without much information were ranked with a "?" after the rank to denote that this rank may change with more information but that the best knowledge to date (sometimes personal observation) was used. Otherwise, hard references were used to place rank. These ranks are the "Global" and "State" ranks as seen below.

    a. **G1** and **S1:** Fewer than six viable occurrences worldwide and/or less than 2000 acres

    b. **G2** and **S2:** 6–20 viable occurrences worldwide and/or 2,000–10,000 acres

c. **G3** and **S3:** 21–100 viable occurrences worldwide and/or 10,000–50,000 acres

d. **G4** and **S4:** Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres

26. **Minimum sample size for classification and description:** n = 3. Descriptions of associations with fewer than three samples were attempted if (a) the association was sampled and described by previous authors or (b) the vegetation was confirmed as distinctive and repeatable based on field reconnaissance or by photointerpretation signature.

27. **Sample(s):** Listed by their survey numbers from the vegetation databases and indicated using the following: rapid assessments begin with the alpha code "rap," and accuracy assessments begin with the alpha code AA (an abbreviation for accuracy assessment). Releve samples begin with the code "rap" followed by a numeric code and terminated with the alpha code "rlv." Successive numeric codes follow each of the alpha prefixes.

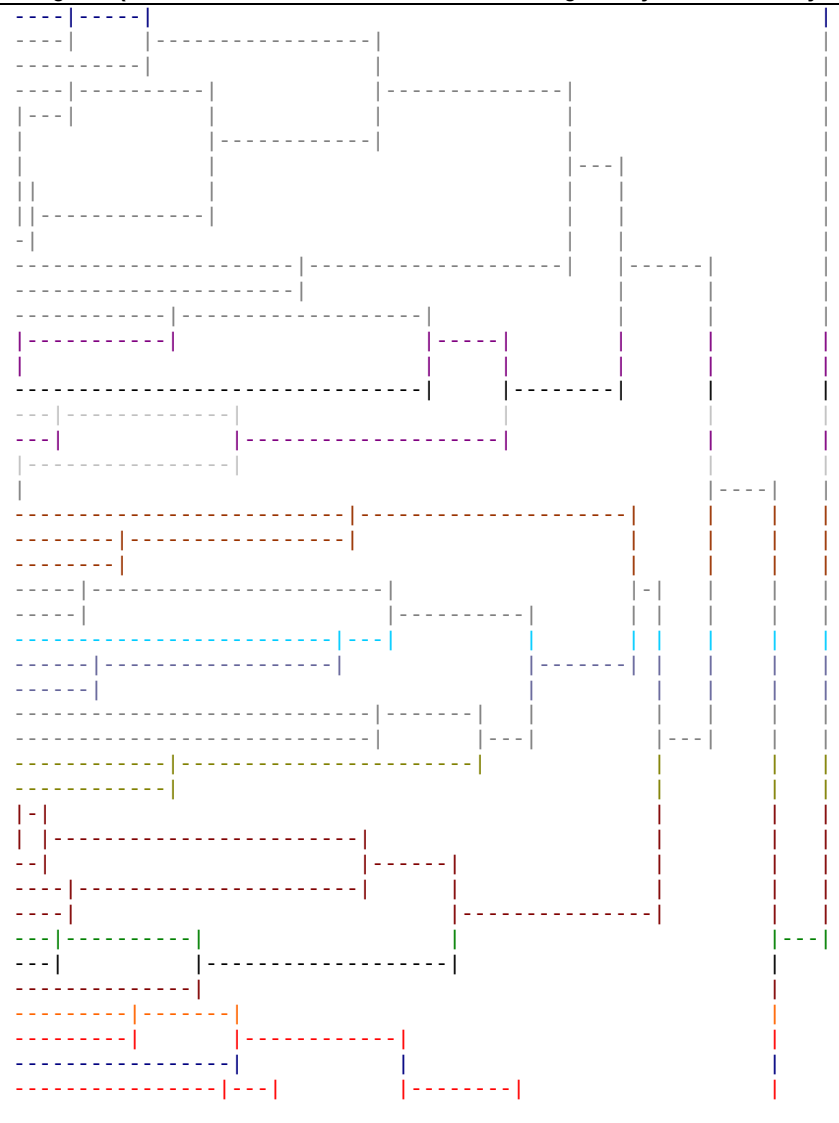
28. **Con, Avg, Min, Max:** A species table is provided at the end of each alliance or association description. The Con column provides the overall constancy value for each species within all rapid assessments and relevés classified as that vegetation type. The constancy values are between 0 and 100. Species that occurred with at least 20 percent constancy are listed in the table. The Avg column provides the average cover value for each species, as calculated across all samples in that vegetation type. The Min and Max values denote the minimum and maximum cover values of species listed in the table.

RESULTS

The final agglomerative cluster analyses for the classification used data from 3,912 of 4,014 surveys sampled, and it included the 254 most abundant of 544 species sampled in the rapid and accuracy assessments. An example of the cluster analysis with the final sample assignments to association and phase is shown in figure 3, and the final classification is shown in table 1.

In summary, 84 vegetation alliances or unique stands and 204 associations or phases were defined for the project. Of these, 177 types are fully described in this document as natural or seminatural vegetation units. These include associations, alliance-level units where insufficient sample size precluded further

analysis to the association level, and known or presumed rare stands that were not assigned to either associations or alliances (unique stands). Many association descriptions also contain brief descriptions of phases, which indicate further subassociation-level variation.

Survey #	Alliance	Diagram (clusters closest to left are ecologically more closely related)
rap2456rlv	Platanus racemosa	
rap2524rlv	California Annual	
rap2525rlv	California Annual	
rap2521rlv	California Annual	
rap2522rlv	California Annual	
rap2523rlv	California Annual	
rap2892rlv	California Annual	
rap2891rlv	California Annual	
rap2893rlv	California Annual	
rap2917rlv	California Annual	
rap2790rlv	California Annual	
rap2903rlv	California Annual	
rap2520rlv	California Annual	
rap2529rlv	Lolium multiflorum	
rap2849rlv	Lolium multiflorum	
rap2895rlv	Phalaris aquatica	
rap2527rlv	Avena spp.	
rap2530rlv	Lolium multiflorum	
rap2528rlv	Avena spp.	
rap2641rlv	California Annual	
rap2469rlv	Eriogonum fasciculatum	
rap2642rlv	Eriogonum fasciculatum	
rap2864rlv	Eriogonum fasciculatum	
rap2526rlv	California Annual	
rap2915rlv	California Annual	
rap2563rlv	Leymus triticoides	
rap2872rlv	Hazardia squarrosa	
rap2874rlv	Hazardia squarrosa	
rap2535rlv	Euphorbia terracina	
rap2916rlv	California Annual	
rap2536rlv	Baccharis pilularis	
rap2862rlv	Baccharis pilularis	
rap2532rlv	Nassella pulchra	
rap2533rlv	Nassella pulchra	
rap2534rlv	Nassella pulchra	
rap2873rlv	Nassella pulchra	
rap2913rlv	Nassella pulchra	
rap2863rlv	Opuntia spp.	
rap2897rlv	Pennisetum setaceum	
rap2914rlv	Nassella pulchra	
rap2457rlv	Alnus rhombifolia	
rap2464rlv	Quercus agrifolia	
rap2458rlv	Platanus racemosa	
rap2460rlv	Quercus agrifolia	

Survey #	Alliance	Diagram (clusters closest to left are ecologically more closely related)
rap2462rlv	Quercus agrifolia	
rap2751rlv	Quercus agrifolia	
rap2555rlv	Quercus agrifolia	
rap2461rlv	Quercus agrifolia	
rap2557rlv	Quercus agrifolia	
rap2463rlv	Quercus agrifolia	
rap2852rlv	Quercus agrifolia	
rap2556rlv	Quercus agrifolia	
rap2851rlv	Quercus agrifolia	
rap2854rlv	Quercus agrifolia	
rap2682rlv	Platanus racemosa	
rap2857rlv	Salix laevigata-Salix	
rap2752rlv	Salix laevigata-Salix	
rap2856rlv	Salix laevigata-Salix	
rap2855rlv	Salix laevigata	
rap2858rlv	Rhus integrifolia	
rap2870rlv	Coreopsis gigantea	
rap2871rlv	Coreopsis gigantea	
rap2890rlv	Mesembryanthemum-Carpobrotus	

Figure 3. This is an example of the cluster analysis dendrogram using Sorensen's distance measure and flexible beta linkage method, showing the relationship of individual samples and their final alliance names to the cluster breaks.

Table 1. National Vegetation Classification standard list of types identified in this study. Hierarchy levels increase in resolution from left to right with the finest level, the phase, on the right. Corresponding mapping code numbers are provided on the far right. Darkest color denotes class difference, slightly lighter shading denotes formation difference, and lightest shading denotes alliance differences. The information within the Class, Hierarchy code, and Alliance Code field columns is derived from NatureServe (2005).

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
I. Forest							
	I.A.6.N.b	Lowland or submontane winter-rain evergreen sclerophyllous forest					
			A.84	*Eucalyptus*	*Eucalyptus* Alliance		9510
			A.87	*Umbellularia californica*	*Umbellularia californica* Alliance		1010
					Umbellularia californica/Ceanothus oliganthus		1012
					Umbellularia californica-Alnus rhombifolia		1013
					Umbellularia californica-Juglans californica/Ceanothus spinosus		1011
					Umbellularia californica-Platanus racemosa		1014
	I.B.2.N.d	Temporarily flooded cold-deciduous forest					
			A.306	*Alnus rhombifolia*	*Alnus rhombifolia* Alliance		1440
					Alnus rhombifolia-Platanus racemosa		1441
II. Woodland							
	II.A.5.N.a	Sclerophyllous extremely xeromorphic evergreen woodland					
			A.589	*Quercus agrifolia*	*Quercus agrifolia* Alliance		1110
					Quercus agrifolia		6122
					Quercus agrifolia/Adenostoma fasciculatum		6115
					Quercus agrifolia/Annual Grass-Herb		1111
					Quercus agrifolia/Ceanothus spinosus		1118

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Quercus agrifolia/Quercus berberidifolia		6112
					Quercus agrifolia/Salvia leucophylla-Artemisia californica		1116
					Quercus agrifolia/Toxicodendron diversilobum		1117
						Quercus agrifolia/Toxicodendron diversilobum	1117
						Quercus agrifolia/Mimulus aurantiacus	6113
					Quercus agrifolia/Heteromeles arbutifolia		6117
						Quercus agrifolia/Heteromeles arbutifolia	6117
						Quercus agrifolia/Malosma laurina	6116
					Quercus agrifolia-Juglans californica		1115
						Juglans californica-Quercus agrifolia/Toxicodendron diversilobum	6311
					Quercus agrifolia-Salix lasiolepis		6114
					Quercus agrifolia-Umbellularia californica		1114
						Quercus agrifolia-Umbellularia californica	1114
						Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum	6119
					Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus		1119
	II.B.2.N.a	Cold-deciduous woodland					
			A.607	*Juglans californica*	*Juglans californica* Alliance		1310
					Juglans californica/Annual Grass-Herb		1312
					Juglans californica/Artemisia californica/Leymus condensatus		1317

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Juglans californica/Ceanothus spinosus		1315
					Juglans californica/Heteromeles arbutifolia		6312
					Juglans californica/Malosma laurina		1314
			A.618	*Quercus lobata*	*Quercus lobata* Alliance		1320
					Quercus lobata/Annual Grass-Herb		1321
					Quercus lobata-Quercus agrifolia/Annual Grass-Herb		1323
					Quercus lobata-Salix lasiolepis		1324
	II.B.2.N.b	Temporarily flooded cold-deciduous woodland					
			A.634	*Platanus racemosa*	*Platanus racemosa* Alliance		1450
					Platanus racemosa		6451
					Platanus racemosa/Annual Grass-Herb		1456
					Platanus racemosa-Quercus agrifolia		1452
					Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana		1458
					Platanus racemosa-Quercus agrifolia-Salix lasiolepis		6452
			A.639	*Salix exigua*	*Salix exigua* Alliance		3110
			A.646	*Salix laevigata*	*Salix laevigata* Alliance		1420
			none	*Salix laevigata-Salix lasiolepis*	*Salix laevigata-Salix lasiolepis* Alliance		1410
					Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/Annual Grass-Herb		1413
					Salix laevigata-Salix lasiolepis/Baccharis salicifolia		1412
			A.977	*Salix lasiolepis*	*Salix lasiolepis* Alliance		1430
					Salix lasiolepis/Baccharis salicifolia		1432

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association *Salix lasiolepis/Malosma laurina*	Phase	Map Code 1433
III. Shrubland							
	III.A.1.N.a.	Tropical or subtropical broad-leaved evergreen shrubland					
			none	*Schinus molle*	*Schinus molle* Alliance		9550
	III.A.2.N.a	Temperate broad-leaved evergreen shrubland					
			none	*Venegasia carpesioides*	*Venegasia carpesioides* Alliance		4750
	III.A.2.N.c	Sclerophyllous temperate broad-leaved evergreen shrubland					
			A.755	*Adenostoma fasciculatum*	*Adenostoma fasciculatum* Alliance		2010
					Adenostoma fasciculatum		2011
					Adenostoma fasciculatum-Ceanothus megacarpus		2019
					Adenostoma fasciculatum-Eriogonum fasciculatum		2017
						Adenostoma fasciculatum-Eriogonum fasciculatum/Annual Grass-Herb	
						Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida	7012
					Adenostoma fasciculatum-Malosma laurina		2013
					Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium/Annual Grass-Herb		7018
					Adenostoma fasciculatum-Mimulus aurantiacus		7013
					Adenostoma fasciculatum-Salvia leucophylla		2018

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			none	*Adenostoma fasciculatum-Quercus berberidifolia*	*Adenostoma fasciculatum-Quercus berberidifolia* Association		2581
			none	*Adenostoma fasciculatum-Adenostoma sparsifolium*	*Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Association		2042
			none	*Adenostoma fasciculatum-Arctostaphylos glandulosa*	*Adenostoma fasciculatum-Arctostaphylos glandulosa* Association		2021
						Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa	7017
			none	*Adenostoma fasciculatum-Arctostaphylos glauca*	*Adenostoma fasciculatum-Arctostaphylos glauca* Association		2531
			none	*Adenostoma fasciculatum-Ceanothus crassifolius*	*Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association		2572
			none	*Adenostoma fasciculatum-Ceanothus cuneatus*	*Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Association		2511
			none	*Adenostoma fasciculatum-Salvia mellifera*	*Adenostoma fasciculatum-Salvia mellifera*/Grass-Herb Association		2036
					Adenostoma fasciculatum-Salvia mellifera-Malosma laurina		2035
					Adenostoma fasciculatum-Salvia mellifera-Rhus ovata		2038
			A.756	*Adenostoma sparsifolium*	*Adenostoma sparsifolium* Alliance		2050
			A.757	*Arctostaphylos glandulosa*	*Arctostaphylos glandulosa* Alliance		2550
			A.759	*Arctostaphylos glauca*	*Arctostaphylos glauca* Alliance		2540
			A.764	*Ceanothus crassifolius*	*Ceanothus crassifolius* Alliance		2060
				Ceanothus crassifolius	*Ceanothus crassifolius*		2063
					Ceanothus crassifolius-Malosma laurina		2065

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.765	*Ceanothus cuneatus*	*Ceanothus cuneatus* Alliance		2520
					Ceanothus cuneatus-Quercus berberidifolia		2521
			A.770	*Ceanothus megacarpus*	*Ceanothus megacarpus* Alliance		2080
					Ceanothus megacarpus		2081
					Ceanothus megacarpus-Adenostoma fasciculatum		2083
						Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera	7083
					Ceanothus megacarpus-Adenostoma sparsifolium		2082
					Ceanothus megacarpus-Cercocarpus betuloides		2084
						Ceanothus megacarpus-Quercus berberidifolia	2089
					Ceanothus megacarpus-Malosma laurina		2087
						Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral	7081
						Ceanothus megacarpus-Malosma laurina-Salvia mellifera-Mixed Coastal Sage	2085
					Ceanothus megacarpus-Salvia mellifera		7085
			A.771	*Ceanothus oliganthus*	*Ceanothus oliganthus* Alliance		2070
					Ceanothus oliganthus		2072
					Ceanothus oliganthus-Adenostoma sparsifolium		2078
					Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata		2076
					Ceanothus oliganthus-Quercus berberidifolia		2077
			none	*Ceanothus spinosus*	*Ceanothus spinosus* Alliance		2090

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Ceanothus spinosus		2092
						Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia	2094
						Ceanothus spinosus-Malosma laurina	2097
					Ceanothus spinosus-Ceanothus megacarpus		2091
			A.896	*Cercocarpus betuloides*	*Cercocarpus betuloides* Association		2114
					Cercocarpus betuloides-Adenostoma fasciculatum		2115
					Cercocarpus betuloides-Malosma laurina-Artemisia californica		2117
						Cercocarpus betuloides-Artemisia californica/Melica imperfecta	2111
						Cercocarpus betuloides-Malosma laurina-Artemisia californica	2117
					Cercocarpus betuloides-Ceanothus spinosus		2113
			none	*Dendromecon rigida*	*Dendromecon rigida* Alliance		3350
			none	*Heteromeles arbutifolia*	*Heteromeles arbutifolia* Alliance		2130
					Heteromeles arbutifolia-Malosma laurina		2138
						Heteromeles arbutifolia-Artemisia californica-Mimulus aurantiacus	2135
						Heteromeles arbutifolia-Malosma laurina	2138
						Heteromeles arbutifolia-Cercocarpus betuloides	2136
						Heteromeles arbutifolia	2137
						Heteromeles arbutifolia-Salvia mellifera-Rhus spp.	2133
			none	*Malosma laurina*	*Malosma laurina* Alliance		2140
					Malosma laurina		7142

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
						Malosma laurina/Annual Grass-Herb	2145
					Malosma laurina-Artemisia californica		7148
						Malosma laurina-Artemisia californica	7148
						Malosma laurina-Artemisia californica-Salvia leucophylla	2142
					Malosma laurina-Eriogonum cinereum		2141
						Malosma laurina-Eriogonum cinereum	2141
						Malosma laurina-Eriogonum cinereum-Lotus scoparius	7144
						Malosma laurina-Eriogonum cinereum-Salvia mellifera	7141
						Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera	7146
						Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica	21413
					Malosma laurina-Rhus ovata-Ceanothus megacarpus		21415
					Malosma laurina-Salvia mellifera		2148
					Malosma laurina-Eriogonum fasciculatum		21423
						Malosma laurina-Eriogonum fasciculatum	21423
						Malosma laurina-Eriogonum fasciculatum-Artemisia californica/Annual Grass-Herb	3382

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus		3383
			A.2608	*Prunus ilicifolia*	*Prunus ilicifolia-Heteromeles arbutifolia* Association		2121
			A.777	*Quercus berberidifolia*	*Quercus berberidifolia* Alliance		2160
					Quercus berberidifolia		2161
						Quercus berberidifolia	2161
						Quercus berberidifolia-Heteromeles arbutifolia	2164
						Quercus berberidifolia-Adenostoma fasciculatum	2163
					Quercus berberidifolia-Ceanothus spinosus		2167
			none	*Quercus berberidifolia-Cercocarpus betuloides*	*Quercus berberidifolia-Cercocarpus betuloides* Association		2591
			A.786	*Quercus wislizeni* var. *frutescens*	*Quercus wislizeni var. frutescens* Alliance		2560
			none	*Rhus integrifolia*	*Rhus integrifolia* Alliance		2150
					Rhus integrifolia		2153
						Rhus integrifolia	2153
						Rhus integrifolia-Heteromeles arbutifolia	2158
						Rhus integrifolia-Malacothamnus fasciculatus	7153
					Rhus integrifolia-Artemisia californica-Eriogonum cinereum		7157
						Rhus integrifolia-Artemisia californica-Salvia leucophylla	2155
						Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea	7155
					Rhus integrifolia-Opuntia spp.*-Eriogonum cinereum*		2151

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			none	*Rhus ovata*	*Rhus ovata* Association		2193
					Rhus ovata-Salvia leucophylla-Artemisia californica		2192
	III.A.4.N.a	Lowland microphyllous evergreen shrubland					
			A.836	*Baccharis pilularis*	*Baccharis pilularis* Alliance		2310
					Baccharis pilularis/Annual Grass-Herb		2311
			none	*Baccharis pilularis-Artemisia californica*	*Baccharis pilularis-Artemisia californica* Alliance		2310
					Baccharis pilularis-Artemisia californica		2313
						Baccharis pilularis-Artemisia californica-Salvia leucophylla	2315
						Baccharis pilularis-Malosma laurina-Artemisia californica	2314
			none	*Hazardia squarrosa*	*Hazardia squarrosa* Alliance		3260
					Hazardia squarrosa-Artemisia californica		3262
						Hazardia squarrosa/Annual Grass-Herb	3261
						Hazardia squarrosa-Artemisia californica/Leymus condensatus	3262
					Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata		3263
						Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata	3263
			none	*Spartium junceum*	*Spartium junceum* Alliance		9542
	III.A.4.N.b	Intermittently flooded microphyllous shrubland					
			A.838	*Lepidospartum squamatum*	*Lepidospartum squamatum* Alliance		2220
	III.A.5.N.b	Facultatively deciduous extremely xeromorphic subdesert shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.815	*Artemisia californica*	*Artemisia californica* Association		8213
						Artemisia californica/Annual Grass-Herb	8213
						Artemisia californica-Salvia leucophylla	3211
						Artemisia californica-Malosma laurina	3219
					Artemisia californica/Leymus condensatus		3216
					Artemisia californica-Eriogonum cinereum		3214
						Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta	3218
					Artemisia californica-Mimulus aurantiacus		8214
			none	*Artemisia californica-Eriogonum fasciculatum*	*Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association		3371
					Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla		3372
					Artemisia californica-Eriogonum fasciculatum-Salvia mellifera		3373
			none	*Atriplex lentiformis*	*Atriplex lentiformis* Alliance		2330
			A.772	*Encelia californica*	*Encelia californica*		3222
						Encelia californica-Eriogonum fasciculatum	3224
					Encelia californica-Artemisia californica		3227
					Encelia californica-Eriogonum cinereum		3225
					Encelia californica-Malosma laurina-Salvia mellifera		3221
					Encelia californica-Rhus integrifolia		3226
			none	*Eriogonum cinereum*	*Eriogonum cinereum*		3257

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
						Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus	3259
			A.868	*Eriogonum fasciculatum*	*Eriogonum fasciculatum* Association		3241
						Eriogonum fasciculatum-Lotus scoparius	3249
						Eriogonum fasciculatum	3241
					Eriogonum fasciculatum-Salvia mellifera-Malosma laurina		3248
			A.773	*Eriogonum fasciculatum-Salvia apiana*	*Eriogonum fasciculatum-Salvia apiana* Alliance		3410
			none	*Mimulus aurantiacus*	*Mimulus aurantiacus-Malosma laurina* Association		2172
						Mimulus aurantiacus-Malosma laurina	2172
						Mimulus aurantiacus-Salvia leucophylla	2171
			A.748	*Salvia leucophylla*	*Salvia leucophylla* Alliance		3390
			none		*Salvia leucophylla* Association		3316
						Salvia leucophylla	3316
						Salvia leucophylla/Leymus condensatus	3319
						Salvia leucophylla/Nassella spp.	3311
						Salvia leucophylla-Artemisia californica-Malacothamnus fasciculatus	8311
			none		*Salvia leucophylla-Artemisia californica* Association	*Salvia leucophylla-Artemisia californica*	3391
						Salvia leucophylla-Artemisia californica/Leymus condensatus	3393

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella	*Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella*	3396
						Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella	3395
						Salvia leucophylla-Artemisia californica-Mimulus aurantiacus	3392
					Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb		3312
			A.749	*Salvia mellifera*	*Salvia mellifera* Alliance		3320
						Salvia mellifera	3324
						Salvia mellifera-Adenostoma fasciculatum	3329
						Salvia mellifera-Eriogonum fasciculatum	3321
						Salvia mellifera-Malacothamnus fasciculatus	3322
				Salvia mellifera-Artemisia californica	*Salvia mellifera-Artemisia californica*		3421
						Salvia mellifera-Artemisia californica-Salvia leucophylla	8323
					Salvia mellifera-Eriogonum cinereum		3323
					Salvia mellifera-Malosma laurina		8324
						Salvia mellifera-Malosma laurina	8324
						Salvia mellifera-Artemisia californica-Rhus integrifolia	8322
					Salvia mellifera-Rhus ovata		8325
	III.A.5.N.c	Succulent extremely xeromorphic evergreen shrubland					
			none	*Opuntia* spp.	*Opuntia* spp.-Mixed Coastal Sage Scrub Association		2412

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
	III.B.1.N.a	Lowland drought-deciduous shrubland					
			none	*Coreopsis gigantea*	*Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Association		3345
					Coreopsis gigantea-Ericameria ericoides-Encelia californica		3342
			none	*Malacothamnus fasciculatus*	*Malacothamnus fasciculatus* Association		3287
					Malacothamnus fasciculatus-Ceanothus spinosus		3289
					Malacothamnus fasciculatus-Ceanothus megacarpus		3288
					Malacothamnus fasciculatus-Malosma laurina		3286
					Malacothamnus fasciculatus-Salvia leucophylla		3281
					Malacothamnus fasciculatus-Salvia mellifera		3282
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			A.933	*Baccharis salicifolia*	*Baccharis salicifolia*-Riparian Association		2212
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			none	*Rosa californica*	*Rosa californica* Alliance		3010
	III.B.2.N.c	Intermittently flooded cold-deciduous shrubland					
			A.935	*Sambucus mexicana*	*Sambucus mexicana/Leymus condensatus*-Annual Grass-Herb Association		3021
					Sambucus mexicana-Heteromeles arbutifolia/Annual Grass-Herb		3022
	III.C.2.N.a	Mixed evergreen cold-deciduous shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.2610	*Toxicodendron diversilobum*	*Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association		3331
					Toxicodendron diversilobum-Mimulus aurantiacus		3332
IV. Dwarf Shrubland							
	IV.A.2.N.b	Facultatively deciduous subdesert dwarf-shrubland					
			none	*Lotus scoparius*	*Lotus scoparius* Alliance		3270
						Lotus scoparius-Artemisia californica/Annual Grass-Herb	3273
						Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera	3272
V. Herbaceous Vegetation							
	V.A.5.N.a	Tall sod temperate grassland					
			none	*Leymus condensatus*	*Leymus condensatus* Association		4041
	V.A.5.N.d	Medium-tall bunch temperate or subpolar grassland					
			A.1248	*Nassella lepida*	*Nassella lepida* Alliance		4090
			A.1289	*Nassella pulchra*	*Nassella* Alliance		4020
			A.1289	*Nassella pulchra*	*Nassella pulchra-Hazardia squarrosa*		4021
			none	*Pennisetum setaceum*	*Pennisetum setaceum* Alliance		4060
					Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina		4061
			none	*Phalaris aquatica*	*Phalaris aquatica* Alliance		4070
	V.A.5.N.i	Intermittently flooded temperate or subpolar grassland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.1332	*Distichlis spicata*	*Distichlis spicata-Ambrosia chamissonis* Association		4511
					Distichlis spicata-Salicornia virginica-Jaumea carnosa		4527
						Distichlis spicata-Salicornia virginica-Jaumea carnosa	4527
						Distichlis spicata-Jaumea carnosa	4514
	V.A.5.N.j	Temporarily flooded temperate or subpolar grassland					
			A.1339	*Arundo donax*	*Arundo donax* Alliance		4310
			A.1353	*Leymus triticoides*	*Leymus triticoides* Alliance		4030
	V.A.5.N.k	Seasonally flooded temperate or subpolar grassland					
			none	*Juncus effusus*	*Juncus effusus* Alliance		4330
	V.A.5.N.l	Semipermanently flooded temperate or subpolar grassland					
			A.1171	*Scirpus californicus*	*Scirpus californicus* Alliance		4410
			A.1394	*Typha* sp.	*Typha* sp. Alliance		4420
	V.B.2.N.a	Tall temperate or subpolar perennial forb vegetation					
			none	*Foeniculum vulgare*	*Foeniculum vulgare* Alliance		4760
			none	*Euphorbia terracina*	*Euphorbia terracina* Stands		4771
	V.B.2.N.	Intermittently flooded perennial herbaceous vegetation					
			none	*Lepidium latifolium*	*Lepidium latifolium* Alliance		4780
	V.B.2.N.b	Creeping or matted cold-deciduous dwarf-shrubland					

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
			A.1620	*Mesembryanthemum* spp.-*Carpobrotus* spp. Seminatural Herbaceous Alliance	*Carpobrotus edulis* Association		4720
	V.B.2.N.b	Low temperate or subpolar perennial forb vegetation					
			none	*Selaginella bigelovii*	*Selaginella bigelovii/Eriogonum fasciculatum* Association		4811
	V.B.2.N.g.	Tidal temperate perennial forb vegetation					
			none	*Frankenia salina*	*Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association		4551
			A.2618	*Salicornia virginica*	*Salicornia virginica/Algae* Association		4528
					Salicornia virginica-Brassica nigra		4529
					Salicornia virginica-Frankenia salina		4524
					Salicornia virginica-Frankenia salina-Batis maritima Dry		4526
					Salicornia virginica-Jaumea carnosa		4527
					Salicornia virginica-Salicornia subterminalis		4525
					Salicornia virginica-Suaeda taxifolia		45201
	V.D.2.N.	Medium-tall temperate annual grassland					
			none	California Annual Grassland/Herbaceous Alliance			5000
					Brassica nigra		5000
					Brassica nigra-Bromus diandrus		5000
					Brassica nigra-Centaurea melitensis		5000
					Bromus diandrus		5000
					Bromus diandrus-Avena spp.		5000

Class	Hierarchy Code	Formation Name	Alliance Code	Alliance	Association	Phase	Map Code
					Avena fatua Association (and *Avena* spp. Alliance)		5000 (4220)
					Lolium multiflorum Association and Alliance		5000 (4210)

KEY

The key for distinguishing vegetation types (table 2) is not strictly dichotomous. Because of the diversity of vegetation in the mapping area and to avoid an excessively long document, a series of paired statements (or couplets) was not developed for each option. Instead, sets of characteristics with choices beneath them are provided. The key will first lead the user to the general options, and the individual selections for the vegetation associations will be listed beneath these options. Simply work through the numbered list of types from the more general to the most specific options until the best fit is reached. The choices are identified by a combination of alphanumeric codes, using capital letters, numerals, upper- and lowercase letters, and decimal points to distinguish the different key levels. The most basic, general levels in the key are on the left side of the alphanumeric code, and the most specific are on the right side. This coding system in the key relates to a series of left indentations. Thus, down the left-hand side of the pages are the major groupings; nested within them are the subgroupings. Phases, if present, are listed directly below the association in the key with a brief description. Mapping units (defined as an informal, visually distinct structural assemblage of plants that does not correlate directly with a floristically defined alliance, association, or phase used by the photointerpreters), are also defined where appropriate herein.

The preliminary key will direct you to the major groups, such as forest/woodland, shrubland, and herbaceous, with the more specific choices beneath them. The more specific lists within these are generally based on presence/absence or dominance/subordinance of species until arriving at the optimum choice. *Please note: Since there may be more than two alternatives in a group, be sure to work through all of the options in a list before you decide what is the best choice.*

Table 2: Field key to the defined vegetation associations of the Santa Monica Mountains and Simi Hills area, Ventura and Los Angeles counties, California.

Class A. Vegetation with an overstory of trees (at least 5 m tall). Absolute tree canopy cover is generally >10% but occasionally may be < 10% over a denser understory of shrub and/or herbaceous species. If the latter, trees are evenly distributed across the stand and are ecologically significant members of the stand (stand is thus "characterized" by trees, even if not "dominated" by them). = **Tree-Overstory Vegetation**

Class B. Vegetation characterized by woody shrubs in the canopy. Tree species, if present, generally total < 10% absolute cover. Herbaceous species may total higher cover than shrubs. Shrubs are usually at least 10% cover. = **Shrub-Overstory Vegetation**

Class C. Vegetation characterized by nonwoody, herbaceous species in the canopy including grass, graminoid, and broad-leaved herbaceous species. Shrubs, if present, usually comprise < 10% absolute cover. Trees, if present, generally compose < 5% absolute cover. = **Herbaceous Vegetation**

Class A. Tree-Overstory Vegetation

Group I: Woodlands and forests characterized by needle or scale-leaved conifer trees including pine *(Pinus).* The conifers may only occur intermittently in the overstory and may be associated with tree oaks or shrubs.

I.A. The overstory is dominated by pine *(Pinus)* or other coniferous trees (none native to the mapping area) alone or in shared dominance with broadleaf evergreen trees or shrubs.

> **I.A.1.** Introduced pine (*Pinus* sp.) or other conifers occur as the dominant tree or co-occurs with other tree species in an open overstory, associated with roadsides and human habitation. (Note: This is not a vegetation type since all occurrences are plantations.)
>
> ***Pinus* mapping unit (9520)**

Group II. Woodlands and forests characterized mainly by broad-leaved evergreen and deciduous tree species such as oaks *(Quercus),* willows *(Salix),* bay *(Umbellularia californica),* California walnut *(Juglans californica),* and California sycamore *(Platanus racemosa).*

II.A. California sycamore is the sole dominant tree in the canopy or shares dominance with coast live oak or willows, which may be in the canopy or subcanopy.

***Platanus racemosa* Alliance (1450)**

II.A.1. California sycamore is the sole dominant tree over either a sparse understory of shrubs and herbs or dense annual grasses and herbs.

II.A.1.a. California sycamore is the sole dominant tree with no characteristic species in either the canopy or understory.

Platanus racemosa* South Coast Intermittent Stream Association *(*6451*)

II.A.1.b. California sycamore is the sole dominant tree in the overstory. The understory has a significant mixed cover of grasses, herbs, and shrubs.

***Platanus racemosa*/Annual Grass-Herb Association (1456)**

II.A.2. Coast live oak usually shares dominance with California sycamore in the overstory (they either may be codominant or dominant). Arroyo willow may be present.

II.A.2.a California sycamore and coast live oak occur in the canopy with no significant cover of any other large riparian trees or shrubs.

***Platanus racemosa-Quercus agrifolia* South Coast Association (1452)**

II.A.2.b. Coast live oak usually shares dominance with California sycamore in the overstory. In the understory, arroyo willow occurs with mule fat *(Baccharis salicifolia)* and other species.

***Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Association (6452)**

II.A.2.c. Coast live oak usually shares dominance with California sycamore in the overstory. In the understory, mule fat *(Baccharis salicifolia*) dominates, and mugwort *(Artemisia douglasiana)* is usually present.

***Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/ Artemisia douglasiana* South Coast Association (1458)**

II.B. California walnut *(Juglans californica)* provides an open to intermittent tree overstory canopy (in some cases it may be a large shrub). It may co-occur and codominate with coast live oak. Shrubs of either chaparral *(Ceanothus* sp.,

Heteromeles arbutifolia, etc.) or coastal sage scrub *(Artemisia californica, Salvia leucophylla)* as well as annual or perennial grasses may occur in the understory.

***Juglans californica* Alliance (1310)**

II.B.1. California walnut is the sole dominant tree (or large shrub) in the overstory. Shrubs are sparse to open, while annual grasses and herbs are abundant in the understory.

***Juglans californica*/Annual Grass-Herb Association (1312)**

II.B.2. California walnut is dominant in the tree overstory, and stands contain significant and obvious shrubs of either chaparral or coastal scrub affinities *(Ceanothus spinosus, Malosma laurina, Heteromeles arbutifolia, Artemisia californica, Salvia leucophylla)* in the understory subcanopy.

II.B.2.a. California walnut is the sole dominant tree (or occasionally, large shrub) and greenbark ceanothus is strongly dominant in the shrub layer.

***Juglans californica/Ceanothus spinosus* Association (1315)**

II.B.2.b. Laurel sumac is dominant in the shrub understory, although a number of other shrubs (some often early seral such as *Malacothamnus fasciculatus*) may be present at low cover.

***Juglans californica/Malosma laurina* Association (1314)**

II.B.2.c. California sagebrush is codominant to dominant often with purple sage in the shrub understory. Giant wild rye is usually present in significant cover in the herb layer. California walnut is dominant in the overstory.

***Juglans californica/Artemisia californica/Leymus condensatus* Association (1317)**

II.B.2.d. Toyon is the dominant shrub in the understory with coast live oak present but always subdominant to California walnut in the tree layer. Sugar bush and several other typically chaparral shrubs are usually present along with toyon in the shrub layer.

***Juglans californica/Heteromeles arbutifolia* Association (6312)**

II.B.3. California walnut is subdominant to codominant with coast live oak in the overstory, and the understory may be open and grassy or may have shrub layer with poison oak.

***Quercus agrifolia-Juglans californica* Association (1115)**

Note: Two phases of this association occur: One in which the shrub layer is low in cover (trace cover of poison oak) while the herbaceous layer is usually moderately to highly developed, and another in which the shrub layer has moderate to high cover of poison oak and other shrub species such as toyon and elderberry.

***Quercus agrifolia-Juglans californica* Phase (1115)**

***Juglans californica-Quercus agrifolia/Toxicodendron diversilobum* Phase (6311)**

II.C. Oaks (either valley oak or coast live oak) are the dominant trees in the overstory.

II.C.1. Valley oak is the dominant or conspicuous tree occurring as a sole dominant or as codominant with coast live oak and/or arroyo willow.

***Quercus lobata* Alliance (1320)**

II.C.1.a. Valley oak occurs in nonriparian settings over an understory with sparse shrubs and characterized by annual grasses and herbs, with or without coast live oak.

II.C.1.a.i. Valley oak is the sole dominant tree over annual grasses and herbs. Coast live oak and/or walnut may be present but in total never more than half the cover of valley oak.

***Quercus lobata*/Annual Grass-Herb Association (1321)**

II.C.1.a.ii. Valley oak occurs with coast live oak as a codominant or subdominant in the tree layer over annual grasses and herbs.

***Quercus lobata-Quercus agrifolia*/Annual Grass-Herb Association (1323)**

II.C.1.b. Valley oak occurs with shrubby or tree-sized arroyo willow in riparian settings.

***Quercus lobata-Salix lasiolepis* Association (1324)**

II.C.2. Coast live oak occurs as the dominant tree in the canopy, while California sycamore and/or California bay may be subdominant to codominant.

***Quercus agrifolia* Alliance (1110)**

II.C.2.a. Willows (*Salix lasiolepis* primarily) are subdominant trees with coast live oak in riparian or ravine settings.

III.C.2.a.i. Arroyo willow and/or red willow are subdominant overstory or understory trees with coast live oak. Riparian shrubs and herbs may also be present, including mule fat, mugwort, and rorippa.

***Quercus agrifolia-Salix lasiolepis* Association (6114)**

II.C.2.b. Coast live oak is usually the sole dominant tree species in the overstory in upland (usually nonriparian) settings over a variety of understory layers from grassy to scrubby.

II.C.2.b.i. While the overstory is dominated solely by coast live oak, the understory is sparse to low in cover and may have occasional shrubs or herbs.

***Quercus agrifolia* South Coastal Association (6122)**

II.C.2.b.ii. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by annual grasses and herbs.

***Quercus agrifolia*/Annual Grass-Herb Association (1111)**

II.C.2.b.iii. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by poison oak and/or bush monkey flower in one layer and annual grasses and herbs in another layer, though the shrub layer usually has higher understory cover.

***Quercus agrifolia/Toxicodendron diversilobum* Association (1117)**

Note: This association includes the following phase, which may contain poison oak at sparse to moderate cover but also has bush monkey flower at moderate to high cover.

***Quercus agrifolia/Mimulus aurantiacus* Phase (6113)**

II.C.2.b.iv. While the overstory is dominated solely by coast live oak, the understory is primarily dominated by toyon. Laurel sumac may be present. If poison oak is present, cover is less than toyon.

***Quercus agrifolia/Heteromeles arbutifolia* Association (6117)**

Note: This association includes the following phase, which contains toyon and laurel sumac at moderate cover.

***Quercus agrifolia/Malosma laurina* Phase (6116)**

II.C.2.b.v. Chamise occurs as an open to dense understory under an open canopy of coast live oak.

***Quercus agrifolia/Adenostoma fasciculatum* Association (6115)**

II.C.2.b.vi. Greenbark ceanothus occurs as a tall understory shrub associated with an open to intermittent canopy of coast live oak.

***Quercus agrifolia/Ceanothus spinosus* Association (1118)**

II.C.2.b.vii. Scrub oak occurs as the principal understory shrub in an open to intermittent overstory of coast live oak.

***Quercus agrifolia/Quercus berberidifolia* Association (6112)**

II.C.2.b.viii. Both purple sage and California sagebrush occur as understory shrubs to an open to intermittent canopy of coast live oak.

***Quercus agrifolia/Salvia leucophylla-Artemisia californica* Association (1116)**

II.C.2.c. California bay is subdominant to codominant with coast live oak in the overstory. The understory may be open and grassy or may include a moderate to high cover of shrub cover.

II.C.2.c.i. Hairy leaf ceanothus occurs as a tall understory shrub associated with an open to intermittent canopy of coast live oak and frequently California bay. If poison oak is present, it is trace in cover.

***Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Association (1119)**

II.C.2.c.ii. The understory is usually open, though shrubs such as poison oak, toyon, and greenbark ceanothus may also be present at low to moderate cover.

***Quercus agrifolia-Umbellularia californica* Association (1114)**

Note: This association includes the following two phases: One contains poison oak at moderate cover but may also have other shrub species at low to moderate cover, and the other contains no poison oak.

***Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum* Phase (6119)**
***Quercus agrifolia-Umbellularia californica* Phase (1114)**

II.D. One or more willow species are the primary tree(s) in the riparian overstory. (Note: Although some willows may be considered shrubs in this area, most are tall enough to be identified as tree willows, and there is no separation of tree and shrub willow categories in this key.)

II.D.1. Arroyo willow *(S. lasiolepis)* is the dominant tree in the canopy or is codominant with red willow *(Salix laevigata)* in the canopy.

II.D.1.a. Red willow occurs with arroyo willow as a sub- or codominant in the overstory.

II.D.1.a.i. California blackberry and mugwort *(Artemisia douglasiana)* are usually present in the understory with a variety of other herbs and shrubs.

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association (1413)**

II.D.1.a.ii. Red willow and arroyo willow are co- or subdominant, but stands lack California blackberry and/or mugwort.

***Salix laevigata-Salix lasiolepis* Association (1410)**

II.D.1.a.iii. Red willow and arroyo willow both occur in the tree or tall shrub layer with mule fat as the characteristic shorter shrub.

***Salix laevigata-Salix lasiolepis/Baccharis salicifolia* Association (1412/1432)**

II.D.2. Riparian shrublands or woodlands in which arroyo willow *(Salix lasiolepis)* is dominant. An emergent and sparse tree layer may also be present.

***Salix lasiolepis* Alliance (1430)**

II.D.2.a. Laurel sumac is a common and characteristic shrub associating with the overstory-dominant arroyo willow, occasionally seen on seeps and bluffs along the immediate coast.

***Salix lasiolepis/Malosma laurina* Association (1433)**

II.D.2.b. Mule fat is a characteristic subdominant or codominant with arroyo willow.

***Salix lasiolepis/Baccharis salicifolia* Association (1414)**

II.D.3. The overstory is dominated by the clonal shrubby to short tree-sized narrow-leaved willow. Stands are uncommon and usually small in the study area.

***Salix exigua* Alliance (3110)**

II.D.4. Red willow is the sole dominant.

***Salix laevigata* Alliance (1420)**

II.E. White alder *(Alnus rhombifolia*) is the dominant or, most commonly, it shares dominance with other trees. It is usually restricted to permanently flowing streams close to the coast.

***Alnus rhombifolia* Alliance (1440)**

II.E.1. White alder is codominant to subdominant with California sycamore.

***Alnus rhombifolia-Platanus racemosa* Association (1441)**

II.F. A species of *Eucalyptus* dominates in the tree/shrub canopy, though there may be a minor presence of native trees/shrubs. Most stands are planted and noninvasive in this study area.

***Eucalyptus* Alliance (9510)**

II.G. California bay occurs as a tree or tall shrub usually dominant or codominant with coast live oak, California walnut, California sycamore, white alder, or taller mesic chaparral shrubs such as greenbark or hairy leaf ceanothus *(Ceanothus spinosus* or *C. oliganthus).*

***Umbellularia californica* Alliance (1010)**

II.G.1. California bay dominates or codominates in upland settings and not usually adjacent to streams or bottomlands.

II.G.1.a. California bay is either a shrub or a tree of rocky upland settings associated with hairy leaf ceanothus and usually associated with coast live oak in lower cover.

***Umbellularia californica/Ceanothus oliganthus* Association (1012)**

II.G.2. California bay occurs in stands in convex upper slopes and ravines or in true riparian settings adjacent to streams and associated with California walnut, California sycamore, or white alder.

II.G.2.a. California bay occurs along perennial streams with white alder, rare and local in the Santa Monica Mountains.
***Umbellularia californica-Alnus rhombifolia* Association (1013)**

II.G.2.b. California bay occurs along streams or in ravines with codominance to a low cover presence of California sycamore.
***Umbellularia californica-Platanus racemosa* Association (1014)**

II.G.2.c. California bay occurs with California walnut as a frequent subdominant and greenbark ceanothus as the principal understory shrub, usually in ravines and concavities on slopes.
***Umbellularia californica-Juglans californica/Ceanothus spinosus* Association (1011)**

II.H. Interior live oak occurs as a dominant or codominant in the tree/shrub overstory.

***Quercus wislizeni* Alliance (2560)**

Note: In this study the few known stands of *Quercus wislizeni* Alliance appear to be dominated by shrubby individuals and have been placed in the Shrub-Overstory Vegetation section of this classification. For thoroughness and assuming that there may be some stands that reach near tree-size, they may be keyed here or in the shrub key that follows.

Class B. Shrub-Overstory Vegetation

Group I: Shrublands are dominated by sclerophyllous temperate broad-leaved shrubs (with leaves hardened by a waxy cuticle). They are dominated by typical chaparral shrub genera including chamise *(Adenostoma fasciculatum*), manzanita *(Arctostaphylos*), *Ceanothus,* mountain mahogany *(Cercocarpus),* scrub oaks *(Quercus),* coffeeberry *(Rhamnus),* and so forth. This group also includes vegetation dominated or codominated by large broad-leaved evergreen species such as *Malosma laurina* and *Rhus* spp., which may be associated with shorter nonsclerophyll shrubs.

I.A. A postfire transition scrub dominated by bush poppy *(Dendromecon rigida),* usually with chamise *(Adenostoma fasciculatum)* or other chaparral shrubs present. Note: Bush poppy is considered by some as a drought-deciduous species and may also be keyed in Group II of this shrub key.

***Dendromecon rigida* Alliance,**
***Dendromecon rigida* Association (3350)**

I.B. The shrubland overstory is dominated primarily by one species of shrub oak (*Quercus*) or has shared dominance with other chaparral shrub species such as chamise.

I.B.1. Scrub oak *(Quercus berberidifolia)* usually occurs as a dominant or, if it codominates, it is not codominant with chamise nor birch leaf mountain mahogany.

***Quercus berberidifolia* Alliance (2160)**

I.B.1.a. Scrub oak occurs as the sole dominant in the shrub layer. Other shrubs may occur as subdominants.

***Quercus berberidifolia* Association (2161)**

Note: This association is complex including two phases with a small but constant cover of either chamise or toyon.

***Quercus berberidifolia-Heteromeles arbutifolia* Phase (2164)**
***Quercus berberidifolia-Adenostoma fasciculatum* Phase (2163)**

I.B.1.b. Greenbark ceanothus *(C. spinosus)* characteristically occurs as a subdominant or codominant with scrub oak.

***Quercus berberidifolia-Ceanothus spinosus* Association (2167)**

I.B.2. Scrub oak codominates with chamise (chamise and scrub oak each > 15% relative cover in the shrub layer), other shrubs in the stands are significantly less cover.

***Adenostoma fasciculatum-Quercus berberidifolia* Alliance (2580)**
***Adenostoma fasciculatum-Quercus berberidifolia* Association (2581)**

I.B.3. Scrub oak *(Quercus berberidifolia)* usually occurs as a codominant or subdominant with birch leaf mountain mahogany (typically both with 10% cover).

***Quercus berberidifolia-Cercocarpus betuloides* Alliance (2590)**
***Quercus berberidifolia-Cercocarpus betuloides* Association (2591)**

I.B.4. The overstory is dominated by interior live oak. Stands are uncommon and small and are at the upper elevations of the Santa Monica Mountains, usually in rocky settings.

***Quercus wislizeni* var. *frutescens* Alliance (2560)**

I.C. The overstory is dominated by lemonade berry *(Rhus integrifolia),* holly leaf cherry *(Prunus ilicifolia),* sugar bush *(Rhus ovata),* or toyon *(Heteromeles arbutifolia),* and the shrubs may have shared dominance with other evergreen, coastal scrub, or succulent shrubs.

I.C.1. Lemonade berry occurs as the dominant shrub in an open to intermittent overstory while other shrubs (mostly nonchaparral coastal scrub species) may be present at low cover.

***Rhus integrifolia* Alliance (2150)**

I.C.1.a. Lemonade berry strongly dominates the shrub layer, though the shrub layer is typically open to intermittent in cover.

***Rhus integrifolia* Association (2153)**

Note: This is a complex association including four phases: one with a constant low cover of toyon; one with nearly pure shrub cover of lemonade berry; one with a postfire phase with a constant low cover of bush mallow; and one with a cover of laurel sumac and sagebrush.

***Rhus integrifolia-Heteromeles arbutifolia* Phase (2158)**
***Rhus integrifolia* Phase (2153)**
***Rhus integrifolia-Malacothamnus fasciculatus* Phase (7153)**
***Rhus integrifolia-Malosma laurina-Artemisia californica* Phase (7156)**

I.C.1.b. Lemonade berry is conspicuous in the shrub layer but regularly has smaller, usually drought-deciduous coastal scrub shrubs associating with it.

I.C.1.b.i. California sagebrush and/or ashy buckwheat are subdominants and may occur in equal to higher cover (in total) to lemonade berry.

***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association (7157)**

Note: This is a complex association including three phases that contain lemonade berry mixed with drought deciduous shrubs; one with California sagebrush and purple sage; one with California sagebrush and ashy buckwheat; and another, often of steep bluffs, with ashy buckwheat and low cover of coast yucca and giant coreopsis.

***Rhus integrifolia-Artemisia californica-Salvia leucophylla* Phase (2155)**
***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association Phase (7157)**
***Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea* Phase (7155)**

I.C.1.b.ii. Coast prickly pear cactus and ashy buckwheat are conspicuous species associated with lemonade berry, usually of coastal bluffs along the western end of the Santa Monica Mountains and volcanic slopes above the Oxnard Plain.

***Rhus integrifolia-Opuntia* spp.-*Eriogonum cinereum* Association (2151)**

I.C.2. Holly leaf cherry occurs as a dominant or codominant shrub with other shrubs such as toyon in an open to intermittent overstory. Usually found in steep, mesic concavities or near rock outcroppings.

***Prunus ilicifolia* Alliance (2120)**

I.C.2.a. Toyon occurs as a subdominant to codominant shrub in the overstory.

***Prunus ilicifolia-Heteromeles arbutifolia* Association (2121)**

I.C.3. Toyon occurs as a codominant to dominant shrub in an open to continuous shrub overstory.

***Heteromeles arbutifolia* Alliance (2130)**

I.C.3.a. Laurel sumac frequently occurs as a subdominant or codominant shrub with toyon in the overstory, and there may have several other shrub species (including *Rhus* spp.) associated in lower cover.

***Heteromeles arbutifolia-Malosma laurina* Association (2138)**

Note: This is a complex association including five phases, each with a mixture of toyon and laurel sumac along with different shrubs as subdominants as indicated in the phase names. The *Heteromeles* phase has virtually no other major shrub species.

***Heteromeles arbutifolia-Malosma laurina-Artemisia californica-Mimulus aurantiacus* Phase (2135)**
***Heteromeles arbutifolia-Malosma laurina-Cercocarpus betuloides* Phase (2136)**
***Heteromeles arbutifolia-Malosma laurina-Quercus agrifolia* Phase (2137)**
***Heteromeles arbutifolia-Malosma laurina-Salvia mellifera-Rhus* spp. Phase (2138)**
***Heteromeles arbutifolia* Phase (2137)**

I.C.4. Sugar bush occurs as a dominant or codominant or sometimes may be subdominant to California sagebrush and/or purple sage in an open to intermittent shrub overstory with other shrub species.

***Rhus ovata* Alliance (2190)**

I.C.4.a. Sugar bush is strongly dominant with a significantly lower cover of other shrubs.

***Rhus ovata* Association (2193)**

I.C.4.b. Sugar bush tends to codominate with purple sage and/or California sagebrush.

***Rhus ovata-Salvia leucophylla-Artemisia californica* Association (2192)**

I.D. Birch leaf mountain mahogany occurs as a dominant or codominant with other chaparral shrubs.

I.D.1. Birch leaf mountain mahogany occurs as a dominant or codominant with other chaparral shrubs in an open to continuous shrub overstory.

***Cercocarpus betuloides* Alliance (2110)**

I.D.1.a. Birch leaf mountain mahogany usually occurs as a strong dominant, though shrubs such as toyon may occur as subdominants.

***Cercocarpus betuloides* Association (2114)**

I.D.1.b. Birch leaf mountain mahogany is codominant with chamise, although other shrubs may occur in lower cover, usually on upper northerly facing steep slopes adjacent to ridges.

***Cercocarpus betuloides-Adenostoma fasciculatum* Association (2115)**

I.D.1.c. Birch leaf mountain mahogany is codominant with greenbark ceanothus, usually on lower, more mesic slope positions than the former association.

***Cercocarpus betuloides-Ceanothus spinosus* Association (2113)**

I.D.1.d. Birch leaf mountain mahogany is dominant to codominant with laurel sumac and California sagebrush, usually found in coastal areas.

***Cercocarpus betuloides-Malosma laurina-Artemisia californica* Association (2117)**

Note: This association is complex and includes two phases, one where laurel sumac is more of a clear codominant with birch leaf mountain mahogany while California sagebrush is subdominant, and another where laurel sumac and sagebrush

are subdominant and *Melica imperfecta* is a conspicuous understory grass.

***Cercocarpus betuloides-Malosma laurina* Phase (2117)**
***Cercocarpus betuloides-Malosma laurina-Artemisia californica/Melica imperfecta* Phase (2111)**

I.E. Laurel sumac usually occurs as a codominant to dominant in an open to intermittent shrub overstory often with nonsclerophyllous shrubs such as California buckwheat, black sage *(Salvia mellifera),* or California sagebrush.

***Malosma laurina* Alliance (2140)**

I.E.1. Laurel sumac is strongly dominant with significantly lower cover of all other shrub species, usually forming an open to intermittent shrub cover.

***Malosma laurina* Association (7142)**

Note: This association includes a phase where annual grasses and herbs predominate in the understory, and another phase where the herbaceous layer is low in cover.

***Malosma laurina*/Annual Grass-Herb Phase (2145)**
***Malosma laurina* Phase (7142)**

I.E.2. California buckwheat occurs as a codominant short shrub along with the taller laurel sumac. Other shrubs may occur at low cover.

***Malosma laurina-Eriogonum fasciculatum* Association (21423)**

Note: This complex association includes three phases: one with other coastal sage species such as California sagebrush, one with essentially only the two nominate species in the shrub layer, and another with chaparral species such as big pod ceanothus as low cover associates.

***Malosma laurina-Eriogonum fasciculatum-Artemisia californica*/Annual Grass-Herb Phase (3382)**
***Malosma laurina-Eriogonum fasciculatum* Phase (21423)**
***Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus* Phase (3383)**

I.E.3. Black sage is usually codominant or a major subdominant shrub with laurel sumac. Ashy buckwheat is not present in significant cover.

***Malosma laurina-Salvia mellifera* Association (2148)**

I.E.4. Sugar bush and big pod ceanothus are constant subdominants with laurel sumac.

***Malosma laurina-Rhus ovata-Ceanothus megacarpus* Association (21415)**

I.E.5. Ashy buckwheat is a codominant to subdominant with laurel sumac. Several other shrubs may be associated at lower cover.

***Malosma laurina-Eriogonum cinereum* Association (2141)**

Note: This complex association includes five phases each with different subdominants or, in one case, only with the two nominate species as codominants. At least two are postfire phases indicated by the presence of either bush mallow or deerweed.

***Malosma laurina-Eriogonum cinereum-Lotus scoparius* Phase (7144)**
***Malosma laurina-Eriogonum cinereum-Salvia mellifera* Phase (7141)**
***Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera* Phase (7146)**
***Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica* Phase (21413)**
***Malosma laurina-Eriogonum cinereum* Phase (2141)**

I.E.6. Laurel sumac codominates or dominates with California sagebrush. Stands may or may not include purple sage as a subdominant.

***Malosma laurina-Artemisia californica* Association (7148)**

Note: This complex association may include stands where purple sage occurs as a subdominant along with the other two nominate shrubs or stands where the nominate species are the only significant shrub cover.

***Malosma laurina-Artemisia californica-Salvia leucophylla* Phase (2142)**
***Malosma laurina-Artemisia californica* Phase (7148)**

I.F. A manzanita species occurs as a dominant in the shrub overstory.

I.F.1. Eastwood manzanita occurs as the sole dominant in the shrub overstory, usually making up at least two-thirds of the total shrub cover, uncommon at the upper elevations in the Santa Monica Mountains.

***Arctostaphylos glandulosa* Alliance,**
***Arctostaphylos glandulosa* Association (2550)**

I.F.2. Big berry manzanita occurs as a dominant in the shrub overstory, most common in the Simi Hills portion of the study area.

***Arctostaphylos glauca* Alliance (2540)**

I.G. The overstory is dominated by *Ceanothus* alone or in shared dominance with other broadleaf evergreen shrubs.

I.G.1. Hoary leaf ceanothus *(Ceanothus crassifolius)* usually occurs as a dominant or as a codominant with species such as laurel sumac.

***Ceanothus crassifolius* Alliance (2060)**

I.G.1.a. Hoary leaf ceanothus occurs as the sole dominant species, and other chaparral shrubs, if present, are relatively low in cover.

***Ceanothus crassifolius* Association (2063)**

I.G.1.b. Laurel sumac occurs as a subdominant to codominant in the shrub overstory.

***Ceanothus crassifolius-Malosma laurina* Association (2065)**

I.G.2. Wedge leaf ceanothus *(Ceanothus cuneatus)* occurs as the dominant in an open to intermittent shrub overstory.

***Ceanothus cuneatus* Alliance (2520)**

I.G.2.a. Wedge leaf ceanothus occurs with a constant subordinate cover of scrub oak, and stands are scattered throughout the central portion of the Santa Monica Mountains.

***Ceanothus cuneatus-Quercus berberidifolia* Association (2521)**

I.G.3. Big pod ceanothus *(Ceanothus megacarpus)* is dominant in an intermittent to continuous shrub overstory.

***Ceanothus megacarpus* Alliance (2080)**

I.G.3.a. Big pod ceanothus is the sole dominant shrub with no other species at significant cover in the stands.

***Ceanothus megacarpus* Association (2081)**

I.G.3.b. Big pod ceanothus is dominant with chamise subdominant to codominant.

***Ceanothus megacarpus-Adenostoma fasciculatum* Association (2083)**

Note: This complex association includes a phase with black sage as a subdominant along with chamise and a phase where just the two nominate species are present in the shrub layer.

***Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera* Phase (7083)**
***Ceanothus megacarpus-Adenostoma fasciculatum* Phase (2083)**

I.G.3.c. Big pod ceanothus occurs as a dominant along with redshank as a subdominant.

***Ceanothus megacarpus-Adenostoma sparsifolium* Association (2082)**

I.G.3.d. Big pod ceanothus occurs as a dominant with birch leaf mountain mahogany as a subdominant. May also include scrub oak in the stand.

***Ceanothus megacarpus-Cercocarpus betuloides* Association (2084)**

I.G.3.e. Big pod ceanothus dominates with a subdominance of laurel sumac. May have other shrubs in lower cover such as chamise and black sage.

***Ceanothus megacarpus-Malosma laurina* Association (2087)**

Note: This complex association includes two phases: one with chamise and other chaparral species and another with the two nominate species providing almost all of the cover.

***Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral* Phase (7081)**
***Ceanothus megacarpus-Malosma laurina* Phase (2087)**

I.G.3.f. Big pod ceanothus dominates with a subdominance of black sage.

Ceanothus megacarpus-Salvia mellifera Association (7085)

I.G.3.g. Big pod ceanothus dominates or codominates with chaparral mallow.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association (3288)**

I.G.3.h. Big pod ceanothus is the dominant or codominant along with the subdominant to codominant greenbark ceanothus.

***Ceanothus spinosus-Ceanothus megacarpus* Association (2091)**

I.G.4. Hairy leaf ceanothus *(Ceanothus oliganthus)* is usually dominant in an open to continuous shrub overstory, typical in mesic sites at upper elevations or interior locations in the study area.

***Ceanothus oliganthus* Alliance (2070)**

I.G.4.a. Hairy leaf ceanothus is the dominant shrub, no other species provides high cover in the shrub layer.

***Ceanothus oliganthus* Association (2072)**

I.G.4.b. Hairy leaf ceanothus is the dominant shrub, but redshank is a regular subdominant.

***Ceanothus oliganthus-Adenostoma sparsifolium* Association (2078)**

I.G.4.c. Toyon and/or sugar bush are subdominant to hairy leaf ceanothus.

***Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Association (2076)**

I.G.4.d. Scrub oak is subdominant to hairy leaf ceanothus.

***Ceanothus oliganthus-Quercus berberidifolia* Association (2077)**

I.G.5. Stands are dominated by the large mesophytic greenbark ceanothus.

***Ceanothus spinosus* Alliance (2090)**

I.G.5.a. Greenbark ceanothus strongly dominates the shrub overstory with only minor cover of other shrubs including toyon, holly leaf cherry, or laurel sumac.

***Ceanothus spinosus* Association (2092)**

Note: This complex association includes three phases based on the subordinate shrub species. In one case greenbark ceanothus is the sole dominant.

***Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia* Phase (2094)**
***Ceanothus spinosus-Malosma laurina* Phase (2097)**
***Ceanothus spinosus* Phase (2090)**

I.G.5.b. Greenbark ceanothus is the dominant or codominant along with the subdominant to codominant big pod ceanothus.

***Ceanothus spinosus-Ceanothus megacarpus* Association (2091)**

I.H. The overstory is dominated by chamise alone or in shared dominance with other chaparral or coastal scrub species in an open to continuous shrub canopy.

I.H.1. Chamise occurs as a dominant or as a codominant with laurel sumac, California buckwheat, big pod ceanothus, or other shrubs such as yerba santa or bush monkey flower.

***Adenostoma fasciculatum* Alliance (2010)**

I.H.1.a. Chamise occurs as a sole dominant shrub with no other constant subdominants.

***Adenostoma fasciculatum* Association (2011)**

I.H.1.b. Big pod ceanothus occurs as a codominant or subdominant with chamise.

***Adenostoma fasciculatum-Ceanothus megacarpus* Association (2019)**

I.H.1.c. California buckwheat occurs as a subdominant or codominant with chamise.

I.H.1.c.i. Chamise and California buckwheat occur in an open to intermittent shrub overstory with various mostly nonnative herbs among these two shrubs.

***Adenostoma fasciculatum-Eriogonum fasciculatum* Association (2017)**

Note: This complex association includes the postfire or postdisturbance phases.

***Adenostoma fasciculatum-Eriogonum fasciculatum*/Annual Grass-Herb Phase (2017)**

***Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida* Phase (7012)**

I.H.1.d. Laurel sumac usually occurs as a codominant with chamise.

***Adenostoma fasciculatum-Malosma laurina* Association (2013)**

I.H.1.d.i Laurel sumac and Chamise are joined with yerba santa in an open to intermittent shrub overstory over annual herbs and grasses.

***Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium*/Annual Grass-Herb Association (7018)**

I.H.1.e. Chamise is dominant to codominant with bush monkey flower.

***Adenostoma fasciculatum-Mimulus aurantiacus* Association (7013)**

I.H.1.f. Chamise is dominant and accompanied by purple sage as a subdominant to occasional codominant.

***Adenostoma fasciculatum-Salvia leucophylla* Association (2018)**

I.H.2. Eastwood manzanita is usually codominant (occasionally subdominant) with chamise in an open to continuous shrub overstory.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Alliance (2020)**

I.H.2.a. Eastwood manzanita occurs as a codominant with chamise and may have big pod ceanothus as a subdominant.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Association (2021)**

Note: Included is the variant with big pod ceanothus consistently present at low cover.

Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa* Phase *(7017)

I.H.3. Big berry manzanita usually occurs as a codominant with chamise in an intermittent to continuous shrub overstory. Wedge leaf ceanothus, cup leaf ceanothus, and hoary leaf ceanothus are absent or subdominant.

***Adenostoma fasciculatum-Arctostaphylos glauca* Alliance (2530)**

***Adenostoma fasciculatum-Arctostaphylos glauca* Association (2531)**

I.H.4. Hoary leaf ceanothus usually occurs as a codominant with chamise in an open to intermittent shrub overstory locally with other shrubs including laurel sumac.

***Adenostoma fasciculatum-Ceanothus crassifolius* Alliance (2570)**

I.H.4.a. Laurel sumac characteristically occurs as a subdominant or codominant and is lower in cover than hoary leaf ceanothus and chamise.

***Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association (2572)**

I.H.5. Wedge leaf ceanothus occurs as a codominant with chamise in an intermittent to continuous shrub overstory. Other shrubs may intermix as subdominants.

***Adenostoma fasciculatum-Ceanothus cuneatus* Alliance (2510)**

I.H.5.a Black sage and laurel sumac occur as subdominants to chamise and wedge leaf ceanothus in an intermittent to continuous shrub overstory.

***Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Alliance Association (2511)**

I.H.6. Black sage usually occurs as codominant with chamise in an open to continuous shrub overstory. Wedge leaf ceanothus is absent or, if present, < 5% relative cover.

***Adenostoma fasciculatum-Salvia mellifera* Alliance (2030)**

Note: If wedge leaf ceanothus is present at significant cover, see heading I.H.5.

I.H.6.a. Laurel sumac occurs as a subdominant.
Adenostoma fasciculatum-Salvia mellifera-Malosma laurina **Association (2035)**

I.H.6.b. Sugar bush occurs as a subdominant and is consistently lower in cover than black sage.
Adenostoma fasciculatum-Salvia mellifera-Rhus ovata **Association (2038)**

I.H.6.c. Chamise and black sage are sole principal shrubs with an open herbaceous understory composed mainly of nonnative species.
Adenostoma fasciculatum-Salvia mellifera **Association (2036)**

I.H.7. Scrub oak codominates with chamise (chamise and scrub oak each > 15% relative cover in the shrub layer), other shrubs in the stands are significantly less cover.
Adenostoma fasciculatum-Quercus berberidifolia **Alliance (2580)**
Adenostoma fasciculatum-Quercus berberidifolia **Association (2581)**

I.I. The overstory is dominated by redshank alone or in shared dominance with other chaparral (including chamise), deciduous, or succulent species in an open to continuous shrub canopy.

I.I.1. Redshank occurs as a dominant. If chamise is present, it occurs at trace cover.
Adenostoma sparsifolium **Alliance (2050)**

I.I.2. Redshank usually occurs with chamise as a codominant in an open to continuous shrub layer.
Adenostoma sparsifolium-Adenostoma fasciculatum **Alliance (2040)**

I.I.2.a. Hoary leaf ceanothus are characteristically present at > 1% cover.
Adenostoma sparsifolium-Adenostoma fasciculatum-Ceanothus crassifolius **Association (2042)**

<u>Group II.</u> Shrublands are dominated mainly by soft-leaved or succulent shrubs that are microphyllous or broad-leaved, and they include cactus, drought-deciduous, summer-deciduous, and/or cold-deciduous species. These are generally considered to be part of coastal sage scrub or other more soft-leaved shrub habitats. Chaparral species may be present but are

not dominant. Included are shrub willow *(Salix),* baccharis *(Baccharis),* buckwheat *(Eriogonum),* sagebrush *(Artemisia),* sage *(Salvia),* prickly pear *(Opuntia)*, bush mallow *(Malacothamnus),* poison oak *(Toxicodendron)*, California rose *(Rosa californica),* Canyon sunflower *(Venegasia carpesioides),* and so forth.

II.A. The shrub overstory is characterized by deciduous shrubs or by shrubs with scale-like leaves that are primarily found in riparian or wetland habitats.

II.A.1. Shrublands are characterized by the presence of scale broom *(Lepidospartum squamatum),* where scale broom is usually dominant but may be codominant or subdominant with other shrubs. These are generally found in rocky, occasionally flooded washes or floodplains.

***Lepidospartum squamatum* Alliance (2220)**

II.A.2. Shrublands are characterized by the dominance of mule fat alone or in shared dominance with other shrubs. An emergent and sparse tree layer of willows or other species may also be present.

***Baccharis salicifolia* Alliance (2210)**
***Baccharis salicifolia*-Riparian Association (2212)**

II.A.3. Shrublands in which a willow *(Salix*) is dominant, usually as a tall shrub or low tree. An emergent and sparse overstory tree layer may also be present.

II.A.3.a. Arroyo willow is the dominant species. (Note: May also be considered a tree, see tree key above.) It may be accompanied by mule fat *(Baccharis salicifolia),* laurel sumac *(Malosma laurina),* or other riparian shrubs.

***Salix lasiolepis* Alliance (1430)**

II.A.3.a.i. Laurel sumac is a subdominant to codominant with arroyo willow.

***Salix lasiolepis/Malosma laurina* Association (1433)**

II.A.3.a.ii. Mule fat is a characteristic subdominant or codominant with arroyo willow.

***Salix lasiolepis/Baccharis salicifolia* Association (1432)**

II.A.3.b. Narrow leaf willow *(Salix exigua)* dominates but is uncommon in small shrubby stands.

***Salix exigua* Alliance (3110)**

II.A.4. Shrublands in which California rose *(Rosa californica)* dominates the canopy, usually small narrow strips adjacent to other riparian vegetation.

***Rosa californica* Alliance (3010)**

II.A.5. Shrublands in which Mexican elderberry *(Sambucus mexicana)* is dominant in the overstory (although other shorter shrubs may be common). At times, the elderberry may take the form of a small tree.

***Sambucus mexicana* Alliance (3020)**

II.A.5.a. Mexican elderberry occurs over a mixture of herbaceous species including the native giant wild rye *(Leymus condensatus)* and other annual grasses and herbs.

***Sambucus mexicana/Leymus condensatus*/Annual Grass-Herb Association (3021)**

II.A.5.b. Mexican elderberry occurs with toyon and annual grasses and herbs in the understory.

***Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Association (3022)**

II.B. Shrublands are dominated by drought-deciduous or coastal succulent shrubs that are primarily in upland or mesic habitats.

II.B.1. Shrubland is usually characterized by the dominance of a species of encelia *(Encelia)* alone or in shared dominance with other shrubs. California sagebrush *(Artemisia californica)* occasionally may be dominant when encelia has at least 5 percent cover.

II.B.1.a. Shrubland in which California encelia *(Encelia californica)* is dominant or codominant in the canopy.

***Encelia californica* Alliance (3220)**

II.B.1.a.i. California encelia is the sole dominant or occurs with subdominant California buckwheat.

***Encelia californica* Association (3222)**

Note: Included is one phase with California buckwheat as subdominant and another phase in which California encelia is strongly dominant.

***Encelia californica-Eriogonum fasciculatum* Phase (3224)**
***Encelia californica* Phase (3222)**

II.B.1.a.ii. California sagebrush is characteristically subdominant to codominant with California encelia.

***Encelia californica-Artemisia californica* Association (3227)**

II.B.1.a.iii. Ashy buckwheat *(Eriogonum cinereum)* codominates or is subdominant with California encelia.

***Encelia californica-Eriogonum cinereum* Association (3225)**

II.B.1.a.iv. Laurel sumac and black sage regularly occur with and may codominate with California encelia.

***Encelia californica-Malosma laurina-Salvia mellifera* Association (3221)**

II.B.1.a.v. Lemonade berry *(Rhus integrifolia)* co-occurs as a subdominant to California encelia.

***Encelia californica-Rhus integrifolia* Association (3226)**

II.B.2. Shrubland with a succulent coastal prickly pear *(Opuntia oricola* or *littoralis)* or cholla *(Opuntia prolifera)* is dominant.

II.B.2.a. Coast prickly pear *(Opuntia littoralis)* is dominant or codominant with coastal sage scrub species and other cactus species.

***Opuntia littoralis* Alliance (2410)**

II.B.2.a.i. A mixture of *Opuntia* species (*littoralis, oricola,* and/or *prolifera*) may be present along with other coastal sage scrub species (*Eriogonum* spp., *Encelia californica, Artemisia californica,* etc.).

***Opuntia* spp.-Mixed Coastal Sage Scrub Association (2412)**

II.B.3. Shrubland in which giant coreopsis *(Coreopsis gigantea) is* dominant or codominant in the shrub overstory.

***Coreopsis gigantea* Alliance (3340)**

II.B.3.a. Giant coreopsis is codominant to dominant with California sagebrush and ashy buckwheat. Generally found on sea bluffs and steep slopes within one kilometer of the ocean but may extend a few kilometers inland when directly adjacent to the Conejo Plain.

***Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Association (3345)**

II.B.3.b. Giant coreopsis dominates or codominates with dune goldenbush and California encelia. Usually on sandy soils of dunes or slopes adjacent to the ocean, mostly localized around Point Dume.

***Coreopsis gigantea-Ericameria ericoides-Encelia californica* Association (3342)**

II.B.4. Shrubland in which California sagebrush *(Artemisia)* is dominant or codominant with white sage, black sage, California buckwheat, or laurel sumac in the canopy. The shrub canopy is sometimes over a higher cover of annual or perennial herbs such as bromes *(Bromus)*, cryptantha *(Cryptantha)*, stork's bill *(Erodium),* etc.

II.B.4.a. California sagebrush is codominant with California buckwheat and sometimes also with laurel sumac.

***Artemisia californica-Eriogonum fasciculatum* Alliance (3370)**

II.B.4.a.i. California sagebrush and California buckwheat usually codominate in the canopy.

***Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association (3371)**

II.B.4.a.ii. California buckwheat and purple sage occur as subdominants to codominants with California sagebrush.

***Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Association (3372)**

II.B.4.a.iii. California buckwheat is usually codominant with California sagebrush, while black sage is subdominant to codominant.

***Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Association (3373)**

II.B.4.b. California sagebrush is codominant with purple sage, and sometimes other shrubs may also be codominant.

***Salvia leucophylla* Alliance (3310)**

II.B.4.b.i. California sagebrush and purple sage are the sole dominants in the shrub canopy.

***Salvia leucophylla-Artemisia californica* Association (3391)**

Note: Included is a phase with giant wild rye at moderate cover and a phase in which the nominate species are the only species of significant cover.

***Salvia leucophylla-Artemisia californica/Leymus condensatus* Phase (3393)**
***Salvia leucophylla- Artemisia californica* Phase (3391)**

II.B.4.b.ii. California sagebrush and purple sage codominate, while ashy buckwheat is usually subdominant and *Nassella* sp. is characteristic of the herb layer.

***Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* sp. Association (3396)**

Note: Included are the following three phases: one of which has ashy buckwheat along with the codominants, and two have the following shrub species:

***Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella* sp. Phase (3395)**
***Salvia leucophylla-Artemisia californica-Mimulus aurantiacus* Phase (3392)**
***Salvia leucophylla- Artemisia californica-Eriogonum cinereum/Nassella* sp. Phase (3396)**

II.B.4.c. California sagebrush is the sole dominant species in the canopy, or it is sometimes codominant with laurel sumac, ashy buckwheat, or bush monkey flower. A higher cover of annual or perennial herbs such as bromes *(Bromus)* may be present.

***Artemisia californica* Alliance (3210)**

II.B.4.c.i. California sagebrush is the sole dominant species in the shrub canopy, stands may be open to dense with a sparse to dense understory of herbaceous species.

***Artemisia californica* Association (8213)**

Note: This complex association includes three phases that may be distinguished by the additional species or species groups in the epithets. In the two shrub phases, the associated species are characteristic but relatively low in cover.

***Artemisia californica*/Annual Grass-Herb Phase (8213)**
***Artemisia californica-Salvia leucophylla* Phase (3211)**
***Artemisia californica-Malosma laurina* Phase (3219)**

II.B.4.c.ii. Giant wild rye is a conspicuous understory species (may be as tall as California sagebrush) while California sagebrush is the main cover in the shrub overstory.

***Artemisia californica/Leymus condensatus* Association (3216)**

II.B.4.c.iii. Ashy buckwheat is a subdominant to codominant with California sagebrush. Bush monkey flower and the understory grass *Melica imperfecta* may be present.

***Artemisia californica-Eriogonum cinereum* Association (3214)**

Note: This complex association includes a phase with just the two nominate species as the major species and a phase where bush monkey flower and *Melica imperfecta* are subdominant species.

***Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta* Phase (3218)**
***Artemisia californica-Eriogonum cinereum* Phase (3214)**

II.B.4.c.iv. Bush monkey flower occurs as the principle codominant or subdominant with California sagebrush. If ashy buckwheat is present, it is at trace cover only.

***Artemisia californica-Mimulus aurantiacus* Association (8214)**

II.B.5. Shrubland in which a sage *(Salvia)* species is dominant in the canopy or codominant with California buckwheat or brittlebush.

II.B.5.a. White sage is present in the canopy, usually subdominant to codominant with California buckwheat. Other shrubs may be present at relatively low cover such as California sagebrush, laurel sumac, etc.

***Eriogonum fasciculatum-Salvia apiana* Alliance,**
***E. fasciculatum-S. apiana* Association (3410)**

II.B.5.b. Black sage is usually dominant in the shrub canopy but may codominate with California sagebrush, deerweed *(Lotus scoparius),* sugar bush *(Rhus ovata),* or ashy buckwheat

***Salvia mellifera* Alliance (3320)**

II.B.5.b.i. Black sage is dominant in the shrub overstory but may occur with subdominant chamise, bush mallow, or California buckwheat.

***Salvia mellifera* Association (3324)**

Note: This complex association includes a pure phase where black sage is strongly dominant, a phase in which chamise occurs as a low-cover subdominant, a postfire phase with bush mallow, and a phase with low cover of California buckwheat.

***Salvia mellifera* Phase (3324)**
***Salvia mellifera-Adenostoma fasciculatum* Phase (3329)**
***Salvia mellifera-Malacothamnus fasciculatus* Phase (3322)**
***Salvia mellifera-Eriogonum fasciculatum* Phase (3321)**

II.B.5.b.ii. Laurel sumac is subdominant to codominant in the shrub overstory, while stands may also include low cover of lemonade berry and California sagebrush.

***Salvia mellifera-Malosma laurina* Association (8324)**

Note: This complex association has been divided into two phases: one in which the nominate species alone prevail and the other based on the low cover of the characteristically associated lemonade berry.

Salvia mellifera-Malosma laurina* Phase *(8324)
***Salvia mellifera-Artemisia californica-Rhus integrifolia* Phase (8322)**

II.B.5.b.iii. Sugar bush is subdominant to codominant in the shrub overstory.

***Salvia mellifera-Rhus ovata* Association (8325)**

II.B.5.b.iv. Ashy buckwheat occurs as a subdominant to codominant with black sage.

***Salvia mellifera-Eriogonum cinereum* Association (3323)**

II.B.5.b.v. California sagebrush is subdominant to codominant with black sage; stands may include subdominant purple sage.

***Salvia mellifera-Artemisia californica* Association (8321/3421)**

Note: This association includes one phase where purple sage occurs as a subdominant.

***Salvia mellifera-Artemisia californica-Salvia leucophylla* Phase (8323)**

II.B.5.c. Black sage usually occurs as codominant with chamise in an open to continuous shrub overstory.

***Adenostoma fasciculatum-Salvia mellifera* Alliance (2030)**

(For associations in this alliance, see heading I.H.6. in class B, group I [chaparral] of the shrub key above.)

II.B.5.d. Purple sage is the dominant shrub or may be codominant with ashy buckwheat.

***Salvia leucophylla* Alliance (3310)**

II.B.5.d.i. Purple sage is dominant in the shrub layer but may be accompanied by lower cover of several other species including ashy buckwheat, California sagebrush, bush mallow, or understory species of native and nonnative grasses and herbs.

***Salvia leucophylla* Association (3316)**

Note: This complex association includes the following three phases in which other grasses and shrubs may be present as subdominants and the last phase in which only purple sage is significant in the stands.

***Salvia leucophylla/Leymus condensatus* Phase (3319)**
***Salvia leucophylla/Nassella* spp. Phase (3311)**
***Salvia leucophylla-Artemisia californica-Malacothamnus fasciculatus* Phase (8311)**
***Salvia leucophylla* Phase (3315)**

II.B.5.d.ii. Ashy buckwheat occurs as a subdominant or codominant with purple sage, usually in an open to intermittent canopy with annual species in the understory.

***Salvia leucophylla-Eriogonum cinereum*/Annual Grass-Herb Association (3312)**

II.B.5.d.iii. California sagebrush occurs as a codominant with purple sage.

***Salvia leucophylla* Alliance, *Salvia leucophylla-Artemisia californica* Associations**

(For associations in this alliance, see heading II.B.4.b. in class B, group II [coastal sage scrub] of the shrub key above.)

II.B.6. Shrubland in which a buckwheat *(Eriogonum)* species is dominant in the canopy or is codominant with black sage, laurel sumac, bush mallow, or white sage. The shrub canopy is sometimes over a higher

cover of annual or perennial herbs such as bromes *(Bromus),* cryptantha *(Cryptantha),* stork's bill *(Erodium),* wild oats *(Avena),* etc.

II.B.6.a. California buckwheat is dominant with other shrubs in the canopy.

***Eriogonum fasciculatum* Alliance (3240)**

II.B.6.a.i. California buckwheat is usually the dominant shrub in the canopy, from coastal to inland sites, though sometimes this buckwheat may codominate with deerweed *(Lotus scoparius).*

***Eriogonum fasciculatum* Association (3241)**

Note: Included is a postfire/disturbance phase with deerweed subdominant to codominant and a phase in which California buckwheat is the sole dominant.

***Eriogonum fasciculatum-Lotus scoparius* Phase (3249)**
***Eriogonum fasciculatum* Phase (3241)**

II.B.6.a.ii. California buckwheat is dominant, and black sage and laurel sumac occur as subdominants.

***Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Association (3248)**

II.B.6.b. Ashy buckwheat occurs as the dominant low shrub but may be mixed with lower cover of other shrubs such as bush mallow *(Malacothamnus fasciculatus).*

***Eriogonum cinereum* Alliance (3250)**

II.B.6.b.i. Ashy buckwheat dominates with a variable cover of annual and perennial herbs and grasses.

***Eriogonum cinereum* Association (3257)**

Note: Included is the postfire phase and a phase in which ashy buckwheat is the strong dominant.

***Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus* Phase (3259)**
***Eriogonum cinereum* Phase (3257)**

II.B.7. Successional shrublands in which short-lived subshrubs or shrubs of deerweed *(Lotus scoparius),* bush poppy *(Dendromecon rigida),* or bush mallow *(Malacothamnus fasciculatus)* dominate following disturbance, particularly fire. The shrub canopy is sometimes over a higher cover of annual or perennial herbs such as bromes *(Bromus),*

common sand aster *(Lessingia filaginifolia),* needlegrass *(Nassella)*, stork's bill, wild oats, etc.

II.B.7.a. Deerweed *(Lotus scoparius)* is the dominant subshrub species in the canopy.

***Lotus scoparius* Alliance,**
***Lotus scoparius* Association (3270)**

Note: Included are the following two phases:
***Lotus scoparius-Artemisia californica*/Annual Grass-Herb Phase (3273)**
***Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera* Phase (3272)**

II.B.7.b. Bush mallow *(Malacothamnus fasciculatus)* is the dominant or codominant shrub species in the canopy. It may be associated with a variety of chaparral or coastal scrub species, which may be subdominant to codominant. These stands typically arise following fire events and do not persist for more than a decade or so.

***Malacothamnus fasciculatus* Alliance (3280)**

II.B.7.b.i. Stands strongly dominated by bush mallow with no other significant cover by shrub species.

***Malacothamnus fasciculatus* Association (3287)**

II.B.7.b.ii. Bush mallow associated with subdominant or codominant greenbark ceanothus.

***Malacothamnus fasciculatus-Ceanothus spinosus* Association (3289)**

II.B.7.b.iii. Bush mallow associated with subdominant or codominant big pod ceanothus.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association (3288)**

II.B.7.b.iv. Bush mallow is associated with subdominant laurel sumac.

***Malacothamnus fasciculatus-Malosma laurina* Association (3286)**

II.B.7.b.v. Bush mallow is associated with subdominant to codominant purple sage and often with subdominant California sagebrush.

Malacothamnus fasciculatus-Salvia leucophylla **Association (3281)**

II.B.7.b.vi. Bush mallow associated with subdominant to codominant black sage.

Malacothamnus fasciculatus-Salvia mellifera **Association (3282)**

II.B.7.c. Bush poppy dominates, usually following chaparral burns (This may also be keyed in chaparral/sclerophyllous shrubland key [Group 1 A of shrub key].)

Dendromecon rigida **Alliance,**
Dendromecon rigida **Association (3350)**

II.B.8. Shrub canopy dominated by the largely locally introduced quail bush *(Atriplex lentiformis),* usually along the coastal strip near highways.

Atriplex lentiformis **Alliance (2330)**

II.B.9. Shrub canopy dominated by the low facultatively drought-deciduous bush monkey flower.

Mimulus aurantiacus **Alliance (2170)**

II.B.9.a. Bush monkey flower is dominant and often has regularly spaced large shrubs of laurel sumac.

Mimulus aurantiacus-Malosma laurina **Association (2172)**

Note: This complex association includes a phase with purple sage as subdominant with laurel sumac as well as a phase in which only the nominate species prevail in the shrub layer.

Mimulus aurantiacus-Malosma laurina-Salvia leucophylla **Phase (2172)**
Mimulus aurantiacus-Malosma laurina **Phase (2172)**

II.C. Shrublands are typically uplands, dominated by cold-deciduous or thin broad-leaved species of mesic situations.

II.C.1. Poison oak *(Toxicodendron diversilobum)* is dominant in the shrub canopy, while a variety of other shrubs and herbs may also occur at lower cover.

Toxicodendron diversilobum **Alliance (3330)**

II.C.1.a. California sagebrush and giant wild rye mix as subdominants with poison oak in these stands.

***Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association (3331)**

II.C.1.b. Bush monkey flower is the subdominant shrub species in the canopy.

***Toxicodendron diversilobum-Mimulus aurantiacus* Association (3332)**

II.C.2. Mexican elderberry *(Sambucus mexicana)* is the dominant shrub species in the canopy, although other species such as *Salvia leucophylla, Artemisia californica*, and *Malosma laurina* may be present. At times, the elderberry may take the form of a small tree.

***Sambucus mexicana* Alliance (3020)**

II.C.2.a. Elderberry is dominant or codominant with toyon present or conspicuous.

***Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Association (3022)**

II.C.2.b. Elderberry is the dominant shrub species over the perennial giant wild rye and other annual herbs and grasses.

***Sambucus mexicana-Leymus condensatus*/Annual Grass-Herb Association (3021)**

II.C.3. Canyon sunflower, a leafy shrub of mesic slopes, conspicuous after fire, is dominant.

***Venegasia carpesioides* Alliance (4750)**

<u>Group III.</u> Vegetation dominated by microphyllous evergreen shrubs including coyote brush *(Baccharis pilularis),* cut-leaved goldenbush *(Hazardia squarrosa),* and broom *(Spartium junceum).*

III.A. Coyote brush is dominant, often with shrubs of coastal sage, such as *Artemisia californica* and *Salvia leucophylla*, as subordinates. Sometimes coyote brush is codominant, usually in disturbed areas such as old fields, road banks, and stream and ravine borders.

***Baccharis pilularis* Alliance (2310)**

III.A.1. Coyote brush dominates over a mixture of native and nonnative annual grasses and herbs.

***Baccharis pilularis*/Annual Grass-Herb Association (2311)**

III.A.2. Coyote brush dominates with California sagebrush as a subdominant. Purple sage and laurel sumac may be present.

***Baccharis pilularis-Artemisia californica* Association (2313)**

Note: Included are three phases in which one has both California sagebrush and purple sage occurring as subdominants, one has both California sagebrush and laurel sumac as subdominants, and one in which only sagebrush and coyote bush occur.

***Baccharis pilularis-Artemisia californica-Salvia leucophylla* Phase (2315)**
***Baccharis pilularis-Malosma laurina-Artemisia californica* Phase (2314)**
***Baccharis pilularis-Artemisia californica* Phase (2313)**

III.B. Cut-leaved goldenbush is the dominant low shrub usually with a mixture of herbs and grasses plus a low cover of California sagebrush and other shrubs.

***Hazardia squarrosa* Alliance (3260)**

III.B.1. Cut-leaved goldenbush dominates with a lower cover of California sagebrush usually present. Giant wild rye and/or a mixture of annual grasses and herbs may be present.

***Hazardia squarrosa-Artemisia californica* Association (3262)**

III.B.1.a. Understory is usually strongly dominated by a mixture of annual grasses and herbs; giant wild rye is absent or inconspicuous.

***Hazardia squarrosa*/Annual Grass-Herb Phase (3261)**

III.B.1.b. Herb layer is usually with a significant cover of giant wild rye.

***Hazardia squarrosa-Artemisia californica/Leymus condensatus* Phase (3262)**

III.B.2. Cut-leaved goldenbush dominates with open or intermediate cover over a herbaceous layer characterized by the native grass *Nassella pulchra* and the native annual herb *Hemizonia fasciculate*.

***Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Association (3263)**

III.C. The nonnative Spanish broom dominates stands usually closely associated with road cuts in the Santa Monica Mountains.

***Spartium junceum* Alliance (9542)**

Class C. Herbaceous Vegetation

Group I. Vegetation is dominated by mainly freshwater wetland forb species including cattail *(Typha),* rush *(Juncus),* sedge *(Carex),* spike rush *(Eleocharis),* and giant reed grass *(Arundo)* species. Woody species cover < 2% of the ground surface.

I.A. Stands are dominated with > 30% absolute cover by tall (generally > 1 m) wetland grasses and graminoids including cattails *(Typha)*, bulrushes and tules *(Scirpus),* and reeds *(Arundo donax).*

I.A.1. Vegetation of common bulrush *(S. acutus)* and/or California bulrush *(S. californicus)* provides the main cover in the herbaceous canopy.
***Scirpus acutus-Scirpus californicus* Alliance (4410)**

I.A.2. Cattails (*Typha* spp.) are dominant, usually in standing fresh or brackish water.
***Typha* spp. Alliance (4420)**

I.A.3. Dense stands are dominated by giant reed *(Arundo donax),* generally small and locally distributed along streams and creeks.
***Arundo donax* Alliance (4310)**

I.B. Stands are dominated by grasses and graminoids that are generally between 0.1–1 m tall including rushes *(Juncus)* and sedges *(Carex).*

I.B.1. A rush species, specifically common rush *(Juncus effusus),* is the sole dominant in the herb overstory.
***Juncus effusus* Alliance (4330)**

I.C. Stands are dominated (> 30% relative cover) by annual or perennial forbs.

I.C.1. Vegetation is dominated > 30% relative cover by the perennial noxious forb perennial pepperweed *(Lepidium latifolium),* occasional along creeks and valley bottoms, especially in the Malibu Creek watershed.
***Lepidium latifolium* Alliance (4780)**

Group II. Vegetation dominated mainly by upland and mesic herbaceous species including native and exotic grasses, forbs, and cryptogrammic species. If woody species are present, they cover < 10% of the ground surface.

II.A. Vegetation is dominated by a mixture of native perennial grasses and annuals, with the native grasses usually making up > 10% relative cover of the herbaceous layer.

II.A.1. Native grass component is usually mainly purple needlegrass *(Nassella pulchra),* and the annual component is a mixture of grasses and forbs.

***Nassella pulchra* Alliance (4020)**

II.A.1.a. Purple needlegrass co-occurs with < 10% cover of the low microphyllous shrub cut-leaved goldenbush.

***Nassella pulchra-Hazardia squarrosa* Association (4021)**

II.A.2. Native grass component is dominated by foothill needlegrass *(Nassella lepida)* alone or in shared dominance with other native and nonnative grasses and forbs. Stands are uncommon and may include emergent shrubs of the coastal sage scrub formation.

***Nassella lepida* Alliance (4090)**

II.A.3. Stands are usually on slopes associated with scrub or woodland vegetation dominated by the coarse, moderately tall giant wild rye.

***Leymus condensatus* Alliance (4040)**
***Leymus condensatus* Association (4041)**

II.A.4. Stands of the lowland or valley bottom species creeping wild rye *(Leymus triticoides)* are generally small and uncommon in study area.

***Leymus triticoides* Alliance (4030)**

II.B. Vegetation is dominated mainly by nonnative invasive perennial bunchgrasses.

II.B.1. Fountain grass *(Pennisetum setaceum)* occurs as the dominant species, though other species may be subdominant, usually on steep coastal bluffs or road cuts.

***Pennisetum setaceum* Alliance (4060)**

II.B.1.a. While fountain grass is dominant, native coastal shrubs such as *Coreopsis gigantea, Malosma laurina*, and *Yucca whipplei* occur as subdominants.

***Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina* Association (4061)**

II.B.2. Harding grass *(Phalaris aquatica)* is dominant with at least 40–50% relative cover, usually in old low-lying pastures and bottomland grasslands.

***Phalaris aquatica* Alliance (4070)**

II.C. Grasslands or forb lands are strongly dominated by nonnative annual grasses and forbs including red brome, ripgut brome, Italian ryegrass, wild oat, star thistle, and black mustard. There may be native species, but these may be relatively low cover.

California Annual Grassland Alliance (5000/4340)

II.C.1. Ripgut brome *(Bromus diandrus)* is abundant; however, an assortment of other herbs and grasses also usually occur in the stands including native species such as sun cup (*Camissonia* spp.), common sand aster *(Lessingia filaginifolia),* etc.

***Bromus diandrus*-Mixed Herb Association (50005)**

II.C.2. Ripgut brome *(Bromus diandrus)* is abundant or codominant with nonnative oats (*Avena barbata* and/or *A. fatua*).

***Bromus diandrus-Avena* spp. Association (50007)**

II.C.3. Wild oats *(Avena fatua)* are dominant with lower cover of all other nonnative and native species.

***Avena fatua* Association (4220)**

II.C.4. Italian ryegrass *(Lolium multiflorum)* is strongly dominant with low cover of all other nonnative and native species and is often found in low-lying portions of grasslands.

***Lolium multiflorum* Association (4210)**

II.C.5. Black mustard *(Brassica nigra)* is dominant or codominant in stands made up largely of other nonnative herbs and grasses.

II.C.5.a. Black mustard is the sole dominant.

***Brassica nigra* Association (50006)**

II.C.5.b. Ripgut brome and black mustard are both important or codominant in the stands.

***Brassica nigra-Bromus diandrus* Association (50009)**

II.C.5.c. Black mustard and star thistle *(Centaurea melitensis)* are both important or codominant in the stands.

***Brassica nigra-Centaurea melitensis* Association (50008)**

II.D. Stands of vegetation dominated by medium to tall introduced perennial herbs including fennel and *Euphorbia terracina*.

II.D.1. Sweet fennel *(Foeniculum vulgare)* dominates usually weedy stands along road cuts and steep coastal slopes but also may be found in bottomlands on the edge of the Conejo Plain.

***Foeniculum vulgare* Alliance (4760)**

II.D.2. The noxious perennial weed *Euphorbia terracina* dominates fields, fire clearance areas, and roadsides along the immediate coast.

***Euphorbia terracina* Nonnative Stands (4771)**

<u>Group III.</u> Vegetation dominated mainly by relatively low perennial forbs and graminoids of coastal, more or less, saline environments including brackish and salt marshes, sea cliffs, and dunes.

III.A. Salt marsh vegetation dominated or codominated by pickleweed (*Salicornia virginica* and/or *S. subterminalis*).

***Salicornia virginica* Alliance (4520)**

III.A.1. Pickleweed *(Salicornia virginica)* form and are open to intermittent cover over mudflats with marine filamentous algae.

***Salicornia virginical*Algae Association (4528)**

III.A.2. *Salicornia virginica* mix as dominant, codominant, or subdominant with *Salicornia subterminalis*.

***Salicornia virginica-Salicornia subterminalis* Association (4525)**

III.A.3. *Salicornia virginica* is dominant with a constant presence of California sea blite, often seen near salt pans.

***Salicornia virginica-Suaeda taxifolia* (synonym *S. californica* var. *taxifolia)* Association (4525)**

III.A.4. *Salicornia virginica* codominates with *Jaumea carnosa* and perennial grass *Distichlis spicata.*

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association (4527)**

Note: Two phases occur: one with lesser presence of pickleweed and one with greater presence of pickleweed.

***Distichlis spicata-Jaumea carnosa* Phase (4514)**
***Salicornia virginica-Jaumea carnosa-Distichlis spicata* Phase (4527)**

III.A.5. *Salicornia virginica* dominates with *Frankenia salina* as a constant associate.

III.A.5.a. *Frankenia salina* is > 1% and constant along with *Salicornia virginica.* Other species may occur as subdominants.

***Salicornia virginica-Frankenia salina* Association (45201)**

Note: Included are three phases: one with consistent presence and subdominance of *Batis maritima* with the *Frankenia salina,* one with consistent presence and subdominance of *Suaeda taxifolia* with the *Frankenia salina,* and one with *Suaeda taxifolia* higher in cover than *Frankenia salina.*

***Salicornia virginica-Frankenia salina-Batis maritima* Phase (4526)**
***Salicornia virginica-Frankenia salina-Suaeda taxifolia (*synonym *Suaeda californica)* Phase (4524)**
***Salicornia virginica-Suaeda taxifolia (*synonym *Suaeda californica)* Phase (45201)**

III.A.6. *Salicornia virginica* occurs with the nonnative black mustard, usually at the edge of the marsh in slightly elevated areas.

***Salicornia virginica-Brassica nigra* Association (4529)**

III.B. Salt marsh vegetation dominated by the perennial forb *Frankenia salina*, usually mixed with other saline forbs and grasses.

***Frankenia salina* Alliance (4550)**

III.B.1. *Frankenia salina* associates with the herbs *Limonium californicum* and *Salicornia* spp. and the native salt-tolerant grass *Monanthochloe littoralis.*

***Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association (4551)**

III.C. Salt marsh and coastal low-spreading, turf-forming salt grass is the dominant species and may have emergent low shrubs and taller perennial herbs.

***Distichlis spicata* Alliance (4510)**

III.C.1. Salt grass associates with the sand-loving, coastal dune burweed.

***Distichlis spicata-Ambrosia chamissonis* Association (4511)**

III.C.2. Salt grass associates with marsh jaumea *(Jaumea carnosa)* and pickleweed *(Salicornia virginica)*.

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association (n/a)**

Note: Two phases occur: one with lesser presence of pickleweed and one with greater presence of pickleweed.

***Distichlis spicata-Jaumea carnosa* Phase**
***Salicornia virginica-Jaumea carnosa-Distichlis spicata* Phase**

III.D. The low spreading and invasive succulent perennial sea fig (ice plant) is strongly dominant, usually on bluffs or dunes adjacent to the ocean.

***Mesembryanthemum* spp.-*Carpobrotus* spp. SemiNatural Herbaceous Alliance (4720)**

III.D.1. *Carpobrotus edulis* (sea fig) is the dominant species.

***Carpobrotus edulis* Association (4720)**

<u>Group IV.</u> Vegetation of rocky outcrops and cliffs usually dominated by low-matted spike moss, *Selaginella bigelovii,* or widely scattered but conspicuous individuals of buckwheat with spike moss.

IV.A. Spike moss occurs as intermediate to dense mat with emergent California buckwheat and sometimes other shrubs and herbs.

***Selaginella bigelovii* Alliance (4810)**

IV.A.1. *Selaginella bigelovii* dominates the low herb layer with emergent annual and perennial herbs, grasses, and a constant presence of California buckwheat at low cover.

***Selaginella bigelovii/Eriogonum fasciculatum* Association (4811)**

Tree Overstory Vegetation Descriptions

Alnus rhombifolia-Platanus racemosa Woodland/Forest Association

White Alder-California Sycamore Woodland/Forest Association
***Alnus rhombifolia* Woodland/Forest Alliance**
White Alder Woodland/Forest Alliance

Mapping Code: 1441

Local Description

Summary:
This woodland/forest association occurs on gentle to abrupt slopes with variable aspects at elevations between 7 and 202 m. It is codominated by *Alnus rhombifolia* and *Platanus racemosa* in the tree layer, *Salix lasiolepis* and *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 7–202 m, mean 80 m
Aspect: variable
Slope: range 0–35 degrees, mean 14 degrees
Topography (micro; macro): often concave; often bottom and lower slopes
Litter Cover: range 25–80%, mean 46.7%
Small Rock Cover: range 0–30%, mean 13.6%
Large Rock Cover: range 0–28%, mean 11.6%
Bare Ground: range 7–30%, mean 15%
Parent Material: depositional or igneous
Soil Texture: sand

Vegetation Description:
Stands of *Alnus rhombifolia-Platanus racemosa* Woodland/Forest form an open to intermittent tree layer (31–55%, mean 39.7%) with conifers at 0–15 m tall and hardwoods at 5–15 m tall, a sparse to open shrub layer (1–12%, mean 6.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (0–46%, mean 9.7%) at 0–5 m tall. Total vegetation cover is 40–75%, mean cover is 53%.

In this association, the tree layer is dominated by *Alnus rhombifolia* and *Platanus racemosa*, and *Quercus agrifolia* and *Umbellularia californica* are frequently included in this layer at lower cover. The shrub layer is sparse to open and occasionally includes *Salix lasiolepis* and *Ceanothus spinosus. Malosma laurina* and *Baccharis salicifolia* may also be present in low cover. The herbaceous layer is diverse and includes a variety of forbs and grasses such as *Piptatherum miliaceum, Cyperus* sp., *Euphorbia terracina, Rubus ursinus, Bromus diandrus, Arundo donax, Vinca major, Foeniculum vulgare, Artemisia douglasiana,* and *Brassica nigra.*

***Alnus rhombifolia-Platanus racemosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	ALRH2-T	*Alnus rhombifolia*	100	17.1	3	35	X	X	
	PLRA	*Platanus racemosa*	100	13	5	25	X	X	
	QUAG-T	*Quercus agrifolia*	67	4.7	1	17			
	UMCA-T	*Umbellularia californica*	67	1.3	1	3			
	JUCA-T	*Juglans californica*	22	0.5	0.2	4			
Tree Understory									
	JUCA-M	*Juglans californica*	22	0.2	0.2	2			
Shrub									
	SALA6-M	*Salix lasiolepis*	44	1.2	0.2	6			
	CESP	*Ceanothus spinosus*	44	0.7	0.2	3			
	MALA6	*Malosma laurina*	33	1.4	0.2	12			
	BASA4	*Baccharis salicifolia*	33	0.8	0.2	5			
	TODI	*Toxicodendron diversilobum*	22	0.4	0.2	3			
	RICO3	*Ricinus communis*	22	0.1	0.2	1			X
	ENCA	*Encelia californica*	22	0.01	0.2	0.2			
	ERCI5	*Eriogonum cinereum*	22	0.01	0.2	0.2			
	HEAR5	*Heteromeles arbutifolia*	22	0.01	0.2	0.2			
Herb									
	PIMI3	*Piptatherum miliaceum*	44	1.4	0.2	4			X
	CYPER	*Cyperus*	33	0.3	0.2	2			
	EUTE10	*Euphorbia terracina*	22	1	2	7			X
	RUUR	*Rubus ursinus*	22	0.8	2	5			
	BRDI3	*Bromus diandrus*	22	0.6	0.2	5			X
	ARDO4	*Arundo donax*	22	0.5	0.2	4			X
	VIMA	*Vinca major*	22	0.5	0.2	4			X
	FOVU	*Foeniculum vulgare*	22	0.3	1	2			X
	ARDO3	*Artemisia douglasiana*	22	0.2	0.2	2			
	BRNI	*Brassica nigra*	22	0.01	0.2	0.2			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 9 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 4 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Euphorbia terracina, Bromus diandrus, Arundo donax, Vinca major, Foeniculum vulgare, Ricinus communis, Brassica nigra, Tropaeolum majus, Hedera helix, Raphanus sativus, Conium maculatum, Rumex crispus, Centaurea melitensis, Cirsium vulgare, Malva parviflora, Melilotus albus, Nicotiana glauca, Phoenix canariensis, Rorippa nasturtium-

aquaticum, Salsola tragus, Senecio mikanioides, Spartium junceum

Samples Used in Description: (n = 9)
rap0384, rap1482, rap2168, rap2206m, rap2457rlv, rap2569, rap2605, rap2650, rap2760

Comments:
Alnus rhombifolia and *Platanus racemosa* co-occur throughout much of the mountainous and hilly parts of south coastal California. Stands in the SAMO study area are restricted to permanently flowing creeks mostly in the coastal strip.

Phases:
None

COMMON NAME	White Alder-California Sycamore Woodland/Forest Association
SYNONYM	Southern Sycamore-Alder Riparian Woodland (Holland 1996)
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous forest
PHYSIOGNOMIC GROUP	Cold-deciduous forest
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous forest
FORMATION	Temporarily flooded cold-deciduous forest
ALLIANCE	*Alnus rhombifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is known from the Santa Monica Mountains region and western Riverside County, though it may be found in other regions in southern California with additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association occurs along riparian corridors of concave creek bottoms to lower slopes that are gentle to abrupt. It is known to occur near the coast in southern California (Ventura County) and inland within the peninsular range (western Riverside County) at elevations usually below 1800 m.

Vegetation Description:
Based on data from western Riverside County, the following information can augment the local description above. In the *Alnus rhombifolia-Platanus racemosa* Association, both tree species are codominant and may be regenerating in the understory. Other trees may also be

codominant, including *Quercus agrifolia* and *Salix laevigata*, and a variety of herb species may be present in this association.

Comments:
This association is likely to occur in other parts of south coastal California. To date, an analogous association has been recently described from western Riverside County, and a similar association of *Alnus rhombifolia-Platanus racemosa-Quercus chrysolepis* has been recently described from inland San Diego County. In addition, a similar association of *Alnus rhombifolia-Salix laevigata-Platanus racemosa* is described in lower montane of the southern Sierra Nevada below 1,000 m. Other than these three trees listed in this association, there is moderate to low constancy and cover of *Fraxinus latifolia*, *Quercus* spp., *Salix lasiolepis, Toxicodendron diversilobum,* and *Rubus ursinus.*

References:
Evens and San 2005, Holland 1986, Klein and Evens 2005, Potter 2003

Eucalyptus Woodland/Forest Alliance

Eucalyptus Woodland/Forest Alliance

Mapping Code: 9510

Local Description

Summary:
This woodland/forest alliance occurs on gentle to steep slopes with variable aspects at low elevations between 31 and 341 m. The tree layer is open to dense, and it is mainly dominated by *Eucalyptus* spp. Both shrub and herb layers are sparse to open, and they may include *Malosma laurina* and *Heteromeles arbutifolia* as shrubs and *Hirschfeldia incana* and annual grasses.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains., Western Fog Zone, Eastern Urban, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 31–341 m, mean 202.6 m
Aspect: variable
Slope: range 2–35 degrees, mean 18.7 degrees
Topography (micro; macro): variable, though more concave; mainly bottom
Litter Cover: range 65–75%, mean 70%
Small Rock Cover: range 2–5%, mean 3%
Large Rock Cover: range 0–8%, mean 3.3%
Bare Ground: range 8–25%, mean 14.3%
Parent Material: variable sediments, though more often igneous and sedimentary
Soil Texture: no data

Vegetation Description:
Stands of the *Eucalyptus* Woodland/Forest Alliance form an open to continuous tree layer (15–67% cover, mean 40.9%) with conifers at 0–15 m tall and hardwoods at 5–50 m tall. The shrub layer is sparse to open and may occur in two different strata at (0–15%, mean 3%), with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is sparse to open (0–20%, mean 5.4%) at 0–0.5 m tall. Total vegetation cover is 28–68%, mean cover is 49.4%.

In this alliance, the tree layer is dominated by *Eucalyptus* spp. *Quercus agrifolia, Platanus racemosa,* and *Pinus* (introduced species) are occasionally included in this layer at low cover. *Eucalyptus* spp. sometimes regenerates in the understory. The shrub tree layer is open and may include *Malosma laurina* and *Heteromeles arbutifolia* at low cover. The herbaceous layer is usually simple and open, and it may include *Hirschfeldia incana* and annual grasses.

***Eucalyptus* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	EUCAL-T	*Eucalyptus*	89	31.7	15.0	65.0	X	X	X
	QUAG-T	*Quercus agrifolia*	33	0.7	0.2	4.0			
	PLRA	*Platanus racemosa*	33	0.5	0.2	2.0			
	PINUS	*Pinus*	33	0.4	0.2	2.0			
Tree Understory									
	EUCAL-M	*Eucalyptus*	22	0.4	2.0	2.0			X
Shrub									
	MALA6	*Malosma laurina*	44	1.8	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	44	0.4	0.2	2.5			
	BAPI	*Baccharis pilularis*	22	0.0	0.2	0.2			
Herb									
	UNGR	Unknown annual grass	22	2.4	2.0	20.0			
	HIIN3	*Hirschfeldia incana*	22	0.2	1.0	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Eucalyptus, Hirschfeldia incana, Vinca major, Rosmarinus officinalis, Schinus molle, Piptatherum miliaceum, Nerium oleander, Robinia, Brassica nigra, Cortaderia, Dactylis glomerata, Foeniculum vulgare, Lactuca serriola, Spartium junceum

Samples Used in Description: (n = 9)
AA0417, AA0554cc, AA0614, AA0721, AA0832, rap0053, rap0710, rap2215, rap2237

Comments:
Most stands seen appear to have originated from plantings, and regeneration around stands is taking place in some cases. However, some stands appear to be established through naturalization as well (Charlie Hohn, personal communication).

Phases:
None

COMMON NAME	Eucalyptus Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	I-Forest
PHYSIOGNOMIC SUBCLASS	I.A.-Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6.-Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N.-Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b.-Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Eucalyptus* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK Nonnative

Global Description

Distribution:

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands occur in various settings, usually the result of plantings. Most stands in California are below 1,000 m in elevation and are west of the Cascade-Sierra Divide.

Vegetation Description:
Stands are strongly dominated by *Eucalyptus* spp. Coastal stands tend to develop a seminatural understory with *Toxicodendron diversilobum* and other native shade-tolerant shrubs.

Comments:
This alliance is composed of vegetation types that are dominated by species not native to the western United States. Nine species of *Eucalyptus* are included in this alliance in California; none of them are native to North America. A description can be developed in the future for this alliance should it prove useful to do so.

References:
Sawyer and Keeler-Wolf 1995

Juglans californica/Annual Grass-Herb Woodland/Forest Association

California Walnut/Annual Grass-Herb Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1312

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable aspects at low elevations between 119 and 461 m. It is dominated by *Juglans californica* in the tree layer and a variety of forbs and grasses in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 119–461 m, mean 310 m
Aspect: variable
Slope: range 15–38 degrees, mean 25 degrees
Topography (micro; macro): variable but often undulating; lower to top slopes
Litter Cover: range 75–85%, mean 80%
Small Rock Cover: range 0–15%, mean 5.4%
Large Rock Cover: range 0–2%, mean 0.8%
Bare Ground: range 2–30%, mean 15%
Parent Material: often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Juglans californica*/Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (5–45%, mean 21.5%) with hardwoods at 2–10 m tall, a sparse to open shrub layer (0–15%, mean 5.7%) at 0–10 m tall, and an open to intermittent herbaceous layer (12–45%, mean 30.8%) at 0–1m tall. Total vegetation cover is 37–65%, mean cover is 54.9%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse to open and occasionally includes *Artemisia californica, Malosma laurina,* and *Toxicodendron diversilobum*. The herbaceous layer is diverse and includes *Brassica nigra, Leymus condensatus, Bromus* sp., *Bromus diandrus, Marah macrocarpus, Centaurea melitensis, Galium aparine, Marrubium vulgare,* and a variety of other native and nonnative species.

***Juglans californica*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	100	18.5	5	45	X	X	
	QUAG-T	*Quercus agrifolia*	50	1.4	0.2	6			
Shrub									
	ARCA11	*Artemisia californica*	44	0.7	0.2	2.5			
	MALA6	*Malosma laurina*	44	0.6	0.2	3			
	TODI	*Toxicodendron diversilobum*	44	0.3	0.2	3			
	HEAR5	*Heteromeles arbutifolia*	31	1.3	2.5	6			
	SALE3	*Salvia leucophylla*	25	1	0.2	10			
	HASQ2	*Hazardia squarrosa*	25	0.8	0.2	7			
Herb									
	BRNI	*Brassica nigra*	56	3.2	0.2	25			X
	LECO12	*Leymus condensatus*	50	1.3	1	4			
	BROMU	*Bromus*	38	7.6	10	35			
	BRDI3	*Bromus diandrus*	31	6.3	4	35			X
	MAMA8	*Marah macrocarpus*	31	0.3	0.2	4			
	CEME2	*Centaurea melitensis*	31	0.3	0.2	2.5			X
	GAAP2	*Galium aparine*	25	0.8	0.2	6			X
	MAVU	*Marrubium vulgare*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 16 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Galium aparine, Marrubium vulgare, Erodium, Stellaria media, Brassica, Hirschfeldia incana, Avena fatua, Avena barbata, Cirsium vulgare, Malva parviflora, Urtica urens, Bromus hordeaceus, Carduus pycnocephalus, Lactuca serriola, Nicotiana glauca

Samples Used in Description: (n = 16)
AA0108cc, AA0151cc, AA0313cc, AA0321cc, AA0612, AA0932, AA0991, rap0619, rap0621, rap0702, rap0703, rap1072, rap1506m, rap1950, rap2082, rap2608

Comments:
As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent. This type is often found in disturbed and urban settings.

Phases:
None

COMMON NAME California Walnut/Annual Grass-Herb Woodland/Forest Association
SYNONYM None
PHYSIOGNOMIC CLASS Woodland

PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to be restricted to the Santa Monica Mountains and other parts of the western Los Angeles Basin of California. Higher-quality stands have a relatively high native to nonnative understory species component.

References:
Holland 1986

Juglans californica/Artemisia californica/Leymus condensatus Woodland/Forest Association

California Walnut/California Sagebrush/Giant Wild Rye Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1317

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 41 and 500 m. It is dominated by *Juglans californica* in the tree layer, *Artemisia californica* in the understory shrub layer, and *Leymus condensatus* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 41–500 m, mean 311.5 m
Aspect: variable, but often northeast or northwest
Slope: range 2–42 degrees, mean 29.5 degrees
Topography (micro; macro): variable but often undulating or convex; lower to top slopes
Litter Cover: range 2–40%, mean 21%
Small Rock Cover: range 15–20%, mean 16%
Large Rock Cover: range 0–8%, mean 2.2%
Bare Ground: range 20–40%, mean 29%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Juglans californica/Artemisia californica/Leymus condensatus* Woodland/Forest form a sparse to intermittent tree layer (5–36%, mean 20.3%) with hardwoods at 2–10 m tall, a sparse to intermittent shrub layer (5–47%, mean 28.2%) at 0–5 m tall, and a sparse to open herbaceous layer (0–30%, mean 7.5%) at 0–2 m tall. Total vegetation cover is 40–70%, mean cover is 53.5%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* and *Platanus racemosa* are occasionally included in this layer. The shrub layer is sparse to intermittent and often includes *Artemisia californica*. Frequently, *Salvia leucophylla*, *Toxicodendron diversilobum,* and *Malosma laurina* are also included. A variety of other shrubs is also present in lower cover. The herbaceous layer is diverse and is dominated by *Leymus condensatus.* Other herbs include *Centaurea melitensis, Hirschfeldia incana,* and a variety of native and nonnative grasses and forbs.

Juglans californica/Artemisia californica/Leymus condensatus

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	79	15.1	1	35	X	X	
	QUAG-T	*Quercus agrifolia*	29	0.6	1	3			
Tree Understory									
	JUCA-M	*Juglans californica*	29	4.3	2	35			
Shrub									
	ARCA11	*Artemisia californica*	96	6.3	2	30		X	
	SALE3	*Salvia leucophylla*	63	6.5	0.2	28			
	TODI	*Toxicodendron diversilobum*	50	3.2	0.2	25			
	MALA6	*Malosma laurina*	50	1	0.2	5			
	MAFA	*Malacothamnus fasciculatus*	42	2.3	0.2	15			
	MIAU	*Mimulus aurantiacus*	38	2.1	1	18			
	HEAR5	*Heteromeles arbutifolia*	29	0.6	0.2	4			
	SAME5	*Sambucus mexicana*	29	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	25	0.9	0.2	9			
	BAPI	*Baccharis pilularis*	21	1.1	0.2	15			
	SAME3	*Salvia mellifera*	21	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	83	5.3	0.2	30	X	X	
	CEME2	*Centaurea melitensis*	21	0.5	0.2	5			X
	HIIN3	*Hirschfeldia incana*	21	0.1	0.2	1			X

Other Noteworthy Species:
Juglans californica was found in 24 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Nicotiana glauca, Melilotus indicus, Cortaderia, Medicago polymorpha, Bromus madritensis, Bromus tectorum, Avena barbata, Avena fatua, Erodium cicutarium, Lactuca serriola

Samples Used in Description: (n = 24)
AA0115cc, AA0286cc, AA0955, AA1095, AA1176, AA1177, rap1191, rap1369m, rap1373m, rap1511, rap1662m, rap1706, rap1943, rap1952, rap1953, rap2083, rap2204, rap2295, rap2451, rap2452, rap2459rlv, rap2617, rap2725, rap2731

Comments:
This association is one of the most common types of California walnut woodland in the project zone. It is the typical walnut/coastal sage association locally.

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/California Sagebrush/Giant Wild Rye Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Ceanothus spinosus Woodland/Forest Association

California Walnut/Greenbark Ceanothus Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1315

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes, usually on northeast aspects, at low elevations between 193 and 616 m. It is dominated by *Juglans californica* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a mixture of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 193–616 m, mean 407.5 m
Aspect: variable but often northeast
Slope: range 15–42 degrees, mean 29.8 degrees
Topography (micro; macro): variable but often undulating; bottom to upper slopes
Litter Cover: no data
Small Rock Cover: range 5–35%, mean 16.7%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 13–55%, mean 27.7%
Parent Material: variable but more often sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Juglans californica/Ceanothus spinosus* Woodland/Forest form a sparse to intermittent tree layer (7–33%, mean 15.4%) with hardwoods at 2–10 m tall, a sparse to intermittent shrub layer (9–50%, mean 37.2%) at 0–5 m tall, and a sparse to open herbaceous layer (0–12%, mean 2.2%) at 0–2 m tall. Total vegetation cover is 38–66%, mean cover is 54.6%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* is frequently included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus*, though *Heteromeles arbutifolia* is frequently present in lower cover. Occasionally, *Rhus ovata*, *Malosma laurina, Mimulus aurantiacus, Ceanothus megacarpus,* and *Sambucus mexicana* are also included. The herbaceous layer is simple and composed of a mixture of grass and forb species in low cover such as *Leymus condensatus*, *Marah macrocarpus,* and *Melica imperfecta.*

***Juglans californica/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	83	12	2	30	X	X	
	QUAG-T	*Quercus agrifolia*	50	0.8	0.2	3			
Tree Understory									
	JUCA-M	*Juglans californica*	22	1.8	6	13			
Shrub									
	CESP	*Ceanothus spinosus*	100	27.9	7	50	X	X	
	HEAR5	*Heteromeles arbutifolia*	72	3	0.2	15			
	RHOV	*Rhus ovata*	44	1.4	1	13			
	MALA6	*Malosma laurina*	39	0.5	0.2	4			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	5			
	CEME	*Ceanothus megacarpus*	33	0.5	0.2	4			
	SAME5	*Sambucus mexicana*	33	0.3	0.2	2			
	PRIL	*Prunus ilicifolia*	22	0.9	2	6			
	CEBE3	*Cercocarpus betuloides*	22	0.5	0.2	4			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 18 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 18 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Nicotiana glauca, Senecio mikanioides, Bromus diandrus, Bromus hordeaceus, Avena, Euphorbia terracina, Foeniculum vulgare

Samples Used in Description: (n = 18)
AA0472cc, AA0601, AA0608, AA0671, AA1142, AA1168, AA1206, rap0476, rap0491, rap1174m, rap1742, rap2475, rap2516, rap2576, rap2590m, rap2626, rap2639, rap2925

Comments:
This California walnut association typically occurs adjacent to other north-facing slope scrubs and is probably more similar to a chaparral type with emergent walnut. It has a small proportion of *Quercus agrifolia* associated with it about half the time. Taken together, either understory or overstory *Juglans californica* occurs at 100% frequency, and cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Greenbark Ceanothus Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Heteromeles arbutifolia Woodland/Forest Association

California Walnut/Toyon Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 6312

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable aspects (though often northeast facing) at elevations between 237 and 514 m. It is dominated by *Juglans californica* in the tree layer and *Heteromeles arbutifolia* in the understory shrub layer. A variety of grass and forbs occurs in the herbaceous layer.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 237–514 m, mean 327.1 m
Aspect: variable, but often northeast or northwest
Slope: range 15–40 degrees, mean 28 degrees
Topography (micro; macro): variable but often undulating; bottom to top slopes
Litter Cover: 75%
Small Rock Cover: range 5–15%, mean 6.8%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 5–25%, mean 16.3%
Parent Material: more often sedimentary, occasionally igneous or metamorphic
Soil Texture: moderately fine silty clay loam to fine clay but more often moderately fine clay loam

Vegetation Description:
Stands of *Juglans californica/Heteromeles arbutifolia* Woodland/Forest form a sparse to intermittent tree layer (6–58%, mean 21.6%) with conifers at 0–15 m tall and hardwoods at 2–15 m tall, a sparse to intermittent shrub layer (0–40%, mean 24.4%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–37%, mean 8.2%) at 0–1 m tall. Total vegetation cover is 25–68%, mean cover is 52.5%.

In this association, the tree layer is dominated by *Juglans californica. Quercus agrifolia* is frequently included in this layer. The shrub layer is sparse to intermittent and is dominated by *Heteromeles arbutifolia* although *Rhus ovata* and *Malosma laurina* are frequently present. Occasionally, *Ceanothus spinosus, Quercus berberidifolia, Sambucus mexicana, Salvia mellifera,* and *Artemisia californica* are also included. The herbaceous layer is diverse and includes a variety of grasses and forbs in low cover such as *Brassica nigra, Marah macrocarpus, Leymus condensatus,* and *Marrubium vulgare.*

***Juglans californica/Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	100	15.6	5	45	X	X	
	QUAG-T	*Quercus agrifolia*	80	3.6	0.2	15		X	
Shrub									
	HEAR5	*Heteromeles arbutifolia*	95	10.1	0.2	33	X	X	
	RHOV	*Rhus ovata*	65	3.7	0.2	35			
	MALA6	*Malosma laurina*	55	1.3	0.2	4			
	CESP	*Ceanothus spinosus*	45	1.3	0.2	6			
	QUBE5	*Quercus berberidifolia*	30	1.4	0.2	12			
	SAME5	*Sambucus mexicana*	30	0.7	0.2	12			
	SAME3	*Salvia mellifera*	30	0.3	0.2	2			
	ARCA11	*Artemisia californica*	30	0.3	0.2	2.5			
	RISP	*Ribes speciosum*	25	0.2	0.2	3			
	TODI	*Toxicodendron diversilobum*	25	0.2	0.2	3			
	RHIL	*Rhamnus ilicifolia*	25	0.2	0.2	2.5			
	ENCA	*Encelia californica*	20	2.1	0.2	26			
	MIAU	*Mimulus aurantiacus*	20	0.9	0.2	12			
	LONIC	*Lonicera*	20	0.4	0.2	3			
Herb									
	BRNI	*Brassica nigra*	35	0.4	0.2	4			X
	MAMA8	*Marah macrocarpus*	30	0.2	0.2	2.5			
	LECO12	*Leymus condensatus*	20	0.6	1	5			
	MAVU	*Marrubium vulgare*	20	0.1	0.2	2			X

Other Noteworthy Species:
Juglans californica was found in 20 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Marrubium vulgare, Senecio mikanioides, Bromus diandrus, Stellaria media, Medicago polymorpha, Schinus molle, Erodium, Nicotiana glauca, Carduus pycnocephalus, Centaurea melitensis, Hirschfeldia incana, Ageratina adenophora, Galium aparine, Salsola tragus

Samples Used in Description: (n = 20)
AA0023cc, AA0109cc, AA0154cc, AA0158cc, AA0411, AA0588, AA0605, AA0929, rap0606, rap0618, rap0632, rap0701m, rap0706, rap0711, rap0715, rap0743m, rap0752m, rap2502, rap2504, rap2588

Comments:
Compared to the *Juglans californica/Ceanothus spinosus* Association, this association has a higher cover and constancy of *Quercus agrifolia* and *Heteromeles arbutifolia*. Both of these associations tend to occur on northeast-facing exposures and on disturbed sights. *H. arbutifolia* is often as tall as the walnut.

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Toyon Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986

Juglans californica/Malosma laurina Woodland/Forest Association

California Walnut/Laurel Sumac Woodland/Forest Association
***Juglans californica* Woodland/Forest Alliance**
California Walnut Woodland/Forest Alliance

Mapping Code: 1314

Local Description

Summary:
This woodland/forest association occurs on gentle to very steep slopes on all aspects at low elevations between 20 and 460 m. It is dominated by *Juglans californica* in the tree layer, *Malosma laurina* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Eastern Urban, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 20–460 m, mean 252.7 m
Aspect: all aspects but often northeast
Slope: range 2–50 degrees, mean 20.7 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: 55%
Small Rock Cover: range 5–30%, mean 19.3%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 12–30%, mean 21.8%
Parent Material: more often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Juglans californica/Malosma laurina* Woodland/Forest form a sparse to intermittent tree layer (4–40%, mean 14.3%) with hardwoods at 0–15 m tall, an open to intermittent shrub layer (10–55%, mean 27.8%) at 0.5–5 m tall, and a sparse to intermittent herbaceous layer (0–41%, mean 10.9%) at 0–1 m tall. Total vegetation cover is 40–62%, mean cover is 51.2%.

In this association, the tree layer is dominated by *Juglans californica*. *Quercus agrifolia* and *Platanus racemosa* are occasionally found in lower cover in this layer. The open to intermittent shrub layer is dominated by *Malosma laurina.* Frequently, *Artemisia californica, Heteromeles arbutifolia,* and *Malacothamnus fasciculatus* are found in lower cover in this layer. A variety of other shrubs is also included in this layer. The herbaceous layer is diverse and includes *Leymus condensatus, Bromus* sp.*, Avena* sp.*, Erodium* sp., *Medicago polymorpha,* and *Marah macrocarpus.*

***Juglans californica/Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	75	10.4	5	40	X	X	
	QUAG-T	*Quercus agrifolia*	42	1.1	1	5			
	PLRA	*Platanus racemosa*	25	0.5	1	3			
Tree Understory									
	JUCA-M	*Juglans californica*	33	3.3	7	15			
Shrub									
	MALA6	*Malosma laurina*	100	14.8	6	25	X	X	
	ARCA11	*Artemisia californica*	58	1.2	0.2	8			
	HEAR5	*Heteromeles arbutifolia*	58	1.1	0.2	3			
	MAFA	*Malacothamnus fasciculatus*	50	3.8	0.2	15			
	SALE3	*Salvia leucophylla*	33	0.8	0.2	4			
	ERCI5	*Eriogonum cinereum*	33	0.6	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.5	0.2	5			
	SAME5	*Sambucus mexicana*	25	0.7	0.2	8			
	MIAU	*Mimulus aurantiacus*	25	0.6	2	3			
	KECO	*Keckiella cordifolia*	25	0.2	0.2	1			
Herb									
	LECO12	*Leymus condensatus*	58	0.8	0.2	3			
	BROMU	*Bromus*	25	4.8	2	40			
	AVENA	*Avena*	25	1.6	0.2	17			X
	ERODI	*Erodium*	25	0.4	0.2	5			X
	MEPO3	*Medicago polymorpha*	25	0.2	0.2	2			X
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 12 of 12 surveys of this plant community. Regionally, the park considers this species as RarE. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena, Erodium, Medicago polymorpha, Bromus diandrus, Bromus hordeaceus, Bromus madritensis, Centaurea melitensis, Nicotiana glauca, Brassica, Brassica nigra, Pennisetum setaceum, Hirschfeldia incana, Euphorbia terracina, Nerium oleander, Stellaria media, Marrubium vulgare, Melilotus indicus, Ricinus communis, Schinus molle, Silybum marianum

Samples Used in Description: (n = 12)
AA0015cc, AA0183cc, rap0029, rap0170, rap0617, rap0719, rap1079, rap1141, rap1843, rap2081, rap2655, rap2767

Comments:
This association is widespread in the Santa Monica Mountains. It tends to occur on a wider range of aspects than most other associations and is the only association in this alliance that has a significant cover of *Malosma laurina.*

As a general note, cover values of *Juglans* are likely to average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Walnut/Laurel Sumac Woodland/Forest Association
SYNONYM	California Walnut Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Juglans californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Platanus racemosa South Coast Intermittent Stream Woodland/Forest Association

California Sycamore South Coast Intermittent Stream Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 6451

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 134 and 460 m. It is dominated by *Platanus racemosa* in the tree layer. The shrub and herbaceous layers are open.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, Eastern Urban, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 134–460 m, mean 325 m
Aspect: variable
Slope: range 2–15 degrees, mean 10.5 degrees
Topography (micro; macro): concave or flat; bottom to mid slopes
Litter Cover: 55%
Small Rock Cover: range 3–8%, mean 5.5%
Large Rock Cover: range 2–5%, mean 3.5%
Bare Ground: range 2–15%, mean 8.5%
Parent Material: variable
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Platanus racemosa* Woodland/Forest form an open to intermittent tree layer (15–59%, mean 37.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (0–13%, mean 6.8%) at 0–5 m tall, and a sparse herbaceous layer (0–8%, mean 2.2%) at 0–1 m tall. Total vegetation cover is 28–60%, mean cover is 46.5%.

In this association, the tree layer is dominated by *Platanus racemosa*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to open and includes *Toxicodendron diversilobum, Ceanothus spinosus,* and *Heteromeles arbutifolia* in low cover. Various other shrubs also contribute to low cover. The herbaceous layer is simple and most often includes *Leymus condensatus.* Other herbs occasionally include *Artemisia douglasiana* and *Rubus ursinus*.

***Platanus racemosa* South Coast Intermittent Stream Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	33.2	15	55	X	X	
	JUCA-T	*Juglans californica*	33	1.6	2.5	7			
Tree Understory									
	JUCA-M	*Juglans californica*	33	2.4	7	7.5			
Shrub									
	TODI	*Toxicodendron diversilobum*	67	1.6	0.2	6			
	CESP	*Ceanothus spinosus*	50	1.9	2	7.5			
	HEAR5	*Heteromeles arbutifolia*	50	1.5	0.2	6			
	MIAU	*Mimulus aurantiacus*	33	0.6	1	2.5			
	RHOV	*Rhus ovata*	33	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	50	0.8	1	2.5	X		
	ARDO3	*Artemisia douglasiana*	33	0.4	0.2	2.5			
	RUUR	*Rubus ursinus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Ricinus communis, Schinus molle, Nicotiana glauca, Piptatherum miliaceum

Samples Used in Description: (n = 6)
AA0287cc, AA0388cc, AA0789, AA0837, rap0350, rap2250

Comments:
This is the most simple floristically of the four local California sycamore associations. It is most similar to the *Platanus racemosa-Quercus agrifolia* South Coast Association but lacks the oak.

Phases:
None

COMMON NAME	California Sycamore South Coast Intermittent Stream Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland

FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other parts of southern coastal California and adjacent Baja California, Mexico.

Nations:
United States, Mexico (probable)

States or Provinces:
CA, Baja California

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Sawyer and Keeler-Wolf 1995

Platanus racemosa/Annual Grass-Herb Woodland/Forest Association

California Sycamore/Annual Grass-Herb Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1456

Local Description

Summary:
This woodland/forest association occurs on flat to gentle slopes at low elevations between 34 and 140 m. It consists of *Platanus racemosa* dominating in the tree layer and *Bromus diandrus* dominating in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 34–140 m, mean 77 m
Aspect: flat
Slope: range 0–2 degrees, mean 1.2 degrees
Topography (micro; macro): flat; bottom to lower slopes
Litter Cover: range 35–35%, mean 35%
Small Rock Cover: range 0–17%, mean 7.3%
Large Rock Cover: range 0–3%, mean 0.8%
Bare Ground: range 4–30%, mean 14.8%
Parent Material: depositional
Soil Texture: silt to fine sandy clay

Vegetation Description:
Stands of *Platanus racemosa*/Annual Grass-Herb Woodland/Forest form a sparse to open tree layer (6–22%, mean 13.2%) with conifers at 0–15 m tall and hardwoods at 10–20 m tall, a sparse shrub layer (0–2%, mean 0.4%) at 0–5 m tall, and an open to intermittent herbaceous layer (17–64%, mean 42.8%) at 0–1 m tall. Total vegetation cover is 38–68%, mean cover is 53.2%.

In this association, the tree layer is dominated by *Platanus racemosa*. The shrub layer is sparse and often includes *Malacothamnus fasciculatus*, while *Baccharis pilularis, Baccharis salicifolia, Salix lasiolepis,* and *Spartium junceum* are occasionally included at very low cover. The herbaceous layer is diverse yet often dominated by nonnative species such as *Bromus diandrus, Marrubium vulgare, Brassica nigra,* and *Cirsium vulgare.* Other herbs occasionally occurring at low cover include *Ambrosia* sp., *Arundo donax, Piptatherum miliaceum, Foeniculum vulgare,* and *Cynodon dactylon.*

***Platanus racemosa*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	12.8	6	20	X	X	
	CALOC2	*Calocedrus*	20	0.01	0.2	0.2			X
	POPUL	*Populus*	20	0.01	0.2	0.2			
	QUAG-T	*Quercus agrifolia*	20	0.01	0.2	0.2			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	0.01	0.2	0.2			
Shrub									
	MAFA	*Malacothamnus fasciculatus*	60	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	40	0.1	0.2	0.2			
	BASA4	*Baccharis salicifolia*	40	0.1	0.2	0.2			
	SALA6-M	*Salix lasiolepis*	40	0.1	0.2	0.2			
	SPJU2	*Spartium junceum*	40	0.1	0.2	0.2			X
	ARCA11	*Artemisia californica*	20	0.01	0.2	0.2			
	LEPID	*Lepidium*	20	0.01	0.2	0.2			
	MALA6	*Malosma laurina*	20	0.01	0.2	0.2			
	NIGL	*Nicotiana glauca*	20	0.01	0.2	0.2			X
	RHOV	*Rhus ovata*	20	0.01	0.2	0.2			
	RIBES	*Ribes*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			
	SAEX	*Salix exigua*	20	0.01	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.01	0.2	0.2			
Herb									
	MAVU	*Marrubium vulgare*	80	0.2	0.2	0.2		X	X
	BRDI3	*Bromus diandrus*	60	31.2	50	55	X		X
	BRNI	*Brassica nigra*	60	1.6	0.2	7			X
	CIVU	*Cirsium vulgare*	60	0.3	0.2	1			X
	AMBRO	*Ambrosia*	40	1	0.2	5			
	ARDO4	*Arundo donax*	40	0.4	0.2	2			X
	CYDA	*Cynodon dactylon*	40	0.2	0.2	1			X
	FOVU	*Foeniculum vulgare*	40	0.2	0.2	1			X
	PIMI3	*Piptatherum miliaceum*	40	0.2	0.2	1			X
	ARDO3	*Artemisia douglasiana*	40	0.1	0.2	0.2			
	AVENA	*Avena*	40	0.1	0.2	0.2			X
	DAIN2	*Datura inoxia*	40	0.1	0.2	0.2			
	HEGR7	*Heterotheca grandiflora*	40	0.1	0.2	0.2			
	POACXX	*Poaceae*	20	3.2	16	16			
	BROMU	*Bromus*	20	2	10	10			
	AMAC2	*Ambrosia acanthicarpa*	20	0.8	4	4			
	SIMA3	*Silybum marianum*	20	0.6	3	3			X
	VISA	*Vicia sativa*	20	0.4	2	2			X
	BRHO2	*Bromus hordeaceus*	20	0.2	1	1			X
	HIIN3	*Hirschfeldia incana*	20	0.2	1	1			X
	AMPS	*Ambrosia psilostachya*	20	0.01	0.2	0.2			
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRASS2	*Brassica*	20	0.01	0.2	0.2			X

CAPY2	*Carduus pycnocephalus*	20	0.01	0.2	0.2	X
CEME2	*Centaurea melitensis*	20	0.01	0.2	0.2	X
CESO3	*Centaurea solstitialis*	20	0.01	0.2	0.2	X
ERSE3	*Eremocarpus setigerus*	20	0.01	0.2	0.2	

***Platanus racemosa*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
	ERODI	*Erodium*	20	0.01	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	20	0.01	0.2	0.2			X
	GNAPH	*Gnaphalium*	20	0.01	0.2	0.2			
	LECO12	*Leymus condensatus*	20	0.01	0.2	0.2			
	PHAQ	*Phalaris aquatica*	20	0.01	0.2	0.2			X
	RASA2	*Raphanus sativus*	20	0.01	0.2	0.2			X
	SOAS	*Sonchus asper*	20	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Marrubium vulgare, Bromus diandrus, Brassica nigra, Cirsium vulgare, Arundo donax, Cynodon dactylon, Foeniculum vulgare, Piptatherum miliaceum, Avena, Spartium junceum, Silybum marianum, Vicia sativa, Bromus hordeaceus, Hirschfeldia incana, Avena fatua, Brassica, Carduus pycnocephalus, Centaurea melitensis, Centaurea solstitialis, Erodium, Erodium cicutarium, Nicotiana glauca, Phalaris aquatica, Raphanus sativus, Sonchus asper

Samples Used in Description: (n = 5)
rap0202, rap0204, rap0467, rap0495, rap2456rlv

Comments:
This association differs from other California sycamore associations locally by having a relatively high cover of *Bromus diandrus* and other nonnative annual grasses and native forbs without a significant shrub layer. This type is found on riparian terraces along the major drainages of the park.

Phases:
None

COMMON NAME	California Sycamore/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Sycamore Alluvial Woodland (Holland 1986)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association resembles some stands that were classified as Sycamore Alluvial Woodland, a rare natural community of central California.

References:
Holland 1986, Keeler-Wolf et al. 1997, Sawyer and Keeler-Wolf 1995

Platanus racemosa-Quercus agrifolia South Coast Woodland/Forest Association

California Sycamore-Coast Live Oak South Coast Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1452

Local Description

Summary:
This woodland/forest association occurs on moderately steep to steep slopes with variable aspects at low elevations between 166 and 480 m. It is codominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, usually as a woodland. *Heteromeles arbutifolia* is characteristically present at low cover in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Eastern Urban, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 166–480 m, mean 280 m
Aspect: variable
Slope: range 10–35 degrees, mean 16.9 degrees
Topography (micro; macro): often concave; bottom to mid slopes
Litter Cover: 75%
Small Rock Cover: range 2–5%, mean 3.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 2–5%, mean 3.5%
Parent Material: sedimentary or igneous
Soil Texture: no data

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia* Woodland/Forest form an open to intermittent tree layer (23–48%, mean 37.6%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–35%, mean 13.4%) at 0–5 m tall, and a sparse to open herbaceous layer (0–14%, mean 3.6%) at 0–1 m tall. Total vegetation cover is 40–85%, mean cover is 54.4%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Juglans californica* is frequently included in this layer. The shrub layer is sparse to intermittent and often includes *Heteromeles arbutifolia, Malosma laurina,* and *Ceanothus spinosus.* Occasionally, *Toxicodendron diversilobum, Ceanothus megacarpus,* and *Baccharis pilularis* are also included. The herbaceous layer is sparse and includes *Marrubium vulgare, Marah macrocarpus,* and *Stellaria media* in low cover.

***Platanus racemosa-Quercus agrifolia* South Coast Woodland Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	16	2	25	X	X	
	PLRA	*Platanus racemosa*	100	15.1	8	25	X	X	
	JUCA-T	*Juglans californica*	50	2.8	1	10			
	EUCAL-T	*Eucalyptus*	25	0.4	0.2	3			X
	PINUS	*Pinus*	25	0.3	0.2	2			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	75	2.9	0.2	12		X	
	MALA6	*Malosma laurina*	63	3.5	0.2	15			
	CESP	*Ceanothus spinosus*	63	2.5	0.2	7.5			
	TODI	*Toxicodendron diversilobum*	38	0.8	1	3			
	CEME	*Ceanothus megacarpus*	38	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	25	0.4	1	2.5			
	BASA4	*Baccharis salicifolia*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	25	0.3	0.2	2.5			
	MAVU	*Marrubium vulgare*	25	0.3	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 5 of 8 surveys of this plant community. Regionally, the park considers this species as RarE. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Marrubium vulgare, Stellaria media, Ageratina adenophora, Bromus diandrus, Carduus pycnocephalus, Cortaderia, Brassica nigra, Foeniculum vulgare, Nicotiana glauca, Rubus discolor

Samples Used in Description: (n = 8)
AA0051cc, AA0304cc, AA0753, rap0338m, rap0633, rap0728m, rap1071, rap2340

Comments:
This association with California sycamore differs from the others in the Santa Monica Mountains by having a constant codominant presence of coast live oak, a minor herbaceous component, and moderate shrub cover composed of several species of nonriparian shrubs.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak South Coast Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is related to the *Quercus agrifolia-Platanus racemosa/Toxicodendron diversilobum* Association of western Riverside and San Diego counties. However, in that association *Q. agrifolia* is strongly dominant.

References:
Evens and San 2005, Klein and Evens 2005

Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana South Coast Woodland/Forest Association

California Sycamore-Coast Live Oak/Mule Fat South Coast Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 1458

Local Description

Summary:
This woodland/forest association occurs on often flat to gentle and occasionally somewhat steep slopes at elevations between 0 and 414 m. While slopes are usually flat, the association may be somewhat steep with steepness on southeast or variable exposures. It is codominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, *Baccharis salicifolia* in the understory shrub layer, and *Piptatherum miliaceum* is often in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 0–414 m, mean 184.2 m
Aspect: often flat, occasionally variable or southeast
Slope: range 0–15 degrees, mean 3.2 degrees
Topography (micro; macro): often flat, occasionally concave; bottom to lower slopes
Litter Cover: range 15–75%, mean 55%
Small Rock Cover: range 3–50%, mean 18.7%
Large Rock Cover: range 0–40%, mean 6.3%
Bare Ground: range 5–35%, mean 14.6%
Parent Material: variable but more often depositional
Soil Texture: coarse sand to fine sandy clay

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* Woodland/Forest form a sparse to intermittent tree layer (8–40%, mean 20.3%) with hardwoods at 5–20 m tall, a sparse to intermittent shrub layer (1–36%, mean 16.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (2–35%, mean 12.2%) at 0–1 m tall. Total vegetation cover is 29–75%, mean cover is 45.3%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Baccharis salicifolia*. Various other shrubs such as *Toxicodendron diversilobum* and *Sambucus mexicana* are occasionally included in low cover. The herbaceous layer is diverse and often includes *Piptatherum miliaceum, Artemisia douglasiana,* and *Bromus diandrus.* Other herbs include *Hirschfeldia incana, Leymus condensatus,* and *Rubus ursinus*.

***Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* South Coast Woodland Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	13.1	3	30	X	X	
	QUAG-T	*Quercus agrifolia*	79	4.4	0.2	15		X	
	JUCA-T	*Juglans californica*	37	1	0.2	7.5			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	32	0.6	0.2	5			
Shrub									
	BASA4	*Baccharis salicifolia*	100	7.2	1	20	X	X	
	TODI	*Toxicodendron diversilobum*	37	0.5	0.2	3			
	SAME5	*Sambucus mexicana*	32	0.4	0.2	4			
	SAME3	*Salvia mellifera*	26	0.9	0.2	10			
	MIAU	*Mimulus aurantiacus*	26	0.8	0.2	6			
	MALA6	*Malosma laurina*	26	0.7	0.2	9			
	CESP	*Ceanothus spinosus*	26	0.4	0.2	3			
	ARCA11	*Artemisia californica*	26	0.4	0.2	3			
	NIGL	*Nicotiana glauca*	26	0.1	0.2	1			X
	ROCA2	*Rosa californica*	21	0.3	0.2	6			
	MAFA	*Malacothamnus fasciculatus*	21	0.3	0.2	2.5			
	BAPI	*Baccharis pilularis*	21	0.2	0.2	3			
	BRCA3	*Brickellia californica*	21	0.1	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	79	3	0.2	12		X	X
	ARDO3	*Artemisia douglasiana*	68	3.4	0.2	10			
	BRDI3	*Bromus diandrus*	58	3.5	0.2	30			X
	HIIN3	*Hirschfeldia incana*	42	0.4	0.2	3			X
	LECO12	*Leymus condensatus*	37	0.5	0.2	5			
	RUUR	*Rubus ursinus*	32	0.3	0.2	2.5			
	AMPS	*Ambrosia psilostachya*	26	0.2	0.2	1			
	FOVU	*Foeniculum vulgare*	26	0.1	0.2	1			X
	BRNI	*Brassica nigra*	21	0.01	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 9 of 19 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Bromus diandrus, Hirschfeldia incana, Foeniculum vulgare, Nicotiana glauca, Brassica nigra, Carduus pycnocephalus, Marrubium vulgare, Bromus madritensis, Conium maculatum, Melilotus officinalis, Cirsium vulgare, Bromus hordeaceus, Anagallis arvensis, Centaurea melitensis, Erodium cicutarium, Silybum marianum, Sonchus asper, Arundo donax, Anthemis cotula, Melilotus albus, Urtica urens, Raphanus sativus, Senecio mikanioides, Melilotus indicus, Vicia villosa, Avena, Cynodon dactylon, Lactuca serriola, Oxalis pes-caprae, Plantago major, Ricinus communis, Rumex crispus, Sequoia sempervirens, Sonchus oleraceus, Veronica anagallis-aquatica, Vinca major

Samples Used in Description: (n = 19)
AA0064cc, AA0346, AA0517, AA0785, AA1013, rap0199m, rap0205, rap0445, rap0447, rap1425, rap1903, rap2435, rap2458rlv, rap2619, rap2637, rap2670, rap2689, rap2911, rap2924

Comments:
This is the most widespread of the California sycamore associations in the study area, usually found in seasonal streambeds with high water fluctuation or in wide washes. In this association the sycamore dominates tree canopy with much lower cover of coast live oak. The understory is characterized by the riparian *Baccharis salicifolia* and may also include other riparian or semiriparian shrubs such as *Rosa californica* and *Sambucus mexicana*. The higher proportion of large and small surface rocks suggests a more active flooding regime than other California sycamore associations represented locally.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak/Mule Fat South Coast Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur in other parts of south coastal California and is similar to the *Platanus racemosa-Quercus agrifolia* Central Coast Association.

References:
Keeler-Wolf et al. 1997

Platanus racemosa-Quercus agrifolia-Salix lasiolepis Woodland/Forest Association

California Sycamore-Coast Live Oak-Arroyo Willow Woodland/Forest Association
***Platanus racemosa* Woodland/Forest Alliance**
California Sycamore Woodland/Forest Alliance

Mapping Code: 6452

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at elevations between 35 and 445 m. It is dominated by *Platanus racemosa* and *Quercus agrifolia* in the tree layer, *Salix lasiolepis* in the tree understory, *Toxicodendron diversilobum* and *Salix lasiolepis* in the shrub layer, and a variety of forbs and grasses in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 35–445 m, mean 246 m
Aspect: variable but often flat
Slope: range 2–35 degrees, mean 10.4 degrees
Topography (micro; macro): often concave, rarely flat; bottom to upper slopes
Litter Cover: range 15–70%, mean 42.6%
Small Rock Cover: range 2–40%, mean 15.2%
Large Rock Cover: range 1–45%, mean 12%
Bare Ground: range 2–40%, mean 16.1%
Parent Material: variable but more often sedimentary
Soil Texture: silt to moderately fine clay loam

Vegetation Description:
Stands of *Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (12–59%, mean 35.9%) with hardwoods at 5–20 m tall, a sparse to intermittent shrub layer (0–45%, mean 13.9%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–37%, mean 5.8%) at 0–1 m tall. Total vegetation cover is 30–70%, mean cover is 50.9%.

In this association, the tree layer is dominated by *Platanus racemosa* and *Quercus agrifolia*. *Umbellularia californica, Salix laevigata,* and *Juglans californica* are occasionally included in this layer. *Salix lasiolepis* is dominant in the tree and shrub understory. The shrub layer is also dominated by *Toxicodendron diversilobum*. Occasionally, *Baccharis salicifolia, Ceanothus spinosus,* and *Heteromeles arbutifolia* are also included in the diverse shrub layer. The herbaceous layer is diverse and includes a variety of herbs such as *Piptatherum miliaceum, Artemisia douglasiana, Carduus pycnocephalus, Typha* sp., and *Leymus condensatus*.

***Platanus racemosa-Quercus agrifolia-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	13.1	4	30	X	X	
	QUAG-T	*Quercus agrifolia*	88	9.2	0.2	40	X	X	
	UMCA-T	*Umbellularia californica*	29	1.4	0.2	16			
	SALA3-T	*Salix laevigata*	24	0.6	1	5			
	JUCA-T	*Juglans californica*	24	0.4	0.2	3			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	53	5.8	1	30	X		
Shrub									
	TODI	*Toxicodendron diversilobum*	71	4.1	0.2	20			
	SALA6-M	*Salix lasiolepis*	53	4.4	0.2	35			
	BASA4	*Baccharis salicifolia*	41	1.9	2	12			
	CESP	*Ceanothus spinosus*	35	2.2	0.2	23			
	HEAR5	*Heteromeles arbutifolia*	35	0.7	0.2	4			
Herb									
	PIMI3	*Piptatherum miliaceum*	47	1.8	0.2	20			X
	ARDO3	*Artemisia douglasiana*	35	0.7	0.2	4			
	CAPY2	*Carduus pycnocephalus*	29	0.1	0.2	1			X
	TYPHA	*Typha*	24	0.4	0.2	3			
	LECO12	*Leymus condensatus*	24	0.3	0.2	3			
	FOVU	*Foeniculum vulgare*	24	0.1	0.2	1			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 17 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 6 of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 17 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 17 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Lactuca serriola, Bromus diandrus, Arundo donax, Dactylis glomerata, Melilotus albus, Rorippa nasturtium-aquaticum,

Spartium junceum, Myoporum laetum, Avena fatua, Brassica nigra, Conium maculatum, Cynodon dactylon, Schinus molle, Veronica anagallis-aquatica, Bromus madritensis, Cirsium vulgare, Convolvulus arvensis, Cortaderia, Ficus carica, Hirschfeldia incana, Lolium, Lotus corniculatus, Nerium oleander, Nicotiana glauca, Oxalis pes-caprae, Phalaris aquatica, Polypogon monspeliensis, Robinia, Silybum marianum, Sonchus oleraceus

Samples Used in Description: (n = 17)
AA1137, AA1188, rap0009, rap0157m, rap0355m, rap1790, rap2205m, rap2275, rap2307, rap2338, rap2427, rap2497, rap2625, rap2673, rap2682rlv, rap2769, rap2898

Comments:
Of the three of the local associations in the Santa Monica Mountains with a mixture of sycamore and coast live oak, this one seems to be more tied to permanent water. The presence of *Salix lasiolepis* and/or S*. laevigata* and the addition of *Typha* sp. in several of the stands suggest a relatively constant source of water on a gentle slope. However, this association also represents the narrow and steep ravine type of sycamore woodland at least in part of the study area. Some stands may be on steep rocky ravines and follow upslope at a substantial distance from the bases of the mountains. The presence of *Umbellularia californica* in about one-third of the samples along with the constant and frequently codominant *Q. agrifolia* suggests narrow canyon stands. Thus, this appears to be an association with variable ecological setting. It may require further refinement in its definition.

Phases:
None

COMMON NAME	California Sycamore-Coast Live Oak-Arroyo Willow Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Platanus racemosa* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia South Coastal Woodland/Forest Association

Coast Live Oak South Coastal Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6122

Local Description

Summary:
This woodland/forest association occurs on gentle to steep, north-facing slopes at elevations between 0 and 636 m. It is dominated by *Quercus agrifolia* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–636 m, mean 325 m
Aspect: variable but often northeast and northwest
Slope: range 2–35 degrees, mean 23.0 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 45–95%, mean 72.9%
Small Rock Cover: range 0–30%, mean 6.4%
Large Rock Cover: range 0–15%, mean 3%
Bare Ground: range 0–35%, mean 14.7%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: medium loam to clay

Vegetation Description:
Stands of *Quercus agrifolia* Woodland/Forest form a sparse to continuous tree layer (9–73%, mean 43%) with hardwoods at 2–20 m tall, a sparse to open shrub layer (0–32%, mean 7.6%) at 0-10 m tall, and a sparse to open herbaceous layer (0–15%, mean 2.1%) at 0–2 m tall. Total vegetation cover is 19–71%, mean cover is 52.7%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Platanus racemosa, Juglans californica,* and *Umbellularia californica* are occasionally included in this layer. The shrub layer is sparse to open and occasionally includes *Heteromeles arbutifolia, Ceanothus spinosus, Mimulus aurantiacus,* and *Artemisia californica*. The herbaceous layer is diverse and occasionally includes herb such as *Leymus condensatus, Bromus diandrus,* and *Piptatherum miliaceum* in low cover.

***Quercus agrifolia* South Coastal Woodland/Forest Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	40.5	9	65	X	X	
	PLRA	*Platanus racemosa*	25	0.6	0.2	8			
	JUCA-T	*Juglans californica*	21	0.4	0.2	5			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	46	1	0.2	7			
	CESP	*Ceanothus spinosus*	42	1.1	0.2	7.5			
	MIAU	*Mimulus aurantiacus*	31	0.6	0.2	6			
	ARCA11	*Artemisia californica*	29	0.4	0.2	6			
	MALA6	*Malosma laurina*	27	0.7	0.2	6			
	TODI	*Toxicodendron diversilobum*	23	0.3	0.2	2.5			

Other Noteworthy Species:
Juglans californica was found in 11 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Carduus pycnocephalus, Brassica nigra, Centaurea melitensis, Vinca major, Ailanthus altissima, Bromus madritensis, Arundo donax, Avena, Erodium, Hirschfeldia incana, Stellaria media

Samples Used in Description: (n = 48)
AA0048cc, AA0084cc, AA0089cc, AA0193cc, AA0213cc, AA0414, AA0524, AA0532, AA0546, AA0550, AA0552, AA0585, AA0594, AA0647, AA0648, AA0660, AA0707, AA0751, AA0766, AA0774, AA0775, AA0802, AA0844, AA0845, AA0856, AA0890, AA0922, AA1012, AA1017, AA1037, AA1044, AA1107, AA1181, AA1220, rap0014m, rap0142, rap0421m, rap0583, rap0744, rap0807, rap1073, rap2187, rap2197, rap2387, rap2398, rap2478, rap2508, rap2601

Comments:
This is the generic coast live oak woodland of the Santa Monica Mountains within the south coastal region. It has no characteristic understory species in either the shrub or the herb layer. Since more than half of the samples were assessed within the stand and still did not group with other locally defined associations, it is unlikely that this is the result of several of the samples being taken from out of the stand precluding detailed assessment of the understory. In general, the relatively closed canopy, shady understory, and dense litter cover may be the cause of the indistinct understory composition.

Phases:
None

COMMON NAME	Coast Live Oak South Coastal Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is analogous to the *Quercus agrifolia* Association, in which coast live oak is the only principal indicator. This association (or suballiance, as defined by Allen et al. 1991) ranges from central coastal (San Luis Obispo County) to southern California (San Diego County).

Nations:
United States

States or Provinces:
CA

Environmental Description:
This common association occurs on lower slopes and hillsides west of the coastal divide in central and southern California. It occurs largely on west-, east-, and south-facing exposures between 100 and 400 m elevation on moderate to steep slopes. Substrate is largely rocky and/or gravelly loams over sedimentary sandstones and shales.

Vegetation Description:
The canopy is strongly dominated by *Quercus agrifolia* with generally low cover of understory species.

Comments:
This association has relatively high tree cover and low cover of understory species.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Adenostoma fasciculatum Woodland/Forest Association

Coast Live Oak/Chamise Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6115

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep north-facing slopes at low elevations between 0 and 612 m. It is dominated by *Quercus agrifolia* in the tree layer, *Adenostoma fasciculatum* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 0–612 m, mean 353.3 m
Aspect: variable, but often northeast and northwest
Slope: range 15–40 degrees, mean 30.5 degrees
Topography (micro; macro): often flat, occasionally undulating; lower to upper
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 11.7%
Large Rock Cover: range 1–15%, mean 10.3%
Bare Ground: range 10–35%, mean 20%
Parent Material: sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Adenostoma fasciculatum* Woodland/Forest form a sparse to open tree layer (0–15%, mean 8.7%) with hardwoods at 5–15 m tall, an open to intermittent shrub layer (10–58%, mean 36.8%) at 01–5 m tall, and a sparse to intermittent herbaceous layer (0–40%, mean 11.3%) at 0–0.5 m tall. Total vegetation cover is 32–60%, mean cover is 50%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The open to intermittent shrub layer is dominated by *Adenostoma fasciculatum*. Frequently, *Mimulus aurantiacus, Malosma laurina, Ceanothus spinosus, Heteromeles arbutifolia,* and *Rhus ovata* are also included. The herbaceous layer is simple and occasionally includes *Melica imperfecta* and *Leymus condensatus.*

***Quercus agrifolia/Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	83	9.7	8	15	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	3.5	9	12			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	17.3	7	35	X	X	
	MIAU	*Mimulus aurantiacus*	83	2.3	1	5		X	
	MALA6	*Malosma laurina*	83	1.6	1	3		X	
	CESP	*Ceanothus spinosus*	67	3.7	1	10			
	HEAR5	*Heteromeles arbutifolia*	67	1	0.2	3			
	RHOV	*Rhus ovata*	50	1	1	3			
	CEBE3	*Cercocarpus betuloides*	33	2.2	1	12			
	YUWH	*Yucca whipplei*	33	0.4	0.2	2.5			
Herb									
	MEIM	*Melica imperfecta*	33	9.2	15	40			
	LECO12	*Leymus condensatus*	33	0.4	0.2	2.5			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Erodium cicutarium

Samples Used in Description: (n = 6)
AA0224cc, rap0155m, rap0406, rap0470m, rap0575, rap1285m

Comments:
This association represents a transitional stage between chaparral dominated by *Adenostoma fasciculatum* and oak woodland dominated by *Quercus agrifolia*, with chamise chaparral in a marginal environmental setting such as on a northerly facing lower slope that is being colonized by oak from an adjacent stand. This type also may be associated with the presence of rocks creating microclimates such as in sandstone areas of Castro Crest or upper Simi Hills. Such situations are apparently uncommon, resulting in only a few stands sampled.

Phases:
None

COMMON NAME	Coast Live Oak/Chamise Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Similar open woodlands of short *Quercus agrifolia* over *A. fasciculatum* have been seen in other parts of California (e.g., Monterey County, T. Keeler-Wolf personal observation 2004) but have not been sampled. *Q. agrifolia*/Chaparral Association is described from western Riverside County in which the understory contains a mixture of chaparral species including *Adenostoma fasciculatum*. Further, *Q. agrifolia/Adenostoma fasciculatum-Salvia mellifera* Association is described from central California from Monterey south to Ventura County, which is quite similar to this. In this type, *Salvia mellifera* only occurs in 62% of the samples. However, it is insignificant in the Santa Monica Mountains samples. Further descriptive work may show all these types to be equivalent.

References:
Allen et al. 1991, Klein and Evens 2005

Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association

Coast Live Oak/Annual Grass-Herb Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1111

Local Description

Summary:
This woodland/forest association occurs on flat to steep slopes that are often facing northwest at low elevations between 32 and 625 m. It is dominated by *Quercus agrifolia* in the tree layer and *Bromus diandrus* and other herbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, Immediate Coast, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 32–625 m, mean 312.2 m
Aspect: variable but often northwest or flat
Slope: range 0–35 degrees, mean 15.9 degrees
Topography (micro; macro): variable but more often undulating or flat; bottom to top slopes
Litter Cover: range 11–88%, mean 64.9%
Small Rock Cover: range 0–25%, mean 5.6%
Large Rock Cover: range 0–85%, mean 4.5%
Bare Ground: range 0–70%, mean 16.1%
Parent Material: depositional or sedimentary, occasionally igneous
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Quercus agrifolia*/Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (2–59%, mean 23.1%) with conifers at 0–15 m tall and hardwoods at 2–15 m tall, a sparse to intermittent shrub layer (0–41%, mean 6.8%) at 0–5 m tall, and a sparse to continuous herbaceous layer (4–70%, mean 24.1%) at 0–2 m tall. Total vegetation cover is 11–78%, mean cover is 50.1%.

In this association, the tree layer is dominated by *Quercus agrifolia*. Other trees such as *Eucalyptus* sp*., Quercus lobata,* and *Juglans californica* may infrequently be present at low cover as well. The shrub layer is sparse to intermittent and occasionally includes *Salvia leucophylla, Artemisia californica, Sambucus mexicana,* and *Malosma laurina*. The herbaceous layer is diverse and is dominated by *Bromus diandrus.* Other herbs often include *Brassica nigra, Centaurea melitensis, Marrubium vulgare, Bromus hordeaceus,* and *Avena fatua*.

***Quercus agrifolia*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	93	20.6	1	55	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	32	1.3	0.2	20			
	QUAG-L	*Quercus agrifolia*	24	0.2	0.2	3			
Shrub									
	SALE3	*Salvia leucophylla*	37	1	0.2	23			
	ARCA11	*Artemisia californica*	32	0.7	0.2	12			
	SAME5	*Sambucus mexicana*	32	0.1	0.2	1			
	MALA6	*Malosma laurina*	29	0.6	0.2	6			
	HASQ2	*Hazardia squarrosa*	29	0.3	0.2	3			
	MIAU	*Mimulus aurantiacus*	27	0.5	0.2	7			
	HEAR5	*Heteromeles arbutifolia*	24	0.4	0.2	4			
	MAFA	*Malacothamnus fasciculatus*	22	0.3	0.2	7.5			
	BAPI	*Baccharis pilularis*	20	0.4	0.2	7			
	TODI	*Toxicodendron diversilobum*	20	0.3	0.2	4			
Herb									
	BRDI3	*Bromus diandrus*	63	9.4	0.2	56	X		X
	BRNI	*Brassica nigra*	51	1.6	0.2	31			X
	CEME2	*Centaurea melitensis*	44	1.2	0.2	20			X
	MAVU	*Marrubium vulgare*	41	0.3	0.2	7			X
	BRHO2	*Bromus hordeaceus*	29	0.9	0.2	15			X
	AVFA	*Avena fatua*	27	0.8	0.2	20			X
	LECO12	*Leymus condensatus*	27	0.5	0.2	12			
	HIIN3	*Hirschfeldia incana*	27	0.5	0.2	8			X
	MEIN2	*Melilotus indicus*	27	0.4	0.2	10			X
	SIMA3	*Silybum marianum*	22	0.1	0.2	2			X
	BROMU	*Bromus*	20	2.5	6	23			
	BRMA3	*Bromus madritensis*	20	0.6	0.2	15			X
	CIVU	*Cirsium vulgare*	20	0.2	0.2	2			X
	MAMA8	*Marah macrocarpus*	20	0.1	0.2	2			

Other Noteworthy Species:
Brodiaea jolonensis was found in 1 of 41 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Calochortus catalinae was found in 1 of 41 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Delphinium parryi was found in 1 of 41 surveys of this plant community, which may be the rare *D. parryi* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 5 of 41 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Marrubium vulgare, Bromus hordeaceus, Avena fatua, Hirschfeldia incana, Melilotus indicus, Silybum marianum, Bromus madritensis, Cirsium vulgare, Galium aparine, Erodium cicutarium, Lactuca serriola, Avena barbata, Medicago polymorpha, Sonchus oleraceus, Lolium, Carduus pycnocephalus, Malva parviflora, Avena, Stellaria media, Piptatherum miliaceum, Anagallis arvensis, Sisymbrium, Picris echioides, Conyza canadensis, Foeniculum vulgare, Phalaris aquatica, Nicotiana glauca, Rumex crispus, Schinus molle, Sonchus asper, Chenopodium ambrosioides, Cynodon dactylon, Tamarix, Anthriscus caucalis, Centaurea solstitialis, Erodium, Erodium botrys, Erodium moschatum, Hypochaeris, Melilotus officinalis, Myoporum laetum, Raphanus sativus, Salsola tragus, Vicia villosa

Samples Used in Description: (n = 41)
AA0043cc, AA0099cc, AA0225cc, AA0353, AA0460cc, AA0465cc, AA0543, AA0583, AA0689, AA0804, AA0815, AA0910, AA0941, AA1120, AA1189, rap0206, rap0401m, rap0403m, rap0854, rap0956, rap1311, rap1312, rap1321, rap1327, rap1619, rap1635, rap1731, rap1896, rap1928, rap2157, rap2354, rap2392, rap2462rlv, rap2463rlv, rap2556rlv, rap2578, rap2678, rap2751rlv, rap2851rlv, rap2852rlv, rap2854rlv

Comments:
This association is the common live oak/grass association in the study area. It has been described elsewhere for California.

Phases:
None

COMMON NAME	Coast Live Oak/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Coast Live Oak/Grass (Allen et al. 1991)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	

Global Description

Distribution:
This association is known from much of central and southern coastal California. This association is known from Solano to San Diego counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association occupies virtually all aspects and slope steepness (0–32 degrees) between 50 and 700 m elevation. Substrate texture is variable, and stands typically occur on sandstones and shales.

Vegetation Description:
The *Quercus agrifolia* overstory is variable in cover from open to continuous cover. The herbaceous layer is usually intermittent to open, especially with forbs (e.g., *Brassica* spp., *Claytonia perfoliata,* and *Lupinus* spp.) and nonnative annual grasses (e.g., *Bromus diandrus, B. hordeaceus,* and *Vulpia* spp.).

Comments:
This association was originally named *Quercus agrifolia*/Grass by Allen et al. (1991) from Solano to Monterey counties, though it has been documented elsewhere in southern California as well as central California. It is called *Quercus agrifolia*/Annual Grass-Herb herein to better describe the annual nature of the understory.

References:
Allen et al. 1991, Evens and San 2005, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Ceanothus spinosus Woodland/Forest Association

Coast Live Oak/Greenbark Ceanothus Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1118

Local Description

Summary:
This woodland/forest association occurs on gentle to steep north-facing slopes at low elevations between 136 and 517 m. It is dominated by *Quercus agrifolia* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 136–517 m, mean 372 m
Aspect: variable but often northwest or northeast
Slope: range 3–43 degrees, mean 24.0 degrees
Topography (micro; macro): variable but more often concave or undulating; bottom to upper slopes
Litter Cover: range 65–85%, mean 76.4%
Small Rock Cover: range 0–15%, mean 5.1%
Large Rock Cover: range 0–5%, mean 1.9%
Bare Ground: range 0–25%, mean 9.4%
Parent Material: more often sedimentary, occasionally igneous or depositional
Soil Texture: coarse loamy sand to moderately fine silty clay loam but more often medium loam

Vegetation Description:
Stands of *Quercus agrifolia/Ceanothus spinosus* Woodland/Forest form an open to continuous tree layer (12–78%, mean 24.7%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–55%, mean 34.2%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–35%, mean 4.3%) at 0–1 m tall. Total vegetation cover is 41–78%, mean cover is 60.3%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus. Heteromeles arbutifolia* and *Mimulus aurantiacus* are often included. The herbaceous layer is diverse and includes *Leymus condensatus, Melica imperfecta, Dryopteris arguta,* and *Marah macrocarpus.*

***Quercus agrifolia/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.9	12	60	X	X	
	JUCA-T	*Juglans californica*	28	0.4	0.2	2.5			
Shrub									
	CESP	*Ceanothus spinosus*	100	22.8	7	45	X	X	
	HEAR5	*Heteromeles arbutifolia*	59	1.8	0.2	8			
	MIAU	*Mimulus aurantiacus*	52	1.5	0.2	7			
	CEME	*Ceanothus megacarpus*	45	2	0.2	25			
	MALA6	*Malosma laurina*	45	1.1	0.2	7			
	TODI	*Toxicodendron diversilobum*	34	0.6	0.2	7			
	SAME5	*Sambucus mexicana*	24	0.3	0.2	3			
	KECO	*Keckiella cordifolia*	21	0.5	1	5			
	RHOV	*Rhus ovata*	21	0.3	0.2	4			
	SASP3	*Salvia spathacea*	21	0.1	0.2	1			
Herb									
	LECO12	*Leymus condensatus*	34	0.4	0.2	3			
	MEIM	*Melica imperfecta*	24	1.5	0.2	35			
	DRAR3	*Dryopteris arguta*	24	0.1	0.2	2			
	MAMA8	*Marah macrocarpus*	21	0.1	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 8 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Carduus pycnocephalus, Bromus diandrus, Bromus madritensis, Galium aparine, Bromus hordeaceus, Brassica, Brassica nigra, Centaurea melitensis, Phalaris aquatica, Foeniculum vulgare, Marrubium vulgare, Medicago polymorpha, Nicotiana glauca, Ricinus communis, Spartium junceum, Stellaria media

Samples Used in Description: (n = 29)
AA0053cc, AA0130cc, AA0228cc, AA0523, AA0596, AA0643, AA0655, AA0864, AA1041, AA1042, AA1055, AA1185, rap0128, rap0129, rap0443, rap0554m, rap0555, rap0557m, rap0677, rap1292, rap1707, rap2096, rap2189, rap2367, rap2433, rap2442, rap2490, rap2592, rap2828

Comments:
This association is largely endemic to the Santa Monica Mountains and characterized by the mixture of coast live oak over the tall mesic chaparral shrub *Ceanothus spinosus.*

Phases:
None

COMMON NAME Coast Live Oak/Greenbark Ceanothus Woodland/Forest Association

SYNONYM None

PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia/Heteromeles arbutifolia Woodland/Forest Association

Coast Live Oak/Toyon Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6117

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes with variable or north-facing aspects at elevations between 87 and 658 m. It is dominated by *Quercus agrifolia* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Eastern Urban, Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 87–658 m, mean 349.9 m
Aspect: variable but often northeast or northwest
Slope: range 15–40 degrees, mean 30.5 degrees
Topography (micro; macro): variable but often undulating; bottom to top slopes
Litter Cover: range 65–85%, mean 75%
Small Rock Cover: range 0–10%, mean 4.3%
Large Rock Cover: range 0–10%, mean 2.5%
Bare Ground: range 2–20%, mean 7.8%
Parent Material: often sedimentary, occasionally igneous or depositional
Soil Texture: moderately fine sandy clay loam to moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Heteromeles arbutifolia* Woodland/Forest form a sparse to intermittent tree layer (2–51%, mean 26.3%) with hardwoods at 5–10 m tall, an open to intermittent shrub layer (13–45%, mean 22.3%) at 0–10 m tall, and a sparse herbaceous layer (0–10%, mean 4.1%) at 0–1 m tall. Total vegetation cover is 30–71%, mean cover is 51.9%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The open to intermittent shrub layer is dominated by *Heteromeles arbutifolia*. *Malosma laurina* and *Toxicodendron diversilobum* are often included in low to moderate cover. Occasionally, *Ceanothus spinosus* and *Mimulus aurantiacus* may also be present in low cover. The herbaceous layer is diverse and includes a variety of grasses and forbs with *Leymus condensatus* most frequently occurring. *Bromus* sp.*, Melica imperfecta, Bromus diandrus,* and *Stellaria media* are other herbs present in the stands at low frequency.

***Quercus agrifolia/Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	25.5	2.5	50.0	X	X	
Shrub									
	HEAR5	*Heteromeles arbutifolia*	89	7.8	0.2	25.0		X	
	MALA6	*Malosma laurina*	61	3.1	1.0	15.0			
	TODI	*Toxicodendron diversilobum*	50	1.1	0.2	6.0			
	CESP	*Ceanothus spinosus*	39	0.6	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	39	0.5	0.2	3.0			
	ARCA11	*Artemisia californica*	28	0.2	0.2	1.0			
	RHOV	*Rhus ovata*	28	0.2	0.2	1.0			
	RHIN2	*Rhus integrifolia*	22	2.6	2.0	25.0			
	MAFA	*Malacothamnus fasciculatus*	22	1.3	0.2	12.0			
	SAME5	*Sambucus mexicana*	22	0.3	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	22	0.3	0.2	2.5			
	SALE3	*Salvia leucophylla*	22	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	50	0.5	0.2	3.0			

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

Juglans californica was found in 4 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Stellaria media, Carduus pycnocephalus, Ageratina adenophora, Avena, Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Bromus madritensis, Piptatherum miliaceum, Senecio mikanioides, Avena fatua, Hedera helix, Lolium, Marrubium vulgare, Nicotiana glauca

Samples Used in Description: (n = 18)
AA0219cc, AA0392cc, AA0522, AA0735, AA0783, AA0838, AA0893, AA0919, AA1174, rap0407, rap0714, rap1694, rap1993, rap2280, rap2394, rap2446, rap2636, rap2653

Comments:
Coast live oak and toyon (*Heteromeles arbutifolia*) co-occur commonly throughout coastal, central, and southern California. This association is equivalent to others defined by Allen et al. (1991). Two phases were defined locally: one with relatively high cover of *Heteromeles* in the shrub layer and another with relatively high cover of *Malosma laurina*. Both of these phases overlap sufficiently in environmental and species characteristics to not be distinguished at the association level.

Phases:
Quercus agrifolia/Heteromeles arbutifolia (Coast Live Oak/Toyon) Phase [6117]
Quercus agrifolia/Malosma laurina (Coast Live Oak/Laurel Sumac) Phase [6116]

COMMON NAME	Coast Live Oak/Toyon Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G5S5

Global Description

Distribution:
Similar associations (e.g., similar *Q. agrifolia/Heteromeles arbutifolia-Toxicodendron diversilobum* Association) are known from much of central and southern coastal California, as far north as Napa County and as far south as Los Angeles County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association typically occurs on moderate to steep north- to northeast-facing slopes. The soils are mostly loams over hard sedimentary rocks such as sandstone and shale.

Vegetation Description:
Average cover reported by Allen et al. (1991) for the similar *Q. agrifolia/Heteromeles arbutifolia-Toxicodendron diversilobum* Association is 89% tree cover and about 10% *H. arbutifolia* and *T. diversilobum* cover. A number of woody and herbaceous species occur in < 15% constancy.

Comments:
Allen et al. (1991) have identified two associations of coast live oak with toyon: one with the shrub *Toxicodendron diversilobum* and one with grass species in the understory. It is likely that the currently defined association herein is most similar to the one with *Toxicodendron diversilobum*. Although only 50% of the samples had *T. diversilobum*, the other environmental characteristics suggest a congruence of this and these two types. Since both accounts do not completely detail the herbaceous component of stands, it remains for a more detailed study to reveal whether these two associations can be reduced to synonymy.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus agrifolia/Quercus berberidifolia Woodland/Forest Association

Coast Live Oak/Scrub Oak Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6112

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 118 and 413 m. It is dominated by *Quercus agrifolia* in the tree layer, *Quercus berberidifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Lower Elevation Inland and Upper Elevation Santa Monica Mountains, Dry Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 118–413 m, mean 248 m
Aspect: variable
Slope: range 4–18 degrees, mean 14.0 degrees
Topography (micro; macro): often undulating, occasionally concave; bottom to lower slopes, sometimes to upper slopes
Litter Cover: range 35–80%, mean 61%
Small Rock Cover: range 1–30%, mean 9%
Large Rock Cover: range 0–10%, mean 2.8%
Bare Ground: range 1–35%, mean 21.7%
Parent Material: sedimentary or depositional
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia/Quercus berberidifolia* Woodland/Forest form an open to intermittent tree layer (12–38%, mean 23.1%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (9–50%, mean 28.6%) at 0–5 m tall, and a sparse to open herbaceous layer (0–18%, mean 7%) at 0–1m tall. Total vegetation cover is 45–68%, mean cover is 57%.

In this association, the tree layer is dominated by *Quercus agrifolia. Juglans californica* and *Populus fremontii* are occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Quercus berberidifolia*. Occasionally, *Rhamnus ilicifolia, Ceanothus cuneatus, Heteromeles arbutifolia, Sambucus mexicana,* and *Cercocarpus betuloides* are also included. The herbaceous layer is diverse and includes *Bromus* sp., *Centaurea melitensis,* and *Dryopteris arguta*.

***Quercus agrifolia/Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	21.5	9	35	X	X	
	JUCA-T	*Juglans californica*	25	1.1	2.5	6			
	POFR2	*Populus fremontii*	25	0.3	0.2	2.5			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	25	0.4	1	2.5			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	18	4	32	X	X	
	RHIL	*Rhamnus ilicifolia*	50	0.6	0.2	2.5			
	CECU	*Ceanothus cuneatus*	38	4.8	0.2	22			
	HEAR5	*Heteromeles arbutifolia*	38	0.9	2	3			
	SAME5	*Sambucus mexicana*	38	0.5	0.2	2			
	CEBE3	*Cercocarpus betuloides*	38	0.4	0.2	2			
	MALA6	*Malosma laurina*	25	1.3	3	7.5			
	CESP	*Ceanothus spinosus*	25	0.5	1	3			
	TODI	*Toxicodendron diversilobum*	25	0.5	1	3			
	MIAU	*Mimulus aurantiacus*	25	0.2	0.2	1			
	ERFA2	*Eriogonum fasciculatum*	25	0.1	0.2	0.2			
Herb									
	BROMU	*Bromus*	38	3.1	4	11			
	UNHE	Unknown Herbs/Forbs	38	1.4	3	5			
	BRDI3	*Bromus diandrus*	38	0.5	0.2	2.5			X
	CEME2	*Centaurea melitensis*	25	0.8	3	3			X
	STME2	*Stellaria media*	25	0.2	0.2	1			X
	DRAR3	*Dryopteris arguta*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Polygala cornuta was found in 1 of 8 surveys of this plant community, which could be the rare subspecies *P. C.* var. *fishiae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-2. Global rank is G5T4, and state rank is S3.3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Stellaria media, Galium aparine, Carduus pycnocephalus, Lolium, Marrubium vulgare, Melilotus albus, Piptatherum miliaceum, Vinca major

Samples Used in Description: (n = 8)
AA0470cc, AA0754cc, AA0808, AA1136, rap0459, rap1551m, rap2253, rap2830

Comments:
This association typically occurs in between a lower slope or bottom slope position while *Quercus agrifolia* Woodland, *Q. agrifolia/Heteromeles arbutifolia*, or other *Q. agrifolia* associations occur and a middle or lower slope position with *Quercus berberidifolia A*lliance stands. These oaks

stands are not usually adjacent or transitional throughout the Santa Monica Mountains, and they occur in large enough stands so as not to be considered strictly ecotonal.

Phases:
None

COMMON NAME	Coast Live Oak/Scrub Oak Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A somewhat similar association, the *Quercus agrifolia-Umbellularia californica/Heteromeles arbutifolia-Quercus berberidifolia* Association, has been defined. It differs from this association by having *Umbellularia* in > 75% of the samples, and *Arbutus menziesii* in about half of the samples. It is perhaps a northern California analog to this association.

References:
Allen et al. 1991

Quercus agrifolia/Salvia leucophylla-Artemisia californica Woodland/Forest Association

Coast Live Oak/Purple Sage-California Sagebrush Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1116

Local Description

Summary:
This woodland/forest association occurs on somewhat steep to steep slopes that are often north facing at elevations between 53 and 420 m. It is dominated by *Quercus agrifolia* in the tree layer, *Salvia leucophylla* and *Artemisia californica* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 53–420 m, mean 301.1 m
Aspect: variable but often northwest or northeast
Slope: range 15–35 degrees, mean 26.0 degrees
Topography (micro; macro): often convex or undulating, occasionally flat; bottom to top slopes
Litter Cover: range 20–75%, mean 49.4%
Small Rock Cover: range 2–20%, mean 10.3%
Large Rock Cover: range 0–2%, mean 1.1%
Bare Ground: range 15–50%, mean 28.8%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: moderately fine clay loam to fine sandy clay

Vegetation Description:
Stands of *Quercus agrifolia/Salvia leucophylla-Artemisia californica* Woodland/Forest form a sparse to intermittent tree layer (8–35%, mean 19.3%) with hardwoods at 2–15 m tall, an open to intermittent shrub layer (10–50%, mean 27.5%) at 0–5 m tall, and a sparse to open herbaceous layer (0–22%, mean 5.6%) at 0–1 m tall. Total vegetation cover is 32–64%, mean cover is 49.9%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Juglans californica* is occasionally included in this layer. The open to intermittent shrub layer is dominated by *Salvia leucophylla* and *Artemisia californica.* Occasionally, *Malosma laurina* and *Malacothamnus fasciculatus* are also included. The herbaceous layer is diverse and includes *Leymus condensatus, Brassica nigra, Bromus diandrus,* and *Centaurea melitensis.*

***Quercus agrifolia/Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	96	16.1	5	33	X	X	
	JUCA-T	*Juglans californica*	29	1.9	1	15			
	QULO-T	*Quercus lobata*	29	0.7	1	4			
Shrub									
	SALE3	*Salvia leucophylla*	100	13.3	2	25	X	X	
	ARCA11	*Artemisia californica*	96	10	0.2	23	X	X	
	MALA6	*Malosma laurina*	46	1.2	0.2	9			
	SAME5	*Sambucus mexicana*	43	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	36	1	0.2	17			
	HASQ2	*Hazardia squarrosa*	32	0.2	0.2	3			
	HEAR5	*Heteromeles arbutifolia*	29	0.5	0.2	5			
	MIAU	*Mimulus aurantiacus*	21	0.8	0.2	12			
	RHOV	*Rhus ovata*	21	0.5	0.2	6			
	TODI	*Toxicodendron diversilobum*	21	0.3	0.2	7.5			
	BAPI	*Baccharis pilularis*	21	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	54	1.4	0.2	10			
	BRNI	*Brassica nigra*	36	0.5	0.2	8			X
	BRDI3	*Bromus diandrus*	29	0.9	0.2	6			X
	CEME2	*Centaurea melitensis*	29	0.4	0.2	3			X

Other Noteworthy Species:
Juglans californica was found in 9 of 28 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Carduus pycnocephalus, Marrubium vulgare, Avena, Melilotus indicus, Lolium, Silybum marianum, Bromus hordeaceus, Anagallis arvensis, Avena barbata, Avena fatua, Erodium cicutarium, Galium aparine, Lactuca serriola, Medicago polymorpha, Senecio vulgaris, Vicia villosa

Samples Used in Description: (n = 28)
AA0318cc, AA0385cc, AA0462cc, AA0496cc, AA0578, AA0684, AA0687, AA0709, AA0951, AA0953, AA0981, AA1096, AA1180, rap0200, rap1309, rap1325, rap1401, rap1847m, rap2001, rap2067, rap2184, rap2185, rap2199, rap2201, rap2277, rap2554rlv, rap2630, rap2853rlv

Comments:
This is a locally common association that is largely endemic to the Santa Monica Mountains and Ventura region of the southern California coast. It represents the most common expression of coast live oak and coastal sage scrub species. These stands appear to be mature stands with lengthening intervals between fires, which have allowed for oaks and coastal scrub to recolonize areas and develop into mature trees and shrubs that may have been dominated more by grasses under a regime of higher frequency fire. Alternatively, this type may be a type recovering from grazing pressure more than a release from fires (J. Christian, personal observation).

Phases:
None

COMMON NAME	Coast Live Oak/Purple Sage-California Sagebrush Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association has been reported by Allen et al. (1991). It is the *Quercus agrifolia/ Artemisia californica/*Grass Association. It is likely to be the "parent" suballiance to this association. It is identified from Santa Clara to San Diego counties with *Artemisia californica* as the overall constant shrub at 88% and *Salvia leucophylla* at 13% constancy. However, since *A. californica* has a much wider geographic range than S*. leucophylla*, it is likely that if the southern California samples were analyzed separately, they would also have shown a higher constancy of S*. leucophylla*, thus mirroring the Santa Monica Mountains situation.

References:
Allen et al. 1991

Quercus agrifolia/Toxicodendron diversilobum Woodland/Forest Association

Coast Live Oak/Poison Oak Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1117

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 40 and 577 m. It is dominated by *Quercus agrifolia* in the tree layer. *Toxicodendron diversilobum* is characteristic in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone, Upper Elevation Santa Monica Mountains, Immediate Coast, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Dry Inland of the study area.

Environmental Description:
Elevation: range 40–577 m, mean 286.4 m
Aspect: variable, often northwest or northeast
Slope: range 1–40 degrees, mean 20.7 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: range 45–85%, mean 72.2%
Small Rock Cover: range 0–15%, mean 4.2%
Large Rock Cover: range 0–20%, mean 3%
Bare Ground: range 2–25%, mean 12%
Parent Material: often sedimentary, occasionally depositional or igneous
Soil Texture: medium to very fine loamy sand to moderately fine sandy clay loam but often medium loam

Vegetation Description:
Stands of *Quercus agrifolia/Toxicodendron diversilobum* Woodland/Forest form a sparse to continuous tree layer (5–74%, mean 31.8%) with conifers at 0–20 m tall and hardwoods at 2–35 m tall, a sparse to intermittent shrub layer (6–56%, mean 24.8%) at 0–10 m tall, and a sparse to open herbaceous layer (0–15%, mean 5.3%) at 0–2 m tall. Total vegetation cover is 38–90%, mean cover is 58.6%.

In this association, the tree layer is dominated by *Quercus agrifolia*. The shrub layer is sparse to intermittent and is characterized by *Toxicodendron diversilobum*. Frequently, *Mimulus aurantiacus* and *Heteromeles arbutifolia* are also included. *Malosma laurina, Artemisia californica, Salvia leucophylla, Sambucus mexicana,* and *Rhamnus ilicifolia* are occasionally included in the shrub layer. The herbaceous layer is diverse and includes *Leymus condensatus, Marah macrocarpus, Bromus diandrus, Piptatherum miliaceum,* and *Melica imperfecta.*

***Quercus agrifolia/Toxicodendron diversilobum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	29.0	5.0	65.0	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	34	1.7	1.0	15.0			
Shrub									
	TODI	*Toxicodendron diversilobum*	86	7.3	0.2	51.0		X	
	MIAU	*Mimulus aurantiacus*	71	4.7	0.2	25.0			
	HEAR5	*Heteromeles arbutifolia*	54	1.0	0.2	5.0			
	MALA6	*Malosma laurina*	49	1.4	0.2	9.0			
	ARCA11	*Artemisia californica*	46	1.8	0.2	16.0			
	SALE3	*Salvia leucophylla*	37	1.1	0.2	15.0			
	SAME5	*Sambucus mexicana*	34	0.5	0.2	2.5			
	RHIL	*Rhamnus ilicifolia*	34	0.3	0.2	2.5			
	KECO	*Keckiella cordifolia*	29	0.6	0.2	5.0			
	MAFA	*Malacothamnus fasciculatus*	26	0.4	0.2	3.0			
	CESP	*Ceanothus spinosus*	23	1.0	0.2	12.0			
	BAPI	*Baccharis pilularis*	20	0.7	0.2	10.0			
Herb									
	LECO12	*Leymus condensatus*	57	1.4	0.2	15.0			
	MAMA8	*Marah macrocarpus*	26	0.2	0.2	2.5			
	BRDI3	*Bromus diandrus*	23	0.3	0.2	4.0			X
	PIMI3	*Piptatherum miliaceum*	23	0.3	0.2	3.0			X
	MEIM	*Melica imperfecta*	20	0.4	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 8 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 35 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Woodwardia fimbriata was found in 1 of 35 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Marrubium vulgare, Brassica nigra, Carduus pycnocephalus, Bromus madritensis, Phalaris aquatica, Centaurea melitensis, Galium aparine, Avena, Anagallis arvensis, Cirsium vulgare, Stellaria media, Bromus hordeaceus, Lolium, Hirschfeldia incana, Conium maculatum, Ageratina adenophora, Avena barbata, Brassica, Chenopodium album, Foeniculum vulgare, Hypochaeris, Medicago polymorpha, Melilotus indicus, Nicotiana glauca, Picris echioides, Senecio vulgaris, Sonchus, Sonchus oleraceus

Samples Used in Description: (n = 35)
AA0018cc, AA0019cc, AA0046cc, AA0330cc, AA0914, AA0977, AA0978, AA1087, AA1125, AA1224, rap0002m, rap0082, rap0084, rap0198, rap0201m, rap0212, rap0215m, rap0245, rap0730, rap0756, rap0838, rap0853, rap1152, rap1374, rap1528, rap1708, rap1983, rap2076m, rap2183, rap2299, rap2304, rap2461rlv, rap2555rlv, rap2557rlv, rap2735

Comments:
This is a common association in the Santa Monica Mountains. It can be distinguished from others of this alliance by the relatively high cover of understory shrubs (about 25%) most of which are *Toxicodendron diversilobum* and *Mimulus aurantiacus.* Two phases have been distinguished: one with high cover of *T. diversilobum* and the other with high cover of *M. aurantiacus.* Both have sufficient overlap in species and environmental characteristics to be combined.

Phases:
Quercus agrifolia/Toxicodendron diversilobum (Coast Live Oak/Poison Oak) Phase [1117]
Quercus agrifolia/Mimulus aurantiacus (Coast Live Oak/Bush Monkey Flower) Phase [6113]

COMMON NAME	Coast Live Oak/Poison Oak Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	

Global Description

Distribution:
This association is known from other parts of central and south coastal California (Allen et al. 1991).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Quercus agrifolia* associations are characterized by the presence of *T. diversilobum*. These include *Q. agrifolia/T. diversilobum*/Grass (Allen et al. 1991), *Q. agrifolia/T. diversilobum-Riparian,* and *Q. agrifolia/T. diversilobum*/Grass (Evens and San 2005), and *Q. agrifolia/T. diversilobum-(Corylus cornuta)* (NatureServe et al. 2003a). All these have distinguishing biogeographic and environmental features that justify keeping these as separate associations.

References:
Allen et al. 1991, NatureServe et al. 2003a, Evens and San 2005

Quercus agrifolia-Juglans californica Woodland/Forest Association

Coast Live Oak-California Walnut Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1115

Local Description

Summary:
This woodland/forest association occurs on moderately steep to very steep slopes with variable aspects at low to mid elevations between 58 and 869 m. It is dominated by *Quercus agrifolia* and *Juglans californica* in the tree layer. *Toxicodendron diversilobum* is characteristic in the understory shrub layer. A variety of grasses and forbs occurs in the herbaceous layer with *Leymus condensatus* most frequently occurring.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 58–869 m, mean 275 m
Aspect: often northeast or northwest, sometimes southwest or variable
Slope: range 7–46 degrees, mean 25.4 degrees
Topography (micro; macro): variable but more often undulating or concave; bottom to upper slopes
Litter Cover: range 35–90%, mean 67%
Small Rock Cover: range 0–50%, mean 8.4%
Large Rock Cover: range 0–3%, mean 0.8%
Bare Ground: range 2–35%, mean 11%
Parent Material: variable but more often sedimentary, occasionally igneous or depositional
Soil Texture: medium loam to moderately fine sandy clay loam but more often moderately fine clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Juglans californica* Woodland/Forest form an open to continuous tree layer (0–72%, mean 36.5%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (2–63%, mean 16.6%) at 0–10 m tall, and a sparse to intermittent herbaceous layer (0–46%, mean 7.3%) at 0–1 m tall. Total vegetation cover is 44–85%, mean cover is 58.3%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Juglans californica*. *Umbellularia californica* is infrequently included in this layer at low cover. The shrub layer is sparse to intermittent and is characterized by *Toxicodendron diversilobum*, usually with highest cover. *Heteromeles arbutifolia* and other shrubs, such as *Sambucus mexicana, Artemisia californica,* and *Mimulus aurantiacus,* are often found in lower cover. The herbaceous layer is diverse with *Leymus condensatus* often present and various herbs occasionally present such as *Marrubium vulgare, Bromus* sp., *Piptatherum miliaceum,* and *Brassica nigra*.

***Quercus agrifolia-Juglans californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.8	4.0	65.0	X	X	
	JUCA-T	*Juglans californica*	96	13.4	2.5	42.0	X	X	
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.4	0.2	3.0			
Shrub									
	TODI	*Toxicodendron diversilobum*	87	6.1	0.2	20.0		X	
	HEAR5	*Heteromeles arbutifolia*	70	2.2	0.2	10.0			
	SAME5	*Sambucus mexicana*	48	1.1	0.2	7.0			
	ARCA11	*Artemisia californica*	48	0.9	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	43	0.7	0.2	4.0			
	MALA6	*Malosma laurina*	35	0.5	0.2	3.0			
	BAPI	*Baccharis pilularis*	26	0.4	0.2	2.5			
	RISP	*Ribes speciosum*	26	0.1	0.2	1.0			
	RHIN2	*Rhus integrifolia*	22	0.5	0.2	4.0			
	LONIC	*Lonicera*	22	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	52	0.9	0.2	4.0			
	MAVU	*Marrubium vulgare*	35	0.2	0.2	2.5			X
	BRDI3	*Bromus diandrus*	30	1.2	1.0	12.0			X
	BROMU	*Bromus*	22	0.9	1.0	7.5			
	PIMI3	*Piptatherum miliaceum*	22	0.4	0.2	6.0			X
	BRNI	*Brassica nigra*	22	0.2	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 23 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Marrubium vulgare, Bromus diandrus, Piptatherum miliaceum, Brassica nigra, Carduus pycnocephalus, Ageratina adenophora, Medicago polymorpha, Silybum marianum, Centaurea melitensis, Brassica, Euphorbia terracina, Hirschfeldia incana, Bromus hordeaceus, Melilotus indicus, Stellaria media, Cirsium vulgare, Nicotiana glauca, Ricinus communis, Rumex crispus, Galium aparine, Avena, Bromus madritensis, Anagallis arvensis, Avena barbata, Erodium, Lactuca serriola, Plantago lanceolata, Sonchus asper, Sonchus oleraceus

Samples Used in Description: (n = 23)
AA0153cc, AA0199cc, AA0242cc, AA0306cc, AA0415, AA0502, AA0738, rap0483, rap0620m, rap0732, rap0736, rap0748, rap0755, rap0763, rap1139, rap1177, rap2255, rap2414, rap2460rlv, rap2464rlv, rap2510, rap2565, rap2926

Comments:
This association is largely endemic to the Santa Monica Mountains and immediate surroundings. It is differentiated from others of this alliance by the constant presence of *Juglans californica* as a sub- or occasionally codominant. Also as a general note, cover values of *Juglans* are likely to

average higher than recorded because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Two phases have been identified: one with little understory shrubs or herbs and another with high cover of *Toxicodendron diversilobum*.

Phases:
Quercus agrifolia-Juglans californica (Coast Live Oak-California Walnut) Phase [1115]
Juglans californica-Quercus agrifolia/Toxicodendron diversilobum (California Walnut-Coast Live Oak/Poison Oak) Phase [6311]

COMMON NAME	Coast Live Oak-California Walnut Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	1
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus agrifolia-Salix lasiolepis Woodland/Forest Association

Coast Live Oak-Arroyo Willow Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 6114

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with variable aspects at low elevations between 119 and 527 m. It is dominated by *Quercus agrifolia* in the tree layer and *Salix lasiolepis* in the understory tree layer. A variety of grasses and forbs is often abundant in the herbaceous layer.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 119–527 m, mean 345 m
Aspect: variable
Slope: range 2–15 degrees, mean 10.7 degrees
Topography (micro; macro): variable but more often concave; bottom to mid slopes
Litter Cover: range 0–80%, mean 40%
Small Rock Cover: range 0–8%, mean 4.3%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 15–70%, mean 33.3%
Parent Material: often sedimentary, occasionally igneous
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of *Quercus agrifolia-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (27–63%, mean 46.8%) with conifers at 0–15 m tall and hardwoods at 5–15 m tall, a sparse to open shrub layer (1–16%, mean 6.7%) at 0–5 m tall, and a sparse herbaceous layer (0–7%, mean 3.3%) at 0–1 m tall. Total vegetation cover is 43–65%, mean cover is 56.2%.

In this association, the tree layer is dominated by *Quercus agrifolia*. *Salix lasiolepis* is frequently in the understory or overstory tree layer, while *Salix laevigata* may also occur in the overstory tree layer. The shrub layer is sparse to open and frequently includes *Heteromeles arbutifolia* and *Toxicodendron diversilobum*. The herbaceous layer is diverse and includes *Piptatherum miliaceum, Artemisia douglasiana,* and *Rorippa nasturtium-aquaticum*.

***Quercus agrifolia-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	28.5	19	40	X	X	
	SALIX-T	*Salix*	50	4.7	5	15			
	SALA3-T	*Salix laevigata*	33	2.3	4	10			
	JUCA-T	*Juglans californica*	33	0.5	0.2	3			
	PLRA	*Platanus racemosa*	33	0.2	0.2	1			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	50	9.3	6	30	X		
	QUAG-L	*Quercus agrifolia*	33	0.5	1	2			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	67	0.9	0.2	4			
	TODI	*Toxicodendron diversilobum*	50	0.4	0.2	2			
	RHIL	*Rhamnus ilicifolia*	33	0.5	0.2	3			
	BASA4	*Baccharis salicifolia*	33	0.2	0.2	1			
	KECO	*Keckiella cordifolia*	33	0.2	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	50	1	0.2	5			X
	ARDO3	*Artemisia douglasiana*	50	0.5	0.2	2			
	UNHE	Unknown Herbs/Forbs	33	0.8	2	3			
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 2 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Rorippa nasturtium-aquaticum, Schinus molle, Nerium oleander, Bromus diandrus, Cortaderia, Ricinus communis, Rumex crispus, Sonchus, Vinca major

Samples Used in Description: (n = 6)
AA0530, AA0695, AA1020, rap1580, rap2389, rap2766

Comments:
This is a riparian oak woodland. Several associated species are indicative of higher than ambient moisture settings as a result of urban runoff. Most of the *Salix* sp. unidentified in the overstory tree layer of this association are likely to be S*. lasiolepis*.

Phases:
None

COMMON NAME	Coast Live Oak-Arroyo Willow Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland

PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in central and southern coastal California.

References:
None

Quercus agrifolia-Umbellularia californica Woodland/Forest Association

Coast Live Oak-California Bay Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1114

Local Description

Summary:
This woodland/forest association occurs on gentle to steep, often north-facing slopes at low to mid elevations between 0 and 851 m. It is dominated by *Quercus agrifolia* and *Umbellularia californica* in the tree layer, *Heteromeles arbutifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–851 m, mean 399 m
Aspect: variable but often northeast or northwest
Slope: range 2–36 degrees, mean 24.8 degrees
Topography (micro; macro): variable but more often concave or undulating; bottom to top slopes
Litter Cover: range 80–80%, mean 80%
Small Rock Cover: range 1–9%, mean 4.4%
Large Rock Cover: range 0–25%, mean 7.2%
Bare Ground: range 1–15%, mean 6.8%
Parent Material: often sedimentary, occasionally igneous, metamorphic, or depositional
Soil Texture: more often medium loam, less often moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Umbellularia californica* Woodland/Forest form an open to continuous tree layer (7–70%, mean 40.3%) with hardwoods at 2–20 m tall, a sparse to intermittent shrub layer (0–50%, mean 15.7%) at 0–5 m tall, and a sparse to open herbaceous layer (0–15%, mean 1.7%) at 0–2 m tall. Total vegetation cover is 40–78%, mean cover is 57%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Umbellularia californica*. *Platanus racemosa* and *Juglans californica* are occasionally included in this layer. The shrub layer is sparse to intermittent and is characterized by *Heteromeles arbutifolia* at low cover. Frequently, *Toxicodendron diversilobum* and *Mimulus aurantiacus* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Rubus ursinus, Marah macrocarpus,* and *Dryopteris arguta.*

***Quercus agrifolia-Umbellularia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	22.4	1.0	50.0	X	X	
	UMCA-T	*Umbellularia californica*	89	14.7	1.0	45.0	X	X	
	PLRA	*Platanus racemosa*	44	1.4	0.2	10.0			
	JUCA-T	*Juglans californica*	28	0.8	1.0	6.0			
Tree Understory									
	UMCA-M	*Umbellularia californica*	22	1.0	2.0	8.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	78	1.4	0.2	7.0		X	
	TODI	*Toxicodendron diversilobum*	67	4.6	1.0	20.0			
	MIAU	*Mimulus aurantiacus*	50	1.2	0.2	6.0			
	CESP	*Ceanothus spinosus*	44	2.2	0.2	17.0			
	CEOL	*Ceanothus oliganthus*	28	0.7	0.2	5.0			
	PRIL	*Prunus ilicifolia*	28	0.3	0.2	2.5			
	RHOV	*Rhus ovata*	22	0.4	1.0	4.0			
	MALA6	*Malosma laurina*	22	0.4	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	39	0.7	0.2	4.0			
	RUUR	*Rubus ursinus*	22	0.4	0.2	6.0			
	MAMA8	*Marah macrocarpus*	22	0.2	0.2	2.5			
	DRAR3	*Dryopteris arguta*	22	0.1	0.2	1.0			

Other Noteworthy Species:
Juglans californica was found in 5 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 18 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Piptatherum miliaceum, Bromus hordeaceus, Senecio mikanioides, Spartium junceum

Samples Used in Description: (n = 18)
AA0143cc, AA0221cc, AA0260cc, AA0654, AA0786, AA0965, rap0410, rap0435, rap0460, rap0498, rap0585, rap0782, rap1514m, rap1591, rap1775, rap2285, rap2352, rap2383

Comments:
This is the common oak and bay forest of the Santa Monica Mountains. It is widespread on mesic slopes and in canyons at lower to mid elevations. Coast live oak is usually clearly dominant, but California bay accounts for approximately half the total tree cover. Two phases have been identified, one with significantly higher *Toxicodendron* cover than the other.

Phases:
Quercus agrifolia-Umbellularia californica (Coast Live Oak-California Bay) Phase [1114]
Quercus agrifolia-Umbellularia californica/Toxicodendron diversilobum (Coast Live Oak-California Bay/Poison Oak) Phase [6119]

COMMON NAME	Coast Live Oak-California Bay Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Q. agrifolia* associations have been identified with a subdominance of *Umbellularia californica*. These include *Q. agrifolia-U. californica/Arctostaphylos glauca-Toxicodendron diversilobum* and *Q. agrifolia-U. californica/*Grass (Evens and San 2005), *Q. agrifolia-U. californica/Ceanothus oliganthus* (this report), and *Q. agrifolia-U. californica/ Heteromeles*

arbutifolia-Quercus berberidifolia (Allen et al. 1991). All these differ in their biogeography and in their environmental factors but are clearly related. All are characteristic of the central and southern coastal portions of California.

References:
Allen et al. 1991, Evens and San 2005

Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association

Coast Live Oak-California Bay/Hairy Leaf Ceanothus Woodland/Forest Association
***Quercus agrifolia* Woodland/Forest Alliance**
Coast Live Oak Woodland/Forest Alliance

Mapping Code: 1119

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes, often with north-facing aspects at low to mid elevations between 298 and 801 m. *Quercus agrifolia* and *Umbellularia californica* are dominant in the tree layer, *Ceanothus oliganthus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 298–801 m, mean 588.3 m
Aspect: variable but often northeast
Slope: range 4–35 degrees, mean 23.2 degrees
Topography (micro; macro): variable; bottom to top slopes
Litter Cover: range 15–80%, mean 47.5%
Small Rock Cover: range 3–25%, mean 10.6%
Large Rock Cover: range 0–25%, mean 8.4%
Bare Ground: range 5–15%, mean 10.8%
Parent Material: igneous, depositional, or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Woodland/Forest form an open to intermittent tree layer (18–38%, mean 32.4%) with hardwoods at 5–10 m tall, a sparse to intermittent shrub layer (6–45%, mean 26.1%) at 0–10 m tall, and a sparse to open herbaceous layer (0–25%, mean 2.9%) at 0–1 m tall. Total vegetation cover is 40–90%, mean cover is 59.6%.

In this association, the tree layer is dominated by *Quercus agrifolia* and *Umbellularia californica*. *Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus oliganthus. Heteromeles arbutifolia* is often included. *Quercus berberidifolia, Mimulus aurantiacus, Adenostoma sparsifolium,* and *Ribes malvaceum* are occasionally present in low cover. The herbaceous layer is simple and occasionally includes *Dryopteris arguta, Piptatherum miliaceum, Leymus condensatus, Melica imperfecta,* and *Silene gallica* in low cover.

***Quercus agrifolia-Umbellularia californica/Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	23	12	35	X	X	
	UMCA-T	*Umbellularia californica*	56	6	3	23			
	JUCA-T	*Juglans californica*	33	0.8	2	3			
Tree Understory									
	UMCA-M	*Umbellularia californica*	44	2.3	0.2	10			
	JUCA-M	*Juglans californica*	22	0.3	1	2			
Shrub									
	CEOL	*Ceanothus oliganthus*	89	16.1	6	40	X	X	
	HEAR5	*Heteromeles arbutifolia*	67	2.3	0.2	10			
	QUBE5	*Quercus berberidifolia*	44	0.8	0.2	5			
	MIAU	*Mimulus aurantiacus*	44	0.4	0.2	2.5			
	ADSP	*Adenostoma sparsifolium*	44	0.3	0.2	1			
	RIMA	*Ribes malvaceum*	44	0.1	0.2	0.2			
	PRIL	*Prunus ilicifolia*	33	1.2	0.2	8			
	RHOV	*Rhus ovata*	33	0.5	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.4	0.2	2.5			
	ARGL3	*Arctostaphylos glandulosa*	33	0.2	0.2	1			
	CESP	*Ceanothus spinosus*	22	0.8	2.5	5			
	MAFA	*Malacothamnus fasciculatus*	22	0.4	1	3			
	MALA6	*Malosma laurina*	22	0.3	1	2			
	DERI	*Dendromecon rigida*	22	0.1	0.2	1			
	ADFA	*Adenostoma fasciculatum*	22	0.01	0.2	0.2			
	GAVE2	*Garrya veatchii*	22	0.01	0.2	0.2			
	LEFR	*Lepechinia fragrans*	22	0.01	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	22	0.01	0.2	0.2			
Herb									
	DRAR3	*Dryopteris arguta*	22	0.9	0.2	7.5			
	PIMI3	*Piptatherum miliaceum*	22	0.1	0.2	1			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 9 surveys of this plant community, which is assumed to be the rare subspecies *B. p.* subsp. *plummerae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 5 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 2 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Silene gallica

Samples Used in Description: (n = 9)
AA0473cc, AA1226, rap0282m, rap0284, rap0696m, rap0777m, rap0784, rap2425, rap2836

Comments:
This association is characteristic of the more inland or upper elevation mixed oak and bay woodlands of the project area. In general, *Ceanothus oliganthus* does not occur much below 615 m in the main portion of the Santa Monica Mountains, thus the combination of these species is often found on shaded upper slopes and in upper canyons. In the less coastal Simi Hills, this association may occur at lower elevations.

Phases:
None

COMMON NAME	Coast Live Oak-California Bay/Hairy Leaf Ceanothus Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen woodland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural extremely xeromorphic evergreen woodland
FORMATION	Sclerophyllous extremely xeromorphic evergreen woodland
ALLIANCE	*Quercus agrifolia* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK:	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Several other *Q. agrifolia* associations have been identified with a subdominance of *Umbellularia californica*. These include *Q. agrifolia-U. californica/Arctostaphylos glauca-Toxicodendron diversilobum* and *Q. agrifolia-U. californica*/Grass (Evens and San 2005), *Q. agrifolia-U. californica* (this report), and *Q. agrifolia-U. californica/Heteromeles arbutifolia-Q. berberidifolia* (Allen et al. 1991). All these differ in their biogeography and in their environmental factors but are clearly related. All are characteristic of the central and southern coastal portions of California.

References:
Allen et al. 1991, Evens and San 2004

Quercus lobata/Annual Grass-Herb Woodland/Forest Association

Valley Oak/Annual Grass-Herb Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1321

Local Description

Summary:
This woodland/forest association occurs on flat to steep slopes with variable aspect at low elevations between 230 and 418 m. It is dominated by *Quercus lobata* in the tree layer, and various herbs and grasses, such as *Brassica nigra*, *Bromus diandrus,* and *Lactuca serriola,* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–418 m, mean 297 m
Aspect: variable
Slope: range 0–35 degrees, mean 12.8 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 25–85%, mean 55.8%
Small Rock Cover: range 0–25%, mean 7.8%
Large Rock Cover: range 0–5%, mean 1.1%
Bare Ground: range 0–63%, mean 21.1%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: medium loam to fine clay

Vegetation Description:
Stands of *Quercus lobata*/Annual Grass-Herb Woodland/Forest form a sparse to intermittent tree layer (4–41%, mean 15.8%) with hardwoods at 2–15 m tall, a sparse shrub layer (0–5%, mean 1%) at 0–5 m tall, and an open to intermittent herbaceous layer (16–53%, mean 28.3%) at 0–2 m tall. Total vegetation cover is 20–60%, mean cover is 42.3%.

In this association, the tree layer is dominated by *Quercus lobata*. *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse and infrequently includes species such as *Baccharis salicifolia* and *Salvia leucophylla*. The herbaceous layer is dominated by nonnative species, characteristically including *Brassica nigra* and *Bromus diandrus.* Other herbs often include *Lactuca serriola*, *Bromus* sp., *Erodium* sp., and other grasses and forbs.

***Quercus lobata*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QULO-T	*Quercus lobata*	83	12.4	4	35	X	X	
	QUAG-T	*Quercus agrifolia*	33	0.2	0.2	1			
	JUCA-T	*Juglans californica*	25	1.2	1	12			
Tree Understory									
	QULO-M	*Quercus lobata*	25	1.1	4	5			
Herb									
	BRNI	*Brassica nigra*	83	8	4	15		X	X
	BRDI3	*Bromus diandrus*	75	6.1	0.2	15		X	X
	LASE	*Lactuca serriola*	67	1	0.2	4			X
	AVFA	*Avena fatua*	33	3.4	0.2	30			X
	MAPA5	*Malva parviflora*	33	0.4	0.2	3			X
	CEME2	*Centaurea melitensis*	25	0.4	0.2	5			X
	HORDE	*Hordeum*	25	0.3	0.2	3			
	BRHO2	*Bromus hordeaceus*	25	0.2	0.2	1			X
	HIIN3	*Hirschfeldia incana*	25	0.2	0.2	1			X
	LECO12	*Leymus condensatus*	25	0.1	0.2	1			
	MEIN2	*Melilotus indicus*	25	0.1	0.2	1			X

Other Noteworthy Species:
Dudleya cymosa was found in 1 of 12 surveys of this plant community, which could be one of the rare subspecies such as *D. C.* subsp. *ovatifolia, D. C.* subsp. *marcescens,* or *D. C.* subsp. *agourensis.* Regionally, the park considers these three species as Rare. CNPS ranks them as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G5T2 or G5T1, and state rank is S2.2 or S1.2. Federal listing is Threatened, and state listing is none or Rare (CNPS 2005, SAMO 2004).

Juglans californica was found in 3 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Lactuca serriola, Avena fatua, Malva parviflora, Centaurea melitensis, Bromus hordeaceus, Hirschfeldia incana, Melilotus indicus, Avena, Erodium moschatum, Erodium cicutarium, Piptatherum miliaceum, Centaurea solstitialis, Medicago polymorpha, Erodium, Bromus madritensis, Arundo donax, Carduus pycnocephalus, Conyza canadensis, Foeniculum vulgare, Lolium, Nicotiana glauca, Rumex crispus

Samples Used in Description: (n = 12)
AA0355, AA0541, AA0685, AA1133, rap1240, rap1496, rap1497, rap1498, rap2245, rap2314, rap2379, rap2631

Comments:
Two associations of this alliance occur in the study area. Both represent the southernmost representation of this alliance. Interestingly, both associations also are represented throughout much of the full range of this alliance, occurring far north into northern California. The association name has been modified somewhat from Allen et al. (1991), where it was called *Q. lobata*/Grass. The renaming here suggests that it also includes annual forbs as well as grasses.

Phases:
None

COMMON NAME	Valley Oak/Annual Grass-Herb Woodland/Forest Association
SYNONYM	Valley Oak/Grass (Allen et al. 1991)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from northern, central, and southern coastal California from Mendocino to Los Angeles counties inland to Contra Costa, Santa Clara, San Benito, and Kern counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The association occurs on mostly loamy soils of granitic or sedimentary parent material. It occurs on all aspects with slope usually < 35% with elevation below 1,710 m.

Vegetation Description:
Valley oak is the dominant tree in the overstory in open to moderately open woodlands. Shrub species are rarely present, and grasses are in high abundance.

Comments:
See local description.

References:
Allen et al. 1991, Sawyer and Keeler-Wolf 1995

Quercus lobata-Quercus agrifolia/Annual Grass-Herb Woodland/Forest Association

Valley Oak-Coast Live Oak/Annual Grass Herb Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1323

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects at low elevations between 236 and 465 m. It is dominated by *Quercus agrifolia* and *Quercus lobata* in the tree layer and *Brassica nigra* in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 236–465 m, mean 337 m
Aspect: variable
Slope: range 2–35 degrees, mean 17.7 degrees
Topography (micro; macro): variable but more often concave; bottom to top slopes
Litter Cover: range 20–85%, mean 58.6%
Small Rock Cover: range 1–30%, mean 7.2%
Large Rock Cover: range 0–8%, mean 1.5%
Bare Ground: range 2–50%, mean 17.8%
Parent Material: often sedimentary, occasionally depositional
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Quercus lobata-Quercus agrifolia*/Annual Grass-Herb Woodland/Forest form a sparse to continuous tree layer (0–67%, mean 22.7%) with hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (0–47%, mean 6.7%) at 0–5 m tall, and a sparse to intermittent herbaceous layer (1–60%, mean 26.3%) at 0–1 m tall. Total vegetation cover is 27–70%, mean cover is 51.5%.

In this association, the tree layer is codominated by *Quercus agrifolia* and *Quercus lobata. Juglans californica* is occasionally included in this layer. The shrub layer is sparse to intermittent and occasionally includes *Salvia leucophylla, Artemisia californica, Sambucus mexicana,* and *Hazardia squarrosa*. The herbaceous layer is diverse and often includes *Brassica nigra* and *Bromus diandrus.* Other herbs occasionally include *Hirschfeldia incana, Centaurea melitensis, Lactuca serriola, Eriogonum elongatum, Bromus hordeaceus, Lessingia filaginifolia, Leymus condensatus,* and *Marrubium vulgare.*

***Quercus lobata-Quercus agrifolia*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	12.3	1	47	X	X	
	QULO-T	*Quercus lobata*	100	10.3	2	20	X	X	
	JUCA-T	*Juglans californica*	28	1.2	0.2	9			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	0.4	0.2	2.5			
Shrub									
	SALE3	*Salvia leucophylla*	39	1.9	0.2	17			
	ARCA11	*Artemisia californica*	33	1.2	0.2	16			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	1			
	HASQ2	*Hazardia squarrosa*	22	0.6	0.2	8			
Herb									
	BRNI	*Brassica nigra*	78	4.8	0.2	20		X	X
	BRDI3	*Bromus diandrus*	67	7.9	1	28			X
	HIIN3	*Hirschfeldia incana*	39	1.8	2	10			X
	CEME2	*Centaurea melitensis*	39	1.5	0.2	13			X
	LASE	*Lactuca serriola*	28	0.3	0.2	2.5			X
	EREL6	*Eriogonum elongatum*	28	0.2	0.2	2.5			
	BRHO2	*Bromus hordeaceus*	22	0.6	0.2	5			X
	LEFI11	*Lessingia filaginifolia*	22	0.2	0.2	2.5			
	LECO12	*Leymus condensatus*	22	0.1	0.2	1			
	MAVU	*Marrubium vulgare*	22	0.1	0.2	1			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 7 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Hirschfeldia incana, Centaurea melitensis, Lactuca serriola, Bromus hordeaceus, Marrubium vulgare, Medicago polymorpha, Avena fatua, Carduus pycnocephalus, Cirsium vulgare, Avena, Melilotus indicus, Erodium cicutarium, Centaurea solstitialis, Lolium, Malva parviflora, Bromus madritensis, Salsola tragus, Galium aparine, Nicotiana glauca, Silybum marianum, Verbascum blattaria

Samples Used in Description: (n = 18)
AA0322cc, AA0539, AA0540, AA0792, AA1132, rap1241, rap1314, rap1434m, rap1505, rap1507, rap2450, rap2580, rap2628, rap2632, rap2676, rap2745, rap2796, rap2798

Comments:
This association is characterized by codominance of valley and coast live oak with a largely nonnative annual grass and herb understory. Two associations of this alliance occur in the study

area. Both represent the southernmost representation of this alliance. Interestingly, both associations also are represented throughout much of the full range of this alliance, occurring far north into northern California. The association name has been modified somewhat from Allen et al. (1991), where it was called *Quercus lobata-Q. agrifolia*/Grass. The renaming here suggests that it also includes annual forbs as well as grasses.

Phases:
None

COMMON NAME	Valley Oak-Coast Live Oak/Annual Grass Herb Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from central California to southern California ranging from Santa Clara County to Los Angeles County and inland to Kern, Merced, San Benito, and Santa Clara counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The association usually occurs on deep clay soils at elevations ranging from near sea level to more than 1,000 m (in the Tehachapi Mountains and northern coast range).

Vegetation Description:
These are moderately open woodlands to very open woodlands (10–50% tree cover), with a shared dominance of *Q. lobata* and *Q. agrifolia* along with a largely herbaceous understory of grasses and herbs.

Comments:
It remains to be seen if the presence of certain southern California shrubs, such as *Salvia leucophylla,* in about one-third of the samples is sufficient to differentiate the local stands from other similar stands in northern and central California.

References:
Allen et al. 1989, Sawyer and Keeler-Wolf 1995

Quercus lobata-Salix lasiolepis Woodland/Forest Association

Valley Oak-Arroyo Willow (provisional) Woodland/Forest Association
***Quercus lobata* Woodland/Forest Alliance**
Valley Oak Woodland/Forest Alliance

Mapping Code: 1324

Local Description

Summary:
This woodland/forest association occurs on gentle to moderate slopes with variable aspect at low elevations between 230 and 318 m. It is dominated by *Quercus lobata* in the overstory tree layer. *Salix lasiolepis* is present in either the tree or shrub layer, and *Quercus agrifolia* is often present in the understory tree layer. *Baccharis salicifolia* is abundant in the understory shrub layer, and a variety of grasses and forbs is found in the herbaceous layer. This is considered a provisional association because only three samples of this type have been collected.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–318 m, mean 239 m
Aspect: variable or flat/none
Slope: range 2–15 degrees, mean 6.3 degrees
Topography (micro; macro): concave; bottom to lower slopes
Litter Cover: range 35–65%, mean 55%
Small Rock Cover: range 5–8%, mean 7%
Large Rock Cover: range 2–2%, mean 2%
Bare Ground: range 10–35%, mean 20%
Parent Material: depositional or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Quercus lobata-Salix lasiolepis* Woodland/Forest form an open to intermittent tree layer (25–60%, mean 42.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (2–11%, mean 7.7%) at 0–2 m tall, and a sparse to open herbaceous layer (2–25%, mean 12%) at 0–1 m tall. Total vegetation cover is 60–65%, mean cover is 62%.

In this association, the tree layer is dominated by *Quercus lobata*. *Salix lasiolepis* is found in the tree or shrub layer with moderate to abundant cover. *Quercus agrifolia* is found in low cover in the understory tree layer, and *Salix laevigata* is occasionally included in the tree layer. The shrub layer is sparse to open and often includes *Baccharis salicifolia* and *Baccharis pilularis.* The herbaceous layer is simple and occasionally includes *Bromus diandrus* and *Rubus ursinus.*

***Quercus lobata-Salix lasiolepis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QULO-T	*Quercus lobata*	100	18.3	15	25	X	X	
	SALA3-T	*Salix laevigata*	33	2.5	7.5	7.5			
	JUCA-T	*Juglans californica*	33	0.8	2.5	2.5			
	PLRA	*Platanus racemosa*	33	0.8	2.5	2.5			
	QUAG-T	*Quercus agrifolia*	33	0.8	2.5	2.5			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	67	2.6	0.2	7.5			
	SALA6-T	*Salix lasiolepis*	33	7.3	22	22			
	SCMO	*Schinus molle*	33	0.8	2.5	2.5			X
	WASHI	*Washingtonia*	33	0.8	2.5	2.5			X
	QULO-L	*Quercus lobata*	33	0.3	1	1			
Shrub									
	BASA4	*Baccharis salicifolia*	67	4.2	5	7.5			
	BAPI	*Baccharis pilularis*	67	1.2	1	2.5			
	SALA6-M	*Salix lasiolepis*	33	8.3	25	25			
	SAME5	*Sambucus mexicana*	33	1.3	4	4			
	RHCA	*Rhamnus californica*	33	0.8	2.5	2.5			
	RHOV	*Rhus ovata*	33	0.8	2.5	2.5			
	ROCA2	*Rosa californica*	33	0.8	2.5	2.5			
	SALE3	*Salvia leucophylla*	33	0.3	1	1			
Herb									
	BRDI3	*Bromus diandrus*	33	1.7	5	5			X
	RUUR	*Rubus ursinus*	33	1.7	5	5			
	AMPS	*Ambrosia psilostachya*	33	0.8	2.5	2.5			
	LASE	*Lactuca serriola*	33	0.8	2.5	2.5			X
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.8	2.5	2.5			X
	TYPHA	*Typha*	33	0.8	2.5	2.5			
	SIMA3	*Silybum marianum*	33	0.7	2	2			X
	PIMI3	*Piptatherum miliaceum*	33	0.3	1	1			X
	CLEL	*Clarkia elegans*	33	0.1	0.2	0.2			
	HIIN3	*Hirschfeldia incana*	33	0.1	0.2	0.2			X
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			
	MEIN2	*Melilotus indicus*	33	0.1	0.2	0.2			X
	URDI	*Urtica dioica*	33	0.1	0.2	0.2			
	VIVI	*Vicia villosa*	33	0.1	0.2	0.2			X

Other Noteworthy Species:

Juglans californica was found in 1 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Lactuca serriola, Rorippa nasturtium-aquaticum, Schinus molle, Silybum marianum, Piptatherum miliaceum, Hirschfeldia incana, Melilotus indicus, Vicia villosa

Samples Used in Description: (n = 3)
AA0102cc, AA0165cc, rap1715m

Comments:
Locally, the presence of arroyo and red willow in these stands may be relatively recent and a result of urban runoff.

Phases:
None

COMMON NAME	Valley Oak-Arroyo Willow (provisional) Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Quercus lobata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This provisional association is likely to occur elsewhere within the range of the *Quercus lobata* Alliance. Many stands of *Q. lobata* in the Sacramento Valley are true riparian stands. Although no associations have been defined with *Q. lobata* and S*. lasiolepis*, it is likely that this association

occurs elsewhere in the south and central coast ranges of California and possibly in the Sacramento and San Joaquin valleys as well.

References:
Holland 1986, Vaghti and Greco 2005

Salix laevigata-Salix lasiolepis Woodland/Forest Suballiance

Red Willow-Arroyo Willow Woodland/Forest Suballiance
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1410

Local Description

Summary:
This woodland/forest association occurs on flat to somewhat steep slopes with variable aspects at elevations between 69 and 334 m. It is dominated by *Salix laevigata* and *S. lasiolepis* in both the tree and shrub layers. A variety of grasses and forbs occurs in the herbaceous layer at low cover.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, and Immediate Coast of the study area.

Environmental Description:
Elevation: range 69–334 m, mean 224 m
Aspect: variable but more often flat
Slope: range 0–15 degrees, mean 5.5 degrees
Topography (micro; macro): concave or flat; bottom to lower slopes
Litter Cover: range 40–90%, mean 68.3%
Small Rock Cover: range 0–25%, mean 9.3%
Large Rock Cover: range 0–15%, mean 4.3%
Bare Ground: range 0–20%, mean 12.5%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis* Woodland/Forest form a sparse to intermittent tree layer (0–66%, mean 37.9%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall, a sparse to intermittent shrub layer (0–60%, mean 11.9%) at 0–10 m tall, and a sparse to open herbaceous layer (0–25%, mean 4.7%) at 0–5 m tall. Total vegetation cover is 30–65%, mean cover is 54.4%.

In this association, the tree layer is dominated by *Salix laevigata* and *S. lasiolepis. Quercus agrifolia* occasionally is included in this layer. The shrub layer is sparse to intermittent and occasionally includes *Baccharis pilularis, Eriogonum fasciculatum,* and *Baccharis salicifolia*. The herbaceous layer includes a variety of grasses and forbs at low cover and frequency including *Piptatherum miliaceum, Arundo donax, Typha* sp.*, Bromus* sp.*, Equisetum* sp., and *Leymus condensatus*.

***Salix laevigata-Salix lasiolepis* Suballiance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix laevigata/S. lasiolepis*	71	25.5	17	59	X		
	QUAG-T	*Quercus agrifolia*	36	1.4	2	8			
	SCMO	*Schinus molle*	21	1	2	8			X
Shrub									
	BAPI	*Baccharis pilularis*	36	1.7	0.2	10			
	ERFA2	*Eriogonum fasciculatum*	21	0.4	0.2	3			
	BASA4	*Baccharis salicifolia*	21	0.1	0.2	1			
Herb									
	PIMI3	*Piptatherum miliaceum*	21	0.3	0.2	2			X

Other Noteworthy Species:
Juglans californica was found in 3 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Schinus molle, Piptatherum miliaceum, Arundo donax, Hirschfeldia incana, Robinia, Ricinus communis, Cortaderia, Tamarix, Bromus diandrus, Foeniculum vulgare, Myoporum laetum, Phoenix canariensis, Rorippa nasturtium-aquaticum, Ulmus parvifolia

Samples Used in Description: (n = 14)
AA0144cc, AA0354, AA0422, AA0501, AA0507, AA0571, rap1744, rap2151, rap2152, rap2231m, rap2347, rap2577, rap2719, rap2720

Comments:
Salix laevigata and *S. lasiolepis* were sometimes difficult to identify in the field, so their cover estimates were combined into one value in the species list. This is considered a suballiance in which further variation must be defined via complete species inventory. Urban runoff may contribute to the existence of this type.

Phases:
None

COMMON NAME	Red Willow-Arroyo Willow Woodland/Forest Suballiance
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3?

Global Description

Distribution:
This vegetation type has also been described in northern California from the Suisun Marsh, and an association of these two willow species with an understory species associate is described in southern California. It likely occurs in many areas of California and potentially adjacent states.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This vegetation type occurs in permanently to intermittently flooded channels, stream banks, and sloughs.

Vegetation Description:
In Suisun Marsh and southern California, an association is defined by a codominance of S*. laevigata* and *S. lasiolepis*.

Comments:
This mixed red and arroyo willow type as defined in the Santa Monica Mountains clearly needs further definition based on species composition.

References:
Evens and San 2005, Klein and Evens 2005, Keeler-Wolf and Vaghti 2000

Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus/Annual Grass-Herb Woodland/Forest Association

Red Willow-Arroyo Willow/Douglas Mugwort-California Blackberry/Annual Grass-Herb (Provisional) Woodland/Forest Association
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1413

Local Description

Summary:
This woodland/forest association occurs on flat to gentle slopes with no or variable aspect at low elevations between 237 and 325 m. *Salix laevigata* and *S. lasiolepis* dominate in the tree, understory tree, and shrub layers. *Bromus diandrus, Rubus ursinus, Artemisia douglasiana,* and *Marrubium vulgare* are constants in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 237–325 m, mean 293 m
Aspect: variable but more often flat
Slope: range 0–3 degrees, mean 1.7 degrees
Topography (micro; macro): flat or concave; bottom slopes
Litter Cover: range 60–85%, mean 73.3%
Small Rock Cover: range 0–10%, mean 4%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 5–30%, mean 15%
Parent Material: depositional or sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Woodland/Forest form an intermittent tree layer (33–40%, mean 35.3%) with hardwoods at 5–15 m tall, a sparse to open shrub layer (0–15%, mean 5%) at 0.5–5 m tall, and a sparse to open herbaceous layer (5–15%, mean 11%) at 0–1 m tall. Total vegetation cover is 43–51%, mean cover is 47.3%.

In this association, the tree layer is dominated by *Salix,* most likely both *Salix laevigata* and *S. lasiolepis. Quercus lobata* is occasionally included in this layer and the understory at low cover, and *Quercus agrifolia* is often in the understory at low cover. The sparse to open shrub layer is dominated by *Salix* sp., and *Baccharis salicifolia* and *Salvia spathacea* are often present. The herbaceous layer is diverse and includes a variety of grasses and forbs, in which *Bromus diandrus, Rubus ursinus, Artemisia douglasiana,* and *Marrubium vulgare* characteristically occur.

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix laevigata/S. lasiolepis*	100	29.7	19	39	X	X	
	QULO-T	*Quercus lobata*	33	0.3	1	1			
Tree Understory									
	QUAG-L	*Quercus agrifolia*	67	0.1	0.2	0.2			
	QUAG-M	*Quercus agrifolia*	67	0.1	0.2	0.2			
	QULO-L	*Quercus lobata*	33	0.1	0.2	0.2			
	QULO-M	*Quercus lobata*	33	0.1	0.2	0.2			
	SALIX	*Salix laevigata/S. lasiolepis*	33	0.1	0.2	0.2			
Shrub									
	SALIX-M	*Salix laevigata/S. lasiolepis*	67	5.3	2	14	X		
	BASA4	*Baccharis salicifolia*	67	0.1	0.2	0.2			
	SASP3	*Salvia spathacea*	67	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	33	1.3	4	4			
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	33	0.1	0.2	0.2			
	GERAN	*Geranium*	33	0.1	0.2	0.2			
	LONIC	*Lonicera*	33	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	33	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	BRDI3	*Bromus diandrus*	100	4.7	0.2	8		X	X
	RUUR	*Rubus ursinus*	100	4.1	0.2	11		X	
	ARDO3	*Artemisia douglasiana*	100	1.3	1	2		X	
	MAVU	*Marrubium vulgare*	100	0.2	0.2	0.2		X	X
	PIMI3	*Piptatherum miliaceum*	67	2.1	0.2	6			X
	BRNI	*Brassica nigra*	67	0.1	0.2	0.2			X
	BRCA5	*Bromus carinatus*	67	0.1	0.2	0.2			
	CIVU	*Cirsium vulgare*	67	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	67	0.1	0.2	0.2			X
	MAMA8	*Marah macrocarpus*	67	0.1	0.2	0.2			
	MEIN2	*Melilotus indicus*	67	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	67	0.1	0.2	0.2			X
	SOAS	*Sonchus asper*	67	0.1	0.2	0.2			X
	SOOL	*Sonchus oleraceus*	67	0.1	0.2	0.2			X
	CLEMA	*Clematis*	33	0.3	1	1			
	EUTE10	*Euphorbia terracina*	33	0.3	1	1			X
	VELA	*Verbena lasiostachys*	33	0.3	1	1			
	AMPS	*Ambrosia psilostachya*	33	0.1	0.2	0.2			
	ANAR	*Anagallis arvensis*	33	0.1	0.2	0.2			X
	ANCO2	*Anthemis cotula*	33	0.1	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	33	0.1	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	33	0.1	0.2	0.2			X
	EUCH	*Eucrypta chrysanthemifolia*	33	0.1	0.2	0.2			

JUNCU	*Juncus*	33	0.1	0.2	0.2	
LASE	*Lactuca serriola*	33	0.1	0.2	0.2	X
MELIL	*Melilotus*	33	0.1	0.2	0.2	X
PHAU4	*Pholistoma auritum*	33	0.1	0.2	0.2	

***Salix laevigata-Salix lasiolepis/Artemisia douglasiana-Rubus ursinus*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
	POACXX	*Poaceae*	33	0.1	0.2	0.2			
	RONA2	*Rorippa nasturtium-aquaticum*	33	0.1	0.2	0.2			X
	SISYM	*Sisymbrium*	33	0.1	0.2	0.2			X
	SONCH	*Sonchus*	33	0.1	0.2	0.2			X
	TYPHA	*Typha*	33	0.1	0.2	0.2			
	URDI	*Urtica dioica*	33	0.1	0.2	0.2			
	VEAN2	*Veronica anagallis-aquatica*	33	0.1	0.2	0.2			X
	VULPI	*Vulpia*	33	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Marrubium vulgare, Piptatherum miliaceum, Brassica nigra, Cirsium vulgare, Galium aparine, Melilotus indicus, Rumex crispus, Sonchus asper, Sonchus oleraceus, Euphorbia terracina, Bromus hordeaceus, Anagallis arvensis, Anthemis cotula, Erodium cicutarium, Lactuca serriola, Melilotus, Rorippa nasturtium-aquaticum, Sisymbrium, Sonchus, Veronica anagallis-aquatica

Samples Used in Description: (n = 3)
rap2752rlv, rap2856rlv, rap2857rlv

Comments:
Salix laevigata and *S. lasiolepis* were sometimes difficult to identify in the field, so their cover estimates were combined into one value in the species list. This association should remain provisional until resampling can occur in which all willow species are clearly identified. The presence of *Quercus agrifolia* seedlings and saplings in two-thirds of the plots suggests a relationship to the *Quercus agrifolia-Salix lasiolepis A*ssociation of the coast live oak alliance.

Phases:
None

COMMON NAME	Red Willow-Arroyo Willow/Douglas Mugwort-California Blackberry/Annual Grass-Herb (Provisional) Woodland/Forest Association
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region; however, a comparable association of *S. laevigata-S. lasiolepis/Artemisia douglasiana* is defined in western Riverside and San Diego counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The comparable association occurs in southern California within intermittently to seasonally flooded riparian corridors of lower elevations from 100 to 1,540 m on mixed alluvial sediments.

Vegetation Description:
Salix laevigata occurs as a tree overstory dominant, and *S. lasiolepis* occurs as a tree overstory codominant or shrub understory dominant. Other trees infrequently occur at low cover including *Platanus racemosa, Populus fremontii,* and *Quercus agrifolia.* Common understory shrubs include *Baccharis salicifolia*, *Rubus ursinus,* and *Rosa californica.* A wide variety of herb species occupy the understory, with *Artemisia douglasiana* characteristically present. Other herbs often occur including *Mimulus guttatus, Ambrosia psilostachya, Bromus diandrus, B. hordeaceus, Hirschfeldia incana, Lolium multiflorum,* and *Urtica dioica.*

Comments:
The association defined in this Santa Monica Mountains report is comparable to the *S. laevigata-S. lasiolepis/Artemisia douglasiana* Association defined from western Riverside and San Diego counties, and these two could probably collapse into one association.

References:
Evens and San 2005, Klein and Evens 2005

Salix laevigata-Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association

Red Willow-Arroyo Willow/Mule Fat Woodland/Forest Association
***Salix laevigata* Woodland/Forest Alliance**
Red Willow Woodland/Forest Alliance

Mapping Code: 1412

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes with little influence of aspect (being flat to variable in nature) and at elevations between 73 and 303 m. It is dominated by *Salix laevigata* in the overstory tree layer and *Salix lasiolepis* in the understory tree layer. It has an open cover of *Baccharis salicifolia* in the understory shrub layer and an open cover of various grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 73–303 m, mean 241.8 m
Aspect: variable but often flat
Slope: range 2–15 degrees, mean 5.7 degrees
Topography (micro; macro): flat or concave; bottom slopes
Litter Cover: range 55–80%, mean 70%
Small Rock Cover: range 1–30%, mean 12%
Large Rock Cover: range 1–20%, mean 6.3%
Bare Ground: range 10–20%, mean 15%
Parent Material: often depositional, occasionally sedimentary
Soil Texture: coarse loamy sand to fine sandy clay

Vegetation Description:
Stands of *Salix laevigata-Salix lasiolepis/Baccharis salicifolia* Woodland/Forest form an open to intermittent tree layer (14–50%, mean 25.1%) with hardwoods at 5–10 m tall, a sparse to open shrub layer (4–28%, mean 14.3%) at 0–5 m tall, and a sparse to open herbaceous layer (2–18%, mean 9.9%) at 0–1 m tall. Total vegetation cover is 42–51%, mean cover is 47.3%.

In this association, the overstory tree layer is dominated by *Salix laevigata. Salix lasiolepis* is dominant in the understory tree layer. The shrub layer is sparse to open and is dominated by *Baccharis salicifolia*. The herbaceous layer is diverse and often includes *Hirschfeldia incana* and *Artemisia douglasiana.* Other herbs occasionally include *Typha* sp., *Piptatherum miliaceum, Carduus pycnocephalus,* and *Foeniculum vulgare.*

Salix laevigata-Salix lasiolepis/Baccharis salicifolia Association

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALA3-T	*Salix laevigata*	71	12.1	10	23	X		
	PLRA	*Platanus racemosa*	43	0.6	0.2	2			
	QULO-T	*Quercus lobata*	29	0.9	0.2	6			
	QUAG-T	*Quercus agrifolia*	29	0.6	0.2	4			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	71	7.4	5	17	X		
Shrub									
	BASA4	*Baccharis salicifolia*	100	11.1	3	25	X	X	
	BAPI	*Baccharis pilularis*	29	0.2	0.2	1			
Herb									
	HIIN3	*Hirschfeldia incana*	57	1.3	0.2	8			X
	ARDO3	*Artemisia douglasiana*	57	1.3	1	3			
	TYPHA	*Typha*	43	1.3	0.2	5			
	PIMI3	*Piptatherum miliaceum*	43	0.5	0.2	3			X
	UNHE	Unknown Herbs/Forbs	29	1.3	2	7			
	CAPY2	*Carduus pycnocephalus*	29	0.2	0.2	1			X
	FOVU	*Foeniculum vulgare*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Dudleya cymosa was found in 1 of 7 surveys of this plant community, which could be one of the rare subspecies such as *D. C.* subsp. *ovatifolia, D. C.* subsp. *marcescens,* or *D. C.* subsp. *agourensis.* Regionally, the park considers these three species as Rare. CNPS ranks them as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G5T2 or G5T1, and state rank is S2.2 or S1.2. Federal listing is Threatened, and state listing is none or Rare (CNPS 2005, SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Bromus diandrus, Centaurea melitensis, Conyza canadensis, Schinus molle, Brassica nigra, Conium maculatum, Dactylis glomerata, Ricinus communis, Bromus hordeaceus, Marrubium vulgare, Melilotus albus, Sonchus

Samples Used in Description: (n = 7)
AA0582, AA0658, rap1716, rap2491, rap2643, rap2672, rap2685

Comments:
The presence of *Platanus racemosa* in almost half the plots and the ubiquitous presence of *Baccharis salicifolia* suggest an ecological setting similar to the *Platanus racemosa-Quercus agrifolia/Baccharis salicifolia/Artemisia douglasiana* Woodland/Forest Association. The presence of *Salix* species suggests an increase in water availability from the *Platanus*-dominated analog mentioned above. This water may be the result of nonnatural augmentation from runoff from irrigation of private homes, golf courses, wastewater treatment facilities, and so forth.

Phases:
None

COMMON NAME Red Willow-Arroyo Willow/Mule Fat Woodland/Forest Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix laevigata* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory; however, similar associations are likely to exist elsewhere in California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The association in this report has all willow species identified and is clearly related to the other *Salix laevigata-S. lasiolepis* vegetation described in other reports.

References:
Keeler-Wolf and Vaghti 2000, Evens and San 2005, Klein and Evens 2005

Salix lasiolepis Woodland/Forest Alliance

Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1430

Local Description

Summary:
Five stands of this woodland/forest alliance occur usually on relatively flat surfaces with little or no exposure at low elevations between 13 and 251 m. It is dominated by *Salix lasiolepis* as a small tree in the overstory layer. *Baccharis pilularis* and *Malosma laurina* occur often in the understory shrub layer, and *Typha* sp. often occurs in the herbaceous layer.

Distribution:
The five surveys classified to the alliance level occur in the Immediate Coast and Lower Elevation Inland Santa Monica Mountains regions of the study area; however, other association data shows the alliance occurring within all regions of the study area except Eastern Urban.

Environmental Description:
Elevation: range 13–251 m, mean 149.4 m
Aspect: usually none (usually flat), rarely southwest
Slope: range 0–35 degrees, mean 6.8 degrees
Topography (micro; macro): concave or flat; bottom to lower slope
Litter Cover: range 5.0–85%, mean 60.0%
Small Rock Cover: range 1–55%, mean 11.8%
Large Rock Cover: range 0–15%, mean 2.2%
Bare Ground: range 1–60%, mean 18.8%
Parent Material: depositional
Soil Texture: sandy to fine silty clay

Vegetation Description:
Stands of *Salix lasiolepis* Woodland/Forest Alliance form an open to intermittent tree layer (0–65%, mean 31.3%) with hardwoods at 0–10 m tall, an open to intermittent shrub layer (0–58%, mean 12.8%) at 0–10 m tall, and an open to intermittent herbaceous layer (0–37%, mean 6.6%) at 0–2 m tall. Total vegetation cover is 15–78%, mean cover is 49.3%.

In this alliance, the tree layer is dominated by *Salix lasiolepis* as a small tree. Other trees occur infrequently at low cover including *Juglans californica*, *Alnus rhombifolia, Platanus racemesa,* and *Washingtonia*. The shrub layer is open to intermittent and often includes *Baccharis pilularis* and *Malosma laurina.* Occasionally, the shrub layer includes *Myoporum laetum, Ricinus communis,* and *B. salicifolia*. The herbaceous layer is diverse and may be dominated by *Typha* and/or *Scirpus* spp. Other herbs include *Leymus condensatus, Arundo donax,* and many others.

***Salix lasiolepis* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SALIX-T	*Salix*	20	7.0	35.0	35.0			
	JUCA-T	*Juglans californica*	20	1.5	7.5	7.5			
	ALRH2-T	*Alnus rhombifolia*	20	0.2	1.0	1.0			
	PLRA	*Platanus racemosa*	20	0.2	1.0	1.0			
	EUCAL-T	*Eucalyptus*	20	0.0	0.2	0.2			X
Tree Understory									
	SALA6-T	*Salix lasiolepis*	60	11.2	4.0	45.0	X		
	WASHI	*Washingtonia*	20	0.4	2.0	2.0			X
Shrub									
	BAPI	*Baccharis pilularis*	60	2.5	0.2	7.5			
	MALA6	*Malosma laurina*	60	1.5	0.2	5.0			
	MYLA5	*Myoporum laetum*	40	0.6	0.2	3.0			X
	RICO3	*Ricinus communis*	40	0.2	0.2	1.0			X
	BASA4	*Baccharis salicifolia*	40	0.1	0.2	0.2			
	SALA6-M	*Salix lasiolepis*	20	3.0	15.0	15.0			
	TODI	*Toxicodendron diversilobum*	20	0.5	2.5	2.5			
	ARCA11	*Artemisia californica*	20	0.4	2.0	2.0			
	ATLE	*Atriplex lentiformis*	20	0.2	1.0	1.0			
	ENCA	*Encelia californica*	20	0.2	1.0	1.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.2	1.0	1.0			
	ISME5	*Isocoma menziesii*	20	0.0	0.2	0.2			
	NIGL	*Nicotiana glauca*	20	0.0	0.2	0.2			X
Herb									
	TYPHA	*Typha*	60	7.4	2.0	25.0	X		
	LECO12	*Leymus condensatus*	40	1.7	2.5	6.0			
	ARDO4	*Arundo donax*	40	1.0	2.0	3.0			X
	SCIRP	*Scirpus*	20	2.4	12.0	12.0			
	ARDO3	*Artemisia douglasiana*	20	0.5	2.5	2.5			
	OXALI	*Oxalis*	20	0.4	2.0	2.0			
	UNHE	Unknown Herbs/Forbs	20	0.4	2.0	2.0			
	BRNI	*Brassica nigra*	20	0.2	1.0	1.0			X
	ERODI	*Erodium*	20	0.2	1.0	1.0			X
	FOVU	*Foeniculum vulgare*	20	0.2	1.0	1.0			X
	AGAVE	*Agave*	20	0.0	0.2	0.2			X
	BRDI3	*Bromus diandrus*	20	0.0	0.2	0.2			X
	CHENO	*Chenopodium*	20	0.0	0.2	0.2			
	LUPIN	*Lupinus*	20	0.0	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	20	0.0	0.2	0.2			
	MAPA5	*Malva parviflora*	20	0.0	0.2	0.2			X
	PHCI	*Phacelia cicutaria*	20	0.0	0.2	0.2			
	PIMI3	*Piptatherum miliaceum*	20	0.0	0.2	0.2			X
	POOL	*Portulaca oleracea*	20	0.0	0.2	0.2			X

Other Noteworthy Species:

Juglans californica was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:

Arundo donax, Myoporum laetum, Ricinus communis, Brassica nigra, Erodium, Foeniculum vulgare, Bromus diandrus, Eucalyptus, Malva parviflora, Nicotiana glauca, Piptatherum miliaceum, Portulaca oleracea

Samples Used in Description: (n = 5)

AA0280cc, AA0579, rap0967, rap1124, rap2749m

Comments:

Five stands were not classified below the alliance level and are represented here (separately from the associations also described). This alliance is typically considered a shrub type in the national vegetation classification, but most stands locally are dominated by trees and warranted description. Most of these five stands sampled locally were associated with higher than normal growing season water as a result of irrigation or runoff. This may have accounted for the relatively high frequency of *Typha* and *Scirpus* spp. in the understory. Identification of some willow tree species was uncertain in a minority of samples but was likely to be of this species.

Phases:

None

COMMON NAME	Arroyo Willow
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrub land
FORMATION	III.B.2.N.d. Temporarily flooded cold-deciduous shrubland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:

This alliance is locally common along creeks, stream terraces, and seeps in Nevada, southwestern Utah, Arizona, New Mexico, east of the Cascade Mountains in Washington, and California.

Nations:

United States

States or Provinces:
AZ, CA, NM, NV, UT, WA

Environmental Description:
Communities within this alliance occupy stream benches and occasionally seeps. They can form stringer communities along drainages with slopes ranging between 1 to 15%. Elevations range between 1,200 m to 2,490 m. Soils are xeric and developed on alluvium. Water tables were rarely reached within the depth of soil pits, and mottles were not evident because of the coarse soil texture.

Vegetation Description:
The tall shrub layer is dominated by *Salix lasiolepis* that forms a dense overstory ranging from 60–100%. *Ribes aureum* and *Rosa woodsii* typically form a low shrub layer near the base of the willows. The undergrowth is typically sparse with *Clematis ligusticifolia* and *Smilacina stellata* present in minor amounts. Bare ground and/or leaf litter from the willow overstory are characteristic of stands within this alliance.

Comments:
In California, this is probably the most common willow alliance below 1,000 m west of the Sierra-Cascade and desert divides. It is particularly common along streams and creeks in the California coast ranges.

References:
Manning and Padgett 1995, NatureServe 2005, Padgett et al. 1989, Sawyer and Keeler-Wolf 1995

Salix lasiolepis/Baccharis salicifolia Woodland/Forest Association

Aroyo Willow/Mule Fat Woodland/Forest Association
***Salix lasiolepis* Woodland/Forest Alliance**
Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1432

Local Description

Summary:
This woodland/forest association occurs on gentle to somewhat steep slopes that are often flat and at elevations between 3 and 413 m. It is dominated by *Salix lasiolepis* in the understory tree layer, *Baccharis salicifolia* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 3–413 m, mean 187.2 m
Aspect: often flat, occasionally variable, northeast or northwest
Slope: range 0–15 degrees, mean 5.8 degrees
Topography (micro; macro): variable but often concave; bottom to upper slopes
Litter Cover: range 5–75%, mean 56%
Small Rock Cover: range 1–55%, mean 11.2%
Large Rock Cover: range 0–15%, mean 2.2%
Bare Ground: range 2–60%, mean 19.5%
Parent Material: often depositional, occasionally sedimentary or igneous
Soil Texture: silt to fine sandy clay

Vegetation Description:
Stands of *Salix lasiolepis/Baccharis salicifolia* Woodland/Forest form a sparse to intermittent tree layer (3–65%, mean 37.7%) with hardwoods at 2–10 m tall, a sparse to open shrub layer (0–30%, mean 9%) at 0–5 m tall, and a sparse to open herbaceous layer (0–14%, mean 6%) at 0–1 m tall. Total vegetation cover is 22–78%, mean cover is 50.7%.

In this association, *Salix lasiolepis* dominates in the understory tree layer. *Quercus agrifolia* is occasionally found in low cover in the overstory tree layer. The shrub layer is sparse to open and is dominated by *Baccharis salicifolia*. Occasionally, *Salix lasiolepis, Baccharis pilularis,* and *Ricinus communis* are also included. The herbaceous layer is diverse and occasionally includes *Artemisia douglasiana, Piptatherum miliaceum, Typha, Conium maculatum, Bromus diandrus, Arundo donax, Brassica nigra,* and *Centaurea melitensis.*

***Salix lasiolepis/Baccharis salicifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	1.3	0.2	17			
	PLRA	*Platanus racemosa*	33	0.5	0.2	3			
Tree Understory									
	SALA6-T	*Salix lasiolepis*	90	30.8	3	55	X	X	
Shrub									
	BASA4	*Baccharis salicifolia*	86	3.5	0.2	17		X	
	SALA6-M	*Salix lasiolepis*	33	3.2	0.2	23			
	BAPI	*Baccharis pilularis*	29	0.7	0.2	7.5			
	RICO3	*Ricinus communis*	24	0.1	0.2	1			X
Herb									
	ARDO3	*Artemisia douglasiana*	48	1.7	0.2	9			
	PIMI3	*Piptatherum miliaceum*	33	0.4	0.2	6			X
	TYPHA	*Typha*	33	0.4	0.2	3			
	COMA2	*Conium maculatum*	29	0.5	0.2	8			X
	BRDI3	*Bromus diandrus*	29	0.5	0.2	8			X
	ARDO4	*Arundo donax*	29	0.4	0.2	5			X
	BRNI	*Brassica nigra*	29	0.3	0.2	3			X
	CEME2	*Centaurea melitensis*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 5 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Conium maculatum, Bromus diandrus, Arundo donax, Brassica nigra, Centaurea melitensis, Ricinus communis, Hirschfeldia incana, Euphorbia terracina, Foeniculum vulgare, Carduus pycnocephalus, Marrubium vulgare, Schinus molle, Vinca major, Brassica, Melilotus indicus, Sonchus oleraceus, Lactuca serriola, Bromus madritensis, Cirsium vulgare, Lolium, Tropaeolum majus, Conyza canadensis, Myoporum laetum, Acer negundo, Ailanthus altissima, Avena fatua, Cortaderia, Cotoneaster, Melilotus albus, Parthenocissus, Salsola tragus, Senecio mikanioides, Silybum marianum, Sonchus asper, Spartium junceum

Samples Used in Description: (n = 21)
AA0209cc, AA0246cc, AA0669, AA1127, rap0468, rap0561, rap1360, rap1433, rap1439m, rap1471, rap1483, rap1688, rap1690, rap1750, rap1752, rap1818, rap1916, rap1978, rap2044m, rap2211, rap2315

Comments:
The relatively simple species composition and the high proportion of nonnative species suggest that this association represents the more actively disturbed riparian settings locally.

Phases:
None

COMMON NAME	Aroyo Willow/Mule Fat Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in central and southern California.

References:
None

Salix lasiolepis/Malosma laurina Woodland/Forest Association

Arroyo Willow/Laurel Sumac Woodland/Forest Association
***Salix lasiolepis* Woodland/Forest Alliance**
Aroyo Willow Woodland/Forest Alliance

Mapping Code: 1433

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes that are often south facing at elevations between 5 and 250 m. *Salix lasiolepis* is dominant in the understory tree and/or shrub layers, and *Malosma laurina* is codominant with the willow in the understory shrub layer. A variety of grasses and forbs, including *Leymus condensatus,* is dominant in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 5–250 m, mean 99 m
Aspect: often southeast and southwest, occasionally northwest
Slope: range 4–35 degrees, mean 16.3 degrees
Topography (micro; macro): concave or flat; bottom to mid slopes
Litter Cover: range 70–70%, mean 70%
Small Rock Cover: range 1–25%, mean 11.8%
Large Rock Cover: range 0–7%, mean 2.4%
Bare Ground: range 1–30%, mean 14.2%
Parent Material: sedimentary, igneous, or depositional
Soil Texture: moderately fine sandy clay loam to moderately fine silty clay loam

Vegetation Description:
Stands of *Salix lasiolepis/Malosma laurina* Woodland/Forest form a sparse to intermittent tree layer (0–49%, mean 15%) with hardwoods at 0–10 m tall, a sparse to intermittent shrub layer (9–58%, mean 31.2%) at 0–10 m tall, and a sparse to open herbaceous layer (0–15%, mean 3.5%) at 0–1 m tall. Total vegetation cover is 30–62%, mean cover is 49.2%.

In this association, *Salix lasiolepis* is dominant in the understory tree and/or shrub layers. *Juglans californica* is abundant in the understory. The shrub layer is sparse to intermittent and is codominated by *Malosma laurina* as well as the willow. Frequently, *Baccharis pilularis, Baccharis salicifolia, Artemisia californica,* and *Encelia californica* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Juncus* sp.*, Rubus ursinus, Centaurea melitensis,* and *Distichlis spicata* in low cover.

***Salix lasiolepis/Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	33	0.5	1	2			
Tree Understory									
	JUCA-M	*Juglans californica*	50	1.9	0.2	11			
	SALA6-T	*Salix lasiolepis*	33	6.3	12	26			
	SAME5	*Sambucus mexicana*	33	0.7	0.2	4			
Shrub									
	MALA6	*Malosma laurina*	100	9.5	2	25	X	X	
	BAPI	*Baccharis pilularis*	67	1.4	0.2	4			
	BASA4	*Baccharis salicifolia*	67	0.9	0.2	2			
	ARCA11	*Artemisia californica*	67	0.6	0.2	2			
	SALA6-M	*Salix lasiolepis*	50	10.8	5	30	X		
	ENCA	*Encelia californica*	50	1.4	0.2	7			
	MAFA	*Malacothamnus fasciculatus*	50	0.5	0.2	2			
	SAME3	*Salvia mellifera*	33	1	0.2	6			
	HEAR5	*Heteromeles arbutifolia*	33	0.7	1	3			
	TODI	*Toxicodendron diversilobum*	33	0.4	0.2	2			
Herb									
	LECO12	*Leymus condensatus*	67	1	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 3 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Foeniculum vulgare, Arundo donax, Avena fatua, Brassica nigra, Cakile maritima, Carduus pycnocephalus, Cortaderia, Marrubium vulgare, Myoporum laetum, Nicotiana glauca, Pennisetum setaceum, Salsola tragus, Tamarix

Samples Used in Description: (n = 6)
rap0660, rap1017, rap1064, rap1243, rap2263, rap2311

Comments:
The combination of the typically upland xerophytic *Malosma laurina* with the hydrophytic *Salix lasiolepis* is indicative of disturbed alluvial settings on relatively steep slopes (relative to most riparian settings) with southerly aspects. This is often on steep cliffs in slumps or below houses where water availability is higher than normal because of urban runoff.

Phases:
None

COMMON NAME	Arroyo Willow/Laurel Sumac Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland

PHYSIOGNOMIC GROUP	Cold-deciduous woodland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural cold-deciduous woodland
FORMATION	Cold-deciduous woodland
ALLIANCE	*Salix lasiolepis* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Schinus molle Woodland/Forest Alliance

Peruvian Peppertree Woodland/Forest Alliance

Mapping Code: 9550

Local Description

Summary:
This woodland/forest alliance occurs on somewhat steep to steep slopes with no or variable exposure at low elevations between 186 and 300 m. It is dominated by the introduced *Schinus molle* in the tree layer. The understory shrub layer has a variety of fast growing species such as *Baccharis pilularis*, and the herbaceous layer is dominated by nonnative grasses and herbs.

Distribution:
This alliance is sampled in the Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 186–300 m, mean 254 m
Aspect: none (flat) to variable
Slope: range 15–35 degrees, mean 21.7 degrees
Topography (micro; macro): variable (flat, concave, convex, or undulating); bottom to top
Litter Cover: range 20.0–80%, mean 46.3%
Small Rock Cover: range 0–45%, mean 19.2%
Large Rock Cover: range 0–1%, mean 0.2%
Bare Ground: range 10–54%, mean 29.5%
Parent Material: sedimentary or depositional
Soil Texture: coarse loamy sand to fine sandy clay loam

Vegetation Description:
Stands of *Schinus molle* Woodland/Forest Alliance form an open to intermittent tree layer (3–52%, mean 18.7%) with conifers at 0–10 m tall and hardwoods at 2–10 m tall, an open to intermittent shrub layer (0–36%, mean 10.4%) at 0–5 m tall, and an open to intermittent herbaceous layer (0–40%, mean 10.3%) at 0–1 m tall. Total vegetation cover is 27–55%, mean cover is 39%.

In this alliance, the tree layer is dominated by *Schinus molle* as an invasive species. *Pinus* sp. also has been introduced with low cover. *Quercus agrifolia* is infrequently included in this layer. The shrub layer is usually open and characterized by *Baccharis pilularis* at low cover. A variety of other shrubs is occasionally present at low cover including *Salvia leucophylla, Artemisia californica, Encelia californica, Eriogonum fasciculatum,* and *Malosma laurina*. The herbaceous layer is simple to diverse including many nonnative species such as *Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Brassica nigra,* and *Carduus pycnocephalus.*

***Schinus molle* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SCMO	*Schinus molle*	89	14.3	2.0	35.0	X	X	X
	PINUS	*Pinus*	56	0.4	0.2	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.1	0.2	1.0			
Shrub									
	BAPI	*Baccharis pilularis*	78	1.0	0.2	6.0		X	
	SALE3	*Salvia leucophylla*	44	0.7	0.2	4.0			
	ARCA11	*Artemisia californica*	33	0.4	0.2	2.0			
	ENCA	*Encelia californica*	33	0.3	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.2	0.2	1.0			
	LOSC2	*Lotus scoparius*	33	0.2	0.2	1.0			
	MALA6	*Malosma laurina*	33	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	22	0.6	0.2	5.0			X
	BASA4	*Baccharis salicifolia*	22	0.4	0.2	3.0			
	SAME5	*Sambucus mexicana*	22	0.2	0.2	2.0			
Herb									
	CEME2	*Centaurea melitensis*	67	1.6	1.0	5.0			X
	HIIN3	*Hirschfeldia incana*	44	1.5	0.2	8.0			X
	BRMA3	*Bromus madritensis*	44	0.6	0.2	2.0			X
	BRNI	*Brassica nigra*	44	0.6	1.0	2.0			X
	CAPY2	*Carduus pycnocephalus*	33	0.5	0.2	4.0			X
	BRDI3	*Bromus diandrus*	22	1.3	1.0	11.0			X
	CAMA24	*Calystegia macrostegia*	22	0.0	0.2	0.2			
	LASE	*Lactuca serriola*	22	0.0	0.2	0.2			X
	MAVU	*Marrubium vulgare*	22	0.0	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Schinus molle, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Brassica nigra, Carduus pycnocephalus, Bromus diandrus, Nicotiana glauca, Lactuca serriola, Marrubium vulgare, Carpobrotus chilensis, Rosmarinus officinalis, Acacia redolens, Schinus molle, Olea europaea, Avena fatua, Nerium oleander, Avena, Pennisetum setaceum, Rosa, Salsola tragus, Conyza canadensis, Melilotus albus, Melilotus indicus, Ricinus communis

Samples Used in Description: (n = 9)
rap1446, rap1930, rap1977, rap2045, rap2048, rap2049, rap2212, rap2213, rap2214

Comments:
This is the first time *Schinus molle* has been identified as an alliance in California. These stands are clearly self-perpetuating and are often found invading *Opuntia* stands.

Phases:
None

COMMON NAME	Alliance only
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.1. Tropical or subtropical broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.1.N. Natural/Seminatural tropical or subtropical broad-leaved evergreen shrubland
FORMATION	III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrubland
ALLIANCE	*Schinus molle* Woodland/Forest Alliance (Provisional)
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS:	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	An introduced species

Global Description

Distribution:
This alliance is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This is a common introduced tree of central and southern coastal California, originally from the Peruvian Andes. Its seeds occur in fruits that are bird dispersed, and resulting small stands are occasional in south coastal California. It typically forms small open stands with coastal scrub in the more interior portions of the Santa Monica Mountains and Simi Valley areas. Although it is not commonly considered as invasive as the related *Schinus terebinthifolius* (Brazilian peppertree) that is an introduced alliance in Hawaii, Florida, and Texas, it is clearly reproducing and colonizing on its own in the Santa Monica Mountains region.

References:
NatureServe 2005

Umbellularia californica/Ceanothus oliganthus Woodland/Forest Association

California Bay/Hairy Leaf Ceanothus (Provisional) Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1012

Local Description

Summary:
This woodland/forest association occurs on steep slopes that are northwest or southeast facing (neutral slopes) at low to mid elevations between 499 and 812 m. It is dominated by *Umbellularia californica* in the tree layer, *Ceanothus oliganthus* in the understory shrub layer, and grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 499–812 m, mean 697 m
Aspect: often northwest, occasionally southeast
Slope: range 27–35 degrees, mean 31.2 degrees
Topography (micro; macro): variable; mid to upper slopes
Litter Cover: no data
Small Rock Cover: range 0–20%, mean 10%
Large Rock Cover: range 0–8%, mean 4.3%
Bare Ground: range 0–5%, mean 3.3%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to fine clay

Vegetation Description:
Stands of *Umbellularia californica/Ceanothus oliganthus* Woodland/Forest form an open to intermittent tree layer (22–50%, mean 34.3%) with hardwoods at 2–10 m tall, an open to intermittent shrub layer (20–40%, mean 28.3%) at 0–5 m tall, and a sparse to open herbaceous layer (0–10%, mean 2.5%) at 0–1 m tall. Total vegetation cover is 58–68%, mean cover is 62.8%.

In this association, the overstory and understory tree layers are dominated by *Umbellularia californica*. *Quercus agrifolia* is frequently included in the overstory tree layer at relatively low cover. The shrub layer is sparse to open and is dominated by *Ceanothus oliganthus*, and *Heteromeles arbutifolia* is also characteristically present in low average cover. Occasionally, *Prunus ilicifolia, Lupinus longifolius,* and *Rhus ovata* are also included. The herbaceous layer is simple and includes *Leymus condensatus, Bromus madritensis, Clematis,* and *Pellaea mucronata* at low cover and constancy.

***Umbellularia californica/Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	75	12.8	3	28	X	X	
	QUAG-T	*Quercus agrifolia*	75	4.5	1	12		X	
	JUCA-T	*Juglans californica*	25	0.3	1	1			
Tree Understory									
	UMCA-M	*Umbellularia californica*	50	16.8	32	35	X		
Shrub									
	CEOL	*Ceanothus oliganthus*	100	17	3	27	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	3.8	1	12		X	
	PRIL	*Prunus ilicifolia*	50	1.5	1	5			
	LULO	*Lupinus longifolius*	50	0.8	0.2	3			
	RHOV	*Rhus ovata*	50	0.6	0.2	2			
	KECO	*Keckiella cordifolia*	25	2	8	8			
	CEME	*Ceanothus megacarpus*	25	0.8	3	3			
	TODI	*Toxicodendron diversilobum*	25	0.5	2	2			
	LEFR	*Lepechinia fragrans*	25	0.3	1	1			
	LONIC	*Lonicera*	25	0.3	1	1			
	QUBE5	*Quercus berberidifolia*	25	0.3	1	1			
	ADSP	*Adenostoma sparsifolium*	25	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	25	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	25	2.5	10	10			
	BRMA3	*Bromus madritensis*	25	0.1	0.2	0.2			X
	CLEMA	*Clematis*	25	0.1	0.2	0.2			
	PEMU	*Pellaea mucronata*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus madritensis

Samples Used in Description: (n = 4)
rap0577, rap0625, rap0791, rap2355m

Comments:
This provisional association is likely to occur in other parts of the south coast ranges north to Monterey County.

Phases:
None

COMMON NAME	California Bay/Hairy Leaf Ceanothus (Provisional) Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Umbellularia californica-Alnus rhombifolia Woodland/Forest (Provisional) Association

California Bay Woodland/Forest (Provisional) Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1013

Local Description

Summary:
This woodland/forest association occurs on relatively gentle slopes with variable aspect at low elevations between 49 and 347 m. It is dominated by *Umbellularia californica*, *Alnus rhombifolia,* and *Platanus racemosa* in the tree layer and *Baccharis salicifolia* in the understory shrub layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 49–347 m, mean 198 m
Aspect: variable
Slope: range 2–2 degrees, mean 2 degrees
Topography (micro; macro): concave; bottom to lower slopes
Litter Cover: no data
Small Rock Cover: range 30–30%, mean 30%
Large Rock Cover: range 15–15%, mean 15%
Bare Ground: range 5–5%, mean 5%
Parent Material: sedimentary
Soil Texture: muck

Vegetation Description:
Stands of *Umbellularia californica-Alnus rhombifolia* Woodland/Forest form an intermittent tree layer (42–43%, mean 42.5%) with conifers at 0–15 m tall and hardwoods at 10–15 m tall, a sparse shrub layer (9%, mean 9%) at 0.5–5 m tall, and a sparse herbaceous layer (9%, mean 9%) at 0–1 m tall. Total vegetation cover is 63–64%, mean cover is 63.5%.

In this association, the overstory tree layer is dominated by *Umbellularia californica*, *Alnus rhombifolia,* and *Platanus racemosa*. *Salix lasiolepis, Quercus agrifolia,* and *Juglans californica* are frequently in the understory tree layer. The shrub layer is sparse and is dominated by *Baccharis salicifolia*. The herbaceous layer is diverse and is dominated by *Arundo donax, Piptatherum miliaceum,* Algae, *Cyperus* sp., *Foeniculum vulgare*, *Bromus diandrus, Equisetum* sp., and *Typha* sp.

***Umbellularia californica-Alnus rhombifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	100	18.5	15	22	X	X	
	ALRH2-T	*Alnus rhombifolia*	100	11	10	12	X	X	
	PLRA	*Platanus racemosa*	100	5.5	3	8		X	
	PINUS	*Pinus*	50	0.5	1	1			
	EUCAL-T	*Eucalyptus*	50	0.1	0.2	0.2			X
Tree Understory									
	SALA6-T	*Salix lasiolepis*	100	3	3	3	X	X	
	QUAG-M	*Quercus agrifolia*	100	2.5	2	3	X	X	
	JUCA-M	*Juglans californica*	100	1	1	1		X	
	ALRH2-M	*Alnus rhombifolia*	50	1	2	2			
Shrub									
	BASA4	*Baccharis salicifolia*	100	3	2	4	X	X	
	MALA6	*Malosma laurina*	100	2.5	2	3		X	
	NIGL	*Nicotiana glauca*	100	0.6	0.2	1		X	X
	BAPI	*Baccharis pilularis*	50	1	2	2			
	HEAR5	*Heteromeles arbutifolia*	50	1	2	2			
	CESP	*Ceanothus spinosus*	50	0.5	1	1			
	RICO3	*Ricinus communis*	50	0.5	1	1			X
	ACRE9	*Acacia redolens*	50	0.1	0.2	0.2			X
	RHOV	*Rhus ovata*	50	0.1	0.2	0.2			
	SPJU2	*Spartium junceum*	50	0.1	0.2	0.2			X
Herb									
	ARDO4	*Arundo donax*	100	3	2	4		X	X
	PIMI3	*Piptatherum miliaceum*	100	0.6	0.2	1		X	X
	ALGAE	Algae	50	1.5	3	3			
	CYPER	*Cyperus*	50	1.5	3	3			
	FOVU	*Foeniculum vulgare*	50	1.5	3	3			X
	BRDI3	*Bromus diandrus*	50	1	2	2			X
	EQUIS	*Equisetum*	50	1	2	2			
	TYPHA	*Typha*	50	1	2	2			
	CERU2	*Centranthus ruber*	50	0.5	1	1			X
	AGAVE	*Agave*	50	0.1	0.2	0.2			X
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	50	0.1	0.2	0.2			
	MEAL2	*Melilotus albus*	50	0.1	0.2	0.2			X
	PESE3	*Pennisetum setaceum*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 2 of 2 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Arundo donax, Nicotiana glauca, Piptatherum miliaceum, Foeniculum vulgare, Bromus diandrus, Centranthus ruber, Ricinus communis, Acacia redolens, Brassica nigra, Melilotus albus, Pennisetum setaceum, Rumex crispus, Spartium junceum

Samples Used in Description: (n = 2)
rap0386, rap0388

Comments:
This is a locally rare provisional association from one main site location, so it will require further sampling to be validated as an association. It is clearly related to the *Alnus rhombifolia-Platanus racemosa* Association in this report. The presence of significant cover of *Umbellularia californica* suggests a narrow, shaded, and rocky riparian setting.

Phases:
None

COMMON NAME	California Bay-White Alder Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This vegetation type may also occur in the south and central coast ranges north of the study area (J. Evens, personal observation). While *Alnus rhombifolia-Platanus racemosa* and *Umbellularia californica-Platanus racemosa* associations are described in this study area, this association is retained because of the strong presence of *Umbellularia californica* with *Alnus rhombifolia*.

References:
None

Umbellularia californica-Juglans californica/Ceanothus spinosus Woodland/Forest Association

California Bay-California Walnut/Greenbark Ceanothus Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1011

Local Description

Summary:
This woodland/forest association occurs on moderately steep to steep north-facing slopes at low elevations between 0 and 734 m. It is dominated by *Umbellularia californica* and *Juglans californica* in the tree layer, *Ceanothus spinosus* in the understory shrub layer, and a variety of grasses and forbs in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast region of the study area.

Environmental Description:
Elevation: range 0–734 m, mean 384 m
Aspect: variable but often northeast or northwest
Slope: range 12–40 degrees, mean 26.4 degrees
Topography (micro; macro): variable but often concave; bottom to top slopes
Litter Cover: range 85–85%, mean 85%
Small Rock Cover: range 1–10%, mean 4.5%
Large Rock Cover: range 0–20%, mean 7.3%
Bare Ground: range 1–25%, mean 6.5%
Parent Material: igneous or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Umbellularia californica-Juglans californica/Ceanothus spinosus* Woodland/Forest form a sparse to intermittent tree layer (8–62%, mean 27.6%) with conifers at 0–10 m tall and hardwoods at 5–15 m tall, a sparse to intermittent shrub layer (1–56%, mean 32.1%) at 0–10 m tall, and a sparse herbaceous layer (0–10%, mean 1.5%) at 0–1 m tall. Total vegetation cover is 35–70%, mean cover is 60.9%.

In this association, the tree layer is dominated by *Umbellularia californica* and *Juglans californica*, and *Quercus agrifolia* is occasionally included in this layer. The shrub layer is sparse to intermittent and is dominated by *Ceanothus spinosus*, and *Heteromeles arbutifolia* is often found in lower cover. Occasionally, *Ceanothus megacarpus, Prunus ilicifolia,* and *Toxicodendron diversilobum* are also included. The herbaceous layer is diverse and occasionally includes *Leymus condensatus, Dryopteris arguta,* and *Piptatherum miliaceum* in low cover.

***Umbellularia californica-Juglans californica/Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	95	17.7	5	50	X	X	
	JUCA-T	*Juglans californica*	76	7.2	0.2	30		X	
	QUAG-T	*Quercus agrifolia*	48	1.6	0.2	8			
Shrub									
	CESP	*Ceanothus spinosus*	100	23.9	1	40	X	X	
	HEAR5	*Heteromeles arbutifolia*	76	1.5	0.2	8		X	
	CEME	*Ceanothus megacarpus*	43	0.8	0.2	10			
	PRIL	*Prunus ilicifolia*	43	0.6	0.2	4			
	TODI	*Toxicodendron diversilobum*	33	0.5	0.2	5			
	MALA6	*Malosma laurina*	29	2.1	0.2	31			
	RHOV	*Rhus ovata*	24	0.4	0.2	7			
Herb									
	LECO12	*Leymus condensatus*	29	0.4	0.2	3			

Other Noteworthy Species:
Juglans californica was found in 16 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lepechinia fragrans was found in 1 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Senecio mikanioides, Bromus diandrus, Brassica nigra, Catalpa, Cynodon dactylon, Medicago polymorpha, Nicotiana glauca, Sequoia sempervirens

Samples Used in Description: (n = 21)
AA0477cc, AA0557, AA0854, AA0904, AA0952, AA1040, AA1193, AA1211, rap0126, rap0143, rap0144, rap0146, rap0409, rap0433m, rap0439, rap0449, rap0472m, rap0531, rap0550, rap2160, rap2781

Comments:
This association with *Umbellularia* as a dominant to codominant with *Juglans* is a common semiriparian association occurring on usually steep northerly facing ravines and upper drainages in the Santa Monica Mountains. This association is similar to the *Juglans californica/Ceanothus spinosus* Association, which is especially found on north-facing slopes that are not particularly riparian.

The overstory cover of *Juglans californica* was variable in the stands because some sampling was done during periods when the leaves of this deciduous species were largely absent.

Phases:
None

COMMON NAME	California Bay-California Walnut/Greenbark Ceanothus Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest
FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although locally common, this association is largely endemic to the Santa Monica Mountains and surrounding areas.

References:
None

Umbellularia californica-Platanus racemosa Woodland/Forest Association

California Bay-California Sycamore Woodland/Forest Association
***Umbellularia californica* Woodland/Forest Alliance**
California Bay Woodland/Forest Alliance

Mapping Code: 1014

Local Description

Summary:
This woodland/forest association occurs on gentle to steep slopes with variable aspects, at low elevations between 183 and 596 m. It is dominated by *Umbellularia californica* and *Platanus racemosa* in the tree layer. *Ceanothus spinosus* is abundant in the understory shrub layer, and a variety of grasses and forbs is in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 183–596 m, mean 418.6 m
Aspect: variable
Slope: range 2–35 degrees, mean 15.7 degrees
Topography (micro; macro): often concave, rarely undulating; bottom to mid slopes
Litter Cover: 60% (one survey)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: more often sedimentary, occasionally metamorphic or depositional
Soil Texture: medium loam

Vegetation Description:
Stands of *Umbellularia californica-Platanus racemosa* Woodland/Forest form a sparse to continuous tree layer (0–75%, mean 46.6%) with hardwoods at 5–15 m tall, an a sparse to intermittent shrub layer (0–40%, mean 9.5%) at 0–5 m tall, and a sparse herbaceous layer (0–10%, mean 1.6%) at 0–2 m tall. Total vegetation cover is 36–75%, mean cover is 56.7%.

In this association, the tree layer is dominated by *Umbellularia californica* and *Platanus racemosa. Juglans californica* and *Quercus agrifolia* are frequently included in this layer. *Ceanothus spinosus* is abundant in the sparse to intermittent shrub layer. *Heteromeles arbutifolia* is frequently in this layer. Occasionally, *Toxicodendron diversilobum* and *Malosma laurina* are also included. The herbaceous layer is simple and includes *Leymus condensatus* and *Dryopteris arguta*.

***Umbellularia californica-Platanus racemosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	100	36.8	9	70	X	X	
	PLRA	*Platanus racemosa*	100	9.2	2	16		X	
	JUCA-T	*Juglans californica*	70	2.1	0.2	8			
	QUAG-T	*Quercus agrifolia*	50	1.8	2	5			
Shrub									
	CESP	*Ceanothus spinosus*	60	1.7	0.2	12	X		
	HEAR5	*Heteromeles arbutifolia*	60	1.5	0.2	11			
	TODI	*Toxicodendron diversilobum*	30	0.9	0.2	8			
	MALA6	*Malosma laurina*	30	0.1	0.2	0.2			
	PRIL	*Prunus ilicifolia*	20	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	30	0.3	0.2	2			
	DRAR3	*Dryopteris arguta*	30	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 7 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Lilium humboldtii was found in 1 of 10 surveys of this plant community, which is most likely the rare subspecies *Lilium humboldtii* subsp. *ocellatum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G4T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Stellaria media, Galium aparine, Nicotiana glauca

Samples Used in Description: (n = 10)
AA1221, rap0392, rap1415, rap2386, rap2659, rap2683, rap2684, rap2692, rap2718, rap2783

Comments:
These stands vary from low-lying valleys to steep narrow ravines on upper slopes.

Phases:
None

COMMON NAME	California Bay-California Sycamore Woodland/Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	I.A. Evergreen forest
PHYSIOGNOMIC GROUP	I.A.6. Winter-rain broad-leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUBGROUP	I.A.6.N. Natural/Seminatural winter-rain broad-leaved evergreen sclerophyllous forest

FORMATION	I.A.6.N.b. Lowland or submontane winter-rain evergreen sclerophyllous forest
ALLIANCE	*Umbellularia californica* Woodland/Forest Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to occur elsewhere in the south and central coast ranges north through Monterey County (T. Keeler-Wolf, personal observation).

References:
None

Shrub Overstory Vegetation Descriptions

Adenostoma fasciculatum Shrubland Association
Chamise Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2011

Local Description

Summary:
This shrubland association occurs on flat to steep slopes of variable aspect at low to middle elevations between 38–862 m. It is dominated by *Adenostoma fasciculatum* in the shrub layer with a diverse but low cover herbaceous layer. There are virtually no emergent trees, but occasionally, *Quercus agrifolia, Umbellularia californica,* and *Platanus racemosa* are present.

Distribution:
This association is sampled in the Upper and Lower Elevation Santa Monica Mountains, Western Fog Zone, Simi Hills Inland, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 38–862 m, mean 420.2 m
Aspect: variable
Slope: range 0–45 degrees, mean 23.3 degrees
Topography (micro;macro): variable; lower slope to ridge
Litter Cover: range 0–60%, mean 25.2%
Small Rock Cover: range 1–68%, mean 27.3%
Large Rock Cover: range 0–55%, mean 4.8%
Bare Ground: range 0–50%, mean 25.6%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum* Shrubland form an open to intermittent shrub layer (12–65%, mean 37.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 2.4%) at 0–5 m tall. Trees are occasionally emergent (0–7% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–65%, mean cover is 40.1%.

In this association, the shrub layer is characterized by an abundance of *Adenostoma fasciculatum*. *Salvia mellifera* and *Malosma laurina* are usually included in this layer. The tree layer is emergent and open and may rarely include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Nassella lepida, Centaurea melitensis, Bromus diandrus,* or *Hemizonia fasciculata*.

***Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	28.4	7.5	60.0	X	X	
	SAME3	*Salvia mellifera*	70	2.0	0.2	9.0			
	MALA6	*Malosma laurina*	64	1.0	0.2	6.0			
	YUWH	*Yucca whipplei*	49	0.5	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	32	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	31	0.6	0.2	11.0			
	CEME	*Ceanothus megacarpus*	31	0.4	0.2	6.0			
	LOSC2	*Lotus scoparius*	30	0.2	0.2	3.0			
	ARCA11	*Artemisia californica*	23	0.4	0.2	9.0			
	RHOV	*Rhus ovata*	23	0.2	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	22	0.2	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	21	0.3	0.2	4.0			
Herb									
	BRMAI3	*Bromus madritensis*	27	0.3	0.2	3.0			X

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Hemizonia minthornii was found in 1of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is ?, and state rank is ? (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Brassica nigra, Hirschfeldia incana, Anagallis arvensis, Avena fatua, Erodium cicutarium, Avena, Avena barbata, Carduus pycnocephalus, Lactuca serriola, Medicago polymorpha, Piptatherum miliaceum, Robinia, Schinus molle, Silene gallica

Samples Used in Description: (n = 77)
AA0050cc, AA0191cc, AA0211cc, AA0237cc, AA0259cc, AA0261cc, AA0295cc, AA0485cc, AA0525, AA0561, AA0606, AA0609, AA0724, AA0771, AA0813, AA0824, AA0846, AA0928, AA0943, AA0963, AA1045, AA1050, AA1082, AA1088, AA1156, rap0001, rap0186, rap0193, rap0211, rap0218, rap0219, rap0220, rap0249, rap0258, rap0277, rap0308, rap0310, rap0458, rap0480, rap0481, rap0567, rap0593, rap1207, rap1265, rap1288, rap1305, rap1307, rap1558, rap1586, rap1588, rap1608, rap1613, rap1614, rap1615, rap1658, rap1685, rap1718m, rap1787, rap1788, rap1895, rap1920, rap2089, rap2120, rap2145, rap2284, rap2291, rap2297, rap2322, rap2334, rap2547, rap2548, rap2646, rap2660, rap2691, rap2844, rap2918, rap2927

Comments:
Throughout much of California, there are stands strongly dominated by *Adenostoma fasciculatum* with little else to characterize them. This association is the local SAMO expression of this strongly dominated *A. fasciculatum* vegetation. Clearly, there are some associated species not to be expected in other parts of the state, but none of them occur frequently enough to be

considered characteristic. Thus, this is called the *A. fasciculatum* Shrubland Association although it may be ecologically and biotically somewhat different than other similar associations defined elsewhere in the state.

Phases:
None

COMMON NAME	Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, several other chamise associations have been defined from California including San Diego County (Evens and San 2005), western Riverside County (Klein, Evens, Keeler-Wolf and Hickson 2005), and mafic soils type from the peninsular ranges (Gordon & White 1994). Several of these may be so similar to be considered synonymous.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The chamise alliance is the most widespread chaparral vegetation in California and ranges from Shasta County in the north to northwestern Baja California, Mexico.

References:
Evens and San 2005, Gordon & White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Ceanothus megacarpus Shrubland Association

Chamise-Big Pod Ceanothus Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2019

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 130–810 m. It is dominated by *Adenostoma fasciculatum* in the shrub layer with lower cover of *Ceanothus megacarpus.* It has no significant herbaceous layer. The emergent tree layer is generally nonexistent but may include occasional emergent *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 130–810 m, mean 426.4 m
Aspect: variable
Slope: range 2–35 degrees, mean 23 degrees
Topography (micro; macro): undulating or convex; mid to upper slope
Litter Cover: range 8–50%, mean 23%
Small Rock Cover: range 0–55%, mean 25%
Large Rock Cover: range 0–11%, mean 3.1%
Bare Ground: range 0–58%, mean 30.5%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (23–60%, mean 39.1%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–10%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 30—60%, mean cover is 40.3%.

In this association, the shrub layer is characterized by abundant *Adenostoma fasciculatum* with *Ceanothus megacarpus, Malosma laurina,* and *Salvia mellifera* also present. *Yucca whipplei* is often present, and *Lotus scoparius* and *Heteromeles arbutifolia* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Nassella lepida, Bromus madritensis,* and *Pellaea mucronata*.

***Adenostoma fasciculatum-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	21.9	8.0	38.0	X	X	
	CEME	*Ceanothus megacarpus*	98	7.9	2.0	18.0		X	
	MALA6	*Malosma laurina*	90	1.8	0.2	8.0		X	
	SAME3	*Salvia mellifera*	81	3.3	0.2	15.0		X	
	YUWH	*Yucca whipplei*	69	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	48	0.7	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	45	0.4	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.6	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	24	0.3	0.2	4.0			
	HASQ2	*Hazardia squarrosa*	21	0.1	0.2	2.0			

Other Noteworthy Species:
Lepechinia fragrans was found in 3 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus hordeaceus, Avena, Bromus diandrus, Anagallis arvensis, Avena fatua, Carduus pycnocephalus, Schinus molle

Samples Used in Description: (n = 42)
AA0024cc, AA0289cc, AA0335, AA0521, AA0668, AA0827, AA0887, AA1039, AA1139, AA1202, rap0005m, rap0020, rap0107, rap0110, rap0131m, rap0141, rap0180, rap0208, rap0286, rap0313, rap0375, rap0414, rap0423m, rap0525, rap0530, rap0544, rap0595, rap0597, rap0799, rap1290, rap1487, rap1702m, rap1735, rap1781, rap2121, rap2243, rap2360, rap2401, rap2474, rap2485, rap2715, rap2788

Comments:
This is an abundant association in the study area and is an interesting one from the standpoint of monitoring. In general, *Ceanothus megacarpus* appears to have become more abundant in the Santa Monica Mountains over the past 60–70 years, while *Adenostoma fasciculatum* has declined (R. Taylor 2004 personal communication). It is in this association of the *Adenostoma fasciculatum* Alliance where one might expect to observe shifts in relative cover and abundance of these two shrubs. Monitoring of several of the 42 samples in these stands through fire events may help clarify the long-term trends of these two common shrub species.

Phases:
None

COMMON NAME	Chamise-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland

ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The inverse of this association, the *Ceanothus megacarpus-Adenostoma fasciculatum/Salvia mellifera* Association, has been described by Borchert et al. (1993). It remains to be seen whether these two associations should be combined.

References:
Borchert et al. 1993

Adenostoma fasciculatum-Eriogonum fasciculatum Shrubland Association

Chamise-California Buckwheat Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2017

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 150–718 m. It is dominated by *Adenostoma fasciculatum* with lower cover of *Eriogonum fasciculatum* in the shrub layer and a low cover of mostly nonnative grasses and forbs in the herbaceous layer. The emergent tree layer is generally nonexistent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 150–718 m, mean 345.5 m
Aspect: variable
Slope: range 4–35 degrees, mean 21.4 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 10–25%, mean 18.3%
Small Rock Cover: range 10–45%, mean 20.7%
Large Rock Cover: range 0–50%, mean 8.1%
Bare Ground: range 10–54%, mean 31.1%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (8–49%, mean 31.1%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–30%, mean 6.7%) at 0–1 m tall. Trees are occasionally emergent (0–1% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–51%, mean cover is 36.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Eriogonum fasciculatum,* and *Lotus scoparius. Salvia mellifera, Malosma laurina,* and *Yucca whipplei* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Centaurea melitensis* and *Bromus diandrus.* Other herbs sometimes include *Bromus hordeaceus, Brassica nigra, Bromus madritensis,* and *Chlorogalum pomeridianum*.

***Adenostoma fasciculatum-Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	11.9	2.0	22.0		X	
	ERFA2	*Eriogonum fasciculatum*	94	4.7	1.0	18.0		X	
	LOSC2	*Lotus scoparius*	82	2.9	0.2	13.0		X	
	SAME3	*Salvia mellifera*	65	2.7	1.0	8.0			
	MALA6	*Malosma laurina*	59	0.8	0.2	5.0			
	YUWH	*Yucca whipplei*	53	0.3	0.2	2.5			
	CECR	*Ceanothus crassifolius*	41	0.7	0.2	3.0			
	RHOV	*Rhus ovata*	41	0.4	0.2	3.0			
	DERI	*Dendromecon rigida*	35	1.0	0.2	6.0			
	CESP	*Ceanothus spinosus*	35	0.5	0.2	4.0			
	QUBE5	*Quercus berberidifolia*	29	0.8	0.2	7.0			
	CEBE3	*Cercocarpus betuloides*	29	0.6	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	29	0.4	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	29	0.3	0.2	4.0			
	ARCA11	*Artemisia californica*	29	0.3	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	29	0.2	0.2	2.0			
	CEME	*Ceanothus megacarpus*	24	0.6	2.0	3.0			
	CECU	*Ceanothus cuneatus*	24	0.5	0.2	5.0			
Herb									
	CEME2	*Centaurea melitensis*	65	1.1	0.2	7.5			X
	BRDI3	*Bromus diandrus*	41	1.0	0.2	9.0			X
	BRHO2	*Bromus hordeaceus*	35	1.8	0.2	20.0			X
	BRNI	*Brassica nigra*	29	0.2	0.2	1.0			X
	AVENA	*Avena*	24	0.6	0.2	7.5			X
	BRMA3	*Bromus madritensis*	24	0.3	0.2	2.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Brassica nigra, Avena, Bromus madritensis, Avena fatua, Avena barbata, Erodium, Lamarckia aurea

Samples Used in Description: (n = 17)
AA0299cc, rap0226m, rap0229, rap0269, rap0368, rap0372, rap0398, rap0455, rap0488, rap0489, rap0490, rap2146, rap2209, rap2353, rap2378, rap2756, rap2768

Comments:
The presence of living or dead *Lotus scoparius* in most of the stands of this association suggests it is a seral association of the *Adenostoma fasciculatum* Alliance. In general, most of these stands appear to have been disturbed by fire within the past 10 years. Over time, these stands may be colonized by *C. crassifolius, C. megacarpus,* or *C. cuneatus* based on location, and the canopy may close, largely excluding *E. fasciculatum*. The two phases identified suggest a more disturbed seral chaparral with annual grasses (perhaps more frequent fires or poor germination of obligate seeding chaparral species) and a phase with better germination of seral fire following shrubs such as *Dendromecon* and *Lotus scoparius*.

Phases:
Adenostoma fasciculatum-Eriogonum fasciculatum/Annual Grass-Herb (Chamise-California Buckwheat/Annual Grass-Herb) Phase [2017]
Adenostoma fasciculatum-Lotus scoparius-Dendromecon rigida (Chamise-Deerweed-Bush Poppy) Phase [7012]

COMMON NAME	Chamise-California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains region as well as from western Riverside County (Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Stands of this association sampled in western Riverside County also have *Salvia mellifera*, *Arctostaphylos glauca*, *Encelia farinosa,* and *Rhus ovata* in the shrub layer. A similar association, the *Adenostoma fasciculatum-Eriogonum fasciculatum-Salvia apiana* Association, is also known from western Riverside County.

References:
Klein and Evens 2005

Adenostoma fasciculatum-Malosma laurina Shrubland Association

Chamise-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2013

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low to mid elevations between 111–991 m. It is dominated by *Adenostoma fasciculatum* and subdominated by *Malosma laurina* in the shrub layer. The herbaceous layer is sparse and composed primarily of introduced annual species. The emergent tree layer includes *Quercus agrifolia* in 20% of the samples.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 111–991 m, mean 445.1 m
Aspect: variable
Slope: range 6–35 degrees, mean 25.3 degrees
Topography (micro; macro): undulating; mid to upper slope
Litter Cover: range 15–25%, mean 17.5%
Small Rock Cover: range 0–75%, mean 18.2%
Large Rock Cover: range 0–90%, mean 14.7%
Bare Ground: range 0–60%, mean 29.3%
Parent Material: sedimentary
Soil Texture: coarse loamy sand to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Malosma laurina* Shrubland form an open to intermittent shrub layer (8–55%, mean 35.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–9%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 8–55%, mean cover is 36.2%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Malosma laurina,* and *Salvia mellifera*. *Yucca whipplei* is often present, and *Eriogonum fasciculatum* is occasionally included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Hirschfeldia incana, Centaurea melitensis, Bromus diandrus,* and *Brassica nigra*.

***Adenostoma fasciculatum-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.1	0.2	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	0.1	0.2	2.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	19.1	3.0	37.0	X	X	
	MALA6	*Malosma laurina*	100	8.8	2.0	22.0		X	
	SAME3	*Salvia mellifera*	80	1.9	0.2	5.0		X	
	YUWH	*Yucca whipplei*	72	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	48	0.8	0.2	6.0			
	LOSC2	*Lotus scoparius*	36	0.3	0.2	2.0			
	CEME	*Ceanothus megacarpus*	32	0.7	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	32	0.3	0.2	3.0			
	RHOV	*Rhus ovata*	28	0.6	0.2	8.0			
	CECR	*Ceanothus crassifolius*	20	0.8	0.2	6.0			
	ERCR2	*Eriodictyon crassifolium*	20	0.2	0.2	2.0			
	ARCA11	*Artemisia californica*	20	0.2	0.2	3.0			
	ARGL3	*Arctostaphylos glandulosa*	20	0.1	0.2	1.0			
Herb									
	BRMA3	*Bromus madritensis*	24	0.01	0.2	0.2			X
	AVENA	*Avena*	20	0.1	0.2	1.0			X

Other Noteworthy Species:
Leptodactylon californicum was found in 2 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Avena, Hirschfeldia incana, Centaurea melitensis, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Pennisetum setaceum, Erodium, Silene gallica

Samples Used in Description: (n = 25)
AA0060cc, AA0691, AA0776, AA0825, AA0877, AA1083, rap0541, rap0600, rap0678, rap1082, rap1119, rap1236, rap1242, rap1572, rap1573, rap1612, rap1616, rap1695m, rap1913, rap2164, rap2239, rap2318m, rap2412, rap2734, rap2846

Comments:
This is a relatively common association in the study area. The presence of *Malosma laurina* with chamise indicates relatively warm and dry conditions. Although *Adenostoma fasciculatum* is typically dominant, averaging about twice the cover of *M. laurina*, occasionally *M. laurina* may codominate.

Phases:
None

COMMON NAME Chamise-Laurel Sumac Shrubland Association
SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County. It likely occurs elsewhere in coastal southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association has also been recently described from western Riverside County, where *Ceanothus leucodermis*, *Yucca whipplei*, and *Eriogonum fasciculatum* are also common co-occurring species in the shrub layer.

References:
Klein and Evens 2005

Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium/ Annual Grass-Herb Shrubland Association

Chamise-Laurel Sumac-Yerba Santa Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 7018

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 162–657 m. It is dominated by *Adenostoma fasciculatum* and subdominated by *Malosma laurina* in the shrub layer and scattered native and nonnative species in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about one-third of the samples.

Distribution:
This association is sampled in the Immediate Coast and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 162–657 m, mean 526 m
Aspect: variable
Slope: range 2–42 degrees, mean 20.3 degrees
Topography (micro; macro): flat, undulating, convex, or concave; lower slope to ridge
Litter Cover: range 7–55%, mean 26.2%
Small Rock Cover: range 2–35%, mean 15%
Large Rock Cover: range 0–60%, mean 17.8%
Bare Ground: range 8–70%, mean 24.9%
Parent Material: sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Malosma laurina-Eriodyction crassifolium*/Annual Grass-Herb Shrubland form an open to intermittent shrub layer (4–42%, mean 21.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (2–32%, mean 13.6%) at 0–1 m tall. Trees are occasionally emergent (0–15% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–52%, mean cover is 36.8%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Eriodictyon crassifolium, Malosma laurina,* and *Salvia mellifera*. *Eriogonum fasciculatum, Ceanothus crassifolius,* and *Lotus scoparius* are usually included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Bromus madritensis* and *Centaurea melitensis.* Other herbs sometimes include *Bromus diandrus, Filago californica, Hirschfeldia incana,* and *Avena barbata*.

***Adenostoma fasciculatum-Malosma laurina-Eriodictyon crassifolium*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	1.6	2.5	15.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	6.5	2.0	15.0	X		
	MALA6	*Malosma laurina*	88	4.1	2.0	15.0	X		
	ERCR2	*Eriodictyon crassifolium*	88	3.9	2.0	12.0	X		
	SAME3	*Salvia mellifera*	81	1.7	1.0	4.0	X		
	ERFA2	*Eriogonum fasciculatum*	69	0.9	0.2	2.5			
	CECR	*Ceanothus crassifolius*	62	1.3	0.2	7.5			
	LOSC2	*Lotus scoparius*	56	1.9	0.2	15.0			
	MIAU	*Mimulus aurantiacus*	44	0.8	0.2	4.0			
	RIMA	*Ribes malvaceum*	31	0.5	0.2	2.5			
	RHOV	*Rhus ovata*	25	0.6	0.2	5.0			
	HASQ2	*Hazardia squarrosa*	25	0.6	1.0	3.0			
	YUWH	*Yucca whipplei*	25	0.5	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	25	0.4	1.0	3.0			
	PRIL	*Prunus ilicifolia*	25	0.4	1.0	2.5			
	HEMI6	*Hemizonia minthornii*	25	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	62	1.1	0.2	3.0			X
	BRMA3	*Bromus madritensis*	62	0.8	0.2	3.0			X
	HIIN3	*Hirschfeldia incana*	56	1.5	0.2	6.0			X
	BRDI3	*Bromus diandrus*	31	1.1	0.2	8.0			X
	FICA2	*Filago californica*	31	0.3	0.2	2.0			
	BRNI	*Brassica nigra*	25	0.8	0.2	7.5			X
	BRHO2	*Bromus hordeaceus*	25	0.8	0.2	7.5			X
	HEFA	*Hemizonia fasciculata*	25	0.7	2.0	3.0			
	AVENA	*Avena*	25	0.6	0.2	7.5			X
	LEFI11	*Lessingia filaginifolia*	25	0.4	0.2	2.5			
	AVBA	*Avena barbata*	25	0.2	0.2	3.0			X
	CUCA	*Cuscuta californica*	25	0.2	0.2	3.0			
	PHACE	*Phacelia*	25	0.1	0.2	1.0			

Other Noteworthy Species:

Hemizonia minthornii was found in 4 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2 , and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:

Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus diandrus, Brassica nigra, Bromus hordeaceus, Avena, Avena barbata, Erodium cicutarium, Avena fatua, Anagallis arvensis, Vicia villosa, Carduus pycnocephalus, Lamarckia aurea, Nicotiana glauca, Silene gallica

Samples Used in Description: (n = 16)
AA0195cc, AA0196cc, AA0197cc, AA0198cc, AA0264cc, rap1548, rap1603, rap1607, rap1609, rap1610, rap1994, rap2208, rap2372, rap2409, rap2410, rap2411

Comments:
The presence of *Eriodictyon crassifolium* suggests a seral setting in these stands. This is strengthened by the presence of other common short-lived perennial species such as *Lotus scoparius, Hazardia squarrosa*, and numerous annual nonnative species. However, it may persist for longer periods in rocky areas with thin soils. This vegetation type is clearly related to the *Adenostoma fasciculatum-Malosma laurina* Association and may ultimately be considered a broad seral phase of it.

Phases:
None

COMMON NAME	Chamise-Laurel Sumac-Yerba Santa Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma fasciculatum-Mimulus aurantiacus Shrubland Association

Chamise-Bush Monkey Flower Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 7013

Local Description

Summary:
This shrubland association occurs on steep to very steep northeast-facing slopes at low elevations between 277–488 m. It is dominated by *Adenostoma fasciculatum* with lesser cover of *Mimulus aurantiacus* in the shrub layer with little distinguishing the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 277–488 m, mean 351.1 m
Aspect: northeast
Slope: range 30–60 degrees, mean 37.1 degrees
Topography (micro; macro): undulating, flat, convex, or concave; lower to ridge top
Litter Cover: range 20–60%, mean 41.7%
Small Rock Cover: range 6–35%, mean 21.5%
Large Rock Cover: range 0–1%, mean 0.5%
Bare Ground: range 20–42%, mean 30.5%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam or sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Mimulus aurantiacus* Shrubland form an intermittent shrub layer (40–48%, mean 43.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–4%, mean 1%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 1.7%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–52%, mean cover is 46.1%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum* and *Mimulus aurantiacus. Heteromeles arbutifolia, Salvia mellifera,* and *Malosma laurina* are usually included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and occasionally includes *Bromus madritensis.* Other herbs may include *Piptatherum miliaceum, Pentagramma triangularis, Nassella lepida,* and *Marah macrocarpus.*

***Adenostoma fasciculatum-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.7	0.2	10.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	18.7	7.0	30.0	X	X	
	MIAU	*Mimulus aurantiacus*	100	9.9	5.0	16.0		X	
	HEAR5	*Heteromeles arbutifolia*	57	5.7	1.0	14.0			
	MALA6	*Malosma laurina*	57	2.2	0.2	6.0			
	SAME3	*Salvia mellifera*	57	0.5	0.2	2.0			
	RHOV	*Rhus ovata*	43	1.3	1.0	6.0			
	KECO	*Keckiella cordifolia*	43	1.2	0.2	7.0			
	ARCA11	*Artemisia californica*	43	0.6	0.2	4.0			
	YUWH	*Yucca whipplei*	29	0.7	2.0	3.0			
	CEBE3	*Cercocarpus betuloides*	29	0.3	0.2	2.0			
	QUBE5	*Quercus berberidifolia*	29	0.3	0.2	2.0			
	SALE3	*Salvia leucophylla*	29	0.3	0.2	2.0			
	CEME	*Ceanothus megacarpus*	29	0.3	1.0	1.0			
	RHIL	*Rhamnus ilicifolia*	29	0.2	0.2	1.0			
	RIMA	*Ribes malvaceum*	29	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	29	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	29	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	43	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus madritensis, Bromus hordeaceus, Centaurea melitensis, Piptatherum miliaceum

Samples Used in Description: (n = 7)
rap1912, rap1914, rap2024, rap2071, rap2376, rap2484, rap2827

Comments:
The presence of *Mimulus aurantiacus* as a constant in this association suggests a more coastal or semisheltered setting for this association of the chamise alliance. The *M. aurantiacus* Association of the chamise alliance tends to occur in somewhat rocky, steep areas but typically not as xeric as many other chamise associations. All local aspects are northeast facing, and this association appears to be most common in areas within the summer fog zone.

Phases:
None

COMMON NAME	Chamise-Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and from Marin County. Information about its global distribution is not available without additional inventory; however, it likely occurs elsewhere in the coastal mountains of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
In Marin County (Keeler-Wolf et al. 2003), this association is found on the upper one-third of rocky, 16–30 degree angle, south-facing slopes. Soil textures range from medium loam to moderately coarse sandy loam of sandstone origin. Most stands are above the average summer fog layer.

Vegetation Description:
In Marin County (Keeler-Wolf et al. 2003) stands of the *Adenostoma fasciculatum-Mimulus aurantiacus Shrubland* Association are dominated by *Adenostoma fasciculatum*. *Mimulus aurantiacus covers 1 to 20% of the stand.* Also common in this association are the small nonnative grasses *Aira caryophyllea* and *Gastridium ventricosum.* Other shrubs and understory herbs vary but may include *Melica californica, Hypericum concinnum, Nassella pulchra, Nassella lepida, Avena barbata, Zigadenus fremontii, Chlorogalum pomeridianum, Pleuropogon californicus, Bromus madritensis rubens, Cynosurus echinatus,* and *Baccharis pilularis. Umbellularia californica* may also be present.

Comments:
The association named *Adenostoma fasciculatum-Mimulus aurantiacus* was first described from the outer coast ranges of northern California in Marin County (Keeler-Wolf et al. 2003). Although it differs to some degree in the species composition from the Santa Monica Mountains version, it is essentially similar in that it occurs near or in the coastal fog zone within only one mile or two of the ocean. It stands to reason that the more northerly expression of this association is more restricted to south-facing slopes and in otherwise relatively more xeric settings than the southern California expression where there is less rainfall and warmer temperatures.

References:
Keeler-Wolf et al. 2003

Adenostoma fasciculatum-Salvia leucophylla Shrubland Association

Chamise-Purple Sage (Provisional) Shrubland Association
***Adenostoma fasciculatum* Shrubland Alliance**
Chamise Shrubland Alliance

Mapping Code: 2018

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes at low elevations between 567 and 631 m. It is codominated by *Adenostoma fasciculatum* and *Salvia leucophylla* in the shrub layer, and a variety of other coastal sage and chaparral shrubs are often present at low cover. The herbaceous layer is variable and may be dominated by grasses or herbs such as *Avena* sp., *Centaurea melitensis,* and/or *Hemizonia fasciculata*. The tree layer is not recorded.

Distribution:
This association is sampled in the Simi Hills Inland region of the study area.

Environmental Description:
Elevation: range 567–631 m, mean 614 m
Aspect: northeast and southwest
Slope: range 15–35 degrees, mean 25.3 degrees
Topography (micro; macro): usually flat, sometimes convex; mid to upper slopes to ridgetop
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: no data
Soil Texture: no data

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia leucophylla* Shrubland form intermittent shrub layer (35–48%, mean 43%). Shrubs commonly occur in two different strata, with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 5.5%) at 0.01–1 m tall. The tree layer is not recorded. Total vegetation cover is 48.–50%, mean cover is 48.5%.

In this association, shrub layer is intermittent and codominated by *Adenostoma fasciculatum* and *Salvia leucophylla*. A variety of other coastal sage and chaparral shrubs is often present at low cover including *Heteromeles arbutifolia*, *Salvia mellifera, Ceanothus crassifolius*, and *Malacothamnus fasciculatus.* The herbaceous layer is variable and may be dominated by *Centaurea melitensis, Avena* sp., and/or *Hemizonia fasciculata*. Other herbs at low cover often include *Marah macrocarpus* and *Leymus condensatus.* The tree layer is absent.

***Adenostoma fasciculatum-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	17.9	7.5	22.0	X	X	
	SALE3	*Salvia leucophylla*	100	15.0	10.0	20.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	75	2.1	2.0	4.0		X	
	SAME3	*Salvia mellifera*	75	1.9	1.0	4.0		X	
	CECR	*Ceanothus crassifolius*	75	1.4	0.2	3.0		X	
	MAFA	*Malacothamnus fasciculatus*	75	0.9	0.2	2.5		X	
	ARCA11	*Artemisia californica*	50	0.7	0.2	2.5			
	ERFA2	*Eriogonum fasciculatum*	25	0.6	2.5	2.5			
	YUWH	*Yucca whipplei*	25	0.6	2.5	2.5			
	MALA6	*Malosma laurina*	25	0.3	1.0	1.0			
	RHOV	*Rhus ovata*	25	0.3	1.0	1.0			
	BAPI	*Baccharis pilularis*	25	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	75	0.6	0.2	2.0		X	
	CEME2	*Centaurea melitensis*	50	2.6	3.0	7.5	X		X
	LECO12	*Leymus condensatus*	50	0.6	0.2	2.0			
	AVENA	*Avena*	25	1.9	7.5	7.5			X
	HEFA	*Hemizonia fasciculata*	25	1.9	7.5	7.5			
	ANMU3	*Antirrhinum multiflorum*	25	0.1	0.2	0.2			
	CUCA	*Cuscuta californica*	25	0.1	0.2	0.2			
	HIIN3	*Hirschfeldia incana*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Hirschfeldia incana

Samples Used in Description: (n = 4)
AA0297cc, rap1676, rap1680, rap2038

Comments:
This association has been defined only locally in the study area, where there is a codominance of chamise and purple sage. Currently, the association is provisional since the sample size is low.

Phases:
None

COMMON NAME	Chamise-Purple Sage (Provisional) Shrubland Association
SYNONYM	Coastal Sage-Chaparral Scrub (Holland 1986)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
Holland 1986

Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius Shrubland Association

Chamise-Redshank-Hoary Leaf Ceanothus Shrubland Association
***Adenostoma fasciculatum-Adenostoma sparsifolium* Shrubland Alliance**
Chamise-Redshank Shrubland Alliance

Mapping Code: 2042

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 320–888 m. It is dominated by *Adenostoma fasciculatum, Adenostoma sparsifolium, and Ceanothus crassifolius* in the shrub layer with little cover in the herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 320–888 m, mean 705.8 m
Aspect: variable
Slope: range 2–35 degrees, mean 20.3 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 60–80%, mean 70%
Small Rock Cover: range 5–40%, mean 16%
Large Rock Cover: range 0–5%, mean 1.8%
Bare Ground: range 10–38%, mean 21.7%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Shrubland form an open to intermittent shrub layer (21–58%, mean 42.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–31%, mean 5.5%) at 0–0.5 m tall. Trees are not present. Total vegetation cover is 42–58%, mean cover is 48%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium, Ceanothus crassifolius,* and *Adenostoma fasciculatum*. *Yucca whipplei* and *Rhus ovata* are occasionally included in this layer. The tree layer is absent. The herbaceous layer is diverse and may include *Bromus hordeaceus, Centaurea melitensis,* and *Avena* sp.

***Adenostoma fasciculatum-Adenostoma sparsifolium-Ceanothus crassifolius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	13.6	2.0	25.0	X	X	
	CECR	*Ceanothus crassifolius*	100	12.8	4.0	25.0		X	
	ADFA	*Adenostoma fasciculatum*	92	9.8	2.0	24.0		X	
	YUWH	*Yucca whipplei*	50	0.4	0.2	2.5			
	RHOV	*Rhus ovata*	42	1.0	0.2	4.0			
	CEOL	*Ceanothus oliganthus*	33	0.8	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.3	0.2	2.0			
	LEFR	*Lepechinia fragrans*	33	0.2	0.2	1.0			
	SAME3	*Salvia mellifera*	25	0.3	0.2	2.5			
Herb									
	BRHO2	*Bromus hordeaceus*	33	1.1	1.0	10.0			X

Other Noteworthy Species:
Delphinium parryi was found in 1of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 4of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus hordeaceus, Avena, Centaurea melitensis, Avena barbata, Bromus madritensis

Samples Used in Description: (n = 12)
AA0138cc, AA0458cc, rap0785m, rap0795, rap1535m, rap1764, rap1772, rap1782m, rap1784, rap1789, rap2148, rap2171

Comments:
This association is characterized by a codominance of the three nominate species. Although *Ceanothus crassifolius* is a widespread chaparral species forming its own alliance in many parts of southern coastal California, it is not known to occur with redshank in combination with chamise anywhere outside of the Santa Monica Mountains.

Phases:
None

COMMON NAME	Chamise-Redshank-Hoary Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Adenostoma sparsifolium* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is found in southern coastal California and adjacent Baja California, Mexico (Sawyer and Keeler-Wolf, 1995, Gordon and White (1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Arctostaphylos glandulosa Shrubland Association

Chamise-Eastwood Manzanita Shrubland Association
***Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland Alliance**
Chamise-Eastwood Manzanita Shrubland Alliance

Mapping Code: 2021

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low to mid elevations between 207–781 m. It is dominated by *Adenostoma fasciculatum* and *Arctostaphylos glandulosa* in the shrub layer and in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 207–781 m, mean 536.9 m
Aspect: northeast and northwest
Slope: range 7–38 degrees, mean 21.9 degrees
Topography (micro; macro): undulating or convex; lower slope to ridgetop
Litter Cover: range 15–35%, mean 25%
Small Rock Cover: range 1–45%, mean 16.3%
Large Rock Cover: range 0–25%, mean 9.1%
Bare Ground: range 5–40%, mean 24.8%
Parent Material: sedimentary or quaternary
Soil Texture: coarse to very fine loamy sand

Vegetation Description:
Stands of *Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland form an open to continuous shrub layer (30–70%, mean 49.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.1%) at 0–0.5 m tall. Trees are occasionally emergent (0–5% cover, mean 0.7%) with hardwoods at 0–15 m tall. Total vegetation cover is 31–70%, mean cover is 50.3%.

In this association, the shrub layer is characterized by abundant cover of *Adenostoma fasciculatum* and *Arctostaphylos glandulosa*. *Malosma laurina* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Piptatherum miliaceum, Bromus diandrus, Bromus madritensis,* or *Marah macrocarpus*.

***Adenostoma fasciculatum-Arctostaphylos glandulosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	44	0.5	0.2	2.5			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	23.8	13.0	40.0	X		
	ARGL3	*Arctostaphylos glandulosa*	100	15.2	4.0	28.0	X		
	MALA6	*Malosma laurina*	56	1.3	0.2	9.0			
	HEAR5	*Heteromeles arbutifolia*	56	0.8	0.2	5.0			
	QUBE5	*Quercus berberidifolia*	48	1.9	1.0	9.0			
	CEME	*Ceanothus megacarpus*	44	3.0	1.0	12.0			
	ARGL4	*Arctostaphylos glauca*	40	0.4	0.2	3.0			
	LOSC2	*Lotus scoparius*	36	0.5	0.2	4.0			
	DERI	*Dendromecon rigida*	36	0.4	0.2	2.5			
	CEOL	*Ceanothus oliganthus*	28	0.8	0.2	8.0			
	CEBE3	*Cercocarpus betuloides*	24	0.6	0.2	8.0			
	PIMO5	*Pickeringia montana*	24	0.4	0.2	3.0			
	RHOV	*Rhus ovata*	24	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	20	0.5	2.0	3.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.3	0.2	2.5			

Other Noteworthy Species:
Lepechinia fragrans was found in 1of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Spartium junceum, Bromus diandrus, Bromus madritensis, Avena, Bromus hordeaceus, Centaurea melitensis, Erodium cicutarium, Hirschfeldia incana

Samples Used in Description: (n = 25)
AA0039cc, AA0049cc, AA0484cc, AA0597, AA0688, AA0879, rap0250, rap0254, rap0259m, rap0266m, rap0267, rap0274m, rap0279m, rap0359, rap0361, rap0363, rap0442, rap0502, rap0504, rap0601, rap1291, rap1682, rap1699, rap2543, rap2786

Comments:
This is an upper elevation chaparral found on the upper slopes of the Santa Monica Mountains and the Simi Hills. It typically occurs on upper ridges and slopes usually above 600 m on northerly facing slopes. In addition to the main manifestation of codominant *A. fasciculatum* and *A. glandulosa*, another phase with a constant presence of *Ceanothus megacarpus* has been identified.

Phases:
Adenostoma fasciculatum-Arctostaphylos glandulosa (Chamise-Eastwood Manzanita) Phase [2021]
Adenostoma fasciculatum-Ceanothus megacarpus-Arctostaphylos glandulosa (Chamise-Big Pod Ceanothus-Eastwood Manzanita) Phase [7017]

COMMON NAME	Chamise-Eastwood Manzanita Shrubland Association
SYNONYM	*Arctostaphylos glandulosa* Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Arctostaphylos glandulosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as several other mountain ranges of southern California including the San Gabriel, San Bernardino, San Jacinto, and peninsular ranges.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association of California is found on north-facing slopes, outcrops, and ridges on shallow soils. Occurrences range in elevation from 300 to 2,200 m. This alliance often follows disturbance, growing on sites that have been burned, logged, or otherwise disturbed.

Vegetation Description:
In western Riverside County, the *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association has *Adenostoma fasciculatum* and *Arctostaphylos glandulosa* consistently present, and both species are usually codominant, though sometimes *Arctostaphylos glandulosa* may be subdominant to *Adenostoma fasciculatum*. Other chaparral shrubs often intermix as subdominants including *Quercus berberidifolia, Heteromeles arbutifolia,* and *Garrya flavescens*.

Comments:
Very similar stands of this association occur throughout many of the mountain ranges of southern coastal California.

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005, Reid et al. 1999

Adenostoma fasciculatum-Arctostaphylos glauca Shrubland Association

Chamise-Big Berry Manzanita (Provisional) Shrubland Association
***Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland Alliance**
Chamise-Big Berry Manzanita Shrubland Alliance

Mapping Code: 2531

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 367–664 m. It is dominated by *Adenostoma fasciculatum* and *Arctostaphylos glauca* in the shrub layer with an insignificant herbaceous layer.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 367–664 m, mean 445.8 m
Aspect: northeast and northwest
Slope: range 20–35 degrees, mean 29 degrees
Topography (micro; macro): flat, undulating, or concave; mid slope to ridgetop
Litter Cover: range 30–30%, mean 30%
Small Rock Cover: range 2–50%, mean 19.7%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 8–45%, mean 27%
Parent Material: igneous
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of *Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland form an intermittent shrub layer (40–60%, mean 49.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare. Trees are not present. Total vegetation cover is 40–60%, mean cover is 49.5%.

In this association, the shrub layer is characterized by *Malosma laurina, Ceanothus megacarpus*, *Adenostoma fasciculatum,* and *Arctostaphylos glauca*. *Salvia mellifera, Cercocarpus betuloides,* and *Heteromeles arbutifolia* are occasionally included in this layer. The tree layer is absent. The herbaceous layer is simple and sometimes contains *Bromus madritensis* and *Centaurea melitensis.*

***Adenostoma fasciculatum-Arctostaphylos glauca* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	22.3	18.0	28.0	X	X	
	ARGL4	*Arctostaphylos glauca*	100	17.8	15.0	20.0	X	X	
	CEME	*Ceanothus megacarpus*	100	7.3	4.0	15.0		X	
	MALA6	*Malosma laurina*	100	0.9	0.2	2.0		X	
	SAME3	*Salvia mellifera*	75	1.5	0.2	5.0		X	
	CEBE3	*Cercocarpus betuloides*	75	0.3	0.2	1.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	0.2	0.2	0.2		X	
	ERFA2	*Eriogonum fasciculatum*	50	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	50	0.1	0.2	0.2			
	GAVE2	*Garrya veatchii*	25	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	0.2			
	PIMO5	*Pickeringia montana*	25	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	25	0.1	0.2	0.2			
	YUWH	*Yucca whipplei*	25	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	50	0.1	0.2	0.2	X		X
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2	X		X
	GALIU	*Galium*	50	0.1	0.2	0.2	X		
Cryptogam									
	LICHEN	*Lichen*	25	0.1	0.2	0.2			
	MOSS	*Moss*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Bromus madritensis, Centaurea melitensis

Samples Used in Description: (n = 4)
rap0378, rap0379, rap0412, rap2921

Comments:
This association occurs locally in the higher and more inland continental portions of the study area. *A. glauca* is a xerophytic manzanita, and it commonly codominates with chamise in many of the hotter, drier chaparral stands throughout central and southern California including the western borders of the Mojave and Sonoran deserts.

Phases:
None

COMMON NAME	Chamise-Big Berry Manzanita Shrubland Association
SYNONYM	*Arctostaphylos glauca* Shrubland Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland

PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Arctostaphylos glauca* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S4

Global Description

Distribution:
This is a common association in the southern and central coastal California area.

Nations:
United States, Mexico (Baja)

States or Provinces:
CA

Environmental Description:
Stands are found at elevations between 300 and 1,000 m. Aspect is more often northerly, less often southerly. Slopes are usually moderate to steep with variable topography. Parent material is varied including granitic metamorphic, sedimentary, and igneous. Soil texture is also varied from sandy loam and sand to clay loam.

Vegetation Description:
In the *Adenostoma fasciculatum-Arctostaphylos glauca* Association, the two species are consistently codominant in the intermittent to dense shrub overstory. A variety of other chaparral species intermixes as subdominants shrubs (e.g., *Garrya flavescens, Keckiella antirrhinoides, Prunus ilicifolia, Heteromeles arbutifolia*).

Comments:
This is a common association in the southern and central coastal California area. It has been reported in San Diego, Riverside, Los Angeles, Santa Barbara, Ventura, San Benito, Monterey, San Luis Obispo, and Fresno counties. Its presence reflects somewhat drier and warmer conditions than the *Adenostoma fasciculatum-Arctostaphylos glandulosa* Association of the *A. fasciculatum–A. glandulosa* Alliance. *Arctostaphylos glauca* is an obligate seeder as opposed to *A. glandulosa*, which is a resprouting species. Similar stands occur as far north as Alameda County in the central coast ranges, though they have not been adequately described (Keeler-Wolf 2005 personal observation).

References:
Evens and San 2005, Evens et al. 2005, Gordon and White 1994, Klein and Evens 2005, Reid 1999, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina Shrubland Association

Chamise-Hoary Leaf Ceanothus-Laurel sumac Shrubland Association
***Adenostoma fasciculatum-Ceanothus crassifolius* Shrubland Alliance**
Chamise-Hoary Leaf Ceanothus Shrubland Alliance

Mapping Code: 2572

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low to mid elevations between 17–821 m. It is dominated by both *Adenostoma fasciculatum* and *Ceanothus crassifolius* in the shrub layer, although *C. crassifolius* is typically somewhat higher cover. The herbaceous layer is sparse except for occasional vines of *Marah macrocarpa,* which may sprawl over the shrubs. Trees are generally absent.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 17–821 m, mean 467.5 m
Aspect: variable
Slope: range 15–35 degrees, mean 27.1 degrees
Topography (micro; macro): undulating, flat, concave, or convex; lower to upper slope
Litter Cover: range 20–85%, mean 37.9%
Small Rock Cover: range 1–40%, mean 13.2%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 0–60%, mean 29.4%
Parent Material: predominantly sedimentary, some igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Shrubland form an open to intermittent shrub layer (22–60%, mean 45.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open (0–13%, mean 2%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–60%, mean cover is 48.3%.

In this association, the shrub layer is characterized by *Ceanothus crassifolius, Adenostoma fasciculatum, Salvia mellifera*, and *Malosma laurina*. *Heteromeles arbutifolia, Rhus ovata,* and *Yucca whipplei* are occasionally included in this layer. The tree layer is emergent and open and may rarely include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Marah macrocarpus, Bromus madritensis, Phacelia cicutaria*, and *Centaurea melitensis.*

***Adenostoma fasciculatum-Ceanothus crassifolius-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CECR	*Ceanothus crassifolius*	100	22.7	7.0	45.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	13.8	1.0	35.0		X	
	SAME3	*Salvia mellifera*	81	2.9	0.2	15.0		X	
	MALA6	*Malosma laurina*	77	3.5	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	49	1.0	0.2	10.0			
	RHOV	*Rhus ovata*	49	0.8	0.2	6.0			
	YUWH	*Yucca whipplei*	42	0.3	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	33	0.5	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	21	0.2	0.2	2.5			
Herb									
	MAMA8	*Marah macrocarpus*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 43 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Hemizonia minthornii was found in 1of 43 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Avena, Brassica nigra, Bromus diandrus, Hirschfeldia incana, Foeniculum vulgare, Nicotiana glauca, Avena fatua, Bromus hordeaceus, Bromus madritensis subsp. *rubens, Centaurea solstitialis, Marrubium vulgare, Melilotus indicus, Stellaria media*

Samples Used in Description: (n = 43)
AA0029cc, AA0187cc, AA0188cc, AA0192cc, AA0194cc, AA0200cc, AA0296cc, AA0867, AA0939, AA0967, AA1081, AA1104, rap0399, rap0400, rap0492, rap0781, rap1541, rap1542, rap1545m, rap1611, rap1679, rap1681, rap1683, rap1693, rap1698, rap1779, rap1795, rap1796, rap2039m, rap2043, rap2054, rap2091, rap2092, rap2147, rap2149, rap2172, rap2178, rap2179, rap2289, rap2290, rap2333, rap2336, rap2920

Comments:
This association is common in the Simi Hills and at the upper elevation, central portions of the Santa Monica Mountains. The presence of the frost-sensitive *Malosma laurina* in more than 75% of the samples suggests that this is a relatively warm temperate association of the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME Chamise-Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar stands occur in western Riverside County (Klein and Evens 2005) and other parts of the peninsular range (Gordon and White 1994); however, they do not have *Malosma laurina* as a constant.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina Shrubland Association

Chamise-Wedge Leaf Ceanothus-Black Sage-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum-Ceanothus cuneatus* Shrubland Alliance**
Chamise-Wedge Leaf Ceanothus Shrubland Alliance

Mapping Code: 2511

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep slopes of variable aspect at low elevations between 109–521 m. It is dominated by *Adenostoma fasciculatum* and *Ceanothus cuneatus* with *Salvia mellifera* and *Malosma laurina* as constant subdominants in the shrub layer. It has a low cover of mostly nonnative exotics in the herbaceous layer. The emergent tree layer may include *Quercus agrifolia*.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 109–521 m, mean 306 m
Aspect: variable
Slope: range 9–55 degrees, mean 28.8 degrees
Topography (micro; macro): undulating or convex; lower slope to ridge
Litter Cover: range 15–25%, mean 20%
Small Rock Cover: range 5–40%, mean 22%
Large Rock Cover: range 0–3%, mean 1.6%
Bare Ground: range 15–44%, mean 33.4%
Parent Material: predominantly igneous, some sedimentary
Soil Texture: moderately fine sandy or silty clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (18–52%, mean 40.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 3.4%) at 0–0.5 m tall. Trees are occasionally emergent (0–3% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 22–52%, mean cover is 44%.

In this association, the shrub layer is characterized by *Ceanothus cuneatus, Adenostoma fasciculatum,* and *Eriogonum fasciculatum*. *Salvia mellifera, Malosma laurina, Rhus ovata,* and *Yucca whipplei* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and occasionally includes *Centaurea melitensis* and *Bromus madritensis.* Other herbs sometimes include *Dudleya pulverulenta, Chlorogalum pomeridianum,* and *Hemizonia fasciculata*.

***Adenostoma fasciculatum-Ceanothus cuneatus-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.3	0.2	3.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	15.0	2.5	25.0	X	X	
	CECU	*Ceanothus cuneatus*	100	11.2	3.0	18.0		X	
	ERFA2	*Eriogonum fasciculatum*	75	1.7	0.2	8.0		X	
	SAME3	*Salvia mellifera*	67	3.7	1.0	10.0			
	MALA6	*Malosma laurina*	67	1.4	0.2	3.0			
	RHOV	*Rhus ovata*	67	1.2	0.2	7.0			
	YUWH	*Yucca whipplei*	67	0.9	0.2	4.0			
	CEBE3	*Cercocarpus betuloides*	42	0.7	0.2	5.0			
	QUBE5	*Quercus berberidifolia*	33	1.6	2.5	7.0			
	ARCA11	*Artemisia californica*	33	0.5	1.0	2.5			
	LOSC2	*Lotus scoparius*	33	0.1	0.2	1.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.6	1.0	4.0			
Herb									
	CEME2	*Centaurea melitensis*	50	1.3	0.2	7.0	X		X
	AVENA	*Avena*	33	0.8	0.2	4.0			X
	BRMA3	*Bromus madritensis*	25	0.1	0.2	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Avena fatua, Bromus hordeaceus, Hirschfeldia incana, Bromus diandrus

Samples Used in Description: (n = 12)
AA0124cc, AA0489cc, AA0490cc, AA1106, rap0402, rap0572, rap1628, rap2032, rap2134, rap2136, rap2144, rap2829

Comments:
This association is the only expression of this widespread California alliance locally. It occurs sporadically mostly in the central portion of the Santa Monica Mountains at mid elevations. It remains to be seen how closely related it is to other stands of this alliance reported from other parts of southern California (Gordon and White 1994, Klein and Evens 2005, Borchert et al. 2004).

Phases:
None

COMMON NAME	Chamise-Wedge Leaf Ceanothus-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland

PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Ceanothus cuneatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar stands occur to the north in the Santa Ynez region (Borchert et al. 2004), but those stands have not been differentiated at the association level.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005

Adenostoma fasciculatum-Salvia mellifera Shrubland Association

Chamise-Black Sage Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2036

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- to northwest-facing slopes at low elevations between 114–510 m. It is dominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with a typically sparse herbaceous layer. The emergent tree layer is typically nonexistent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 114–510 m, mean 297.4 m
Aspect: southeast to northwest
Slope: range 15–42 degrees, mean 27.2 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 18–18%, mean 18%
Small Rock Cover: range 10–30%, mean 20.8%
Large Rock Cover: range 0–10%, mean 3.2%
Bare Ground: range 15–65%, mean 35.8%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera* Shrubland form an open to intermittent shrub layer (20–45%, mean 34.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 4.3%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 1%) with hardwoods at 0–5 m tall. Total vegetation cover is 31–45%, mean cover is 39.5%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Salvia mellifera,* and *Yucca whipplei. Artemisia californica* is usually present, and *Eriogonum fasciculatum* and *Lotus scoparius* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Nassella lepida* and *Trichostema lanatum*. Other herbs occasionally include *Centaurea melitensis, Bromus diandrus, Calystegia macrostegia, Cuscuta californica, Bromus madritensis,* and *Melica imperfecta*.

***Adenostoma fasciculatum-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	16.6	6.0	30.0	X	X	
	SAME3	*Salvia mellifera*	100	12.0	5.0	23.0	X	X	
	YUWH	*Yucca whipplei*	82	0.7	0.2	2.5		X	
	ARCA11	*Artemisia californica*	55	0.9	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	45	0.7	0.2	3.0			
	LOSC2	*Lotus scoparius*	45	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.4	0.2	2.0			
	MALA6	*Malosma laurina*	27	0.1	0.2	1.0			
	CEBE3	*Cercocarpus betuloides*	27	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	27	0.1	0.2	0.2			
Herb									
	NALE2	*Nassella lepida*	27	0.5	0.2	5.0			
	TRLA3	*Trichostema lanatum*	27	0.1	0.2	0.2			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena barbata, Bromus madritensis, Bromus diandrus, Centaurea melitensis, Avena fatua, Schinus molle, Avena, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Rosmarinus officinalis, Sonchus oleraceus

Samples Used in Description: (n = 11)
AA0315cc, AA0762, rap0569, rap0588, rap0708, rap1224, rap1778, rap1824, rap1856, rap2119, rap2833

Comments:
Locally this association is often seral showing the evidence of recent fire such as the presence of *Hazardia squarrosa* and *Lotus scoparius.* However, some stands of this association appear to have persisted for much longer periods since the most recent fire event. In general, most of the local stands seem to have a stronger affinity toward coastal scrub species than toward chaparral as indicated by the average constancy of the most common shrub species. This is a transitional association that would be valuable to monitor over the long term to clarify regional trends in scrub dynamics between chaparral and coastal scrub vegetation formations.

Phases:
None

COMMON NAME Chamise-Black Sage Shrubland Association

SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is found in the central coast of California (including Santa Clara County) and in southern California (including inner south coast; western transverse ranges; and Santa Ana, San Jacinto, San Gabriel, and San Bernardino mountains) per Sawyer and Keeler-Wolf (1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands are found at elevations between 100 and 1,000 m on all aspects. Slopes are gentle to steep with variable topography. Parent material is more often granite and less often sedimentary, metamorphic, gabbro, diorite, or metavolcanic. Soil texture varies from sandy loam to silty clay loam.

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera* Shrubland form an open to continuous shrub layer (10–75%, mean 44.2%) where *Adenostoma fasciculatum* usually codominates with *Salvia mellifera*. The shrub layer is often in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to continuous (0.2–75%, mean 22.7%) at 0–1 m tall with a variety of native and nonnative species (see species table). Total vegetation cover is 38–85%, mean cover is 59.2%.

Comments:
This is a widespread association in the central and southern coastal parts of California. It is one of the classic intermixings of chaparral and coastal sage scrub in the California mediterranean climate.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Adenostoma fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association

Chamise-Black Sage-Laurel Sumac Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2035

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–648 m. It is codominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with *Malosma laurina* as a subdominant. It has an insignificant herbaceous layer. The emergent tree layer is usually absent but infrequently includes occasional individuals of *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Western Fog Zone, Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and the Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–648 m, mean 400 m
Aspect: variable
Slope: range 4–35 degrees, mean 25 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridge
Litter Cover: range 0–45%, mean 19.4%
Small Rock Cover: range 1–60%, mean 27.5%
Large Rock Cover: range 0–15%, mean 3%
Bare Ground: range 0–55%, mean 33.9%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (18–50%, mean 36.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–17%, mean 1.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 28–52%, mean cover is 37.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Salvia mellifera,* and *Malosma laurina. Yucca whipplei* and *Eriogonum fasciculatum* are usually included in this layer, and *Lotus scoparius* is occasionally present. The tree layer is emergent and open and may rarely include *Quercus agrifolia* and/or *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Centaurea melitensis,* and *Trichostema lanatum*. Other herbs may include *Bromus madritensis* and/or *Galium angustifolium*.

***Adenostoma fasciculatum-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	16.6	5.0	30.0	X	X	
	SAME3	*Salvia mellifera*	100	10.1	5.0	25.0		X	
	MALA6	*Malosma laurina*	96	4.2	0.2	15.0		X	
	YUWH	*Yucca whipplei*	62	0.8	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	53	0.6	0.2	4.0			
	LOSC2	*Lotus scoparius*	45	0.5	0.2	6.0			
	CEME	*Ceanothus megacarpus*	38	0.8	0.2	5.0			
	CEBE3	*Cercocarpus betuloides*	32	0.2	0.2	2.0			
	RHOV	*Rhus ovata*	30	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	28	0.3	0.2	4.0			
	ARCA11	*Artemisia californica*	21	0.4	0.2	7.5			
	MAFA	*Malacothamnus fasciculatus*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 53 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 53 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Avena, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena barbata, Erodium, Erodium cicutarium, Lamium amplexicaule, Marrubium vulgare, Melilotus indicus

Samples Used in Description: (n = 53)
AA0161cc, AA0186cc, AA0241cc, AA0357cc, AA0360cc, AA0361cc, AA0367cc, AA0404, AA0486cc, AA0527, AA0564, AA0565, AA0568, AA0646, AA0649, AA0650, AA0652, AA0772, AA0799, AA0874, AA0962, AA0974, AA1070, rap0106, rap0227m, rap0432, rap0457m, rap0493, rap0494, rap0568, rap0570, rap0707, rap0917m, rap1117, rap1238, rap1239, rap1263, rap1284, rap1331, rap1565, rap1566, rap1605, rap1696, rap1769, rap1797, rap1987, rap2010, rap2035, rap2080, rap2137, rap2282, rap2321, rap2859rlv

Comments:
This is a very common and widespread association within the Santa Monica Mountains but is not known elsewhere. The presence of *Malosma laurina* within stands of *A. fasciculatum* and *Salvia mellifera* is apparently largely restricted to the coastal strip of southern California. As with the *A. fasciculatum-S. mellifera* association of the same alliance, this association is often indicative of relatively recent fire.

Phases:
None

COMMON NAME	Chamise-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma fasciculatum-Salvia mellifera-Rhus ovata Shrubland Association

Chamise-Black Sage-Sugar Bush Shrubland Association
***Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance**
Chamise-Black Sage Shrubland Alliance

Mapping Code: 2038

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 17–552 m. It is dominated by *Adenostoma fasciculatum* and *Salvia mellifera* in the shrub layer with *Rhus ovata* as a subdominant. The herbaceous layer is generally poorly developed. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Dry Inland and Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 17–552 m, mean 354.5 m
Aspect: variable
Slope: range 15–38 degrees, mean 30.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower slope to ridgetop
Litter Cover: range 15–30%, mean 22.5%
Small Rock Cover: range 5–30%, mean 15%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 10–50%, mean 31%
Parent Material: sedimentary, some igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Salvia mellifera-Rhus ovata* Shrubland form an open to intermittent shrub layer (32–60%, mean 42.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–3%, mean 0.6%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) with hardwoods at 0–10m tall. Total vegetation cover is 33–62%, mean cover is 43.3%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum*, *Salvia mellifera,* and *Rhus ovata*. *Eriogonum fasciculatum* and *Malacothamnus fasciculatus* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Centaurea melitensis, Cuscuta californica,* and *Trichostema lanatum*.

***Adenostoma fasciculatum-Salvia mellifera-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	19.7	10.0	28.0	X	X	
	SAME3	*Salvia mellifera*	100	10.5	0.2	25.0		X	
	RHOV	*Rhus ovata*	100	5.5	2.0	15.0		X	
	ERFA2	*Eriogonum fasciculatum*	46	1.7	0.2	9.0			
	MAFA	*Malacothamnus fasciculatus*	42	1.3	0.2	9.0			
	YUWH	*Yucca whipplei*	38	0.4	0.2	2.5			
	MALA6	*Malosma laurina*	33	0.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	29	0.7	0.2	7.5			
	CEBE3	*Cercocarpus betuloides*	25	0.4	0.2	2.5			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	5.0			
	CECU	*Ceanothus cuneatus*	21	0.6	0.2	7.5			
	CEME	*Ceanothus megacarpus*	21	0.6	0.2	6.0			
	QUBE5	*Quercus berberidifolia*	21	0.6	1.0	5.0			
	ARCA11	*Artemisia californica*	21	0.4	0.2	7.5			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Hirschfeldia incana, Brassica nigra, Bromus hordeaceus, Marrubium vulgare

Samples Used in Description: (n = 24)
AA0047cc, AA0092cc, AA0179cc, AA0204cc, AA0236cc, AA0397cc, AA0492cc, AA0581, AA0600, AA0602, AA0604, AA0694, AA0820, AA1182, rap1561, rap1562, rap1793, rap1801, rap1919, rap2003, rap2007, rap2011, rap2025, rap2031

Comments:
This association is the most inland of the three locally represented associations of the *Adenostoma fasciculatum-Salvia mellifera* Alliance. *Rhus ovata* is most commonly found in the hotter and more dry continental climates of southern California; in the local area these stands may be found in areas that experience frequent frost in winter. The hybridization between *Rhus ovata* and *Rhus integrifolia* in the study area makes many individual shrubs in the genus *Rhus* difficult to identify. Occasional hybrids were found in these stands, but most *Rhus* appeared to be more characteristic of *R. ovata.*

Phases:
None

COMMON NAME	Chamise-Black Sage-Sugar Bush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma fasciculatum-Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Adenostoma sparsifolium Shrubland Alliance

Redshank Shrubland Alliance

Mapping Code: 2050

Local Description

Summary:
This shrubland alliance occurs on somewhat steep southwest- and southeast-facing slopes at low to mid elevations between 356–844 m. It is dominated by *Adenostoma sparsifolium* in the shrub layer. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 356–844 m, mean 656 m
Aspect: southwest and southeast
Slope: range 15–35 degrees, mean 21.6 degrees
Topography (micro; macro): undulating or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: 25%
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
Stands of this shrubland alliance form an intermittent shrub layer (47–52%, mean 49.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is bare (0%). Trees are occasionally emergent (0–0.2% cover, mean 0.1%) with hardwoods at 0–5 m tall. Total vegetation cover is 47–52%, mean cover is 49.3%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium, Rhus ovata, Ceanothus spinosus,* and *Malosma laurina*. *Heteromeles arbutifolia, Salvia mellifera*, *Ceanothus megacarpus,* and *Adenostoma fasciculatum* are often included in this layer. Occasional, small trees are emergent and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus* and *Bromus* sp.

Adenostoma sparsifolium Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	18.3	7.0	25.0	X	X	
	CESP	*Ceanothus spinosus*	100	13.7	4.0	23.0	X	X	
	MALA6	*Malosma laurina*	100	3.0	3.0	3.0		X	
	RHOV	*Rhus ovata*	100	0.8	0.2	2.0		X	
	CEME	*Ceanothus megacarpus*	67	4.3	5.0	8.0			
	ADFA	*Adenostoma fasciculatum*	67	1.4	0.2	4.0			
	SAME3	*Salvia mellifera*	67	1.1	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	67	0.1	0.2	0.2			
	HEAR5	*Heteromeles arbutifolia*	67	0.1	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	33	0.3	1.0	1.0			
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	33	0.1	0.2	0.2			
	LEFR	*Lepechinia fragrans*	33	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	33	0.1	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	33	0.1	0.2	0.2			
Herb									
	BROMU	*Bromus*	33	0.1	0.2	0.2			
	LECO12	*Leymus condensatus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 1of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 3)
rap0527m, rap2496, rap2928

Comments:
Most stands with significant *A. sparsifolium* in the Santa Monica Mountains are considered part of the *A. sparsifolium-Adenostoma fasciculatum* Alliance. The three relatively pure stands represented in this alliance level description all have relatively high cover of *Ceanothus spinosus* and with further verification may be considered to be an *A. sparsifolium-C. spinosus* Association. Such stands are apparently rare in the study area and are not likely to be found outside of the study area.

Phases:
None

COMMON NAME Redshank Alliance
SYNONYM Ribbonwood or Chamise-Redshank Community
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.C. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Adenostoma sparsifolium* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance occurs from California's central coast, south into the cismontane transverse and peninsular ranges, extending into northern Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
The *Adenostoma sparsifolium* Shrubland Alliance grows on dry slopes and flats with deep soils derived from alluvium or bedrock. Stands occur from 300 to 2,000 m in elevation. This alliance is adapted to slightly cooler temperatures and drier conditions than other widespread chaparral vegetation types. Summers are dry and winters are relatively cool and moist. This alliance often occurs in a mosaic with the *Adenostoma fasciculatum* Shrubland Alliance. Keeler-Wolf et al. (1998) show an *Adenostoma sparsiflorum* Alliance and the closely related *Adenostoma fasciculatum-Adenostoma sparsiflorum* Alliance as occurring adjacent to desert vegetation types along much of the northwestern portion of Anza-Borrego Desert State Park.

Vegetation Description:
This shrubland of California and Baja California is dominated by *Adenostoma sparsifolium* that may be the sole shrub in the canopy. Other shrubs may include *Cercocarpus montanus* var. *glaber, Adenostoma fasciculatum, Ceanothus greggii, Rhamnus ilicifolia, Quercus cornelius-mulleri*, and *Garrya veatchii*. The herbaceous layer is sparse.

Comments:
In a study of the range of *Adenostoma sparsifolium,* Marion (1943) found monotypic stands of redshank in just 3% of its distribution; more often it intermixes with chamise.

References:
Keeler-Wolf et al. 1998, Marion 1943, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Arctostaphylos glandulosa Shrubland Alliance

Eastwood Manzanita Shrubland Alliance

Mapping Code: 2550

Local Description

Summary:
This shrubland alliance occurs on somewhat steep to steep northwest-facing slopes at low to middle to high elevations between 557–878 m. It is dominated by *Arctostaphylos glandulosa* in the shrub layer and has an insignificant herbaceous layer in the mature stands. The emergent tree layer includes *Quercus agrifolia* in about one-third of the stand sampled.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 557–878 m, mean 755 m
Aspect: northwest
Slope: range 20–35 degrees, mean 27.6 degrees
Topography (micro; macro): undulating or concave; middle slope to ridge
Litter Cover: 75%
Small Rock Cover: range 5–13%, mean 9%
Large Rock Cover: range 3–15%, mean 9%
Bare Ground: range 2–10%, mean 6%
Parent Material: igneous or metamorphic
Soil Texture: medium to very fine loamy sand

Vegetation Description:
Stands of this shrubland alliance form an intermittent shrub layer (38–65%, mean 54.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare (<1%). Occasionally emergent trees are present (0–0.2% cover, mean 0.1%) with hardwoods from 0–10 m tall. Total vegetation cover is 38–65%, mean cover is 54.3%.

In this association, the shrub layer is dominated by *Arctostaphylos glandulosa*. *Heteromeles arbutifolia* and *Adenostoma fasciculatum* are also usually present but at much lower cover values. Other shrubs occasionally present include *Helianthemum scoparium, Ceanothus crassifolius, Lepechinia fragrans, Ceanothus oliganthus, Adenostoma sparsifolium, Quercus berberidifolia,* and *Ceanothus megacarpus. The* tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus* and *Zigadenus fremontii*.

Arctostaphylos glandulosa Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	ARGL3	*Arctostaphylos glandulosa*	100	33.7	23.0	50.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	2.7	1.0	4.0		X	
	HEAR5	*Heteromeles arbutifolia*	100	0.7	0.2	1.0		X	
	ADSP	*Adenostoma sparsifolium*	67	9.0	5.0	22.0			
	CEME	*Ceanothus megacarpus*	67	4.0	2.0	10.0			
	CEOL	*Ceanothus oliganthus*	67	2.0	3.0	3.0			
	LEFR	*Lepechinia fragrans*	67	1.3	2.0	2.0			
	CECR	*Ceanothus crassifolius*	67	0.4	0.2	1.0			
	HESC2	*Helianthemum scoparium*	67	0.4	0.2	1.0			
	QUBE5	*Quercus berberidifolia*	67	0.4	0.2	1.0			
	LECA7	*Leptodactylon californicum*	33	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	33	0.1	0.2	0.2			
	RIMA	*Ribes malvaceum*	33	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			
	ZIFR	*Zigadenus fremontii*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 2 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 3)
rap0235, rap0790m, rap1533

Comments:
This alliance is only found at the upper elevations of the study area. It is much more widespread in the higher mountains of the transverse and peninsular ranges of southern California.

Phases:
None

COMMON NAME Eastwood Manzanita Alliance
SYNONYM Montane Manzanita Chaparral (Holland 1986)
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Arctostaphylos glandulosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is found along California's outer north coast, outer central coast, and along the montane transverse and peninsular ranges. It may also occur in the northern portion of Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
The *Arctostaphylos glandulosa* Shrubland Alliance of California is found on north-facing slopes, outcrops, and ridges on shallow soils. Occurrences range in elevation from 300 to 2,200 m. This alliance often follows disturbance, growing on sites that have been burned, logged, or otherwise disturbed.

Vegetation Description:
This shrubland is characterized by a continuous canopy of sclerophyllous broad-leaved, evergreen shrubs less than 3 m in height. Emergent conifers may be present. The herbaceous layer is sparse or absent. *Arctostaphylos glandulosa* dominates this alliance. Six subspecies of *Arctostaphylos glandulosa* are recognized by the Jepson Manual (Hickman 1993), any of which may occur in this alliance. Other shrubs present often include *Arctostaphylos glauca, Adenostoma fasciculatum, Ceanothus leucodermis, Yucca whipplei, Baccharis pilularis, Quercus wislizeni, Quercus dumosa, Rhus ovata*, and *Heteromeles arbutifolia*. Emergent *Pinus coulteri* may be present.

Comments:
There are several subspecies of *A. glandulosa.* Most of them are montane and typically occur above 600 m elevation. All are resprouters with lignotubers.

References:
Hickman 1993, Holland 1986, Sawyer and Keeler-Wolf 1995

Arctostaphylos glauca Shrubland Alliance

Big Berry Manzanita Shrubland Alliance

Mapping Code: 2540

Local Description

Summary:
This shrubland alliance occurs on somewhat steep northwest-facing slopes at low elevation (382 m). It is solely dominated by *Arctostaphylos glauca* in the shrub layer. No species were recorded for the herbaceous and tree layers.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 382 m
Aspect: northwest
Slope: 15 degrees
Topography (micro; macro): flat; mid to upper slopes
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
One stand of *Arctostaphylos glauca* Shrubland forms an intermittent shrub layer (55%). Shrubs occur in two different strata with low shrubs at 0.5–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer and emergent tree layer were not recorded for this stand. Total vegetation cover is 55%.

In this alliance, the shrub layer is intermittent and was solely dominated by *Arctostaphylos glauca*. *Adenostoma fasciculatum* occurred at low cover as did *Malosma laurina*. No species were recorded for the tree layer or herbaceous layer.

Arctostaphylos glauca Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARGL4	*Arctostaphylos glauca*	100	48.0	48.0	48.0	X	X	
	ADFA	*Adenostoma fasciculatum*	100	5.0	5.0	5.0		X	
	MALA6	*Malosma laurina*	100	2.0	2.0	2.0		X	

Other Noteworthy Species:
None

Nonnative Species:
None

Samples Used in Description: (n = 1)
rap0411

Comments:
The one stand was assessed at a distance. Big berry manzanita stands are not common but local in the Simi Hills portion of the study area on northerly slopes.

Phases:
None

COMMON NAME	Big Berry Manzanita Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Arctostaphylos glauca* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is known to occur in the central coast (including Santa Clara County south to Santa Barbara County), inner south coast, and montane transverse and peninsular ranges (including from southern San Bernardino Mountains, San Jacinto Mountains, and San Diego County western foothills) to Baja California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands occur on moderate to steep slopes that are typically granitic or metamorphic parent material, though some are found on serpentine. Soils usually have a sandy loam or loam texture, most often shallow to moderately deep.

Vegetation Description:
Arctostaphylos glauca is primarily the dominant shrub in the overstory. *Adenostoma fasciculatum* is often present in relatively low cover. The herbaceous layer may be sparse to well developed including a variety of native species including *Camissonia* spp., *Galium* spp., *Marah macrocarpus, Melica* spp., and *Phacelia* spp.

Comments:
None

References:
Borchert et al. 2004, Evens et al. 2005, Evens and San 2004, Gordon and White 1994, Keeler-Wolf 1990, Sawyer and Keeler-Wolf 1995

Artemisia californica Shrubland Association

California Sagebrush Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 8213

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–609 m. It is characterized by a dominance of *Artemisia californica* in the shrub layer, and a scattered, mostly nonnative herbaceous layer. The emergent tree layer infrequently includes *Quercus agrifolia, Juglans californica,* and *Schinus molle*.

Distribution:
This association is sampled in the Simi Hills Inland, Immediate Coast, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Dry Inland Upper Elevation Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–609 m, mean 247.4 m
Aspect: variable
Slope: range 1–45 degrees, mean 21.5 degrees
Topography (micro; macro): convex, undulating, or flat; lower slope to ridgetop
Litter Cover: range 2–80%, mean 33.7%
Small Rock Cover: range 0–55%, mean 16.5%
Large Rock Cover: range 0–20%, mean 1.7%
Bare Ground: range 10–98%, mean 40%
Parent Material: sedimentary or igneous, occasional quaternary alluvium
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica* Shrubland form an open to intermittent shrub layer (5–49%, mean 29%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–51%, mean 7.9%) at 0–2 m tall. Trees are occasionally emergent (0–8% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 14–65%, mean cover is 37.2%.

In this association, the shrub layer is characterized by *Artemisia californica. Malosma laurina* and *Salvia leucophylla* are usually present. *Baccharis pilularis* and *Salvia mellifera* are occasionally included in the shrub layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia, Juglans californica,* or *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Leymus condensatus,* and *Bromus diandrus.*

***Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	20.2	2.5	40.0	X		
	MALA6	*Malosma laurina*	61	2.0	0.2	15.0			
	SALE3	*Salvia leucophylla*	48	1.3	0.2	15.0			
	BAPI	*Baccharis pilularis*	45	0.6	0.2	7.5			
	SAME3	*Salvia mellifera*	35	0.7	0.2	8.0			
	LOSC2	*Lotus scoparius*	29	0.4	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	24	0.3	0.2	9.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.3	0.2	3.0			
	SAME5	*Sambucus mexicana*	21	0.1	0.2	5.0			
	ERCI5	*Eriogonum cinereum*	20	0.5	0.2	6.0			
	YUWH	*Yucca whipplei*	20	0.2	0.2	7.0			
Herb									
	BRMA3	*Bromus madritensis*	36	0.7	0.2	8.0			X
	BRNI	*Brassica nigra*	30	0.8	0.2	15.0			X
	CEME2	*Centaurea melitensis*	30	0.7	0.2	12.0			X
	HIIN3	*Hirschfeldia incana*	29	0.7	0.2	10.0			X
	LECO12	*Leymus condensatus*	21	0.3	0.2	5.0			
	BRDI3	*Bromus diandrus*	20	0.3	0.2	8.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 100 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 6 of 100 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Carduus pycnocephalus, Avena, Avena fatua, Foeniculum vulgare, Erodium, Erodium cicutarium, Marrubium vulgare, Nicotiana glauca, Ricinus communis, Conyza canadensis, Lactuca serriola, Melilotus indicus, Pennisetum setaceum, Euphorbia terracina, Anagallis arvensis, Cirsium vulgare, Schinus molle, Avena barbata, Conium maculatum, Phalaris aquatica, Salsola tragus, Lamarckia aurea, Senecio vulgaris, Vicia villosa, Eucalyptus, Brassica, Centaurea solstitialis, Robinia, Schinus molle, Silene gallica, Chenopodium album, Erodium botrys, Eucalyptus, Medicago polymorpha, Piptatherum miliaceum, Raphanus sativus, Rumex crispus, Sonchus, Sonchus oleraceus, Xanthium spinosum

Samples Used in Description: (n = 100)
AA0002cc, AA0262cc, AA0281cc, AA0282cc, AA0362cc, AA0365cc, AA0498, AA0510, AA0514, AA0515, AA0534, AA0567, AA0572, AA0587, AA0592, AA0616, AA0676, AA0680, AA0748cc, AA0759, AA0768, AA0769cc, AA0826, AA0853, AA0863, AA0871, AA0883, AA0909, AA0934, AA0958, AA1003, AA1043, AA1128, rap0041, rap0119m, rap0175, rap0652, rap0654, rap0803, rap0805, rap0848, rap0931, rap0949, rap0959, rap1016, rap1092, rap1112m, rap1147, rap1168,

rap1169, rap1170, rap1176m, rap1210, rap1258, rap1261, rap1423, rap1424, rap1429, rap1540, rap1732, rap1748, rap1754m, rap1817, rap1870, rap1900, rap1937, rap1938, rap1968, rap1969, rap1970, rap1972, rap1973, rap1975, rap1979, rap1982m, rap2016, rap2036, rap2050, rap2077, rap2107, rap2202, rap2246, rap2252, rap2281, rap2283, rap2366, rap2420, rap2455rlv, rap2473rlv, rap2482, rap2507, rap2518rlv, rap2669, rap2724, rap2742, rap2785, rap2820, rap2821, rap2850rlv, rap2932

Comments:
This is an abundant association in the SAMO study area. All stands are strongly dominated by *A. californica*. Many stands have low cover of *Baccharis pilularis,* and a smaller number of stands have *Lotus scoparius.* Both species are generally considered seral in the area, suggesting this association is also reflective of somewhat recent disturbance. This is also underscored by a low cover of several nonnative annual grasses and herbs in many of the plots. The phase with annual grass-herb understory suggests a degraded version or a postfire setting (see below).

Phases:
Artemisia californica-Malosma laurina (California Sagebrush-Laurel Sumac) Phase [3219]
Artemisia californica-Salvia leucophylla (California Sagebrush-Purple Sage) Phase [3211]
Artemisia californica/Annual Grass-Herb (California Sagebrush/Annual Grass-Herb) Phase [8213]

COMMON NAME	California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and San Diego County (Evens and San 2005). It is likely to occur in many other parts of California from the central coast ranges south to at least the Mexican border.

Nations:
United States

States or Provinces:
CA

Environmental Description: (Additional Information from Evens and San [2005])
Elevation: below 700 m
Aspect: mostly southwest, but occasionally northeast and rarely northwest

Slope: gentle to steep, mostly moderate
Topography: undulating, concave, flat, and convex; lower slope to ridgetop
Litter Cover: range 11.7–95%, mean 58.6%
Rock Cover: range 1.2–18%, mean 8.8%
Bare Ground: range 12–65%, mean 38%
Parent Material: often mesozoic granite, occasionally sandstone
Soil Texture: more often medium to very fine sandy loam; occasionally moderately fine sandy clay loam, moderately fine clay loam, medium sand, or fine sandy clay

Vegetation Description:
In the *Artemisia californica* Association, *Artemisia californica* is the sole dominant shrub in the understory, while herbaceous species may be abundant in the understory including *Nassella lepida, Bromus madritensis,* and *Centaurea melitensis.* Shrub species *Malosma laurina* and *Eriogonum fasciculatum* are often present but in relatively low cover.

Comments:
Although not described as an association beyond this study and the study of the San Dieguito River drainage by Evens and San (2005), this is likely to be a common association throughout much of the range of the *Artemisia californica* Alliance. Borchert et al. (2004) describe strongly dominated *A. californica* stands from the Los Padres National Forest of Monterey County south to Ventura County. Gordon and White (1994) describe this alliance in a similar setting to Borchert et al. White and Padley (1997) describe a California sagebrush series (alliance) in Riverside County that has a mean elevation of 1,350 ft.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, White and Padley 1997

Artemisia californica/Leymus condensatus Shrubland Association

California Sagebrush/Giant Wild Rye Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 3216

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 38–432 m. It is characterized by *Artemisia californica* in the shrub layer and *Leymus condensatus* in the herbaceous layer. The emergent tree layer is usually absent but may include *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Dry Inland, Simi Hills Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 38–432 m, mean 272.5 m
Aspect: variable
Slope: range 2–35 degrees, mean 28.3 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 30–75%, mean 52.5%
Small Rock Cover: range 3–5%, mean 4.5%
Large Rock Cover: range 0–7%, mean 1.8%
Bare Ground: range 7–60%, mean 26%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica/Leymus condensatus* Shrubland form an open to intermittent shrub layer (14–52%, mean 29.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (2–39%, mean 16.2%) at 0.1–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–60%, mean cover is 47%.

In this association, the shrub layer is characterized by *Artemisia californica. Salvia leucophylla, Toxicodendron diversilobum,* and *Mimulus aurantiacus* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and is characterized by *Leymus condensatus.* Other herbs sometimes include *Brassica nigra, Malacothrix saxatilis, Bromus diandrus, Hirschfeldia incana,* and *Melica imperfecta*.

***Artemisia californica/Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	16.3	7.0	30.0	X	X	
	SALE3	*Salvia leucophylla*	67	2.3	0.2	8.0			
	TODI	*Toxicodendron diversilobum*	61	3.4	0.2	14.0			
	MIAU	*Mimulus aurantiacus*	50	1.5	0.2	13.0			
	MAFA	*Malacothamnus fasciculatus*	39	0.4	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	33	0.3	0.2	2.5			
	MALA6	*Malosma laurina*	28	1.1	1.0	9.0			
	SAME5	*Sambucus mexicana*	28	0.8	0.2	5.0			
	CEME	*Ceanothus megacarpus*	22	0.4	0.2	4.0			
	RHOV	*Rhus ovata*	22	0.3	0.2	2.5			
	BAPI	*Baccharis pilularis*	22	0.2	0.2	3.0			
	RHIN2	*Rhus integrifolia*	22	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	22	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	100	9.8	2.0	25.0	X	X	
	UNGR	Unknown annual grass	22	3.0	2.0	25.0			
	POACXX	Poaceae	22	1.2	0.2	19.0			
	BRNI	*Brassica nigra*	22	0.3	0.2	4.0			X
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 1of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 3 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Samples Used in Description: (n = 18)
AA0001cc, AA0320cc, AA0627, AA0736, rap0030, rap0810, rap0850, rap0851, rap1008, rap1009, rap1812, rap1887, rap1965, rap1967, rap1981, rap2220, rap2223, rap2227

Comments:
This association of the *A. californica* Alliance is characterized by a codominance of California sagebrush and giant wild rye. This condition tends to develop as a result of fire on relatively mesic slopes that may have formerly contained a mixture of *A. californica* with other species prior to the fire. Both *Leymus condensatus* and *Malacothamnus fasciculatus* (found in about 40% of the plots) tend to increase in cover following recent fire. However, the association may be more persistent in areas with seasonal seeps or natural ground disturbance.

Phases:
None

COMMON NAME	California Sagebrush/Giant Wild Rye Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Artemisia californica-Eriogonum cinereum Shrubland Association

California Sagebrush-Ashy Buckwheat Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 3214

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep slopes of variable aspect at low elevations between 0–460 m. It is characterized by *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer is generally insignificant but does include several native species of grasses. The emergent tree layer is generally absent but may include *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Dry Inland Simi Hills, Inland Upper Elevation Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–460, mean 177 m
Aspect: variable but most often southwest or southeast
Slope: range 6–50 degrees, mean 30.7 degrees
Topography (micro; macro): flat or convex; lower slope to ridgetop
Litter Cover: range 15–45%, mean 21.8%
Small Rock Cover: range 0–60%, mean 21%
Large Rock Cover: range 0–15%, mean 2.8%
Bare Ground: range 0–80%, mean 35%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (12–48%, mean 31.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–30%, mean 6%) at 0–1 m tall. Trees are occasionally emergent (0–10% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 12–51%, mean cover is 36.9%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Eriogonum cinereum. Malosma laurina, Yucca whipplei,* and *Salvia mellifera* are usually included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Melica imperfecta,* and *Bromus madritensis.*

***Artemisia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	99	10.2	3.0	22.0		X	
	ERCI5	*Eriogonum cinereum*	97	7.9	0.2	17.0		X	
	MALA6	*Malosma laurina*	75	2.2	0.2	15.0			
	YUWH	*Yucca whipplei*	71	1.5	0.2	12.0			
	SAME3	*Salvia mellifera*	70	3.7	0.2	15.0			
	LOSC2	*Lotus scoparius*	46	0.5	0.2	4.0			
	SALE3	*Salvia leucophylla*	41	0.7	0.2	5.0			
	RHIN2	*Rhus integrifolia*	41	0.6	0.2	7.5			
	ENCA	*Encelia californica*	39	0.6	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	38	1.3	0.2	12.0			
	HASQ2	*Hazardia squarrosa*	32	0.5	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	28	0.5	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	22	0.3	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	30	0.3	0.2	2.5			
	MEIM	*Melica imperfecta*	29	2.2	1.0	20.0			
	BRMA3	*Bromus madritensis*	25	0.4	0.2	12.0			X
	NASSE	*Nassella*	23	0.7	0.2	8.0			

Other Noteworthy Species:
Calochortus catalinae was found in 2 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Avena, Bromus diandrus, Foeniculum vulgare, Hirschfeldia incana, Bromus hordeaceus, Erodium, Avena barbata, Erodium cicutarium, Medicago polymorpha, Sonchus oleraceus, Eucalyptus, Carpobrotus edulis, Anagallis arvensis, Avena fatua, Cirsium vulgare, Lolium, Nicotiana glauca, Vicia villosa

Samples Used in Description: (n = 79)
AA0009cc, AA0068cc, AA0070cc, AA0074cc, AA0077cc, AA0078cc, AA0079cc, AA0080cc, AA0116cc, AA0134cc, AA0178cc, AA0180cc, AA0406, AA0407, AA0449cc, AA0478cc, AA0516, AA0549, AA0623, AA0664, AA0666, AA0720, AA0780, AA0823, AA0866, AA0998, AA1024, AA1069, rap0046, rap0047m, rap0048, rap0049, rap0050, rap0051, rap0070, rap0094, rap0096, rap0097, rap0114m, rap0165, rap0509m, rap0680, rap0686, rap0845, rap0847, rap0916, rap0976, rap0982, rap1029, rap1033m, rap1053m, rap1054, rap1059, rap1060, rap1068, rap1099, rap1102, rap1161, rap1205, rap1509, rap1539, rap1675, rap1815, rap2112, rap2180, rap2269, rap2327, rap2374, rap2517rlv, rap2546, rap2560rlv, rap2566, rap2594, rap2622, rap2661, rap2662, rap2754, rap2793, rap2904rlv

Comments:
This is a very common and largely endemic association to the more coastal portions of the Santa Monica Mountains. It occupies relatively steep slopes usually on southerly facing exposures. Two minor phases of this association have been identified. The one with *Melica imperfecta* may indicate slightly more mesic conditions.

Phases:
Artemisia californica-Eriogonum cinereum (California Sagebrush-Ashy Buckwheat-Black Sage) Phase [3214]
Artemisia californica-Eriogonum cinereum-Mimulus aurantiacus/Melica imperfecta (California Sagebrush-Ashy Buckwheat-Bush Monkey Flower) Phase [3218]

COMMON NAME	California Sagebrush-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Artemisia californica-Mimulus aurantiacus Shrubland Association

California Sagebrush-Bush Monkey Flower Shrubland Association
***Artemisia californica* Shrubland Alliance**
California Sagebrush Shrubland Alliance

Mapping Code: 8214

Local Description

Summary:
This shrubland association occurs on moderately steep to steep southwest- to northeast-facing slopes at low elevations between 160–467 m. It is characterized by a codominance of *Artemisia californica* and *Mimulus aurantiacus* in the shrub layer. Although no individual species are strongly characteristic in the herbaceous layer, the native perennial grasses *Melica imperfecta* and *Leymus condensatus* occur in about half of the samples. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Eastern Urban, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 160–467 m, mean 327.8 m
Aspect: southwest to northeast
Slope: range 10–35 degrees, mean 27.3 degrees
Topography (micro; macro): flat or convex; middle to upper slope
Litter Cover: range 45–60%, mean 50%
Small Rock Cover: range 0–20%, mean 9.3%
Large Rock Cover: range 0–10%, mean 4%
Bare Ground: range 20–55%, mean 36.2%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica-Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (24–51%, mean 37%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–12%, mean 5.5%) at 01–1 m tall. Trees are occasionally emergent (0–7% cover, mean 0.9%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 35–52%, mean cover is 43.5%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Mimulus aurantiacus. Malosma laurina* is usually present. *Ribes malvaceum* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta* and *Leymus condensatus.*

***Artemisia californica-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	13.9	8.0	24.0	X	X	
	MIAU	*Mimulus aurantiacus*	100	10.9	5.0	20.0		X	
	MALA6	*Malosma laurina*	60	2.9	0.2	8.0			
	CEME	*Ceanothus megacarpus*	40	0.4	0.2	3.0			
	RIMA	*Ribes malvaceum*	40	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	30	2.6	6.0	12.0			
	HEAR5	*Heteromeles arbutifolia*	30	0.6	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	30	0.5	0.2	3.0			
	SALE3	*Salvia leucophylla*	30	0.5	0.2	4.0			
	TODI	*Toxicodendron diversilobum*	30	0.5	0.2	3.0			
	LOSC2	*Lotus scoparius*	30	0.3	0.2	2.0			
	BAPI	*Baccharis pilularis*	20	1.2	2.0	10.0			
	SAME5	*Sambucus mexicana*	20	0.6	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	20	0.5	1.0	4.0			
	SAME3	*Salvia mellifera*	20	0.3	0.2	3.0			
	KECO	*Keckiella cordifolia*	20	0.3	1.0	2.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.2	1.0	1.0			
	ADFA	*Adenostoma fasciculatum*	20	0.1	0.2	1.0			
	LULO	*Lupinus longifolius*	20	0.1	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	20	0.01	0.2	0.2			
	RHIL	*Rhamnus ilicifolia*	20	0.01	0.2	0.2			
	YUWH	*Yucca whipplei*	20	0.01	0.2	0.2			
Herb									
	MEIM	*Melica imperfecta*	60	0.9	0.2	4.0			
	LECO12	*Leymus condensatus*	50	1.0	0.2	8.0			
	BRNI	*Brassica nigra*	30	0.3	0.2	2.0			X
	BRDI3	*Bromus diandrus*	30	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	30	0.1	0.2	1.0			X
	CEME2	*Centaurea melitensis*	30	0.1	0.2	0.2			X
	CAPY2	*Carduus pycnocephalus*	20	0.1	0.2	1.0			X
	HIIN3	*Hirschfeldia incana*	20	0.1	0.2	1.0			X
	MAVU	*Marrubium vulgare*	20	0.1	0.2	1.0			X
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	20	0.01	0.2	0.2			X
	CAMA24	*Calystegia macrostegia*	20	0.01	0.2	0.2			
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			
Cryptogam									
	LICHEN	*Lichen*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Bromus madritensis, Centaurea melitensis, Carduus pycnocephalus, Hirschfeldia incana, Marrubium vulgare, Avena fatua, Bromus hordeaceus, Ageratina adenophora, Schinus molle, Avena barbata, Cirsium vulgare, Erodium, Melilotus indicus, Nicotiana glauca, Senecio vulgaris

Samples Used in Description: (n = 10)
AA0885, rap0612, rap0951, rap1153, rap1375, rap1733, rap1768, rap1971, rap2487, rap2814

Comments:
In general, this association occurs in relatively steep coastal settings. It tends to occupy more mesic settings than the associations of the *Artemisia californica-Eriogonum fasciculatum* alliance.

Phases:
None

COMMON NAME	California Sagebrush-Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region, although this association is to be expected elsewhere in coastal central and southern California. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Traditionally in the shrublands with a codominance of *Artemisia californica* and other species (*Eriogonum fasciculatum, Salvia leucophylla*, etc.), California ecologists have erected mixed alliance names bases on the codominant species (e.g., Gordon and White 1994). This is the first case when a codominant *A. californica- Mimulus aurantiacus* Association has been described, so we have decided not to describe it as a new alliance but simply as an association within the broader view of the *Artemisia californica* Alliance. The proliferation of mixed alliances based on codominance is a philosophical dilemma that will continue to plague ecologists in California for some time to come.

References: Gordon and White 1994, Sawyer and Keeler-Wolf 1995

Artemisia californica-Eriogonum fasciculatum/Annual Grass-Herb Shrubland Association

California Sagebrush-California Buckwheat/Annual Grass-Herb Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3371

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 99–442 m. It is characterized by a codominance of *Artemisia californica* and *Eriogonum fasciculatum* in the shrub layer. There are a variety of native and nonnative species in the herbaceous layer, none particularly characteristic. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 99–442 m, mean 277.2 m
Aspect: southwest and southeast
Slope: range 2–35 degrees, mean 22 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 25–30%, mean 27.5%
Small Rock Cover: range 2–27%, mean 14.8%
Large Rock Cover: range 2–50%, mean 16.8%
Bare Ground: range 3–45%, mean 22.5%
Parent Material: igneous or quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Shrubland form an open to intermittent shrub layer (10–25%, mean 16.8%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (7–24%, mean 16.7%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–42%, mean cover is 33.8%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Eriogonum fasciculatum. Malosma laurina* is usually present. *Lotus scoparius* and *Salvia leucophylla* are sometimes included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Centaurea melitensis,* while *Hemizonia fasciculata, Bromus diandrus,* and *Hirschfeldia incana* are sometimes present.

***Artemisia californica-Eriogonum fasciculatum*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	5.7	4.0	7.5	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	5.4	2.0	8.0		X	
	MALA6	*Malosma laurina*	56	0.7	0.2	2.5			
	LOSC2	*Lotus scoparius*	44	0.5	0.2	2.5			
	SALE3	*Salvia leucophylla*	44	0.1	0.2	0.2			
	SAME3	*Salvia mellifera*	33	0.3	0.2	2.5			
	SAME5	*Sambucus mexicana*	33	0.3	0.2	2.5			
	RHIN2	*Rhus integrifolia*	33	0.3	0.2	2.0			
	ERCI5	*Eriogonum cinereum*	22	1.2	4.0	7.0			
	BASA4	*Baccharis salicifolia*	22	0.9	0.2	7.5			
	CEME	*Ceanothus megacarpus*	22	0.7	3.0	3.0			
	ENCA	*Encelia californica*	22	0.6	0.2	5.0			
	BRCA3	*Brickellia californica*	22	0.1	0.2	1.0			
	BAPI	*Baccharis pilularis*	22	0.01	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	22	0.01	0.2	0.2			
Herb									
	HEFA	*Hemizonia fasciculata*	67	4.6	1.0	10.0			
	AVENA	*Avena*	56	2.6	1.0	7.0			X
	CEME2	*Centaurea melitensis*	56	1.8	0.2	8.0			X
	BRDI3	*Bromus diandrus*	44	1.2	1.0	5.0			X
	HIIN3	*Hirschfeldia incana*	44	1.0	1.0	3.0			X
	BROMU	*Bromus*	33	1.6	3.0	7.5			X
	AVFA	*Avena fatua*	33	0.7	2.0	2.5			X
	PHACE	*Phacelia*	33	0.4	0.2	2.0			
	ASFA	*Asclepias fascicularis*	22	0.3	0.2	2.5			
	LEFI11	*Lessingia filaginifolia*	22	0.3	0.2	2.5			
	LECO12	*Leymus condensatus*	22	0.1	0.2	1.0			
	NASSE	*Nassella*	22	0.1	0.2	1.0			
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	44	1.0	1.0	4.0			

Other Noteworthy Species:
Dudleya blochmaniae was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-3-2. Global rank is G2T2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 1of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Avena, Centaurea melitensis, Bromus diandrus, Hirschfeldia incana, Avena fatua, Bromus madritensis, Cortaderia, Brassica nigra, Piptatherum miliaceum, Carduus pycnocephalus, Foeniculum vulgare, Lactuca serriola, Lamarckia aurea

Samples Used in Description: (n = 9)
AA0014cc, AA0872, rap1957, rap1959, rap2115, rap2221, rap2258, rap2361, rap2395

Comments:
This association is scattered in stands from the immediate coast into the warmer inland areas of the study area. It often contains short-lived seral species such as *Lotus scoparius, Brickellia californica,* and *Malacothamnus fasciculatus* and tends to be a relatively open scrub of xeric exposures. Its seral relationship to certain chaparrals and coastal scrubs is suggested by the presence of *Salvia leucophylla, Encelia californica,* and *Ceanothus megacarpus* in some of the stands. The open nature of many of the stands is suggested by the relatively high constancy of shade-intolerant herbs such as *Hemizonia fasciculata and Avena* sp. This vegetation type appears to sometimes be related to anthropomorphic disturbance.

Phases:
None

COMMON NAME	California Sagebrush-California Buckwheat/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is sampled in the California south coast (including Ventura to western Riverside and San Diego counties) and peninsular ranges (western Riverside County: Santa Ana Mountains, Perris Valley and Hills, and Fontana Plain and San Diego County: hills north of Ramona).

Nations:
United States

States or Provinces:
CA

Environmental Description:
The following information is derived from Evens and San (2005) and Klein and Evens (2005). Elevation ranges from 95 to 1,095 m with aspects variable (north to south). Slopes are gentle to steep, and topography is variable. Parent material is more often sedimentary or granite, less often gabbro, diorite, metavolcanic, or mixed granitic and metamorphic. Soil texture is more often sandy loam but varies from sand to clay loam.

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum* Shrubland form an open to continuous shrub layer (10–78%), where *Artemisia californica* usually codominates with *Eriogonum fasciculatum*. Shrubs sometimes occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0.2–60%,) at 0–1 m tall and includes a variety of native and nonnative species. Emergent trees occur infrequently (0.2–8% cover) at 5–15 m tall. Total vegetation cover is 26–88%. Occasional subdominant shrubs include *Salvia apiana*, *Lotus scoparius*, *Tetradymia comosa*, and *Lessingia filaginifolia*. The most common annuals in the herb understory include native *Amsinckia menziesii* and nonnatives *Bromus madritensis*, *Bromus diandrus*, *Bromus hordeaceus*, and *Avena fatua*.

Comments:
This is a widespread association in the central and south coastal areas of California. Similar stands have been seen as far north as San Benito County (Keeler-Wolf 2005 personal observation).

References:
Boyd et al. 1995, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, White 1994

Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla Shrubland Association

California Sagebrush-California Buckwheat-Purple Sage Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3372

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 231–527 m. It is characterized by the codominance of *Artemisia californica, Eriogonum fasciculatum*, and *Salvia leucophylla* in the shrub layer. The herbaceous layer is not well developed. The emergent tree layer is generally absent but can include *Quercus agrifolia*.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 231–527 m, mean 366 m
Aspect: southeast and southwest
Slope: range 17–35 degrees, mean 30.8 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 8–30%, mean 19.5%
Small Rock Cover: range 18–35%, mean 25.8%
Large Rock Cover: range 2–15%, mean 6.3%
Bare Ground: range 25–50%, mean 40%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Shrubland form an open to intermittent shrub layer (18–41%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0-1 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (1–13%, mean 4.1%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–45%, mean cover is 37.1%.

In this association, the shrub layer is characterized by *Artemisia californica, Eriogonum fasciculatum, Salvia leucophylla,* and *Yucca whipplei. Malosma laurina* is often present, and *Salvia apiana* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Centaurea melitensis*, while *Brassica nigra* is often included.

***Artemisia californica-Eriogonum fasciculatum-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	12.4	8.0	20.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	10.1	2.5	19.0		X	
	SALE3	*Salvia leucophylla*	100	6.7	2.0	15.0		X	
	YUWH	*Yucca whipplei*	75	1.0	0.2	2.5		X	
	MALA6	*Malosma laurina*	62	1.3	0.2	3.0			
	SAAP2	*Salvia apiana*	50	0.7	0.2	2.5			
	RHOV	*Rhus ovata*	38	1.0	2.5	3.0			
	ENCA	*Encelia californica*	38	0.1	0.2	0.2			
	MAFA	*Malacothamnus fasciculatus*	25	0.7	2.5	3.0			
	LOSC2	*Lotus scoparius*	25	0.5	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.3	0.2	2.5			
	SAME3	*Salvia mellifera*	25	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	75	1.2	0.2	3.0		X	X
	BRNI	*Brassica nigra*	62	0.7	0.2	2.5			X
	BRDI3	*Bromus diandrus*	38	0.6	1.0	2.5			X
	AVENA	*Avena*	25	0.4	0.2	3.0			X
	HEFA	*Hemizonia fasciculata*	25	0.4	1.0	2.0			
	BRMA3	*Bromus madritensis*	25	0.3	1.0	1.0			X
	HIIN3	*Hirschfeldia incana*	25	0.2	0.2	1.0			X
	NAPU4	*Nassella pulchra*	25	0.2	0.2	1.0			
	CUCA	*Cuscuta californica*	25	0.1	0.2	0.2			
	LECO12	*Leymus condensatus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus diandrus, Avena, Bromus madritensis, Hirschfeldia incana, Bromus hordeaceus, Foeniculum vulgare

Samples Used in Description: (n = 8)
AA0189cc, AA0267cc, AA0536, rap2087, rap2244, rap2260, rap2603, rap2823

Comments:
This association differs from the *Artemisia californica-Eriogonum fasciculatum* Association by having a constant codominance of *Salvia leucophylla* along with the other two major shrubs. It is a relatively uncommon association in the study area and is usually found in the inland portions of the area on very dry, warm, steep south-facing slopes. It is likely to be endemic to the general area of the Ventura region of the coastal sage scrub zone (*sensu* Westman 1981)

Phases:
None

COMMON NAME	California Sagebrush-California Buckwheat-Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Westman 1981

Artemisia californica-Eriogonum fasciculatum-Salvia mellifera Shrubland Association

California Sagebrush-California Buckwheat-Black Sage Shrubland Association
***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance**
California Sagebrush-California Buckwheat Shrubland Alliance

Mapping Code: 3373

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 0–588 m. It is characterized by a codominance of *Artemisia californica, Eriogonum fasciculatum*, and *Salvia mellifera* in the shrub layer. There is an insignificant herbaceous layer. The emergent tree layer is generally absent but may include *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Western Fog Zone, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–588 m, mean 326.7 m
Aspect: variable
Slope: range 0–35 degrees, mean 23.7 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridge
Litter Cover: range 15–35%, mean 21.9%
Small Rock Cover: range 8–45%, mean 18.7%
Large Rock Cover: range 0–15%, mean 5.5%
Bare Ground: range 25–65%, mean 46.4%
Parent Material: igneous or sedimentary
Soil Texture: medium to moderately fine sandy clay loam

Vegetation Description:
Stands of *Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Shrubland form an open to intermittent shrub layer (20–39%, mean 30.8%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–8%, mean 2.7%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 20–42%, mean cover is 33.7%.

In this association, the shrub layer is characterized by *Artemisia californica, Eriogonum fasciculatum,* and *Salvia mellifera. Malosma laurina* and *Encelia californica* are usually included in this layer. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Centaurea melitensis.* Other herbs sometimes include nonnative annual *Bromus* species.

***Artemisia californica-Eriogonum fasciculatum-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.2	0.2	1.0			
Shrub									
	ARCA11	*Artemisia californica*	100	9.8	3.0	16.0	X		
	ERFA2	*Eriogonum fasciculatum*	100	6.5	2.5	12.0	X		
	SAME3	*Salvia mellifera*	100	4.1	2.5	8.0	X		
	ENCA	*Encelia californica*	69	2.4	0.2	9.0			
	MALA6	*Malosma laurina*	69	2.1	0.2	10.0			
	YUWH	*Yucca whipplei*	56	0.9	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	44	1.4	0.2	7.0			
	LOSC2	*Lotus scoparius*	38	0.7	0.2	2.5			
	SALE3	*Salvia leucophylla*	31	0.8	2.0	3.0			
	MIAU	*Mimulus aurantiacus*	31	0.5	0.2	4.0			
	RHIN2	*Rhus integrifolia*	25	0.5	0.2	2.5			
	CEME	*Ceanothus megacarpus*	25	0.4	0.2	2.5			
Herb									
	BROMU	*Bromus*	38	0.6	0.2	4.0			
	CEME2	*Centaurea melitensis*	31	0.4	0.2	2.5			X
	BRMA3	*Bromus madritensis*	25	0.2	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 1of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Avena, Erodium cicutarium, Marrubium vulgare, Bromus diandrus, Hirschfeldia incana, Avena fatua, Brassica, Foeniculum vulgare, Lobularia maritima

Samples Used in Description: (n = 16)
AA0231cc, AA0234cc, AA0253cc, AA0366cc, AA0757cc, AA0758, AA0847, AA1002, AA1052, rap0806, rap0813, rap1229, rap1352, rap1625m, rap1626m, rap2264

Comments:
This association is found in the hotter and drier exposures of the study area but generally within the zone of morning summer fog. It is not so strongly restricted to south-facing slopes as the *A. californica-E. fasciculatum-S. leucophylla* Association. It probably ranges more widely than that association as well. It would be expected to occur in other parts of the central and south coastal areas of California.

Phases:
None

COMMON NAME California Sagebrush-California Buckwheat-Black Sage Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other parts of central and southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Atriplex lentiformis Shrubland Alliance

Quail Bush Shrubland Alliance

Mapping Code: 2330

Local Description

Summary:
This shrubland alliance occurs on gentle to steep southeast- and southwest-facing slopes at low elevations between 0–171 m. It is dominated by *Atriplex lentiformis* in the shrub layer and by several nonnative herbs and forbs in the herbaceous layer.

Distribution:
This alliance is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–171 m, mean 20.6 m
Aspect: southeast and southwest
Slope: range 0–35 degrees, mean 11.6 degrees
Topography (micro; macro): flat to undulating; lower and bottom slope
Litter Cover: range 45–95%, mean 70%
Small Rock Cover: range 0–25%, mean 10.2%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 0–80%, mean 41.2%
Parent Material: sedimentary and quaternary
Soil Texture: fine clay

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (8–55%, mean 25.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–34%, mean 13.3%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–64%, mean cover is 39.4%.

In this association, the shrub layer is characterized by *Atriplex lentiformis. Baccharis pilularis* and *Myoporum laetum* are often present, while *Rhus integrifolia* and *Artemisia californica* are occasionally included in this layer. The tree layer is rare, emergen, and open. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Bromus madritensis, Carpobrotus edulis,* and *Malacothrix saxatilis.*

Atriplex lentiformis Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ATLE	*Atriplex lentiformis*	83	16.5	6.0	55.0	X	X	
	BAPI	*Baccharis pilularis*	67	1.5	0.2	8.0			
	MYLA5	*Myoporum laetum*	67	0.6	0.2	3.0			X
	RHIN2	*Rhus integrifolia*	50	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	50	0.3	0.2	1.0			
	ENCA	*Encelia californica*	42	1.7	2.0	8.0			
	MALA6	*Malosma laurina*	42	0.9	0.2	10.0			
	ATRIP	*Atriplex*	25	3.3	6.0	18.0			
	BASA4	*Baccharis salicifolia*	25	1.0	0.2	12.0			
Herb									
	BRNI	*Brassica nigra*	58	0.3	0.2	1.0			X
	BRMA3	*Bromus madritensis*	50	2.3	1.0	8.0			X
	MASA2	*Malacothrix saxatilis*	42	0.5	0.2	4.0			
	CAED3	*Carpobrotus edulis*	42	0.4	0.2	2.0			X
	PESE3	*Pennisetum setaceum*	33	2.3	1.0	17.0			X
	FOVU	*Foeniculum vulgare*	33	0.2	0.2	2.0			X
	SATR12	*Salsola tragus*	33	0.1	0.2	0.2			X
	DISP	*Distichlis spicata*	25	1.0	1.0	8.0			
	EUTE10	*Euphorbia terracina*	25	0.2	0.2	1.0			X
	BRDI3	*Bromus diandrus*	25	0.1	0.2	1.0			X

Other Noteworthy Species:
None

Nonnative Species:
Myoporum laetum, Brassica nigra, Bromus madritensis, Carpobrotus edulis, Pennisetum setaceum, Foeniculum vulgare, Salsola tragus, Euphorbia terracina, Bromus diandrus, Medicago polymorpha, Melilotus albus, Melilotus indicus, Atriplex semibaccata, Centaurea melitensis, Cortaderia, Lobularia maritima, Malva parviflora, Mesembryanthemum crystallinum, Nicotiana glauca, Oxalis pes-caprae, Bassia hyssopifolia, Piptatherum miliaceum, Spartium junceum, Bougainvillea, Avena fatua, Cakile maritima, Chenopodium murale, Cynodon dactylon, Erodium, Hirschfeldia incana, Limonium perezii, Mesembryanthemum nodiflorum, Picris echioides, Ricinus communis, Sonchus oleraceus, Vicia sativa

Samples Used in Description: (n = 12)
AA0439, rap0118, rap0669, rap0876, rap1010, rap1015, rap1021, rap1022m, rap1111, rap1200, rap1247, rap2779

Comments:
The local stands of this alliance may have been largely the result of plantings by CalTrans and other agencies along the Highway 1 corridor. Several of these stands appear self-perpetuating now. The decision was made to make no further attempt to differentiate these stands into local associations as a result of their possible introduced nature and the general heterogeneity of the species composition. Note the extensive list of nonnative species associated with these stands, perhaps another indication of their nonnatural origins.

Phases:
None

COMMON NAME	Quail Bush Alliance
SYNONYM	*Atriplex (lentiformis, polycarpa)* Shrubland Alliance (NatureServe 2005), Mixed Saltbush Series (Sawyer and Keeler-Wolf 1995)
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.A. Evergreen shrubland
FORMATION GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
FORMATION SUBGROUP	III.A.5.N. Natural/Seminatural extremely xeromorphic evergreen shrubland
FORMATION NAME	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Atriplex lentiformis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This alliance is also known from the western edge of the Sonoran Desert region in Anza-Borrego Desert State Park (Keeler-Wolf et al. 1998). Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This alliance has been recently segregated from the previously defined *Atriplex lentiformis-A. polycarpa* Alliance (Sawyer and Keeler-Wolf 1995). Based on recent plot data collected over the past 10 years, it is now apparent that both of these species tend to segregate and form their own alliances with frequently different environmental and species characteristics.

References:
Keeler-Wolf et al. 1998, Sawyer and Keeler-Wolf 1995

Baccharis pilularis/Annual Grass-Herb Shrubland Association

Coyote Brush/Annual Grass-Herb Shrubland Association
***Baccharis pilularis* Shrubland Alliance**
Coyote Brush Shrubland Alliance

Mapping Code: 2311

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes with flat to variable aspect at low elevations between 1–568 m. It is characterized by the dominance of *Baccharis pilularis* in the shrub layer and a variety of nonnative largely annual grasses and herbs in the herbaceous layer. The emergent tree layer includes occasional ruderal trees such as *Schinus molle, Eucalyptus* spp., and *Phoenix canariensis* as well as the native *Quercus agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Eastern Urban, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains of the study area.

Environmental Description:
Elevation: range 1–568 m, mean 179 m
Aspect: commonly none/flat, sometimes variable
Slope: range 0–35 degrees, mean 6.7 degrees
Topography (micro; macro): flat; bottom to mid slope
Litter Cover: range 45–60%, mean 51.3%
Small Rock Cover: range 0–10%, mean 3.6%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 5–55%, mean 25.1%
Parent Material: primarily quaternary, some sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Baccharis pilularis*/Annual Grass-Herb Shrubland form an open to intermittent shrub layer (6–55%, mean 27.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to continuous (1–71%, mean 17%) at 0–2 m tall. Trees are occasionally emergent (0–3% cover, mean 0.9%) with hardwoods at 0–15 m tall. Total vegetation cover is 9–80%, mean cover is 44.9%.

In this association, the shrub layer is characterized by an abundance of *Baccharis pilularis. Artemisia californica, Sambucus Mexicana,* and *Toxicodendron diversilobum* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Schinus molle, Eucalyptus, Juglans californica,* and *Phoenix canariensis* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra* and *Centaurea melitensis.* Other herbs present may include *Bromus diandrus, Phalaris aquatica, Foeniculum vulgare,* and *Erodium cicutarium*.

***Baccharis pilularis*/Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	100	23.3	4.0	50.0	X	X	
	ARCA11	*Artemisia californica*	39	0.4	0.2	4.0			
	SAME5	*Sambucus mexicana*	33	0.4	0.2	5.0			
	TODI	*Toxicodendron diversilobum*	22	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	50	0.6	0.2	2.5			X
	CEME2	*Centaurea melitensis*	39	0.3	0.2	2.5			X
	BRDI3	*Bromus diandrus*	33	4.0	0.2	45.0			X
	PHAQ	*Phalaris aquatica*	28	4.7	0.2	70.0			X
	FOVU	*Foeniculum vulgare*	28	1.4	0.2	15.0			X
	ERCI6	*Erodium cicutarium*	22	0.1	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 1of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus diandrus, Phalaris aquatica, Foeniculum vulgare, Erodium cicutarium, Hirschfeldia incana, Carduus pycnocephalus, Marrubium vulgare, Avena, Melilotus albus, Bromus madritensis, Schinus molle, Bromus hordeaceus, Ricinus communis, Salsola tragus, Conium maculatum, Chenopodium ambrosioides, Eucalyptus, Myoporum laetum, Ailanthus altissima, Silybum marianum, Anagallis arvensis, Eucalyptus, Melilotus, Nicotiana glauca, Schinus molle, Avena barbata, Conyza canadensis, Erodium, Galium aparine, Lactuca serriola, Lamarckia aurea, Malva parviflora, Melilotus indicus, Pennisetum setaceum, Phoenix canariensis

Samples Used in Description: (n = 18)
AA0352cc, AA0468cc, AA0506cc, rap0066, rap0080m, rap0081, rap0083, rap0247, rap0896, rap0899, rap1135, rap1137, rap1747, rap2047, rap2068, rap2503, rap2536rlv, rap2862rlv

Comments:
This association is indicative of a disturbed seral stage that, in these mountains, typically comes following the reversion of cleared pastureland or nonnative grassland back to shrubland. *B. pilularis* behaves similarly in these mountains as it does in other areas of northern California (e.g., Bartolome 1989) where it often forms the first wave of woody species to recolonize cleared land. This association has been defined from northern coastal California (Keeler-Wolf et al. 2003), and it is likely to be widespread throughout the coast ranges from northern to southern California. The relatively xeric climate of the local study area compared to areas in northern California where this association has been reported is reflected in a low slope position and locally mesic setting of most of the stands. Stands in the northern part of the state may occur in many topographic settings.

Phases:
None

COMMON NAME	Coyote Brush/Annual Grass-Herb Shrubland Association
SYNONYM	*Baccharis pilularis*-Annual Grassland Association (Keeler-Wolf et al. 2003), *Baccharis*/Annual Grasses (Keeler-Wolf and Vaghti 2000)
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Baccharis pilularis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is well known from the Santa Monica Mountains region. Preliminary descriptions based on relatively little plot information have been developed from Suisun Marsh (Keeler-Wolf and Vaghti 2000), Point Reyes (Keeler-Wolf et al. 2003), and Coyote Hills of Santa Clara County (Evens and San 2004).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bartolome 1989, Evens and San 2004, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003

Baccharis pilularis-Artemisia californica Shrubland Association

Coyote Brush-California Sagebrush Shrubland Association
***Baccharis pilularis* Shrubland Alliance**
Coyote Brush Shrubland Alliance

Mapping Code: 2313

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of flat to variable aspect at low elevations between 2–547 m. It is characterized by a dominance of *Baccharis pilularis* and subdominance of *Artemisia californica* in the shrub layer. The herbaceous layer is more variable than the *B. pilularis*/Annual Grass-Herb Association and tends to have more cover by tall exotic herbs such as *Brassica nigra* and *Foeniculum vulgare.* The emergent tree layer is generally absent but can include exotic ruderals such as *Schinus molle* and *Eucalyptus* spp. as well as the native *Quercus lobata* and *Q. agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, Simi Hills Inland, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 2–547 m, mean 202.2 m
Aspect: flat to variable
Slope: range 0–35 degrees, mean 9.9 degrees
Topography (micro; macro): flat, undulating, or concave; bottom to middle slope
Litter Cover: range 5–85%, mean 46.7%
Small Rock Cover: range 0–70%, mean 12.7%
Large Rock Cover: range 0–15%, mean 1.4%
Bare Ground: range 0–74%, mean 30.4%
Parent Material: quaternary, igneous, or sedimentary
Soil Texture: moderately fine silty or sandy clay loam

Vegetation Description:
Stands of *Baccharis pilularis-Artemisia californica* Shrubland form an open to intermittent shrub layer (8–51%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–45%, mean 8.6%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 28–55%, mean cover is 41.9%.

In this association, the shrub layer is characterized by *Baccharis pilularis* and *Artemisia californica. Salvia leucophylla* is often present, while *Malosma laurina* is occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Eucalyptus, Schinus molle,* and *Quercus lobata* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra*. *Leymus condensatus, Bromus madritensis, Foeniculum vulgare,* and *Centaurea melitensis* are occasionally present in this layer.

***Baccharis pilularis-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	100	18.5	5.0	37.0		X	
	ARCA11	*Artemisia californica*	90	6.1	0.2	25.0		X	
	SALE3	*Salvia leucophylla*	51	1.9	0.2	15.0			
	MALA6	*Malosma laurina*	45	2.6	0.2	15.0			
	SAME5	*Sambucus mexicana*	25	0.8	0.2	9.0			
	BASA4	*Baccharis salicifolia*	20	0.4	0.2	7.0			
Herb									
	BRNI	*Brassica nigra*	43	0.5	0.2	7.0			X
	LECO12	*Leymus condensatus*	24	1.0	0.2	17.0			
	BRMA3	*Bromus madritensis*	24	0.2	0.2	4.0			X
	FOVU	*Foeniculum vulgare*	22	0.5	0.2	12.0			X
	CEME2	*Centaurea melitensis*	22	0.2	0.2	2.5			X
	NASSE	*Nassella*	20	0.5	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 51 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Foeniculum vulgare, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Carduus pycnocephalus, Nicotiana glauca, Bromus hordeaceus, Myoporum laetum, Avena, Medicago polymorpha, Pennisetum setaceum, Marrubium vulgare, Phalaris aquatica, Eucalyptus, Schinus molle, Silybum marianum, Picris echioides, Rumex crispus, Salsola tragus, Stellaria media, Conium maculatum, Melilotus officinalis, Euphorbia terracina, Lolium, Schinus molle, Carpobrotus edulis, Erodium, Melilotus, Melilotus indicus, Avena fatua, Carpobrotus, Cortaderia, Lactuca serriola, Mesembryanthemum nodiflorum, Oxalis pes-caprae, Plantago major

Samples Used in Description: (n = 51)
AA0059cc, AA0146cc, AA0245cc, AA0285cc, AA0349cc, AA0356cc, AA0363cc, AA0370cc, AA0378cc, AA0396cc, AA0443cc, AA0573, AA0586, AA0659, AA0745cc, AA0957, AA1018, AA1102, AA1198, AA1201, AA1222, rap0044, rap0069, rap0076, rap0077m, rap0098, rap0649, rap0667, rap0729, rap0894, rap0935, rap0973, rap1044, rap1086, rap1087, rap1431, rap1456, rap1672m, rap1751, rap1867, rap1869, rap1929, rap1974, rap2124, rap2265, rap2296, rap2549, rap2583, rap2736, rap2738, rap2739

Comments:
This is the most common expression of the *Baccharis pilularis* Alliance locally. As with the *B. pilularis*/Annual Grass-Herb Association, this association is also indicative of seral conditions and is often found in relatively mesic low-lying settings. The large number of nonnative species is also indicative of the disturbed/seral nature of this association. In the La Jolla Valley area of the park, there are stands that appear to be colonizing annual grassland areas, especially in regions of flood disturbance or erosion. In many cases, die-off of the *Baccharis* was noted. Three phases are identified in this type exhibiting augmentation of stands with higher cover and frequency of *Malosma laurina* or *Salvia leucophylla*.

Phases:
Baccharis pilularis-Malosma laurina-Artemisia californica (Coyote Brush-Laurel Sumac-California Sagebrush) Phase [2314]
Baccharis pilularis-Artemisia californica (Coyote Brush-California Sagebrush) Phase [2313]
Baccharis pilularis-Artemisia californica-Salvia leucophylla (Coyote Brush-California Sagebrush-Purple Sage) Phase [2315]

COMMON NAME	Coyote Brush-California Sagebrush Shrubland Association
SYNONYM	*Baccharis pilularis-Artemisia californica-Toxicodendron diversilobum/Monardella villosa* Association (Keeler-Wolf et al. 2003), *Baccharis pilularis-Artemisia californica-Heteromeles arbutifolia* Shrubland Association (Evens and San 2004), *Baccharis pilularis-Artemisia californica (*Heady et al. 1977), *Baccharis pilularis-Artemisia californica* Alliance (Borchert et al. 2004)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Baccharis pilularis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is well known from the Santa Monica Mountains. Similar associations with *Baccharis pilularis* and *Artemisia californica* as main components have been noted as far south as San Diego County (Heady et al. 1977, Kirkpatrick and Hutchinson 1977, Evens and San 2005) and as far north as the San Francisco Bay region (Keeler-Wolf et al. 2003, Evens and San 2004). Borchert et al. 2004 describes a series of 11 stands they call the *B. pilularis-A. californica* Alliance from the coastal portions of the Los Padres National Forest in Monterey County in which the two species codominate. In the Santa Monica Mountains, *B. pilularis* usually dominates, so the association is placed in the *B. pilularis* Alliance. In a few samples in the SAMO study area, *B. pilularis* codominates with *A. californica*; however, not enough samples are present to warrant an alliance designation.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although similar associations have been described elsewhere, there are minor differences in some of these from the presently described association. There is some debate about whether to to place the associations into the *Baccharis pilularis* Alliance or maintain the mixed *Baccharis pilularis-Artemisia californica* Alliance to contain a range of associations characterized by the presence or codominance of these two species of shrubs. Currently Borchert et al. 2004 recognizes a mixed alliance. However, the samples of this association from Santa Monica Mountains are placed in the *Baccharis pilularis* Alliance since *B. pilularis* is generally dominant while *A. californica* is subdominant.

References:
Borchert et al. 2004, Evens and San 2004, Evens and San 2005, Heady et al. 1977, Keeler-Wolf et al. 2003, Kirkpatrick and Hutchinson 1977

Baccharis salicifolia Riparian Shrubland Association

Mule Fat Riparian Shrubland Association
***Baccharis salicifolia* Shrubland Alliance**
Mule Fat Shrubland Alliance

Mapping Code: 2212

Local Description

Summary:
This shrubland association occurs on gentle to somewhat steep slopes of flat aspect at low elevations between 2–501 m. It is characterized by *Baccharis salicifolia* in the shrub layer and a variety of native and nonnative mesophytic species in the herbaceous layer, perhaps the most characteristic of which is *Artemisia douglasiana*. The emergent tree layer includes riparian species such as *Platanus racemosa*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Western Fog Zone, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 2–501 m, mean 200.9 m
Aspect: flat
Slope: range 0–15 degrees, mean 2.8 degrees
Topography (micro; macro): flat or concave; slope bottom
Litter Cover: range 2–80%, mean 41.9%
Small Rock Cover: range 2–70%, mean 21.7%
Large Rock Cover: range 0–75%, mean 10.7%
Bare Ground: range 2–70%, mean 22.9%
Parent Material: quaternary or sedimentary
Soil Texture: coarse to medium loamy sand

Vegetation Description:
Stands of *Baccharis salicifolia*-Riparian Shrubland form an open to intermittent shrub layer (4–48%, mean 27.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–28%, mean 8.4%) at 0–2 m tall. Trees are occasionally emergent (0–15% cover, mean 3.1%) with hardwoods at 0–15 m tall. Total vegetation cover is 10–65%, mean cover is 38.5%.

In this association, the shrub layer is characterized by *Baccharis salicifolia. Baccharis pilularis*, *Salix lasiolepis, Nicotiana glauca, Artemisia californica,* and *Malosma laurina* are occasionally included in this layer. The tree layer is emergent and open and may include *Platanus racemosa, Salix laevigata, or Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Artemisia douglasiana,* while *Piptatherum miliaceum* and *Brassica nigra* are sometimes present.

***Baccharis salicifolia*-Riparian Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	26	0.3	0.2	3.0			
Shrub									
	BASA4	*Baccharis salicifolia*	100	23.6	3.0	48.0	X	X	
	BAPI	*Baccharis pilularis*	37	0.6	0.2	5.0			
	SALA6-M	*Salix lasiolepis*	33	0.6	0.2	4.0			
	NIGL	*Nicotiana glauca*	30	0.2	0.2	4.0			X
	ARCA11	*Artemisia californica*	30	0.1	0.2	2.0			
	MALA6	*Malosma laurina*	26	0.2	0.2	2.0			
	SAME3	*Salvia mellifera*	22	0.2	0.2	2.0			
	LOSC2	*Lotus scoparius*	22	0.1	0.2	2.0			
Herb									
	ARDO3	*Artemisia douglasiana*	56	0.7	0.2	3.0			
	PIMI3	*Piptatherum miliaceum*	41	0.5	0.2	4.0			X
	BRNI	*Brassica nigra*	37	0.7	0.2	12.0			X
	HIIN3	*Hirschfeldia incana*	33	0.9	0.2	12.0			X
	BRDI3	*Bromus diandrus*	26	0.6	0.2	8.0			X
	COMA2	*Conium maculatum*	26	0.5	0.2	5.0			X
	FOVU	*Foeniculum vulgare*	26	0.2	0.2	2.0			X
	BRMA3	*Bromus madritensis*	22	0.2	0.2	2.0			X
	CEME2	*Centaurea melitensis*	22	0.1	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 27 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Brassica nigra, Hirschfeldia incana, Nicotiana glauca, Bromus diandrus, Conium maculatum, Foeniculum vulgare, Bromus madritensis, Centaurea melitensis, Marrubium vulgare, Euphorbia terracina, Melilotus indicus, Cynodon dactylon, Silybum marianum, Avena, Ricinus communis, Rumex crispus, Carduus pycnocephalus, Salsola tragus, Rorippa nasturtium-aquaticum, Spartium junceum, Arundo donax, Phalaris aquatica, Conyza canadensis, Carpobrotus edulis, Melilotus albus, Centaurea repens, Crypsis schoenoides, Bromus hordeaceus, Apium graveolens, Cirsium vulgare, Plantago major, Anagallis arvensis, Chenopodium album, Erodium cicutarium, Eucalyptus, Lactuca serriola, Lolium, Malva parviflora, Polypogon monspeliensis, Sonchus, Tropaeolum majus

Samples Used in Description: (n = 27)
AA0300cc, AA0841, AA0859, AA1056, AA1144, rap0300, rap0508, rap0893, rap0977, rap1480, rap1481, rap1484, rap1687, rap1691, rap1749, rap1902, rap2008, rap2274, rap2328, rap2339, rap2370, rap2403, rap2437, rap2513, rap2515, rap2675, rap2681

Comments:
This is a common riparian scrub association in the study area, reflecting either intermittent flooding or regular disturbance (by scouring) conditions. It is very similar, if not identical, to many other stands dominated by *Baccharis salicifolia* in the south coastal area of California. As with

many riparian vegetation types, these stands are inherently variable and, hence, this treatment is relatively broad.

Phases:
None

COMMON NAME	Mule Fat Riparian Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.B. Deciduous shrubland
FORMATION GROUP	III.B.2. Cold-deciduous shrubland
FORMATION SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION NAME	III.B.2.N.e. Seasonally flooded cold-deciduous shrubland
ALLIANCE	*Baccharis salicifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. In the broad sense, these types of *B. salicifolia* stands range widely from northern Sacramento Valley and south into Baja California, Mexico.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar *Baccharis salicifolia-Sambucus mexicana* Association has been described from western Riverside County (Klein and Evens 2005). Very similar stands occur at least as far north as Shasta County in the Sacramento Valley of California (Keeler-Wolf personal observation 2004). Because of the inherent variability of these riparian scrublands, it remains to be seen if these associations should stay separate.

References:
Klein and Evens 2005

Ceanothus crassifolius Shrubland Association

Hoary Leaf Ceanothus Shrubland Association
***Ceanothus crassifolius* Shrubland Alliance**
Hoary leaf Ceanothus Shrubland Alliance

Mapping Code: 2063

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes at low elevations between 312 and 640 m. It is solely dominated by *Ceanothus crassifolius* in the shrub layer. Trees and herbs are relatively low in cover and constancy.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 312–640 m, mean 491.1 m
Aspect: variable, but more often northeast
Slope: range 23–35 degrees, mean 33.7 degrees
Topography (micro; macro): variable but more often undulating; lower to middle slopes
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: no data
Soil Texture: no data

Vegetation Description:
Stands of *Ceanothus crassifolius* Shrubland form an intermittent shrub layer (45–60%, mean 53.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is sparse (0–3%, mean 0.6%) at 0–1 m tall. Trees rarely occur as emergent (0–0% cover, mean 0%) with hardwoods at 0–5 m tall. Total vegetation cover is 45–60%, mean cover is 54.3%.

In this association, the shrub layer is solely dominated by *Ceanothus crassifolius. Heteromeles arbutifolia* and *Malosma laurina* are frequently included in this layer at relatively low cover. The tree and herbaceous layers are sparse in cover and low in constancy, though they may include *Platanus racemosa, Quercus agrifolia, Marah macrocarpus,* and *Leymus condensatus.*

***Ceanothus crassifolius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CECR	*Ceanothus crassifolius*	100	43.0	32.0	55.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	89	2.1	0.2	4.0		X	
	MALA6	*Malosma laurina*	78	1.2	0.2	3.0		X	
	ADFA	*Adenostoma fasciculatum*	67	1.9	1.0	5.0			
	RHOV	*Rhus ovata*	56	1.4	0.2	9.0			
	SAME3	*Salvia mellifera*	56	1.3	1.0	4.0			
	CEBE3	*Cercocarpus betuloides*	33	0.7	0.2	4.0			
	CESP	*Ceanothus spinosus*	22	0.4	1.0	3.0			

Other Noteworthy Species:
None

Nonnative Species:
Spartium junceum

Samples Used in Description: (n = 9)
AA0034cc, AA0291cc, AA0336, AA0651, AA1210, rap1677m, rap2041, rap2331, rap2824

Comments:
These *Ceanothus crassifolius* Association stands typically occur in relatively inland, continental settings locally and are not found close to the coast within the summer fog zone. Most local stands with *Ceanothus crassifolius* have been placed within the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME	Hoary Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is likely to occur somewhat further north and south in south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This additional information from Borchert et al. 2004 probably largely applies to the *C. crassifolius* Association within the Santa Ynez Mountains of Santa Barbara County. The hoary leaf ceanothus alliance occupies the middle and upper slopes of east- and souht-facing aspects between elevations of 2,000 and 3,600 feet.

Vegetation Description:
Based on 16 plots sampled in the Santa Ynez Mountains of Santa Barbara County, Borchert et al. 2004 add this information to the local description above: Hoary leaf ceanothus has an average cover of 70%. Chamise and sugar bush have relatively high constancies (88% and 71% respectively) but low (< 10%) averge covers.

Comments:
See local description.

References:
Borchert et al. 2004

Ceanothus crassifolius-Malosma laurina Shrubland Association

Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association
***Ceanothus crassifolius* Shrubland Alliance**
Hoary Leaf Ceanothus Shrubland Alliance

Mapping Code: 2065

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 337–675 m. It is characterized by a dominance of *Ceanothus crassifolius* and subdominance of *Malosma laurina* in the shrub layer and an insignificant herbaceous layer. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Simi Hills Inland, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 337–675 m, mean 475.5 m
Aspect: variable
Slope: range 15–35 degrees, mean 28.5 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 8–8%, mean 8%
Small Rock Cover: range 6–20%, mean 13.3%
Large Rock Cover: range 0–10%, mean 5%
Bare Ground: range 10–61%, mean 33.7%
Parent Material: sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus crassifolius-Malosma laurina* Shrubland form an open to intermittent shrub layer (31–60%, mean 49.1%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–10%, mean 2.1%) at 0–1 m tall. Trees are infrequently present. Total vegetation cover is 41–60%, mean cover is 51.1%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Ceanothus crassifolius. Rhus ovata, Heteromeles arbutifolia, Adenostoma fasciculatum, Salvia mellifera,* and *Eriogonum fasciculatum* are usually included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Marah macrocarpus, Phacelia parryi, Chaenactis artemisiifolia,* and *Gnaphalium bicolor.*

***Ceanothus crassifolius-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	22	0.01	0.2	0.2			
Shrub									
	CECR	*Ceanothus crassifolius*	100	25.0	12.0	45.0	X	X	
	MALA6	*Malosma laurina*	100	10.6	2.5	22.0		X	
	RHOV	*Rhus ovata*	78	1.8	0.2	4.0		X	
	ADFA	*Adenostoma fasciculatum*	67	1.3	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	67	1.2	0.2	4.0			
	SAME3	*Salvia mellifera*	56	4.7	0.2	15.0			
	ERFA2	*Eriogonum fasciculatum*	56	0.8	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	33	2.3	2.5	15.0			
	YUWH	*Yucca whipplei*	33	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	22	0.8	2.0	5.0			
	KECO	*Keckiella cordifolia*	22	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	22	0.1	0.2	1.0			
	RHIL	*Rhamnus ilicifolia*	22	0.1	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	22	0.01	0.2	0.2			
	SALE3	*Salvia leucophylla*	22	0.01	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	22	0.01	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Avena, Bromus madritensis, Avena barbata, Brassica nigra, Bromus diandrus, Centaurea melitensis, Melilotus indicus

Samples Used in Description: (n = 9)
AA0030cc, AA0293cc, rap0507m, rap0558m, rap1543, rap2055, rap2173, rap2348, rap2677

Comments:
These *Ceanothus crassifolius-Malosma laurina* stands typically occur in relatively inland, continental settings locally and are not found close to the coast within the summer fog zone. The subdominance of *Malosma laurina* also suggests that winter temperatures are not severe. Most local stands with *Ceanothus crassifolius* have been placed within the mixed *Adenostoma fasciculatum-Ceanothus crassifolius* Alliance.

Phases:
None

COMMON NAME	Hoary Leaf Ceanothus-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus crassifolius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County regions. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
A larger number of samples (n = 23) of this association were taken from a recent study of the vegetation of western Riverside County (Klein and Evens 2005). Below is a summary of the environmental setting:
Elevation: low, range 228–889 m, mean 524 m
Aspect: all aspects (except flat)
Slope: moderate to steep, range 12–45 degrees, mean 29.1 degrees
Topography: undulating or convex, lower to top slopes
Litter Cover: range 4–90%, mean 52.4%
Rock Cover: range 1–45%, mean 19.6%
Bare ground: range 2–85%, mean 24.3%
Parent Material: often metavolcanic, less often gabbro and diorite, sedimentary, mesozoic granite
Soil Texture: often medium to very fine sandy loam, but varies from coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
To supplement the above local description, the following information from Klein and Evens 2005 may be added: *Ceanothus crassifolius* dominates in the shrub layer while *Malosma laurina* and *Adenostoma fasciculatum* are subdominant to codominant. *Salvia mellifera* and *Heteromeles arbutifolia* are characteristically present at low cover.

Comments:
This association is likely to be found in other parts of south coastal California at least as far south as the Mexican border.

References:
Klein and Evens 2005

Ceanothus cuneatus-Quercus berberidifolia Shrubland Association

Wedge Leaf Ceanothus-Scrub Oak Shrubland Association
***Ceanothus cuneatus* Shrubland Alliance**
Wedge Leaf Ceanothus Shrubland Alliance

Mapping Code: 2521

Local Description

Summary:
This shrubland association occurs on somewhat steep northeast- and southeast-facing slopes at low elevations between 226–408 m. It is characterized by *Ceanothus cuneatus* as the dominant shrub with about half as much cover provided by *Quercus berberidifolia*. As with many chaparral association, the herbaceous layer is relatively insignificant in mature stands. The emergent tree layer includes *Quercus agrifolia* and occasional small trees of *Fraxinus dipetala*.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 226–408 m, mean 267 m
Aspect: northeast and southeast
Slope: range 15–35 degrees, mean 24.7 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridgetop
Litter Cover: range 50–50%, mean 50%
Small Rock Cover: range 1–15%, mean 8%
Large Rock Cover: range 0–3%, mean 1.5%
Bare Ground: range 2–25%, mean 13.5%
Parent Material: igneous
Soil Texture: fine clay

Vegetation Description:
Stands of *Ceanothus cuneatus-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (26–60%, mean 48.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 3.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–61%, mean cover is 52%.

In this association, the shrub layer is characterized by *Ceanothus cuneatus, Quercus berberidifolia, Adenostoma fasciculatum, Cercocarpus betuloides,* and *Rhus ovata. Heteromeles arbutifolia* is often included in this layer, while *Sambucus mexicana* is occasionally present. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Hemizonia fasciculate, Hirschfeldia incana, Centaurea melitensis,* and *Avena fatua*.

***Ceanothus cuneatus-Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.2	1.0	1.0			
Tree Understory									
	FRDI2	*Fraxinus dipetala*	20	0.1	0.2	1.0			
	QUAG-M	*Quercus agrifolia*	20	0.1	0.2	1.0			
Shrub									
	CECU	*Ceanothus cuneatus*	100	24.0	8.0	37.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	10.3	0.2	25.0		X	
	ADFA	*Adenostoma fasciculatum*	100	4.4	0.2	12.0		X	
	CEBE3	*Cercocarpus betuloides*	80	5.4	0.2	21.0		X	
	RHOV	*Rhus ovata*	80	0.7	0.2	2.0		X	
	HEAR5	*Heteromeles arbutifolia*	60	0.5	0.2	2.0			
	SAME5	*Sambucus mexicana*	40	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	30	0.4	0.2	4.0			
	SAME3	*Salvia mellifera*	30	0.4	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	30	0.2	0.2	1.0			
	YUWH	*Yucca whipplei*	30	0.1	0.2	1.0			
	MALA6	*Malosma laurina*	20	0.7	3.0	4.0			
	TODI	*Toxicodendron diversilobum*	20	0.1	0.2	1.0			
	PRIL	*Prunus ilicifolia*	20	0.01	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	30	0.1	0.2	1.0			
	HEFA	*Hemizonia fasciculata*	20	1.0	0.2	10.0			
	AVFA	*Avena fatua*	20	0.9	4.0	5.0			X
	CEME2	*Centaurea melitensis*	20	0.3	1.0	2.0			X
	HIIN3	*Hirschfeldia incana*	20	0.2	0.2	2.0			X
	UNGR	Unknown annual grass	20	0.2	0.2	2.0			

Other Noteworthy Species:
None

Nonnative Species:
Avena fatua, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis

Samples Used in Description: (n = 10)
AA0851, AA1092, rap2140, rap2154, rap2156, rap2158, rap2744, rap2807, rap2811, rap2834

Comments:
A similarly named and potentially synonymous association, *Quercus berberidifolia-Ceanothus cuneatus* tentatively placed in the *Quercus berberidifolia* Alliance (Gordon and White 1994), has been described from the western transverse ranges of southern California. Gordon and White's brief provisional description suggests that both *Q. berberidifolia* and *C. cuneatus* codominate the stands. In the local Santa Monica Mountains setting, *Ceanothus cuneatus* typically dominates, but occasionally *Q. berberidifolia* codominates. It may be that the Santa Monica Mountains represent the lower elevation coastward expression of this broader association that may also occur in the San Gabriel and other mountains of the transverse ranges at somewhat higher elevations.

Phases:
None

COMMON NAME	Wedge Leaf Ceanothus-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus cuneatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (uncertain alliance affinity)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region; however, it is likely to range somewhat eastward into the western transverse ranges (Gordon and White 1994). Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Gordon and White 1994

Ceanothus megacarpus Shrubland Association

Big Pod Ceanothus Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2081

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low elevations between 53–730 m. It is characterized by a strong dominance of *Ceanothus megacarpus* in the shrub layer and an uncharacteristic and insignificant herbaceous layer. The emergent tree layer may include *Quercus agrifolia, Umbellularia californica,* and *Juglans californica*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Western Fog Zone, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 53–730 m, mean 361.9 m
Aspect: variable
Slope: range 8–45 degrees, mean 28.8 degrees
Topography (micro; macro): convex, flat, or undulating; lower slope to ridgetop
Litter Cover: range 15-50%, mean 33.8%
Small Rock Cover: range 1–50%, mean 15.3%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 0–50%, mean 21.6%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus* Shrubland form an open to continuous shrub layer (16–75%, mean 53.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–8%, mean 0.6%) at 0–2 m tall. Trees are occasionally emergent (0–7% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 19–75%, mean cover is 54.1%.

In this association, the shrub layer is dominated by *Ceanothus megacarpus. Malosma laurin*a is also characteristic but at much lower cover. *Adenostoma fasciculatum* and *Salvia mellifera* are usually included in this layer. The tree layer is emergent and open and can infrequently include *Quercus agrifolia* or *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Marah macrocarpus, Bromus madritensis, Melica imperfecta, Centaurea melitensis, Bromus diandrus,* and *Brassica nigra*.

***Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	44.4	12.0	75.0	X	X	
	MALA6	*Malosma laurina*	89	2.3	0.2	9.0		X	
	ADFA	*Adenostoma fasciculatum*	71	2.1	0.2	12.0			
	SAME3	*Salvia mellifera*	51	0.7	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	44	0.7	0.2	10.0			
	RHOV	*Rhus ovata*	38	0.7	0.2	7.5			
	CEBE3	*Cercocarpus betuloides*	25	0.3	0.2	5.0			
	CESP	*Ceanothus spinosus*	24	0.4	0.2	7.5			
	YUWH	*Yucca whipplei*	24	0.2	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.2	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.2	0.2	3.0			

Other Noteworthy Species:
Delphinium parryi was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 4 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 84 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5, and state rank is S5 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Bromus diandrus, Brassica nigra, Hirschfeldia incana, Avena, Bromus hordeaceus, Cortaderia, Avena fatua, Erodium, Melilotus indicus, Nicotiana glauca

Samples Used in Description: (n = 84)
AA0006cc, AA0041cc, AA0042cc, AA0166cc, AA0172cc, AA0226cc, AA0229cc, AA0232cc, AA0243cc, AA0331cc, AA0337, AA0338, AA0344, AA0359cc, AA0369cc, AA0426, AA0429, AA0431, AA0432, AA0499, AA0500, AA0503, AA0558, AA0599, AA0619, AA0645, AA0670,

AA0698, AA0725, AA0782, AA0784, AA0830, AA0834, AA0888, AA0903, AA0973, AA0983, AA1035, AA1071, AA1076, AA1110, AA1119, AA1123, AA1148, AA1194, AA1195, rap0003, rap0026, rap0027, rap0034, rap0035, rap0037, rap0136, rap0140, rap0147m, rap0150, rap0152, rap0179, rap0197, rap0288, rap0533m, rap0536, rap0546, rap0549, rap0592, rap0599, rap0864m, rap0888, rap1144, rap1206, rap1209, rap1223, rap1267, rap1278, rap1338, rap1468m, rap1485, rap1654, rap1701, rap1730, rap2079, rap2181, rap2329, rap2747

Comments:
In some ways this association forms the ecological core of the chaparral zone in the Santa Monica Mountains. *Ceanothus megacarpus* has its center of distribution in these mountains, and it commonly occurs in dense stands from low to moderate elevations throughout the region. This association is the relatively pure expression of the alliance where on the average *C. megacarpus* provides about 10 times the cover of all other shrub species in these stands. There is little variation in these stands and, hence, no phases have been identified.

Phases:
None

COMMON NAME	Big Pod Ceanothus Shrubland Association
SYNONYM	*Ceanothus megacarpus* Alliance (Borchert et al. 2004), big pod ceanothus chaparral (Holland 1986)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is likely to occur somewhat further north and south in south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This additional information from Borchert et al. 2004 probably largely applies to the *C. megacarpus* Association: The big pod ceanothus alliance is the dominant vegetation type on ocean-facing (south-facing) slopes of the Santa Ynez Mountains. Stands mostly occupy south-

and east-facing, upper and middle slopes between elevations of 482 and 1,023 m. Slopes generally are > 45%.

Vegetation Description:
Based on 14 plots sampled in the Santa Ynez Mountains of Santa Barbara County, Borchert et al. 2004 add this information to the local description above: Big pod ceanothus dominates this alliance with an average cover of 73%. Chamise and holly leaf cherry have constancies > 50% but their average covers are < 10%.

Comments:
See local description.

References:
Borchert et al. 2004, Holland 1986

Ceanothus megacarpus-Adenostoma fasciculatum Shrubland Association

Big Pod Ceanothus-Chamise Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2083

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 0–688 m. It is characterized by the dominance of *Ceanothus megacarpus* and subdominance (averaging about half as much cover) of *Adenostoma fasciculatum* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer may infrequently include *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–688 m, mean 372.9 m
Aspect: variable
Slope: range 15–35 degrees, mean 26 degrees
Topography (micro; macro): undulating, convex, or flat; middle to upper slope
Litter Cover: range 10–65%, mean 41%
Small Rock Cover: range 1–50%, mean 15.5%
Large Rock Cover: range 0–8%, mean 2.8%
Bare Ground: range 10–65%, mean 24.5%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Adenostoma fasciculatum* Shrubland form an open to continuous shrub layer (15–70%, mean 46.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–16%, mean 1.4%) at 0–1 m tall. Trees are occasionally emergent (1–5% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 20–70%, mean cover is 47.3%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Adenostoma fasciculatum,* and *Salvia mellifera. Malosma laurina* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Bromus madritensis, Piptatherum miliaceum, Centaurea melitensis, Bromus diandrus,* and *Leymus condensatus.*

***Ceanothus megacarpus-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	22.9	6.0	38.0	X		
	ADFA	*Adenostoma fasciculatum*	100	12.9	2.0	30.0	X		
	SAME3	*Salvia mellifera*	77	3.4	0.2	15.0	X		
	MALA6	*Malosma laurina*	68	1.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	52	0.5	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	35	0.7	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	35	0.5	0.2	7.5			
	LOSC2	*Lotus scoparius*	35	0.4	0.2	5.0			
	YUWH	*Yucca whipplei*	35	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	29	1.2	0.2	11.0			
	RHOV	*Rhus ovata*	29	0.2	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	23	0.4	0.2	7.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 2 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Piptatherum miliaceum, Bromus madritensis, Bromus diandrus, Centaurea melitensis, Avena, Brassica nigra, Carduus pycnocephalus, Euphorbia terracina, Lactuca canadensis, Nerium oleander, Brassica, Erodium, Hirschfeldia incana, Melilotus indicus

Samples Used in Description: (n = 31)
AA0054cc, AA0091cc, AA0096cc, AA0288cc, AA0673, AA0708, AA0712, AA0822, AA0857, AA0895, AA0902, AA0921, AA1057, AA1207, rap0006, rap0021m, rap0139, rap0154, rap0159, rap0181, rap0222, rap0285, rap0380, rap0545, rap0586, rap1339, rap1383, rap1492, rap1648, rap1880, rap2666

Comments:
The combination of *C. megacarpus* and *Adenostoma fasciculatum* is a common occurrence in these mountains. Two phases have been identified—one with higher cover and frequency of *Salvia mellifera*.

Phases:
Ceanothus megacarpus-Adenostoma fasciculatum (Big Pod Ceanothus-Chamise) Phase [2083]
Ceanothus megacarpus-Adenostoma fasciculatum-Salvia mellifera (Big Pod Ceanothus-Chamise-Black Sage) Phase [7083]

COMMON NAME	Big Pod Ceanothus-Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Historically, the balance between the *Adenostoma fasciculatum* (and related *Adenostoma fasciculatum* codominant alliances such as *A. fasciculatum-Salvia mellifera*) and the *Ceanothus megacarpus* Alliance may have been different. Early mapping by the U.S. Forest Service VTM crews (John Tiszler, Robert Taylor personal communication 2003) suggest that in the 1930s the predominant chaparral stands were dominated or codominated by *Adenostoma fasciculatum*. However, currently, Franklin 1998 and current mapping for this project suggest that *C. megacarpus* dominated chaparral has taken over as the principal cover. The interface of these two main dominance types occurs in associations such as this one. Thus, monitoring plots within such stands may afford a more complete understanding of overall trends of vegetation dominance within the area.

References:
Franklin 1998

Ceanothus megacarpus-Adenostoma sparsifolium Shrubland Association

Big Pod Ceanothus-Redshank Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2082

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low to mid elevations between 383–847 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Adenostoma sparsifolium* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is generally absent but may include *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 383–847 m, mean 640 m
Aspect: variable
Slope: range 15–42 degrees, mean 30.6 degrees
Topography (micro; macro): undulating, convex, or flat; middle slope to ridgetop
Litter Cover: no data
Small Rock Cover: range 5–40%, mean 20%
Large Rock Cover: range 1–18%, mean 6.8%
Bare Ground: range 5–35%, mean 20.6%
Parent Material: igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Adenostoma sparsifolium* Shrubland form an open to intermittent shrub layer (31–65%, mean 48.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–4%, mean 0.7%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 35–65%, mean cover is 49.1%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Adenostoma sparsifolium, Malosma laurina,* and *Adenostoma fasciculatum*. *Salvia mellifera* is often present, and *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple and sometimes includes *Bromus madritensis, Bromus hordeaceus, Centaurea melitensis, Bromus diandrus*, *Avena barbata,* and *Marah macrocarpus.*

***Ceanothus megacarpus-Adenostoma sparsifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	25.7	14.0	52.0	X	X	
	ADSP	*Adenostoma sparsifolium*	100	12.8	5.0	20.0		X	
	MALA6	*Malosma laurina*	80	1.9	0.2	8.0		X	
	ADFA	*Adenostoma fasciculatum*	76	3.9	0.2	15.0		X	
	SAME3	*Salvia mellifera*	60	1.0	0.2	5.0			
	RHOV	*Rhus ovata*	48	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	0.3	0.2	2.5			
	CEBE3	*Cercocarpus betuloides*	36	0.4	0.2	4.0			
	CESP	*Ceanothus spinosus*	32	0.5	0.2	7.0			
	ERFA2	*Eriogonum fasciculatum*	28	0.3	0.2	2.5			
	YUWH	*Yucca whipplei*	28	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	24	0.2	0.2	3.0			
	CEOL	*Ceanothus oliganthus*	20	0.4	1.0	4.0			
	ERCO25	*Eriophyllum confertiflorum*	20	0.1	0.2	1.0			
	LOSC2	*Lotus scoparius*	20	0.01	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	20	0.1	0.2	2.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 4 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus hordeaceus, Avena barbata, Centaurea melitensis, Bromus diandrus, Avena, Erodium cicutarium, Lamarckia aurea

Samples Used in Description: (n = 25)
AA0055cc, AA0563, AA1190, AA1192, AA1203, AA1204, AA1215, AA1218, AA1219, rap0526m, rap0578m, rap0579, rap0581, rap0582, rap0628, rap0786m, rap1488, rap1489, rap1490, rap1493, rap1771, rap1785, rap2423, rap2429, rap2431

Comments:
This association is likely to be largely endemic to the Santa Monica Mountains. Elsewhere, *A. sparsifolium* typically occurs at either more inland localities or at elevations greater than the range of *Ceanothus megacarpus.* Most of these stands occur on northerly facing steep slopes above 600 m. Mature stands tend to have a two-layered canopy with the *A. sparsifolium* projecting 1–3 m above the subcanopy of *C. megacarpus.* More recently burned stands tend to have a relatively even canopy.

Phases:
None

COMMON NAME	Big Pod Ceanothus-Redshank Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Cercocarpus betuloides Shrubland Association

Big Pod Ceanothus-Birch Leaf Mountain Mahogany Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2084

Local Description

Summary:
This shrubland association occurs on gentle to steep northwest- and northeast-facing slopes at low elevations between 110–701 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer is generally insignificant in mature stands. The emergent tree layer is generally absent but may contain both introduced and native species.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 110–701 m, mean 370.8 m
Aspect: northwest and northeast
Slope: range 2–40 degrees, mean 25.1 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 25–55%, mean 40%
Small Rock Cover: range 5–30%, mean 15.4%
Large Rock Cover: range 0–2%, mean 0.6%
Bare Ground: range 5–35%, mean 20.3%
Parent Material: igneous
Soil Texture: medium to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Cercocarpus betuloides* Shrubland form an open to dense shrub layer (39–65%, mean 51.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–5%, mean 0.7%) at 0–1 m tall. Trees are occasionally emergent (0–16% cover, mean 1.2%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 39–65%, mean cover is 53.1%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Cercocarpus betuloides, Adenostoma fasciculatum,* and *Heteromeles arbutifolia. Malosma laurina* and *Ceanothus spinosus* are often included in this layer. The tree layer is emergent and open and may infrequently include *Umbellularia californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Leymus condensatus, Bromus madritensis,* and *Avena* sp.

***Ceanothus megacarpus-Cercocarpus betuloides* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	27.8	14.0	45.0		X	
	CEBE3	*Cercocarpus betuloides*	88	9.7	0.2	23.0		X	
	ADFA	*Adenostoma fasciculatum*	82	2.4	0.2	5.0		X	
	HEAR5	*Heteromeles arbutifolia*	76	0.4	0.2	2.5		X	
	MALA6	*Malosma laurina*	59	1.1	0.2	5.0			
	CESP	*Ceanothus spinosus*	53	1.2	0.2	7.0			
	SAME3	*Salvia mellifera*	47	0.4	0.2	2.5			
	QUBE5	*Quercus berberidifolia*	41	4.6	0.2	25.0			
	ADSP	*Adenostoma sparsifolium*	35	0.7	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	35	0.4	0.2	3.0			
	RHOV	*Rhus ovata*	35	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	24	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	24	0.3	0.2	3.0			
	YUWH	*Yucca whipplei*	24	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	24	0.2	0.2	2.5			

Other Noteworthy Species:
Juglans californica was found in 1of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena, Bromus madritensis, Eucalyptus, Bromus hordeaceus, Avena barbata, Bromus diandrus, Centaurea melitensis

Samples Used in Description: (n = 17)
AA0065cc, AA0067cc, AA0402, AA0862, rap0148, rap0236, rap0239m, rap0302, rap0404m, rap0576m, rap0580, rap0590m, rap1653, rap1737, rap2447, rap2500, rap2567

Comments:
This association tends to occur on northerly facing steep slopes where insolation is intermediate between ridges and concave-sheltered slopes. It is likely to be endemic to the Santa Monica Mountains and perhaps other parts of the western transverse ranges of California.

Phases:
None

COMMON NAME Big Pod Ceanothus-Birch Leaf Mountain Mahogany Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Malosma laurina Shrubland Association

Big Pod Ceanothus-Laurel Sumac Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 2087

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low to mid elevations between 42–780 m. It is characterized by a dominance of *Ceanothus megacarpus* and a subdominance of *Malosma laurina* in the shrub layer. The herbaceous layer is insignificant in older stands. The emergent tree layer is generally absent but can include *Quercus agrifolia*, *Umbellularia californica, Juglans californica, Pinus* sp., and *Eucalyptus* sp.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Immediate Coast, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 42–780 m, mean 395.8 m
Aspect: variable
Slope: range 2–50 degrees, mean 29.2 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 15–60%, mean 30%
Small Rock Cover: range 2–55%, mean 19.1%
Large Rock Cover: range 0–15%, mean 2.5%
Bare Ground: range 5–65%, mean 24.6%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Malosma laurina* Shrubland form an open to intermittent shrub layer (23–65%, mean 47.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–10 m tall. The herbaceous layer is open (0–25%, mean 1.6%) at 0–1 m tall. Trees are occasionally emergent (0–9% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 35–65%, mean cover is 49%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus* and *Malosma laurina*. *Adenostoma fasciculatum* and *Heteromeles arbutifolia* are often present, and *Salvia mellifera* is sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Marah macrocarpus, Centaurea melitensis*, *Brassica nigra, Melica imperfecta,* and *Bromus madritensis.*

***Ceanothus megacarpus-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	24.9	7.5	45.0	X		
	MALA6	*Malosma laurina*	100	11.7	2.0	33.0	X		
	ADFA	*Adenostoma fasciculatum*	71	2.7	0.2	13.0			
	HEAR5	*Heteromeles arbutifolia*	66	1.9	0.2	19.0			
	SAME3	*Salvia mellifera*	63	1.8	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	7.0			
	RHOV	*Rhus ovata*	44	0.6	0.2	6.0			
	CESP	*Ceanothus spinosus*	33	0.8	0.2	8.0			
	YUWH	*Yucca whipplei*	27	0.2	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	26	0.3	0.2	5.0			

Other Noteworthy Species:
Juglans californica was found in 3 of 99 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Nicotiana glauca, Hirschfeldia incana, Bromus diandrus, Avena, Piptatherum miliaceum, Avena fatua, Pennisetum setaceum, Stellaria media, Ageratina adenophora, Eucalyptus, Ailanthus altissima, Avena barbata, Brassica, Carduus pycnocephalus, Galium aparine, Marrubium vulgare, Melilotus, Nerium oleander, Schinus molle

Samples Used in Description: (n=99)
AA0058cc, AA0061cc, AA0062cc, AA0093cc, AA0098cc, AA0136cc, AA0140cc, AA0235cc, AA0270cc, AA0279cc, AA0386, AA0413, AA0416, AA0419, AA0430, AA0483cc, AA0487cc, AA0518, AA0520, AA0553, AA0559, AA0598, AA0639, AA0657, AA0662, AA0692, AA0702, AA0704, AA0715, AA0729, AA0730, AA0788, AA0880, AA0897, AA0917, AA0930, AA0944, AA1005, AA1038, AA1049, AA1053, AA1067, AA1122, AA1173, AA1196, rap0007, rap0196, rap0210, rap0221m, rap0287, rap0294, rap0317, rap0329m, rap0341, rap0343, rap0345, rap0346, rap0356, rap0364m, rap0376, rap0377, rap0413, rap0422, rap0434, rap0552, rap0672, rap0760, rap0775, rap0824, rap0827m, rap0862, rap0953, rap1125, rap1160, rap1163, rap1335, rap1336, rap1381, rap1409m, rap1414, rap1467, rap1519, rap1643, rap1703, rap1734, rap1740, rap2058, rap2098, rap2101, rap2182, rap2192, rap2219, rap2267, rap2368, rap2369, rap2658, rap2780, rap2787, rap2791

Comments:
This is one of the most well sampled and most common associations in the mapping area. It is essentially a mix of two of the most abundant and characteristic shrub species of the study area. It may be broken up into several phases (see below). These are generally based on the degree of codominance or subdominance of other species such as *Adenostoma fasciculatum* with *M. laurina* and *C. megacarpus*.

Phases:
Ceanothus megacarpus-Malosma laurina (Big Pod Ceanothus-Laurel Sumac) Phase [2087]
Ceanothus megacarpus-Malosma laurina-Adenostoma fasciculatum Mixed Chaparral (Big Pod Ceanothus-Laurel Sumac-Chamise Mixed Chaparral) Phase [7081]

COMMON NAME	Big Pod Ceanothus-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be restricted to the western transverse ranges of southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus megacarpus-Salvia mellifera Shrubland Association

Big Pod Ceanothus-Black Sage Shrubland Association
***Ceanothus megacarpus* Shrubland Alliance**
Big Pod Ceanothus Shrubland Alliance

Mapping Code: 7085

Local Description

Summary:
This shrubland association occurs on gentle to very steep southwest- and southeast-facing slopes at low elevations between 49–636 m. It is characterized by *Ceanothus megacarpus* as a dominant and *Salvia mellifera* as a subdominant in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is largely absent in most stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Simi Hills Inland, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 49–636 m, mean 322.7 m
Aspect: southwest and southeast
Slope: range 2–55 degrees, mean 31.3 degrees
Topography (micro; macro): variable (all); middle slope to ridgetop
Litter Cover: range 10–55%, mean 26.7%
Small Rock Cover: range 0–75%, mean 25.8%
Large Rock Cover: range 0–15%, mean 3.5%
Bare Ground: range 0–70%, mean 22.8%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus megacarpus-Salvia mellifera* Shrubland form an open to intermittent shrub layer (21–62%, mean 38.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–15%, mean 2.9%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 25–65%, mean cover is 42.2%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Malosma laurina,* and *Salvia mellifera. Eriogonum fasciculatum, Eriogonum cinereum, Yucca whipplei,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Bromus madritensis, Melica imperfecta, Leymus condensatus,* and *Brassica nigra*.

***Ceanothus megacarpus-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	12.4	3.0	35.0	X	X	
	MALA6	*Malosma laurina*	93	7.8	0.2	20.0		X	
	SAME3	*Salvia mellifera*	83	5.9	0.2	20.0		X	
	ERFA2	*Eriogonum fasciculatum*	57	3.1	0.2	20.0			
	ERCI5	*Eriogonum cinereum*	55	2.7	0.2	15.0			
	YUWH	*Yucca whipplei*	55	0.4	0.2	2.5			
	ADFA	*Adenostoma fasciculatum*	52	0.8	0.2	3.0			
	ARCA11	*Artemisia californica*	41	1.1	0.2	12.0			
	RHOV	*Rhus ovata*	41	0.9	0.2	8.0			
	HEAR5	*Heteromeles arbutifolia*	40	1.0	0.2	15.0			
	ENCA	*Encelia californica*	38	1.2	0.2	15.0			
	CESP	*Ceanothus spinosus*	22	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	22	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	21	0.4	0.2	8.0			
	MAFA	*Malacothamnus fasciculatus*	21	0.3	0.2	6.0			
Herb									
	CEME2	*Centaurea melitensis*	24	0.3	0.2	2.5			X
	BRMA3	*Bromus madritensis*	22	0.4	0.2	10.0			X

Other Noteworthy Species:
Juglans californica was found in 5 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Bromus diandrus, Avena barbata, Avena, Hirschfeldia incana, Avena fatua, Piptatherum miliaceum, Bromus hordeaceus, Nicotiana glauca, Erodium cicutarium, Foeniculum vulgare, Marrubium vulgare, Schinus molle, Ageratina adenophora, Brassica, Galium aparine, Lobularia maritima, Pennisetum setaceum, Stellaria media

Samples Used in Description: (n = 58)
AA0005cc, AA0071cc, AA0097cc, AA0132cc, AA0135cc, AA0137cc, AA0251cc, AA0284cc, AA0290cc, AA0345, AA0368cc, AA0418, AA0513, AA0620, AA0693, AA0714, AA0728, AA0937, AA1078, AA1109, rap0008, rap0031, rap0111, rap0121, rap0149m, rap0151, rap0183m, rap0217, rap0292, rap0312, rap0387m, rap0469, rap0548, rap0766, rap0809, rap0833, rap0835, rap1187, rap1211, rap1213m, rap1221, rap1304m, rap1357, rap1384, rap1385, rap1410, rap1412, rap1413, rap1508m, rap1709, rap1738, rap1743, rap2125, rap2190, rap2488, rap2499m, rap2606, rap2748

Comments:
Stands of this association occur on hot, dry southerly facing slopes throughout the study area. Both main shrub species are unlikely to form an association outside the western transverse ranges of Santa Barbara, Ventura, and Los Angeles counties.

Phases:
None

COMMON NAME	Big Pod Ceanothus-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus megacarpus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Both main shrub species are unlikely to form an association outside the western transverse ranges of Santa Barbara, Ventura, and Los Angeles counties.

References:
None

Ceanothus oliganthus Shrubland Association

Hairy Leaf Ceanothus Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2072

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low to mid elevations between 498–847 m. It is characterized by a strong dominance of *Ceanothus oliganthus* in the shrub layer, although a variety of other shrubs may occur occasionally at low cover. The emergent tree layer occasionally includes *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 498–847 m, mean 719.8 m
Aspect: variable
Slope: range 3–35 degrees, mean 22.8 degrees
Topography (micro; macro): flat, concave, or undulating; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–30%, mean 15.3%
Large Rock Cover: range 0–20%, mean 7.7%
Bare Ground: range 10–32%, mean 18.7%
Parent Material: igneous
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus* Shrubland form an intermittent to continuous shrub layer (36–65%, mean 55.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is bare. Trees are occasionally emergent (0–12% cover, mean 3.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 48–65%, mean cover is 58.8%.

In this association, the shrub layer is dominated by *Ceanothus oliganthus. Heteromeles arbutifolia* is also characteristic, but at lower cover. *Adenostoma sparsifolium* and *Quercus berberidifolia* are often present, and *Ceanothus megacarpus* is sometimes included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia and Umbellularia californica* at low cover. The herbaceous layer is simple and occasionally includes *Avena barbata, Bromus diandrus,* and *Bromus hordeaceus.*

***Ceanothus oliganthus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.4	1.0	7.0	X		
	UMCA-T	*Umbellularia californica*	20	0.2	1.0	1.0			
Tree Understory									
	QUAG-M	*Quercus agrifolia*	20	1.0	5.0	5.0			
	UMCA-M	*Umbellularia californica*	20	0.7	2.0	5.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	44.6	21.0	58.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	90	1.7	0.2	7.0		X	
	ADSP	*Adenostoma sparsifolium*	70	2.6	1.0	8.0			
	QUBE5	*Quercus berberidifolia*	60	1.2	0.2	5.0			
	CEME	*Ceanothus megacarpus*	40	0.4	0.2	2.5			
	ADFA	*Adenostoma fasciculatum*	30	0.3	0.2	3.0			
	RHOV	*Rhus ovata*	30	0.2	0.2	1.0			
	GAVE2	*Garrya veatchii*	30	0.1	0.2	1.0			
	LEFR	*Lepechinia fragrans*	30	0.1	0.2	0.2			
	LULO	*Lupinus longifolius*	20	1.5	0.2	15.0			
	CECR	*Ceanothus crassifolius*	20	0.6	0.2	6.0			
	ARGL3	*Arctostaphylos glandulosa*	20	0.4	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	20	0.4	0.2	4.0			
	PRIL	*Prunus ilicifolia*	20	0.2	0.2	2.0			
	DERI	*Dendromecon rigida*	20	0.2	1.0	1.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.1	0.2	1.0			
	ARCTO3	*Arctostaphylos*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Lepechinia fragrans was found in 3 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis

Samples Used in Description: (n = 10)
AA0056cc, AA0819, rap0265, rap0778m, rap0779m, rap0783, rap0787m, rap0789m, rap0796m, rap2382

Comments:
Ceanothus oliganthus in southern California tends to be a montane species. In the study area, it may be considered as an upper-elevation analog to *Ceanothus spinosus*, replacing it largely above 700 m. It is an obligate seeder and tends to senesce after about three to four decades (Borchert et al. 2004). This association is more common at lower elevations in the Simi Hills than in the main portion of the Santa Monica Mountains.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in a number of areas from Monterey County to San Diego County but has not been adequately treated at the association level to determine its full extent.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Klein and Evens 2005, Evens and San 2005, and Borchert et al. 2004 have reported on stands of *Ceanothus oliganthus* that resemble these relatively pure stands in the SAMO study area. However, they have not had the sufficient number of stands to further differentiate their examples at the association level. Recent sampling in the peninsular ranges of San Diego County (Keeler-Wolf personal observation 2005) suggests there are other early seral postfire *Ceanothus oliganthus* associations, which may occur in mixed coniferous forests up to 1,800 m in association with emergent *Quercus chrysolepis* and *Pinus coulteri*.

References:
Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005

Ceanothus oliganthus-Adenostoma sparsifolium Shrubland Association

Hairy Leaf Ceanothus-Redshank Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2078

Local Description

Summary:
This shrubland association occurs on moderate to steep northwest- to southeast-facing slopes at low to mid elevations between 621–879 m. It is characterized by a codominance of *Ceanothus oliganthus* and *Adenostoma sparsifolium* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 621–879 m, mean 744.8 m
Aspect: northwest to southeast
Slope: range 7–35 degrees, mean 22.5 degrees
Topography (micro; macro): variable (all); middle slope to ridgetop
Litter Cover: range 25–75%, mean 48.8%
Small Rock Cover: range 4–45%, mean 18.2%
Large Rock Cover: range 0–15%, mean 4.2%
Bare Ground: range 10–45%, mean 20.6%
Parent Material: igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Adenostoma sparsifolium* Shrubland form an intermittent shrub layer (38–65%, mean 50.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.4%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 1.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 38–65%, mean cover is 51.9%.

In this association, the shrub layer is characterized by *Adenostoma sparsifolium* and *Ceanothus oliganthus. Adenostoma fasciculatum* are usually present, while *Ceanothus megacarpus, Quercus berberidifolia,* and *Lepechinia fragrans* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Marah macrocarpus, Bromus madritensis*, *Melica imperfecta,* and *Leymus condensatus.*

***Ceanothus oliganthus-Adenostoma sparsifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	35	0.6	0.2	5.0			
Shrub									
	ADSP	*Adenostoma sparsifolium*	100	17.3	5.0	38.0	X		
	CEOL	*Ceanothus oliganthus*	96	17.0	2.0	35.0	X		
	ADFA	*Adenostoma fasciculatum*	61	1.0	0.2	7.0			
	CEME	*Ceanothus megacarpus*	57	4.0	0.2	16.0			
	QUBE5	*Quercus berberidifolia*	48	1.6	0.2	17.0			
	LEFR	*Lepechinia fragrans*	48	1.3	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	43	0.7	0.2	10.0			
	CEBE3	*Cercocarpus betuloides*	39	2.2	0.2	20.0			
	SAME3	*Salvia mellifera*	39	0.4	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	35	0.5	0.2	6.0			
	RHOV	*Rhus ovata*	35	0.3	0.2	2.5			
	CECR	*Ceanothus crassifolius*	30	1.3	0.2	10.0			
	MALA6	*Malosma laurina*	26	1.0	0.2	18.0			
	ARGL3	*Arctostaphylos glandulosa*	26	0.4	1.0	2.5			
	PRIL	*Prunus ilicifolia*	22	1.0	0.2	16.0			
	RHIL	*Rhamnus ilicifolia*	22	0.1	0.2	1.0			
	RIMA	*Ribes malvaceum*	22	0.1	0.2	1.0			

Other Noteworthy Species:
Lepechinia fragrans was found in 11 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Piptatherum miliaceum, Brassica nigra, Bromus hordeaceus, Bromus diandrus

Samples Used in Description: (n = 23)
AA0205cc, AA0915, AA1199, rap0262, rap0309m, rap0540, rap0616, rap0773, rap0774, rap0780, rap0788m, rap0797, rap0798, rap1491, rap1536, rap1773, rap1780, rap1783, rap1820, rap2400, rap2424, rap2800, rap2935

Comments:
Although both *A. sparsifolium* and *C. oliganthus* codominate in these stands, the ecological relationships borne out in the cluster analysis suggest this association should be classified within the *Ceanothus oliganthus* Alliance and not the *Adenostoma sparsifolium* Alliance. This is likely to be an endemic association to the Santa Monica Mountains. No other reports of this type have been alluded to in other studies of southern California chaparral. The Boney Ridge area of the high west-central portion of the study area appears to be the stronghold for this association. This is generally the only portion of the study area where elevations are high enough to support both of the characteristic species of this association. At lower elevation, *Ceanothus oliganthus* can be replaced by *Ceanothus spinosus*.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Redshank Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description

References:
None

Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata Shrubland Association

Hairy Leaf Ceanothus-Toyon Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2076

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 336–677 m. It is characterized by the dominance of *Ceanothus oliganthus* and subdominance of *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer is generally sparse. The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Simi Hills, Inland Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 336–677 m, mean 506 m
Aspect: northeast and northwest
Slope: range 15–35 degrees, mean 30.7 degrees
Topography (micro; macro): undulating or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: 5%
Large Rock Cover: no data
Bare Ground: 10%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Shrubland form an intermittent shrub layer (38–60%, mean 51.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 2.9%) at 0–1 m tall. Trees are occasionally emergent (0–12% cover, mean 2.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 45–63%, mean cover is 57%.

In this association, the shrub layer is characterized by *Ceanothus oliganthus*, *Heteromeles arbutifolia, Adenostoma fasciculatum,* and *Rhus ovata. Malosma laurina* and *Ceanothus crassifolius* are often included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus, Marah macrocarpus*, *Delphinium cardinale,* and *Bromus madritensis.*

***Ceanothus oliganthus-Heteromeles arbutifolia-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.4	0.2	7.0	X		
	JUCA-T	*Juglans californica*	21	0.7	1.0	5.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	26.2	15.0	42.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	86	7.2	0.2	15.0		X	
	ADFA	*Adenostoma fasciculatum*	79	5.5	0.2	15.0		X	
	RHOV	*Rhus ovata*	79	4.6	1.0	13.0		X	
	CECR	*Ceanothus crassifolius*	57	1.4	1.0	4.0			
	MALA6	*Malosma laurina*	57	1.3	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	43	2.1	2.0	9.0			
	SAME3	*Salvia mellifera*	36	1.0	0.2	8.0			
	PRIL	*Prunus ilicifolia*	36	0.8	0.2	4.0			
	SAME5	*Sambucus mexicana*	36	0.3	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	21	0.7	2.0	4.0			
	QUBE5	*Quercus berberidifolia*	21	0.7	0.2	8.0			
Herb									
	LECO12	*Leymus condensatus*	21	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 4 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Ailanthus altissima, Bromus madritensis, Centaurea melitensis, Robinia

Samples Used in Description: (n = 14)
AA0033cc, AA0294cc, rap0246, rap1452, rap2056, rap2093m, rap2094, rap2175m, rap2228m, rap2335, rap2356, rap2405, rap2406, rap2649

Comments:
This is the most widespread of the *Ceanothus oliganthus* associations in the study area. It is more common in the Simi Hills region but also occurs at upper elevations in the main portion of the Santa Monica Mountains. It can be considered as the mesic expression of this alliance between the relatively xeric *C. oliganthus-A. sparsifolium* and the more mesophytic *C. oliganthus-Quercus berberidifolia* associations in moisture relations.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Toyon Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is only known so far from the SAMO study area but may occur elsewhere in central or south-coastal California.

References:
None

Ceanothus oliganthus-Quercus berberidifolia Shrubland Association

Hairy Leaf Ceanothus-Scrub Oak Shrubland Association
***Ceanothus oliganthus* Shrubland Alliance**
Hairy Leaf Ceanothus Shrubland Alliance

Mapping Code: 2077

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 332–729 m. It is characterized by a codominance of *Ceanothus oliganthus* and *Quercus berberidifolia* in the shrub layer. The herbaceous layer is sparse and insignificant. The emergent tree layer occasionally includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 332–729 m, mean 663.5 m
Aspect: northeast and northwest
Slope: range 4–35 degrees, mean 18.3 degrees
Topography (micro; macro): convex or flat; bottom to middle slope
Litter Cover: range 2–80%, mean 50.5%
Small Rock Cover: range 2–10%, mean 5.1%
Large Rock Cover: range 0–85%, mean 12.8%
Bare Ground: range 2–35%, mean 17%
Parent Material: quaternary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus oliganthus-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (10–65%, mean 49.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–5%, mean 0.8%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 1.2%) with hardwoods at 0–15 m tall. Total vegetation cover is 12–65%, mean cover is 50.3%.

In this association, the shrub layer is characterized by *Ceanothus oliganthus. Quercus berberidifolia, Adenostoma fasciculatum, Arctostaphylos glandulosa,* and *Heteromeles arbutifolia* are often present, and *Cercocarpus betuloides* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Bromus diandrus, Piptatherum miliaceum*, and *Centaurea melitensis.*

***Ceanothus oliganthus-Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	25	0.2	0.2	1.0			
Shrub									
	CEOL	*Ceanothus oliganthus*	100	19.1	2.5	48.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	12.0	2.5	32.0		X	
	ADFA	*Adenostoma fasciculatum*	92	3.3	0.2	13.0		X	
	ARGL3	*Arctostaphylos glandulosa*	75	2.2	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	1.8	0.2	8.0		X	
	CEME	*Ceanothus megacarpus*	50	2.8	1.0	14.0			
	CEBE3	*Cercocarpus betuloides*	50	1.1	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	42	1.1	0.2	6.0			
	RHOV	*Rhus ovata*	42	0.4	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.8	0.2	13.0			
	DERI	*Dendromecon rigida*	33	0.9	1.0	8.0			
	LOSC2	*Lotus scoparius*	33	0.3	0.2	2.0			
	GAVE2	*Garrya veatchii*	33	0.2	0.2	1.0			
	CELE2	*Ceanothus leucodermis*	25	0.9	0.2	10.0			
	ADSP	*Adenostoma sparsifolium*	25	0.8	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.3	0.2	3.0			
	CECR	*Ceanothus crassifolius*	25	0.2	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	1.0			
Herb									
	BRDI3	*Bromus diandrus*	42	0.1	0.2	0.2			X
	CEME2	*Centaurea melitensis*	25	0.1	0.2	0.2			X
	PIMI3	*Piptatherum miliaceum*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is G2 CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Lepechinia fragrans was found in 2 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Piptatherum miliaceum, Eucalyptus, Spartium junceum, Bromus hordeaceus, Brassica nigra, Schinus molle, Avena, Avena barbata, Bromus madritensis, Foeniculum vulgare, Galium aparine, Lolium, Marrubium vulgare, Phoenix canariensis

Samples Used in Description: (n = 12)
AA0163cc, rap0260, rap0271m, rap0272, rap0280m, rap0281, rap0283, rap0307m, rap0627, rap1656, rap1657m, rap2242

Comments:
This association, only known from the SAMO study area, may be the most mesic expression of this alliance. It is restricted to moist northerly facing slopes and generally occurs on lower portions of the slopes.

Phases:
None

COMMON NAME	Hairy Leaf Ceanothus-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus oliganthus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely that this association may occur elsewhere particularly northward into the central coast ranges of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Ceanothus spinosus Shrubland Association

Greenbark Ceanothus Shrubland Association
***Ceanothus spinosus* Shrubland Alliance**
Greenbark Ceanothus Shrubland Alliance

Mapping Code: 2092

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northeast- and northwest-facing slopes at low elevations between 0–692 m. It is characterized by a strong dominance of *Ceanothus spinosus* in the shrub layer and may include a wide variety of mesophytic species in the herbaceous layer, none apparently in high constancy. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–692 m, mean 385.5 m
Aspect: northeast and northwest
Slope: range 10–48 degrees, mean 29.8 degrees
Topography (micro; macro): concave, convex, or flat; lower to upper slope
Litter Cover: range 25–70%, mean 51.4%
Small Rock Cover: range 0–35%, mean 9.9%
Large Rock Cover: range 0–15%, mean 1.6%
Bare Ground: range 0–75%, mean 18.2%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus spinosus* Shrubland form an open to continuous shrub layer (10–68%, mean 53.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–10 m tall. The herbaceous layer is open to intermittent (0–57%, mean 3.4%) at 0–2 m tall. Trees are occasionally emergent (0–45% cover, mean 2%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 38–70%, mean cover is 58.1%.

In this association, the shrub layer is dominated by *Ceanothus spinosus. Heteromeles arbutifolia* is also characteristic but at lower cover. *Malosma laurina* and *Ceanothus megacarpus* are often present, while *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia, Juglans californica,* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Marah macrocarpus, Melica imperfecta,* and *Bromus diandrus.*

***Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	37	0.8	0.2	5.0			
	JUCA-T	*Juglans californica*	24	0.5	0.2	7.0			
Shrub									
	CESP	*Ceanothus spinosus*	100	39.2	5.0	65.0	X		
	HEAR5	*Heteromeles arbutifolia*	79	3.1	0.2	20.0	X		
	MALA6	*Malosma laurina*	60	2.6	0.2	26.0			
	CEME	*Ceanothus megacarpus*	51	1.5	0.2	9.0			
	RHOV	*Rhus ovata*	49	1.2	0.2	25.0			
	PRIL	*Prunus ilicifolia*	40	1.6	0.2	20.0			
	CEBE3	*Cercocarpus betuloides*	34	0.6	0.2	11.0			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	7.5			
	ADFA	*Adenostoma fasciculatum*	26	0.5	0.2	9.0			
	SAME5	*Sambucus mexicana*	22	0.2	0.2	6.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 42 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 6 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 134 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Brassica nigra, Nicotiana glauca, Senecio mikanioides, Carduus pycnocephalus, Bromus madritensis, Avena, Bromus hordeaceus, Galium aparine, Hirschfeldia incana, Avena fatua, Piptatherum miliaceum, Stellaria media, Schinus molle, Eucalyptus, Avena barbata, Briza maxima, Foeniculum vulgare, Medicago polymorpha, Melilotus indicus, Ricinus communis, Sonchus oleraceus

Samples Used in Description: (n = 134)
AA0027cc, AA0052cc, AA0063cc, AA0090cc, AA0131cc, AA0170cc, AA0171cc, AA0201cc, AA0202cc, AA0210cc, AA0214cc, AA0217cc, AA0239cc, AA0269cc, AA0311cc, AA0333, AA0425, AA0433, AA0436, AA0441, AA0456cc, AA0551, AA0556, AA0611, AA0631, AA0635, AA0642, AA0705, AA0811, AA0812, AA0836, AA0855, AA0876, AA0878, AA0894, AA0918,

AA0924, AA0938, AA0945, AA0992, AA1006, AA1025, AA1036, AA1046, AA1054, AA1073, AA1079, AA1112, AA1131, AA1138, AA1143, AA1154, AA1184, rap0013m, rap0018m, rap0130, rap0156, rap0232, rap0233m, rap0253, rap0256, rap0318m, rap0325, rap0328m, rap0332m, rap0348, rap0351, rap0373, rap0405, rap0408, rap0426m, rap0427, rap0450, rap0456, rap0471m, rap0473m, rap0477, rap0478, rap0497, rap0501, rap0534, rap0537m, rap0538, rap0566, rap0573, rap0589, rap0594, rap0635m, rap0681m, rap0765, rap0767, rap0768, rap1175, rap1225, rap1227, rap1232, rap1237, rap1255, rap1256m, rap1287, rap1341, rap1371, rap1486, rap1494, rap1516, rap1520, rap1569, rap1584, rap1587, rap1622m, rap1623m, rap1646, rap1700, rap1704, rap1739, rap2078, rap2135, rap2143m, rap2163, rap2342, rap2385, rap2399, rap2443, rap2444, rap2589, rap2599, rap2607, rap2693, rap2694, rap2717, rap2723, rap2782, rap2810, rap2934

Comments:
This is an abundant association in the study area. Although typical of concave north-facing slopes at mid and lower elevations, it may also occur on drier exposures closer to the coast where summer fog may ameliorate evapotranspiration. This relatively tall, arborescent chaparral association often occurs adjacent to stands of *Quercus agrifolia, Juglans californica*, or even riparian woodlands, suggesting a relatively high moisture regime. Three phases have been identified that suggests relatively more (*Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia)* or less *(Ceanothus spinosus-Malosma laurina*) mesic settings. The association with *Malosma laurina* may also indicate increased fire frequency.

Phases:
Ceanothus spinosus (Greenbark Ceanothus) Phase [2092]
Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia (Greenbark Ceanothus-Toyon-Holly Leaf Cherry) Phase [2094]
Ceanothus spinosus-Malosma laurina (Greenbark Ceanothus-Laurel Sumac) Phase [2097]

COMMON NAME	Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus spinosus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Based on the similarities of this association with the alliance description in Borchert et al. 2004, we can extrapolate the following from their general description and state: The greenbark ceanothus alliance is prominent on north-facing slopes, although it also occurs on ocean-facing slopes. Most stands occupy mesic (solar insolation < 200), moderately steep (> 50%) slopes on a variety of exposures, although north-facing aspects are most common.

Vegetation Description:
The following information has been excerpted from Borchert et al. 2004 in their description of the alliance in the Santa Ynez Mountains: Although greenbark ceanothus clearly dominates this alliance, holly leaf cherry *(Prunus ilicifolia)* and toyon *(Heteromeles arbutifolia)* are almost always associated with it, indicating that these species form a plant association within the greenbark ceanothus alliance. Co-occurring species in this alliance may be different on ocean-facing slopes of the Santa Ynez Mountains.

Comments:
Based on the comments of Borchert et al. 2004, it is likely that this association is the principal one found in the Santa Monica Mountains and in the Santa Ynez Mountains to the north and west of this study area. Although *Heteromeles arbutifolia* is a common associate of this association, it was not found to be a strong enough indicator to warrant an entire association. A *Ceanothus spinosus-Heteromeles arbutifolia-Prunus ilicifolia* phase of this association has been identified, which is analogous to the situation described by Borchert et al. 2004 above.

References:
Borchert et al. 2004

Ceanothus spinosus-Ceanothus megacarpus Shrubland Association

Greenbark Ceanothus-Big Pod Ceanothus Shrubland Association
***Ceanothus spinosus* Shrubland Alliance**
Greenbark Ceanothus Shrubland Alliance

Mapping Code: 2091

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low elevations between 0–749 m. It is characterized by a codominance of *Ceanothus spinosus* and *C. megacarpus* in the shrub layer. The herbaceous layer is diverse but has no constant indicators and generally provides little cover. The emergent tree layer includes occasional *Quercus agrifolia* and *Juglans californica.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–749 m, mean 395 m
Aspect: northeast and northwest
Slope: range 10–40 degrees, mean 32.9 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 25–60%, mean 48.3%
Small Rock Cover: range 5–45%, mean 14.9%
Large Rock Cover: range 0–7%, mean 2.2%
Bare Ground: range 7–45%, mean 21%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Ceanothus spinosus-Ceanothus megacarpus* Shrubland form an open to continuous shrub layer (32–66%, mean 53.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–25%, mean 1.7%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.5%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 40–67%, mean cover is 56.2%.

In this association, the shrub layer is characterized by *Ceanothus spinosus, Ceanothus megacarpus,* and *Malosma laurina*. *Heteromeles arbutifolia* is often present, and *Rhus ovata* is occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta, Leymus condensatus, Brassica nigra, Marah macrocarpus,* and *Bromus madritensis.*

***Ceanothus spinosus-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.9	0.2	10.0			
Shrub									
	CESP	*Ceanothus spinosus*	100	22.7	5.0	50.0	X	X	
	CEME	*Ceanothus megacarpus*	100	18.8	5.0	45.0	X	X	
	MALA6	*Malosma laurina*	78	3.2	0.2	12.0		X	
	HEAR5	*Heteromeles arbutifolia*	70	2.9	0.2	16.0			
	RHOV	*Rhus ovata*	41	0.7	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	37	0.7	0.2	7.0			
	MIAU	*Mimulus aurantiacus*	33	0.7	0.2	5.0			
	PRIL	*Prunus ilicifolia*	28	0.5	0.2	5.0			
	SAME3	*Salvia mellifera*	26	0.8	0.2	12.0			
	CEBE3	*Cercocarpus betuloides*	26	0.5	0.2	8.0			

Other Noteworthy Species:
Juglans californica was found in 12 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Nicotiana glauca, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Foeniculum vulgare, Centaurea melitensis, Piptatherum miliaceum, Eucalyptus, Bromus diandrus, Erodium, Bromus hordeaceus, Senecio mikanioides, Avena, Ageratina adenophora, Conyza canadensis, Erodium cicutarium, Malva parviflora, Marrubium vulgare

Samples Used in Description: (n = 54)
AA0025cc, AA0094cc, AA0203cc, AA0227cc, AA0258cc, AA0340, AA0348, AA0457cc, AA0632, AA0644, AA0661, AA0663, AA0706, AA0734, AA0831, AA0865, AA0889, AA0925, AA1140, AA1205, rap0017m, rap0122, rap0153m, rap0184, rap0216m, rap0224m, rap0230m, rap0237m, rap0296m, rap0315, rap0316, rap0353, rap0598m, rap0615, rap0817, rap0823m, rap0825m, rap0929, rap0952, rap1289, rap1379, rap1382, rap1406, rap1575, rap1576, rap1577m, rap1650, rap1879, rap2103, rap2343, rap2345, rap2346, rap2486, rap2667

Comments:
In this association, the two principal members of the two main chaparral alliances endemic to the western transverse ranges comingle. Because *C. megacarpus* is typical of relatively xeric settings and *C. spinosus* is conversely typical of mesic settings, it stands to reason that this mixing of the two species falls in between. Thus, although the stands of this association tend to occur on northerly facing slopes, they usually occur on the upper slopes, toward the ridges and on minor convexities. Either species of *Ceanothus* may dominate with more than twice the cover of the other, although *C. spinosus* is more frequently dominant.

Phases:
None

COMMON NAME	Greenbark Ceanothus-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Ceanothus spinosus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Cercocarpus betuloides Shrubland Association

Birch Leaf Mountain Mahogany Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2114

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northeast- and northwest-facing slopes at low elevations between 10–661 m. It is characterized by a dominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer has no characteristic species. The emergent tree layer may include infrequent *Quercus agrifolia, Juglans californica, Platanus racemosa,* and *Umbellularia californica*.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 10–661 m, mean 233.5 m
Aspect: northeast and northwest
Slope: range 8–8 degrees, mean 31.3 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 55–65%, mean 59.3%
Small Rock Cover: range 0–15%, mean 8.8%
Large Rock Cover: range 0–12%, mean 3.4%
Bare Ground: range 0–55%, mean 19.7%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides* Shrubland form an open to continuous shrub layer (16–68%, mean 46.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–28%, mean 4%) at 0–2 m tall. Trees are occasionally emergent (0–7% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 37–70%, mean cover is 51.1%.

In this association, the shrub layer is dominated by *Cercocarpus betuloides. Heteromeles arbutifolia* is also characteristic but at lower cover. *Malosma laurina* is often present, while *Ceanothus spinosus* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Melica imperfecta, Marah macrocarpus, Phacelia* sp., *Nassella* sp., and *Bromus diandrus.*

***Cercocarpus betuloides* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEBE3	*Cercocarpus betuloides*	100	31.8	12.0	65.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	76	3.1	0.2	15.0		X	
	MALA6	*Malosma laurina*	52	1.0	0.2	7.0			
	CESP	*Ceanothus spinosus*	50	1.5	0.2	12.0			
	CEME	*Ceanothus megacarpus*	43	1.0	0.2	8.0			
	ADFA	*Adenostoma fasciculatum*	40	1.1	0.2	16.0			
	MIAU	*Mimulus aurantiacus*	36	1.1	0.2	8.0			
	SAME3	*Salvia mellifera*	36	0.8	0.2	6.0			
	ARCA11	*Artemisia californica*	33	0.5	0.2	5.0			
	PRIL	*Prunus ilicifolia*	31	0.5	0.2	5.0			
	RHOV	*Rhus ovata*	29	0.5	0.2	5.0			
	SAME5	*Sambucus mexicana*	29	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	38	1.0	0.2	10.0			

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 5 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Lepechinia fragrans was found in 1 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Woodwardia fimbriata was found in 2 of 42 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Bromus hordeaceus, Centaurea melitensis, Avena fatua, Bromus madritensis, Piptatherum miliaceum, Hirschfeldia incana, Avena barbata, Capsella bursa-pastoris, Carduus pycnocephalus, Erodium, Malva parviflora, Nicotiana glauca, Ricinus communis, Stellaria media, Ageratina adenophora, Bromus tectorum, Cistus, Galium aparine, Marrubium vulgare

Samples Used in Description: (n = 42)
AA0141cc, AA0408, AA0435, AA0711, AA0716, AA0719, AA0901, AA0927, AA1022, AA1029, AA1091, AA1162, AA1191, AA1214, rap0127, rap0369, rap0676, rap0716, rap0718, rap0724, rap0754m, rap1030, rap1031, rap1105m, rap1252, rap1651m, rap1663, rap1664, rap1762m,

rap1855, rap1857m, rap1859, rap2139, rap2141, rap2142, rap2408m, rap2551, rap2620, rap2671, rap2690, rap2802, rap2909

Comments:
This is the most widespread of the four associations of *Cercocarpus betuloides* in the study area. It is often found on steep, usually upper northerly facing slopes.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains and western Riverside County (Klein and Evens 2005). Information about its global distribution is not available without additional inventory; however, it is likely to occur more widely throughout California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
Cercocarpus betuloides is usually the dominant species in the shrub overstory. A variety of shrubs consistently intermix as subdominants including *Heteromeles arbutifolia*, *Ceanothus crassifolius*, *Rhamnus ilicifolia*, *Prunus ilicifolia*, and *Salvia mellifera*. Other species that commonly occur at low cover include the shrub *Adenostoma fasciculatum* and herb *Dudleya pulverulenta* (in western Riverside County).

Comments:
This association appears to be widespread throughout coastal California and may also range into the foothills of the Sierra Nevada (Keeler-Wolf, personal observation).

References:
Klein and Evens 2005

Cercocarpus betuloides-Adenostoma fasciculatum Shrubland Association

Birch Leaf Mountain Mahogany-Chamise Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2115

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest-facing slopes at low elevations between 154–618 m. It is characterized by a codominance of *Cercocarpus betuloides* and *Adenostoma fasciculatum* in the shrub layer. *Melica imperfecta* occurs regularly in many of the stands at low cover in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 154–618 m, mean 315.5 m
Aspect: northwest
Slope: range 15–40 degrees, mean 32.5 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 8–55%, mean 31.5%
Small Rock Cover: range 8–35%, mean 20.6%
Large Rock Cover: range 0–15%, mean 4.2%
Bare Ground: range 15–32%, mean 22.4%
Parent Material: igneous
Soil Texture: medium to moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Adenostoma fasciculatum* Shrubland form an intermittent shrub layer (35–52%, mean 43.7%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 4.9%) at 0–2 m tall. Trees are occasionally emergent (0–4% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 35–60%, mean cover is 49.8%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum, Cercocarpus betuloides, Heteromeles arbutifolia,* and *Malosma laurina*. *Salvia mellifera* is often present and *Quercus berberidifolia* is occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Melica imperfecta, Phacelia* sp., *Brassica nigra, Bromus madritensis, Bromus diandrus, Marah macrocarpus,* and *Centaurea melitensis.*

***Cercocarpus betuloides-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	13.3	4.0	24.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	13.0	7.5	23.0		X	
	HEAR5	*Heteromeles arbutifolia*	82	2.6	0.2	10.0		X	
	MALA6	*Malosma laurina*	82	1.2	0.2	3.0		X	
	SAME3	*Salvia mellifera*	73	2.5	0.2	10.0			
	QUBE5	*Quercus berberidifolia*	45	1.2	0.2	6.0			
	CEME	*Ceanothus megacarpus*	36	1.4	1.0	6.0			
	CECR	*Ceanothus crassifolius*	36	0.9	0.2	5.0			
	KECO	*Keckiella cordifolia*	27	1.1	1.0	6.0			
	LONIC	*Lonicera*	27	0.8	0.2	6.0			
	LOSC2	*Lotus scoparius*	27	0.6	0.2	4.0			
	DERI	*Dendromecon rigida*	27	0.6	1.0	3.0			
	MIAU	*Mimulus aurantiacus*	27	0.5	1.0	3.0			
	CESP	*Ceanothus spinosus*	27	0.5	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	27	0.2	0.2	2.0			
Herb									
	MEIM	*Melica imperfecta*	27	0.9	1.0	5.0			

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Centaurea melitensis, Brassica nigra, Bromus madritensis, Senecio mikanioides, Avena, Bromus hordeaceus, Galium aparine

Samples Used in Description: (n = 11)
AA0476cc, AA1090, rap0366, rap0705m, rap0859, rap0861, rap1684, rap2073, rap2598, rap2789, rap2825

Comments:
This association occurs often at the head of small ravines and canyons on northerly exposures where there is an intermediate set of moisture conditions between convex and concave topography that allows a blending of the two dominant shrubs.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany-Chamise Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4

Global Description

Distribution:
This association is also known from other regions of southern California including western San Gabriel and San Bernardino mountains, the San Jacinto Mountains, and the southern peninsular ranges as well as the Santa Monica Mountains.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Elsewhere it occurs on low to moderately high elevations on moderately steep to steep, southeast- to northeast-facing slopes. Geologic substrate is usually granitic and the soil group is usually alfisols.

Vegetation Description:
Elsewhere it is similar to above local description. The two main species of the association are regularly codominant, and there is usually some *Eriogonum fasciculatum* present (Gordon and White 1994).

Comments:
Interestingly, two recent studies of the vegetation of western Riverside County (Klein and Evens 2005) and San Dieguito River watershed (Evens and San 2005) failed to find this particular association.

References:
Evens and San 2005, Gordon and White 1994, Klein and Evens 2005

Cercocarpus betuloides-Ceanothus spinosus Shrubland Association

Birch Leaf Mountain Mahogany-Greenbark Ceanothus Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2113

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest-facing slopes at low elevations between 64–526 m. It is characterized by a codominance of *Cercocarpus betuloides* and *Ceanothus spinosus* in the shrub layer and an insignificant herbaceous layer with occasional *Leymus condensatus.* The emergent tree layer includes occasional *Quercus agrifolia* and rarely *Juglans californica* and *Platanus racemosa*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 64–526 m, mean 317 m
Aspect: northwest
Slope: range 15–45 degrees, mean 31.3 degrees
Topography (micro; macro): undulating or flat; middle to upper slope
Litter Cover: range 50–70%, mean 60%
Small Rock Cover: range 2–18%, mean 8.3%
Large Rock Cover: range 0–8%, mean 2%
Bare Ground: range 12–42%, mean 22.8%
Parent Material: igneous or sedimentary
Soil Texture: medium loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Ceanothus spinosus* Shrubland form an open to intermittent shrub layer (29–60%, mean 52.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is open (0–7%, mean 1.9%) at 0–1 m tall. Trees are occasionally emergent (0–21% cover, mean 2.1%) with hardwoods at 0–15 m tall. Total vegetation cover is 47–65%, mean cover is 55.3%.

In this association, the shrub layer is characterized by *Ceanothus spinosus, Cercocarpus betuloides,* and *Prunus ilicifolia. Heteromeles arbutifolia, Malosma laurina, Ceanothus megacarpus,* and *Adenostoma fasciculatum* are usually included in this layer. The tree layer is emergent and open and may occasionally include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus*, *Bromus diandrus,* and *Melica imperfecta.*

***Cercocarpus betuloides-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	QUAG-M	*Quercus agrifolia*	27	0.1	0.2	0.2			
Shrub									
	CESP	*Ceanothus spinosus*	100	20.1	10.0	35.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	15.7	9.0	25.0	X	X	
	PRIL	*Prunus ilicifolia*	82	1.9	0.2	5.0		X	
	HEAR5	*Heteromeles arbutifolia*	64	1.7	1.0	5.0			
	CEME	*Ceanothus megacarpus*	55	4.9	2.0	22.0			
	ADFA	*Adenostoma fasciculatum*	55	1.9	0.2	7.0			
	MALA6	*Malosma laurina*	55	0.9	0.2	5.0			
	RHOV	*Rhus ovata*	45	0.6	1.0	3.0			
	SAME3	*Salvia mellifera*	36	1.0	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	36	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	27	1.2	0.2	13.0			
Herb									
	LECO12	*Leymus condensatus*	36	0.3	0.2	2.0			

Other Noteworthy Species:
Juglans californica was found in 2 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus diandrus, Bromus madritensis, Avena, Avena barbata, Avena fatua, Brassica nigra, Bromus hordeaceus, Foeniculum vulgare

Samples Used in Description: (n = 11)
AA0519, AA0861, AA1141, rap0004, rap0125, rap0134, rap0429m, rap1332m, rap1644m, rap2623, rap2826

Comments:
This is the local mesic version of the *Cercocarpus betuloides* Alliance. Its environmental position is typically on concave slopes adjacent to the more mesic *Ceanothus spinosus* Alliance stands but typically at higher-slope positions. It represents a more mesic setting than the *C. betuloides* Association and is significantly more mesic than the *C. betuloides-Adenostoma fasciculatum* Association. All the local *Cercocarpus betuloides* Associations in the SAMO study area tend to occur in small stands in intermediate positions between other more widespread alliances such as *Ceanothus megacarpus, C. spinosus,* or *Adenostoma fasciculatum* Alliance stands.

Further detailed description of the understory of this and other steep mesophytic stands of chaparral would likely reveal more species of shared herbs and grasses such as *Melica imperfecta*.

Phases:
None

COMMON NAME	Birch Leaf Mountain Mahogany-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Cercocarpus betuloides-Malosma laurina-Artemisia californica Shrubland Association

Birch Leaf Mountain Mahogany-Laurel Sumac-California Sagebrush Shrubland Association
***Cercocarpus betuloides* Shrubland Alliance**
Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2117

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northeast-facing slopes at low elevations between 33–743 m. It is characterized by dominance of *Cercocarpus betuloides* and subdominance to codominance of *Malosma laurina* in the shrub layer. *Melica imperfecta* and scattered other native and nonnative species are present in the herbaceous layer. The emergent tree layer includes infrequent *Quercus agrifolia* and *Umbellularia californica*.

Distribution:
This association is sampled in the Immediate Coast, Eastern Urban, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 33–743 m, mean 177.5 m
Aspect: northeast
Slope: range 12–48 degrees, mean 34.1 degrees
Topography (micro; macro): flat or convex; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–55%, mean 18.3%
Large Rock Cover: range 0–85%, mean 12.4%
Bare Ground: range 2–40%, mean 23.1%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Cercocarpus betuloides-Malosma laurina-Artemisia californica* Shrubland form an open to intermittent shrub layer (17–51%, mean 37.3%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–19%, mean 6.1%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 17–55%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Cercocarpus betuloides, Malosma laurina*, *Heteromeles arbutifolia,* and *Artemisia californica. Salvia mellifera* and *Eriogonum cinereum* are often present, while *Mimulus aurantiacus* is occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is diverse and sometimes includes *Melica imperfecta, Leymus condensatus, Bromus madritensis, Avena fatua, Foeniculum vulgare, Brassica nigra,* and *Marah macrocarpus.*

***Cercocarpus betuloides-Malosma laurina-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEBE3	*Cercocarpus betuloides*	100	13.9	4.0	26.0	X		
	MALA6	*Malosma laurina*	100	6.8	1.0	15.0	X		
	HEAR5	*Heteromeles arbutifolia*	93	2.8	0.2	7.5	X		
	ARCA11	*Artemisia californica*	80	3.6	0.2	13.0	X		
	SAME3	*Salvia mellifera*	73	2.1	0.2	8.0			
	ERCI5	*Eriogonum cinereum*	60	1.0	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	47	0.7	0.2	2.5			
	CESP	*Ceanothus spinosus*	33	1.5	1.0	9.0			
	RHOV	*Rhus ovata*	33	0.8	0.2	6.0			
	SALE3	*Salvia leucophylla*	33	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	33	0.2	0.2	2.0			
	ADFA	*Adenostoma fasciculatum*	27	0.3	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.1	0.2	1.0			
	ENCA	*Encelia californica*	20	0.2	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	20	0.1	0.2	1.0			
Herb									
	MEIM	*Melica imperfecta*	47	1.9	0.2	10.0			
	LECO12	*Leymus condensatus*	33	1.0	1.0	8.0			
	POACXX	*Poaceae*	20	0.9	0.2	8.0			
	BRMA3	*Bromus madritensis*	20	0.3	0.2	4.0		X	

Other Noteworthy Species:
Juglans californica was found in 1 of 15 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Avena, Avena fatua, Brassica nigra, Foeniculum vulgare, Senecio mikanioides, Schinus molle, Nerium oleander, Conium maculatum, Hirschfeldia incana, Ailanthus altissima, Centaurea melitensis, Erodium, Euphorbia terracina, Nicotiana glauca, Pennisetum setaceum, Piptatherum miliaceum

Samples Used in Description: (n = 15)
AA0010cc, AA0185cc, AA0926, rap0163, rap0166, rap0273, rap0919, rap0928, rap1052, rap1116, rap1181m, rap1192m, rap1865m, rap2167m, rap2644

Comments:
This is a low elevation, largely coastal association that likely does not range much beyond the SAMO study area and the western transverse ranges. It typically occurs on northerly facing slopes immediately adjacent to coastal scrub alliances such as the *Artemisia californica* Alliance. These stands are usually well within the coastal summer fog zone. Two phases have been defined, one with relatively more *Malosma laurina* and the other with relatively more *A. californica*.

Phases:
Cercocarpus betuloides-Malosma laurina-Artemisia californica (Birch Leaf Mountain Mahogany-Laurel Sumac) Phase [2117]
Cercocarpus betuloides-Artemisia californica/Melica imperfecta (Birch Leaf Mountain Mahogany-California Sagebrush [Provisional]) Phase [2111]

COMMON NAME	Birch Leaf Mountain Mahogany-Laurel Sumac-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Coreopsis gigantea-Artemisia californica-Eriogonum cinereum Shrubland Association

Giant Coreopsis-California Sagebrush-Ashy Buckwheat Shrubland Association
***Coreopsis gigantea* Shrubland Alliance**
Giant Coreopsis Shrubland Alliance

Mapping Code: 3345

Local Description

Summary:
This shrubland association occurs on flat to very steep southwest- to northeast-facing slopes at low elevations between 1–407 m. It is characterized by a dominance of *Coreopsis gigantea* with a co- or subdominance of *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer may have low cover of *Leymus condensatus*, *Melica imperfecta,* and scattered nonnative species. The emergent tree layer is typically absent but may include nonnative species.

Distribution:
This association is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 1–407 m, mean 51.1 m
Aspect: southwest to northeast
Slope: range 0–60 degrees, mean 34.4 degrees
Topography (micro; macro): undulating or flat; bottom to middle slope
Litter Cover: range 5–15%, mean 10%
Small Rock Cover: range 10–50%, mean 28.5%
Large Rock Cover: range 0–30%, mean 6%
Bare Ground: range 8–50%, mean 32.8%
Parent Material: quaternary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Coreopsis gigantea-Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (14–48%, mean 28.3%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–30%, mean 8.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–55%, mean cover is 36.4%.

In this association, the shrub layer is characterized by *Coreopsis gigantea, Artemisia californica, Rhus integrifolia,* and *Eriogonum cinereum*. *Yucca whipplei, Encelia californica, Malosma laurina,* and *Isomeris arborea* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Eucalyptus* sp. and *Pinus* sp. at low cover. The herbaceous layer is diverse and may include *Leymus condensatus, Melica imperfecta, Foeniculum vulgare, Bromus madritensis*, *Carpobrotus edulis,* and *Brassica nigra.*

Coreopsis gigantea-Artemisia californica-Eriogonum cinereum

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	COGI	*Coreopsis gigantea*	100	9.0	2.0	21.0	X	X	
	ARCA11	*Artemisia californica*	90	5.4	0.2	20.0		X	
	RHIN2	*Rhus integrifolia*	86	3.3	0.2	10.0		X	
	ERCI5	*Eriogonum cinereum*	76	3.2	0.2	8.0		X	
	YUWH	*Yucca whipplei*	43	0.9	0.2	4.0			
	ENCA	*Encelia californica*	43	0.8	0.2	5.0			
	MALA6	*Malosma laurina*	33	0.9	0.2	7.0			
	ISAR	*Isomeris arborea*	33	0.3	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	24	0.4	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	24	0.4	0.2	3.0			
Herb									
	LECO12	*Leymus condensatus*	48	0.8	0.2	8.0			
	MEIM	*Melica imperfecta*	29	1.0	1.0	7.0			
	FOVU	*Foeniculum vulgare*	29	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	24	0.3	0.2	3.0			X

Other Noteworthy Species:
Erysimum insulare was found in 1 of 21 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Foeniculum vulgare, Bromus madritensis, Carpobrotus edulis, Brassica nigra, Pennisetum setaceum, Carpobrotus chilensis, Salsola tragus, Nicotiana glauca, Cortaderia, Malva parviflora, Mesembryanthemum crystallinum, Bromus diandrus, Eucalyptus, Medicago polymorpha, Melilotus indicus, Myoporum laetum, Brassica, Cakile maritima, Erodium cicutarium, Hirschfeldia incana, Marrubium vulgare, Oxalis pes-caprae, Raphanus sativus, Sonchus oleraceus

Samples Used in Description: (n = 21)
AA0869, AA1058, AA1059, AA1062, AA1063, rap0520, rap0639, rap0645, rap0666, rap0903, rap0907, rap0938, rap1045, rap1156, rap1201, rap1273, rap1276, rap2818, rap2887rlv, rap2888rlv, rap2889rlv

Comments:
This is an association restricted to the immediate coast, usually on steep bluffs or stable slopes within a kilometer of the ocean. The dominant species is a drought-deciduous soft woody shrub, which is very frost sensitive. *Coreopsis gigantea* is an indicator and may not always be a dominant. Due to the withering nature of *C. gigantea* in the later summer and fall months, these stands appear to have much higher relative cover of the codominant shrubs.

Phases:
None

COMMON NAME Giant Coreopsis-California Sagebrush-Ashy Buckwheat Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Coreopsis gigantea* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur locally along the immediate coast of adjacent Santa Barbara County and also on Santa Cruz and perhaps other northern Channel Islands.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Coreopsis gigantea-Ericameria ericoides-Encelia californica Shrubland Association

Giant Coreopsis-Dune Goldenbush-California Encelia Shrubland Association
***Coreopsis gigantea* Shrubland Alliance**
Giant Coreopsis Shrubland Alliance

Mapping Code: 3342

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast-facing slopes at low elevations between 0–40 m. It is characterized by a codominance of *Coreopsis gigantea* and *Ericameria ericoides* in the shrub layer and a variety of psammophytic coastal species in the herbaceous layer. The emergent tree layer is absent.

Distribution:
This association is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–40 m, mean 21.3 m
Aspect: northeast or flat
Slope: range 0–35 degrees, mean 9.5 degrees
Topography (micro; macro): flat or undulating; lower slope to ridgetop
Litter Cover: range 35–60%, mean 47.5%
Small Rock Cover: range 0–10%, mean 3.7%
Large Rock Cover: range 0–5%, mean 0.6%
Bare Ground: range 20–80%, mean 48.4%
Parent Material: quaternary
Soil Texture: coarse to medium loamy sand

Vegetation Description:
Stands of *Coreopsis gigantea-Ericameria ericoides-Encelia californica* Shrubland form an open to intermittent shrub layer (2–60%, mean 24.2%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent (0–41%, mean 10.6%) at 0–1 m tall. Trees are not present. Total vegetation cover is 17–60%, mean cover is 34.9%.

In this association, the shrub layer is characterized by *Coreopsis gigantea, Encelia californica,* and *Ericameria ericoides. Opuntia littoralis* is often present and *Rhus integrifolia* is occasionally included in this layer. The tree layer is absent. The herbaceous layer is diverse and occasionally includes *Croton californicus, Eschscholzia californica, Carpobrotus edulis,* and *Marah macrocarpus.*

***Coreopsis gigantea-Ericameria ericoides-Encelia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	COGI	*Coreopsis gigantea*	94	7.6	0.2	18.0	X	X	
	ENCA	*Encelia californica*	94	3.8	0.2	12.0		X	
	ERER11	*Ericameria ericoides*	75	5.7	0.2	21.0		X	
	OPLI3	*Opuntia littoralis*	62	1.4	0.2	6.0			
	RHIN2	*Rhus integrifolia*	44	2.2	0.2	28.0			
	BAPI	*Baccharis pilularis*	38	0.2	0.2	2.0			
	ISME5	*Isocoma menziesii*	31	0.4	0.2	6.0			
	ERPA8	*Eriogonum parvifolium*	31	0.3	0.2	3.0			
	LOSC2	*Lotus scoparius*	31	0.2	0.2	2.0			
	ARCA11	*Artemisia californica*	25	0.2	0.2	2.0			
Herb									
	CRCA5	*Croton californicus*	62	1.6	0.2	5.0			
	ESCA2	*Eschscholzia californica*	62	0.9	0.2	5.0			
	CAED3	*Carpobrotus edulis*	56	0.6	0.2	5.0			X
	PHACE	*Phacelia*	50	0.7	0.2	3.0			
	MAMA8	*Marah macrocarpus*	44	0.3	0.2	2.0			
	BRDI3	*Bromus diandrus*	25	1.0	0.2	10.0			X
	RASA2	*Raphanus sativus*	25	0.6	0.2	5.0			X
	AMCH4	*Ambrosia chamissonis*	25	0.2	0.2	2.0			
	GNAPH	*Gnaphalium*	25	0.1	0.2	0.2			
	LEFI11	*Lessingia filaginifolia*	25	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Carpobrotus edulis, Bromus diandrus, Raphanus sativus, Brassica, Erodium moschatum, Medicago polymorpha, Pennisetum setaceum, Anagallis arvensis, Bromus madritensis, Foeniculum vulgare, Brassica nigra, Brassica rapa, Erodium botrys, Erodium cicutarium, Lobularia maritima, Malva parviflora

Samples Used in Description: (n = 16)
rap0515, rap0637, rap0641, rap0642, rap0643, rap0644, rap0646, rap0689, rap0690, rap0691, rap0692, rap0694, rap1128, rap2753, rap2870rlv, rap2871rlv

Comments:
This is a rare and local vegetation type known mostly from the Point Dume area and scattered bluffs westward to Point Mugu. The scattered bluffs, however, do not have *Ericameria ericoides.* Similar stands may exist as far north as San Luis Obispo County at places such as the Nipomo Dunes, although they have not been confirmed elsewhere. Recent removal of *Carpobrotus edulis* for the Point Dume stands should be monitored to ensure protection from reinvasion and human trampling.

Phases:
None

COMMON NAME	Giant Coreopsis-Dune Goldenbush-California Encelia Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Sem-natural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Coreopsis gigantea* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Dendromecon rigida Shrubland Alliance

Bush Poppy Shrubland Alliance

Mapping Code: 3350

Local Description

Summary:
This shrubland alliance occurs on moderately steep to steep northwest- or southeast-facing slopes at low elevations between 0–673 m. It is dominated by *Dendromecon rigida* in the shrub layer. All Santa Monica Mountains stands so far have a constant low cover of *Heteromeles arbutifolia,* and *Adenostoma fasciculatum* is also found in more than 80% of the stands. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–673 m, mean 385.2 m
Aspect: northwest and southeast
Slope: range 12–35 degrees, mean 25 degrees
Topography (micro; macro): flat to undulating; mid to upper slope
Litter Cover: no data
Small Rock Cover: range 4–15%, mean 9.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 15–20%, mean 17.5%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (32–57%, mean 40.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–1%, mean 0.2%) at 0–1 m tall. Trees are occasionally emergent (0–15% cover, mean 3%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–58%, mean cover is 42.5%.

In this association, the shrub layer is characterized by *Dendromecon rigida, Heteromeles arbutifolia*, and *Adenostoma fasciculatum*. *Malosma laurina, Rhus ovata, Quercus berberidifolia*, *Ceanothus spinosus,* and *Prunus ilicifolia* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Poaceae* sp.

***Dendromecon rigida* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	50	1.8	1.0	8.0	X		
Shrub									
	DERI	*Dendromecon rigida*	100	21.2	16.0	29.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	0.9	0.2	2.0		X	
	ADFA	*Adenostoma fasciculatum*	83	0.8	0.2	4.0		X	
	MALA6	*Malosma laurina*	67	1.2	0.2	6.0			
	CESP	*Ceanothus spinosus*	50	2.0	1.0	7.0			
	QUBE5	*Quercus berberidifolia*	50	1.4	0.2	6.0			
	RHOV	*Rhus ovata*	50	0.5	0.2	2.0			
	PRIL	*Prunus ilicifolia*	50	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	33	4.0	8.0	16.0			
	CEOL	*Ceanothus oliganthus*	33	1.2	2.0	5.0			

Other Noteworthy Species:
None

Nonnative Species:
Eucalyptus

Samples Used in Description: (n = 6)
AA0334, rap0252, rap0263m, rap2665, rap2761, rap2919

Comments:
This is a typically ephemeral, postfire vegetation alliance. It has not been sampled extensively except in this study. It forms short-lived stands in burned chaparral that appear to exist about 10 years or less. The seeds are long lived. Over a period of several years, *Dendromecon* is replaced by resprouting shrubs of *Adenostoma* sp., *Heteromeles arbutifolia, Malosma laurina, Rhus ovata*, and seedlings of other species of longer-lived shrubs such as *Ceanothus megacarpus*.

Phases:
None

COMMON NAME	Bush Poppy Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.a. Temperate broad-leaved evergreen shrubland
ALLIANCE	*Dendromecon rigida* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is likely that with widespread sampling throughout its California range, the *D. rigida* Alliance will be found throughout California from Shasta County to San Diego County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Stands with *Dendromecon rigida* occur in many chaparral types following fire. In Yosemite National Park (Keeler-Wolf et al. 2003), stands with *D. rigida* were considered an association of the *Adenostoma fasciculatum* Alliance. It remains to be seen if analogs to the strongly dominated *D. rigida* stands in the Santa Monica Mountains will be found elsewhere in California.

References:
Keeler-Wolf et al. 2003

Encelia californica Shrubland Association

California Encelia Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3222

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 2–496 m. It is characterized by strong dominance of *Encelia californica* in the shrub layer and a scattering of mostly nonnative species in the herbaceous layer. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Dry Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 2–496 m, mean 205.8 m
Aspect: southwest and southeast
Slope: range 0–38 degrees, mean 24.4 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 10–75%, mean 38.9%
Small Rock Cover: range 0–65%, mean 16%
Large Rock Cover: range 0–10%, mean 0.9%
Bare Ground: range 0–55%, mean 31.4%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Encelia californica* Shrubland form an open to continuous shrub layer (12–69%, mean 34.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–31%, mean 4.7%) at 0–1 m tall. Trees are occasionally emergent (0–12% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 24–70%, mean cover is 39.8%.

In this association, the shrub layer is characterized by abundant *Encelia californica*. *Artemisia californica* and *Malosma laurina* are usually present, while *Salvia mellifera* and *Yucca whipplei* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra*. *Bromus madritensis, Leymus condensatus,* and *Centaurea melitensis* are sometimes present.

***Encelia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	23.8	6.0	50.0	X	X	
	ARCA11	*Artemisia californica*	62	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	60	1.6	0.2	10.0			
	SAME3	*Salvia mellifera*	50	1.2	0.2	13.0			
	YUWH	*Yucca whipplei*	43	0.3	0.2	2.0			
	SALE3	*Salvia leucophylla*	38	0.4	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	36	1.7	0.2	14.0			
	ERCI5	*Eriogonum cinereum*	36	0.7	0.2	6.0			
	RHIN2	*Rhus integrifolia*	33	0.5	0.2	6.0			
	MAFA	*Malacothamnus fasciculatus*	24	0.4	0.2	8.0			
	MILA6	*Mirabilis laevis*	24	0.2	0.2	5.0			
Herb									
	BRNI	*Brassica nigra*	55	0.7	0.2	7.5			X
	BRMA3	*Bromus madritensis*	36	0.3	0.2	4.0			X
	LECO12	*Leymus condensatus*	26	0.7	0.2	10.0			
	CEME2	*Centaurea melitensis*	24	0.3	0.2	8.0			X

Other Noteworthy Species:
Juglans californica was found in 2 of 42 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Centaurea melitensis, Nicotiana glauca, Bromus diandrus, Hirschfeldia incana, Ricinus communis, Erodium cicutarium, Avena fatua, Pennisetum setaceum, Myoporum laetum, Avena, Melilotus indicus, Euphorbia terracina, Salsola tragus, Foeniculum vulgare, Malva parviflora, Marrubium vulgare, Sonchus oleraceus, Schinus molle, Opuntia ficus-indica, Avena barbata, Brassica, Bromus hordeaceus, Cakile maritima, Carduus pycnocephalus, Cortaderia, Lactuca serriola, Lamarckia aurea, Medicago polymorpha, Melilotus officinalis, Piptatherum miliaceum, Senecio vulgaris, Silybum marianum, Vicia villosa

Samples Used in Description: (n = 42)
AA0372cc, AA0373cc, AA0497, AA0615, AA0976, AA0995, AA1097, AA1111, rap0036, rap0330, rap0334, rap0623, rap0657, rap0915, rap0923, rap0926, rap0934, rap0972, rap0981, rap1047, rap1063, rap1269, rap1420, rap1421m, rap1463, rap1525, rap1596, rap1598, rap1638, rap1745, rap1794, rap1830, rap1837, rap1851, rap1963, rap2046, rap2051, rap2514, rap2755, rap2816, rap2869rlv, rap2905rlv

Comments:
This is the standard version of the *Encelia californica* Alliance in the study area. As with other examples of this alliance defined elsewhere, it typically contains a relatively large nonnative herbaceous component with evidence of recent disturbance from fire or clearing. *E. californica* seems to require disturbance of this type to maintain stands over time. Otherwise, it may succeed to more stable versions of coastal scrub such as associations in the *Artemisia californica, Salvia leucophylla, Salvia mellifera,* or *Eriogonum cinereum* Alliances. Two phases

have been identified, one with essentially pure dominance of *E. californica* and the other with a mixture of *Eriogonum fasciculatum* and *Encelia californica*.

Phases:
Encelia californica (California Encelia) Phase [3222]
Encelia californica-Eriogonum fasciculatum (California Encelia-California Buckwheat) Phase [3224]

COMMON NAME	California Encelia Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Other studies of this alliance (Klein and Evens 2005, Evens and San 2005) have not defined this association. They do describe similar associations but with a mixture of *Encelia californica* and *Artemisia californica*.

References:
Evens and San 2005, Klein and Evens 2005

Encelia californica-Artemisia californica Shrubland Association

California Encelia-California Sagebrush Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3227

Local Description

Summary:
This shrubland association occurs on gentle to very steep southwest-and southeast-facing slopes at low elevations between 3–423 m. It is characterized by a codominance of *Encelia californica* and *Artemisia californica* in the shrub layer and a largely nonnative herbaceous layer characterized by *Brassica nigra*. The emergent tree layer includes *Juglans californica* and *Sambucus mexicana*.

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 3–423 m, mean 211 m
Aspect: southwest and southeast
Slope: range 2–50 degrees, mean 27.1 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 35–55%, mean 45%
Small Rock Cover: range 5–40%, mean 20.7%
Large Rock Cover: range 0–15%, mean 1.9%
Bare Ground: range 10–65%, mean 33.5%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine to fine silty or sandy clay loam

Vegetation Description:
Stands of *Encelia californica-Artemisia californica* Shrubland form an open to intermittent shrub layer (5–47%, mean 28.9%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (1–25%, mean 10.5%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–52%, mean cover is 39.6%.

In this association, the shrub layer is characterized by *Encelia californica* and *Artemisia californica. Malosma laurina* and *Salvia mellifera* are often present, while *Sambucus mexicana* and *Baccharis pilularis* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by *Brassica nigra*. Other herbs sometimes include *Marah macrocarpus, Marrubium vulgare, Bromus diandrus,* and *Leymus condensatus.*

***Encelia californica-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	21	0.4	1.0	3.0			
Tree Understory									
	SAME5	*Sambucus mexicana*	21	0.2	0.2	1.0			
Shrub									
	ENCA	*Encelia californica*	100	11.2	4.0	22.0	X	X	
	ARCA11	*Artemisia californica*	100	9.2	0.2	26.0	X	X	
	MALA6	*Malosma laurina*	71	2.0	1.0	5.0			
	SAME3	*Salvia mellifera*	57	2.0	0.2	7.5			
	SAME5	*Sambucus mexicana*	50	0.6	0.2	2.5			
	BAPI	*Baccharis pilularis*	36	0.9	0.2	10.0			
	RHIN2	*Rhus integrifolia*	29	0.4	0.2	2.5			
	NIGL	*Nicotiana glauca*	29	0.3	0.2	2.0			X
	HEAR5	*Heteromeles arbutifolia*	29	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.4	0.2	4.0			
	ISME5	*Isocoma menziesii*	21	0.1	0.2	1.0			
	MIAU	*Mimulus aurantiacus*	21	0.01	0.2	0.2			
Herb									
	BRNI	*Brassica nigra*	93	4.6	0.2	18.0	X	X	X
	MAMA8	*Marah macrocarpus*	50	0.3	0.2	2.0			
	BRDI3	*Bromus diandrus*	43	2.5	0.2	17.0			X
	LECO12	*Leymus condensatus*	43	0.4	0.2	2.5			
	MAVU	*Marrubium vulgare*	43	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	36	0.5	0.2	3.0			X
	ERODI	*Erodium*	36	0.2	0.2	1.0			X
	MEPO3	*Medicago polymorpha*	29	0.1	0.2	0.2			X
	BROMU	*Bromus*	21	0.3	1.0	2.5			

Other Noteworthy Species:
Stanleya pinnata was found in 1 of 14 surveys of this plant community. Regionally, the park considers this species as Locally Rare. This species is not listed by CNPs. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 14 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Marrubium vulgare, Bromus madritensis, Erodium, Nicotiana glauca, Medicago polymorpha, Hirschfeldia incana, Centaurea melitensis, Foeniculum vulgare, Melilotus indicus, Myoporum laetum, Euphorbia terracina, Carpobrotus chilensis, Arundo donax, Cakile maritima, Carpobrotus edulis, Galium aparine, Malva parviflora, Pennisetum setaceum, Salsola tragus, Schinus molle, Brassica, Conium maculatum, Erodium cicutarium, Ricinus communis

Samples Used in Description: (n = 14)
AA0149cc, rap0629, rap0668, rap0712, rap0746, rap0762, rap0950, rap0965, rap1034, rap1088, rap1155, rap1171, rap1455, rap1524

Comments:
This association is less common than the *Encelia californica* Association. It is generally only differentiated from the former association by the codominance of *A. californica* and *E. californica*. This association tends to reflect more stable conditions with less recent disturbance than the former type.

Phases:
None

COMMON NAME	California Encelia-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as other parts of south coastal California including western Riverside and San Diego counties. Malanson 1984 also describes this association from southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
In western Riverside County and San Diego County, stands are found on gentle to somewhat steep slopes at low elevations (below 1,000 m). The ground typically has a moderate to high amount of rock cover and bare exposed soil. Parent material is often granite, less often sedimentary. Soil texture is usually sandy loam.

Vegetation Description:
In western Riverside County (Klein and Evens 2005), *Artemisia californica* is either codominant or subdominant. Other shrubs may intermix at low cover, the most common species being

Eriogonum fasciculatum, *Opuntia parryi*, and *Lessingia filaginifolia*. A variety of native and nonnative forbs and grasses occupies the herb understory. In San Diego County (Evens and San 2005), *Encelia californica* and *Artemisia californica* are codominant in the shrub layer. *Hirschfeldia incana* or *Bromus madritensis* may dominate the herbaceous layer.

Comments:
None

References:
Evens and San 2005, Klein and Evens 2005, Malanson 1984

Encelia californica-Eriogonum cinereum Shrubland Association

California Encelia-Ashy Buckwheat Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3225

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southeast- and southwest-facing slopes at low elevations between 0–259 m. It is characterized by a codominance of *Encelia californica* and *Eriogonum cinereum* in the shrub layer. As with other associations of this alliance, the herbaceous layer tends to have relatively high frequencies of *Brassica nigra* and other nonnatives. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–259 m, mean 102.9 m
Aspect: southeast and southwest
Slope: range 15–55 degrees, mean 27.2 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–35%, mean 27.5%
Small Rock Cover: range 0–40%, mean 15.8%
Large Rock Cover: range 0–30%, mean 3.9%
Bare Ground: range 20–55%, mean 42.7%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine sandy or silty clay loams

Vegetation Description:
Stands of *Encelia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (18–40%, mean 27.1%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (2–15%, mean 6.7%) at 0–1 m tall. Trees are infrequently present. Total vegetation cover is 25–43%, mean cover is 33.5%.

In this association, the shrub layer is characterized by *Encelia californica, Eriogonum cinereum,* and *Artemisia californica. Malosma laurina, Yucca whipplei,* and *Salvia leucophylla* are often present, while *Salvia mellifera* and *Rhus integrifolia* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and often includes *Brassica nigra* and *Bromus madritensis.*

***Encelia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	9.4	3.0	16.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	8.3	3.0	15.0		X	
	ARCA11	*Artemisia californica*	77	1.6	1.0	3.0		X	
	MALA6	*Malosma laurina*	62	1.9	0.2	7.0			
	YUWH	*Yucca whipplei*	62	0.6	0.2	2.5			
	SALE3	*Salvia leucophylla*	54	0.7	0.2	2.5			
	SAME3	*Salvia mellifera*	46	1.8	2.5	7.5			
	RHIN2	*Rhus integrifolia*	46	0.8	0.2	2.5			
	OPLI3	*Opuntia littoralis*	38	1.2	0.2	6.0			
	ERFA2	*Eriogonum fasciculatum*	38	0.4	0.2	2.5			
	HASQ2	*Hazardia squarrosa*	38	0.3	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	31	0.3	0.2	2.5			
	LOSC2	*Lotus scoparius*	31	0.2	0.2	2.5			
Herb									
	BRNI	*Brassica nigra*	69	1.3	0.2	5.0			X
	BRMA3	*Bromus madritensis*	69	1.0	0.2	4.0			X
	LECO12	*Leymus condensatus*	46	0.8	1.0	3.0			
	CEME2	*Centaurea melitensis*	38	0.3	0.2	2.5			X
	BRDI3	*Bromus diandrus*	31	0.8	0.2	7.5			X
	NALE2	*Nassella lepida*	31	0.3	0.2	3.0			
	CHST4	*Chorizanthe staticoides*	23	0.4	1.0	2.5			
	CHAMA15	*Chamaesyce*	23	0.1	0.2	1.0			
	BRHO2	*Bromus hordeaceus*	23	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Bromus madritensis, Centaurea melitensis, Bromus diandrus, Bromus hordeaceus, Avena fatua, Avena, Schinus molle, Pennisetum setaceum, Erodium cicutarium, Melilotus indicus, Arundo donax, Cakile maritima, Hedera helix, Avena barbata, Carpobrotus edulis, Datura stramonium, Erodium, Eucalyptus, Foeniculum vulgare, Nicotiana glauca, Piptatherum miliaceum, Ricinus communis, Salsola tragus

Samples Used in Description: (n = 13)
AA0230cc, AA0377cc, AA0391cc, rap0055, rap0056, rap0058, rap0962, rap0996, rap1110m, rap1136, rap1466, rap1592, rap2922

Comments:
This association is likely endemic to the Santa Monica Mountains and vicinity. It has slightly lower than average vegetation cover and slightly steeper slopes than other types within the *Encelia californica* Alliance. The codominance of *Encelia* and *Eriogonum cinereum* is diagnostic.

Phases:
None

COMMON NAME	California Encelia-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Encelia californica-Malosma laurina-Salvia mellifera Shrubland Association

California Encelia-Laurel Sumac-Black Sage Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3221

Local Description

Summary:
This shrubland association occurs on gentle to very steep southeast- and southwest-facing slopes at low elevations between 5–457 m. It is characterized by a codominance of *Encelia californica, Salvia mellifera,* and *Malosma laurina* in the shrub layer. The herbaceous layer is diverse and dominated by nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Eastern Urban, Dry Inland, Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 5–457 m, mean 248.8 m
Aspect: southeast and southwest
Slope: range 1–48 degrees, mean 29.3 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 15–45%, mean 28.8%
Small Rock Cover: range 4–35%, mean 17.8%
Large Rock Cover: range 0–8%, mean 2.5%
Bare Ground: range 5–50%, mean 30%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Encelia californica-Malosma laurina-Salvia mellifera* Shrubland form an open to intermittent shrub layer (5–55%, mean 35.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open to intermittent (0–40%, mean 3.8%) at 0-1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.3%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 29–60%, mean cover is 39.4%.

In this association, the shrub layer is characterized by *Encelia californica, Salvia mellifera*, *Malosma laurina,* and *Yucca whipplei. Artemisia californica* is often present, while *Eriogonum fasciculatum, Eriogonum cinereum,* and *Ceanothus megacarpus* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Marah macrocarpus, Bromus madritensis*, *Pennisetum setaceum,* and *Medicago polymorpha*.

***Encelia californica-Malosma laurina-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	10.9	5.0	20.0		X	
	SAME3	*Salvia mellifera*	94	7.5	0.2	22.0		X	
	MALA6	*Malosma laurina*	88	8.7	0.2	30.0		X	
	YUWH	*Yucca whipplei*	75	1.3	0.2	4.0		X	
	ARCA11	*Artemisia californica*	59	0.8	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	50	1.2	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	41	1.0	0.2	6.0			
	CEME	*Ceanothus megacarpus*	34	1.6	0.2	12.0			
	RHOV	*Rhus ovata*	31	0.6	0.2	5.0			
	RHIN2	*Rhus integrifolia*	31	0.3	0.2	3.0			
	ADFA	*Adenostoma fasciculatum*	28	0.6	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	28	0.4	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	28	0.3	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	47	0.4	0.2	3.0			X
	LECO12	*Leymus condensatus*	25	0.4	0.2	4.0			
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	1.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 32 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Pennisetum setaceum, Nicotiana glauca, Medicago polymorpha, Centaurea melitensis, Bromus diandrus, Erodium, Melilotus indicus, Hirschfeldia incana, Carpobrotus edulis, Foeniculum vulgare, Marrubium vulgare, Ricinus communis, Ageratina adenophora, Avena, Avena fatua, Erodium cicutarium, Piptatherum miliaceum, Schinus molle, Vicia villosa

Samples Used in Description: (n = 32)
AA0133cc, AA0252cc, AA0314cc, AA0580, AA0667, AA0674, AA1016, rap0042, rap0305m, rap0610m, rap0611, rap0613, rap0630, rap0658, rap0749, rap0751, rap0886, rap0979, rap1004, rap1025m, rap1114, rap1182, rap1184, rap1193, rap1196m, rap1279, rap1669m, rap2106, rap2268, rap2635, rap2860rlv, rap2933

Comments:
This association is distinctive from others in the *Encelia californica* Alliance by having a codominance of three shrubs. One of them, *Malosma laurina,* is an evergreen broadleaf species that contrasts with the other two codominants by being typically both taller and broader. *Salvia mellifera* and *Encelia californica* may look similar from a distance, especially during the summer when their leaves are drier and may be mostly absent.

Phases:
None

COMMON NAME	California Encelia-Laurel Sumac-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is apparently endemic to the Santa Monica Mountains area; however, it may occur elsewhere in south coastal California.

References:
None

Encelia californica-Rhus integrifolia Shrubland Association

California Encelia-Lemonade Berry Shrubland Association
***Encelia californica* Shrubland Alliance**
California Encelia Shrubland Alliance

Mapping Code: 3226

Local Description

Summary:
This shrubland association occurs on somewhat steep to abrupt southeast-facing slopes at low elevations between 2–625 m. It is characterized by a codominance of *Encelia californica* and *Rhus integrifolia* in the shrub. The herbaceous layer is generally insignificant and composed of nonnative species. The emergent tree layer is usually not present.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 2–625 m, mean 148.8 m
Aspect: southeast
Slope: range 15–75 degrees, mean 37.4 degrees
Topography (micro; macro): undulating; lower to upper slope
Litter Cover: range 5–15%, mean 10%
Small Rock Cover: range 10–50%, mean 26.3%
Large Rock Cover: range 0–8%, mean 3.3%
Bare Ground: range 5–60%, mean 29.6%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Encelia californica-Rhus integrifolia* Shrubland form an open to intermittent shrub layer (10–51%, mean 32.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–11%, mean 2.2%) at 0-1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 12–51%, mean cover is 35%.

In this association, the shrub layer is characterized by *Encelia californica, Rhus integrifolia,* and *Eriogonum cinereum. Salvia mellifera* and *Yucca whipplei* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Schinus molle* and *Pinus* sp. at low cover. The herbaceous layer is simple and sometimes includes *Dichelostemma capitatum, Bromus madritensis, Nassella lepida, Avena fatua,* and *Pennisetum setaceum*.

***Encelia californica-Rhus integrifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ENCA	*Encelia californica*	100	8.6	3.0	16.0		X	
	RHIN2	*Rhus integrifolia*	100	7.5	1.0	16.0		X	
	ERCI5	*Eriogonum cinereum*	80	3.6	0.2	12.0		X	
	SAME3	*Salvia mellifera*	73	4.0	0.2	11.0			
	YUWH	*Yucca whipplei*	73	1.5	1.0	6.0			
	ARCA11	*Artemisia californica*	60	0.8	0.2	4.0			
	MALA6	*Malosma laurina*	47	0.9	1.0	3.0			
	SALE3	*Salvia leucophylla*	27	0.6	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.5	0.2	4.0			
	ISAR	*Isomeris arborea*	27	0.5	0.2	4.0			
	COGI	*Coreopsis gigantea*	27	0.2	0.2	2.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.3	0.2	4.0			
	RHOV	*Rhus ovata*	20	0.2	1.0	1.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.2	0.2	2.0			
	MILA6	*Mirabilis laevis*	20	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	27	0.2	0.2	2.0			X
	NALE2	*Nassella lepida*	20	0.3	0.2	3.0			
	PESE3	*Pennisetum setaceum*	20	0.2	0.2	2.0			X
	AVFA	*Avena fatua*	20	0.01	0.2	0.2			X
	BRMA3	*Bromus madritensis*	20	0.01	0.2	0.2			X
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 15 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Pennisetum setaceum, Avena fatua, Bromus madritensis, Myoporum laetum, Erodium cicutarium, Brassica nigra, Bromus hordeaceus, Nicotiana glauca, Foeniculum vulgare, Bromus diandrus, Hirschfeldia incana, Schinus molle, Sonchus oleraceus

Samples Used in Description: (n = 15)
AA1007, AA1009, AA1010, rap0659, rap0661, rap0884, rap0932, rap1297, rap1465, rap1602, rap1821, rap1836, rap2113, rap2610, rap2804

Comments:
This association differs from the other *Encelia californica* associations by the codominance of the low sprawling evergreen shrub *Rhus integrifolia*. This may resemble the *E. californica-Salvia mellifera-Malosma laurina* Association in structure. It differs from that type by being typically restricted to low elevation and steep slopes, usually relatively close to the ocean. This is a common vegetation type on bluffs facing the immediate coast along Pacific Coast Highway.

Phases:
None

COMMON NAME	California Encelia-Lemonade Berry Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Encelia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association may also occur elsewhere close to the ocean in southern California (Sawyer and Keeler-Wolf 1995). Due to development along the coast, it is likely to be relatively rare with few high-quality examples remaining out of protected areas.

References:
Sawyer and Keeler-Wolf 1995

Eriogonum cinereum Shrubland Association

Ashy Buckwheat Shrubland Association
***Eriogonum cinereum* Shrubland Alliance**
Ashy Buckwheat Shrubland Alliance

Mapping Code: 3257

Local Description

Summary:
This shrubland association occurs on moderate to abrupt southwest-facing slopes at low elevations between 0–500 m. It is characterized by a dominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer has no characteristic species. The emergent tree layer is generally absent but can include *Quercus agrifolia* and *Umbellularia californica.*

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–500 m, mean 289.5 m
Aspect: southwest
Slope: range 9–80 degrees, mean 35.6 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 10–35%, mean 16.7%
Small Rock Cover: range 3–46%, mean 23.1%
Large Rock Cover: range 0–85%, mean 17.1%
Bare Ground: range 0–65%, mean 27.8%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (3–37%, mean 18.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–33%, mean 10.7%) at 0–2 m tall. Trees are occasionally emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 6–47%, mean cover is 29.2%.

In this association, the shrub layer is characterized by *Eriogonum cinereum. Artemisia californica* is usually present. *Yucca whipplei, Salvia mellifera, Malosma laurina,* and *Lotus scoparius* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Centaurea melitensis, Bromus madritensis, Leymus condensatus, Bromus diandrus,* and *Hirschfeldia incana.*

***Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERCI5	*Eriogonum cinereum*	98	10.9	0.2	25.0	X		
	ARCA11	*Artemisia californica*	71	1.5	0.2	8.0			
	SAME3	*Salvia mellifera*	38	0.4	0.2	5.0			
	YUWH	*Yucca whipplei*	38	0.2	0.2	2.5			
	LOSC2	*Lotus scoparius*	35	1.0	0.2	24.0			
	MALA6	*Malosma laurina*	35	0.7	0.2	6.0			
	SALE3	*Salvia leucophylla*	31	0.6	0.2	10.0			
	ENCA	*Encelia californica*	23	0.4	0.2	4.0			
	BRCA3	*Brickellia californica*	21	0.3	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	21	0.2	0.2	2.5			
	RHOV	*Rhus ovata*	21	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	50	1.6	0.2	12.0		X	
	CEME2	*Centaurea melitensis*	38	1.8	0.2	15.0		X	
	BRMA3	*Bromus madritensis*	31	1.3	0.2	20.0		X	
	LECO12	*Leymus condensatus*	25	0.8	0.2	12.0			
	HIIN3	*Hirschfeldia incana*	21	0.7	0.2	15.0		X	
	BRDI3	*Bromus diandrus*	21	0.7	0.2	8.0		X	

Other Noteworthy Species:
Leptodactylon californicum was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Bromus diandrus, Avena fatua, Foeniculum vulgare, Nicotiana glauca, Avena, Piptatherum miliaceum, Avena barbata, Bromus hordeaceus, Eragrostis cilianensis, Cortaderia, Carpobrotus edulis, Centranthus ruber, Erodium cicutarium, Medicago polymorpha, Pennisetum setaceum, Ricinus communis, Salsola tragus, Silybum marianum

Samples Used in Description: (n = 48)
AA0016cc, AA0276cc, AA0504, AA0624, AA0743cc, AA0750cc, AA0858, AA0954, AA1159, AA1161, AA1175, rap0073, rap0093, rap0137, rap0161, rap0389, rap0390, rap0420, rap0463, rap0499, rap1249, rap1250, rap1302, rap1323, rap1367, rap1389, rap1391m, rap1711, rap1722, rap1741, rap1800, rap1804, rap1813, rap1814, rap1819, rap1872, rap1877, rap1927m, rap1947, rap1995, rap1996, rap2000m, rap2127, rap2128, rap2200, rap2586, rap2713, rap2722

Comments:
This is an endemic alliance and association to the Ventura region of California and probably has most of its area represented within the SAMO study area. It is characteristic of steep usually southerly facing slopes below 600 m elevation and is often found on rocky or eroded cliffs. An early seral (postfire) phase has been identified with a higher cover of *Malacothamnus fasciculatus* and *Leymus condensatus*.

Phases:
Eriogonum cinereum (Ashy Buckwheat/Annual Grass-Herb) Phase [3257]
Eriogonum cinereum-Malacothamnus fasciculatus/Leymus condensatus (Ashy Buckwheat-Bush Mallow/Giant Wild Rye) Phase [3259]

COMMON NAME	Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum cinereum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Eriogonum fasciculatum Shrubland Association

California Buckwheat Shrubland Association
***Eriogonum fasciculatum* Shrubland Alliance**
California Buckwheat Shrubland Alliance

Mapping Code: 3241

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low elevations between 5–563 m. It is characterized by the dominance of *Eriogonum fasciculatum* in the shrub layer. The herbaceous layer is largely a sparse mix of nonnative species. The emergent tree layer is largely absent.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 5–563 m, mean 389.5 m
Aspect: variable
Slope: range 2–55 degrees, mean 24.2 degrees
Topography (micro; macro): undulating, flat, or convex; lower slope to ridgetop
Litter Cover: range 10–40%, mean 21.7%
Small Rock Cover: range 10–65%, mean 33.4%
Large Rock Cover: range 0–48%, mean 4.7%
Bare Ground: range 8–70%, mean 32.2%
Parent Material: sedimentary or igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (5–48%, mean 23.3%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–25%, mean 6%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.1%) with hardwoods at 0–2 m tall. Total vegetation cover is 6–49%, mean cover is 29.3%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum. Lotus scoparius*, *Artemisia californica, Malosma laurina,* and infrequently includes *Quercus agrifolia*. The herbaceous layer is diverse and sometimes includes *Bromus madritensis, Bromus diandrus*, *Brassica nigra,* and *Centaurea melitensis.*

***Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	14.6	3.0	46.0	X		
	LOSC2	*Lotus scoparius*	58	2.6	0.2	10.0			
	ARCA11	*Artemisia californica*	48	1.2	0.2	7.0			
	MALA6	*Malosma laurina*	45	1.2	0.2	8.0			
	SAME3	*Salvia mellifera*	45	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	29	0.2	0.2	2.5			
	CEME	*Ceanothus megacarpus*	26	0.3	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	26	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	23	0.6	0.2	11.0			
Herb									
	BRMA3	*Bromus madritensis*	45	0.4	0.2	4.0			X
	BRDI3	*Bromus diandrus*	42	1.2	0.2	16.0			X
	BRNI	*Brassica nigra*	39	0.7	0.2	7.0			X
	CEME2	*Centaurea melitensis*	39	0.7	0.2	7.0			X
	AVENA	*Avena*	23	0.5	0.2	6.0			X

Other Noteworthy Species:
Leptodactylon californicum was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Stanleya pinnata was found in 1 of 31 surveys of this plant community. Regionally, the park considers this species as Locally Rare. This species is not listed by CNPs. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus diandrus, Brassica nigra, Centaurea melitensis, Avena, Hirschfeldia incana, Nicotiana glauca, Erodium cicutarium, Spartium junceum, Melilotus indicus, Piptatherum miliaceum, Erodium botrys, Avena fatua, Pennisetum setaceum, Foeniculum vulgare, Cistus, Ricinus communis, Medicago polymorpha, Rosmarinus officinalis, Acacia redolens, Avena barbata, Bromus hordeaceus, Cortaderia, Melilotus officinalis, Mesembryanthemum crystallinum

Samples Used in Description: (n = 31)
AA0233cc, AA0274cc, AA0653, AA0798, AA0969, AA1114, AA1126, rap0225m, rap0304, rap0357, rap0391, rap0731, rap0757, rap1275, rap1283, rap1447m, rap1457, rap1458, rap1849, rap1886, rap2131, rap2325, rap2359, rap2362, rap2407, rap2440, rap2469rlv, rap2476, rap2642rlv, rap2657, rap2864rlv

Comments:
This is a common disturbance-related association. It is often found on road cuts and other nonnatural clearings such as fuel breaks and abandoned house pads. It also may occur after fire in chaparral and some drier coastal scrubs. The most common postfire phase is the *Eriogonum fasciculatum-Lotus scoparius* phase.

Phases:
Eriogonum fasciculatum (California Buckwheat) Phase [3241]
Eriogonum fasciculatum-Lotus scoparius (California Buckwheat-Deerweed) Phase [3249]

COMMON NAME	California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as San Diego and western Riverside counties. It probably is widespread throughout much of central and south coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The *Eriogonum fasciculatum* Association usually occurs on alluvial/depositional, lower to upper slopes that are undulating or convex. Parent material is usually granitic or sedimentary. Many stands denote recent disturbance from invasive annual species, grazing, erosion, foot traffic, and so forth.

Vegetation Description:
In the *Eriogonum fasciculatum* Association, *E. fasciculatum* is consistently present at low to high cover. A wide variety of chaparral, coastal sage, and disturbance shrub species (e.g., *Artemisia californica*, *Lotus scoparius, Lessingia filaginifolia*, *Rhus ovata*, *Salvia apiana*, *Adenostoma fasciculatum*) may be present at low cover. Diverse annual herbs compose the herb understory, the most common being natives *Cryptantha* spp. and nonnatives such as *Hirschfeldia incana, Erodium* spp., *Bromus* spp., and *Avena* spp.

Comments:
The colonization abilities of *Eriogonum fasciculatum* are prodigious in southern California; however, they may be helped in some areas by artificial seeding programs along road cuts and so forth.

References:
Evens and San 2005, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Eriogonum fasciculatum-Salvia mellifera-Malosma laurina Shrubland Association

California Buckwheat-Black Sage-Laurel Sumac Shrubland Association
***Eriogonum fasciculatum* Shrubland Alliance**
California Buckwheat Shrubland Alliance

Mapping Code: 3248

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southwest- and southeast-facing slopes at low elevations between 0–681 m. It is characterized by a codominance of *Eriogonum fasciculatum, Salvia mellifera,* and *Malosma laurina* in the shrub layer. The herbaceous layer is generally insignificant and composed of scattered nonnative species. The emergent tree layer includes, on occasion, *Quercus agrifolia* and *Q. lobata*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Simi Hills Inland, Dry Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–681 m, mean 408.9 m
Aspect: southwest and southeast
Slope: range 15–50 degrees, mean 31.3 degrees
Topography (micro; macro): undulating, convex, or flat; lower to upper slope
Litter Cover: range 2–40%, mean 24.6%
Small Rock Cover: range 2–50%, mean 23.2%
Large Rock Cover: range 0–50%, mean 5.9%
Bare Ground: range 10–80%, mean 36.4%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (11–48%, mean 31%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–25%, mean 3.8%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 15–50%, mean cover is 34.9%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum, Salvia mellifera, Malosma laurina,* and *Adenostoma fasciculatum. Yucca whipplei* and *Rhus ovata* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Quercus lobata* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis. Bromus madritensis, Cuscuta californica, Brassica nigra,* and *Hirschfeldia incana* may be present.

***Eriogonum fasciculatum-Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	9.4	2.0	22.0		X	
	SAME3	*Salvia mellifera*	100	8.5	0.2	17.0		X	
	MALA6	*Malosma laurina*	98	4.8	0.2	12.0		X	
	ADFA	*Adenostoma fasciculatum*	84	1.7	0.2	7.5		X	
	YUWH	*Yucca whipplei*	73	0.9	0.2	4.0			
	RHOV	*Rhus ovata*	57	0.9	0.2	5.0			
	CEME	*Ceanothus megacarpus*	45	1.3	0.2	7.0			
	ARCA11	*Artemisia californica*	39	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	33	0.8	0.2	7.0			
	LOSC2	*Lotus scoparius*	24	0.3	0.2	4.0			
Herb									
	CEME2	*Centaurea melitensis*	29	0.5	0.2	5.0			X
	AVENA	*Avena*	22	0.4	0.2	7.0			X

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Avena, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Bromus diandrus, Avena barbata, Bromus hordeaceus, Brassica, Erodium cicutarium, Melilotus indicus, Pennisetum setaceum, Stellaria media, Avena fatua, Centaurea solstitialis, Cirsium vulgare, Erodium, Marrubium vulgare, Nicotiana glauca, Silybum marianum

Samples Used in Description: (n = 49)
AA0032cc, AA0066cc, AA0247cc, AA0266cc, AA0292cc, AA0298cc, AA0309cc, AA0327cc, AA0401, AA0474cc, AA0683, AA0727, AA0814, AA0850, AA0868, AA0873, AA0966, AA1034, AA1080, AA1105, AA1118, AA1146, AA1167, AA1186, AA1209, rap0124, rap0335, rap0415, rap0745, rap0826, rap0829, rap0891, rap0947, rap1208, rap1226, rap1443, rap1574, rap1717, rap1921, rap2040, rap2042, rap2230, rap2261, rap2357, rap2428, rap2430, rap2439, rap2743, rap2758

Comments:
This association is the analog to the *Encelia californica-Salvia mellifera-Malosma laurina* Association of the *E. californica* Alliance. It is generally found at somewhat higher elevations than that association and may be more likely to occur in stands adjacent to chaparral alliance stands such as *Ceanothus megacarpus* and *Adenostoma fasciculatum* than its *Encelia californica* Alliance analog.

Phases:
None

COMMON NAME	California Buckwheat-Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland

PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Eriogonum fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is not known outside of the study area; however, it may occur elsewhere in coastal southern California below 1,000 m in elevation.

References:
None

Eriogonum fasciculatum-Salvia apiana Shrubland Alliance

California Buckwheat-White Sage Shrubland Alliance

Mapping Code: 3410

Local Description

Summary:
This shrubland alliance occurs on somewhat steep to very steep southeast- or southwest-facing slopes at low elevations between 202–262 m. It is codominated by *Salvia apiana* and *Eriogonum fasciculatum* in the shrub layer and has a variety of native and nonnative herbs, all at low cover in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in 80% of the sampled stands.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 202–262 m, mean 232.4 m
Aspect: southeast and southwest
Slope: range 15–50 degrees, mean 34 degrees
Topography (micro; macro): undulating; lower to middle slope
Litter Cover: 15%
Small Rock Cover: range 5–45%, mean 25%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 20–45%, mean 32.5%
Parent Material: sedimentary, quaternary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of this shrubland alliance form an open shrub layer (10–29%, mean 18.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (3–30%, mean 13%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 1%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–45%, mean cover is 32.6%.

In this alliance, the shrub layer is characterized by *Salvia apiana* and *Eriogonum fasciculatum*. *Yucca whipplei* is also characteristic but at very low cover values. *Artemisia californica* is occasionally included in this layer as are *Malosma laurina, Brickellia californica, Eriogonum cinereum, Salvia leucophylla,* and *Adenostoma fasciculatum*. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by low cover of *Avena* sp. Other herbs sometimes include *Centaurea melitensis, Brassica nigra, Hirschfeldia incana,* and *Dudleya pulverulenta*.

Eriogonum fasciculatum-Salvia apiana Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	80	1.0	0.2	3.0	X	X	
Shrub									
	SAAP2	*Salvia apiana*	100	9.2	3.0	16.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	6.2	0.2	14.0	X	X	
	YUWH	*Yucca whipplei*	100	0.9	0.2	2.0		X	
	ARCA11	*Artemisia californica*	60	1.0	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	40	0.4	0.2	2.0			
	SALE3	*Salvia leucophylla*	40	0.2	0.2	1.0			
	ADFA	*Adenostoma fasciculatum*	40	0.1	0.2	0.2			
	BRCA3	*Brickellia californica*	40	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	40	0.1	0.2	0.2			
	CEBE3	*Cercocarpus betuloides*	20	0.4	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.2	1.0	1.0			
	RHIL	*Rhamnus ilicifolia*	20	0.2	1.0	1.0			
	MILA6	*Mirabilis laevis*	20	0.0	0.2	0.2			
	QUBE5	*Quercus berberidifolia*	20	0.0	0.2	0.2			
	RHOV	*Rhus ovata*	20	0.0	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.0	0.2	0.2			
Herb									
	AVENA	*Avena*	80	2.2	0.2	8.0		X	X
	CEME2	*Centaurea melitensis*	60	4.6	1.0	14.0	X		X
	BRNI	*Brassica nigra*	60	1.8	1.0	4.0			X
	HIIN3	*Hirschfeldia incana*	40	1.2	0.2	6.0			X
	DUPU	*Dudleya pulverulenta*	40	0.1	0.2	0.2			
	SIMA3	*Silybum marianum*	20	0.8	4.0	4.0			X
	BROMU	*Bromus*	20	0.4	2.0	2.0			
	BRMA3	*Bromus madritensis*	20	0.4	2.0	2.0			X
	VULPI	*Vulpia*	20	0.4	2.0	2.0			
	BRDI3	*Bromus diandrus*	20	0.2	1.0	1.0			X
	CUCA	*Cuscuta californica*	20	0.2	1.0	1.0			
	LAPL	*Layia platyglossa*	20	0.2	1.0	1.0			
	MEIM	*Melica imperfecta*	20	0.2	1.0	1.0			
	UNBG	Unknown bunch grass	20	0.2	1.0	1.0			
	CAEX14	*Castilleja exserta*	20	0.0	0.2	0.2			
	CHGL	*Chaenactis glabriuscula*	20	0.0	0.2	0.2			
	ERIN8	*Erysimum insulare*	20	0.0	0.2	0.2			
	GALIU	*Galium*	20	0.0	0.2	0.2			
	LUPIN	*Lupinus*	20	0.0	0.2	0.2			
	STEPH	*Stephanomeria*	20	0.0	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	20	0.0	0.2	0.2			

Other Noteworthy Species:
Erysimum insulare was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and

state listing is none (SAMO 2004).

Nonnative Species:
Avena, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Silybum marianum, Bromus madritensis, Bromus diandrus

Samples Used in Description: (n = 5)
AA1135, rap2305, rap2432, rap2436, rap2910

Comments:
This alliance is characteristic of the inland portions of the Los Angeles Basin and San Diego County. It is less frequent in the Coastal Fog Zone of southern California; hence, it is a relative rarity locally. The local stands appear to be restricted to the inland side of the crest of the Santa Monica Mountains in relatively xeric settings.

Phases:
None

COMMON NAME	California Buckwheat-White Sage Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Eriogonum fasciculatum-Salvia apiana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This alliance occurs within the portions of southern California and Baja California, Mexico, bounded by the San Bernardino Mountains to the north and the Peninsular Ranges to the east.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
Stands of this shrubland alliance of southern California and Baja California occur on south-facing slopes from 500 to 1,500 m elevation. Mean annual precipitation ranges from 35 cm in the northern end of the range (Los Angeles Basin) to 20 cm in the southern (Baja California) portion.

The most favorable habitat is uplands with shallow soils and boulders. Stands intergrade with other chaparral alliances and with other "coastal sage scrub" vegetation types.

Vegetation Description:
This mid elevation variety of southern California sage scrub is characterized by codominance of *Salvia apiana* and *Eriogonum fasciculatum*, each attaining about 20% cover. Other components of this sclerophyllous evergreen alliance often include *Adenostoma fasciculatum, Yucca whipplei, Ceanothus leucodermis, Ceanothus greggii, Lotus scoparius*, and *Quercus berberidifolia*. Emergent individuals of *Quercus agrifolia* may be present. The herbaceous layer is variable and may be composed of graminoid species.

Comments:
This alliance is known to be very common in the western granitic foothills (subsection M262Bn) of western Riverside County (Klein and Evens 2005) and San Diego County (Evens and San 2005).

References:
Evens and San 2005, Klein and Evens 2005, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata Shrubland Association

Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant Shrubland Association
***Hazardia squarrosa* Shrubland Alliance**
Sawtooth Goldenbush Shrubland Alliance

Mapping Code: 3263

Local Description

Summary:
This shrubland association occurs on gentle to somewhat steep northeast-facing slopes at low elevations between 6–486 m. It is characterized by the dominance of *Hazardia squarrosa* in the shrub layer and *Nassella pulchra and Hemizonia fasciculata* in the herbaceous layer.

Distribution:
This association is sampled in the Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 6–486 m, mean 225 m
Aspect: northeast
Slope: range 5–25 degrees, mean 14.3 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: range 20–85%, mean 39.2%
Small Rock Cover: range 0–10%, mean 4%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 6–55%, mean 24.8%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay

Vegetation Description:
Stands of *Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Shrubland form an open to intermittent shrub layer (7–48%, mean 22.2%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent 9–37%, mean 22.5%) at 0–1 m tall. Trees are not present. Total vegetation cover is 30–72%, mean cover is 44.4%.

In this association, the shrub layer is characterized by *Hazardia squarrosa* and *Salvia leucophylla. Artemisia californica* is frequently included in this layer. Other shrubs sometimes include *Baccharis pilularis, Eriogonum cinereum, Yucca whipplei,* and *Eriophyllum confertiflorum*. The tree layer is absent. The herbaceous layer is simple and is characterized by *Hemizonia fasciculata* with *Nassella pulchra* often present. Other herbs sometimes include *Centaurea melitensis, Sisyrinchium bellum, Brassica nigra,* and *Bromus madritensis.*

***Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	100	13.4	3.0	29.0	X	X	
	SALE3	*Salvia leucophylla*	82	1.9	0.2	7.0		X	
	ARCA11	*Artemisia californica*	64	1.2	0.2	3.0			
	BAPI	*Baccharis pilularis*	36	0.9	1.0	4.0			
	ERCO25	*Eriophyllum confertiflorum*	27	0.7	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	27	0.3	0.2	2.5			
	YUWH	*Yucca whipplei*	27	0.1	0.2	1.0			
Herb									
	HEFA	*Hemizonia fasciculata*	82	4.9	1.0	23.0		X	
	NAPU4	*Nassella pulchra*	73	9.3	0.2	25.0	X		
	CEME2	*Centaurea melitensis*	36	1.1	0.2	6.0			X
	SIBE	*Sisyrinchium bellum*	36	0.4	0.2	3.0			
	BRNI	*Brassica nigra*	36	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	36	0.1	0.2	1.0			X
	DICA14	*Dichelostemma capitatum*	27	0.7	0.2	4.0			
	BRHO2	*Bromus hordeaceus*	27	0.4	0.2	2.5			X

Other Noteworthy Species:
Calochortus catalinae was found in 2 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Bromus hordeaceus, Erodium cicutarium, Avena, Anagallis arvensis, Lactuca serriola, Bromus diandrus, Hirschfeldia incana, Stellaria media, Avena fatua, Erodium, Melilotus indicus, Nicotiana glauca, Phalaris aquatica, Sonchus

Samples Used in Description: (n = 11)
AA0122cc, AA1164, rap0987, rap0994, rap2162, rap2196m, rap2309, rap2633, rap2634, rap2805, rap2872rlv

Comments:
This association is indicative of a transitional state between herb-dominated grassland where presumably *Nassella pulchra* and *Hemizonia fasciculata* were among the principal species and various shrublands in the *Artemisia californica* and *Salvia leucophylla* alliances. *Hazardia squarrosa* is a common, early seral species that does well following mechanical disturbance or fire. The stability of these stands is something that should be investigated. They tend to have a higher native herbaceous component than many other shrublands in the study area. In some cases, these stands may be transitioning into denser coastal scrub; however, the stands that are in heavy clay appear to be stable.

Phases:
Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata (Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant) Phase [3263]

COMMON NAME	Sawtooth Goldenbush/Purple Needlegrass-Clustered Tar Plant Shrubland Association
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Hazardia squarrosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Hazardia squarrosa-Artemisia californica Shrubland Association

Sawtooth Goldenbush-California Sagebrush Shrubland Association
***Hazardia squarrosa* Shrubland Alliance**
Sawtooth Goldenbush Shrubland Alliance

Mapping Code: 3262

Local Description

Summary:
This shrubland association occurs on moderately steep to steep northwest- and northeast-facing slopes at low elevations between 30–542 m. It is characterized by a dominance of *Hazardia squarrosa* and a subdominance of *Artemisia californica* in the shrub layer. In the herbaceous layer, there is a mixture of several native and nonnative species, none of which are particularly characteristic. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 30–542 m, mean 335.5 m
Aspect: northwest and northeast
Slope: range 8–35 degrees, mean 23.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower to upper slope
Litter Cover: range 10–65%, mean 28.8%
Small Rock Cover: range 0–35%, mean 10.6%
Large Rock Cover: range 0–4%, mean 0.4%
Bare Ground: range 3–79%, mean 44.5%
Parent Material: sedimentary
Soil Texture: fine clay

Vegetation Description:
Stands of *Hazardia squarrosa-Artemisia californica* Shrubland form an open to intermittent shrub layer (6–50%, mean 27.8%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (1–42%, mean 13.8%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 0.7%) with conifers at 0–1 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–60%, mean cover is 42.2%.

In this association, the shrub layer is characterized by *Hazardia squarrosa. Artemisia californica* and *Salvia leucophylla* are frequently included in this layer. Other shrubs sometimes include *Baccharis pilularis, Mimulus aurantiacus,* and *Eriogonum cinereum*. The tree layer is emergent and open and infrequently includes *Quercus lobata* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus* and *Brassica nigra*. Other herbs sometimes include *Avena fatua, Hirschfeldia incana, Bromus diandrus, Centaurea melitensis,* and *Bromus hordeaceus.*

***Hazardia squarrosa-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	100	18.8	2.5	35.0	X	X	
	ARCA11	*Artemisia californica*	72	3.5	0.2	20.0			
	SALE3	*Salvia leucophylla*	66	0.9	0.2	6.0			
	BAPI	*Baccharis pilularis*	31	0.5	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	21	0.9	0.2	10.0			
	ERCI5	*Eriogonum cinereum*	21	0.5	0.2	5.0			
Herb									
	LECO12	*Leymus condensatus*	52	1.0	0.2	10.0			
	BRNI	*Brassica nigra*	48	1.1	0.2	6.0			X
	AVFA	*Avena fatua*	34	1.3	0.2	15.0			X
	HIIN3	*Hirschfeldia incana*	34	0.6	0.2	4.0			X
	BRDI3	*Bromus diandrus*	31	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	31	0.7	0.2	11.0			X
	AMME	*Amsinckia menziesii*	24	0.7	0.2	14.0			
	BRHO2	*Bromus hordeaceus*	24	0.6	1.0	4.0			X
	LEFI11	*Lessingia filaginifolia*	24	0.3	0.2	4.0			
	HEFA	*Hemizonia fasciculata*	24	0.3	0.2	4.0			
	AVENA	*Avena*	21	1.1	0.2	15.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 4 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 4 of 29 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Avena fatua, Hirschfeldia incana, Bromus diandrus, Centaurea melitensis, Bromus hordeaceus, Avena, Lolium, Lactuca serriola, Bromus madritensis, Erodium cicutarium, Cirsium vulgare, Galium aparine, Melilotus indicus, Sonchus oleraceus, Avena barbata, Foeniculum vulgare, Acacia redolens, Phalaris aquatica, Anagallis arvensis, Centaurea solstitialis, Euphorbia terracina, Medicago polymorpha, Silybum marianum

Samples Used in Description: (n = 29)
AA0118cc, AA0257cc, AA0323cc, AA0988, rap0061, rap0105, rap0510, rap1259, rap1394, rap1441, rap1504, rap1846, rap1850, rap1874, rap1882, rap1883, rap1884, rap1942, rap1944, rap1946, rap2017, rap2235, rap2236, rap2310, rap2797, rap2809, rap2837, rap2838, rap2874rlv

Comments:
In contrast with the previous association of the *Hazardia squarrosa* Alliance, this type does not usually contain high cover of native perennial bunch grasses. It tends to be "weedier" with a higher percentage of nonnative species and higher cover of other shrubs such as *Artemisia californica* and *Salvia leucophylla*. However, in some cases, *Artemisia* cover will be rather low,

and the stand will be dominated by only *Hazardia* and nonnative herbs. These characteristics suggest either a stronger transition toward longer-persisting shrublands of the *Artemisia californica* Alliance or a successional stage developing from a more heavily disturbed annual grassland. These two trends are reflected in the two phases mentioned below.

Phases:
Hazardia squarrosa/Annual Grass-Herb (Sawtooth Goldenbush/Annual Grass-Herb) Phase [3261]
Hazardia squarrosa-Artemisia californica/Leymus condensatus (Sawtooth Goldenbush–California Sagebrush/Giant Wild Rye) Phase [3262]

COMMON NAME	Sawtooth Goldenbus-California Sagebrush Shrubland Association
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	*Hazardia squarrosa* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is not known beyond the SAMO study area but could occur up and down the southern California coastline.

References:
None

Heteromeles arbutifolia-Malosma laurina Shrubland Association

Toyon-Laurel Sumac Shrubland Association
***Heteromeles arbutifolia* Shrubland Alliance**
Toyon Shrubland Alliance

Mapping Code: 2138

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep northeast- and northwest-facing slopes at low elevations between 50–584 m. It is characterized by a dominance of *Heteromeles arbutifolia* with a subdominance of *Malosma laurina* and several other species of lower average cover in the shrub layer. The herbaceous layer is not well characterized. The emergent tree layer occasionally includes both *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, Western Fog Zone, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 50–584 m, mean 298.5 m
Aspect: northeast and northwest
Slope: range 15–55 degrees, mean 31.8 degrees
Topography (micro; macro): variable (all); lower to upper
Litter Cover: range 25–65%, mean 41.9%
Small Rock Cover: range 0–35%, mean 13.7%
Large Rock Cover: range 0–10%, mean 1.9%
Bare Ground: range 10–53%, mean 31%
Parent Material: sedimentary or igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Heteromeles arbutifolia-Malosma laurina* Shrubland form an open to intermittent shrub layer (14–63%, mean 42.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–10 m tall. The herbaceous layer is open (0–26%, mean 4.7%) at 0–2 m tall. Trees are occasionally emergent (0–42% cover, mean 3.7%) with conifers at 0–20 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 30–65%, mean cover is 50%.

In this association, the shrub layer is characterized by *Heteromeles arbutifolia* and *Malosma laurina. Rhus ovata, Ceanothus spinosus, Cercocarpus betuloides,* and *Sambucus mexicana* are often included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus, Marah macrocarpus,* and *Marrubium vulgare.*

***Heteromeles arbutifolia-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	49	1.9	0.2	10.0			
	JUCA-T	*Juglans californica*	20	0.3	0.2	4.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	100	16.9	2.0	63.0	X		
	MALA6	*Malosma laurina*	82	5.0	0.2	25.0	X		
	RHOV	*Rhus ovata*	55	2.5	0.2	19.0			
	CEBE3	*Cercocarpus betuloides*	53	2.5	0.2	15.0			
	CESP	*Ceanothus spinosus*	53	1.7	0.2	14.0			
	SAME5	*Sambucus mexicana*	51	0.9	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	47	1.8	0.2	13.0			
	SAME3	*Salvia mellifera*	44	1.9	0.2	14.0			
	ARCA11	*Artemisia californica*	44	1.6	0.2	15.0			
	CEME	*Ceanothus megacarpus*	38	0.8	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	33	0.8	0.2	7.0			
	RHIN2	*Rhus integrifolia*	31	1.2	0.2	12.0			
	QUBE5	*Quercus berberidifolia*	29	0.5	0.2	4.0			
Herb									
	BRNI	*Brassica nigra*	25	0.4	0.2	6.0		X	
	LECO12	*Leymus condensatus*	22	0.6	0.2	7.5			
	POACXX	*Poaceae*	20	1.6	0.2	25.0			

Other Noteworthy Species:
Juglans californica was found in 15 of 55 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Nicotiana glauca, Bromus madritensis, Marrubium vulgare, Bromus diandrus, Ricinus communis, Cortaderia, Erodium, Centaurea melitensis, Galium aparine, Foeniculum vulgare, Hirschfeldia incana, Eucalyptus, Avena fatua, Ageratina adenophora, Schinus molle, Spartium junceum, Arundo donax, Cotoneaster, Erodium cicutarium, Lantana montevidensis, Malva parviflora, Melilotus indicus, Nerium oleander, Olea europaea, Stellaria media

Samples Used in Description: (n = 55)
AA0026cc, AA0073cc, AA0157cc, AA0160cc, AA0190cc, AA0308cc, AA0455cc, AA0479cc, AA0512, AA0807, AA0933, AA0971, AA1031, AA1147, AA1172, rap0607, rap0614, rap0622, rap0631, rap0697, rap0698, rap0699, rap0720, rap0721m, rap0723, rap0727m, rap0750m, rap0761, rap0801m, rap0802, rap0856m, rap0897m, rap0911, rap0957, rap1038, rap1173m, rap1286, rap1355m, rap1356m, rap1359, rap1721m, rap1833, rap1988, rap2023, rap2238m, rap2453, rap2454, rap2493, rap2494, rap2571, rap2579, rap2621, rap2654, rap2714, rap2770

Comments:
This is a heterogeneous, generally mesic chaparral association dominated by toyon (*Heteromeles arbutifolia*). Its heterogeneity is indicated by the distinguishing of five phases (see below). All of these phases tend to occur on northerly facing steep slopes and share a number of species. The differences between them appear to be mostly related to site history (largely time since last fire

and frequency of fires) and proximity to different adjacent alliances, which may contribute to the higher or lower cover of associated species. In many cases, these stands were seen on small fragments of open space in highly developed areas where fires are rare but human disturbance is high.

Phases:
Heteromeles arbutifolia (Toyon-Coast Live Oak) Phase [2137]
Heteromeles arbutifolia-Salvia mellifera (Toyon-Black Sage Sumac) Phase [2133]
Heteromeles arbutifolia-Cercocarpus betuloides (Toyon-Birch Leaf Mountain Mahogany) Phase [2136]
Heteromeles arbutifolia-Malosma laurina (Toyon-Laurel Sumac) Phase [2138]
Heteromeles arbutifolia-Artemisia californica-Mimulus aurantiacus (Toyon-California Sagebrush-Bush Monkey Flower) Phase [2135]

COMMON NAME	Toyon-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Heteromeles arbutifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur throughout much of cismontane central and southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Two other associations of the *Heteromeles arbutifolia* Alliance have been described from western Riverside County (Klein and Evens 2005). They are the *Heteromeles arbutifolia-Artemisia*

californica Association, where *Artemisia californica* codominates with *Heteromeles arbutifolia* in the shrub overstory, and the *Heteromeles arbutifolia-Quercus berberidifolia-Cercocarpus betuloides-Fraxinus dipetala* Association, where *Quercus berberidifolia*, *Fraxinus dipetala*, and *Cercocarpus betuloides* are characteristically present as codominant or subdominant shrubs. Borchert et al. 2004 describe a *Heteromeles arbutifolia-Prunus ilicifolia* Alliance from the Los Padres National Forest of southern and central coastal California. It has similarities with this association but has much higher average cover of *Prunus ilicifolia*.

References:
Borchert et al. 2004, Klein and Evens 2005

Lepidospartum squamatum Shrubland Alliance

Scale Broom Shrubland Alliance

Mapping Code: 2220

Local Description

Summary:
One example of this shrubland alliance occurs on a gentle slope at 311 m elevation. It is dominated by *Lepidospartum squamatum* in the shrub layer and has a variety of native and nonnative species at low cover in the herbaceous layer. The emergent tree layer includes *Platanus racemosa*.

Distribution:
This alliance is sampled in the Simi Hills Inland region of the study area.

Environmental Description:
Elevation: 311 m
Aspect: flat
Slope: 2 degrees
Topography (micro; macro): flat; bottom slope
Litter Cover: no data
Small Rock Cover: 30%
Large Rock Cover: 10%
Bare Ground: 40%
Parent Material: sedimentary
Soil Texture: coarse loamy sand

Vegetation Description:
One stand of this shrubland alliance forms an open shrub layer (18%). Shrubs occur in two different strata with low shrubs at 0–0.5 m tall and tall shrubs at 0.5–1 m tall. The herbaceous layer is open (5%) at 0.1–0.5 m tall. Trees are occasionally emergent (< 1%) with hardwoods at 1–10 m tall. Total vegetation cover is 23%.

In this alliance, the shrub layer is characterized by *Lepidospartum squamatum*. *Eriogonum fasciculatum* and *Baccharis salicifolia* are also included in this layer. The tree layer is emergent and open and includes *Platanus racemosa* at low cover. The herbaceous layer is simple, and the nonnative *Hirschfeldia incana* is the most abundant. Other herbs include *Centaurea melitensis* and *Artemisia douglasiana*.

Lepidospartum squamatum Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	100	0.2	0.2	0.2	X	X	
Shrub									
	LESQ	*Lepidospartum squamatum*	100	16.0	16.0	16.0	X	X	
	ERFA2	*Eriogonum fasciculatum*	100	3.0	3.0	3.0		X	
	BASA4	*Baccharis salicifolia*	100	1.0	1.0	1.0		X	
	YUWH	*Yucca whipplei*	100	0.2	0.2	0.2		X	
Herb									
	HIIN3	*Hirschfeldia incana*	100	2.0	2.0	2.0	X	X	X
	UNGR	Unknown annual grass	100	1.0	1.0	1.0		X	
	ARDO3	*Artemisia douglasiana*	100	0.2	0.2	0.2		X	
	CEME2	*Centaurea melitensis*	100	0.2	0.2	0.2		X	X
	CLARK	*Clarkia*	100	0.2	0.2	0.2		X	
	CRYPT	*Cryptantha*	100	0.2	0.2	0.2		X	

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana, Centaurea melitensis

Samples Used in Description: (n = 1)
rap2680

Comments: This alliance is represented in the study area only in a few alluvial settings. It is more common inland from the study area in the Los Angeles Basin and other south coastal drainages.

Phases:
None

COMMON NAME	Scale Broom Alliance
SYNONYM	Riverdisian Alluvial Fan Sage Scrub (in part) Holland (1986)
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.4.N.b. Intermittently flooded microphyllous shrubland
ALLIANCE	*Lepidospartum squamatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	The alliance is considered a G4S4, but several associations are ranked as Rare.

Global Description

Distribution:
The alliance ranges from central coastal California (western Stanislaus County) south through the California coast ranges and the far southern Sierra Nevada foothills to the western Mojave Desert and south to coastal Baja California, Mexico.

Nations:
United States, Mexico

States or Provinces:
CA, Baja California Norte

Environmental Description:
This shrubland alliance of the arid southwest is found on rarely flooded, low-gradient deposits along streams. Substrates are usually rocky with little soil. Elevations range from sea level to 1,800 m. Annual precipitation is quite variable and episodic but rarely exceeds 30 cm. Summer temperatures are very hot, and some areas in the Mojave may exceed 30 degrees Celsius for many days in the summer.

Vegetation Description:
Stands of this desert streamside shrubland contain *Lepidospartum squamatum* as a dominant or important species in the shrub layer. Other shrubs present may include *Rhus trilobata, Artemisia tridentata, Artemisia californica, Acacia greggii, Cercocarpus montanus* var. *glaber, Isomeris arboreus, Encelia farinosa, Eriogonum fasciculatum, Hymenoclea salsola, Yucca whipplei, Lotus scoparius, Eriodictyon crassifolium, Baccharis salicifolia, Toxicodendron diversilobum, Opuntia* spp., and *Rhus ovata*. Emergent individuals of *Juniperus californica, Platanus racemosa, Juglans californica* var. *californica, Populus fremontii, Malosma laurina, Rhus integrifolia,* and *Sambucus mexicana* may be present. Two rare forbs, *Dodecahema leptocerus* and *Eriastrum densifolium* subsp. *sanctorum,* are often associated with stands of this alliance in the eastern Los Angeles Basin.

Comments:
Cycles of drought and flood shape this alliance. Periodic disturbances such as floods and fires remove shrubs and trees. If stands are not disturbed for a long period of time, emergent trees gradually take over this shrubland. This alliance is much reduced in extent in the southern portion of its range by flood control projects and other development.

References:
Barbour and Wirka 1997, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Lotus scoparius Shrubland Association

Deerweed Shrubland Association
***Lotus scoparius* Shrubland Alliance**
Deerweed Shrubland Alliance

Mapping Code: 3270

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 24–539 m. It is characterized by the dominance of *Lotus scoparius* in the shrub layer and a variety of mostly nonnative herbs, none particularly characteristic, in the herbaceous layer. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 24–539 m, mean 336.8 m
Aspect: variable
Slope: range 2–38 degrees, mean 24.5 degrees
Topography (micro; macro): undulating, convex, or flat; middle to upper slope
Litter Cover: range 20–65%, mean 37%
Small Rock Cover: range 1–60%, mean 23.6%
Large Rock Cover: range 0–25%, mean 3.8%
Bare Ground: range 5–60%, mean 28.4%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Lotus scoparius* Shrubland form an open to intermittent shrub layer (4–50%, mean 26.7%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–42%, mean 8.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) with hardwoods at 0–5 m tall. Total vegetation cover is 13–68%, mean cover is 35.2%.

In this association, the shrub layer is characterized by *Lotus scoparius. Salvia mellifera*, *Eriogonum fasciculatum, Artemisia californica, Malosma laurina,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Centaurea melitensis, Hirschfeldia incana, Brassica nigra,* and *Bromus madritensis.*

***Lotus scoparius* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	LOSC2	*Lotus scoparius*	100	13.4	1.0	28.0	X		
	SAME3	*Salvia mellifera*	60	1.5	0.2	8.0			
	ARCA11	*Artemisia californica*	56	2.6	0.2	15.0			
	MALA6	*Malosma laurina*	56	0.9	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	56	0.7	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	52	1.1	0.2	6.0			
	MAFA	*Malacothamnus fasciculatus*	36	1.9	2.0	16.0			
	HASQ2	*Hazardia squarrosa*	28	0.8	0.2	5.0			
	SALE3	*Salvia leucophylla*	24	0.7	0.2	7.5			
	CEME	*Ceanothus megacarpus*	24	0.3	0.2	3.0			
	YUWH	*Yucca whipplei*	24	0.1	0.2	1.0			
	ERCI5	*Eriogonum cinereum*	20	0.8	1.0	10.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.3	0.2	4.0			
Herb									
	CEME2	*Centaurea melitensis*	36	0.2	0.2	2.0			X
	HIIN3	*Hirschfeldia incana*	32	1.0	0.2	7.0			X
	BRNI	*Brassica nigra*	32	0.5	0.2	3.0			X
	BRMA3	*Bromus madritensis*	32	0.3	0.2	2.0			X
	BROMU	*Bromus*	20	1.0	0.2	10.0			
	AVFA	*Avena fatua*	20	1.0	0.2	10.0			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 2 of 25 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Bromus madritensis, Avena fatua, Avena, Bromus hordeaceus, Erodium cicutarium, Erodium, Foeniculum vulgare, Euphorbia terracina, Bromus diandrus, Erodium moschatum, Anagallis arvensis, Avena barbata, Brassica, Carduus pycnocephalus, Dactylis glomerata, Erodium botrys, Hypochaeris, Piptatherum miliaceum, Sonchus, Sonchus oleraceus

Samples Used in Description: (n = 25)
AA0007cc, AA0424, AA0675, AA0795, AA1129, rap0339, rap0365m, rap0462, rap0565, rap1093, rap1149, rap1462, rap1875m, rap1936, rap2019, rap2095, rap2102, rap2104, rap2218, rap2358, rap2489, rap2813, rap2847, rap2848, rap2875rlv

Comments:
This is one of the classic seral shrub associations throughout much of central and southern California. It is characteristic of postfire chaparral and coastal sage scrub. There seems to be no

strong reason to further subdivide this association based on short-term differences in subdominant species. The main characteristic of this association is that it reflects a short-term, postfire condition. It has a variety of weakly distinguishable phases that reflects the original prefire vegetation. In general, the phases reflect either a chaparral (e.g., *Adenostoma fasciculatum*) prefire setting or a coastal sage (e.g., *Artemisia californica*) prefire setting.

Phases:
Lotus scoparius-Artemisia californica/Annual Grass-Herb (Deerweed-California Sagebrush/Annual Grass-Herb) Phase [3273]
Lotus scoparius-Malacothamnus fasciculatus-Adenostoma fasciculatum-Salvia mellifera (Deerweed-Bush Mallow-Chamise-Black Sage) Phase [3272]

COMMON NAME	Deerweed Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Lotus scoparius* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. However, it is likely to occur throughout much of California (e.g., south coast and peninsular ranges, Anza-Borrego Desert, Sierra Nevada foothills, and central and inner north coast ranges).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus Shrubland Association

Bush Mallow Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3287

Local Description

Summary:
This shrubland association occurs on gentle to steep southwest- and southeast-facing slopes at low elevations between 0–483 m. It is characterized by a strong dominance of *Malacothamnus fasciculatus* in the shrub layer. The herbaceous layer is generally insignificant and composed of mostly fire-following natives or widespread nonnative weedy species. The emergent tree layer is generally absent but may include *Quercus agrifolia, Juglans californica,* and *Platanus racemosa*.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 0–483 m, mean 304 m
Aspect: southwest and southeast
Slope: range 2–35 degrees, mean 23.5 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 20–50%, mean 35%
Small Rock Cover: range 10–45%, mean 21.4%
Large Rock Cover: range 0–1%, mean 0.6%
Bare Ground: range 14–60%, mean 32.7%
Parent Material: sedimentary and igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus* Shrubland form an open to intermittent shrub layer (12–54%, mean 34.8%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–22%, mean 5.3%) at 0–1 m tall. Trees are occasionally emergent (0–5% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–55%, mean cover is 40.4%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus*, with *Salvia mellifera* often present. *Artemisia californica, Malosma laurina, Encelia californica,* and *Ceanothus megacarpus* are sometimes included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia, Juglans californica,* and *Platanus racemosa* at low cover. The herbaceous layer is simple and may include *Centaurea melitensis, Brassica nigra, Bromus diandrus, Hirschfeldia incana,* and *Hemizonia fasciculata.*

***Malacothamnus fasciculatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	27.2	6.0	48.0	X	X	
	SAME3	*Salvia mellifera*	58	1.1	0.2	5.0			
	ARCA11	*Artemisia californica*	35	0.4	0.2	3.0			
	MALA6	*Malosma laurina*	31	1.0	1.0	8.0			
	ENCA	*Encelia californica*	31	0.6	0.2	5.0			
	CEME	*Ceanothus megacarpus*	27	0.8	1.0	6.0			
	SALE3	*Salvia leucophylla*	27	0.6	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	27	0.5	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	27	0.3	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.3	0.2	2.5			
	RHOV	*Rhus ovata*	23	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	23	0.1	0.2	1.0			
Herb									
	CEME2	*Centaurea melitensis*	35	0.3	0.2	3.0			X
	BRNI	*Brassica nigra*	31	0.5	0.2	6.0			X

Other Noteworthy Species:
Juglans californica was found in 3 of 26 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus diandrus, Hirschfeldia incana, Bromus madritensis, Avena fatua, Melilotus indicus, Avena, Avena barbata, Brassica, Carduus pycnocephalus, Pennisetum setaceum, Piptatherum miliaceum

Samples Used in Description: (n = 26)
AA0381cc, AA0421, AA0626, AA0629, AA0678, AA0681, AA1072, AA1077, AA1099, AA1130, AA1165, AA1166, rap0513, rap0563, rap1185, rap1220, rap1432, rap1530m, rap1599, rap1710, rap1725, rap1727m, rap1728, rap1832, rap2026, rap2065

Comments:
This is the first project in which this alliance has been defined. It is a seral, postfire alliance distinguished by the dominance or codominance of the short-lived tall shrub *Malacothamnus fasciculatus.* The diversity of associations defined in the SAMO study area is indicative of the diversity of recent postfire settings in chaparral and coastal sage scrub in these mountains. This association is the most pure expression of the alliance. In this association, the variety of associated shrub species is almost equally derived from chaparral and coastal sage scrub vegetation (though none are strongly represented at high frequency or cover). Thus, this association may be the result of fire having burned through a stand of chaparral or coastal sage scrub without a large component of resprouting shrubs or where the obligate seeding species other than *M. fasciculatus* had less than favorable postfire germination.

Phases:
None

COMMON NAME	Bush Mallow Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	61Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Ceanothus megacarpus Shrubland Association

Bush Mallow-Big Pod Ceanothus Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3288

Local Description

Summary:
This shrubland association occurs on moderate to very steep slopes of variable aspect at low elevations between 139–467 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Ceanothus megacarpus* in the shrub layer. The simple herbaceous layer is not distinctive. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 139–467 m, mean 309.9 m
Aspect: variable
Slope: range 12–48 degrees, mean 28.3 degrees
Topography (micro; macro): variable (all); bottom to middle slope
Litter Cover: range 15–50%, mean 32.5%
Small Rock Cover: range 10–20%, mean 13.3%
Large Rock Cover: range 0–3%, mean 1%
Bare Ground: range 40–57%, mean 49%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (30–57%, mean 45.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–20%, mean 4%) at 0–1 m tall. Trees are not present. Total vegetation cover is 38–57%, mean cover is 49.2%.

In this association, the shrub layer is characterized by *Ceanothus megacarpus, Malacothamnus fasciculatus, Malosma laurina,* and *Salvia mellifera. Adenostoma fasciculatum* and *Cercocarpus betuloides* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Brassica nigra, Bromus diandrus,* and *Bromus madritensis*.

***Malacothamnus fasciculatus-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	CEME	*Ceanothus megacarpus*	100	22.0	7.0	32.0	X	X	
	MAFA	*Malacothamnus fasciculatus*	100	14.3	5.0	27.0	X	X	
	MALA6	*Malosma laurina*	90	2.9	0.2	16.0		X	
	SAME3	*Salvia mellifera*	80	2.0	0.2	5.0		X	
	CEBE3	*Cercocarpus betuloides*	50	1.4	1.0	5.0			
	ADFA	*Adenostoma fasciculatum*	50	0.5	0.2	3.0			
	ARCA11	*Artemisia californica*	40	0.5	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	40	0.4	0.2	2.5			
	RHOV	*Rhus ovata*	40	0.3	0.2	2.0			
	ENCA	*Encelia californica*	40	0.2	0.2	1.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.2	0.2	1.0			
	SALE3	*Salvia leucophylla*	20	0.8	2.5	5.0			
	ERCI5	*Eriogonum cinereum*	20	0.3	1.0	2.0			
	ADSP	*Adenostoma sparsifolium*	20	0.2	0.2	2.0			
	CESP	*Ceanothus spinosus*	20	0.01	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	20	0.01	0.2	0.2			
	LOSC2	*Lotus scoparius*	20	0.01	0.2	0.2			
	SAME5	*Sambucus mexicana*	20	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2			X
	BRDI3	*Bromus diandrus*	40	1.6	0.2	15.0			X
	BRNI	*Brassica nigra*	40	0.4	0.2	3.0			X
	BRMA3	*Bromus madritensis*	30	0.1	0.2	0.2			X
	BROMU	*Bromus*	20	0.3	1.0	2.5			
	AVFA	*Avena fatua*	20	0.3	0.2	3.0			X
	AVENA	*Avena*	20	0.3	0.2	2.5			X
	PHCI	*Phacelia cicutaria*	20	0.3	0.2	2.5			
	FOVU	*Foeniculum vulgare*	20	0.1	0.2	1.0			X
	LECO12	*Leymus condensatus*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Brassica nigra, Bromus madritensis, Avena fatua, Avena, Foeniculum vulgare, Carduus pycnocephalus, Hirschfeldia incana, Melilotus indicus, Piptatherum miliaceum

Samples Used in Description: (n = 10)
AA0129cc, AA1028, AA1047, rap1222, rap1411m, rap1567, rap1642, rap1652, rap1692, rap2063

Comments:
In keeping with the discussion under the local comments of the *Malacothamnus fasciculatus* Association of this alliance (above), this particular association is reflective of the recent postfire settings where *Ceanothus megacarpus* is the principal reseeding native shrub. Most

Malacothamnus fasciculatus individuals in these stands will be crowded out and shade suppressed by the longer-lived and more broadly spreading *C. megacarpus* within a decade of the fire event.

The general decision was made in the classification of this alliance to include codominant shrub species of either the respective chaparral or coastal sage scrub analog alliances (e.g., *Ceanothus megacarpus, C. spinosus, Malosma laurina*, or *Salvia leucophylla*) within the seral *Malacothamnus fasciculatus* Alliance. This was because these situations are all typically short-lived and reflective first of the postfire condition and then of the overall environmental conditions (temperature, moisture, and perhaps soil fertility).

Phases:
None

COMMON NAME	Bush Mallow-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description

References:
None

Malacothamnus fasciculatus-Ceanothus spinosus Shrubland Association

Bush Mallow-Greenbark Ceanothus Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3289

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 179–648 m. It is characterized by codominance of *Malacothamnus fasciculatus* and *Ceanothus spinosus* in the shrub layer. The simple herbaceous layer is not distinctive. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 179–648 m, mean 434.5 m
Aspect: variable
Slope: range 2–35 degrees, mean 20.6 degrees
Topography (micro; macro): concave or undulating; bottom to upper slope
Litter Cover: range 45–60%, mean 52.5%
Small Rock Cover: range 15–50%, mean 27%
Large Rock Cover: range 2–15%, mean 7%
Bare Ground: range 10–35%, mean 21.7%
Parent Material: sedimentary
Soil Texture: no data

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Ceanothus spinosus* Shrubland form an open to intermittent shrub layer (38–60%, mean 49.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–2%, mean 0.5%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–60%, mean cover is 50.2%.

In this association, the shrub layer is characterized by *Ceanothus spinosus* and *Malacothamnus fasciculatus. Malosma laurina, Heteromeles arbutifolia, Adenostoma fasciculatum,* and *Cercocarpus betuloides* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple, and *Leymus condensatus, Marah macrocarpus,* and *Bromus madritensis* are sometimes present.

***Malacothamnus fasciculatus-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	23	0.5	0.2	6.0			
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	18.5	7.0	33.0	X	X	
	CESP	*Ceanothus spinosus*	100	17.2	2.5	27.0	X	X	
	MALA6	*Malosma laurina*	69	3.2	1.0	9.0			
	HEAR5	*Heteromeles arbutifolia*	69	1.7	0.2	7.0			
	ADFA	*Adenostoma fasciculatum*	62	1.5	0.2	5.0			
	CEBE3	*Cercocarpus betuloides*	54	2.5	0.2	15.0			
	RHOV	*Rhus ovata*	46	1.4	0.2	10.0			
	CEME	*Ceanothus megacarpus*	38	1.1	1.0	7.5			
	SAME3	*Salvia mellifera*	38	1.0	0.2	7.0			
	CECU	*Ceanothus cuneatus*	23	0.5	0.2	5.0			
	PRIL	*Prunus ilicifolia*	23	0.5	0.2	4.0			
	MIAU	*Mimulus aurantiacus*	23	0.3	0.2	2.0			
	ENCA	*Encelia californica*	23	0.01	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	23	0.4	1.0	2.5			
	MAMA8	*Marah macrocarpus*	23	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Avena, Brassica nigra, Bromus madritensis, Centaurea melitensis, Hirschfeldia incana

Samples Used in Description: (n = 13)
AA0208cc, AA0275cc, AA0475cc, AA0529, rap1212, rap1513m, rap1629, rap1631, rap1649, rap2384, rap2419, rap2627, rap2757

Comments:
This is the most mesic association of the *M. fasciculatus* Alliance. In keeping with the discussion under the local comments of the *Malacothamnus fasciculatus* Association of this alliance (above), this particular association is reflective of the recent postfire settings where *Ceanothus spinosus* is the principal native shrub. Most *Malacothamnus fasciculatus* individuals in these stands will be crowded out and shade suppressed by the longer-lived and more broadly spreading *C. spinosus* within a decade of the fire event.

The general decision was made in the classification of this alliance to include codominant shrub species of either the respective chaparral or coastal sage scrub analog alliances (e.g., *Ceanothus megacarpus, C. spinosus, Malosma laurina*, or *Salvia leucophylla*) within the seral *Malacothamnus fasciculatus* Alliance. This was because these situations are all typically short lived and reflective first of the postfire condition and then of the overall environmental conditions (temperature, moisture, and perhaps soil fertility).

Phases:
None

COMMON NAME	Bush Mallow-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Since *Ceanothus spinosus* is a facultative resprouter (i.e., it both resprouts and germinates from seed following fires, per Borchert et al. 2004), it would be expected to overtop and shade out *M. fasciculatus* relatively rapidly following fire events. Thus, this association is likely to be even shorter lived than other associations in this alliance.

References:
Borchert et al. 2004

Malacothamnus fasciculatus-Malosma laurina Shrubland Association

Bush Mallow-Laurel Sumac Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3286

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 18–366 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Malosma laurina* in the shrub layer. The herbaceous layer often has low cover of *Leymus condensatus.* The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 18–366 m, mean 153.3 m
Aspect: variable
Slope: range 2–40 degrees, mean 16.2 degrees
Topography (micro; macro): variable (all); bottom to middle slope
Litter Cover: range 40–80%, mean 62%
Small Rock Cover: range 0–30%, mean 10.7%
Large Rock Cover: range 0–5%, mean 0.8%
Bare Ground: range 0–35%, mean 16.8%
Parent Material: sedimentary
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Malosma laurina* Shrubland form an open to intermittent shrub layer (28–59%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–22%, mean 5.5%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–65%, mean cover is 47.7%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus* and *Malosma laurina. Salvia leucophylla* and *Artemisia californica* are usually included in this layer. Other shrubs sometimes include *Encelia californica, Baccharis pilularis, Salvia mellifera, Hazardia squarrosa,* and *Eriogonum cinereum*. The tree layer is emergent and open and sometimes includes *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is simple and often includes *Leymus condensatus.* Other herbs may include *Bromus madritensis, Brassica nigra, Nassella lepida,* and *Marah macrocarpus.*

***Malacothamnus fasciculatus-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	21.2	7.5	35.0	X	X	
	MALA6	*Malosma laurina*	100	15.1	7.5	38.0	X	X	
	SALE3	*Salvia leucophylla*	52	1.3	0.2	8.0			
	ARCA11	*Artemisia californica*	48	1.0	0.2	5.0			
	ENCA	*Encelia californica*	43	0.7	0.2	7.0			
	BAPI	*Baccharis pilularis*	43	0.5	0.2	2.5			
	SAME3	*Salvia mellifera*	39	0.4	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	35	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	35	0.2	0.2	2.5			
	RHIN2	*Rhus integrifolia*	26	0.3	0.2	3.0			
	CEBE3	*Cercocarpus betuloides*	22	0.5	0.2	8.0			
	CESP	*Ceanothus spinosus*	22	0.4	1.0	3.0			
Herb									
	LECO12	*Leymus condensatus*	61	2.2	0.2	20.0	X		
	BRMA3	*Bromus madritensis*	35	0.4	0.2	6.0			X
	BRNI	*Brassica nigra*	30	0.3	0.2	2.5			X
	NALE2	*Nassella lepida*	26	0.8	0.2	15.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Bromus diandrus, Erodium cicutarium, Melilotus indicus, Hirschfeldia incana, Silybum marianum, Lactuca serriola, Anagallis arvensis, Avena barbata, Erodium, Malva parviflora, Marrubium vulgare, Melilotus

Samples Used in Description: (n = 23)
AA0268cc, AA0453cc, AA0464cc, AA0637, AA0886, AA0899, AA1065, rap0173, rap0518, rap0943m, rap1061, rap1084, rap1100, rap1148, rap1195, rap1215, rap1347, rap1348m, rap1349, rap1418, rap2266, rap2276, rap2317

Comments:
This association of the *M. fasciculatus* Alliance is usually found in lower elevation settings where prefire conditions were likely to support stands of *Artemisia californica, Salvia leucophylla,* or

Malosma laurina Alliance stands. The general vegetation environment of this association can be considered coastal sage scrub, rather than chaparral. Occasional *Ceanothus spinosus* within these stands suggests that at least some stands are mesic, but most are probably relatively dry sites within the zone of summer fog. See comments on the related *M. fasciculatus-Salvia leucophylla* Association for the similarities between these two associations.

Phases:
None

COMMON NAME	Bush Mallow-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (many plots but similar ecological setting to another closely related association of the same alliance)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Salvia leucophylla Shrubland Association

Bush Mallow-Purple Sage Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3281

Local Description

Summary:
This shrubland association occurs on moderate to steep northwest facing slopes at low elevations between 5–576 m. It is characterized by a dominance of *Malosma fasciculatum* and a subdominance of *Salvia leucophylla* in the shrub layer and *Leymus condensatus* in the herbaceous layer. The emergent tree layer infrequently includes *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 5–576 m, mean 337.7 m
Aspect: northwest
Slope: range 2–45 degrees, mean 26.2 degrees
Topography (micro; macro): flat, convex, or undulating; lower slope to ridgetop
Litter Cover: range 15–65%, mean 33.8%
Small Rock Cover: range 10–50%, mean 24%
Large Rock Cover: range 0–2%, mean 0.4%
Bare Ground: range 2–55%, mean 29%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Salvia leucophylla* Shrubland form an open to intermittent shrub layer (18–58%, mean 39.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–36%, mean 5.7%) at 0–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–60%, mean cover is 46%.

In this association, the shrub layer is characterized by *Malacothamnus fasciculatus, Salvia leucophylla,* and *Artemisia californica*. *Malosma laurina, Rhus ovata, Lotus scoparius,* and *Encelia californica* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus, Centaurea melitensis,* and *Bromus madritensis.*

***Malacothamnus fasciculatus-Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	20.1	8.0	38.0	X	X	
	SALE3	*Salvia leucophylla*	94	7.9	0.2	20.0		X	
	ARCA11	*Artemisia californica*	86	5.4	0.2	18.0		X	
	MALA6	*Malosma laurina*	54	1.1	0.2	6.0			
	RHOV	*Rhus ovata*	34	0.7	0.2	6.0			
	LOSC2	*Lotus scoparius*	29	0.8	0.2	9.0			
	ENCA	*Encelia californica*	29	0.8	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	26	0.5	0.2	5.0			
	SAME3	*Salvia mellifera*	26	0.4	0.2	3.0			
	YUWH	*Yucca whipplei*	26	0.2	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	20	0.5	0.2	5.0			
Herb									
	LECO12	*Leymus condensatus*	43	1.9	0.2	15.0			
	BRNI	*Brassica nigra*	43	0.9	0.2	7.5			X
	CEME2	*Centaurea melitensis*	29	0.4	0.2	5.0			X
	BRMA3	*Bromus madritensis*	26	0.3	0.2	5.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 10 of 35 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Hirschfeldia incana, Anagallis arvensis, Melilotus indicus, Avena barbata, Conium maculatum, Nicotiana glauca, Avena fatua, Bromus diandrus, Bromus hordeaceus, Cynodon dactylon, Erodium, Erodium cicutarium, Foeniculum vulgare, Phalaris aquatica

Samples Used in Description: (n = 35)
AA0082cc, AA0445cc, AA0461cc, AA0494cc, AA0495cc, AA0696, AA0848, AA0948, AA1030, rap0975, rap0999, rap1001m, rap1074m, rap1150, rap1345m, rap1396, rap1399, rap1400, rap1404, rap1531, rap1555, rap1579, rap1581, rap1678m, rap1726, rap1858, rap1922, rap1948m, rap1949, rap2027, rap2028, rap2483, rap2505, rap2572, rap2597

Comments:
This association of the *Malacothamnus fasciculatus* Alliance can be considered another seral stage in the general vegetation realm of the coastal sage scrub. In this association the major associate of the bush mallow is *Salvia leucophylla*. Although both *Malosma laurina* and *Artemisia californica* are present in more than half the stands, their cover is substantially lower than their average cover in the *M. fasciculatus-Malosma laurina* Association. Conversely, *Salvia leucophylla* is in higher cover than in that association. However, in many ways this association

and the previous *M. fasciculatus-Malosma laurina* Association are very similar and their distinction at the association level is somewhat questionable. There may be a rationale, with further analysis, to consider both as phases of a larger, more broadly encompassing association.

Phases:
None

COMMON NAME	Bush Mallow-Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (many plots but similar ecological setting to another closely related association of the same alliance)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malacothamnus fasciculatus-Salvia mellifera Shrubland Association

Bush Mallow-Black Sage Shrubland Association
***Malacothamnus fasciculatus* Shrubland Alliance**
Bush Mallow Shrubland Alliance

Mapping Code: 3282

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 152–477 m. It is characterized by a codominance of *Malacothamnus fasciculatus* and *Salvia mellifera* in the shrub layer. The herbaceous layer is indistinct. The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 152–477 m, mean 318 m
Aspect: variable
Slope: range 2–35 degrees, mean 23.5 degrees
Topography (micro; macro): undulating or concave; bottom to upper slope
Litter Cover: range 30–45%, mean 33.8%
Small Rock Cover: range 5–45%, mean 20%
Large Rock Cover: range 0–5%, mean 1.7%
Bare Ground: range 15–50%, mean 33.3%
Parent Material: igneous or sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malacothamnus fasciculatus-Salvia mellifera* Shrubland form an open to intermittent shrub layer (24–50%, mean 35.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–17%, mean 4.1%) at 0–1 m tall. Trees are occasionally emergent (0–7% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 27–55%, mean cover is 40.3%.

In this association, the shrub layer is characterized by *Salvia mellifera* and *Malacothamnus fasciculatus. Malosma laurina, Artemisia californica, Yucca whipplei,* and *Adenostoma fasciculatum* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Brassica nigra, Bromus madritensis,* and *Bromus diandrus.*

***Malacothamnus fasciculatus-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MAFA	*Malacothamnus fasciculatus*	100	12.7	2.0	28.0	X	X	
	SAME3	*Salvia mellifera*	100	10.9	6.0	16.0	X	X	
	MALA6	*Malosma laurina*	67	2.2	0.2	6.0			
	ARCA11	*Artemisia californica*	58	2.5	0.2	12.0			
	YUWH	*Yucca whipplei*	50	0.3	0.2	2.0			
	ADFA	*Adenostoma fasciculatum*	50	0.2	0.2	1.0			
	ENCA	*Encelia californica*	42	0.8	0.2	7.0			
	CEME	*Ceanothus megacarpus*	33	1.2	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.7	2.0	4.0			
	SAME5	*Sambucus mexicana*	25	0.1	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	25	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	25	0.1	0.2	0.2			
	RHOV	*Rhus ovata*	25	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	25	0.1	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	42	0.6	0.2	3.0			X
	BRNI	*Brassica nigra*	42	0.5	0.2	5.0			X
	BRMA3	*Bromus madritensis*	42	0.4	0.2	2.0			X
	BRDI3	*Bromus diandrus*	33	0.4	1.0	2.0			X

Other Noteworthy Species:
Delphinium parryi was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Bromus diandrus, Avena fatua, Marrubium vulgare, Anagallis arvensis, Erodium, Erodium cicutarium, Medicago polymorpha, Melilotus indicus

Samples Used in Description: (n = 12)
AA0562, rap0855, rap0945, rap1145, rap1264, rap1299, rap1337, rap1387m, rap1600, rap1798, rap1999, rap2902

Comments:
This association of the *Malacothamnus fasciculatus* Alliance bridges the gap between chaparral and coastal sage scrub based on the derivation of its prefire species pool. There is a fairly even mix of typical coastal sage species (*Encelia californica, Artemisia californica*) and chaparral species (*Adenostoma fasciculatum, Ceanothus megacarpus*) along with species such as *Salvia mellifera, Eriogonum fasciculatum,* and *Malosma laurina*, which may be found in either.

Phases:
None

COMMON NAME	Bush Mallow-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Malacothamnus fasciculatus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malosma laurina Shrubland Association

Laurel Sumac Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 7142

Local Description

Summary:
This shrubland association occurs on gentle to very steep southeast- to northwest-facing slopes at low elevations between 0–528 m. It is characterized by a dominance of *Malosma laurina* in the shrub layer and a relatively nondescript herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about 20% of the stands.

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, Simi Hills Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–528 m, mean 235.7 m
Aspect: southeast to northwest
Slope: range 2–65 degrees, mean 23.4 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 25–85%, mean 57.5%
Small Rock Cover: range 0–50%, mean 16.4%
Large Rock Cover: range 0–60%, mean 4.5%
Bare Ground: range 0–60%, mean 19.8%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina* Shrubland form an open to intermittent shrub layer (7–64%, mean 31.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–10 m tall. The herbaceous layer is open to intermittent (0–-45%, mean 10%) at 0–1 m tall. Trees are occasionally emergent (0–17% cover, mean 1.4%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 21–68%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Malosma laurina. Artemisia californica, Eriogonum fasciculatum, Salvia mellifera, Heteromeles arbutifolia,* and *Ceanothus megacarpus* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Juglans californica, Platanus racemosa,* and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus*, *Bromus diandrus, Centaurea melitensis,* and *Hirschfeldia incana*.

***Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	21	0.4	0.2	6.0			
Shrub									
	MALA6	*Malosma laurina*	100	23.0	5.0	49.0	X	X	
	ARCA11	*Artemisia californica*	49	0.6	0.2	7.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	8.0			
	SAME3	*Salvia mellifera*	43	0.7	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	37	0.7	0.2	5.0			
	CEME	*Ceanothus megacarpus*	30	0.6	0.2	7.5			
	SAME5	*Sambucus mexicana*	29	0.6	0.2	9.0			
	MAFA	*Malacothamnus fasciculatus*	24	0.6	0.2	8.0			
	RHOV	*Rhus ovata*	22	0.4	0.2	6.0			
	BAPI	*Baccharis pilularis*	21	0.5	0.2	7.0			
	RHIN2	*Rhus integrifolia*	21	0.2	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	33	1.0	0.2	9.0			X
	LECO12	*Leymus condensatus*	27	0.2	0.2	7.5			
	BRDI3	*Bromus diandrus*	24	2.2	0.2	27.0			X
	CEME2	*Centaurea melitensis*	24	0.7	0.2	15.0			X
	HIIN3	*Hirschfeldia incana*	22	1.0	0.2	15.0			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 63 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 10 of 63 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Nicotiana glauca, Pennisetum setaceum, Bromus madritensis, Marrubium vulgare, Avena, Ricinus communis, Eucalyptus, Bromus hordeaceus, Erodium, Myoporum laetum, Piptatherum miliaceum, Foeniculum vulgare, Euphorbia terracina, Avena fatua, Lactuca serriola, Conium maculatum, Erodium botrys, Avena barbata, Lobularia maritima, Romneya coulteri, Carpobrotus chilensis, Anagallis arvensis, Carduus pycnocephalus, Carpobrotus edulis, Chenopodium ambrosioides, Conyza canadensis, Cortaderia, Opuntia ficus-indica, Salsola tragus, Schinus molle

Samples Used in Description: (n = 63)
AA0075cc, AA0076cc, AA0174cc, AA0307cc, AA0342, AA0438, AA0440, AA0547, AA0560, AA0638, AA0690, AA0717, AA0726, AA0733, AA0787, AA0794, AA0796, AA0803, AA0806, AA0809, AA0881, AA0896, AA0970, AA0986, AA0990, AA0999, AA1000, AA1066, AA1121, AA1152, rap0045, rap0060, rap0167, rap0172, rap0241, rap0342, rap0514, rap0523, rap0758, rap0771, rap0811, rap0812, rap0814, rap0816, rap0818, rap0828, rap0834, rap0910, rap1042,

rap1043, rap1046, rap1098, rap1537, rap1568, rap1803m, rap1990, rap2099, rap2278, rap2320, rap2330, rap2562rlv, rap2604, rap2750

Comments:
The Santa Monica Mountains hold the dubious distinction of being the center for diversity of the *Malosma laurina* Alliance in the known world—dubious because of the apparent fact that *M. laurina* has increased its presence throughout its range in the historic past (Taylor 2004 and Stephen Davis personal communication 2003). The dominant species in this alliance resprouts prodigiously from the base following fire and with higher fire frequencies may tend to dominate stands that were once composed of a higher diversity of shrub species. This is the basic association of this locally diverse alliance where *M. laurina* is by far the most dominant species with little else to distinguish it. Two phases have been defined—a phase with a relatively dense overstory of *M. laurina* and a more open phase with scattered annual grasses and herbs in the understory.

Phases:
Malosma laurina (Laurel Sumac) Phase [7142]
Malosma laurina/Annual Grass-Herb (Laurel Sumac/Annual Grass-Herb) Phase [2145]

COMMON NAME	Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is known from San Diego County and from western Riverside County as well (Evens and San 2005 and Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Evens and San 2005, Klein and Evens 2005, Taylor 2004

Malosma laurina-Artemisia californica Shrubland Association

Laurel Sumac-California Sagebrush Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 7148

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 2–611 m. It is characterized by a dominance of *Malosma laurina* and a subdominance of *Artemisia californica;* in many cases, *Salvia leucophylla* in the shrub layer; and typically a minor presence of the grass *Leymus condensatus* in the herbaceous layer. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Dry Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 2–611 m, mean 227.6 m
Aspect: northeast and northwest
Slope: range 2–40 degrees, mean 25.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower to upper slope
Litter Cover: range 50–50%, mean 50%
Small Rock Cover: range 0–35%, mean 10.1%
Large Rock Cover: range 0–4%, mean 0.5%
Bare Ground: range 5–55%, mean 27.1%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Malosma laurina-Artemisia californica* Shrubland form an open to intermittent shrub layer (10–63%, mean 40.2%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–36%, mean 5.9%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 26–65%, mean cover is 46.8%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Artemisia californica*. *Salvia leucophylla* is often present. *Malacothamnus fasciculatus, Eriogonum cinereum, Mimulus aurantiacus, Salvia mellifera, Baccharis pilularis,* and *Sambucus mexicana* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus.* Other herbs may include *Nassella lepida, Centaurea melitensis, Brassica nigra,* and *Marah macrocarpus.*

***Malosma laurina-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	20.2	8.0	46.0	X		
	ARCA11	*Artemisia californica*	100	7.4	0.2	15.0	X		
	SALE3	*Salvia leucophylla*	73	7.1	0.2	20.0			
	MAFA	*Malacothamnus fasciculatus*	44	0.9	0.2	12.0			
	ERCI5	*Eriogonum cinereum*	35	0.6	0.2	7.5			
	MIAU	*Mimulus aurantiacus*	33	0.9	0.2	7.0			
	SAME3	*Salvia mellifera*	27	0.8	0.2	6.0			
	BAPI	*Baccharis pilularis*	25	0.6	0.2	10.0			
	SAME5	*Sambucus mexicana*	25	0.2	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	23	0.7	0.2	12.0			
Herb									
	LECO12	*Leymus condensatus*	56	1.9	0.2	17.0			

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 9 of 48 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Bromus madritensis, Phalaris aquatica, Euphorbia terracina, Nicotiana glauca, Bromus hordeaceus, Erodium, Acacia redolens, Melilotus indicus, Myoporum laetum, Senecio mikanioides, Anagallis arvensis, Avena barbata, Avena fatua, Bromus diandrus, Erodium cicutarium, Eucalyptus, Foeniculum vulgare, Marrubium vulgare

Samples Used in Description: (n = 48)
AA0273cc, AA0437, AA0570, AA0700, AA0722, AA0763, AA0767, AA0793, AA0797, AA0800, AA0849, AA0882, AA0935, AA1004, AA1150, AA1151, rap0025m, rap0059, rap0067, rap0074, rap0088, rap0214, rap0656m, rap0683, rap0685, rap0989, rap0995m, rap0997, rap1007, rap1066, rap1089m, rap1091, rap1194, rap1245m, rap1416, rap1417, rap1453, rap1503, rap1538, rap1617, rap1766m, rap2037, rap2069, rap2302, rap2477, rap2732, rap2741, rap2763

Comments:
This association of the *Malosma laurina* Alliance is distinguished by the subdominance of the coastal sage scrub species, especially *Artemisia californica* and often *S. leucophylla*. The current model of how this association has arisen as a common type is that higher than historic fire frequencies and perhaps other disturbance, such as brush clearing, has afforded the resprouter

Malosma laurina the opportunity to dominate over what otherwise may have previously been stands historically dominated by *Artemisia californica* and/or *Salvia leucophylla*. Two phases of this association have been identified based on either the singular presence of *Artemisia californica* or a mixture of it and *Salvia leucophylla* associated with the dominant species.

Phases:
Malosma laurina-Artemisia californica (Laurel Sumac-California Sagebrush) Phase [7148]
Malosma laurina-Artemisia californica-Salvia leucophylla (Laurel Sumac-California Sagebrush-Purple Sage) Phase [2142]

COMMON NAME	Laurel Sumac-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is likely present in low elevation slopes of southern California from the peninsular to transverse ranges from San Diego County north to Ventura County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is similarly described in western Riverside and San Diego counties. However, it is within the *Artemisia californica* Alliance as the *Artemisia californica-Malosma laurina* Association where *Malosma laurina* is consistently present as a codominant or subdominant shrub. Shrubs *Salvia apiana, Mimulus aurantiacus,* and *Eriogonum fasciculatum* are often present at low cover.

References:
Evens and San 2005, Klein and Evens 2005

Malosma laurina-Eriogonum cinereum Shrubland Association

Laurel Sumac-Ashy Buckwheat Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 2141

Local Description

Summary:
This shrubland association occurs on gentle to abrupt southwest- and southeast-facing slopes at low elevations between 0–550 m. It is characterized by a dominance of *Malosma laurina* and a subdominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer is relatively insignificant with no apparent indicator species. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–550 m, mean 153.3 m
Aspect: southwest and southeast
Slope: range 2–70 degrees, mean 31.7 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 8–75%, mean 32.6%
Small Rock Cover: range 0–60%, mean 26%
Large Rock Cover: range 0–70%, mean 6.7%
Bare Ground: range 0–75%, mean 24.7%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (10–52%, mean 33.7%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–34%, mean 4.1%) at 0–2 m tall. Trees are occasionally emergent (0–5% cover, mean 0.2%) with hardwoods at 0–10 m tall. Total vegetation cover is 10–58%, mean cover is 37.9%.

In this association, the shrub layer is characterized by *Malosma laurina, Eriogonum cinereum,* and *Salvia mellifera. Artemisia californica, Yucca whipplei,* and *Encelia californica* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Leymus condensatus, Brassica nigra, Bromus madritensis,* and *Nassella lepida.*

***Malosma laurina-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	12.4	2.0	31.0		X	
	ERCI5	*Eriogonum cinereum*	96	6.2	0.2	19.0		X	
	SAME3	*Salvia mellifera*	76	4.4	0.2	15.0		X	
	ARCA11	*Artemisia californica*	73	2.3	0.2	15.0			
	YUWH	*Yucca whipplei*	70	1.2	0.2	7.5			
	ENCA	*Encelia californica*	53	1.6	0.2	15.0			
	RHIN2	*Rhus integrifolia*	40	1.5	0.2	13.0			
	HEAR5	*Heteromeles arbutifolia*	38	0.5	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.0	0.2	10.0			
	LOSC2	*Lotus scoparius*	32	0.7	0.2	12.0			
	RHOV	*Rhus ovata*	26	0.5	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.4	0.2	11.0			
	CEME	*Ceanothus megacarpus*	22	0.5	0.2	7.5			
Herb									
	LECO12	*Leymus condensatus*	34	0.8	0.2	9.0			
	BRNI	*Brassica nigra*	20	0.2	0.2	5.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 98 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 98 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus madritensis, Pennisetum setaceum, Centaurea melitensis, Avena, Bromus diandrus, Erodium, Nicotiana glauca, Hirschfeldia incana, Foeniculum vulgare, Avena fatua, Avena barbata, Euphorbia terracina, Piptatherum miliaceum, Salsola tragus, Cortaderia, Erodium cicutarium, Melilotus indicus, Anagallis arvensis, Arundo donax, Brassica, Bromus hordeaceus, Malva parviflora, Marrubium vulgare, Melilotus, Oxalis pes-caprae, Ricinus communis, Senecio vulgaris, Sisymbrium, Sonchus asper

Samples Used in Description: (n = 98)
AA0012cc, AA0013cc, AA0045cc, AA0072cc, AA0081cc, AA0117cc, AA0119cc, AA0120cc, AA0175cc, AA0177cc, AA0206cc, AA0212cc, AA0277cc, AA0278cc, AA0358cc, AA0371cc, AA0374cc, AA0376cc, AA0383, AA0387cc, AA0405, AA0450cc, AA0451cc, AA0452cc, AA0480cc, AA0493cc, AA0511, AA0633, AA0634, AA0656, AA0701, AA0718, AA0875, AA0884, AA0892, AA0898, AA0923, AA1023, AA1026, AA1027, AA1032, AA1048, AA1051, AA1157, rap0033m, rap0112, rap0169, rap0178, rap0185, rap0207, rap0209, rap0385, rap0425m, rap0517, rap0687, rap0738, rap0852, rap0885, rap0963, rap0964, rap0966m, rap0968m, rap0993, rap1003, rap1018, rap1019, rap1020, rap1049, rap1067, rap1069, rap1070, rap1075, rap1081m, rap1090, rap1123, rap1162, rap1189, rap1214m, rap1303, rap1306m, rap1340,

rap1362, rap1363, rap1364, rap1366, rap1377, rap1408m, rap1736, rap2166, rap2541rlv, rap2542rlv, rap2552, rap2561rlv, rap2618, rap2716, rap2784, rap2819, rap2908rlv

Comments:
This is a common and likely largely endemic association to the study area. It is common on steep southerly facing slopes, mostly close to the coast. The variety of associated species can be seen by scanning the list of minor phases that have been identified in the area. In general, variation is increased by seral stage (mostly time since fire influencing the presence of such species as *Lotus scoparius* and *Malacothamnus fasciculatus*) and local site conditions (slightly hotter and better drained slopes may have more *Salvia mellifera* while more coastal foggy slopes may have more *Rhus integrifolia* and *Artemisia californica*). However, the degree of overlap between these phases in species cover and composition was too great to warrant further separation into distinct associations.

Phases:
Malosma laurina-Eriogonum cinereum (Laurel Sumac-Ashy Buckwheat) Phase [2141]
Malosma laurina-Rhus integrifolia-Eriogonum cinereum-Artemisia californica (Laurel Sumac-Lemonade Berry-Ashy Buckwheat-California Sagebrush) Phase [21413]
Malosma laurina-Malacothamnus fasciculatus-Eriogonum cinereum-Salvia mellifera (Laurel Sumac-Bush Mallow-Ashy Buckwheat-Black Sage) Phase [7146]
Malosma laurina-Eriogonum cinereum-Lotus scoparius (Laurel Sumac-Ashy Buckwheat-Deerweed) Phase [7144]
Malosma laurina-Eriogonum cinereum-Salvia mellifera (Laurel Sumac-Ashy Buckwheat-Black Sage) Phase [7141]

COMMON NAME	Laurel Sumac-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Malosma laurina-Eriogonum fasciculatum Shrubland Association

Laurel Sumac-California Buckwheat Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 21423

Local Description

Summary:
This shrubland association occurs on somewhat steep to abrupt southwest- and southeast-facing slopes at low elevations between 0–602 m. It is characterized by a codominance of *Malosma laurina* and *Eriogonum fasciculatum* in the shrub layer. The herbaceous layer is insignificant. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 0–602, mean 413.7 m
Aspect: southwest and southeast
Slope: range 15–75 degrees, mean 35.1 degrees
Topography (micro; macro): variable (all); middle to upper slope
Litter Cover: range 2–35%, mean 16.8%
Small Rock Cover: range 2–65%, mean 29.7%
Large Rock Cover: range 0–85%, mean 7.6%
Bare Ground: range 2–45%, mean 21.2%
Parent Material: metamorphic, sedimentary, or igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Malosma laurina-Eriogonum fasciculatum* Shrubland form an open to intermittent shrub layer (4–54%, mean 31.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–16%, mean 3.4%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 4–55%, mean cover is 34.4%.

In this association, the shrub layer is characterized by *Eriogonum fasciculatum* and *Malosma laurina. Ceanothus megacarpus, Salvia mellifera, Heteromeles arbutifolia, Rhus ovata,* and *Adenostoma fasciculatum* are frequently included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is simple and may include *Brassica nigra, Melica imperfecta, Centaurea melitensis, Gnaphalium* sp., and *Bromus diandrus.*

***Malosma laurina-Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	100	12.3	3.0	28.0	X		
	MALA6	*Malosma laurina*	100	9.6	0.2	20.0	X		
	CEME	*Ceanothus megacarpus*	64	1.5	0.2	7.5			
	SAME3	*Salvia mellifera*	57	0.9	0.2	6.0			
	HEAR5	*Heteromeles arbutifolia*	55	1.6	0.2	7.5			
	RHOV	*Rhus ovata*	53	0.9	0.2	7.5			
	ADFA	*Adenostoma fasciculatum*	50	0.7	0.2	5.0			
	YUWH	*Yucca whipplei*	48	0.2	0.2	2.5			
	ARCA11	*Artemisia californica*	28	0.5	0.2	8.0			
	CESP	*Ceanothus spinosus*	26	0.3	0.2	4.0			
Herb									
	BROMU	*Bromus*	26	1.0	0.2	15.0			

Other Noteworthy Species:
Eriogonum crocatum was found in 1 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 1 of 58 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Avena, Bromus diandrus, Bromus madritensis, Avena barbata, Hirschfeldia incana, Nicotiana glauca, Brassica, Pennisetum setaceum, Acacia redolens, Avena fatua, Eucalyptus, Marrubium vulgare, Piptatherum miliaceum, Ricinus communis

Samples Used in Description: (n = 58)
AA0057cc, AA0095cc, AA0127cc, AA0167cc, AA0248cc, AA0249cc, AA0343, AA0347, AA0548, AA0584, AA0665, AA0703, AA0773, AA0833, AA0835, AA0840, AA0940, AA0985, AA1169, AA1170, AA1217, rap0162m, rap0234m, rap0238, rap0240m, rap0301, rap0311, rap0314, rap0319, rap0320, rap0322m, rap0323, rap0326, rap0327, rap0362, rap0381, rap0393, rap0394, rap0396, rap0430, rap0431, rap0451, rap0452m, rap0453, rap0479, rap0769, rap0770, rap0857, rap1143, rap1159, rap1183, rap1186, rap1630m, rap1763, rap2170, rap2293, rap2480, rap2674

Comments:
This association occurs fairly commonly on hot, dry southerly facing slopes. It is widespread throughout the study area in most of the subregions. It is perhaps most common in the upper elevation regions of the mountains where it tends to be restricted to very steep south-facing slopes**.**

Phases:
Malosma laurina-Eriogonum fasciculatum (Laurel Sumac-California Buckwheat) Phase [21423]
Malosma laurina-Eriogonum fasciculatum-Artemisia californica/Annual Grass-Herb (Laurel Sumac-California Buckwheat-California Sagebrush/Annual Grass-Herb) Phase [3382]

Malosma laurina-Eriogonum fasciculatum-Heteromeles arbutifolia-Ceanothus megacarpus (Laurel Sumac-California Buckwheat-Toyon-Big Pod Ceanothus) Phase [3383]

COMMON NAME	Laurel Sumac-California Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and from San Diego (Evens and San 2005) and western Riverside counties (Klein and Evens 2005). Information about its global distribution is not available without additional inventory, although it is likely to occur elsewhere in southern California below about 1,000 m.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
In the *Malosma laurina-Eriogonum fasciculatum* Association, both species are codominant in the shrub overstory. *Salvia apiana*, *Ceanothus leucodermis*, *Heteromeles arbutifolia*, *Baccharis pilularis*, and *Baccharis salicifolia* are examples of species that may occur as shrubs at low cover. The understory herbaceous layer is variable and usually dominated by nonnative species such as *Bromus madritensis, Avena fatua, Centaurea melitensis,* and *Hirschfeldia incana.*

Comments:
This association appears to have fairly constant environmental and species characteristics in all places it has been sampled in southern California.

References:
Evens and San 2005, Klein and Evens 2005

Malosma laurina-Rhus ovata-Ceanothus megacarpus Shrubland Association

Laurel Sumac-Sugar Bush-Big Pod Ceanothus Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 21415

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep, usually south-facing slopes at low elevations between 156–694 m. It is dominated by *Malosma laurina,* and *Rhus ovata* and *Ceanothus megacarpus* are subdominant or sometimes codominant with *Malosma*. The herbaceous layer is relatively simple and infrequent with species such as *Brassica nigra*, *Bromus, Marah macrocarpus,* and/or *Melica imperfecta.* The tree layer is also sometimes present and includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Eastern Urban, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 156–694 m, mean 306 m
Aspect: most often southwest and southeast, sometimes variable, and rarely northwest
Slope: range 15–38 degrees, mean 33.0 degrees
Topography (micro; macro): often undulating or flat, sometimes convex or concave; lower to upper slopes, rarely bottom or ridgetop
Litter Cover: 55% (one sample)
Small Rock Cover: range 5–30%, mean 17.5%
Large Rock Cover: range 0–5%, mean 2.0%
Bare Ground: range 15–32%, mean 23.7%
Parent Material: frequently igneous and sedimentary, sometimes depositional or metamorphic
Soil Texture: moderately fine sandy clay loam (one sample)

Vegetation Description:
Stands of *Malosma laurina-Rhus ovata-Ceanothus megacarpus* Shrubland form an open to intermittent shrub layer (12–51%, mean 38.4%). Shrubs commonly occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–35%, mean 3.4%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.2%) hardwoods at 0–10 m tall. Total vegetation cover is 30–53%, mean cover is 41.6%.

In this association, the shrub layer is dominated openly to intermittently by *Malosma laurina,* and *Rhus ovata* and *Ceanothus megacarpus* are subdominant or sometimes codominant with *Malosma*. Other species characteristically present but at low cover are *Salvia mellifera* and *Adenostoma fasciculatum*, while a variety of other chaparral or coastal sage scrub species may also be present at low cover such as *Eriogonum fasciculatum* and *Heteromeles arbutifolia*. The herbaceous layer is relatively simple and infrequent with species such as *Brassica nigra*, *Bromus, Marah macrocarpus,* and/or *Melica imperfecta.* Occasionally, emergent trees may occur including *Quercus agrifolia*.

***Malosma laurina-Rhus ovata-Ceanothus megacarpus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.2	0.2	1.0			
Shrub									
	MALA6	*Malosma laurina*	100	15.3	3.0	31.0	X	X	
	RHOV	*Rhus ovata*	94	9.6	1.0	24.0		X	
	CEME	*Ceanothus megacarpus*	88	4.7	0.2	14.0		X	
	SAME3	*Salvia mellifera*	88	2.0	0.2	7.5		X	
	ADFA	*Adenostoma fasciculatum*	75	2.1	0.2	6.0		X	
	ERFA2	*Eriogonum fasciculatum*	56	0.9	0.2	4.0			
	HEAR5	*Heteromeles arbutifolia*	50	0.9	0.2	4.0			
	ARCA11	*Artemisia californica*	31	0.3	0.2	2.0			
	NIGL	*Nicotiana glauca*	31	0.2	0.2	1.0			X
	BRCA3	*Brickellia californica*	31	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	25	0.8	0.2	11.0			
	CESP	*Ceanothus spinosus*	25	0.8	2.0	5.0			
	CEBE3	*Cercocarpus betuloides*	25	0.2	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	25	0.2	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 1 of 16 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Nicotiana glauca, Brassica nigra, Bromus diandrus, Centaurea benedictus, Pennisetum setaceum, Senecio mikanioides

Samples Used in Description: (n = 16)
AA0159cc, AA0412, AA0589, AA0591, AA0640, AA0916, rap0374, rap0713, rap0735, rap0740, rap0831, rap0863, rap1172, rap1878m, rap2332, rap2721

Comments:
None

Phases:
None

COMMON NAME	Laurel Sumac-Sugar Bush-Big Pod Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Malosma laurina-Salvia mellifera Shrubland Association

Laurel Sumac-Black Sage Shrubland Association
***Malosma laurina* Shrubland Alliance**
Laurel Sumac Shrubland Alliance

Mapping Code: 2148

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 17–756 m. It is characterized by a codominance of *Malosma laurina* and *Salvia mellifera* in the shrub layer. The herbaceous layer is generally insignificant. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 17–756 m, mean 321.4 m
Aspect: southeast and southwest
Slope: range 15–40 degrees, mean 32 degrees
Topography (micro; macro): variable (all); lower slope to ridgetop
Litter Cover: range 15–35%, mean 25%
Small Rock Cover: range 0–50%, mean 23.7%
Large Rock Cover: range 0–5%, mean 1.3%
Bare Ground: range 14–65%, mean 37.7%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Malosma laurina-Salvia mellifera* Shrubland form an open to intermittent shrub layer (15–60%, mean 36.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 3.8%) at 0–1 m tall. Trees are frequently emergent (0–10% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 16–62%, mean cover is 40.8%.

In this association, the shrub layer is characterized by *Malosma laurina* and *Salvia mellifera*. *Eriogonum fasciculatum, Heteromeles arbutifolia,* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and may include *Brassica nigra, Centaurea melitensis, Bromus madritensis, Marah macrocarpus,* and *Bromus diandrus.*

***Malosma laurina-Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	14.9	4.0	35.0		X	
	SAME3	*Salvia mellifera*	96	11.6	0.2	25.0		X	
	ERFA2	*Eriogonum fasciculatum*	67	2.1	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	58	1.0	0.2	8.0			
	ADFA	*Adenostoma fasciculatum*	51	1.5	0.2	8.0			
	RHOV	*Rhus ovata*	48	1.0	0.2	9.0			
	YUWH	*Yucca whipplei*	48	0.5	0.2	2.5			
	ARCA11	*Artemisia californica*	41	0.5	0.2	3.0			
	ENCA	*Encelia californica*	36	0.7	0.2	5.0			
	CEME	*Ceanothus megacarpus*	33	0.6	0.2	5.0			
	MAFA	*Malacothamnus fasciculatus*	28	0.6	0.2	10.0			
	LOSC2	*Lotus scoparius*	28	0.4	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	22	0.5	0.2	6.0			
Herb									
	BRNI	*Brassica nigra*	33	0.5	0.2	6.0			X
	CEME2	*Centaurea melitensis*	23	0.5	0.2	8.0			X

Other Noteworthy Species:
Juglans californica was found in 5 of 69 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 69 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus madritensis, Avena, Bromus diandrus, Hirschfeldia incana, Pennisetum setaceum, Erodium, Nicotiana glauca, Marrubium vulgare, Euphorbia terracina, Avena fatua, Melilotus indicus, Bromus hordeaceus, Avena barbata, Erodium cicutarium, Eucalyptus, Foeniculum vulgare, Lobularia maritima, Raphanus sativus, Ricinus communis, Schinus molle, Silene gallica, Vinca major

Samples Used in Description: (n = 69)
AA0008cc, AA0022cc, AA0028cc, AA0035cc, AA0036cc, AA0069cc, AA0139cc, AA0147cc, AA0182cc, AA0207cc, AA0244cc, AA0271cc, AA0272cc, AA0305cc, AA0379cc, AA0403, AA0427, AA0454cc, AA0593, AA0723, AA0752, AA0790, AA0818, AA0839, AA0964, AA0980, AA0984, AA0993, AA1084, AA1117, AA1145, AA1149, AA1153, AA1160, rap0344, rap0349, rap0352, rap0564, rap0673, rap0800, rap0815, rap0840m, rap0887, rap0889, rap0912, rap0913, rap1035, rap1051, rap1056, rap1118, rap1126m, rap1164, rap1165, rap1178m, rap1233, rap1281m, rap1358, rap1372, rap1523, rap1627, rap1634, rap1705, rap1989, rap2169, rap2191, rap2216, rap2391, rap2799, rap2845

Comments:
This is a common association and appears to be widespread throughout much of the study area on dry, hot exposures.

Phases:
None

COMMON NAME	Laurel Sumac-Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Malosma laurina* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	61Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. It is also likely throughout south coastal California evidenced by the similar descriptions of types in Riverside and San Diego counties (Evens and San 2005, Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
In the *Malosma laurina-Eriogonum fasciculatum-Salvia mellifera* Association described from western Riverside County by Klein and Evens (2005) and from San Diego County by Evens and San (2005), all three shrubs are usually codominant. Other chaparral and coastal sage species that are characteristically present at low cover include *Heteromeles arbutifolia*, *Artemisia californica*, *Adenostoma fasciculatum*, and *Yucca whipplei*. The herbaceous layer, which includes a variety of native and nonnative species, is usually dominated by *Bromus madritensis*.

Comments:
We suggest merging this association with the *Malosma laurina-Eriogonum fasciculatum-Salvia mellifera* Association of Klein and Evens (2005) and Evens and San (2005). The frequency of *Eriogonum fasciculatum* in the SAMO samples is 67%, high enough to be considered an adequate constancy by most standards.

References:
Evens and San 2005, Klein and Evens 2005

Mesembryanthemum spp.-*Carpobrotus* spp. Seminatural Shrubland Alliance

Ice Plant Shrubland Alliance

Mapping Code: 4720

Local Description

Summary:
This shrubland alliance occurs on abrupt to steep slopes with northeast aspect at low elevations between 2–46 m. It is dominated by the sprawling *Carpobrotus edulis* in the low shrub layer. The emergent tree layer includes occasional nonnative species such as *Schinus molle* and *Pinus* sp.

Distribution:
This alliance is sampled in the Immediate Coast and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 2–46 m, mean 17.6 m
Aspect: northeast
Slope: range 2–85 degrees, mean 28.5 degrees
Topography (micro; macro): flat or undulating; slope bottom to upper slope
Litter Cover: range 15–65%, mean 40%
Small Rock Cover: range 2–20%, mean 9.8%
Large Rock Cover: range 0–50%, mean 12.5%
Bare Ground: range 12–80%, mean 44.3%
Parent Material: quaternary or sedimentary
Soil Texture: sand to very fine loamy sand

Vegetation Description:
Stands of this shrubland alliance form an open shrub layer (7–20%, mean 12%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 0–2 m tall. The herbaceous layer is open to intermittent (13–40%, mean 26.2%) at 0.1–0.5 m tall. Trees are very occasionally emergent (0–0.4% cover, mean 0.66%) with conifers at 1–10 m and hardwoods at 0–5 m tall. Total vegetation cover is 23–51%, mean cover is 38.2%.

In this association, the shrub layer often includes *Artemisia californica* and *Encelia californica. Rhus integrifolia, Isocoma menziesii,* and *Coreopsis gigantea* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Schinus molle* and *Pinus* sp. at very low cover. The herbaceous layer is diverse and is characterized by *Carpobrotus edulis.* Other herbs sometimes include *Ambrosia chamissonis, Marah macrocarpus, Leymus condensatus, Brassica nigra,* and *Distichlis spicata. Mesembryanthemum crystallinum* is occasionally present.

Mesembryanthemum spp.-_Carpobrotus_ spp. Seminatural Herbaceous Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	67	1.9	0.2	6.0			
	ENCA	*Encelia californica*	67	1.7	0.2	6.0			
	RHIN2	*Rhus integrifolia*	50	1.2	0.2	7.0			
	ISME5	*Isocoma menziesii*	50	0.7	0.2	3.0			
	COGI	*Coreopsis gigantea*	50	0.4	0.2	1.0			
	ERER11	*Ericameria ericoides*	33	1.7	2.0	8.0			
	LOSC2	*Lotus scoparius*	33	0.7	1.0	3.0			
	BAPI	*Baccharis pilularis*	33	0.5	0.2	3.0			
	OPLI3	*Opuntia littoralis*	33	0.5	0.2	3.0			
	MYLA5	*Myoporum laetum*	33	0.3	1.0	1.0			X
	MALA6	*Malosma laurina*	33	0.2	0.2	1.0			
	MILA6	*Mirabilis laevis*	33	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	33	0.1	0.2	0.2			X
Herb									
	CAED3	*Carpobrotus edulis*	100	22.0	10.0	40.0	X	X	X
	AMCH4	*Ambrosia chamissonis*	33	0.4	0.2	2.0			
	BRNI	*Brassica nigra*	33	0.3	1.0	1.0			X
	DISP	*Distichlis spicata*	33	0.2	0.2	1.0			
	LECO12	*Leymus condensatus*	33	0.2	0.2	1.0			
	MAMA8	*Marah macrocarpus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Abronia umbellata was found in 1 of 6 surveys of this plant community, which is *Abronia umbellata* spp. *umbellata.* Regionally, the park considers this species as Rare (SAMO 2004). There is no state or global rank of this subspecies (CNPS 2005).

Nonnative Species:
Carpobrotus edulis, Brassica nigra, Myoporum laetum, Nicotiana glauca, Melilotus indicus, Ricinus communis, Bromus madritensis, Conyza canadensis, Anagallis arvensis, Atriplex semibaccata, Bromus diandrus, Bromus hordeaceus, Cakile maritima, Carpobrotus chilensis, Erodium, Foeniculum vulgare, Lamarckia aurea, Melilotus, Mesembryanthemum crystallinum, Nerium oleander, Pennisetum setaceum, Rumex crispus, Salsola tragus, Schinus molle, Sonchus

Samples Used in Description: (n = 6)
AA0672, rap0640, rap0648, rap1028, rap2777, rap2890rlv

Comments:
This is a widespread introduced vegetation type along the coast of California. It may be composed of one or more species of *Mesembryanthemum* or *Carpobrotus.* The most widespread species in the SAMO study area is *Carpobrotus edulis.* This is an invasive species that sprawls over dunes and coastal bluffs, smothering and shading out native species such as *Coreopsis gigantea, Ericameria ericoides, Ambrosia chamissonis*, and other native herbaceous species.

Phases:
None

COMMON NAME	Ice Plant Herbaceous Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural temperate or subpolar perennial forb vegetation
FORMATION	V.B.2.N.b. Low temperate or subpolar perennial forb vegetation
ALLIANCE	*Mesembryanthemum* spp.-*Carpobrotus* spp. *Seminatural Herbaceous Alliance* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—This is an introduced alliance that usually strongly dominates the landscape to the exclusion of other native species.

Global Description

Distribution:
Ice plant mats occur along the northern, central, and southern California coasts, the Central Valley, and on the Channel Islands.

Nations:
United States

States or Provinces:
CA
Northern California coast (263A)—*Carpobrotus edulis* is the most common invader of dune habitats and is widespread on most dune systems.
Central California coast (261B)—*Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems.
Southern California coast (261B)—*Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems. On the Channel Islands, *Mesembryanthemum* sp. crowded out many native herbaceous and subshrub stands especially on the northern Channel Islands. Salt buildup from the leaves has effectively changed the soil chemistry of some of these stands and effectively excludes native species from recolonizing (Vivrette and Muller 1977).
Great Valley (262A)—Stands occur in Suisun marsh and in other delta areas of the Sacramento-San Joaquin delta (Keeler-Wolf et al. 2000).

Environmental Description:
Occurs on bluffs and disturbed land and sand dunes of the immediate coastline from sea level to 100 m elevation.

Vegetation Description:
Carpobrotus, *Mesembryanthemum* sp., or *Malephora crocea* is the sole or dominant herb in the ground canopy; *Abronia latifolia, Ambrosia chamissonis, Eriogonum latifolium, and/or Poa douglasii* may be present. Emergent shrubs may be present. Herbs are less than 50 cm; canopy is continuous.

Comments:
This treatment is broadly defined to recognize the importance of these introduced species in California's vegetation. The invasive character of several taxa in the *Aizoaceae* family is well appreciated in California, especially on coastal dune habitats. Three genera are included in this series. The *Jepson Manual* includes five taxa in the genera *Carpobrotus*, *Malephora*, and *Mesembryanthemum* as having naturalized in the state. These taxa have historically been placed in *Mesembryanthemum* but are now referred to as *Carpobrotus chilensis, C. edulis, Malephora crocea, Mesembryanthemum crystallinum, and M. nodiflorum.* All are invasive and replace native dune species, particularly members of the *Ambrosia chamissonis* and *Lupinus chamissonis-Ericameria ericoides* alliances.

Widely planted as a soil binder on embankments and as ornamental in coastal districts (Prescott and Venning 1984), ice plants (especially *Carpobrotus edulis*) can form impenetrable mats that crowd out other species. For years, local southern California fire departments have recommended ice plant to people with houses in fire-prone areas. Ice plant is also often used to control erosion. However, during years with a lot of rain, the succulent ice plant swells with water and can cause entire slopes to slide from the increased weight. *Carpobrotus edulis* is considered one of the most invasive wildland plants in California by the California Exotic Plants Pest Council (CalEPPC List of Exotic Pest Plants of Greatest Ecological Concern 2002 http://www.caleppc.org/info/99lista.html). Ice plant stands are being removed to restore native vegetation on the coastal dunes and enhance populations of rare species (Pickart and Sawyer 1998). Removal of these species is time consuming by hand-pulling (large mats can be removed by rolling them up like a carpet) and yet is easier and more cost-effective than removal of *Ammophila arenaria* (Albert 1996). Many California state park and national park lands along the coast are actively removing ice plant and replacing it with native dune species such as members of the *Ambrosia chamissonis* and *Lupinus chamissonis-Ericameria ericoides* alliances.

References:
Albert 1996, Hickman 1993, Keeler-Wolf and Vaghti 2000, Pickart and Sawyer 1998, Prescott and Venning 1984, Sawyer and Keeler-Wolf 1995, Vivrette and Muller 1977

Mimulus aurantiacus Shrubland Association

Bush Monkey Flower Shrubland Association
***Mimulus aurantiacus* Shrubland Alliance**
Bush Monkey Flower Shrubland Alliance

Mapping Code: 2172

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast and northwest slopes at low elevations between 43–571 m. It is characterized by a strong dominance of *Mimulus aurantiacus* in the shrub layer. It has a presence of *Leymus condensatus* in most stands in the herbaceous layer, though this species is not considered characteristic. The emergent tree layer is usually absent but may include *Juglans californica, Eucalyptus* sp., *Pinus* sp., *Quercus agrifolia,* and *Platanus racemosa*.

Distribution:
This association is sampled in the Western Fog Zone, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 43–571 m, mean 297 m
Aspect: northeast and northwest
Slope: range 15–40 degrees, mean 31.1 degrees
Topography (micro; macro): variable (all); lower slope to ridgetop
Litter Cover: range 5–75%, mean 38.8%
Small Rock Cover: range 2–25%, mean 14.3%
Large Rock Cover: range 0–8%, mean 1.7%
Bare Ground: range 10–35%, mean 21.7%
Parent Material: igneous or sedimentary
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (13–63%, mean 43.6%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–22%, mean 3.6%) at 0–1 m tall. Trees are occasionally emergent (0–6% cover, mean 1.3%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 32–70%, mean cover is 48.1%.

In this association, the shrub layer is characterized by *Mimulus aurantiacus, Artemisia californica,* and *Malosma laurina. Salvia leucophylla, Toxicodendron diversilobum,* and *Sambucus mexicana* are usually included in this layer. The tree layer is emergent and open and may include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and often includes *Leymus condensatus.* Other herbs may include *Melica imperfecta, Centaurea melitensis, Hirschfeldia incana,* and *Bromus madritensis.*

***Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MIAU	*Mimulus aurantiacus*	100	22.4	7.0	46.0		X	
	ARCA11	*Artemisia californica*	87	1.8	0.2	8.0		X	
	MALA6	*Malosma laurina*	78	4.4	0.2	15.0		X	
	SALE3	*Salvia leucophylla*	65	3.0	0.2	18.0			
	TODI	*Toxicodendron diversilobum*	52	1.1	0.2	10.0			
	SAME5	*Sambucus mexicana*	52	0.6	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	43	1.3	0.2	5.0			
	BAPI	*Baccharis pilularis*	43	0.7	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	39	1.1	0.2	6.0			
	SAME3	*Salvia mellifera*	39	1.1	0.2	8.0			
	CEME	*Ceanothus megacarpus*	26	0.9	1.0	7.0			
	CESP	*Ceanothus spinosus*	26	0.3	0.2	3.0			
	RHIN2	*Rhus integrifolia*	22	1.7	2.0	18.0			
	CEBE3	*Cercocarpus betuloides*	22	0.8	0.2	8.0			
	RHOV	*Rhus ovata*	22	0.2	0.2	3.0			
	YUWH	*Yucca whipplei*	22	0.2	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	22	0.2	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	65	1.8	0.2	12.0			
	MEIM	*Melica imperfecta*	22	0.4	0.2	7.0			
	CEME2	*Centaurea melitensis*	22	0.3	0.2	4.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus plummerae was found in 1 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 3 of 23 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Nicotiana glauca, Foeniculum vulgare, Eucalyptus, Conium maculatum, Carduus pycnocephalus, Brassica nigra, Marrubium vulgare, Phalaris aquatica, Piptatherum miliaceum, Silybum marianum, Stellaria media

Samples Used in Description: (n = 23)
AA0020cc, AA0555, AA0942, AA0946, rap0092, rap0095, rap0289, rap0486, rap0837, rap1188, rap1260, rap1666, rap1674, rap1864, rap1905, rap1907, rap1910, rap1985, rap2272m, rap2441, rap2495, rap2509, rap2808

Comments:
This is the first time *Mimulus aurantiacus* has been identified at the alliance level in California. These stands are so heavily dominated by this species that there is little doubt that this is a distinct type. However, it is generally related to other coastal sage scrub alliances. It appears on generally steep, often somewhat unstable slopes in relatively mesic settings within the general vicinity of stands of *Artemisia californica* and *Salvia leucophylla* alliances. It also appears to be closely associated with recent burns in many cases and often occurs adjacent to stands of *Quercus agrifolia* woodland. In some cases, this type also appears to be associated with natural ground disturbance such as rockslides. Two phases have been described that have relatively higher cover of either *Malosma laurina* or *Salvia leucophylla*.

Phases:
Mimulus aurantiacus-Malosma laurina (Bush Monkey Flower-Laurel Sumac) Phase [2172]
Mimulus aurantiacus-Salvia leucophylla (Bush Monkey Flower-Purple Sage) Phase [2171]

COMMON NAME	Bush Monkey Flower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Mimulus aurantiacus* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is likely to occur throughout much of cismontane central and southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Small stands of this alliance have been seen as far north as Contra Costa County (Keeler-Wolf 2005, personal observation). These also occur on steep slopes and include *Artemisia californica*.
`

References:
None

Opuntia spp.-Mixed Coastal Sage Scrub Shrubland Association

Coast Prickly Pear-Mixed Coastal Sage Scrub Shrubland Association
***Opuntia* spp. Shrubland Alliance**
Coast Prickly Pear Shrubland Alliance

Mapping Code: 2412

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 10–310 m. It is characterized by a dominance of *Opuntia* spp. (primarily *O. littoralis*, but occasionally *O. oricola* or both) in the shrub layer. The herbaceous layer is generally composed of a variety of nonnative species at low cover. The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 10–310 m, mean 175.6 m
Aspect: southeast and southwest
Slope: range 15–40 degrees, mean 26.7 degrees
Topography (micro; macro): convex, flat, or undulating; lower slope to ridgetop
Litter Cover: range 15–55%, mean 28.6%
Small Rock Cover: range 2–50%, mean 17.5%
Large Rock Cover: range 0–70%, mean 7.6%
Bare Ground: range 0–75%, mean 33.9%
Parent Material: igneous
Soil Texture: fine clay to moderately fine clay loam

Vegetation Description:
Stands of *Opuntia* spp.-Mixed Coastal Sage Scrub Shrubland form an open continuous shrub layer (14–67%, mean 39%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–27%, mean 6%) at 0–2 m tall. Trees are frequently emergent (0–8% cover, mean 0.7%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–75%, mean cover is 45.5%.

In this association, the shrub layer usually contains *Opuntia littoralis* and *Eriogonum fasciculatum*. *Artemisia californica, Yucca whipplei, Rhus integrifolia,* and *Encelia californica* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Schinus molle* and *Quercus agrifolia* at low cover. The herbaceous layer is diverse and sometimes includes *Hirschfeldia incana, Bromus madritensis, Brassica nigra, Melica imperfecta, Dudleya pulverulenta,* and *Nassella pulchra*.

***Opuntia* spp.*-Mixed Coastal Sage Scrub* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	OPLI3	*Opuntia littoralis*	73	15.1	5.0	52.0	X		
	ERFA2	*Eriogonum fasciculatum*	73	3.9	0.2	15.0			
	ARCA11	*Artemisia californica*	60	2.9	0.2	17.0			
	YUWH	*Yucca whipplei*	52	0.7	0.2	5.0			
	ENCA	*Encelia californica*	50	1.6	0.2	15.0			
	RHIN2	*Rhus integrifolia*	50	1.3	0.2	15.0			
	OPOR	*Opuntia oricola*	43	4.0	0.2	25.0			
	MALA6	*Malosma laurina*	40	1.7	0.2	21.0			
	SAME5	*Sambucus mexicana*	35	0.6	0.2	7.5			
	LOSC2	*Lotus scoparius*	32	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	30	0.9	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	28	1.1	0.2	15.0			
	BAPI	*Baccharis pilularis*	28	0.3	0.2	5.0			
	SAME3	*Salvia mellifera*	25	1.0	0.2	22.0			
	OPPR	*Opuntia prolifera*	22	0.6	0.2	7.0			
Herb									
	HIIN3	*Hirschfeldia incana*	32	0.3	0.2	5.0			X
	BRMA3	*Bromus madritensis*	28	0.7	0.2	8.0			X
	NASSE	*Nassella*	22	0.5	0.2	7.5			
	MEIM	*Melica imperfecta*	20	0.9	0.2	10.0			
	BRNI	*Brassica nigra*	20	0.1	0.2	1.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 40 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 2 of 40 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Brassica nigra, Centaurea melitensis, Foeniculum vulgare, Schinus molle, Carduus pycnocephalus, Avena, Bromus hordeaceus, Avena fatua, Nicotiana glauca, Cirsium vulgare, Erodium, Lactuca serriola, Marrubium vulgare, Pennisetum setaceum, Anagallis arvensis, Conyza canadensis, Cortaderia, Erodium cicutarium, Galium aparine, Ricinus communis, Silene gallica, Sonchus oleraceus, Vicia villosa

Samples Used in Description: (n = 40)
AA0003cc, AA0255cc, AA0283cc, AA0332, AA0382cc, AA0423, AA0613, AA0630, AA0679, rap0072, rap0090, rap1097, rap1129, rap1204m, rap1427, rap1428, rap1454, rap1757m, rap1758, rap1759, rap1760, rap1761, rap1767m, rap1831, rap2226, rap2251, rap2373, rap2492, rap2600, rap2648, rap2668, rap2695, rap2740, rap2746, rap2817, rap2863rlv, rap2899, rap2900, rap2901, rap2929

Comments:
This association describes the local succulent-dominated scrub. Difficulty in identifying the difference between *Opuntia littoralis* (and hybrids) from *O. oricola* (and hybrids) through binoculars has led to the nonspecific naming of the association. As a general rule, it appeared that the densest stands were dominated by *O. littoralis* and the more open stands often contained more *O. oricola. Nassella pulchra*, although not often found in mixed stands with shrubs, was sometimes seen in this type. Certain stands appear to have higher frequency of *Opuntia prolifera* (coastal cholla), although these did not segregate from the main cluster of samples in the quantitative analysis. The best and densest stands of this association occur on the northwestern portion of the study area usually on Conejo volcanics. These thickets are not to be taken lightly when considered for sampling.

Phases:
None

COMMON NAME	Coast Prickly Pear-Mixed Coastal Sage Scrub Shrubland Association
SYNONYM	Maritime Succulent Scrub (in part) (Holland 1996)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Succulent extremely xeromorphic evergreen shrubland
ALLIANCE	*Opuntia littoralis* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2 (Hybrids and uncertain identification of key species beyond subgenus level)
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution are not available without additional inventory. Other similar stands of maritime cactus scrub occur south and east through the western Los Angeles Basin to San Diego County.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description

Comments:
These stands dominated by *playtopuntias* (either *Opuntia littoralis* or *O. oricola*) are not to be confused with the stands of more Baja California floristic affinities that occur in San Diego County and on some of the southern Channel Islands. The local stands provide excellent habitat for the coastal cactus wren. These stands are placed in the *O. littoralis* Alliance (c.f., Sawyer and Keeler-Wolf 1995) despite the uncertainty of some of the *Opuntia* species in some of the stands.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Prunus ilicifolia-Heteromeles arbutifolia Shrubland Association

Holly Leaf Cherry-Toyon Shrubland Association
***Prunus ilicifolia* Shrubland Alliance**
Holly Leaf Cherry Shrubland Alliance

Mapping Code: 2121

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 281–667 m. It is characterized by a dominance or codominance of *Prunus ilicifolia* along with *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer may have native grasses, such as *Leymus condensatus* and *Melica imperfecta*, at low cover. The emergent tree layer includes *Umbellularia californica* and *Quercus agrifolia* at low cover in some of the stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Simi Hills Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 281–667 m., mean 475 m
Aspect: northeast and northwest
Slope: range 15–45 degrees, mean 32.7 degrees
Topography (micro; macro): undulating; bottom to upper slope
Litter Cover: no data
Small Rock Cover: range 5–5%, mean 5%
Large Rock Cover: range 0–6%, mean 3%
Bare Ground: range 5–15%, mean 10%
Parent Material: sedimentary or igneous
Soil Texture: medium loam

Vegetation Description:
Stands of *Prunus ilicifolia-Heteromeles arbutifolia* Shrubland form an open to intermittent shrub layer (15–61%, mean 38.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0–40%, mean 5.6%) at 0–1 m tall. Trees are occasionally emergent (0–32% cover, mean 4.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 32–65%, mean cover is 48.4%.

In this association, the shrub layer is characterized by *Prunus ilicifolia* and *Heteromeles arbutifolia. Cercocarpus betuloides, Mimulus aurantiacus, Ceanothus oliganthus,* and *Toxicodendron diversilobum* are frequently included in this layer. The tree layer is emergent and open and may include *Umbellularia californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Melica imperfecta, Leymus condensatus,* and *Hirschfeldia incana.*

***Prunus ilicifolia-Heteromeles arbutifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	UMCA-T	*Umbellularia californica*	55	1.0	0.2	6.0	X		
	QUAG-T	*Quercus agrifolia*	27	0.7	1.0	5.0			
Shrub									
	PRIL	*Prunus ilicifolia*	100	14.0	4.0	28.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	100	7.1	1.0	18.0		X	
	CEBE3	*Cercocarpus betuloides*	73	4.3	3.0	16.0			
	MIAU	*Mimulus aurantiacus*	64	1.0	0.2	3.0			
	CEOL	*Ceanothus oliganthus*	55	2.5	1.0	11.0			
	TODI	*Toxicodendron diversilobum*	55	0.6	0.2	3.0			
	RHOV	*Rhus ovata*	45	2.2	1.0	15.0			
	ADFA	*Adenostoma fasciculatum*	45	0.7	1.0	3.0			
	MALA6	*Malosma laurina*	45	0.3	0.2	2.0			
	CECR	*Ceanothus crassifolius*	36	1.5	0.2	7.0			
	KECO	*Keckiella cordifolia*	36	0.2	0.2	1.0			
	CESP	*Ceanothus spinosus*	27	1.2	0.2	10.0			
Herb									
	MEIM	*Melica imperfecta*	36	3.8	0.2	40.0			
	LECO12	*Leymus condensatus*	27	0.2	0.2	2.0			

Other Noteworthy Species:
Juglans californica was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Avena, Centaurea melitensis, Carduus pycnocephalus, Centaurea solstitialis, Piptatherum miliaceum, Spartium junceum

Samples Used in Description: (n = 11)
AA0770, rap0553m, rap2229m, rap2324, rap2365, rap2402, rap2413, rap2422, rap2426, rap2624, rap2638

Comments:
This is one of the most mesic of the local chaparral associations. It tends to occur at higher elevations and only on northerly facing slopes, especially in narrow gorges or rock crevasses.

Phases:
None

COMMON NAME	Holly Leaf Cherry-Toyon Shrubland Association
SYNONYM	Toyon-Holly Leaf Cherry Alliance (Borchert et al. 2004)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Prunus ilicifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
Central and south coast (including Santa Barbara, Ventura, and western Riverside counties), peninsular ranges (including western Riverside County: San Jacinto foothills, San Diego County: western foothills)

Nations:
United States

States or Provinces:
CA

Environmental Description:
Based on the western Riverside County description of Klein and Evens 2005, the following additional information may be provided on the environmental definition of this association: Elevation is usually below 1,000 m. Aspect is usually north-facing, and slopes are moderate to somewhat steep. Topography is usually concave, mid to upper slopes. Rock cover is relatively high in most stands, derived from granite, sedimentary, or metamorphic parent material. Soil texture is usually sandy loam to loam.

Vegetation Description:
This association has been described by Klein and Evens 2005 from western Riverside County. The following description is excerpted from their study: In the *Prunus ilicifolia-Heteromeles arbutifolia* Association, *Prunus ilicifolia* dominates or codominates in the overstory shrub layer, and *Heteromeles arbutifolia* is present at low cover. A variety of other species may intermix as subdominant shrubs, such as *Eriogonum fasciculatum*, *Toxicodendron diversilobum*, *Keckiella antirrhinoides*, *Adenostoma fasciculatum*, *Salvia apiana*, *and Salvia mellifera*. *Bowlesia incana*, *Marah macrocarpus*, *Muhlenbergia rigens*, *Leymus condensatus,* and nonnative *Bromus madritensis* are examples of species that may occur in the herb layer. This association has also been described from San Diego County (Evens and San 2005) with similar characteristics.

Comments:
Elsewhere *Prunus ilicifolia* stands may reach great age and become semiarborescent (sensu mainland cherry stands Sawyer and Keeler-Wolf 1995). Most of the SAMO stands appear to have burned in the relatively recent past and are multistemmed. Borchert et al. 2004 describe this same vegetation type as a *Prunus ilicifolia-Heteromeles arbutifolia* Alliance, and they separate it from two other similar alliances: the *Ceanothus megacarpus-Prunus ilicifolia* Alliance and the *Cercocarpus betuloides-Prunus ilicifolia* Alliance. All three of these mixed alliances will be treated by Sawyer et al. (2006 MS) as a part of the *Prunus ilicifolia* Alliance, which allows for codominance of other species with *P. ilicifolia*. The rationale behind this involves similar mesic

conditions for all of these and, apparently, low variance within each one of these types not requiring further differentiation into alliances but into associations of the *Prunus ilicifolia* Alliance.

References:
Borchert et al. 2004, Evens and San 2005, Klein and Evens 2005, Sawyer et al. 2006 MS

Quercus berberidifolia Shrubland Association

Scrub Oak Shrubland Association
***Quercus berberidifolia* Shrubland Alliance**
Scrub Oak Shrubland Alliance

Mapping Code: 2161

Local Description

Summary:
This shrubland association occurs on gentle to very steep northwest- and northeast-facing slopes at low to middle elevations between 119–783 m. It is characterized by strong dominance of *Quercus berberidifolia* in the shrub layer. The herbaceous layer is sparse and has no characteristic species. The emergent tree layer includes *Quercus agrifolia* in some stands.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Dry Inland, Eastern Urban, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 119–783 m, mean 342.2 m
Aspect: northwest and northeast
Slope: range 1–55 degrees, mean 23.6 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 50–80%, mean 68.3%
Small Rock Cover: range 0–30%, mean 6.6%
Large Rock Cover: range 0–80%, mean 3.4%
Bare Ground: range 0–42%, mean 15.3%
Parent Material: sedimentary
Soil Texture: coarse loamy sand to fine clay

Vegetation Description:
Stands of *Quercus berberidifolia* Shrubland form an open to continuous shrub layer (8–70%, mean 51.1%). Shrubs occur in two different strata with low shrubs at 0–5 m tall and tall shrubs at 1–10 m tall. The herbaceous layer is open to intermittent (0–48%, mean 3%) at 0–1 m tall. Trees are occasionally emergent (0–24% cover, mean 2.1%) with conifers at 0–10 m tall and hardwoods at 0–15 m tall. Total vegetation cover is 15–78%, mean cover is 55.7%.

In this association, the shrub layer is dominated by *Quercus berberidifolia. Heteromeles arbutifolia* also often occurs in the shrub layer. Other shrubs occasionally include *Adenostoma fasciculatum*, *Rhus ovata, Salvia leucophylla, Ceanothus spinosus, Toxicodendron diversilobum,* and *Malosma laurina*. The tree layer is emergent and open and sometimes includes *Quercus agrifolia, Juglans californica,* and *Quercus lobata* at low cover. The herbaceous layer is diverse and sometimes includes *Centaurea melitensis, Bromus madritensis, Brassica nigra, Bromus diandrus, Marah macrocarpus, Hemizonia fasciculata, Melica imperfecta,* and *Hirschfeldia incana.*

***Quercus berberidifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	31	0.9	0.2	10.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	35.0	3.0	68.0	X		
	HEAR5	*Heteromeles arbutifolia*	78	3.5	0.2	13.0	X		
	ADFA	*Adenostoma fasciculatum*	56	3.2	1.0	25.0			
	RHOV	*Rhus ovata*	46	1.3	0.2	15.0			
	SALE3	*Salvia leucophylla*	37	0.8	0.2	9.0			
	CESP	*Ceanothus spinosus*	30	0.7	0.2	7.0			
	TODI	*Toxicodendron diversilobum*	26	0.5	0.2	10.0			
	CEBE3	*Cercocarpus betuloides*	22	0.6	0.2	7.0			
	MALA6	*Malosma laurina*	22	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	20	0.4	0.2	7.0			
	SAME5	*Sambucus mexicana*	20	0.2	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	31	0.4	0.2	6.0			X

Other Noteworthy Species:
Baccharis malibuensis was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G1, and state rank is S1.1 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 54 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus diandrus, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Avena, Avena fatua, Bromus hordeaceus, Marrubium vulgare, Nicotiana glauca, Stellaria media, Carduus pycnocephalus, Eucalyptus, Galium aparine, Robinia, Schinus molle, Spartium junceum, Anagallis arvensis, Centaurea solstitialis, Conium maculatum, Conyza canadensis, Erodium cicutarium, Foeniculum vulgare, Melilotus, Melilotus indicus, Phoenix canariensis, Piptatherum miliaceum, Salsola tragus, Senecio argutus

Samples Used in Description: (n = 54)
AA0021cc, AA0040cc, AA0085cc, AA0086cc, AA0087cc, AA0399cc, AA0471cc, AA0756cc, AA0975, AA0994, AA1011, AA1094, AA1134, AA1179, rap0248, rap0291, rap0298, rap0299, rap0306, rap0336, rap0337, rap0340, rap0454, rap0461m, rap0505, rap0602, rap0830, rap1583, rap1621, rap1633, rap1637, rap1640m, rap1792, rap1826, rap1897m, rap1899, rap1915, rap2002, rap2004, rap2153, rap2155, rap2195, rap2210, rap2241, rap2316, rap2377, rap2445, rap2679, rap2687, rap2815, rap2832, rap2835, rap2843, rap2912

Comments:
This association is a common mesic chaparral locally and has been found in many other parts of central and southern California. It is easily distinguished from the related *Q. berberidifolia-Ceanothus spinosus* Association and the *Q. berberidifolia-Cercocarpus betuloides* Association. In this association, *Q. berberidifolia* usually forms a dense cover, with neither *C. betuloides* nor *C. spinosus* even approaching codominance. Additional phases have been identified with relatively higher cover of either *Heteromeles arbutifolia* or *Adenostoma fasciculatum*. However, both of these species tend to remain as subdominants to *Q. berberidifolia*.

Phases:
Quercus berberidifolia-Adenostoma fasciculatum (Scrub Oak-Chamise) Phase [2163]
Quercus berberidifolia-Heteromeles arbutifolia (Scrub Oak Toyon) Phase [2164]
Quercus berberidifolia (Scrub Oak) Phase [2161]

COMMON NAME	Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains as well as San Diego County (Evens and San 2005), Riverside County (Klein and Evens 2005), other parts of the eastern transverse and peninsular ranges (Gordon and White 1994), and north and westward to the northern range districts of the Los Padres National Forest (Borchert et al. 2004). It is likely that the same association occurs north well into the central and inner northern coast ranges (Thorne et al. 2004, Sawyer and Keeler-Wolf 1995).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Additional information summary from Klein and Evens (2005) for the *Q. berberidifolia* Alliance follows:

Elevation is below 1,500 m. Aspect is usually northerly and less often southerly. It is found on moderate to steep slopes, and topography is variable. Ground cover especially contains a

moderate to high litter content. Parent material is more often sedimentary, less often granitic, metamorphic, gabbro-diorite, or metavolcanic. Soil texture varies from loamy sand to clay.

Vegetation Description:
Quercus berberidifolia is the sole dominant shrub in the intermittent to continuous shrub layer. A variety of other chaparral, coastal sage, and desert shrub species may be present, the most common being *Adenostoma fasciculatum*, *Salvia mellifera, Heteromeles arbutifolia, Rhamnus crocea,* and *Eriogonum fasciculatum.* The most common herb species include nonnative annuals *Hirschfeldia incana*, *Bromus diandrus*, *Bromus madritensis*, or *Bromus tectorum*, though natives such as *Marah macrocarpus* and *Paeonia californica* are also usually present (Klein and Evens 2005, Evens and San 2005).

Comments:
There may be some minor local variation in this widespread association based on locally distributed, low-constancy species. Sufficient sampling has yet to be done in the northern part of its range.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, Thorne et al. 2004

Quercus berberidifolia-Ceanothus spinosus Shrubland Association

Scrub Oak-Greenbark Ceanothus Shrubland Association
***Quercus berberidifolia* Shrubland Alliance**
Scrub Oak Shrubland Alliance

Mapping Code: 2167

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep slopes of variable aspect at low elevations between 230–563 m. It is characterized by a codominance of *Quercus berberidifolia* and *Ceanothus spinosus* in the shrub layer. The simple herbaceous layer often has the vine *Marah macrocarpa*. The emergent tree layer occasionally includes *Quercus agrifolia*.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 230–563 m, mean 429.4 m
Aspect: variable
Slope: range 15–35 degrees, mean 26 degrees
Topography (micro; macro): flat or undulating; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 3–15%, mean 7.3%
Large Rock Cover: range 0–2%, mean 1%
Bare Ground: range 10–20%, mean 13%
Parent Material: sedimentary, igneous, metamorphic, and quaternary
Soil Texture: coarse loamy sand to moderately fine silty clay loam

Vegetation Description:
Stands of *Quercus berberidifolia-Ceanothus spinosus* Shrubland form an intermittent to continuous shrub layer (41–65%, mean 56.3%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–33%, mean 3.9%) at 0–0.5 m tall. Trees are occasionally emergent (0–5% cover, mean 1%) with hardwoods at 0–10 m tall. Total vegetation cover is 45–65%, mean cover is 59.3%.

In this association, the shrub layer is characterized by *Quercus berberidifolia, Ceanothus spinosus, Heteromeles arbutifolia,* and *Adenostoma fasciculatum. Rhus ovata, Cercocarpus betuloides, Malosma laurina, Rhamnus ilicifolia,* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Umbellularia californica* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Bromus madritensis, Centaurea melitensis, Piptatherum miliaceum,* and *Stellaria media*.

***Quercus berberidifolia-Ceanothus spinosus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	0.6	1.0	3.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	22.6	8.0	40.0	X	X	
	CESP	*Ceanothus spinosus*	100	16.8	10.0	25.0	X	X	
	HEAR5	*Heteromeles arbutifolia*	92	4.8	0.2	14.0		X	
	ADFA	*Adenostoma fasciculatum*	75	4.3	0.2	12.0		X	
	RHOV	*Rhus ovata*	50	1.1	0.2	6.0			
	CEBE3	*Cercocarpus betuloides*	42	0.9	0.2	5.0			
	MALA6	*Malosma laurina*	33	0.1	0.2	1.0			
	RHIL	*Rhamnus ilicifolia*	25	0.1	0.2	1.0			
	SAME3	*Salvia mellifera*	25	0.1	0.2	1.0			
	PRIL	*Prunus ilicifolia*	25	0.1	0.2	0.2			
Herb									
	MAMA8	*Marah macrocarpus*	42	0.7	0.2	3.0			
	BRMA3	*Bromus madritensis*	25	0.2	0.2	2.0			X

Other Noteworthy Species:
Juglans californica was found in 1 of 12 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Stellaria media, Piptatherum miliaceum, Ailanthus altissima, Bromus diandrus, Anagallis arvensis, Brassica nigra, Galium aparine, Hirschfeldia incana, Sonchus oleraceus

Samples Used in Description: (n = 12)
AA1171, rap0244, rap0290m, rap0535m, rap0559m, rap1552, rap1553, rap1589, rap1590, rap1639m, rap2256m, rap2663

Comments:
This is an endemic association to the western transverse ranges, probably centered in the Santa Monica Mountains. It differs from the related *Ceanothus spinosus* Alliance by having dominance to codominance of *Q. berberidifolia*. It stands to reason that these two shrub species would comingle because both are mesophytic and resprout after fire.

Phases:
None

COMMON NAME	Scrub Oak-Greenbark Ceanothus Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Quercus berberidifolia-Adenostoma fasciculatum Shrubland Association

Scrub Oak-Chamise-Shrubland Association
***Quercus berberidifolia-Adenostoma fasciculatum* Shrubland Alliance**
Scrub Oak-Chamise Shrubland Alliance

Mapping Code: 2581

Local Description

Summary:
This shrubland association occurs on gentle to steep slopes of variable aspect at low elevations between 299–764 m. It is dominated by *Adenostoma fasciculatum* and *Quercus berberidifolia* in the shrub layer with a sparse herbaceous layer. The emergent tree layer includes *Quercus agrifolia.*

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Eastern Urban regions of the study area.

Environmental Description:
Elevation: range 299–764 m, mean 451 m
Aspect: variable
Slope: range 2–40 degrees, mean 19.3 degrees
Topography (micro; macro): flat, undulating, concave, or convex; mid slope to ridgetop
Litter Cover: range 35–35%, mean 35%
Small Rock Cover: range 5–45%, mean 22.7%
Large Rock Cover: range 0–12%, mean 3.7%
Bare Ground: range 10–38%, mean 21.9%
Parent Material: sedimentary or igneous, occasionally quaternary
Soil Texture: moderately fine sandy to silty clay loam

Vegetation Description:
Stands of *Adenostoma fasciculatum-Quercus berberidifolia* Shrubland form an open to intermittent shrub layer (20–55%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–18%, mean 2.2%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.2%) with hardwoods at 0–15 m tall. Total vegetation cover is 20–55%, mean cover is 44.9%.

In this association, the shrub layer is characterized by *Adenostoma fasciculatum* and *Quercus berberidifolia. Salvia mellifera* and *Heteromeles arbutifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Marah macrocarpus, Centaurea melitensis, Bromus madritensis*, and *Nassella lepida*.

***Quercus berberidifolia-Adenostoma fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.1	0.2	1.0			
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	24.0	6.0	44.0	X	X	
	QUBE5	*Quercus berberidifolia*	100	7.2	1.0	12.0		X	
	SAME3	*Salvia mellifera*	60	2.5	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	55	1.2	0.2	6.0			
	MALA6	*Malosma laurina*	50	0.9	0.2	4.0			
	YUWH	*Yucca whipplei*	45	0.5	0.2	4.0			
	LOSC2	*Lotus scoparius*	40	0.8	0.2	7.0			
	RHOV	*Rhus ovata*	40	0.3	0.2	2.0			
	ARGL3	*Arctostaphylos glandulosa*	30	1.4	0.2	9.0			
	CESP	*Ceanothus spinosus*	30	0.5	0.2	3.0			
	CEME	*Ceanothus megacarpus*	30	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	25	0.4	0.2	7.0			
	CEBE3	*Cercocarpus betuloides*	25	0.4	0.2	5.0			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	20	0.2	0.2	4.0			
Herb									
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	1.0			

Other Noteworthy Species:
Calochortus plummerae was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, CNPS R-E-D Code is 2-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Avena fatua, Avena, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Eucalyptus, Schinus molle

Samples Used in Description: (n = 20)
AA0312cc, AA0636, rap0264, rap0268, rap0275, rap0331, rap0503m, rap0858, rap1636, rap1986, rap2070, rap2097, rap2194m, rap2233, rap2240, rap2351, rap2417, rap2587, rap2664, rap2792

Comments:
Stands of this association in the Santa Monica Mountains tend to be dominated by *Adenostoma fasciculatum* with a lower cover (on the average less than half as much) of *Q. berberidifolia.* This is in contrast to stands described by Gordon and White 1994, Borchert et al. 2004, Evens and San 2005, and Klein and Evens 2005 where both species codominate usually at > 20% cover each. Because many species are shared and the environmental conditions are similar, we

decided to maintain a conservative approach to naming this association rather than describing a new association of the *Adenostoma fasciculatum* alliance with *Q. berberidifolia* as a subordinate.

Phases:
None

COMMON NAME	Chamise-Scrub Oak Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia-Adenostoma fasciculatum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and several other areas within the central and southern coastal California region. This includes western Riverside (Klein and Evens 2005), San Diego (Evens and San 2005), Los Angeles, Santa Barbara, San Luis Obispo, Ventura, and Monterey counties (Borchert et al. 2004, Gordon and White 1994). It is probably most extensive in the peninsular ranges (western Riverside County: Santa Ana Mountains, San Jacinto Mountains and foothills; San Diego County: western foothills and Palomar-Cuyamaca Peak regions).

Nations:
United States

States or Provinces:
CA

Environmental Description:
In the Los Padres National Forest of Monterey and San Luis Obispo counties (Borchert et al. 2004), the scrub oak-chamise alliance is common in the interior portions of the coast ranges, especially in the Sierra Madre Mountains and Garcia Mountains of the San Luis Obispo Ranger District and in the eastern Monterey Ranger District. Most stands occur below elevations of 1,100 m on middle and upper slope positions. Aspects vary but tend to be north facing. Slopes are generally greater than 20 degrees.

Vegetation Description:
In addition to the codominance of the two main species, a variety of coastal sage and chaparral shrubs (e.g., *Rhamnus ilicifolia*, *Salvia mellifera, Lonicera subspicata*, *Rhus ovata*, *Heteromeles*

arbutifolia, *Eriogonum fasciculatum*) may occur at low cover in the open to continuous shrub layer.

Comments:
There is some confusion about the proper nomenclature for this association and the alliance it is within. The confusion comes from the inversion of the names of the two dominant and characteristic species. The *Adenostoma fasciculatum-Quercus berberidifolia* Association has been described by Gordon and White 1994, while the *Quercus berberidifolia-Adenostoma fasciculatum* Alliance and Association have been described by Sawyer and Keeler-Wolf 1995, Evens and San 2005, and Klein and Evens 2005. Both apparently refer to the same vegetation. The former association has been defined to describe the stands where *A. fasciculatum* clearly dominates but *Q. berberidifolia* is present in low cover. This situation is more the norm for the Santa Monica Mountains stands. However, we have chosen to subsume this as an association within the broader mixed *Q. berberidifolia-A. fasciculatum* Alliance because of the overall similarity in species composition and environmental variables.

References:
Borchert et al. 2004, Evens and San 2005, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995

Quercus berberidifolia-Cercocarpus betuloides Shrubland Association

Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Association
***Quercus berberidifolia-Cercocarpus betuloides* Shrubland Alliance**
Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Alliance

Mapping Code: 2591

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northeast- and northwest-facing slopes at low elevations between 223–314 m. It is characterized by dominance to codominance of *Quercus berberidifolia* with subdominance to codominance of *Cercocarpus betuloides* in the shrub layer. The herbaceous layer may have mesophytic species such as *Melica imperfecta* and *Marah macrocarpa*, but no characteristic herbs have been identified. The emergent tree layer may include *Quercus agrifolia, Juglans californica,* and small trees of *Fraxinus dipetala*.

Distribution:
This association is sampled in the Eastern Urban and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 223–314 m, mean 282.4 m
Aspect: northeast and northwest
Slope: range 15–35 degrees, mean 29.7 degrees
Topography (micro; macro): undulating or flat; lower to upper slope
Litter Cover: range 60–65%, mean 62.5%
Small Rock Cover: range 0–10%, mean 5%
Large Rock Cover: no data
Bare Ground: range 0–45%, mean 26.3%
Parent Material: igneous
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of *Quercus berberidifolia-Cercocarpus betuloides* Shrubland form an intermittent to continuous shrub layer (46–62%, mean 51%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 2–5 m tall. The herbaceous layer is open (0–7%, mean 2%) at 0–0.5 m tall. Trees are occasionally emergent (0–15% cover, mean 3%) with hardwoods at 0–10 m tall. Total vegetation cover is 48–65%, mean cover is 55.8%.

In this association, the shrub layer is characterized by *Quercus berberidifolia, Cercocarpus betuloides, Rhus ovata,* and *Heteromeles arbutifolia*. *Malosma laurina, Ceanothus spinosus*, *Toxicodendron diversilobum, Ceanothus cuneatus, Mimulus aurantiacus,* and *Adenostoma fasciculatum* are occasionally included in this layer. The tree layer is emergent and open and can include *Quercus agrifolia, Juglans californica,* and *Fraxinus dipetala* at low cover. The herbaceous layer is simple and may include *Melica imperfecta, Centaurea melitensis*, and *Marah macrocarpus.*

Quercus berberidifolia-Cercocarpus betuloides Association

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	38	1.5	0.2	7.5			
	JUCA-T	*Juglans californica*	38	0.5	0.2	2.5			
Tree Understory									
	FRDI2	*Fraxinus dipetala*	25	0.8	2.0	4.0			
Shrub									
	QUBE5	*Quercus berberidifolia*	100	24.5	15.0	31.0	X	X	
	CEBE3	*Cercocarpus betuloides*	100	12.9	8.0	17.0		X	
	RHOV	*Rhus ovata*	88	3.7	0.2	8.0		X	
	HEAR5	*Heteromeles arbutifolia*	75	3.2	0.2	7.5		X	
	MALA6	*Malosma laurina*	38	0.8	0.2	5.0			
	CESP	*Ceanothus spinosus*	38	0.6	1.0	3.0			
	TODI	*Toxicodendron diversilobum*	38	0.5	0.2	2.5			
	CECU	*Ceanothus cuneatus*	25	2.5	5.0	15.0			
	MIAU	*Mimulus aurantiacus*	25	0.6	2.0	2.5			
	ADFA	*Adenostoma fasciculatum*	25	0.1	0.2	0.2			
Herb									
	MEIM	*Melica imperfecta*	25	0.5	1.0	3.0			
	CEME2	*Centaurea melitensis*	25	0.2	0.2	1.0			X
	POACXX	*Poaceae*	25	0.2	0.2	1.0			
	MAMA8	*Marah macrocarpus*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Senecio mikanioides, Bromus madritensis, Eucalyptus, Galium aparine

Samples Used in Description: (n = 8)
AA0156cc, AA0590, AA1183, rap0739m, rap0741, rap0742, rap2254m, rap2806

Comments:
This vegetation type is most frequently seen in inland, low-elevation locales such as the Malibu Creek drainage.

Phases:
None

COMMON NAME	Scrub Oak-Birch Leaf Mountain Mahogany Shrubland Association
SYNONYM	*Quercus berberidifolia-Cercocarpus betuloides* Alliance (Gordon and White, Sawyer and Keeler-Wolf 1995)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland

PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Quercus berberidifolia-Cercocarpus betuloides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance is known from the Main Division of the Los Padres National Forest (Borchert et al. 2004) and western Riverside County (Klein and Evens 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
The following information has been provided for the broader alliance concept of *Q. berberidifolia-C. betuloides* as described by Klein and Evens 2005. It includes further variation not present in the Santa Monica Mountains study area: Elevation is below 1,500 m with aspect usually northerly, rarely southerly. Slope is moderate to steep, and topography is variable. Parent material is more often granite, less often metamorphic, sedimentary, gabbro, diorite, or metavolcanic. Soil texture is more often sandy loam but varies from sandy loam to clay loam.

Vegetation Description:
Klein and Evens 2005 have 17 samples to describe the *Q. berberidifolia-Cercocarpus betuloides* Alliance in western Riverside County as follows: Stands of *Quercus berberidifolia-Cercocarpus betuloides* Shrubland form an open to continuous shrub layer (25–87%), where the two species may be codominant or either species may be subdominant to the other. The shrub layer is frequently in two different strata, with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (0.2–60%) at 0–1 m tall and includes a variety of native and nonnative herbs. Total vegetation cover is 55–89%.

Comments:
This association has been treated as an alliance/series by Gordon and White 1994, Sawyer and Keeler-Wolf 1995, and Borchert et al. 2004. It is treated as the type association here and in Sawyer et al. 2006 MS. Further variation of stands with both *Q. berberidifolia* and *C. betuloides* was described by Klein and Evens 2005. These include the *Quercus berberidifolia-Cercocarpus betuloides-Arctostaphylos glauca* Association and the *Quercus berberidifolia-Cercocarpus betuloides-Ceanothus crassifolius* Association. These also could be thought of as associations within the *Quercus berberidifolia* Alliance (*sensu lato*).

References:
Borchert et al. 2004, Gordon and White 1994, Klein and Evens 2005, Sawyer and Keeler-Wolf 1995, Sawyer et al. 2006 MS

Quercus wislizenii var. *frutescens* Shrubland Alliance

Scrub Interior Live Oak Shrubland Alliance

Mapping Code: 2560

Local Description

Summary:
This shrubland alliance occurs on somewhat steep northeast- and northwest-facing slopes at mid elevations between 623 and 690 m. It is dominated by *Quercus wislizeni* var. *frutescens* in the shrub layer with scattered shrubs of *Ceanothus oliganthus*. The emergent tree layer includes scattered *Quercus agrifolia.*

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: range 623–690 m, mean 656.5 m
Aspect: northeast and northwest
Slope: range 15–23 degrees, mean 19 degrees
Topography (micro; macro): convex or concave; upper slope
Litter Cover: 30%
Small Rock Cover: 10%
Large Rock Cover: 45%
Bare Ground: 3%
Parent Material: quaternary and sedimentary
Soil Texture: no data

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (18–50%, mean 34%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is bare (0%). Trees are occasionally emergent (5–16% cover, mean 10.5%) with hardwoods at 1–10 m tall. Total vegetation cover is 34–55%, mean cover is 44.5%.

In this association, the shrub layer is characterized by *Quercus wislizeni* var. *frutescens, Adenostoma fasciculatum, Arctostaphylos glandulosa, Ceanothus oliganthus,* and *Heteromeles arbutifolia. Quercus berberidifolia* and *Adenostoma sparsifolium* are occasionally included in this layer. The tree layer is emergent and open and includes *Quercus agrifolia* at low cover. The herbaceous layer is simple, with *Pellaea* sp. as the most abundant.

Quercus wislizeni* var. *frutescens Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	100	3.0	1.0	5.0	X	X	
Tree Understory									
	QUWI2	*Quercus wislizeni*	100	25.0	15.0	35.0	X	X	
Shrub									
	ADFA	*Adenostoma fasciculatum*	100	4.5	1.0	8.0		X	
	ARGL3	*Arctostaphylos glandulosa*	100	4.1	0.2	8.0		X	
	CEOL	*Ceanothus oliganthus*	100	4.0	2.0	6.0		X	
	HEAR5	*Heteromeles arbutifolia*	100	0.2	0.2	0.2		X	
	QUBE5	*Quercus berberidifolia*	50	2.5	5.0	5.0			
	ADSP	*Adenostoma sparsifolium*	50	1.0	2.0	2.0			
	GAVE2	*Garrya veatchii*	50	0.5	1.0	1.0			
	ARGL4	*Arctostaphylos glauca*	50	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	50	0.1	0.2	0.2			
	KECO	*Keckiella cordifolia*	50	0.1	0.2	0.2			
	LOSC2	*Lotus scoparius*	50	0.1	0.2	0.2			
	MIAU	*Mimulus aurantiacus*	50	0.1	0.2	0.2			
	PIMO5	*Pickeringia montana*	50	0.1	0.2	0.2			
	TODI	*Toxicodendron diversilobum*	50	0.1	0.2	0.2			
Herb									
	PELLA	*Pellaea*	50	0.1	0.2	0.2	X		

Other Noteworthy Species:
None

Nonnative Species:
None

Samples Used in Description: (n = 2)
rap2448, rap2801

Comments:
This widespread California alliance is very local at the upper elevations of the Santa Monica Mountains. It would be a likely candidate for monitoring long-term effects of global climate change.

Phases:
None

COMMON NAME	Interior Live Oak Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.c. Sclerophyllous temperate broad-leaved evergreen shrubland

ALLIANCE	*Quercus wislizenii* var. *frutescens* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This shrubland of cismontane California occurs in the inner north coast range; the foothills of the Cascades and Sierra Nevada Mountains; and the montane Sierra Nevada, transverse, and peninsular ranges.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This shrubland alliance of cismontane California grows between 300 and 1,850 m elevation on all slopes. Substrates are usually derived from bedrock or alluvium and may be rocky. The climate is Mediterranean with cool, moist winters and warm, dry summers. Most precipitation falls as rain between November and May. Yearly rainfall totals vary between 40 and 200 cm in the range of this alliance.

Vegetation Description:
This California chaparral community is dominated by at least 60% relative cover of *Quercus wislizeni*. Other shrubs present may include *Arctostaphylos glauca, Arctostaphylos glandulosa, Cercocarpus montanus* var. *glaber, Aesculus californica, Rhamnus californica, Juniperus californica, Quercus chrysolepis, Adenostoma fasciculatum, Ceanothus leucodermis, Prunus ilicifolia* ssp*. ilicifolia, Rhamnus ilicifolia, Toxicodendron diversilobum, Quercus berberidifolia,* and *Ceanothus cuneatus.* Emergent individual trees could include *Pinus coulteri, Pinus sabiniana,* and *Pinus attenuata*.

Comments:
None

References:
Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Rosa californica Shrubland Alliance
California Rose Shrubland Alliance

Mapping Code: 3010

Local Description

Summary:
One stand of this shrubland alliance occurs on a gentle riparian stream terrace at low elevation (503 m). It is solely dominated by *Rosa californica* in the shrub layer. *Artemisia californica* and *Hirschfeldia incana* occur at low cover in the herbaceous layer, and no species are recorded in the tree layer.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 503 m
Aspect: flat/none
Slope: 2 degrees
Topography (micro; macro): flat; lower slope/stream terrace
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: igneous
Soil Texture: no data

Vegetation Description:
Stands of *Rosa californica* Shrubland form an open shrub layer (25%). Shrubs occur in two different strata with low shrubs at 0.5–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer is sparse to open (3%) at 0.5–1 m tall. The tree layer is not recorded. Total vegetation cover is 28%.

In this alliance, the shrub layer is dominated solely by *Rosa californica*. *Sambucus mexicana* exhibits low cover, and other coastal sage species are present at sparse cover. The herbaceous layer is simple with *Artemisia douglasiana* and *Hirschfeldia incana* occurring at low cover, and the tree layer is absent.

Rosa californica Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ROCA2	*Rosa californica*	100	19.0	19.0	19.0	X	X	
	SAME5	*Sambucus mexicana*	100	2.0	2.0	2.0		X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	SAME3	*Salvia mellifera*	100	0.2	0.2	0.2		X	
Herb									
	ARDO3	*Artemisia douglasiana*	100	4.0	4.0	4.0	X	X	
	HIIN3	*Hirschfeldia incana*	100	3.0	3.0	3.0	X	X	X

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana

Samples Used in Description: (n = 1)
rap2388

Comments:
Small stands of this alliance occur on exposed terraces above to stream channels, adjacent to other riparian vegetation.

Phases:
None

COMMON NAME	California Rose Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Rosa californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This alliance has been recorded in southern California from San Diego and Ventura counties and in central California in Suisun Marsh; however, its distribution is not fully known.

Nations:
United States

States or Provinces:
CA

Environmental Description:
Stands usually occur directly adjacent to stream channels on flat to steep slopes of the stream terraces/banks.

Vegetation Description:
The shrub layer is an open to continuous canopy with sole dominance by *Rosa californica*. Associated shrub species may include *Sambucus mexicana, Symphoricarpos mollis,* and *Salix* sp. The herbaceous layer is usually open and may include wetland species such as *Artemisia douglasiana* or *Urtica dioica*, though they may also include upland species such as *Hirschfeldia incana, Brassica,* and *Bromus* spp. Trees are usually absent.

Comments:
None

References:
Evens and San 2005, Keeler-Wolf and Vaghti 2000

Rhus integrifolia Shrubland Association

Lemonade Berry Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 2153

Local Description

Summary:
This shrubland association occurs on gentle to abrupt slopes of variable aspect at low elevations between 5–750 m. It is characterized by a strong dominance of *Rhus integrifolia* in the shrub layer. The herbaceous layer is insignificant but commonly contains *Leymus condensatus.* The emergent tree layer is usually absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Eastern Urban, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 5–750 m, mean 191.6 m
Aspect: variable
Slope: range 2–75 degrees, mean 30.4 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 25–90%, mean 40.6%
Small Rock Cover: range 0–50%, mean 17%
Large Rock Cover: range 0–55%, mean 9.8%
Bare Ground: range 5–50%, mean 25.1%
Parent Material: igneous
Soil Texture: coarse sand to moderately fine clay loam

Vegetation Description:
Stands of *Rhus integrifolia* Shrubland form an open to continuous shrub layer (6–65%, mean 36.1%). Shrubs occur in two different strata with low shrubs at 0-2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open to intermittent (0–42%, mean 6.7%) at 0–2 m tall. Trees are occasionally emergent (0–14% cover, mean 1.4%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 10–68%, mean cover is 44.3%.

In this association, the shrub layer is characterized by *Rhus integrifolia. Artemisia californica* and *Malosma laurina* are frequently included in this layer. Other shrubs sometimes present include *Salvia mellifera, Heteromeles arbutifolia, Encelia californica, Malacothamnus fasciculatus, Yucca whipplei,* and *Sambucus mexicana*. The tree layer is emergent and open and may infrequently include *Quercus agrifolia, Juglans californica*, and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Leymus condensatus, Centaurea melitensis,* and *Melica imperfecta.*

***Rhus integrifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHIN2	*Rhus integrifolia*	100	18.4	2.0	55.0	X		
	ARCA11	*Artemisia californica*	68	1.9	0.2	8.0			
	MALA6	*Malosma laurina*	50	2.8	0.2	16.0			
	SAME3	*Salvia mellifera*	48	1.4	0.2	15.0			
	HEAR5	*Heteromeles arbutifolia*	46	3.0	0.2	27.0			
	ENCA	*Encelia californica*	44	1.0	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	34	1.8	0.2	13.0			
	ERCI5	*Eriogonum cinereum*	34	0.9	0.2	8.0			
	MIAU	*Mimulus aurantiacus*	30	0.5	0.2	6.0			
	YUWH	*Yucca whipplei*	30	0.4	0.2	2.5			
	SAME5	*Sambucus mexicana*	30	0.3	0.2	5.0			
	SALE3	*Salvia leucophylla*	22	0.4	0.2	6.0			
	RHIL	*Rhamnus ilicifolia*	22	0.3	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	20	0.4	1.0	4.0			
Herb									
	LECO12	*Leymus condensatus*	42	1.4	0.2	20.0			
	CEME2	*Centaurea melitensis*	24	0.5	0.2	8.0			X
	MEIM	*Melica imperfecta*	20	0.4	0.2	4.0			

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Eriogonum crocatum was found in 2 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 5 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Bromus madritensis, Brassica nigra, Avena, Erodium cicutarium, Avena fatua, Carpobrotus edulis, Hirschfeldia incana, Bromus diandrus, Pennisetum setaceum, Nicotiana glauca, Ricinus communis, Myoporum laetum, Bromus hordeaceus, Carduus pycnocephalus, Eucalyptus, Foeniculum vulgare, Limonium perezii, Marrubium vulgare, Vicia villosa, Arundo donax, Ageratina adenophora, Cistus, Cortaderia, Melilotus indicus, Mesembryanthemum crystallinum, Sonchus oleraceus, Erodium, Euphorbia terracina, Medicago polymorpha, Picris echioides, Salsola tragus, Schinus molle

Samples Used in Description: (n = 50)
AA0148cc, AA0216cc, AA0220cc, AA0394cc, AA0508, AA0622, AA0737, AA0905, AA0906, AA0956, AA0997, AA1021, AA1197, rap0516, rap0519, rap0638, rap0647, rap0693, rap0725,

rap0734, rap0747, rap0954, rap1037, rap1103m, rap1157, rap1254m, rap1274, rap1470m, rap1474, rap1594, rap1597, rap1601, rap1729, rap1756m, rap1894, rap1908, rap1917, rap1954, rap1955, rap1956m, rap2110, rap2116, rap2117m, rap2118, rap2217, rap2364, rap2585, rap2794, rap2858rlv, rap2923

Comments:
This association of the *R. integrifolia* Alliance is characterized by a strong dominance of lemonade berry. As with other associations in this alliance, it tends to occur close to the coast on steep south-facing slopes. Three phases have been identified. In addition to the pure phase, one is a mixture of the dominant with a subdominance of *Heteromeles arbutifolia,* and the other is a seral postfire phase with *Malacothamnus fasciculatus.* It is similar to the *R. integrifolia-Artemisia californica-Eriogonum cinereum* Association except that the cover of *R. integrifolia* is higher and the constancy of *Eriogonum cinereum* and *A. californica* is substantially lower. This type is occasionally seen in highly disturbed fragments within urbanized areas.

Phases:
Rhus integrifolia-Heteromeles arbutifolia (Lemonade Berry-Toyon) Phase [2158]
Rhus integrifolia-Malacothamnus fasciculatus (Lemonade Berry-Bush Mallow) Phase [7153]
Rhus integrifolia (Lemonade Berry) Phase [2153]

COMMON NAME	Lemonade Berry Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. The alliance ranges through the coastal hills and terraces of the south coast (including Ventura to San Diego counties). This association is likely to occur elsewhere in this vicinity.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Evens and San 2005

Rhus integrifolia-Artemisia californica-Eriogonum cinereum Shrubland Association

Lemonade Berry-California Sagebrush-Ashy Buckwheat Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 7157

Local Description

Summary:
This shrubland association occurs on moderate to abrupt slopes of variable aspect at low elevations between 4–280 m. It is characterized by a dominance of *Rhus integrifolia* and a subdominance of *Artemisia californica* and *Eriogonum cinereum* in the shrub layer. The herbaceous layer is sparse and composed mostly of nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 4–280 m, mean 101.8 m
Aspect: variable
Slope: range 8–70 degrees, mean 32.8 degrees
Topography (micro; macro): variable (all); bottom to ridgetop
Litter Cover: range 15–35%, mean 20.6%
Small Rock Cover: range 4–60%, mean 26.4%
Large Rock Cover: range 0–90%, mean 19.1%
Bare Ground: range 1–70%, mean 24.4%
Parent Material: igneous or sedimentary
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (6–58%, mean 29.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (1–26%, mean 6.7%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 7–72%, mean cover is 35.2%.

In this association, the shrub layer is characterized by *Rhus integrifolia, Artemisia californica,* and *Eriogonum cinereum. Malosma laurina, Yucca whipplei,* and *Salvia leucophylla* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus* and *Pennisetum setaceum*.

***Rhus integrifolia-Artemisia californica-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHIN2	*Rhus integrifolia*	100	9.8	2.0	35.0	X		
	ARCA11	*Artemisia californica*	81	3.6	0.2	15.0	X		
	ERCI5	*Eriogonum cinereum*	78	3.5	0.2	15.0	X		
	MALA6	*Malosma laurina*	64	1.4	0.2	9.0			
	YUWH	*Yucca whipplei*	61	1.0	0.2	7.0			
	SALE3	*Salvia leucophylla*	56	5.8	0.2	32.0			
	SAME3	*Salvia mellifera*	47	0.7	0.2	5.0			
	ENCA	*Encelia californica*	42	0.5	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	36	0.6	0.2	4.0			
	COGI	*Coreopsis gigantea*	33	0.5	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.3	0.2	2.5			
	ISAR	*Isomeris arborea*	25	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	39	1.3	0.2	7.5			
	PESE3	*Pennisetum setaceum*	33	1.5	0.2	14.0		X	
	CEME2	*Centaurea melitensis*	22	0.6	0.2	4.0		X	

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 36 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Pennisetum setaceum, Centaurea melitensis, Bromus madritensis, Brassica nigra, Hirschfeldia incana, Avena, Avena fatua, Erodium cicutarium, Nicotiana glauca, Anagallis arvensis, Arundo donax, Brassica, Bromus hordeaceus, Erodium, Foeniculum vulgare, Medicago polymorpha, Melilotus indicus, Myoporum laetum, Ricinus communis, Silybum marianum

Samples Used in Description: (n = 36)
AA0121cc, AA0176cc, AA0215cc, AA0509, AA0617, AA0621, AA0744cc, AA0777, AA0781, AA0870, AA0907, AA0960, AA1014, AA1015, AA1033, rap0511, rap0651, rap0663, rap0665, rap0883, rap0941m, rap1095, rap1096, rap1109m, rap1166, rap1202, rap1277, rap1464, rap1472, rap1478, rap1791m, rap2109, rap2375, rap2537rlv, rap2553, rap2822

Comments:
There is some question about how different this association is from the other two associations defined in this alliance. *R. integrifolia* occupies a fairly distinct setting close to the immediate coast at low elevations and usually on steep slopes including ocean bluffs. The matrix species include *A. californica* and *E. cinereum* to varying degrees in most of the 97 samples taken in this alliance. Another approach to classification of this alliance may be to aggregate all stands in the SAMO study area into an *R. integrifolia-Artemisia californica-Eriogonum cinereum* Association and reduce the additional types described as associations herein to phases. Further analysis of other stands of this alliance in southern California will clarify this issue.

Phases:
Rhus integrifolia-Artemisia californica-Salvia leucophylla (Lemonade Berry-California Sagebrush-Purple Sage) Phase [2155]
Rhus integrifolia-Eriogonum cinereum-Yucca whipplei-Coreopsis gigantea (Lemonade Berry-Ashy Buckwheat-Chaparral Yucca-Giant Coreopsis) Phase [7155]

COMMON NAME	Lemonade Berry-California Sagebrush-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. This association is probably endemic to the western transverse ranges of southern California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association, the *Rhus integrifolia-Salvia mellifera-Artemisia californica* Association, has been described by Evens and San 2005 in coastal San Diego County. It lacks *Eriogonum cinereum*.

References:
Evens and San 2005

Rhus integrifolia-Opuntia spp.-*Eriogonum cinereum* Shrubland Association

Lemonade Berry-Coast Prickly Pear-Ashy Buckwheat Shrubland Association
***Rhus integrifolia* Shrubland Alliance**
Lemonade Berry Shrubland Alliance

Mapping Code: 2151

Local Description

Summary:
This shrubland association occurs on somewhat steep to very steep southeast- and southwest-facing slopes at low elevations between 3–251 m. It is characterized by a codominance of *Rhus integrifolia* and *Opuntia littoralis* and a constant subdominance of *Eriogonum cinereum* in the shrub layer. The herbaceous layer is composed of a mixture of native and nonnative species.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 3–251 m, mean 78.6 m.
Aspect: southeast and southwest
Slope: range 15–60 degrees, mean 35.8 degrees
Topography (micro; macro): undulating, flat, or concave; lower to upper slope
Litter Cover: no data
Small Rock Cover: range 15–40%, mean 27.5%
Large Rock Cover: range 1–2%, mean 1.5%
Bare Ground: range 5–20%, mean 12.5%
Parent Material: igneous
Soil Texture: clay

Vegetation Description:
Stands of *Rhus integrifolia-Opuntia* spp.*-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (29–60%, mean 42.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–6%, mean 3.5%) at 0–0.5 m tall. Trees are not present. Total vegetation cover is 30–65%, mean cover is 45.6%.

In this association, the shrub layer is characterized by *Opuntia littoralis, Rhus integrifolia,* and *Eriogonum cinereum. Artemisia californica, Yucca whipplei,* and *Encelia californica* are often included in this layer. The tree layer is absent. The herbaceous layer is simple and sometimes includes *Brassica nigra, Pennisetum setaceum, Bromus madritensis, Nassella lepida, Melica imperfecta, Calystegia macrostegia,* and *Foeniculum vulgare.*

***Rhus integrifolia-Opuntia* spp.-*Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	OPLI3	*Opuntia littoralis*	100	15.3	3.0	26.0	X	X	
	RHIN2	*Rhus integrifolia*	100	11.6	1.0	30.0		X	
	ERCI5	*Eriogonum cinereum*	100	5.7	0.2	12.0		X	
	ARCA11	*Artemisia californica*	73	2.3	0.2	12.0			
	YUWH	*Yucca whipplei*	73	1.2	0.2	4.0			
	ENCA	*Encelia californica*	64	1.3	0.2	8.0			
	ERFA2	*Eriogonum fasciculatum*	45	0.4	0.2	3.0			
	SAME5	*Sambucus mexicana*	45	0.4	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	45	0.2	0.2	1.0			
	BRCA3	*Brickellia californica*	45	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	36	1.5	3.0	5.0			
	OPOR	*Opuntia oricola*	27	1.7	1.0	10.0			
	SAME3	*Salvia mellifera*	27	0.6	0.2	4.0			
	ISAR	*Isomeris arborea*	27	0.3	0.2	3.0			
Herb									
	BRNI	*Brassica nigra*	55	0.3	0.2	2.0			X
	PESE3	*Pennisetum setaceum*	55	0.3	0.2	2.0			X
	BRMA3	*Bromus madritensis*	36	0.3	0.2	1.0			X
	UNBG	Unknown bunch grass	27	0.7	1.0	5.0			
	NALE2	*Nassella lepida*	27	0.5	1.0	4.0			
	MEIM	*Melica imperfecta*	27	0.5	0.2	3.0			
	CAMA24	*Calystegia macrostegia*	27	0.1	0.2	0.2			
	FOVU	*Foeniculum vulgare*	27	0.1	0.2	0.2			X

Other Noteworthy Species:
Eriogonum crocatum was found in 1 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Nonnative Species:
Brassica nigra, Pennisetum setaceum, Bromus madritensis, Foeniculum vulgare, Nicotiana glauca, Avena, Centaurea melitensis, Erodium cicutarium, Malva parviflora, Melilotus indicus, Myoporum laetum, Raphanus sativus, Schinus molle

Samples Used in Description: (n = 11)
AA0779, AA0908, rap0933, rap0940, rap1130, rap1131, rap1133, rap1134, rap1257m, rap2225, rap2696

Comments:
This association has similarities with the *Opuntia* spp.-Mixed Coastal Sage Scrub Shrubland Association stands in the study area. However, the cover of *Rhus integrifolia* is much higher, and the general aspect is low elevation on rockier slopes than the *Opuntia* Alliance stands. Stands may often be seen proximate to one another with the *R. integrifolia* Alliance almost always on the steeper and rockier portions of the slope.

Phases:
None

COMMON NAME	Lemonade Berry-Coast Prickly Pear-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus integrifolia* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Rhus ovata Shrubland Association

Sugar Bush Shrubland Association
***Rhus ovata* Shrubland Alliance**
Sugar Bush Shrubland Alliance

Mapping Code: 2193

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southwest- and northwest-facing slopes at low elevations between 194–520 m. It is characterized by a strong dominance of *Rhus ovata* in the shrub layer. The herbaceous layer is generally open with a varying mixture of native and nonnative species. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica* but is usually absent.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Eastern Urban, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 194–520 m, mean 339.8 m
Aspect: southwest and northwest
Slope: range 15–38 degrees, mean 29.3 degrees
Topography (micro; macro): flat, convex, or concave; middle slope
Litter Cover: range 10–70%, mean 40%
Small Rock Cover: range 3–44%, mean 23.5%
Large Rock Cover: range 0–1%, mean 0.5%
Bare Ground: range 27–40%, mean 33.5%
Parent Material: sedimentary
Soil Texture: fine clay

Vegetation Description:
Stands of *Rhus ovata* Shrubland form an open to intermittent shrub layer (8–62%, mean 41.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–17%, mean 4.3%) at 0–1 m tall. Trees are occasionally emergent (0–14% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–67%, mean cover is 47.7%.

In this association, the shrub layer is characterized by *Rhus ovata. Malacothamnus fasciculatus*, *Salvia mellifera, Heteromeles arbutifolia,* and *Malosma laurina* are occasionally included in this layer. The tree layer is emergent and open and infrequently includes *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Brassica nigra*, *Centaurea melitensis, Hirschfeldia incana,* and *Leymus condensatus.*

***Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	RHOV	*Rhus ovata*	100	30.0	8.0	55.0	X	X	
	MAFA	*Malacothamnus fasciculatus*	70	1.7	0.2	13.0			
	SAME3	*Salvia mellifera*	60	1.1	1.0	3.0			
	HEAR5	*Heteromeles arbutifolia*	40	2.5	2.5	11.0			
	MALA6	*Malosma laurina*	40	0.6	0.2	5.0			
	ADFA	*Adenostoma fasciculatum*	30	0.9	2.0	4.0			
	KECO	*Keckiella cordifolia*	20	1.9	6.0	13.0			
	CEME	*Ceanothus megacarpus*	20	1.0	5.0	5.0			
	SAME5	*Sambucus mexicana*	20	0.7	0.2	7.0			
	CESP	*Ceanothus spinosus*	20	0.6	1.0	5.0			
	QUBE5	*Quercus berberidifolia*	20	0.4	2.0	2.5			
	CEBE3	*Cercocarpus betuloides*	20	0.3	1.0	2.5			
	ERFA2	*Eriogonum fasciculatum*	20	0.2	0.2	2.0			
	ENCA	*Encelia californica*	20	0.1	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	40	0.5	0.2	4.0			X
	CEME2	*Centaurea melitensis*	30	0.8	1.0	4.0			X
	HIIN3	*Hirschfeldia incana*	30	0.5	0.2	3.0			X
	LECO12	*Leymus condensatus*	30	0.3	1.0	1.0			
	CAMA24	*Calystegia macrostegia*	20	0.6	1.0	5.0			
	BRDI3	*Bromus diandrus*	20	0.3	1.0	2.0			X
	MASA2	*Malacothrix saxatilis*	20	0.01	0.2	0.2			
	MAMA8	*Marah macrocarpus*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Juglans californica was found in 2 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis, Marrubium vulgare, Erodium, Melilotus indicus

Samples Used in Description: (n = 10)
AA0126cc, rap0930m, rap1713, rap1871, rap1881, rap2015, rap2381, rap2574, rap2645, rap2729

Comments:
Some of the stands sampled in this association tend to be composed of hybrid backcrosses between *R. ovata* and *R. integrifolia*. However, the majority of physical characteristics of these shrubs appear to have more affinity to *R. ovata* than *R. integrifolia*.

Other stands of the *Rhus ovata* Alliance described from southern California tend to occur in the driy, inland portions of the region. This also appears to be the case in the Santa Monica Mountains area. Most stands of this association are found in the interior of the study area where summer temperatures are relatively hot and summer fog influence is minimal. Colder winter temperatures may also play a role in the distribution of this type by excluding *Malosma laurina*.

Phases:
None

COMMON NAME	Sugar Bush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus ovata* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Other somewhat similar associations have been reported from San Diego and Riverside counties (Keeler-Wolf et al. 1998, Klein and Evens 2005)

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Keeler-Wolf et al. 1998, Klein and Evens 2005

Rhus ovata-Salvia leucophylla-Artemisia californica Shrubland Association

Sugar Bush-Purple Sage-California Sagebrush Shrubland Association
***Rhus ovata* Shrubland Alliance**
Sugar Bush Shrubland Alliance

Mapping Code: 2192

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest- and northeast-facing slopes at low elevations between 265–539 m. It is characterized by a codominance of *Rhus ovata, Salvia leucophylla,* and *Artemisia californica* in the shrub layer. The herbaceous layer often includes *Leymus condensatus.* The emergent tree layer includes occasional *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 265–539 m, mean 373 m
Aspect: northwest and northeast
Slope: range 15—5 degrees, mean 33 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: no data
Small Rock Cover: 30%
Large Rock Cover: no data
Bare Ground: range 15–15%, mean 15%
Parent Material: sedimentary
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Rhus ovata-Salvia leucophylla-Artemisia californica* Shrubland form an intermittent to continuous shrub layer (38–62%, mean 45.5%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–6%, mean 1.7%) at 0–2 m tall. Trees are occasionally emergent (0–11% cover, mean 1.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 41–68%, mean cover is 49.4%.

In this association, the shrub layer is characterized by *Rhus ovata, Salvia leucophylla*, *Artemisia californica,* and *Malacothamnus fasciculatus. Heteromeles arbutifolia, Malosma laurina*, *Eriogonum cinereum,* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and frequently includes *Leymus condensatus. Centaurea melitensis* is also sometimes present.

***Rhus ovata-Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	23	1.0	2.5	8.0			
	QUAG-T	*Quercus agrifolia*	23	1.0	2.5	7.5			
Shrub									
	RHOV	*Rhus ovata*	100	12.8	6.0	21.0		X	
	SALE3	*Salvia leucophylla*	100	11.6	2.5	24.0		X	
	ARCA11	*Artemisia californica*	92	11.1	1.0	33.0		X	
	MAFA	*Malacothamnus fasciculatus*	92	2.5	0.2	7.5		X	
	HEAR5	*Heteromeles arbutifolia*	54	4.7	2.5	15.0			
	MALA6	*Malosma laurina*	38	0.7	0.2	7.0			
	ERCI5	*Eriogonum cinereum*	31	0.7	0.2	4.0			
	SAME3	*Salvia mellifera*	31	0.5	0.2	3.0			
Herb									
	LECO12	*Leymus condensatus*	62	1.0	0.2	2.5	X		
	CEME2	*Centaurea melitensis*	23	0.6	0.2	5.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Brassica nigra, Silybum marianum

Samples Used in Description: (n = 13)
AA0083cc, AA0104cc, AA0113cc, AA0384cc, AA1093, rap1578, rap1945, rap2085, rap2126, rap2132, rap2273, rap2511, rap2839

Comments:
As with the other association of the *Rhus ovata* Alliance, this association occurs in the more inland portions of the Santa Monica Mountians study area. This type may predominate in areas that experience relatively severe winter frosts. Stands of this association differ from the previous association in having a shorter shrub layer of *Artemisia californica* and *Salvia leucophylla* that codominates with the taller and broader evergreen *Rhus ovata*. As with the previous type, *R. ovata* individuals in these stands also occasionally have characteristics morphologically intermediate between *R. ovata* and *R. integrifolia*.

Phases:
None

COMMON NAME	Sugar Bush-Purple Sage-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural

FORMATION	Sclerophyllous temperate broad-leaved evergreen shrubland
ALLIANCE	*Rhus ovata* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salix exigua Shrubland Alliance

Narrow Leaf Willow Shrubland Alliance

Mapping Code: 3110

Local Description

Summary:
This shrubland alliance usually occurs on flat or gentle sloping surfaces with little or no exposure at low elevations between 1 and 10 m. It is dominated by *Salix exigua* in the shrub layer. Other *Salix* species may be present at low cover including *S. lasiolepis.* The herbaceous layer is diverse and includes *Typha* sp., *Arundo donax*, *Melilotus albus*, and *Rorippa nasturtium-aquaticum* at low cover.

Distribution:
This alliance is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–10 m, mean 5.5 m
Aspect: none (flat)
Slope: range 0–2 degrees, mean 1.0 degrees
Topography (micro; macro): concave or flat; bottom
Litter Cover: no data
Small Rock Cover: range 0–20%, mean 10.0%
Large Rock Cover: range 0–10%, mean 5.0%
Bare Ground: range 60–80%, mean 70.0%
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of the *Salix exigua* Shrubland Alliance form an open shrub layer (6–11%, mean 8.5%) at 0–2 m tall, an open tree layer (<0.2%) with hardwoods at 0–5 m tall, and an open herbaceous layer (4–5%, mean 4.5%) at 1–2 m tall. Total vegetation cover is 10–15%, mean cover is 12.5%.

In this alliance, the shrub layer is dominated by *Salix exigua*. Other *Salix* species may be present at relatively low cover including *S. lasiolepis.* The herbaceous layer is diverse and includes *Typha* sp., *Arundo donax*, *Melilotus albus*, and *Rorippa nasturtium-aquaticum* at low cover.

***Salix exigua* Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAEX	*Salix exigua*	100	5.5	3.0	8.0	X	X	
	SALIX-M	*Salix*	50	1.5	3.0	3.0			
	SALA6-M	*Salix lasiolepis*	50	1.5	3.0	3.0			
Herb									
	TYPHA	*Typha*	100	2.0	1.0	3.0		X	
	ARDO4	*Arundo donax*	100	1.0	1.0	1.0		X	X
	MEAL2	*Melilotus albus*	100	0.6	0.2	1.0		X	X
	RONA2	*Rorippa nasturtium-aquaticum*	100	0.6	0.2	1.0		X	X
	ALGAE	Algae	100	0.2	0.2	0.2		X	
	HIIN3	*Hirschfeldia incana*	50	0.5	1.0	1.0			X
	UNGR	Unknown annual grass	50	0.5	1.0	1.0			
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	CHGL	*Chaenactis glabriuscula*	50	0.1	0.2	0.2			
	HEGR7	*Heterotheca grandiflora*	50	0.1	0.2	0.2			
	JUNCU	*Juncus*	50	0.1	0.2	0.2			
	LEMNA	*Lemna*	50	0.1	0.2	0.2			
	LUSU3	*Lupinus succulentus*	50	0.1	0.2	0.2			
	POMO5	*Polypogon monspeliensis*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X
	SATR12	*Salsola tragus*	50	0.1	0.2	0.2			X
	SCIRP	*Scirpus*	50	0.1	0.2	0.2			
	SCAM2	*Scirpus americanus*	50	0.1	0.2	0.2			
	SONCH	*Sonchus*	50	0.1	0.2	0.2			X
	VEAN2	*Veronica anagallis-aquatica*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Arundo donax, Melilotus albus, Rorippa nasturtium-aquaticum, Hirschfeldia incana, Brassica nigra, Polypogon monspeliensis, Rumex crispus, Salsola tragus, Sonchus, Veronica anagallis-aquatica

Samples Used in Description: (n = 2)
rap1127, rap1753

Comments:
This alliance is sparingly represented in the Santa Monica Mountains by small stands along permanent or intermittent streams. Most stands are small (< 0.5 ha).

Phases:
None

COMMON NAME Narrow Leaf Willow Alliance
SYNONYM Sandbar Willow, Coyote Willow

PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.d. Temporarily flooded cold-deciduous shrubland
ALLIANCE	*Salix exigua* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5 (alliance)

Global Description

Distribution:
This alliance is widely known from much of North America. The related *Salix exigua* seasonally flooded woodland *a*lliance is only known from Texas and is considered a woodland, not a shrubland.

Nations:
United States, Canada

States or Provinces:
USA: AR, AZ, CA, CO, IA, ID, IL, IN, KS, KY?, MT, ND, NE, NM, NV, OH?, OK, OR, PA?, SD, TN?, TX, UT, WA, WY
CAN: MB, ON

Environmental Description:
Plant associations within this alliance are located on floodplains and gravel bars at an elevation range between 780 and 1,760 m in the West and at lower elevations (to below 100 m) in the midwestern and southeastern United States. These shrublands are found on open sandbars without canopy shading on larger, well-developed drainages and along larger sandy rivers or on coarser-textured substrates. They are associated with annual flooding and inundation and will grow well into the channel, where it is flooded, even in drier years. Even though flooding is frequent, surface water is not present for much of the growing season and the water table is well below the surface. Some stands form large, wide stands on midchannel islands on larger rivers or narrow stringer bands on small, rocky tributaries. Stream reaches range widely from moderately sinuous and moderate-gradient reaches to broad, meandering rivers with wide floodplains or broad, braided channels. Many stands also occur within highly entrenched or eroding gullies.

This alliance represents an early seral primary successional stage on newly deposited sediments that may persist under a regime of repeated fluvial disturbance. *Salix exigua* and *Salix interior* are highly adapted to most forms of disturbance. Both species are prolific sprouters and will reestablish themselves on sites dominated by other disturbance-associated species, for example, *Glycyrrhiza lepidota* and *Pascopyrum smithii*.

Vegetation Description:
Plant associations within this alliance are characterized as temporarily flooded cold-deciduous shrubland dominated by *Salix exigua* or *Salix interior*. The tall shrub layer has 15–90% cover, ranging in height between 2–5 m. Other willows can occur in the canopy including *Salix eriocephala, Salix lutea, Salix ligulifolia,* and *Salix monticola*. Occasionally the taller *Salix amygdaloides* or *Populus deltoides* occur within the tree subcanopy. The herbaceous layer varies greatly over the broad range of the alliance. It has at least 20–35% cover of various graminoid species including *Carex nebrascensis, Carex pellita (Carex lanuginosa), Spartina pectinata, Phalaris arundinacea, Equisetum arvense, Panicum bulbosum*, and *Muhlenbergia rigens.* The forb cover is usually sparse. The understory can be dominated by barren ground or gravel bar. In Oklahoma, some associates can include *Cephalanthus occidentalis, Eupatorium serotinum, Panicum virgatum, Parthenocissus quinquefolia, Pluchea odorata, Tamarix chinensis*, and *Vitis acerifolia* (Hoagland 2000).

Comments:
All stands of this alliance seen in California are shrublands, though they may be taller than 5 m.

References:
Hoagland 2000, NatureServe 2005, Sawyer and Keeler-Wolf 1995, Vaghti 2003

Salvia leucophylla Shrubland Association

Purple Sage Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3316

Local Description

Summary:
This shrubland association occurs on gentle to very steep slopes of variable aspect at low elevations between 18–613 m. It is characterized by a strong dominance of *Salvia leucophylla* in the shrub layer. The herbaceous layer is composed of both native and nonnative grasses and herbs. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 18–613 m, mean 331 m
Aspect: variable
Slope: range 2–50 degrees, mean 25.5 degrees
Topography (micro; macro): convex, undulating, flat, or concave; bottom to ridgetop
Litter Cover: range 15–75%, mean 33.6%
Small Rock Cover: range 0–60%, mean 13.6%
Large Rock Cover: range 0–8%, mean 0.7%
Bare Ground: range 10–90%, mean 37.4%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla* Shrubland form an open to intermittent shrub layer (12–60%, mean 35.5%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–43%, mean 6.6%) at 0–2 m tall. Trees are occasionally emergent (0–9% cover, mean 0.8%) with conifers at 0–15 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 23–65%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Salvia leucophylla* and *Artemisia californica. Malacothamnus fasciculatus* is often included in this layer. Other shrubs sometimes found include *Malosma laurina, Sambucus mexicana, Baccharis pilularis*, *Hazardia squarrosa, Rhus ovata,* and *Eriogonum cinereum*. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Brassica nigra, Leymus condensatus,* and *Centaurea melitensis.*

***Salvia leucophylla* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	25.2	9.0	55.0		X	
	ARCA11	*Artemisia californica*	91	3.5	0.2	9.0		X	
	MAFA	*Malacothamnus fasciculatus*	54	1.9	0.2	10.0			
	MALA6	*Malosma laurina*	42	0.9	0.2	7.0			
	SAME5	*Sambucus mexicana*	32	0.6	0.2	12.0			
	BAPI	*Baccharis pilularis*	29	0.5	0.2	5.0			
	HASQ2	*Hazardia squarrosa*	27	0.4	0.2	10.0			
	RHOV	*Rhus ovata*	23	0.4	0.2	9.0			
Herb									
	BRNI	*Brassica nigra*	47	0.9	0.2	15.0			X
	LECO12	*Leymus condensatus*	41	2.2	0.2	43.0			
	CEME2	*Centaurea melitensis*	26	0.6	0.2	7.5			X
	HIIN3	*Hirschfeldia incana*	21	0.3	0.2	10.0			X

Other Noteworthy Species:
Astragalus brauntonii was found in 1 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 3-3-3. Global rank is G2, and state rank is S2.1 (CNPS 2005). Federal listing is Endangered, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 3 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 16 of 78 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus diandrus, Bromus madritensis, Melilotus indicus, Avena fatua, Avena, Carduus pycnocephalus, Foeniculum vulgare, Nicotiana glauca, Melilotus officinalis, Eucalyptus, Silybum marianum, Bromus hordeaceus, Conium maculatum, Avena barbata, Bromus madritensis subsp. *rubens, Phalaris aquatica, Erodium, Erodium cicutarium, Galium aparine, Lactuca serriola, Piptatherum miliaceum, Ricinus communis*

Samples Used in Description: (n = 78)
AA0100cc, AA0107cc, AA0112cc, AA0125cc, AA0164cc, AA0319cc, AA0380cc, AA0428, AA0444cc, AA0467cc, AA0535, AA0537, AA0542, AA0566, AA0569, AA0576, AA0607, AA0686, AA0710, AA0816, AA0842, AA0843, AA0891, AA0950, AA0979, AA0987, AA1075, AA1101, AA1108, AA1116, AA1163, AA1216, AA1223, rap0920, rap0936, rap0939, rap0958, rap0998, rap1231, rap1298m, rap1308, rap1393, rap1403, rap1430, rap1501, rap1526, rap1529, rap1532, rap1556, rap1559, rap1570, rap1582, rap1673, rap1834, rap1844, rap1860, rap1885m, rap1893, rap1901m, rap1939, rap1941, rap1951, rap1997m, rap2009m, rap2021, rap2029, rap2086, rap2159, rap2294, rap2380, rap2397, rap2415m, rap2416, rap2434, rap2467rlv, rap2512, rap2591, rap2842

Comments:
This is a characteristic and common alliance of the coastal sage scrub in the Santa Monica Mountains study area. It is clearly related to other alliances, particularly the *Artemisia californica* Alliance. However, as shown in a Bray-Curtis ordination (McCune and Grace 2002), samples of the full array of stands dominated or codominated by *Artemisia californica* and/or *Salvia leucophylla* tend to segregate from stands dominated by *Artemisia,* while stands dominated by *S. leucophylla* or codominated by *S. leucophylla* and *A. californica* share the same ordination space. This suggests that any stand with either pure *S. leucophylla* or more or less equal mixes of the two shrubs should be considered in the *S. leucophylla* Alliance. As indicated by the list of phases, there is substantial variation in this association. Phases tend to represent seral stage (e.g., higher cover of short-lived perennials, such as *Malacothamnus fasciculatus*, or higher cover of perennial grasses that respond to burning such as *Leymus condensatus*). The presence of *Nassella* spp. in some stands may indicate a specific moisture regime coupled with soil texture (finer-grained clay-rich soils) that has yet to be fully defined. Further identification at the species level may indicate that most of the *Nassella* species are *Nassella lepida*, a common understory to more coastal (fog zone) stands of coastal sage scrub.

Phases:
Salvia leucophylla-Artemisia californica Malacothamnus fasciculatus (Purple Sage-California Sagebrush-Bush Mallow) Phase [8311]
Salvia leucophylla-Artemisia californica (Purple Sage-California Sagebrush) Phase [3316]
Salvia leucophylla/Leymus condensatus (Purple Sage/Giant Wild Rye) Phase [3319]
Salvia leucophylla/Nassella spp. (Purple Sage/Needlegrass) Phase [3311]

COMMON NAME	Purple Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Borchert et al. 2004 in their work on the Los Padres National Forest of Santa Barbara and Ventura counties north to Monterey County describe stands of *S. leucophylla* Alliance (reinterpreted by Sawyer et al. 2006) that most likely match this local association.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Borchert et al. 2004

Salvia leucophylla-Artemisia californica Shrubland Association

Purple Sage-California Sagebrush Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3391

Local Description

Summary:
This shrubland association occurs on moderately steep to very steep northwest- and northeast-facing slopes at low elevations between 24–472 m. It is characterized by a codominance of *Artemisia californica* and *Salvia leucophylla* in the shrub layer with no distinguishing species in the herbaceous layer. The emergent tree layer is generally absent but can include *Quercus agrifolia, Q. lobata*, or *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Simi Hills Inland, Immediate Coast, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 24–472 m, mean 289.5 m
Aspect: northwest and northeast
Slope: range 10–46 degrees, mean 28.8 degrees
Topography (micro; macro): undulating, flat, concave, or convex; lower to upper slope
Litter Cover: range 15–45%, mean 28.9%
Small Rock Cover: range 1–57%, mean 15.2%
Large Rock Cover: range 0–10%, mean 1.2%
Bare Ground: range 2–65%, mean 33.9%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla-Artemisia californica* Shrubland form an open to intermittent shrub layer (13–52%, mean 35.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–29%, mean 6.3%) at 0–2 m tall. Trees are occasionally emergent (0–15% cover, mean 1.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 24–65%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Salvia leucophylla* and *Artemisia californica. Malosma laurina, Malacothamnus fasciculatus,* and *Sambucus mexicana* are occasionally included in this layer. The tree layer is emergent and open and rarely includes *Quercus agrifolia, Juglans californica, and Quercus lobata* at low cover. The herbaceous layer is diverse and often includes *Leymus condensatus. Brassica nigra, Centaurea melitensis,* and *Bromus diandrus* are occasionally present in this layer.

***Salvia leucophylla-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	15.4	2.0	27.0		X	
	ARCA11	*Artemisia californica*	100	14.7	1.0	28.0		X	
	ALA6	*Malosma laurina*	39	1.1	0.2	10.0			
	MAFA	*Malacothamnus fasciculatus*	34	0.6	0.2	7.5			
	SAME5	*Sambucus mexicana*	27	0.3	0.2	7.0			
	RHOV	*Rhus ovata*	25	0.5	0.2	7.5			
	BAPI	*Baccharis pilularis*	25	0.5	0.2	7.5			
	HASQ2	*Hazardia squarrosa*	24	0.5	0.2	6.0			
	ERCI5	*Eriogonum cinereum*	24	0.5	0.2	4.0			
	YUWH	*Yucca whipplei*	23	0.4	0.2	3.0			
	HEAR5	*Heteromeles arbutifolia*	20	0.3	0.2	2.5			
Herb									
	LECO12	*Leymus condensatus*	52	2.4	0.2	27.0			
	BRNI	*Brassica nigra*	28	0.3	0.2	6.0			X
	CEME2	*Centaurea melitensis*	20	0.5	0.2	12.0			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Calochortus catalinae was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 6 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Leptodactylon californicum was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Stanleya pinnata was found in 1 of 79 surveys of this plant community. Regionally, the park considers this species as Locally Rare. CNPS ranks this species as List none, CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Centaurea melitensis, Bromus diandrus, Hirschfeldia incana, Bromus madritensis, Melilotus indicus, Avena fatua, Carduus pycnocephalus, Nicotiana glauca, Anagallis arvensis, Galium aparine, Schinus molle, Brassica, Erodium, Erodium cicutarium, Marrubium vulgare, Schinus molle, Senecio vulgaris, Silybum marianum, Sonchus

Samples Used in Description: (n = 79)
AA0017cc, AA0103cc, AA0106cc, AA0110cc, AA0173cc, AA0223cc, AA0238cc, AA0250cc, AA0256cc, AA0263cc, AA0317cc, AA0339, AA0364cc, AA0390cc, AA0398cc, AA0446cc, AA0447cc, AA0448cc, AA0466cc, AA0505, AA0526, AA0531, AA0538, AA0544, AA0545cc, AA0628, AA0677, AA0682, AA0732, AA0739cc, AA0746cc, AA0760, AA0761, AA0764, AA0791, AA0801, AA0821, AA0900, AA1060, AA1200, AA1225, rap0062, rap0103, rap0164, rap0679, rap0682, rap0992, rap1151, rap1154, rap1280, rap1310, rap1315, rap1318, rap1322, rap1324, rap1342, rap1386, rap1390, rap1397, rap1435m, rap1436m, rap1437m, rap1440m, rap1448, rap1515, rap1827, rap1892, rap1923, rap2122, rap2130, rap2198, rap2303, rap2472rlv, rap2573, rap2581, rap2737, rap2840, rap2868rlv, rap2881rlv

Comments:
This is an abundant and characteristic association within the study area. It has a range of expressions from intermittent to open cover and includes a variety of species that may be occasionally present. Either *Artemisia californica* or *Salvia leucophylla* may be more than twice the cover of the other species. Two phases exist based on these variations.

Phases:
Salvia leucophylla-Artemisia californica (California Sagebrush-Purple Sage codominance) Phase [3391]
Salvia leucophylla-Artemisia californica/Leymus condensatus (California Sagebrush-Purple Sage/Giant Wild Rye) Phase [3393]

COMMON NAME	Purple Sage-California Sagebrush Shrubland Association
SYNONYM	Purple Sage-California Sagebrush (Kirkpatrick and Hutchinson 1977), Ventura Coastal Sage Scrub (Holland 1986)
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association has been described from the Santa Monica Mountains and the northwestern peninsular ranges of Orange County (Gordon and White 1994). It is likely to occur farther north as far as San Luis Obispo County, but information about its global distribution is not available without additional inventory. In Los Padres National Forest, Borchert et al. 2004 have an analogous codominant vegetation type, which they interpret at the alliance level.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Although this is a very common association in the study area, its range is probably largely limited to the region between coastal Los Angeles and coastal San Luis Obispo counties. A similar association was described by Kirkpatrick and Hutchinson 1977. However, their definition was somewhat broader than this one.

References:
Borchert et al. 2004, Gordon and White 1994, Holland 1986, Kirkpatrick and Hutchinson 1977

Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella spp. Shrubland Association

Purple Sage-California Sagebrush-Ashy Buckwheat/Needlegrass Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3396

Local Description

Summary:
This shrubland association occurs on gentle to steep northwest- and northeast-facing slopes at low elevations between 9–457 m. It is characterized by a codominance of *Artemisia californica* and *Salvia leucophylla* with a subdominance of *Eriogonum cinereum* in the shrub layer and a low cover of native grasses such as *Nassella lepida, Nassella* sp., and *Leymus condensatus* in the herbaceous layer. The emergent tree layer is generally absent.

Distribution:
This association is sampled in the Western Fog Zone, Immediate Coast, Dry Inland, Lower Elevation Inland Santa Monica Mountains, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 9–457 m, mean 198.7 m
Aspect: Variable, most often northwest and northeast
Slope: range 2–45 degrees, mean 22.5 degrees
Topography (micro; macro): flat, undulating, or convex; lower slope to ridgetop
Litter Cover: range 0–85%, mean 37.2%
Small Rock Cover: range 0–50%, mean 13.2%
Large Rock Cover: range 0–15%, mean 0.9%
Bare Ground: range 5–75%, mean 31%
Parent Material: sedimentary or quaternary
Soil Texture: moderately fine sandy clay loam to fine clay

Vegetation Description:
Stands of *Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* spp. Shrubland form an open to intermittent shrub layer (9–59%, mean 32.2%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open to intermittent (0–65%, mean 13.9%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 16–90%, mean cover is 45.3%.

In this association, the shrub layer is characterized by *Artemisia californica, Salvia leucophylla,* and *Eriogonum cinereum. Malosma laurina*, *Hazardia squarrosa,* and *Lotus scoparius* are often included in this layer. The tree layer is emergent and open and infrequently includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and usually includes *Leymus condensatus,* while *Nassella lepida* and *Bromus madritensis* are sometimes present.

***Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ARCA11	*Artemisia californica*	100	9.0	0.2	28.0		X	
	SALE3	*Salvia leucophylla*	97	9.2	0.2	35.0		X	
	ERCI5	*Eriogonum cinereum*	90	4.2	0.2	15.0		X	
	MALA6	*Malosma laurina*	69	3.0	0.2	15.0			
	HASQ2	*Hazardia squarrosa*	52	1.0	0.2	13.0			
	LOSC2	*Lotus scoparius*	43	0.4	0.2	9.0			
	RHIN2	*Rhus integrifolia*	40	0.7	0.2	6.0			
	YUWH	*Yucca whipplei*	40	0.3	0.2	3.0			
	MIAU	*Mimulus aurantiacus*	34	1.3	0.2	26.0			
	MAFA	*Malacothamnus fasciculatus*	31	0.6	0.2	6.0			
	ENCA	*Encelia californica*	30	0.7	0.2	8.0			
	ERCO25	*Eriophyllum confertiflorum*	22	0.1	0.2	2.0			
Herb									
	LECO12	*Leymus condensatus*	57	1.1	0.2	10.0			
	NALE2	*Nassella lepida*	36	3.0	0.2	35.0			
	BRMA3	*Bromus madritensis*	34	0.5	0.2	10.0			X
	BRNI	*Brassica nigra*	34	0.2	0.2	2.5			X
	NASSE	*Nassella*	27	2.8	0.2	25.0			
	CEME2	*Centaurea melitensis*	26	0.8	0.2	12.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 5 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 77 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Brassica nigra, Centaurea melitensis, Erodium cicutarium, Bromus hordeaceus, Bromus diandrus, Avena, Phalaris aquatica, Hirschfeldia incana, Anagallis arvensis, Avena fatua, Melilotus indicus, Erodium, Sonchus oleraceus, Carduus pycnocephalus, Galium aparine, Medicago polymorpha, Senecio vulgaris, Avena barbata, Sonchus, Bromus madritensis subsp. *rubens, Lolium, Bromus tectorum, Cirsium vulgare, Foeniculum vulgare, Lactuca serriola, Marrubium vulgare, Oxalis pes-caprae, Silene gallica, Silybum marianum*

Samples Used in Description: (n = 77)
AA0011cc, AA0184cc, AA0218cc, AA0482cc, AA0533, AA0911, AA0961, AA0996, AA1061, AA1178, rap0054, rap0071, rap0078, rap0079, rap0086, rap0089, rap0102, rap0168, rap0174, rap0177, rap0189, rap0190, rap0191, rap0194, rap0213, rap0482, rap0521, rap0655, rap0675, rap0684, rap0846, rap0918, rap0921, rap0937m, rap0988, rap0990, rap0991, rap1050, rap1058, rap1077m, rap1104, rap1248, rap1251, rap1253, rap1398, rap1419, rap1473, rap1475, rap1510, rap1564, rap1799, rap1802, rap1805, rap1806, rap1891, rap1918, rap2018m, rap2270, rap2298, rap2300, rap2468rlv, rap2470rlv, rap2471rlv, rap2539rlv, rap2550, rap2558rlv, rap2559rlv,

rap2697, rap2762, rap2865rlv, rap2866rlv, rap2867rlv, rap2876rlv, rap2880rlv, rap2896rlv, rap2906rlv, rap2930

Comments:
Although similar to the *S. leucophylla-A. californica* Association of the same alliance, this association has a constant and significant cover of *Eriogonum cinereum*. This shrub is largely endemic to the greater Santa Monica Mountains area and tends to denote steep slopes within the coastal fog zone. Several phases have been identified depending on the relative cover and constancy of other associated shrubs. Although *Nassella lepida* appears to be the most common associated grass, some samples were taken when the species of *Nassella* was not positively identified—hence the addition of *Nassella* sp. in the species list. Postfire stands tend to have a relative increase in grasses and short-lived perennial shrubs such as *Nassella* spp. and *Hazardia squarrosa* or *Malacothamnus fasciculatus.* The coastal influence and steep slopes of this association are also underscored by the presence of *Rhus integrifolia* in 40% of the stands sampled. Additional phases have been identified with relatively higher cover and frequency of *Malosma laurina* and based on the addition of *Mimulus aurantiacus* to the constant mixture of the other species.

Phases:
Salvia leucophylla-Artemisia californica-Eriogonum cinereum/Nassella spp. (California Sagebrush-Purple Sage-Ashy Buckwheat/Needlegrass) Phase [3396]
Salvia leucophylla-Artemisia californica-Malosma laurina/Nassella spp. (California Sagebrush-Purple Sage-Laurel Sumac/Needlegrass) Phase [3395]
Salvia leucophylla-Artemisia californica-Mimulus aurantiacus (California Sagebrush-Purple Sage-Bush Monkey Flower) Phase [3392]

COMMON NAME	Purple Sage-California Sagebrush-Ashy Buckwheat/Needlegrass Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic subdesert shrubland
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. In the Los Padres National Forest, Borchert et al. 2004 have an analogous codominant alliance, reinterpreted by Sawyer et al. 2006.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
The range of *Eriogonum cinereum* extends from Los Angeles to Santa Barbara counties with its center of distribution in the Santa Monica Mountains.

References:
Borchert et al. 2004, Sawyer et al. 2006

Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb Shrubland Association

Purple Sage-Ashy Buckwheat/Annual Grass-Herb Shrubland Association
***Salvia leucophylla* Shrubland Alliance**
Purple Sage Shrubland Alliance

Mapping Code: 3312

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southeast- and southwest-facing slopes at low elevations between 0–494 m. It is characterized by dominance to codominance of *Salvia leucophylla* with subdominance to codominance of *Eriogonum cinereum* in the shrub layer.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–494 m, mean 272.4 m
Aspect: southeast and southwest
Slope: range 15–38 degrees, mean 27.7 degrees
Topography (micro; macro): undulating or convex; lower slope to ridgetop
Litter Cover: range 15–45%, mean 26.7%
Small Rock Cover: range 5–50%, mean 19.7%
Large Rock Cover: range 0–2%, mean 0.2%
Bare Ground: range 15–62%, mean 38.7%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Salvia leucophylla-Eriogonum cinereum/*Annual Grass-Herb Shrubland form an open to intermittent shrub layer (20–48%, mean 32.6%). Shrubs occur in two different strata with low shrubs at 0–1 m tall and tall shrubs at 1–2 m tall. The herbaceous layer is open (0–23%, mean 6.9%) at 0–1 m tall. Trees are not present. Total vegetation cover is 30–55%, mean cover is 39.3%.

In this association, the shrub layer is characterized by *Eriogonum cinereum, Salvia leucophylla,* and *Artemisia californica*. *Yucca whipplei* and *Encelia californica* are often included in this layer. The tree layer is absent. The herbaceous layer is simple and often includes *Brassica nigra* and *Leymus condensatus.* Other herbs sometimes present include *Centaurea melitensis, Hirschfeldia incana, Bromus madritensis,* and *Bromus diandrus.*

***Salvia leucophylla-Eriogonum cinereum/Annual Grass-Herb* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	100	17.9	6.0	36.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	7.0	2.0	14.0		X	
	ARCA11	*Artemisia californica*	86	1.5	0.2	4.0		X	
	YUWH	*Yucca whipplei*	57	0.3	0.2	1.0			
	ENCA	*Encelia californica*	50	2.2	0.2	15.0			
	MAFA	*Malacothamnus fasciculatus*	43	0.3	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	36	0.6	0.2	6.0			
	LOSC2	*Lotus scoparius*	29	0.7	0.2	9.0			
	MALA6	*Malosma laurina*	29	0.1	0.2	0.2			
Herb									
	BRNI	*Brassica nigra*	64	2.1	0.2	10.0			X
	LECO12	*Leymus condensatus*	50	0.4	0.2	3.0			
	NASSE	*Nassella*	36	1.0	0.2	12.0			
	CEME2	*Centaurea melitensis*	29	0.4	0.2	2.0			X
	HIIN3	*Hirschfeldia incana*	29	0.4	0.2	3.0			X
	BRMA3	*Bromus madritensis*	29	0.1	0.2	1.0			X
	BRDI3	*Bromus diandrus*	21	1.6	3.0	15.0			X
	CUCA	*Cuscuta californica*	21	0.1	0.2	1.0			

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Bromus madritensis, Bromus diandrus, Avena, Melilotus indicus, Erodium cicutarium, Foeniculum vulgare, Anagallis arvensis, Avena fatua, Brassica, Erodium, Sonchus oleraceus

Samples Used in Description: (n = 14)
AA1158, rap0057, rap0099, rap0100, rap0113, rap0902, rap1320, rap1449, rap1746, rap1926, rap2020, rap2877rlv, rap2878rlv, rap2879rlv

Comments:
This association is likely to be endemic to the western transverse ranges at relatively low elevations. It has some relationships with the *Eriogonum cinereum* Alliance but tends to occur on less steep slopes, while that alliance tends to have a very low cover of *Salvia leucophylla* in only about 30% of the stands.

Phases:
None

COMMON NAME	Purple Sage-Ashy Buckwheat/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural

FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia leucophylla* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera Shrubland Association

Black Sage Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 3324

Local Description

Summary:
This shrubland association occurs on moderate to very steep southeast- and southwest-facing slopes at low elevations between 20–768 m. It is characterized by a strong dominance of *Salvia mellifera* in the shrub layer. The herbaceous layer is generally insignificant, as is the emergent tree layer.

Distribution:
This association is sampled in the Dry Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, Simi Hills Inland, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 20–768 m, mean 332.8 m
Aspect: southeast and southwest
Slope: range 10–46 degrees, mean 29.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–70%, mean 34.1%
Small Rock Cover: range 0–40%, mean 18.1%
Large Rock Cover: range 0–25%, mean 2%
Bare Ground: range 0–55%, mean 32.9%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Salvia mellifera* Shrubland form an open to intermittent shrub layer (21–55%, mean 36.4%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–19%, mean 2.2%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 21–55%, mean cover is 38.7%.

In this association, the shrub layer is characterized by abundant *Salvia mellifera. Yucca whipplei*, *Adenostoma fasciculatum,* and *Artemisia californica* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica, Quercus agrifolia,* and *Schinus molle* at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis*, *Centaurea melitensis,* and *Brassica nigra*. Other herbs present may include *Hirschfeldia incana, Leymus condensatus, Melica imperfecta,* and *Nassella lepida*.

***Salvia mellifera* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	25.0	10.0	51.0	X		
	YUWH	*Yucca whipplei*	58	0.7	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	56	1.8	0.2	11.0			
	ARCA11	*Artemisia californica*	54	1.0	0.2	7.5			
	MAFA	*Malacothamnus fasciculatus*	46	1.5	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	46	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	46	0.7	0.2	8.0			
	ENCA	*Encelia californica*	36	0.7	0.2	7.5			
	RHOV	*Rhus ovata*	29	0.4	0.2	7.5			
	CEME	*Ceanothus megacarpus*	28	0.6	0.2	5.0			
	LOSC2	*Lotus scoparius*	25	0.1	0.2	3.0			
	ERCI5	*Eriogonum cinereum*	24	0.5	0.2	7.5			
	SALE3	*Salvia leucophylla*	24	0.2	0.2	2.5			
	HEAR5	*Heteromeles arbutifolia*	22	0.3	0.2	7.0			
Herb									
	BRMA3	*Bromus madritensis*	26	0.2	0.2	4.0			X
	CEME2	*Centaurea melitensis*	25	0.2	0.2	3.0			X
	BRNI	*Brassica nigra*	22	0.2	0.2	2.5			X

Other Noteworthy Species:
Hemizonia minthornii was found in 1 of 72 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.2 (CNPS 2005). Federal listing is Species of Concern, and state listing is Rare (SAMO 2004).

Juglans californica was found in 6 of 72 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena, Foeniculum vulgare, Marrubium vulgare, Avena fatua, Carduus pycnocephalus, Erodium cicutarium, Nicotiana glauca, Schinus molle, Avena barbata, Erodium, Eucalyptus, Malva parviflora, Medicago polymorpha, Melilotus indicus, Rumex crispus, Schinus molle, Spartium junceum

Samples Used in Description: (n = 72)
AA0088cc, AA0105cc, AA0114cc, AA0128cc, AA0162cc, AA0265cc, AA0328cc, AA0469cc, AA0528, AA0610, AA0765, AA0852, AA0920, AA0982, AA0989, AA1008, AA1068, AA1085, AA1086, AA1089, AA1100, AA1115, AA1124, AA1208, rap0138, rap0529m, rap0539, rap0571, rap0704, rap0717, rap0722, rap0808m, rap0895, rap0948, rap0969, rap1216, rap1266, rap1388, rap1392, rap1459, rap1522, rap1527, rap1560, rap1563, rap1660m, rap1661m, rap1665, rap1667m, rap1724, rap1822, rap1839, rap1840, rap1854, rap1862, rap1898, rap1906, rap1933m, rap1966, rap1976, rap1998m, rap2052, rap2053, rap2105, rap2114, rap2123, rap2262, rap2286, rap2292m, rap2349, rap2466rlv, rap2841, rap2883rlv

Comments:
This is a common association in the study area. It is physiognomically part of the coastal sage scrub vegetation formation, but ecologically, *Salvia mellifera* is often associated with certain chaparrals such as *Adenostoma fasciculatum* and *Adenostoma fasciculatum-Salvia mellifera* alliances. *S. mellifera* is more completely drought deciduous than some other species of the coastal sage scrub, and this may enable it to tolerate extremely hot and dry exposures often found in the xeric chaparrals. The phases identified in this association reflect a pure form with monospecific dominance, a postfire form with bush mallow, a mixed xeric scrub with California buckwheat, and a transition to more of chaparral vegetation.

Phases:
Salvia mellifera-Malacothamnus fasciculatus (Black Sage-Bush Mallow) Phase [3322]
Salvia mellifera-Eriogonum fasciculatum (Black Sage-California Buckwheat) Phase [3321]
Salvia mellifera (Black Sage) Phase [3324]
Salvia mellifera-Adenostoma fasciculatum (Black Sage-Chamise) Phase [3329]

COMMON NAME	Black Sage Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is known from the Santa Monica Mountains and other portions of the western transverse ranges (Malanson 1984) and probably in coastal ranges of California from the central portion of the state (Evens and San 2004) to at least the Mexican border. It is likely that some of the stands sampled by Borchert et al. 2004 on the Los Padres National Forest of Ventura, Santa Barbara, and San Luis Obispo counties can be placed in this association. This association has also been described from San Diego County and Orange County (Desimone and Burk 1992) and may occur as far north as Contra Costa County (Ertter and Bowerman 2002).

Nations:
United States

States or Provinces:
CA

Environmental Description:
Information from Borchert et al. 2004, Klein and Evens 2005, and Evens and San 2005 suggests that the elevation range of this association extends upward to 1,050 m in places like Riverside

County, apparently in drier and more inland south coastal areas with aspect tending to face more northeast than in the Santa Monica Mountains (Klein and Evens 2005).

Vegetation Description:
Based on the description of this association from Riverside County (Klein and Evens 2005) and San Diego County (Evens and San 2005), we can add the following information:
Salvia mellifera is usually the dominant shrub in the overstory. *Eriogonum fasciculatum* is consistently present, usually as a subdominant shrub. A variety of other coastal sage and chaparral species frequently intermix in the shrub layer as subdominants. Some of these species include *Artemisia californica*, *Ceanothus crassifolius*, *Adenostoma fasciculatum*, *Keckiella antirrhinoides*, and *Encelia farinosa*. The understory herbaceous layer consists of native species, such as *Leymus condensatus* and *Nassella lepida,* and nonnative species such as *Bromus madritensis* and *Centaurea melitensis*.

Comments:
See local description.

References:
Borchert et al. 2004, Desimone and Burk 1992, Ertter and Bowerman 2002, Evens and San 2004, Evens and San 2005, Klein and Evens 2005, Malanson 1984

Salvia mellifera-Eriogonum cinereum Shrubland Association

Black Sage-Ashy Buckwheat Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 3323

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep southwest-facing slopes at low elevations between 0–507 m. It is characterized by a dominance of *Salvia mellifera* and a subdominance of *Eriogonum cinereum* in the shrub layer. Herbs and trees are insignificant in this association.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–507 m, mean 186.9 m
Aspect: southwest
Slope: range 15–40 degrees, mean 32.8 degrees
Topography (micro; macro): undulating, flat, or convex; lower to upper slope
Litter Cover: range 15–20%, mean 17.5%
Small Rock Cover: range 5–40%, mean 16.6%
Large Rock Cover: range 0–10%, mean 2.1%
Bare Ground: range 10–70%, mean 39.6%
Parent Material: igneous
Soil Texture: coarse loamy sand to moderately fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Eriogonum cinereum* Shrubland form an open to intermittent shrub layer (21–45%, mean 33.9%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–9%, mean 1.6%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 25–50%, mean cover is 35.9%.

In this association, the shrub layer is characterized by *Salvia mellifera, Eriogonum cinereum*, *Malosma laurina,* and *Yucca whipplei*. *Rhus ovata* and *Encelia californica* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis* and *Leymus condensatus.* Other herbs may include *Calystegia macrostegia*, *Hirschfeldia incana*, *Bromus madritensis,* and *Cuscuta californica*.

***Salvia mellifera-Eriogonum cinereum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	17.0	6.0	33.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	7.5	2.0	12.0		X	
	MALA6	*Malosma laurina*	75	1.8	0.2	6.0		X	
	YUWH	*Yucca whipplei*	75	0.9	0.2	5.0		X	
	RHOV	*Rhus ovata*	60	1.5	0.2	6.0			
	ENCA	*Encelia californica*	50	1.7	1.0	10.0			
	ARCA11	*Artemisia californica*	45	0.8	0.2	4.0			
	SALE3	*Salvia leucophylla*	30	0.4	0.2	5.0			
	LOSC2	*Lotus scoparius*	30	0.1	0.2	0.2			
	CEME	*Ceanothus megacarpus*	25	0.3	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	25	0.2	0.2	1.0			
	HEAR5	*Heteromeles arbutifolia*	25	0.1	0.2	0.2			
	CEBE3	*Cercocarpus betuloides*	20	0.4	0.2	6.0			
	RHIN2	*Rhus integrifolia*	20	0.4	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.1	0.2	1.0			
Herb									
	CEME2	*Centaurea melitensis*	30	0.9	0.2	8.0			X
	LECO12	*Leymus condensatus*	25	0.2	0.2	1.0			

Other Noteworthy Species:
Erysimum insulare was found in 1 of 20 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Avena, Hirschfeldia incana, Pennisetum setaceum, Bromus madritensis, Spartium junceum, Avena fatua, Brassica nigra

Samples Used in Description: (n = 20)
AA0326cc, AA0778, AA0828, AA0959, rap0016m, rap0064, rap0108, rap0109m, rap0115, rap0116, rap0117, rap1469m, rap1479, rap1723, rap1861, rap1863, rap1925m, rap1961, rap2602, rap2728

Comments:
This association is likely to be endemic to the western transverse ranges, primarily centered on the Santa Monica Mountains area. This association may be found on steep south-facing slopes often within the belt of summer fog and, thus, typically at lower elevation and more coastal settings than other associations of the *Salvia mellifera* Alliance.

Phases:
None

COMMON NAME	Black Sage-Ashy Buckwheat Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland

PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera-Malosma laurina Shrubland Association

Black Sage-Laurel Sumac Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 8324

Local Description

Summary:
This shrubland association occurs on gentle to steep southeast and southwest-facing slopes at low elevations between 20–485 m. It is characterized by a dominance of *Salvia mellifera* and a subdominance of *Malosma laurina* in the shrub layer. The herbaceous layer and emergent tree layer are insignificant.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Lower Elevation Inland Santa Monica Mountains, Eastern Urban Upper Elevation Santa Monica Mountains, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 20–485 m, mean 155.6 m
Aspect: southeast and southwest
Slope: range 3–45 degrees, mean 27.1 degrees
Topography (micro; macro): variable (all); bottom to top
Litter Cover: range 7–55%, mean 23.3%
Small Rock Cover: range 2–50%, mean 23.6%
Large Rock Cover: range 0–8%, mean 1.3%
Bare Ground: range 15–80%, mean 37.1%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine to fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Malosma laurina* Shrubland form an open to intermittent shrub layer (22–58%, mean 36.1%). Shrubs occur in two different strata with low shrubs at 0–20 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–15%, mean 3.4%) at 0–2 m tall. Trees are occasionally emergent (0–9% cover, mean 0.3%) with hardwoods at 0–15 m tall. Total vegetation cover is 25–60%, mean cover is 39.6%.

In this association, the shrub layer is characterized by *Salvia mellifera, Malosma laurina,* and *Artemisia californica. Yucca whipplei, Encelia californica, Eriogonum cinereum,* and *Rhus integrifolia* are usually included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* and *Juglans californica* at low cover. The herbaceous layer is diverse and sometimes includes *Nassella lepida* and *Bromus madritensis.* Other herbs present may include *Leymus condensatus, Brassica nigra,* and *Nassella pulchra*.

***Salvia mellifera-Malosma laurina* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	18.9	6.0	35.0		X	
	MALA6	*Malosma laurina*	90	4.3	0.2	12.0		X	
	ARCA11	*Artemisia californica*	86	2.8	0.2	15.0		X	
	YUWH	*Yucca whipplei*	68	1.2	0.2	4.0			
	ENCA	*Encelia californica*	60	1.6	0.2	8.0			
	ERCI5	*Eriogonum cinereum*	58	1.4	0.2	9.0			
	RHIN2	*Rhus integrifolia*	56	2.4	0.2	15.0			
	LOSC2	*Lotus scoparius*	42	0.6	0.2	4.0			
	HASQ2	*Hazardia squarrosa*	40	0.4	0.2	3.0			
	MAFA	*Malacothamnus fasciculatus*	34	0.8	0.2	7.5			
	HEAR5	*Heteromeles arbutifolia*	26	0.5	0.2	5.0			
	ERFA2	*Eriogonum fasciculatum*	26	0.5	0.2	4.0			
	ADFA	*Adenostoma fasciculatum*	22	0.2	0.2	2.5			
	SALE3	*Salvia leucophylla*	20	0.2	0.2	2.5			
Herb									
	NALE2	*Nassella lepida*	34	1.0	0.2	7.0			
	BRMA3	*Bromus madritensis*	28	0.1	0.2	2.0			X
	LECO12	*Leymus condensatus*	24	0.4	0.2	4.0			

Other Noteworthy Species:
Calochortus catalinae was found in 3 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Dichondra occidentalis was found in 1 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 2 of 50 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Bromus madritensis, Centaurea melitensis, Brassica nigra, Hirschfeldia incana, Erodium cicutarium, Pennisetum setaceum, Avena barbata, Erodium, Melilotus indicus, Avena, Nicotiana glauca, Salsola tragus, Avena fatua, Bromus diandrus, Foeniculum vulgare, Medicago polymorpha, Eucalyptus, Galium aparine, Melilotus albus, Ricinus communis

Samples Used in Description: (n = 50)
AA0004cc, AA0037cc, AA0038cc, AA0123cc, AA0181cc, AA0303cc, AA0329cc, AA0389cc, AA0393cc, AA0697, AA0741cc, AA0829, AA1019, rap0043, rap0522, rap0524, rap0562, rap0653, rap0674, rap0737, rap0974, rap0980, rap0984, rap0986, rap1002, rap1032, rap1048, rap1055, rap1057, rap1106, rap1107m, rap1115, rap1593m, rap1835, rap2074m, rap2108,

rap2193, rap2350, rap2465rlv, rap2479, rap2506, rap2538rlv, rap2540rlv, rap2730, rap2733, rap2861rlv, rap2882rlv, rap2884rlv, rap2885rlv, rap2886rlv

Comments:
This is the most widespread association of the *Salvia mellifera* Alliance expressed locally. *Malosma laurina* is a large shrub and appears as an emergent over the shorter drought deciduous *S. mellifera* in mature stands. Both of the main species in this association tolerate summer drought using different strategies—the shallow-rooted *S. mellifera* by dropping most of its leaves and the deep-rooted *Malosma* by tapping into moisture deep in the substrate. A phase of this association is found on steep coastward slopes and includes the presence of *Rhus integrifolia* as well as the other two main species**.**

Phases:
Salvia mellifera-Artemisia californica-Rhus integrifolia (Black Sage-California Sagebrush-Lemonade Berry) Phase [8322]
Salvia mellifera-Malosma laurina (Black Sage-Laurel Sumac) Phase [8324]

COMMON NAME	Black Sage-Laurel Sumac Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It probably occurs elsewhere in southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Salvia mellifera-Rhus ovata Shrubland Association

Black Sage-Sugar Bush Shrubland Association
***Salvia mellifera* Shrubland Alliance**
Black Sage Shrubland Alliance

Mapping Code: 8325

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and southeast-facing slopes at low elevations between 140–618 m. It is characterized by dominance of *Salvia mellifera* and subdominance of *Rhus ovata* in the shrub layer. The herbaceous and tree layers are insignificant.

Distribution:
This association is sampled in the Eastern Urban, Simi Hills Inland, Dry Inland, Upper Elevation Santa Monica Mountains, Lower Elevation Inland Santa Monica Mountains, Western Fog Zone, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 140–618 m, mean 325.2 m
Aspect: northeast and southeast
Slope: range 2–40 degrees, mean 29.4 degrees
Topography (micro; macro): undulating, convex, or flat; lower slope to ridgetop
Litter Cover: range 15–50%, mean 30.6%
Small Rock Cover: range 8–25%, mean 16.7%
Large Rock Cover: range 0–25%, mean 3.7%
Bare Ground: range 15–55%, mean 41.4%
Parent Material: sedimentary or igneous
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Salvia mellifera-Rhus ovata* Shrubland form an open to intermittent shrub layer (26–47%, mean 35.6%). Shrubs occur in two different strata, with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–15%, mean 4.2%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 0.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 31–51%, mean cover is 40.4%.

In this association, the shrub layer is characterized by *Salvia mellifera* and *Rhus ovata. Artemisia californica, Heteromeles arbutifolia,* and *Malosma laurina* are often included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and sometimes includes *Centaurea melitensis, Leymus condensatus,* and *Hirschfeldia incana*.

***Salvia mellifera-Rhus ovata* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SAME3	*Salvia mellifera*	100	21.1	8.0	32.0	X	X	
	RHOV	*Rhus ovata*	100	6.3	2.0	15.0		X	
	ARCA11	*Artemisia californica*	68	1.3	0.2	5.0			
	HEAR5	*Heteromeles arbutifolia*	63	1.3	0.2	4.0			
	MALA6	*Malosma laurina*	53	1.0	0.2	6.0			
	YUWH	*Yucca whipplei*	47	0.7	0.2	4.0			
	CEME	*Ceanothus megacarpus*	37	1.3	0.2	8.0			
	SALE3	*Salvia leucophylla*	37	0.3	0.2	2.5			
	CESP	*Ceanothus spinosus*	26	0.7	0.2	9.0			
	ADFA	*Adenostoma fasciculatum*	26	0.1	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	21	0.5	0.2	3.0			
	ERFA2	*Eriogonum fasciculatum*	21	0.4	0.2	2.5			
	ENCA	*Encelia californica*	21	0.3	0.2	2.5			
	ERCI5	*Eriogonum cinereum*	21	0.3	0.2	2.5			
Herb									
	CEME2	*Centaurea melitensis*	42	0.7	0.2	3.0			X
	LECO12	*Leymus condensatus*	32	0.1	0.2	0.2			
	UNHE	Unknown herbs/forbs	26	1.3	2.5	12.0			
	HIIN3	*Hirschfeldia incana*	21	0.2	0.2	2.5			X

Other Noteworthy Species:
Juglans californica was found in 2 of 19 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Centaurea melitensis, Hirschfeldia incana, Acacia redolens, Bromus hordeaceus, Bromus madritensis, Bromus diandrus, Brassica nigra, Nicotiana glauca, Piptatherum miliaceum

Samples Used in Description: (n = 19)
AA0169cc, AA0341, AA0395cc, AA0442cc, AA0459cc, AA0603, AA0740cc, AA0817, AA1098, rap0890, rap1477, rap1808, rap1809, rap2090, rap2313, rap2501, rap2564, rap2575, rap2688

Comments:
This association is primarily found in the warmer inland portions of the study area. Slopes tend to be facing cooler, shadier directions than in other *Salvia mellifera* Associations locally; however, slopes are still relatively steep. The presence of *Heteromeles arbutifolia* or *Ceanothus spinosus* in many stands also suggests a slightly more mesic setting than other *S. mellifera* associations. High frost frequency may play a role in favoring *R. ovata* over *M. laurina* in these stands.

Phases:
None

COMMON NAME Black Sage-Sugar Bush Shrubland Association
SYNONYM None
PHYSIOGNOMIC CLASS III. Shrubland

PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is known from the Santa Monica Mountains and western Riverside County (Klein and Evens 2005). Information about its global distribution is not available without additional inventory but is likely to include much of interior south coastal California inland from the immediate coast.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
Samples from western Riverside County (Klein and Evens 2005) add the following information: In the *Salvia mellifera-Rhus ovata* Association, *Rhus ovata* is consistently present as a codominant or subdominant shrub. *Eriogonum fasciculatum*, *Artemisia californica*, *Encelia farinosa*, *Adenostoma fasciculatum,* and *Ceanothus crassifolius* are occasionally to often present as subdominant shrubs.

Comments:
Heteromeles arbutifolia is a less common associate of this type in western Riverside County than in the Santa Monica Mountains.

References:
Klein and Evens 2005

Salvia mellifera-Artemisia californica Shrubland Association

Black Sage-California Sagebrush Shrubland Association
***Salvia mellifera-Artemisia californica* Shrubland Alliance**
Black Sage-California Sagebrush Shrubland Alliance

Mapping Code: 3421

Local Description

Summary:
This shrubland association occurs on moderate to steep slopes of variable aspect at low elevations between 0–415 m. It is characterized by a codominance of *Salvia mellifera* and *Artemisia californica* in the shrub layer. The herbaceous layer is composed of a variety of mostly nonnative species at low cover. The emergent tree layer includes occasional *Quercus agrifolia*.

Distribution:
This association is sampled in the Western Fog Zone, Dry Inland, Immediate Coast, Eastern Urban, Lower Elevation Inland Santa Monica Mountains, Simi Hills Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 0–415 m, mean 231.7 m
Aspect: variable
Slope: range 14–36 degrees, mean 24 degrees
Topography (micro; macro): undulating, flat, or convex; lower slope to ridgetop
Litter Cover: range 25–45%, mean 32.5%
Small Rock Cover: range 2–30%, mean 12.7%
Large Rock Cover: range 0–5%, mean 2%
Bare Ground: range 15–53%, mean 36.2%
Parent Material: sedimentary or igneous
Soil Texture: coarse to very fine loamy sand

Vegetation Description:
Stands of *Salvia mellifera-Artemisia californica* Shrubland form an open to intermittent shrub layer (31–45%, mean 39.2%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 0.5–5 m tall. The herbaceous layer is open (0–13%, mean 3.2%) at 0–1 m tall. Trees are occasionally emergent (0–2% cover, mean 0.3%) with hardwoods at 0–10 m tall. Total vegetation cover is 34–55%, mean cover is 42.8%.

In this association, the shrub layer is characterized by *Artemisia californica* and *Salvia mellifera*. *Malosma laurina* and *Adenostoma fasciculatum* are often included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia* at low cover. The herbaceous layer is simple and often includes *Hirschfeldia incana*. Other herbs present may include *Melica imperfecta, Bromus madritensis*, *Leymus condensatus,* and *Calystegia macrostegia*.

***Salvia mellifera-Artemisia californica* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	20	0.2	0.2	2.0			
Shrub									
	SAME3	*Salvia mellifera*	100	16.4	10.0	21.0	X	X	
	ARCA11	*Artemisia californica*	100	11.7	5.0	23.0		X	
	MALA6	*Malosma laurina*	60	1.9	1.0	6.0			
	ADFA	*Adenostoma fasciculatum*	50	0.6	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	40	1.5	0.2	10.0			
	ERFA2	*Eriogonum fasciculatum*	40	0.6	0.2	2.5			
	RHIL	*Rhamnus ilicifolia*	40	0.4	0.2	2.5			
	YUWH	*Yucca whipplei*	40	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	30	1.0	0.2	9.0			
	HEAR5	*Heteromeles arbutifolia*	30	0.5	1.0	2.0			
	ERCI5	*Eriogonum cinereum*	30	0.4	1.0	2.0			
	LOSC2	*Lotus scoparius*	30	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	30	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	20	1.2	3.0	9.0			
	ENCA	*Encelia californica*	20	0.9	2.5	6.0			
	SALE3	*Salvia leucophylla*	20	0.3	1.0	2.5			
	QUBE5	*Quercus berberidifolia*	20	0.3	1.0	2.0			
	CEME	*Ceanothus megacarpus*	20	0.3	0.2	2.5			
	COGI	*Coreopsis gigantea*	20	0.2	0.2	2.0			
	CESP	*Ceanothus spinosus*	20	0.01	0.2	0.2			
	ERCO25	*Eriophyllum confertiflorum*	20	0.01	0.2	0.2			
	KECO	*Keckiella cordifolia*	20	0.01	0.2	0.2			
	RIMA	*Ribes malvaceum*	20	0.01	0.2	0.2			
Herb									
	HIIN3	*Hirschfeldia incana*	50	0.4	0.2	2.5			X
	MEIM	*Melica imperfecta*	30	0.5	0.2	4.0			
	BRMA3	*Bromus madritensis*	30	0.3	0.2	2.5			X
	LECO12	*Leymus condensatus*	30	0.1	0.2	0.2			
	FOVU	*Foeniculum vulgare*	20	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	20	0.3	0.2	2.5			X
	NALE2	*Nassella lepida*	20	0.2	0.2	2.0			
	BRDI3	*Bromus diandrus*	20	0.1	0.2	1.0			X
	CAMA24	*Calystegia macrostegia*	20	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 10 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Foeniculum vulgare, Centaurea melitensis, Bromus diandrus, Anagallis arvensis, Brassica nigra, Carduus pycnocephalus, Erodium cicutarium, Marrubium vulgare, Piptatherum miliaceum

Samples Used in Description: (n = 10)
AA0254cc, AA0420, AA0860, AA0912, rap0297, rap1720, rap1755, rap2072, rap2481, rap2907rlv

Comments:
This is a relatively uncommon association in the study area. Since sampling in these facultatively drought deciduous shrublands occurred throughout much of the year, the variance of total cover and individual species cover is expected to be high. The *S. mellifera* association of the same alliance can be differentiated from this association by its monospecific dominance of black sage.

Phases:
None

COMMON NAME	Black Sage-California Sagebrush Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.5. Extremely xeromorphic evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.5.N. Natural/Seminatural
FORMATION	III.A.5.N.b. Facultatively deciduous, extremely xeromorphic
ALLIANCE	*Salvia mellifera-Artemisia californica* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S4

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur much farther north in the central coast ranges of California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

Sambucus mexicana/Leymus condensatus-Annual Herb Shrubland Association

Mexican Elderberry/Giant Wild Rye-Annual Herb Shrubland Association
***Sambucus mexicana* Shrubland Alliance**
Mexican Elderberry Shrubland Alliance

Mapping Code: 3021

Local Description

Summary:
This shrubland association occurs on gentle to steep northeast- and northwest-facing slopes at low elevations between 0–511 m. It is characterized by dominance in the shrub layer or the low tree layer of *Sambucus mexicana* and relatively high cover of the grass *Leymus condensatus* in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* and *Juglans californica*.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 0–511 m, mean 270.2 m
Aspect: northeast and northwest
Slope: range 2–35 degrees, mean 18.6 degrees
Topography (micro; macro): undulating, concave, or flat; bottom to middle slope
Litter Cover: range 45–85%, mean 66.7%
Small Rock Cover: range 0–10%, mean 3.4%
Large Rock Cover: no data
Bare Ground: range 10–40%, mean 24.2%
Parent Material: sedimentary
Soil Texture: moderately fine clay loam

Vegetation Description:
Stands of *Sambucus mexicana/Leymus condensatus-Annual Grass-Herb* Shrubland form an open to intermittent shrub layer (0–51%, mean 16.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open to intermittent (11–57%, mean 29.7%) at 0–1 m tall. Trees are occasionally emergent (0–27% cover, mean 12.4%) with hardwoods at 0–10 m tall. Total vegetation cover is 46–70%, mean cover is 57.4%.

In this association, the shrub layer often includes *Sambucus mexicana, Baccharis pilularis,* and *Artemisia californica. Malosma laurina, Hazardia squarrosa,* and *Nicotiana glauca* are sometimes included in this layer. The tree layer is emergent and open and may infrequently include *Quercus agrifolia*, *Juglans californica,* and *Schinus molle* at low cover. The herbaceous layer is simple and is characterized by *Leymus condensatus* and *Brassica nigra*. Other herbs sometimes include *Bromus diandrus, Marah macrocarpus, Centaurea melitensis*, *Conium maculatum,* and *Bromus madritensis.*

***Sambucus mexicana/Leymus condensatus-Annual Herb* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	33	1.4	3.0	5.0			
	JUCA-T	*Juglans californica*	22	0.8	3.0	4.0			
Tree Understory									
	SAME5	*Sambucus mexicana*	44	5.7	7.0	19.0			
Shrub									
	SAME5	*Sambucus mexicana*	56	11.1	7.0	50.0	X		
	BAPI	*Baccharis pilularis*	56	0.9	0.2	4.0			
	ARCA11	*Artemisia californica*	56	0.4	0.2	2.0			
	MALA6	*Malosma laurina*	44	0.5	0.2	2.0			
	HASQ2	*Hazardia squarrosa*	33	0.2	0.2	1.0			
	NIGL	*Nicotiana glauca*	33	0.1	0.2	0.2			X
	RHIN2	*Rhus integrifolia*	22	0.9	1.0	7.0			
	RICO3	*Ricinus communis*	22	0.2	0.2	2.0			X
	CESP	*Ceanothus spinosus*	22	0.1	0.2	1.0			
	RISP	*Ribes speciosum*	22	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	78	8.7	1.0	57.0	X	X	
	BRNI	*Brassica nigra*	78	4.5	0.2	15.0		X	X
	BRDI3	*Bromus diandrus*	44	3.2	0.2	25.0			X
	MAMA8	*Marah macrocarpus*	44	0.7	0.2	4.0			
	CEME2	*Centaurea melitensis*	44	0.5	0.2	3.0			X
	COMA2	*Conium maculatum*	33	1.3	2.0	6.0			X
	BRMA3	*Bromus madritensis*	33	0.4	0.2	2.0			X
	MAVU	*Marrubium vulgare*	33	0.2	0.2	1.0			X
	BROMU	*Bromus*	22	3.6	2.0	30.0			
	URUR	*Urtica urens*	22	0.7	1.0	5.0			X
	MAPA5	*Malva parviflora*	22	0.1	0.2	1.0			X
	ARDO3	*Artemisia douglasiana*	22	0.01	0.2	0.2			
	ASFA	*Asclepias fascicularis*	22	0.01	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Conium maculatum, Bromus madritensis, Marrubium vulgare, Nicotiana glauca, Urtica urens, Ricinus communis, Malva parviflora, Centaurea solstitialis, Ageratina adenophora, Galium aparine, Eucalyptus, Foeniculum vulgare, Schinus molle, Avena fatua, Bromus hordeaceus, Lactuca serriola, Melilotus indicus, Pennisetum setaceum, Piptatherum miliaceum, Silybum marianum, Sonchus oleraceus

Samples Used in Description: (n = 9)
rap0843, rap0978, rap1132, rap1852, rap2022, rap2177m, rap2363, rap2568, rap2651

Comments:
This association is found scattered throughout the study area usually in mesic settings. The settings seem to reflect some level of past disturbance from fire or nonnatural clearing and suggest in some cases the removal of higher cover of trees or coastal scrub species recently. Some natural stands are semiriparian. The relatively low constancy values for *Sambucus mexicana* in either the tree or the shrub layer do not reflect the absence of the species in some stands. Taken cumulatively, *S. mexicana* either as a shrub or a small tree is present in all of the stands.

Phases:
None

COMMON NAME	Mexican Elderberry/Giant Wild Rye-Annual Herb Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.B. Deciduous shrubland
Formation Group	III.B.2. Cold-deciduous shrubland
FORMATION SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION NAME	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Sambucus mexicana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Similar, though probably not identical, stands occur in the California coast ranges as far north as Marin County (Keeler-Wolf et al. 2003) and south to San Diego County (Evens and San 2005). Holland 1986 describes an elderberry savanna from the Central Valley.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Scattered stands of *Sambucus mexicana* occur throughout much of cismontane California but have not been well sampled. Contradictory to the formal hierarchy above, many stands are not intermittently flooded, at least not in the urban portions of Santa Monica Mountains study area.

References:
Evens and San 2005, Holland 1986, Keeler-Wolf et al. 2003

Sambucus mexicana-Heteromeles arbutifolia/Annual Grass-Herb Shrubland Association

Mexican Elderberry-Toyon/Annual Grass-Herb Shrubland Association
***Sambucus mexicana* Shrubland Alliance**
Mexican Elderberry Shrubland Alliance

Mapping Code: 3022

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep usually north-facing slopes at low elevations between 261–420 m. It is dominated by *Sambucus mexicana* and secondarily by *Heteromeles arbutifolia* in the shrub layer. The herbaceous layer is diverse, with *Leymus condensatus* often present at low to moderate cover. Other herbs are occasionally present such as *Bromus, Marah macrocarpus, Cortaderia,* and *Cuscuta californica*. The tree layer is occasionally present with species such as *Quercus agrifolia* and/or *Juglans californica.*

Distribution:
This association is sampled in the Eastern Urban, Immediate Coast, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 261–420 m, mean 331.4 m
Aspect: frequently northwest or northeast, rarely southwest or variable
Slope: range 15–38 degrees, mean 31.6 degrees
Topography (micro; macro): often undulating or convex; often mid to upper slopes, sometimes to bottom or ridgetop
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: frequently sedimentary, sometimes depositional or igneous
Soil Texture: no data

Vegetation Description:
Stands of *Sambucus mexicana-Heteromeles arbutifolia*/Annual Grass-Herb Shrubland form an open to intermittent shrub layer (19–37%, mean 27.9%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0.0–26%, mean 13.7%) at 0.01–2 m tall. Trees are occasionally emergent (0.0–21% cover, mean 12.1%) usually with hardwoods at 0–10 m tall. Total vegetation cover is 45.0–60%, mean cover is 53.3%.

In this association, the shrub layer is dominated primarily by *Sambucus mexicana* and secondarily by *Heteromeles arbutifolia.* A variety of other shrubs is often present at low cover including *Toxicodendron diversilobum, Malosma laurina, Mimulus aurantiacus,* and *Ceanothus megacarpus.* Other coastal sage and chaparral species are occasionally included in this layer. The herbaceous layer is variable and includes a variety of grasses and forbs. Often occurring is *Leymus condensatus* at low to moderate cover, while *Bromus, Marah macrocarpus, Cortaderia,* and *Cuscuta californica* are occasionally present. The tree layer sometimes includes *Quercus agrifolia* and/or *Juglans californica.*

***Sambucus mexicana-Heteromeles arbutifolia* Annual Grass-Herb Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.3	1.0	5.0			
Tree Understory									
	JUCA-M	*Juglans californica*	29	0.3	0.2	2.0			
Shrub									
	HEAR5	*Heteromeles arbutifolia*	100	6.0	1.0	12.0		X	
	SAME5	*Sambucus mexicana*	86	12.6	8.0	21.0	X	X	
	TODI	*Toxicodendron diversilobum*	57	3.7	2.0	15.0			
	MALA6	*Malosma laurina*	57	1.4	1.0	6.0			
	MIAU	*Mimulus aurantiacus*	57	0.8	0.2	4.0			
	CEME	*Ceanothus megacarpus*	57	0.6	0.2	2.0			
	SAME3	*Salvia mellifera*	43	0.9	0.2	5.0			
	BAPI	*Baccharis pilularis*	43	0.7	1.0	2.0			
	RHOV	*Rhus ovata*	43	0.6	0.2	3.0			
	CESP	*Ceanothus spinosus*	29	2.3	6.0	10.0			
	KECO	*Keckiella cordifolia*	29	1.1	2.0	6.0			
	ARCA11	*Artemisia californica*	29	0.5	0.2	3.0			
	RIMA	*Ribes malvaceum*	29	0.3	1.0	1.0			
	RISP	*Ribes speciosum*	29	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	57	8.7	2.0	26.0	X		
	BROMU	*Bromus*	29	3.6	0.2	25.0			
	UNGR	Unknown annual grass	29	1.3	2.0	7.0			
	MAMA8	*Marah macrocarpus*	29	0.3	1.0	1.0			
	CORTA	*Cortaderia*	29	0.1	0.2	0.2			X
	CUCA	*Cuscuta californica*	29	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 3 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Cortaderia, Brassica nigra, Nicotiana glauca, Ageratina adenophora, Eucalyptus, Spartium junceum, Centaurea melitensis, Conyza canadensis, Erodium, Hirschfeldia incana, Senecio mikanioides

Samples Used in Description: (n = 7)
rap0832, rap0844, rap1354, rap1935, rap2161, rap2609, rap2616

Comments:
None

Phases:
None

COMMON NAME	Mexican Elderberry-Toyon/Annual Grass-Herb Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.B. Deciduous shrubland
PHYSIOGNOMIC GROUP	III.B.2. Cold-deciduous shrubland
PHYSIOGNOMIC SUBGROUP	III.B.2.N. Natural/Seminatural cold-deciduous shrubland
FORMATION	III.B.2.N.c. Intermittently flooded, cold-deciduous shrubland
ALLIANCE	*Sambucus mexicana* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
None

References:
None

Spartium junceum Shrubland Alliance

Spanish Broom Shrubland Alliance

Mapping Code: 9542

Local Description

Summary:
This shrubland alliance occurs on gentle to steep northeast-facing slopes at low to mid elevations between 226–820 m. It is dominated by *Spartium junceum* in the shrub layer and several nonnative grasses and forbs in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* and nonnative *Pinus* sp.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 226–820 m, mean 478 m
Aspect: northeast
Slope: range 2–38 degrees, mean 25.8 degrees
Topography (micro; macro): flat or undulating; mid to upper slope
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 16.2%
Large Rock Cover: range 0–20%, mean 5.5%
Bare Ground: range 5–40%, mean 19.2%
Parent Material: igneous, quaternary, or sedimentary
Soil Texture: coarse loamy sand

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (21–53%, mean 33.6%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–6%, mean 2.6%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 1.4%) with conifers at 0–10 m tall and hardwoods at 0–10 m tall. Total vegetation cover is 25–55%, mean cover is 36%.

In this association, the shrub layer is characterized by *Spartium junceum. Malosma laurina* and *Salvia mellifera* are occasionally included in this layer. The tree layer is emergent and open and may include *Quercus agrifolia and Pinus* sp. at low cover. The herbaceous layer is diverse and sometimes includes *Bromus madritensis* and *Foeniculum vulgare.* Other herbs may include *Centaurea melitensis, Malacothrix saxatilis,* and *Bromus diandrus.*

Spartium junceum Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	57	0.3	0.2	1.0			
	PINUS	*Pinus*	29	1.1	1.0	7.0			X
Shrub									
	SPJU2	*Spartium junceum*	100	25.3	15.0	44.0	X	X	X
	MALA6	*Malosma laurina*	71	0.5	0.2	1.0			
	SAME3	*Salvia mellifera*	57	0.3	0.2	1.0			
	NIGL	*Nicotiana glauca*	43	0.8	0.2	5.0			X
	LOSC2	*Lotus scoparius*	43	0.5	0.2	2.0			
	ERFA2	*Eriogonum fasciculatum*	29	1.0	3.0	4.0			
	CESP	*Ceanothus spinosus*	29	0.6	1.0	3.0			
	ARCA11	*Artemisia californica*	29	0.2	0.2	1.0			
	RHOV	*Rhus ovata*	29	0.1	0.2	0.2			
Herb									
	BRMA3	*Bromus madritensis*	71	1.0	0.2	2.0			X
	FOVU	*Foeniculum vulgare*	71	0.5	0.2	3.0			X
	PIMI3	*Piptatherum miliaceum*	43	1.0	1.0	3.0			X
	BRDI3	*Bromus diandrus*	43	0.2	0.2	1.0			X
	CEME2	*Centaurea melitensis*	43	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	43	0.1	0.2	0.2			
	PHACE	*Phacelia*	29	0.4	1.0	2.0			
	GNAPH	*Gnaphalium*	29	0.3	0.2	2.0			
	BRNI	*Brassica nigra*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Juglans californica was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Spartium junceum, Bromus madritensis, Foeniculum vulgare, Piptatherum miliaceum, Nicotiana glauca, Bromus diandrus, Centaurea melitensis, Brassica nigra, Avena, Ricinus communis

Samples Used in Description: (n = 7)
AA0641, rap0010, rap0011m, rap0015, rap0242m, rap0276, rap0278

Comments:
This alliance apparently began as plantations or seedings along road cuts on several major roads crossing the Santa Monica Mountains. These stands have persisted but so far have not proliferated much beyond their originally established locations.

Phases:
None

COMMON NAME	Spanish Broom Shrubland Alliance
SYNONYM	Broom Stands (Sawyer and Keeler-Wolf 1995)
PHYSIOGNOMIC CLASS	Shrubland

PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	Microphyllous evergreen shrubland
ALLIANCE	*Spartium junceum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	Exotic

Global Description

Distribution:
In California broom stands occur throughout the southern, central, and northern California coast ranges; the Klamath Mountains and southern Cascades; the southern California mountains and valleys; and the Sierra Nevada Mountains and its foothills. This Spanish broom alliance, recently segregated from the generic broom alliance of Sawyer and Keeler-Wolf 1995, is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
All upland slopes; elevation sea level–1,000 m

Vegetation Description:
Cytisus scoparius, Genista monspessulana, Spartium junceum, or *Ulex europaea* is the sole dominant shrub in the canopy; other species of *Cytisus* or *Genista* may be present. Emergent trees may be present. Shrubs are less than 6 m; canopy is continuous. Ground layer is sparse.

Comments:
The following statement is taken from Sawyer et al. 2006 MS: Invasiveness of broom species is well appreciated. Ten species of broom or gorse from four legume genera are included in this type. Hickman 1993 recognizes three *Cytisus*, five *Genista*, one *Spartium*, and one *Ulex* in California. French broom, Spanish broom, and Scotch broom are the major invading brooms of disturbed areas in the state. The following are uncommon or locally common: *Cytisus multiflorus*, *Cytisus striatus*, *Genista canariensis*, *Genista linifolia*, *Genista maderensis*, *Genista stenopetala*, and *Ulex europaea*. In areas where trees form dense canopies with age, broom is killed; however, a persistent seed bank remains. The treatment here is broad, recognizing the importance of these introduced species in the vegetation of California. The most invasive species in central California appears to be *Genista monspessulana.* It is likely that with further sampling, individual broom alliances and associations will be defined. These may include Spanish broom (*Spartium juncea*) from southern coastal California, French broom (*Genista monspessulana*) from central California, and Scotch broom (*Cytisus multiflorus*) from northern California.

References:
Hickman 1993, Sawyer and Keeler-Wolf 1995, Sawyer et al. 2006 MS

Toxicodendron diversilobum-Artemisia californica/Leymus condensatus Shrubland Association

Poison Oak-California Sagebrush/Giant Wild Rye Shrubland Association
***Toxicodendron diversilobum* Shrubland Alliance**
Poison Oak Shrubland Alliance

Mapping Code: 3331

Local Description

Summary:
This shrubland association occurs on somewhat steep to steep northwest- and northeast-facing slopes at low elevations between 0-719 m. It is characterized by a strong dominance of *Toxicodendron diversilobum* and a presence of *Artemisia californica* in the shrub layer. The herbaceous layer is characterized by relatively high cover of *Leymus condensatus.* The emergent tree layer may include *Juglans californica* and *Quercus agrifolia*.

Distribution:
This association is sampled in the Immediate Coast, Simi Hills Inland, Western Fog Zone, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 0–719 m, mean 297.6 m
Aspect: northwest and northeast
Slope: range 15–36 degrees, mean 31.1 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: range 55–55%, mean 55%
Small Rock Cover: range 3–5%, mean 4.3%
Large Rock Cover: range 0–8%, mean 2.7%
Bare Ground: range 11–35%, mean 22%
Parent Material: sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of *Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Shrubland form an open to continuous shrub layer (28–75%, mean 49.6%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 0–5 m tall. The herbaceous layer is open (0–20%, mean 5%) at 0–1 m tall. Trees are occasionally emergent (0–3% cover, mean 0.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 36–75%, mean cover is 55.1%.

In this association, the shrub layer is dominated by *Toxicodendron diversilobum. Artemisia californica* is also characteristically present. *Sambucus mexicana* and *Malosma laurina* are frequently included in this layer. The tree layer is emergent and open and may infrequently include *Juglans californica* and *Quercus agrifolia* at low cover. The herbaceous layer is simple and is characterized by *Leymus condensatus.* Other herbs sometimes include *Melica imperfecta* and *Hirschfeldia incana*.

***Toxicodendron diversilobum-Artemisia californica/Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	TODI	*Toxicodendron diversilobum*	100	37.1	10.0	57.0	X	X	
	ARCA11	*Artemisia californica*	76	1.8	0.2	7.0		X	
	MALA6	*Malosma laurina*	53	2.1	0.2	18.0			
	SAME5	*Sambucus mexicana*	53	0.7	0.2	5.0			
	MIAU	*Mimulus aurantiacus*	47	1.7	0.2	10.0			
	HEAR5	*Heteromeles arbutifolia*	47	0.6	0.2	3.0			
	SALE3	*Salvia leucophylla*	41	1.1	0.2	7.0			
	MAFA	*Malacothamnus fasciculatus*	29	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	24	0.3	0.2	4.0			
Herb									
	LECO12	*Leymus condensatus*	76	5.2	0.2	20.0	X	X	

Other Noteworthy Species:
Juglans californica was found in 2 of 17 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Myoporum laetum, Bromus diandrus, Foeniculum vulgare, Nasturtium, Tropaeolum

Samples Used in Description: (n = 17)
AA0574, AA1155, AA1213, rap0063m, rap1113m, rap1140m, rap1811, rap1909, rap1911, rap1931, rap1964, rap2057, rap2084m, rap2232, rap2271, rap2611, rap2931

Comments:
This is a broadly defined association that occurs from the immediate coast in mesic hollows receiving salt-laden fog to interior sheltered mesic slopes above 700 m elevation. Most of the stands are found coastally and have *Artemisia californica* and *Leymus condensatus.* Stands are usually small and associated with mesic coastal scrub stands or *Quercus agrifolia* stands. Seasonality of sampling may have resulted in lower covers for *Toxicodendron diversilobum* as it looses all leaves in the winter.

Phases:
None

COMMON NAME	Poison Oak-California Sagebrush/Giant Wild Rye Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.C - Mixed evergreen deciduous shrubland
FORMATION GROUP	III.C.2. Mixed evergreen cold-deciduous shrubland
FORMATION SUBGROUP	III.C.2.N. Natural/Seminatural mixed evergreen cold-deciduous shrubland

FORMATION NAME	III.C.2.N.a. Mixed evergreen cold-deciduous shrubland
ALLIANCE	*Toxicodendron diversilobum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This association is likely to be found in other areas along the central and southern coast of California. The mixed evergreen and winter deciduous classification at the formation group level of the hierarchy is debatable, as many stands of this and other associations in this alliance are strongly dominated by the winter deciduous *Toxicodendron diversilobum*.

References:
None

Toxicodendron diversilobum-Mimulus aurantiacus Shrubland Association

Poison Oak-Bush Monkey Flower Shrubland Association
***Toxicodendron diversilobum* Shrubland Alliance**
Poison Oak Shrubland Alliance

Mapping Code: 3332

Local Description

Summary:
This shrubland association occurs on steep to very steep northeast- and northwest-facing slopes at low elevations between 125–591 m. It is characterized by a codominance of *Toxicodendron diversilobum* and *Mimulus aurantiacus* in the shrub layer. There are no characteristic species in the herbaceous layer. The emergent tree layer includes *Quercus agrifolia* in about half the stands.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 125–591 m, mean 282.7 m
Aspect: northeast and northwest
Slope: range 32–55 degrees, mean 39.6 degrees
Topography (micro; macro): variable (all); lower to upper slope
Litter Cover: no data
Small Rock Cover: range 20–20%, mean 20%
Large Rock Cover: range 6–6%, mean 6%
Bare Ground: range 30–30%, mean 30%
Parent Material: igneous
Soil Texture: moderately fine sandy clay loam

Vegetation Description:
Stands of *Toxicodendron diversilobum-Mimulus aurantiacus* Shrubland form an open to intermittent shrub layer (33–58%, mean 40.1%). Shrubs occur in two different strata with low shrubs at 0–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (0–7%, mean 2.1%) at 0–1 m tall. Trees are occasionally emergent (0–4% cover, mean 2.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 36–60%, mean cover is 44.1%.

In this association, the shrub layer is characterized by *Toxicodendron diversilobum* and *Mimulus aurantiacus. Artemisia californica, Malosma laurina,* and *Salvia leucophylla* are usually included in this layer. The tree layer is emergent and open and may occasionally include *Quercus agrifolia* and *Quercus lobata* at low cover. The herbaceous layer is simple and sometimes includes *Leymus condensatus, Melica imperfecta,* and *Bromus diandrus.*

***Toxicodendron diversilobum-Mimulus aurantiacus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	43	1.1	2.0	3.0			
Shrub									
	MIAU	*Mimulus aurantiacus*	100	15.9	5.0	35.0	X	X	
	TODI	*Toxicodendron diversilobum*	100	13.1	9.0	20.0	X	X	
	ARCA11	*Artemisia californica*	71	1.3	1.0	4.0			
	MALA6	*Malosma laurina*	57	0.9	0.2	4.0			
	SALE3	*Salvia leucophylla*	57	0.6	0.2	2.0			
	HEAR5	*Heteromeles arbutifolia*	43	1.4	1.0	8.0			
	SAME3	*Salvia mellifera*	43	0.9	1.0	3.0			
	KECO	*Keckiella cordifolia*	43	0.7	0.2	4.0			
	RHIN2	*Rhus integrifolia*	43	0.2	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	29	2.4	8.0	9.0			
	CEME	*Ceanothus megacarpus*	29	1.1	2.0	6.0			
	ADFA	*Adenostoma fasciculatum*	29	0.2	0.2	1.0			
	YUWH	*Yucca whipplei*	29	0.1	0.2	0.2			
Herb									
	LECO12	*Leymus condensatus*	43	0.2	0.2	1.0			
	MEIM	*Melica imperfecta*	29	1.3	4.0	5.0			
	BRDI3	*Bromus diandrus*	29	0.3	0.2	2.0			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Stellaria media, Ageratina adenophora, Avena, Carduus pycnocephalus, Centaurea melitensis, Foeniculum vulgare, Hirschfeldia incana

Samples Used in Description: (n = 7)
AA0575, AA0577, rap0836m, rap1671, rap1838, rap1904, rap2390m

Comments:
This association appears to be rare in the study area. It bears ecological relationships with *Quercus agrifolia* stands (often occurs on steep concave slopes adjacent to them) and also occurs adjacent to *Artemisia californica* Alliance stands in the coastal scrub. The presence of *Mimulus aurantiacus* in the study area often indicates steep but relatively mesic unstable slopes.

Phases:
None

COMMON NAME	Poison Oak-Bush Monkey Flower Shrubland Association
SYNONYM	None
FORMATION CLASS	III. Shrubland
FORMATION SUBCLASS	III.C. Mixed evergreen deciduous shrubland
FORMATION GROUP	III.C.2. Mixed evergreen cold-deciduous shrubland
FORMATION SUBGROUP	III.C.2.N. Natural/Seminatural mixed evergreen cold-deciduous shrubland

FORMATION NAME	III.C.2.N.a. Mixed evergreen cold-deciduous shrubland
ALLIANCE	*Toxicodendron diversilobum* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Both *Toxicodendron diversilobum* and *Mimulus aurantiacus* are widespread shrubs in coastal California ranging well north and south of the study area. It is likely that this association occurs farther north into the outer central coast ranges (e.g., Big Sur, Monterey County).

References:
None

Venegasia carpesioides Shrubland Alliance

Canyon Sunflower Shrubland Alliance

Mapping Code: 4750

Local Description

Summary:
This shrubland alliance occurs on steep northwest- and northeast-facing slopes at low elevations between 25–534 m. It is dominated by the leafy shrub *Venegasia carpesioides* in the shrub layer. There is a diverse herbaceous layer characterized by *Leymus condensatus.* The emergent tree layer includes *Quercus agrifolia*.

Distribution:
This alliance is sampled in the Upper Elevation Santa Monica Mountains and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 25–534 m, mean 211.4 m
Aspect: northwest and northeast
Slope: range 28–38 degrees, mean 33 degrees
Topography (micro; macro): undulating, concave, or convex; middle slope to ridge
Litter Cover: no data
Small Rock Cover: range 5–25%, mean 12.7%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 10–30%, mean 23.3%
Parent Material: igneous or sedimentary
Soil Texture: medium loam to moderately fine clay loam

Vegetation Description:
Stands of this shrubland alliance form an open to intermittent shrub layer (28–50%, mean 40.4%). Shrubs occur in two different strata with low shrubs at 0.5–2 m tall and tall shrubs at 1–5 m tall. The herbaceous layer is open (2–15%, mean 9%) at 0–1 m tall. Trees are occasionally emergent (0–8% cover, mean 1.6%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–65%, mean cover is 50.2%.

In this association, the shrub layer is characterized by *Venegasia carpesioides, Malosma laurina,* and *Heteromeles arbutifolia*. *Mimulus aurantiacus, Artemisia californica, Salvia mellifera,* and *Toxicodendron diversilobum* are occasionally included in this layer. The tree layer is emergent and open and occasionally includes *Quercus agrifolia* at low cover. The herbaceous layer is diverse and is characterized by *Leymus condensatus* with *Bromus* sp. also occasionally present. Other herbs occasionally present may include *Hirschfeldia incana, Nassella pulchra, Brassica nigra,* and *Lathyrus laetiflorus.*

Venegasia carpesioides Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	40	1.5	0.2	7.5			
	JUCA-T	*Juglans californica*	20	0.5	2.5	2.5			
Shrub									
	VECA	*Venegasia carpesioides*	100	17.8	7.0	25.0	X	X	
	MALA6	*Malosma laurina*	100	4.7	1.0	8.0		X	
	HEAR5	*Heteromeles arbutifolia*	80	4.9	2.0	12.0		X	
	MIAU	*Mimulus aurantiacus*	60	3.1	2.0	7.5			
	ARCA11	*Artemisia californica*	60	1.5	2.0	3.0			
	SAME3	*Salvia mellifera*	60	0.8	0.2	3.0			
	TODI	*Toxicodendron diversilobum*	60	0.6	0.2	2.5			
	LOSC2	*Lotus scoparius*	40	1.4	3.0	4.0			
	CESP	*Ceanothus spinosus*	40	1.2	0.2	6.0			
	BAPI	*Baccharis pilularis*	40	0.7	1.0	2.5			
	RIMA	*Ribes malvaceum*	40	0.2	0.2	1.0			
	CEME	*Ceanothus megacarpus*	20	0.6	3.0	3.0			
	DERI	*Dendromecon rigida*	20	0.6	3.0	3.0			
	ERCI5	*Eriogonum cinereum*	20	0.6	3.0	3.0			
	MAFA	*Malacothamnus fasciculatus*	20	0.6	3.0	3.0			
	CEBE3	*Cercocarpus betuloides*	20	0.5	2.5	2.5			
	RHOV	*Rhus ovata*	20	0.4	2.0	2.0			
	ENCA	*Encelia californica*	20	0.2	1.0	1.0			
	NIGL	*Nicotiana glauca*	20	0.2	1.0	1.0			X
	SAME5	*Sambucus mexicana*	20	0.2	1.0	1.0			
	SOXA	*Solanum xanti*	20	0.2	1.0	1.0			
	BAPL	*Baccharis plummerae*	20	0.0	0.2	0.2			
	KECO	*Keckiella cordifolia*	20	0.0	0.2	0.2			
	NEOL	*Nerium oleander*	20	0.0	0.2	0.2			X
Herb									
	LECO12	*Leymus condensatus*	80	6.9	7.5	11.0	X	X	
	BROMU	*Bromus*	40	0.5	0.2	2.5			
	HIIN3	*Hirschfeldia incana*	20	0.8	4.0	4.0			X
	NAPU4	*Nassella pulchra*	20	0.6	3.0	3.0			
	BRNI	*Brassica nigra*	20	0.5	2.5	2.5			X
	NASSE	*Nassella*	20	0.5	2.5	2.5			
	BRDI3	*Bromus diandrus*	20	0.4	2.0	2.0			X
	LALA2	*Lathyrus laetiflorus*	20	0.2	1.0	1.0			
	CAMA24	*Calystegia macrostegia*	20	0.0	0.2	0.2			
	CAAF	*Castilleja affinis*	20	0.0	0.2	0.2			
	CORTA	*Cortaderia*	20	0.0	0.2	0.2			X

Other Noteworthy Species:
Baccharis plummerae was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-1-3. Global rank is G3T3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Juglans californica was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2 (CNPS 2005). Federal listing is none, and state listing is none (SAMO 2004).

Nonnative Species:
Hirschfeldia incana, Brassica nigra, Bromus diandrus, Nicotiana glauca, Cortaderia, Medicago polymorpha, Nerium oleander

Samples Used in Description: (n = 5)
AA0325cc, rap0464, rap0927, rap1122, rap2656

Comments:
Stands dominated by canyon sunflower dominate on typically sheltered, northerly facing or concave slopes. They typically occur following burns in *Quercus agrifolia* woodlands or mesic chaparral such as the *Ceanothus spinosus* or *Quercus berberidifolia* alliances. Fire in mesic coastal scrub formerly dominated by *Artemisia californica*, *Mimulus aurantiacus*, and *Leymus condensatus* may also be dominated by *V. carpesioides*. Typically, canyon sunflower dominates for several years before shifting toward more long-persisting shrub dominance. Canyon sunflower occurs commonly in such situations along the coast of southern California but has only been sampled extensively in the Santa Monica Mountains in this study so far. Little detail is currently known about the duration of stands following fire. It appears to resprout and perhaps proliferate following fire and returns to relatively low cover and density in the understory of other shrubs and trees following intervals of more than 10 years without fire.

Phases:
None

COMMON NAME	Canyon Sunflower Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	III. Shrubland
PHYSIOGNOMIC SUBCLASS	III.A. Evergreen shrubland
PHYSIOGNOMIC GROUP	III.A.2. Temperate broad-leaved evergreen shrubland
PHYSIOGNOMIC SUBGROUP	III.A.2.N. Natural/Seminatural
FORMATION	III.A.2.N.a. Temperate broad-leaved evergreen shrubland
ALLIANCE	*Venegasia carpesioides* Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
None

HERBACEOUS VEGETATION DESCRIPTIONS

Arundo donax Herbaceous Alliance

Giant Reed Herbaceous Alliance

Mapping Code: 4310

Local Description

Summary:
Two stands of this herbaceous alliance occur on flat to steep, northeast-facing slopes at low elevations between 2 and 153 m. It is dominated by *Arundo donax* in the herbaceous layer. *Artemisia douglasiana*, *Foeniculum vulgare,* and *Malacothrix saxatilis* may also be included in this layer at low cover. *Baccharis pilularis* is found in the shrub layer at low cover, and *Platanus racemosa* is in the tree layer at low cover.

Distribution:
This association is sampled in the Immediate Coast region of the study area. It has also been seen in the Simi Valley, though not sampled there.

Environmental Description:
Elevation: range 2–153 m, mean 78 m
Aspect: flat to northeast
Slope: 0 to 34 degrees
Topography (micro; macro): flat to convex; bottom to mid
Litter Cover: 90% (in one sample)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of this herbaceous alliance form an open to intermittent herbaceous layer (16–50%, mean 33%) at 2–5 m tall. The shrub layer is sparse to open (0–25%, mean 12.5%) at 0–5 m tall. Trees are emergent (1–4% cover, mean 2.5%) with hardwoods at 2–10 m tall. Total vegetation cover is 45–51%, mean cover is 48%.

In this alliance, the herbaceous layer is open to intermittent and is dominated by *Arundo donax*. This layer may also include *Artemisia douglasiana*, *Foeniculum vulgare,* and *Malacothrix saxatilis* at low cover. The shrub layer is low in cover and may include *Baccharis pilularis, Myoporum laetum, Heteromeles arbutifolia, Artemisia californica,* and *Malacothamnus fasciculatus*, and the tree layer may include *Platanus racemosa* as a sparse emergent.

Arundo donax Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	50	0.1	0.2	0.2	X		
Shrub									
	BAPI	*Baccharis pilularis*	50	4.0	8.0	8.0	X		
	MYLA5	*Myoporum laetum*	50	2.0	4.0	4.0			X
	HEAR5	*Heteromeles arbutifolia*	50	1.5	3.0	3.0			
	ARCA11	*Artemisia californica*	50	1.0	2.0	2.0			
	MAFA	*Malacothamnus fasciculatus*	50	1.0	2.0	2.0			
	CESP	*Ceanothus spinosus*	50	0.5	1.0	1.0			
	SALA6-M	*Salix lasiolepis*	50	0.5	1.0	1.0			
	BASA4	*Baccharis salicifolia*	50	0.1	0.2	0.2			
	NIGL	*Nicotiana glauca*	50	0.1	0.2	0.2			X
	RHIL	*Rhamnus ilicifolia*	50	0.1	0.2	0.2			
	SALE3	*Salvia leucophylla*	50	0.1	0.2	0.2			
Herb									
	ARDO4	*Arundo donax*	100	33.5	16.0	51.0	X	X	X
	ARDO3	*Artemisia douglasiana*	50	2.5	5.0	5.0			
	MASA2	*Malacothrix saxatilis*	50	1.0	2.0	2.0			
	FOVU	*Foeniculum vulgare*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Arundo donax, Myoporum laetum, Foeniculum vulgare, Nicotiana glauca

Samples Used in Description: (n = 2)
rap1361, rap2207m

Comments:
This is a dangerously invasive nonnative alliance that, once established, is very difficult to remove. It is easily spread along active stream channels during flooding events when the underground stolon and rootstalks are damaged, uprooted, and transported by water to new locations. This species is sometimes used as an ornamental locally.

Phases:
None

COMMON NAME	Giant Reed Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland

ALLIANCE	*Arundo donax* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains region and also from elsewhere in California from Shasta County south to San Diego County. The species is introduced from Eurasia.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This alliance occurs on banks of streams, rivers, sloughs, and other water bodies in lower elevations of California.

Vegetation Description:
Dense monospecific clumps tend to form interspersed with native woody species such as *Salix lasiolepis, S. exigua, S. gooddingii, Baccharis salicifolia*, and so forth, along gravelly stream channels.

Comments:
This alliance is spreading throughout lower elevation riparian settings in California from the northern Central Valley to San Diego County along coastal streams and estuaries.

References:
Bossard et al. 2000

Avena fatua Herbaceous Association

Wild Oat Herbaceous Association
***Avena* spp. Herbaceous Alliance**
Wild Oat Herbaceous Alliance

Mapping Code: 4220

Local Description

Summary:
This herbaceous association occurs on gentle to steep often northwest- or southwest-facing slopes at low elevations between 165 and 268 m. *Avena fatua* is characteristically abundant in the herbaceous layer, and *Bromus diandrus* and *Brassica nigra* are often present. *Lotus scoparius, Baccharis pilularis*, and *Artemisia californica* are sometimes found in the shrub layer at low cover, and *Quercus agrifolia* is infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Dry Inland, and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 165–268 m, mean 214.6 m
Aspect: variable, but often northwest and southwest
Slope: range 2–35 degrees, mean 9.25 degrees
Topography (micro; macro): flat to undulating; most often bottom to mid
Litter Cover: range 35–60%, mean 51.7%
Small Rock Cover: range 0–8%, mean 2.3%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 0–35%, mean 10.3%
Parent Material: most often depositional or sedimentary, occasionally igneous
Soil Texture: fine or moderately fine clay

Vegetation Description:
Stands of the *Avena fatua* Herbaceous Association form an intermittent to continuous herbaceous layer (40–90%, mean 58.3%) at 0.01–1 m tall. The shrub layer is sparse to open (0–10%, mean 2.8%) at 0–2 m tall. Trees are infrequently emergent (0–0% cover, mean 0%) with hardwoods at 0–10 m tall. Total vegetation cover is 40–90%, mean cover is 61.1%.

In this association, the herbaceous layer is intermittent to continuous, and *Avena fatua* is characteristic. *Bromus diandrus* and *Brassica nigra* are often included in this layer. The shrub layer occasionally includes *Lotus scoparius, Baccharis pilularis*, and *Artemisia californica*. The tree layer infrequently includes *Quercus agrifolia* as an emergent.

***Avena fatua* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	LOSC2	*Lotus scoparius*	38	0.6	0.2	4.0			
	BAPI	*Baccharis pilularis*	38	0.4	0.2	3.0			
	ARCA11	*Artemisia californica*	38	0.4	0.2	2.0			
	SALE3	*Salvia leucophylla*	25	0.8	1.0	5.0			
	MALA6	*Malosma laurina*	25	0.2	0.2	1.0			
Herb									
	AVFA	*Avena fatua*	88	39.9	21.0	88.0	X	X	X
	BRDI3	*Bromus diandrus*	62	1.0	0.2	6.0			X
	BRNI	*Brassica nigra*	50	1.1	1.0	6.0			X
	BRMA3	*Bromus madritensis*	38	0.6	1.0	2.0			X
	DICA14	*Dichelostemma capitatum*	38	0.1	0.2	0.2			
	AVBA	*Avena barbata*	25	5.8	5.0	41.0			X
	VIVI	*Vicia villosa*	25	0.5	1.0	3.0			X
	ASFA	*Asclepias fascicularis*	25	0.1	0.2	0.2			
	LUPIN	*Lupinus*	25	0.1	0.2	0.2			
	MEPO3	*Medicago polymorpha*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 8 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena fatua, Bromus diandrus, Brassica nigra, Bromus madritensis, Avena barbata, Vicia villosa, Medicago polymorpha, Hirschfeldia incana, Lolium multiflorum, Erodium botrys, Bromus hordeaceus, Centaurea melitensis, Convolvulus arvensis, Erodium cicutarium, Erodium moschatum, Foeniculum vulgare, Rumex crispus

Samples Used in Description: (n = 8)
AA0947, rap0944, rap0946, rap1000, rap1262, rap1841, rap2527rlv, rap2528rlv

Comments:
This is the first report that has specifically defined an *Avena* sp. Alliance. Typically, these stands have been placed into the California annual grassland alliance (Sawyer and Keeler-Wolf 1995). All of these annual alliances vary greatly depending on annual climatic conditions.

Phases:
None

COMMON NAME	Wild Oat Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation

PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5 Note: Although *Avena fatua* and *A. barbata* were both introduced from Eurasia, the *Avena* stands may house a number of significant native annuals and perennial herbs. Thus, this is considered an association that has some conservation value.

Global Description

Distribution:
This association is defined from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be extremely widespread throughout cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
A similar association has been identified in the central coast ranges: *Avena barbata-Avena fatua* Association.

References:
Evens and San 2004, Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

California Annual Grassland/Herbaceous Alliance

Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 4340/5000

The California annual grassland alliance is represented by four associations locally. In addition to these, there is additional variation expressed in the herbaceous layer within six samples, which will be briefly described here. These samples occur on flat to steep slopes and from low to moderate elevations. Most of them had low cover of all species, but they were dominated by a high-diversity herb layer, thus making them hard to classify further than the alliance level. *Bromus diandrus, Brassica nigra,* and *Hirschfeldia incana* are the three species with the highest constancy in these six plots, and none had constancy greater than 67%. In addition, a variety of forbs also occurred across the stands and usually dominated the stands including *Camissonia bistorta, Lasthenia californica, Lotus* sp*., Lupinus succulentus, Hemizonia fasciculata,* and *Vicia villosa*. Further, *Calochortus catalinae* was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Samples classified to the alliance level only:
AA1064, rap1326, rap1712, rap2519rlv, rap2520rlv, rap2640rlv

Brassica nigra Herbaceous Association

Black Mustard Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50006

Local Description

Summary:
This herbaceous association occurs on flat to steep, often northwest-facing slopes at low elevations between 7 and 436 m. *Brassica nigra* is characteristically abundant in the herbaceous layer, and *Leymus condensatus* is usually present. *Encelia californica* and *Artemisia californica* are occasionally found in the shrub layer at low cover, and *Juglans californica* is occasionally in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Eastern Urban, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 7–436 m, mean 270 m
Aspect: variable, but most often northwest
Slope: range 0–45 degrees, mean 22.8 degrees
Topography (micro; macro): no data
Litter Cover: range 20–80%, mean 43.3%
Small Rock Cover: range 2–30%, mean 13.4%
Large Rock Cover: no data
Bare Ground: range 10–78%, mean 38.6%
Parent Material: most often sedimentary, sometimes depositional
Soil Texture: fine to moderately fine clay or silty clay loam

Vegetation Description:
Stands of the *Brassica nigra* Herbaceous Association form an open to continuous herbaceous layer (18–70%, mean 37.5%) at 0.01–2 m tall. The shrub layer is sparse to open (0–12%, mean 4.4%) at 0–5 m tall. Trees are sometimes emergent (0–7% cover, mean 1.5%) with hardwoods at 0–10 m tall. Total vegetation cover is 23–70%, mean cover is 42.7%.

In this association, the herbaceous layer is open to continuous, and *Brassica nigra* is characteristically abundant. *Bromus diandrus* and *Leymus condensatus* are usually included in this layer at low cover. The shrub layer occasionally includes *Encelia californica* and *Artemisia californica* at sparse cover. The tree layer occasionally includes *Juglans californica* as an emergent, while *Quercus agrifolia* and *Sambucus mexicana* occur infrequently at low cover.

***Brassica nigra* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	JUCA-T	*Juglans californica*	27	0.7	0.2	7.0			
Shrub									
	ENCA	*Encelia californica*	45	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	45	0.2	0.2	1.0			
	MAFA	*Malacothamnus fasciculatus*	36	0.9	0.2	6.0			
	MALA6	*Malosma laurina*	36	0.5	0.2	2.0			
	NIGL	*Nicotiana glauca*	36	0.1	0.2	0.2			X
	BASA4	*Baccharis salicifolia*	27	0.3	0.2	3.0			
	ERCI5	*Eriogonum cinereum*	27	0.2	0.2	1.0			
	HASQ2	*Hazardia squarrosa*	27	0.1	0.2	1.0			
Herb									
	BRNI	*Brassica nigra*	100	25.4	11.0	46.0	X	X	X
	BRDI3	*Bromus diandrus*	55	0.7	0.2	4.0			X
	LECO12	*Leymus condensatus*	55	0.6	0.2	3.0			
	MAVU	*Marrubium vulgare*	27	0.8	0.2	8.0			X
	CEME2	*Centaurea melitensis*	27	0.6	0.2	5.0			X
	SIMA3	*Silybum marianum*	27	0.1	0.2	1.0			X

Other Noteworthy Species:
Juglans californica was found in 4 of 11 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Nicotiana glauca, Marrubium vulgare, Centaurea melitensis, Silybum marianum, Melilotus indicus, Conium maculatum, Lactuca serriola, Erodium moschatum, Erodium cicutarium, Ricinus communis, Bromus madritensis, Pennisetum setaceum, Sisymbrium

Samples Used in Description: (n = 11)
AA0931, rap1062, rap1065, rap1101, rap1329, rap1422, rap1442, rap1873m, rap1888, rap2059, rap2916rlv

Comments:
Although *Brassica nigra* forms weedy stands throughout much of cismontane California, this is the first time this association has been formally defined. In this report, we are considering it an expansion of the widely known California annual grassland alliance, now modified as the California annual grassland/herbaceous alliance to account for some associations being dominated by annual herbs instead of grasses. Some of the stands surveyed here seemed to be associated with a recent prescribed burn.

Phases:
None

COMMON NAME Black Mustard Herbaceous Association
SYNONYM California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986),

	Bromus (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: *Brassica nigra* stands are generally strongly dominated by *B. nigra*, an invasive weed with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California in disturbed pastures and grasslands.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Brassica nigra-Bromus diandrus Herbaceous Association

Black Mustard-Ripgut Brome Herbaceous Association
California Annual Grassland/Herbaceous Alliance

Mapping Code: 50009

Local Description

Summary:
This herbaceous association occurs on gentle to very steep slopes of variable aspect at low elevations between 37 and 495 m. It is codominated by *Bromus diandrus* and *Brassica nigra* in the herbaceous layer. *Malosma laurina, Hazardia squarrosa, Artemisia californica*, and *Salvia leucophylla* are sometimes found in the shrub layer at low cover, and *Quercus lobata, Q. agrifolia, Juglans californica*, and *Pinus* spp. are infrequently found in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Eastern Urban, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, Simi Hills Inland, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 37–495 m, mean 321.4 m
Aspect: variable
Slope: range 2–48 degrees, mean 19.0 degrees
Topography (micro; macro): most often undulating or flat; variable
Litter Cover: range 25–85%, mean 60.3%
Small Rock Cover: range 0–70%, mean 11%
Large Rock Cover: range 0–2%, mean 0.7%
Bare Ground: range 0–64%, mean 23.3%
Parent Material: usually sedimentary, sometimes igneous, depositional, or metamorphic
Soil Texture: fine clay or moderately fine sandy or silty clay loam

Vegetation Description:
Stands of the *Brassica nigra-Bromus diandrus* Herbaceous Association form an open to intermittent herbaceous layer (16–65%, mean 42.3%) at 0.01–1 m tall. The shrub layer is sparse to open (0–12%, mean 3%) at 0–5 m tall. Trees are infrequently emergent (0–8% cover, mean 0.5%) with hardwoods at 0–15 m tall. Total vegetation cover is 20–65%, mean cover is 45.7%.

In this association, the herbaceous layer is open to intermittent and is codominated by *Bromus diandrus* and *Brassica nigra*. Other nonnative species such as *Centaurea melitensis*, *Hirschfeldia incana*, and *Avena fatua* are also occasionally included in this layer at relatively low cover. The shrub layer sometimes includes *Malosma laurina, Hazardia squarrosa, Artemisia californica*, and *Salvia leucophylla*. The tree layer infrequently includes *Quercus lobata, Q. agrifolia, Juglans californica*, and *Pinus* spp. as emergent trees.

***Brassica nigra-Bromus diandrus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	33	0.5	0.2	3.0			
	HASQ2	*Hazardia squarrosa*	29	0.4	0.2	2.5			
	ARCA11	*Artemisia californica*	25	0.8	0.2	7.5			
	SALE3	*Salvia leucophylla*	25	0.4	0.2	2.5			
	NIGL	*Nicotiana glauca*	21	0.5	0.2	10.0			X
	BAPI	*Baccharis pilularis*	21	0.3	0.2	2.5			
	SAME5	*Sambucus mexicana*	21	0.2	0.2	2.5			
Herb									
	BRNI	*Brassica nigra*	96	11.2	2.0	25.0		X	X
	BRDI3	*Bromus diandrus*	75	17.8	4.0	50.0	X	X	X
	CEME2	*Centaurea melitensis*	33	0.4	0.2	4.0			X
	HIIN3	*Hirschfeldia incana*	29	1.5	0.2	15.0			X
	AVFA	*Avena fatua*	29	0.4	0.2	4.0			X
	BROMU	*Bromus*	21	3.8	2.0	30.0			
	LASE	*Lactuca serriola*	21	0.6	0.2	7.5			X

Other Noteworthy Species:
Ericameria palmeri was found in 1 of 24 surveys of this plant community, which could be the rare variety *E. p.* var. *pachylepis.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 0, and CNPS R-E-D Code is 0-0-0. Global rank is none, and state rank is none. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 2 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Centaurea melitensis, Hirschfeldia incana, Avena fatua, Lactuca serriola, Nicotiana glauca, Bromus madritensis, Erodium, Erodium cicutarium, Melilotus indicus, Medicago polymorpha, Carduus pycnocephalus, Marrubium vulgare, Vicia villosa, Sonchus oleraceus, Avena, Silybum marianum, Foeniculum vulgare, Raphanus sativus, Ricinus communis, Malva parviflora, Rumex crispus, Euphorbia terracina, Galium aparine, Anagallis arvensis, Bromus hordeaceus, Cirsium vulgare, Melilotus albus, Melilotus officinalis, Pennisetum setaceum, Salsola tragus, Stellaria media

Samples Used in Description: (n = 24)
AA0044cc, AA0101cc, AA0111cc, AA0145cc, AA0168cc, AA0310cc, AA0324cc, AA0731, rap0733, rap0764, rap0820, rap1041, rap1094m, rap1246, rap1317, rap1502, rap1554, rap1571, rap2521rlv, rap2522rlv, rap2771, rap2891rlv, rap2892rlv, rap2917rlv

Comments:
Stands of this association are typically the result of high disturbance through grazing, fire, clearing, mechanical treatments, or a combination of the above. All three of the associations with mixtures of *Brassica nigra* and annual herbs and grasses may be considered closely related. They may ultimately be lumped into a single black mustard-weedy herbaceous association of the California annual grassland alliance. However, since analysis suggests these types do separate

out at least floristically, we are maintaining their distinction here until further detailed releve-based sampling is done to determine their relationships.

Phases:
None

COMMON NAME	Black Mustard-Ripgut Brome Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *B. nigra and Bromus diandrus*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Brassica nigra-Centaurea melitensis Herbaceous Association

Black Mustard-Maltese Star Thistle Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50008

Local Description

Summary:
This herbaceous association occurs on gentle to steep slopes of variable aspect at low elevations between 41 and 483 m. It is codominated by *Centaurea melitensis* and *Brassica nigra* in the herbaceous layer. *Hazardia squarrosa, Salvia leucophylla,* and *Artemisia californica* are often found in the shrub layer at low cover, and *Juglans californica* and *Quercus agrifolia* are infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Upper Elevation Santa Monica Mountains, Eastern Urban, Immediate Coast, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 41–483 m, mean 319.9 m
Aspect: variable
Slope: range 2–35 degrees, mean 16 degrees
Topography (micro; macro): usually flat or undulating; variable, but often mid to top
Litter Cover: range 10–60%, mean 35.3%
Small Rock Cover: range 0–60%, mean 12.3%
Large Rock Cover: range 0–2%, mean 0.9%
Bare Ground: range 4–75%, mean 35.8%
Parent Material: sedimentary
Soil Texture: fine to moderately fine clay or clay loam

Vegetation Description:
Stands of the *Brassica nigra-Centaurea melitensis* Herbaceous Association form an open to intermittent herbaceous layer (10–65%, mean 28.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–18%, mean 6.2%) at 0–5 m tall. Trees are infrequently emergent (0–1% cover, mean 0.1%) with hardwoods at 0–5 m tall. Total vegetation cover is 15–65%, mean cover is 35%.

In this association, the herbaceous layer is open to intermittent and is codominated by *Centaurea melitensis* and *Brassica nigra*. *Bromus madritensis* usually occurs in this layer and *Avena fatua*, *Hirschfeldia incana*, and *Bromus diandrus* may also occasionally be found at relatively low cover. The shrub layer is open and often includes *Hazardia squarrosa, Salvia leucophylla,* and *Artemisia californica,* while *Malacothamnus fasciculatus, Encelia californica*, and *Eriogonum cinereum* are also sometimes present. The tree layer infrequently includes *Juglans californica* and *Quercus agrifolia* as sparse emergent trees.

***Brassica nigra-Centaurea melitensis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	56	1.1	0.2	6.0			
	SALE3	*Salvia leucophylla*	56	0.9	0.2	3.0			
	ARCA11	*Artemisia californica*	56	0.4	0.2	2.5			
	MAFA	*Malacothamnus fasciculatus*	33	1.2	1.0	7.5			
	ENCA	*Encelia californica*	33	0.1	0.2	0.2			
	ERCI5	*Eriogonum cinereum*	33	0.1	0.2	0.2			
	MALA6	*Malosma laurina*	22	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	22	0.3	0.2	2.5			
	BASA4	*Baccharis salicifolia*	22	0.3	0.2	2.5			
	ERFA2	*Eriogonum fasciculatum*	22	0.2	0.2	2.0			
	LOSC2	*Lotus scoparius*	22	0.01	0.2	0.2			
Herb									
	CEME2	*Centaurea melitensis*	100	11.3	3.0	28.0	X	X	X
	BRNI	*Brassica nigra*	100	7.9	2.5	20.0		X	X
	BRMA3	*Bromus madritensis*	56	1.9	1.0	11.0			X
	AVFA	*Avena fatua*	44	1.5	0.2	9.0			X
	HIIN3	*Hirschfeldia incana*	44	0.6	0.2	2.5			X
	BRDI3	*Bromus diandrus*	44	0.4	0.2	2.0			X
	BROMU	*Bromus*	33	1.9	2.5	7.5			
	BRHO2	*Bromus hordeaceus*	33	0.7	0.2	6.0			X
	DICA14	*Dichelostemma capitatum*	33	0.7	0.2	6.0			
	AVENA	*Avena*	33	0.6	0.2	2.5			X
	ERCI6	*Erodium cicutarium*	33	0.1	0.2	0.2			X
	HEFA	*Hemizonia fasciculata*	22	0.9	1.0	7.5			
	MEIN2	*Melilotus indicus*	22	0.6	2.0	3.0			X
	LECO12	*Leymus condensatus*	22	0.3	0.2	2.5			
	NALE2	*Nassella lepida*	22	0.3	0.2	2.5			
	LUSU3	*Lupinus succulentus*	22	0.2	0.2	2.0			
	PHCI	*Phacelia cicutaria*	22	0.1	0.2	1.0			
	MASA2	*Malacothrix saxatilis*	22	0.01	0.2	0.2			
	SOAS	*Sonchus asper*	22	0.01	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 1 of 9 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Centaurea melitensis, Brassica nigra, Bromus madritensis, Avena fatua, Hirschfeldia incana, Bromus diandrus, Bromus hordeaceus, Avena, Erodium cicutarium, Melilotus indicus, Sonchus

asper, Lactuca serriola, Silybum marianum, Anagallis arvensis, Carduus pycnocephalus, Cirsium vulgare, Galium aparine, Marrubium vulgare, Medicago polymorpha, Rumex crispus,

Samples Used in Description: (n = 9)
AA0152cc, AA0400cc, AA0463cc, rap0650, rap1402, rap1557, rap1585, rap1807, rap2915rlv

Comments:
Stands of this association are typically the result of high disturbance through grazing, fire, clearing, mechanical treatments, or a combination of the above. All three of the associations with mixtures of *Brassica nigra* and annual herbs and grasses may be considered closely related. They may ultimately be lumped into a single black mustard-weedy herbaceous association of the California annual grassland alliance. However, since analysis suggests these types do separate out at least floristically, we are maintaining their distinction here until further detailed releve-based sampling is done to determine their relationships. Based on the data from this report, this association seems to have a higher probability of having native herbaceous species than the other *Brassica nigra*-dominated associations in this alliance. This is the only association of this alliance where locally *Nassella lepida*, a native perennial grass, was found in > 20% constancy, as well as many forb species such as *Dichelostemma capitatum, Hemizonia fasciculata, Lupinus succulentus,* and *Phacelia cicutaria*.

Phases:
None

COMMON NAME	Black Mustard-Maltese Star Thistle Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *B. nigra and C. melitensis*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Bromus diandrus Herbaceous Association

Ripgut Brome Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50005

Local Description

Summary:
This herbaceous association occurs on flat to steep often northwest- or southwest-facing slopes at elevations between 31 and 613 m. *Bromus diandrus* is abundant in the herbaceous layer and *Brassica nigra* is often present at low cover. *Malosma laurina, Baccharis pilularis, Sambucus mexicana, Ceanothus megacarpus, Salvia mellifera,* and *Heteromeles arbutifolia* are occasionally found in the shrub layer at low cover, and *Quercus agrifolia* is infrequently found in the tree layer at low cover.

Distribution:
This association is sampled in the Eastern Urban, Western Fog Zone, Upper Elevation Santa Monica Mountains, Immediate Coast, Dry Inland, and Simi Hills Inland regions of the study area.

Environmental Description:
Elevation: range 31–613 m, mean 260.9 m
Aspect: variable, but most often southwest or northwest
Slope: range 0–40 degrees, mean 19.4 degrees
Topography (micro; macro): usually flat or undulating; variable
Litter Cover: range 35–60%, mean 47.5%
Small Rock Cover: range 0–30%, mean 9.4%
Large Rock Cover: range 0–45%, mean 5.6%
Bare Ground: range 1–62%, mean 21.6%
Parent Material: usually igneous or sedimentary, sometimes depositional
Soil Texture: moderately fine sandy or silty clay loam

Vegetation Description:
Stands of the *Bromus diandrus* Herbaceous Association form an open to continuous herbaceous layer (10–90%, mean 38.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–22%, mean 8.4%) at 0–5 m tall. Trees are infrequently emergent (0–10% cover, mean 1.3%) with hardwoods at 0–15 m tall and conifers at 0–10 m tall. Total vegetation cover is 15–90%, mean cover is 47.9%.

In this association, the herbaceous layer is open to continuous and *Bromus diandrus* is abundant. Other herbs occur at relatively low cover; for example, *Brassica nigra* is often included, and *Hirschfeldia incana* and *Centaurea melitensis* sometimes occur in this layer. The shrub layer occasionally includes *Malosma laurina, Baccharis pilularis, Sambucus mexicana, Ceanothus megacarpus, Salvia mellifera,* and *Heteromeles arbutifolia*. The tree layer infrequently includes *Quercus agrifolia* as an emergent.

***Bromus diandrus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	QUAG-T	*Quercus agrifolia*	23	0.4	0.2	3.0			
Shrub									
	MALA6	*Malosma laurina*	50	1.3	0.2	7.0			
	BAPI	*Baccharis pilularis*	32	0.8	0.2	7.0			
	SAME5	*Sambucus mexicana*	32	0.4	0.2	4.0			
	CEME	*Ceanothus megacarpus*	27	0.7	0.2	5.0			
	SAME3	*Salvia mellifera*	27	0.6	0.2	7.0			
	HEAR5	*Heteromeles arbutifolia*	27	0.5	0.2	4.0			
	ERFA2	*Eriogonum fasciculatum*	23	0.6	0.2	6.0			
	MIAU	*Mimulus aurantiacus*	23	0.2	0.2	2.5			
	ARCA11	*Artemisia californica*	23	0.2	0.2	3.0			
Herb									
	BRDI3	*Bromus diandrus*	68	26.4	4.0	90.0	X		X
	BRNI	*Brassica nigra*	55	0.7	0.2	5.0			X
	CEME2	*Centaurea melitensis*	36	1.2	0.2	10.0			X
	BROMU	*Bromus*	32	6.1	10.0	30.0			
	HIIN3	*Hirschfeldia incana*	32	0.7	0.2	5.0			X

Other Noteworthy Species:
Juglans californica was found in 3 of 22 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus diandrus, Brassica nigra, Centaurea melitensis, Hirschfeldia incana, Avena fatua, Bromus hordeaceus, Carduus pycnocephalus, Melilotus indicus, Erodium cicutarium, Marrubium vulgare, Erodium, Bromus madritensis, Piptatherum miliaceum, Malva parviflora, Nicotiana glauca, Silybum marianum, Vicia sativa, Acacia redolens, Avena barbata, Conium maculatum, Erodium botrys, Eucalyptus, Phalaris aquatica, Anagallis arvensis, Avena, Cirsium vulgare, Cistus, Lactuca serriola, Raphanus sativus, Rosmarinus officinalis, Sonchus oleraceus

Samples Used in Description: (n = 22)
AA0302cc, AA0409, AA0410, AA0810, AA0913, AA0968, rap0038, rap0203, rap0243, rap0371, rap0448, rap0634, rap0759, rap0842, rap1235, rap1319, rap1689, rap2337, rap2523rlv, rap2524rlv, rap2525rlv, rap2893rlv

Comments:
Although this common association of the California annual grassland/herbaceous alliance shares species with the *Brassica nigra* associations of the same alliance, it is overwhelmingly dominated by *Bromus diandrus.* The plots listed without *B. diandrus* in the summary table all have *Bromus* sp. listed (unidentified to species due to poor phenology) and are all likely to be *B. diandrus.* It remains to be seen how environmentally distinct this association is from the other weedy associations in the same alliance (e.g., those with *Brassica nigra*); however, it does seem to favor slightly wetter areas and slightly deeper soils than the *Brassica nigra* Alliance.

Phases:
None

COMMON NAME	Ripgut Brome Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *Bromus diandrus*, an invasive weed with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it has been widely observed (but not sampled) in other parts of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Bromus diandrus-Avena spp. Herbaceous Association

Ripgut Brome-Wild Oat Herbaceous Association
California Annual Grassland/Herbaceous Herbaceous Alliance

Mapping Code: 50007

Local Description

Summary:
This herbaceous association occurs on gentle to somewhat steep slopes of variable aspect at elevations between 15 and 550 m. *Bromus diandrus* is characteristically present in the herbaceous layer and usually codominates with *Avena fatua* or *A. barbata. Brassica nigra* is also usually found in this layer at low cover. *Hazardia squarrosa, Artemisia californica,* and *Lotus scoparius* are occasionally found in the shrub layer at low cover, and *Quercus lobata* infrequently occurs in the tree layer at low cover.

Distribution:
This association is sampled in the Immediate Coast, Upper Elevation Santa Monica Mountains, and Dry Inland regions of the study area.

Environmental Description:
Elevation: range 15–550 m, mean 293 m
Aspect: variable
Slope: range 2–15 degrees, mean 6.1 degrees
Topography (micro; macro): usually flat or undulating; variable
Litter Cover: range 20–60%, mean 37.5%
Small Rock Cover: range 0–30%, mean 7.2%
Large Rock Cover: range 0–2%, mean 0.3%
Bare Ground: range 1–74%, mean 28.9%
Parent Material: variable but frequently depositional or sedimentary
Soil Texture: variable, but often fine clay

Vegetation Description:
Stands of the *Bromus diandrus-Avena* spp. Herbaceous Association form an open to intermittent herbaceous layer (10–65%, mean 43.9%) at 0.01–1 m tall. The shrub layer is sparse to open (0–9%, mean 2.4%) at 0–5 m tall. Trees are infrequently emergent (0–1% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 13–70%, mean cover is 46.3%.

In this association, the herbaceous layer is open to intermittent, and *Bromus diandrus* is characteristically present and codominant with either *Avena fatua* or *A. barbata. Brassica nigra* is usually included in this layer at low cover while *Bromus madritensis, Bromus hordeaceus*, and *Marrubium vulgare* are occasionally present. Other forbs are occasionally present and sometimes abundant such as *Erodium botrys* and *Centaurea melitensis.* The shrub layer sometimes includes *Hazardia squarrosa, Artemisia californica,* and *Lotus scoparius.* The tree layer infrequently includes *Quercus lobata* as an emergent.

***Bromus diandrus-Avena* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	50	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	30	0.7	0.2	5.0			
	LOSC2	*Lotus scoparius*	30	0.4	0.2	3.0			
	BAPI	*Baccharis pilularis*	20	0.4	1.0	3.0			
	SALE3	*Salvia leucophylla*	20	0.01	0.2	0.2			
Herb									
	BRDI3	*Bromus diandrus*	90	9.8	1.0	20.0		X	X
	AVFA	*Avena fatua*	60	12.1	0.2	51.0			X
	BRNI	*Brassica nigra*	60	0.7	0.2	4.0			X
	AVBA	*Avena barbata*	40	3.3	6.0	12.0			X
	BRMA3	*Bromus madritensis*	40	2.3	0.2	10.0			X
	MAVU	*Marrubium vulgare*	40	0.6	0.2	5.0			X
	BRHO2	*Bromus hordeaceus*	40	0.4	0.2	3.0			X
	ERBO	*Erodium botrys*	30	6.3	3.0	35.0			X
	CEME2	*Centaurea melitensis*	30	1.9	0.2	17.0			X
	MEIN2	*Melilotus indicus*	30	0.2	0.2	1.0			X
	MEPO3	*Medicago polymorpha*	30	0.1	0.2	1.0			X
	FOVU	*Foeniculum vulgare*	30	0.1	0.2	0.2			X
	LEFI11	*Lessingia filaginifolia*	20	0.3	0.2	3.0			
	RASA2	*Raphanus sativus*	20	0.3	0.2	3.0			X
	ANAR	*Anagallis arvensis*	20	0.2	0.2	2.0			X
	HEGR7	*Heterotheca grandiflora*	20	0.2	0.2	2.0			
	HEFA	*Hemizonia fasciculata*	20	0.1	0.2	1.0			
	LUSU3	*Lupinus succulentus*	20	0.1	0.2	1.0			
	AMPS	*Ambrosia psilostachya*	20	0.01	0.2	0.2			
	DICA14	*Dichelostemma capitatum*	20	0.01	0.2	0.2			
	GNAPH	*Gnaphalium*	20	0.01	0.2	0.2			
	GRCA	*Grindelia camporum*	20	0.01	0.2	0.2			
	SOOL	*Sonchus oleraceus*	20	0.01	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Bromus diandrus, Avena fatua, Brassica nigra, Avena barbata, Bromus madritensis, Marrubium vulgare, Bromus hordeaceus, Erodium botrys, Centaurea melitensis, Melilotus indicus, Medicago polymorpha, Foeniculum vulgare, Raphanus sativus, Anagallis arvensis, Sonchus oleraceus, Lolium multiflorum, Avena, Hypochaeris, Cirsium vulgare, Vicia villosa, Euphorbia terracina, Rumex crispus, Silene gallica, Erodium, Erodium cicutarium, Erodium moschatum, Hirschfeldia incana, Malva parviflora, Nicotiana glauca, Sonchus, Sonchus asper, Vicia sativa

Samples Used in Description: (n = 10)
AA1074, rap0324, rap0397m, rap0849, rap0924, rap1328, rap2526rlv, rap2641rlv, rap2790rlv, rap2903rlv

Comments:
Of all the California annual grasslands dominated by nonnative annual grasses, those with *Avena* sp. and mixes of other species tend to have a higher proportion of native annuals. However, this dataset suggests that any given native herbaceous species tend to occur in only 20% or less of the stands.

Phases:
None

COMMON NAME	Ripgut Brome-Wild Oat Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Medium-Tall temperate annual grassland (This is debatable.)
ALLIANCE	California Annual Grassland/Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5—Note: These stands are generally strongly dominated by *Avena* sp. and *Bromus diandrus*, both invasive weeds with low conservation value; however, some stands may have conservation value due to the seasonal nature of the vegetation and the possibility of native species of limited range inhabiting these stands.

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. However, it is anecdotally known from much of cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Distichlis spicata-Ambrosia chamissonis Herbaceous Association

Salt Grass-Dune Burweed Herbaceous Association
***Distichlis spicata* Herbaceous Alliance**
Salt Grass Herbaceous Alliance

Mapping Code: 4511

Local Description

Summary:
This herbaceous association occurs on flat to somewhat steep, often northeast slopes at low elevations between 0 and 15 m. It is dominated by *Distichlis spicata* in the herbaceous layer, and *Ambrosia chamissonis* is characteristically present as a subdominant. *Atriplex lentiformis*, *Atriplex watsonii*, and *Suaeda taxifolia* are sometimes found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–15 m, mean 4 m
Aspect: variable, but often northeast
Slope: range 0–15 degrees, mean 3.7 degrees
Topography (micro; macro): frequently flat; lower to bottom
Litter Cover: no data
Small Rock Cover: range 0–25%, mean 11%
Large Rock Cover: range 0–1%, mean 0.2%
Bare Ground: range 10–70%, mean 52%
Parent Material: depositional
Soil Texture: sand

Vegetation Description:
Stands of the *Distichlis spicata-Ambrosia chamissonis* Herbaceous Association form a sparse to intermittent herbaceous layer (0–44%, mean 12.1%) at 0.01–1 m tall. The shrub layer is open to intermittent (1–49%, mean 11.7%) at 0.01–2 m tall. Total vegetation cover is 2–55%, mean cover is 23.4%.

In this association, the herbaceous layer is sparse to intermittent and is dominated by *Distichlis spicata*, and *Ambrosia chamissonis* is characteristically present usually as a subdominant. *Cakile maritima, Arundo donax*, and *Carpobrotus edulis* are often included in this layer at low cover. The shrub layer occasionally includes *Atriplex lentiformis*, *Atriplex watsonii*, *Suaeda taxifolia*, and *Coreopsis gigantea* at low cover.

***Distichlis spicata-Ambrosia chamissonis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ATLE	*Atriplex lentiformis*	43	0.5	0.2	2.0			
	SUCA	*Suaeda taxifolia*	29	0.4	1.0	2.0			
	ATWA	*Atriplex watsonii*	29	0.2	0.2	1.0			
	COGI	*Coreopsis gigantea*	29	0.1	0.2	0.2			
Herb									
	AMCH4	*Ambrosia chamissonis*	100	4.5	0.2	16.0		X	
	DISP	*Distichlis spicata*	86	13.2	0.2	43.0	X	X	
	CAMA	*Cakile maritima*	71	0.3	0.2	1.0			X
	ARDO4	*Arundo donax*	57	1.1	0.2	5.0			X
	CAED3	*Carpobrotus edulis*	57	0.2	0.2	1.0			X
	CACH13	*Camissonia cheiranthifolia*	43	0.2	0.2	1.0			
	CYDA	*Cynodon dactylon*	29	0.3	1.0	1.0			X
	ABMA2	*Abronia maritima*	29	0.1	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	29	0.1	0.2	0.2			

Other Noteworthy Species:
Abronia maritima was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-2. Global rank is G4?, and state rank is S3?. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Eriogonum crocatum was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Cakile maritima, Arundo donax, Carpobrotus edulis, Cynodon dactylon, Melilotus, Salsola tragus, Erodium, Foeniculum vulgare, Nicotiana glauca, Osteospermum, Pennisetum setaceum, Tetragonia tetragonioides

Samples Used in Description: (n = 7)
rap0869, rap0871, rap0970, rap0971, rap1199m, rap1271, rap2612

Comments:
Although not sampled anywhere outside of the study area, this association is likely to be relatively rare. However, it is not unusual for the two nominate species to co-occur in coastal settings throughout California where brackish to saline lagoons and other bodies of water exist adjacent to sand flats or dunes.

Phases:
None

COMMON NAME	Salt Grass-Dune Burweed Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland
ALLIANCE	*Distichlis spicata* Herbaceous Alliance (*Distichlis spicata* Tidal Herbaceous Alliance)
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S2

Global Description

Distribution:
This association is only sampled from the Santa Monica Mountains region. Anecdotal observation suggests it may occur northward at least to Marin County in northwest California, where brackish or saline lagoons and other bodies of water exist adjacent to sand flats or dunes (T. Keeler-Wolf personal observation).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Reid et al. 1999, Sawyer and Keeler-Wolf 1995

Distichlis spicata-Salicornia virginica-Jaumea carnosa Herbaceous Association

Salt Grass-Pickleweed-Marsh Jaumea Herbaceous Association
***Distichlis spicata* Herbaceous Alliance**
Salt Grass Herbaceous Alliance

Mapping Code: 4527

Local Description

Summary:
This herbaceous association occurs on flat to gently sloped ground at low elevations between 0 and 6 m. *Distichlis spicata* and *Jaumea carnosa* are codominant and characteristically present in the herbaceous layer, and *Salicornia virginica* is usually present and subdominant to codominant. *Frankenia salina* is characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–6 m, mean 3 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: 10% (one sample)
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 60–80%, mean 70%
Parent Material: depositional
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Distichlis spicata-Salicornia virginica-Jaumea carnosa* Herbaceous Association form an open to intermittent herbaceous layer (24–58%, mean 44.6%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–27%, mean 12.3%) at 0–2 m tall. Total vegetation cover is 51–70%, mean cover is 58.4%.

In this association, the herbaceous layer is open to intermittent, and *Jaumea carnosa* is characteristically present. *Distichlis spicata* and *Salicornia virginica* are also usually present. *Jaumea* and *Distichlis* are codominant, while *Salicornia* is subdominant to codominant. *Cuscuta salina*, *Melilotus indicus*, *Monanthochloe littoralis*, *Rumex crispus*, *Scirpus californicus*, and *Typha* spp. are also occasionally found in this layer at low cover. The shrub layer characteristically includes *Frankenia salina* at low cover, while *Batis maritima, Suaeda taxifolia,* and *Atriplex lentiformis* are also sometimes present.

***Distichlis spicata-Salicornia virginica-Jaumea carnosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	86	2.7	0.2	5.0	X		
	BAMA5	*Batis maritima*	29	2.3	1.0	15.0			
	SUCA	*Suaeda taxifolia*	29	0.9	1.0	5.0			
	ATLE	*Atriplex lentiformis*	29	0.6	1.0	3.0			
Herb									
	JACA4	*Jaumea carnosa*	100	22.3	4.0	55.0	X		
	DISP	*Distichlis spicata*	71	14.6	1.0	43.0			
	SAVI	*Salicornia virginica*	57	9.0	7.0	23.0			
	SALIC	*Salicornia*	43	2.4	3.0	10.0			
	CUSA	*Cuscuta salina*	43	0.6	1.0	2.0			
	MEIN2	*Melilotus indicus*	29	0.7	1.0	4.0		X	
	MOLI	*Monanthochloe littoralis*	29	0.5	0.2	3.0			
	RUCR	*Rumex crispus*	29	0.2	0.2	1.0		X	
	SCCA	*Scirpus californicus*	29	0.1	0.2	0.2			
	TYPHA	*Typha*	29	0.1	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 2 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Melilotus indicus, Rumex crispus, Carpobrotus edulis, Oxalis pes-caprae

Samples Used in Description: (n = 7)
rap0904m, rap1012, rap1023, rap2647, rap2707, rap2772, rap2773

Comments:
The variation in the cover of *Distichlis* and *Salicornia* suggests that this association is perhaps better considered a part of a mixed alliance of *S. virginica* and *D. spicata*. However, at this point we remain conservative and select the *Distichlis spicata* Alliance because of the continuously higher cover of *Distichlis* and other nonwoody herbs such as *Jaumea carnosa*. There are several other plant associations listed for California that contain *D. spicata, J. carnosa,* and *S. virginica*. All have been placed in the *D. spicata* Alliance (e.g., *Distichlis spicata-Frankenia salina-Jaumea carnosa* from Point Reyes and *Jaumea carnosa-Distichlis spicata* from southern California).

This association is the most typical of the "upper" salt marsh associations locally. Its ecological position is typically slightly more elevated and more toward the landward edge of the marsh relative to such associations as the *S. virginica*-Algae and the *Salicornia virginica-Frankenia salina-Suaeda taxifolia* Association. During low tides and in the hot summer months, this association regularly dries out and probably develops higher soil salinity than the adjacent regularly flooded tidal marsh. In some cases field crews were unable to determine the identity of *Salicornia* sp. in the samples, thus listing *Salicornia* sp. with *S. virginica*. Combined, these two taxa occurred in nearly 100% of the samples. Further, the field crews placed *Salicornia* in the shrub layer upon doing species cover and total shrub cover estimates, although many species in

this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
Salicornia virginica-Jaumea carnosa-Distichlis spicata (Pickleweed-Marsh Jaumea-Salt Grass) Phase [4527]
Distichlis spicata-Jaumea carnosa (Salt Grass-Marsh Jaumea) Phase [4514]

COMMON NAME	Salt Grass-Pickleweed-Marsh Jaumea-Herbaceous Association
FORMATION CLASS	V. Herbaceous vegetation
FORMATION SUBCLASS	V.A. Perennial graminoid vegetation
FORMATION GROUP	V.A.5. Temperate or subpolar grassland
FORMATION SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION NAME	V.A.5.N.i. Intermittently flooded temperate or subpolar grassland
ALLIANCE NAME	*Distichlis spicata* Intermittently Flooded Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It appears closely related if not identical to stands defined elsewhere in California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
NatureServe et al. 2003a, Peniado et al. 1994, Zedler 1982

Euphorbia terracina Herbaceous Stands

Geraldton Carnation Weed Herbaceous Stands

Mapping Code: 4771

Local Description

Summary:
Three herbaceous stands occur on gentle to somewhat steep slopes of variable aspect at low elevations between 5 and 48 m. It is dominated by *Euphorbia terracina* in the herbaceous layer, and *Brassica nigra* and *Bromus diandrus* are characteristically present at lower cover. *Ricinus communis* is often found in the shrub layer at low cover, and *Platanus racemosa* is often in the tree layer at low cover.

Distribution:
This vegetation type is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: range 5–48 m, mean 26 m
Aspect: variable
Slope: range 2–22 degrees, mean 9.7 degrees
Topography (micro; macro): variable; most often lower or bottom
Litter Cover: 40%
Small Rock Cover: range 0–10%, mean 5%
Large Rock Cover: no data
Bare Ground: range 20–35%, mean 27.5%
Parent Material: depositional
Soil Texture: moderately fine clay

Vegetation Description:
Stands of *Euphorbia terracina* form an intermittent to continuous herbaceous layer (50–80%, mean 65.3%) at 0.01–2 m tall. The shrub layer is sparse to open (0–1%, mean 0.7%) at 0.01–1 m tall. Trees are often emergent (0–5% cover, mean 2%) with hardwoods at 5–15 m tall. Total vegetation cover is 51–80%, mean cover is 67%.

The herbaceous layer is intermittent to continuous and is dominated by *Euphorbia terracina*, while *Brassica nigra* and *Bromus diandrus* are characteristically present at low cover. *Foeniculum vulgare, Silybum marianum*, and *Hordeum* sp. are usually included in this layer. The shrub layer is sparse and often includes *Ricinus communis*, but other shrubs such as *Myoporum laetum, Artemisia californica, Baccharis pilularis, Encelia californica, Sambucus mexicana*, and Opuntia sp. are sometimes present. The tree layer may include *Platanus racemosa* and may occasionally include *Quercus agrifolia* and *Juglans californica* as emergent trees.

***Euphorbia terracina* Stands**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	PLRA	*Platanus racemosa*	67	1.7	0.2	5.0	X		
	QUAG-T	*Quercus agrifolia*	33	0.3	1.0	1.0			
Tree Understory									
	JUCA-M	*Juglans californica*	33	0.1	0.2	0.2			
	QUAG-M	*Quercus agrifolia*	33	0.1	0.2	0.2			
Shrub									
	RICO3	*Ricinus communis*	67	0.1	0.2	0.2			X
	MYLA5	*Myoporum laetum*	33	0.3	1.0	1.0			X
	ARCA11	*Artemisia californica*	33	0.1	0.2	0.2			
	BAPI	*Baccharis pilularis*	33	0.1	0.2	0.2			
	ENCA	*Encelia californica*	33	0.1	0.2	0.2			
	OPUNT	*Opuntia*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	EUTE10	*Euphorbia terracina*	100	56.0	25.0	78.0	X	X	X
	BRNI	*Brassica nigra*	100	5.0	1.0	13.0		X	X
	BRDI3	*Bromus diandrus*	100	0.5	0.2	1.0		X	X
	FOVU	*Foeniculum vulgare*	67	0.1	0.2	0.2			X
	HORDE	*Hordeum*	67	0.1	0.2	0.2			
	SIMA3	*Silybum marianum*	67	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	33	1.7	5.0	5.0			X
	CAED3	*Carpobrotus edulis*	33	1.0	3.0	3.0			X
	MEIN2	*Melilotus indicus*	33	0.7	2.0	2.0			X
	AVENA	*Avena*	33	0.1	0.2	0.2			X
	AVBA	*Avena barbata*	33	0.1	0.2	0.2			X
	BRMAR	*Bromus madritensis* ssp. *rubens*	33	0.1	0.2	0.2			X
	CHAM	*Chenopodium ambrosioides*	33	0.1	0.2	0.2			X
	ERODI	*Erodium*	33	0.1	0.2	0.2			X
	HETE5	*Hesperocnide tenella*	33	0.1	0.2	0.2			
	LOLIU	*Lolium*	33	0.1	0.2	0.2			X
	MAPA5	*Malva parviflora*	33	0.1	0.2	0.2			X
	OXPE	*Oxalis pes-caprae*	33	0.1	0.2	0.2			X
	PACA9	*Papaver californicum*	33	0.1	0.2	0.2			
	PIMI3	*Piptatherum miliaceum*	33	0.1	0.2	0.2			X
	RUUR	*Rubus ursinus*	33	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 1 of 3 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Euphorbia terracina, Brassica nigra, Bromus diandrus, Foeniculum vulgare, Ricinus communis, Silybum marianum, Bromus madritensis, Carpobrotus edulis, Melilotus indicus, Myoporum

laetum, Avena, Avena barbata, Bromus madritensis ssp. *rubens, Chenopodium ambrosioides, Erodium, Lolium multiflorum, Malva parviflora, Oxalis pes-caprae, Piptatherum miliaceum*

Samples Used in Description: (n = 3)
rap1006, rap1027, rap2535rlv

Comments:
Euphorbia terracina is a dangerously invasive nonnative species, which has taken over several coastal terraces and slopes near Malibu and other coastal areas of the Santa Monica Mountains. It tends to form such dense stands that it excludes other herbaceous species and probably native woody species. It is not considered extensive enough, nor sufficiently regionally established, to be considered an alliance yet.

Phases:
None

COMMON NAME	Geraldton Carnation Weed Stands
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation.
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural perennial forb vegetation
FORMATION	V.B.2.N.a. Tall temperate or subpolar perennial forb vegetation
ALLIANCE	*Euphorbia terracina* Herbaceous Stands
CLASSIFICATION CONFIDENCE LEVEL	3
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic

Global Description

Distribution:
This vegetation is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000

Foeniculum vulgare Herbaceous Alliance

Fennel Herbaceous Alliance

Mapping Code: 4760

Local Description

Summary:
This herbaceous alliance occurs on somewhat steep to flat slopes of variable aspect at low elevations between 140 and 178 m. It is dominated by *Foeniculum vulgare* in the herbaceous layer. *Baccharis pilularis* and *Rhus integrifolia* are often found in the shrub layer at low cover, and *Schinus molle* and *Juglans californica* are occasionally present in the tree layer at low cover.

Distribution:
This alliance is sampled in the Dry Inland and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 140–178 m, mean 160 m
Aspect: variable
Slope: range 15–15 degrees, mean 15 degrees
Topography (micro; macro): variable; lower to mid
Litter Cover: range 55–80%, mean 67.5%
Small Rock Cover: range 1–15%, mean 8%
Large Rock Cover: range 0–8%, mean 4%
Bare Ground: range 15–19%, mean 17%
Parent Material: igneous or depositional
Soil Texture: fine clay

Vegetation Description:
Stands of this herbaceous alliance form an open to continuous herbaceous layer (25–69%, mean 37.3%) at 0.5–5 m tall. The shrub layer is sparse to open (0–15%, mean 5.3%) at 0.5–5 m tall. Trees sometimes are emergent (0–2% cover, mean 0.8%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–70%, mean cover is 43.5%.

In this alliance, the herbaceous layer is open to continuous and is dominated by *Foeniculum vulgare. Brassica nigra* and *Carduus pycnocephalus* are occasionally included in this layer. The shrub layer is open and frequently includes *Baccharis pilularis* and *Rhus integrifolia*. Occasionally, *Heteromeles arbutifolia, Malacothamnus fasciculatus, Mimulus aurantiacus,* and *Salvia leucophylla* are present in the shrub layer. The tree layer sometimes includes *Schinus molle* and *Juglans californica* as emergent trees.

Foeniculum vulgare Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	SCMO	*Schinus molle*	25	0.6	2.5	2.5			X
	JUCA-T	*Juglans californica*	25	0.3	1.0	1.0			
Tree Understory									
	JUCA-M	*Juglans californica*	25	0.1	0.2	0.2			
	SCMO	*Schinus molle*	25	0.1	0.2	0.2			X
Shrub									
	BAPI	*Baccharis pilularis*	75	0.3	0.2	1.0		X	
	RHIN2	*Rhus integrifolia*	50	1.6	2.5	4.0	X		
	HEAR5	*Heteromeles arbutifolia*	25	0.6	2.5	2.5			
	MAFA	*Malacothamnus fasciculatus*	25	0.6	2.5	2.5			
	MIAU	*Mimulus aurantiacus*	25	0.6	2.5	2.5			
	SALE3	*Salvia leucophylla*	25	0.6	2.5	2.5			
	SAME5	*Sambucus mexicana*	25	0.6	2.5	2.5			
	RICO3	*Ricinus communis*	25	0.3	1.0	1.0			X
	SALA6-M	*Salix lasiolepis*	25	0.1	0.2	0.2			
Herb									
	FOVU	*Foeniculum vulgare*	100	29.4	7.5	68.0	X	X	X
	BRNI	*Brassica nigra*	50	2.3	2.0	7.0			X
	CAPY2	*Carduus pycnocephalus*	50	1.3	0.2	5.0			X
	LECO12	*Leymus condensatus*	25	1.9	7.5	7.5			
	UNHE	Unknown herbs/forbs	25	1.9	7.5	7.5			
	BRDI3	*Bromus diandrus*	25	0.3	1.0	1.0			X
	MASA2	*Malacothrix saxatilis*	25	0.1	0.2	0.2			
	URDI	*Urtica dioica*	25	0.1	0.2	0.2			

Other Noteworthy Species:
Juglans californica was found in 2 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Foeniculum vulgare, Brassica nigra, Carduus pycnocephalus, Schinus molle, Bromus diandrus, Ricinus communis, Schinus molle

Samples Used in Description: (n = 4)
AA0350cc, rap0120m, rap2248, rap2249

Comments:
Common fennel stands are now widespread in coastal central and southern California. They have caused concern on Santa Cruz Island (R. Klinger 1998, personal communication) because of the difficulty of removing them and being replaced by other weedy species. Stands have not been adequately sampled in any part of California to determine individual associations.

Phases:
None

COMMON NAME	Fennel Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural perennial forb vegetation
FORMATION	V.B.2.N.a. Tall temperate or subpolar perennial forb vegetation
ALLIANCE	*Foeniculum vulgare* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, invasive exotic weed

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains region and also from Suisun Marsh in Solano County. However, it commonly occurs in open to continuous stands in the central and south coast ranges and Santa Cruz Island.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000, Keeler-Wolf and Vaghti 2000

Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia spp. Herbaceous Association

Alkali Heath-California Sea Lavender-Shore Grass-Pickleweed Herbaceous Association
***Frankenia salina* Herbaceous Alliance**
Alkali Heath Herbaceous Alliance

Mapping Code: 4551

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 1 and 3 m. *Monanthochloe littoralis* and *Distichlis spicata* are characteristically abundant and codominant with *Salicornia virginica* in the herbaceous layer. *Limonium californicum* is characteristically present and subdominant. *Frankenia salina* is characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–3 m, mean 1.8 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 10–10%, mean 10%
Parent Material: no data
Soil Texture: fine clay to sand

Vegetation Description:
Stands of the *Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Herbaceous Association form an open to intermittent herbaceous layer (6–60%, mean 43.4%) at 0.01–0.5 m tall. The shrub layer is sparse to intermittent (0–47%, mean 13.2%) at 0–0.5 m tall. Total vegetation cover is 47–75%, mean cover is 56.6%.

In this association, the herbaceous layer is open to intermittent, and *Monanthochloe littoralis* and *Distichlis spicata* are characteristically present and codominant with *Salicornia virginica*. *Limonium californicum* is also characteristically present as a subdominant, and *Jaumea carnosa* is occasionally included in this layer. The shrub layer characteristically includes *Frankenia salina*, and it frequently includes *Suaeda taxifolia* and *Batis maritima*.

***Frankenia salina-Limonium californicum-Monanthochloe littoralis-Salicornia* spp. Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	100	17.0	5.0	20.0	X	X	
	SUCA	*Suaeda taxifolia*	80	5.8	3.0	15.0		X	
	BAMA5	*Batis maritima*	80	1.1	0.2	4.0		X	
	ATLE	*Atriplex lentiformis*	40	0.6	0.2	3.0			
	ATRIP	*Atriplex*	20	0.4	2.0	2.0			
	COGI	*Coreopsis gigantea*	20	0.01	0.2	0.2			
	OPLI3	*Opuntia littoralis*	20	0.01	0.2	0.2			
Herb									
	MOLI	*Monanthochloe littoralis*	100	7.9	0.2	22.0	X	X	
	DISP	*Distichlis spicata*	100	7.6	0.2	20.0	X	X	
	LICA5	*Limonium californicum*	100	2.6	0.2	5.0		X	
	SAVI	*Salicornia virginica*	80	10.2	7.0	17.0		X	
	SASU2	*Salicornia subterminalis*	40	2.0	0.2	10.0			
	JACA4	*Jaumea carnosa*	40	1.4	2.0	5.0			
	TRCO4	*Triglochin concinnum*	20	1.0	5.0	5.0			
	SABI	*Salicornia bigelovii*	20	0.2	1.0	1.0			
	CUSA	*Cuscuta salina*	20	0.01	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 4 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 5)
rap0866, rap0867m, rap0879, rap0880, rap0908

Comments:
This association has only been sampled from the study area, but it is likely to occur in other coastal salt marshes of southern California and adjacent Baja California, Mexico. It is closely related to several other coastal salt marsh associations in the *Salicornia virginica* Alliance. Further analysis of more sample data from other areas will be necessary to determine whether this association of the alkali heath alliance should remain a separate entity. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME Alkali Heath-California Sea Lavender-Shore Grass-Pickleweed Herbaceous Association

SYNONYM None

PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Frankenia salina* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
More northerly stands of the *Frankenia salina* Alliance have been sampled in Suisun Marsh (Solano County, California), but these stands did not have *Limonium californicum* or *Monanthochloe littoralis* associated with them. In general, stands dominated by *Frankenia salina* are less regularly flooded than stands of *Salicornia virginica* and occur on the outer margins of coastal marshes and other saline wetlands.

References:
UCB 2004 Jepson Online Interchange For California Floristics, developed and maintained within the Jepson Flora Project (JFP) at the University of California and Jepson Herbaria (UC/JEPS), University of California, Berkeley (http://ucjeps.berkeley.edu/interchange.html), NatureServe 2005 NatureServe explorer; and an online encyclopedia of life http://www.natureserve.org/explorer/

Juncus effusus Herbaceous Alliance

Common Rush Herbaceous Alliance

Mapping Code: 4330

Local Description

Summary:
One stand of this herbaceous vegetation occurs on a flat surface at low elevation (3 m). It is dominated by *Juncus effusus* in the herbaceous layer, with likely identification as *J. effusus* var. *brunneus* or *J. effusus* var. *pacificus.* Shrub species include *Myoporum laetum* and *Baccharis pilularis.* Emergent tree species include *Washingtonia* (introduced).

Distribution:
This alliance is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: 3 m
Aspect: flat/none
Slope: 0 degrees
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: alluvium/dune
Soil Texture: sand

Vegetation Description:
One stand of the *Juncus effusus* Herbaceous Alliance forms an intermittent herbaceous layer (58%) at 0.5–1 m tall. The shrub layer is open (7%) at 0.5–2 m tall. Emergent trees are sparsely occurring (1%) with mainly hardwoods. Total vegetation cover is 65%.

In this alliance, the herbaceous layer is dominated by *Juncus,* likely *J. effusus* var. *brunneus* or *J. effusus* var. *pacificus.* Other graminoids and forbs occur in this layer at relatively low cover, including nonnative *Carpobrotus edulis.* The shrub layer is open, and *Myoporum laetum* and *Baccharis pilularis* exhibit low cover. The tree layer is sparse and includes *Washingtonia* (introduced).

Juncus effusus Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Understory									
	WASHI	*Washingtonia*	100	1.0	1.0	1.0	X	X	X
Shrub									
	MYLA5	*Myoporum laetum*	100	4.0	4.0	4.0	X	X	X
	BAPI	*Baccharis pilularis*	100	3.0	3.0	3.0	X	X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	ATLE	*Atriplex lentiformis*	100	0.2	0.2	0.2		X	
	BASA4	*Baccharis salicifolia*	100	0.2	0.2	0.2		X	
	NIGL	*Nicotiana glauca*	100	0.2	0.2	0.2		X	X
Herb									
	JUNCU	*Juncus (effusus)*	100	55.0	55.0	55.0	X	X	
	CAED3	*Carpobrotus edulis*	100	1.0	1.0	1.0		X	X
	BRNI	*Brassica nigra*	100	0.2	0.2	0.2		X	X
	CORTA	*Cortaderia*	100	0.2	0.2	0.2		X	X
	PESE3	*Pennisetum setaceum*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Myoporum laetum, Carpobrotus edulis, Brassica nigra, Cortaderia, Nicotiana glauca, Pennisetum setaceum

Samples Used in Description: (n = 1)
rap1198m

Comments:
This stand was assessed at a distance with binoculars (stand occurred at a military firing range); thus, more information on species composition is needed to fully characterize this vegetation. This type may occur on a smaller scale on the immediate coast at seeps along or below coastal bluffs.

Phases:
None

COMMON NAME	Rush Herbaceous Stand
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.k. Seasonally flooded temperate or subpolar grassland
ALLIANCE	*Juncus effusus* Herbaceous Stand
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	G4S4?

Global Description

Distribution:
Stands of various *Juncus* species occur in California including *Juncus mexicanus, J. balticus,* and *J. effusus. Juncus effusus* Alliance is found in most of the southeast states and elsewhere, although the full range in North America is incomplete. It is also found in the Pacific Northwest from British Columbia south to California. A *Juncus effusus* var. *brunneus* Association has been found within a few kilometers of the coast in the vicinity of the Point Reyes National Seashore as well as from the Puget Trough region of Washington and British Columbia. Also, a *J. effusus* Alliance with *J. e. pacificus* has been identified in inland San Diego County.

Nations:
United States, Canada

States or Provinces:
United States: AL, AR, CA, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA, WA and Canada, British Columbia. However, full distribution is not known in North America.

Environmental Description:
In Marin County, *Juncus effusus* var. *brunneus* Association was observed in small stands (under 2 ha.) in seasonally saturated soils within flats, depressions, or gentle slopes of all aspects. Stands prefer basins, bottoms, and plains, which are saturated during the rainy season and usually hold moist soils (sandy loams) most of the growing season. *Juncus effusus* stands are often able to persist in a degraded form in heavily grazed pastures where species associates are largely nonnative. In San Diego County, *Juncus effusus* var. *pacificus* stands occurred as small stands in artificially created stock ponds, riparian features, minor depressions/draws, and wet meadows/seeps. Across the country, J*uncus effusus* has a wide ecological amplitude, and additional alliances with different hydrologies may need to be defined. It is found in marsh habitats that vary greatly in size, situation, geographical location, species composition, and naturalness. Some are beaver-made or human-made impoundments.

Vegetation Description:
This alliance is currently broadly and literally defined, based on dominance by *Juncus effusus.* In Marin County, *Juncus effusus* var. *brunneus* has been found dominant, and other species at low cover may include *Potentilla anserina* var. *pacifica*, *Lolium perenne, Holcus lanatus*, *Trifolium wormskioldii, Trifolium repens*, *Equisetum telmateia braunii, Vicia sp* and/or *Vulpia* sp. In San Diego County, *Juncus effusus* var. *pacificus* was found dominant with *Urtica dioica*, while *Juncus mexicanus* and *Typha latifolia* are present in low cover. *Calocedrus decurrens* or *Salix* spp. are found as emergent trees. Across the country, associated species may include *Andropogon glomeratus, Cyperus* spp., *Typha latifolia, Scirpus cyperinus, Triadenum walteri, Apios americana*, and *Galium aparine*.

Comments:
Identification of the *Juncus* to subspecies is needed within the Santa Monica Mountains region before this alliance can be related to other *Juncus effusus* stands in the state and beyond.

References:
Evens and San 2005, NatureServe 2005, NatureServe et al. 2003a

Lepidium latifolium Herbaceous Association

Broad-Leaved Pepperweed Herbaceous Association
***Lepidium latifolium* Herbaceous Alliance**
Broad-Leaved Pepperweed Herbaceous Alliance

Mapping Code: 4780

Local Description

Summary:
One stand of this herbaceous association occurs on a gentle slope at low elevation (225 m). It is dominated by *Lepidium latifolium* in the herbaceous layer. Other herbs may also be present and are subdominant to low in cover such as *Hirschfeldia incana, Conium maculatum,* and *Bromus madritensis. Baccharis salicifolia* and *B. pilularis* are found in the shrub layer at low cover and, in the single sample, *Fraxinus velutina* and *Quercus lobata* are in the tree layer as sparse emergent trees.

Distribution:
This association is sampled in the Lower Elevation Inland Santa Monica Mountains region of the study area.

Environmental Description:
Elevation: 225 m
Aspect: variable
Slope: 2 degrees
Topography (micro; macro): undulating; bottom to lower
Litter Cover: 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: medium to very fine loamy sand

Vegetation Description:
One stand of *Lepidium latifolium* Herbaceous Association forms an intermittent herbaceous layer (54%) at 0.5–1 m tall. The shrub layer is sparse (1%) at 0–2 m tall. Trees are emergent (< 0.2%) with hardwoods at 5–10 m tall. Total vegetation cover is 63–63%, mean cover is 63%.

In this association, the herbaceous layer is intermittent and is dominated by *Lepidium latifolium. Hirschfeldia incana*, *Bromus madritensis, Conium maculatum*, and *Silybum marianum* are also included in this layer and may be subdominant to low in cover. The shrub layer includes *Baccharis salicifolia* and *B. pilularis* at low cover. The tree layer includes *Fraxinus velutina* and *Quercus lobata* as sparse emergent trees.

***Lepidium latifolium* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Tree Overstory									
	FRVE2	*Fraxinus velutina*	100	0.2	0.2	0.2	X	X	
	QULO-T	*Quercus lobata*	100	0.2	0.2	0.2	X	X	
Shrub									
	BASA4	*Baccharis salicifolia*	100	1.0	1.0	1.0		X	
	BAPI	*Baccharis pilularis*	100	0.2	0.2	0.2		X	
	SAME5	*Sambucus mexicana*	100	0.2	0.2	0.2		X	
Herb									
	HIIN3	*Hirschfeldia incana*	100	18.0	18.0	18.0	X	X	X
	BRMA3	*Bromus madritensis*	100	1.0	1.0	1.0		X	X
	COMA2	*Conium maculatum*	100	1.0	1.0	1.0		X	X
	LEPID	*Lepidium*	100	40.0	40.0	40.0	X	X	
	SIMA3	*Silybum marianum*	100	1.0	1.0	1.0		X	X
	ARDO3	*Artemisia douglasiana*	100	0.2	0.2	0.2		X	
	RUCR	*Rumex crispus*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Hirschfeldia incana, Bromus madritensis, Conium maculatum, Silybum marianum, Rumex crispus

Samples Used in Description: (n = 1)
rap2686

Comments:
These stands are made up of the dangerously invasive exotic weed *Lepidium latifolium*, which has proven very difficult to remove. Extensive stands can be found along Madea Creek and Paramount Ranch. These were not sampled because native vegetation is currently being restored and the *Lepidium* eradicated.

Phases:
None

COMMON NAME	Broad-Leaved Pepperweed Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Lepidium latifolium* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, this is an invasive weedy association.

Global Description

Distribution:
This vegetation type has not been identified as an alliance in the National Vegetation Classification System. According to the NRCS PLANTS database (http://plants.usda.gov/), it has been listed as a State Noxious Weed for 43 states.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
Associations of *Lepidium latifolium* as well as *Salix gooddingii* and *Baccharis pilularis* alliances with high cover of *Lepidium latifolium* in the understory have been defined from San Diego County. They occur in riparian settings (e.g., San Dieguito River watershed). Other strongly herbaceous-dominated stands of *Lepidium latifolium* have been described from saline and brackish marshes of northern California.

References:
Bossard et al. 2000, Evens and San 2005, Keeler-Wolf and Vaghti 2000

Leymus condensatus Herbaceous Association

Giant Wild Rye Herbaceous Association
***Leymus condensatus* Herbaceous Alliance**
Giant Wild Rye Herbaceous Alliance

Mapping Code: 4041

Local Description

Summary:
This herbaceous association occurs on somewhat steep to steep often northerly slopes at low elevations between 25 and 503 m. It is dominated by *Leymus condensatus* in the herbaceous layer, though sometimes nonnative species can codominate with this native grass. *Salvia leucophylla* is usually found in the shrub layer at low cover, and *Juglans californica, Quercus agrifolia,* and *Sambucus mexicana* infrequently occur in the tree or tall shrub layer at low cover.

Distribution:
This association is sampled in the Dry Inland, Immediate Coast, Lower Elevation Inland Santa Monica Mountains, Upper Elevation Santa Monica Mountains, and Western Fog Zone regions of the study area.

Environmental Description:
Elevation: range 25–503 m, mean 352.1 m
Aspect: variable, but often northwest and northeast
Slope: range 15–38 degrees, mean 30 degrees
Topography (micro; macro): variable; variable, but often lower to mid
Litter Cover: range 25–75%, mean 50%
Small Rock Cover: range 0–15%, mean 6%
Large Rock Cover: range 0–2%, mean 0.5%
Bare Ground: range 5–55%, mean 22%
Parent Material: frequently sedimentary
Soil Texture: moderately fine silty clay loam

Vegetation Description:
Stands of the *Leymus condensatus* Herbaceous Association form an open to intermittent herbaceous layer (20–62%, mean 39.7%) at 0.01–2 m tall. The shrub layer is sparse to open though sometimes intermittent (0–35%, mean 8.6%) at 0–5 m tall. Trees are infrequently emergent (0–7% cover, mean 0.9%) with hardwoods at 0–10 m tall. Total vegetation cover is 30–65%, mean cover is 48.8%.

In this association, the herbaceous layer is open to intermittent and is dominated by *Leymus condensatus.* However, nonnative grasses and forbs may be present and subdominant to codominant. For example, nonnative *Brassica nigra* is often included in this layer. Nonnatives *Bromus diandrus* and *Avena fatua* occasionally occur, as does the native forb *Malacothrix saxatilis.* The shrub layer usually includes *Salvia leucophylla* and *Sambucus mexicana, Artemisia californica, Malacothamnus fasciculatus, Hazardia squarrosa,* and *Eriogonum cinereum* are occurring occasionally. The tree layer infrequently includes *Juglans californica, Quercus agrifolia,* and *Sambucus mexicana* as sparse emergent trees.

***Leymus condensatus* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALE3	*Salvia leucophylla*	67	1.2	0.2	8.0			
	SAME5	*Sambucus mexicana*	50	1.1	0.2	5.0			
	ARCA11	*Artemisia californica*	50	0.5	0.2	4.0			
	MAFA	*Malacothamnus fasciculatus*	33	1.2	0.2	8.0			
	HASQ2	*Hazardia squarrosa*	29	0.4	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	25	0.4	0.2	5.0			
	MALA6	*Malosma laurina*	21	0.7	1.0	7.0			
	TODI	*Toxicodendron diversilobum*	21	0.4	0.2	4.0			
	RHOV	*Rhus ovata*	21	0.1	0.2	1.0			
Herb									
	LECO12	*Leymus condensatus*	100	24.0	6.0	48.0	X	X	
	BRNI	*Brassica nigra*	58	2.6	0.2	12.0			X
	BRDI3	*Bromus diandrus*	38	5.1	3.0	25.0			X
	MASA2	*Malacothrix saxatilis*	29	0.2	0.2	2.0			
	AVFA	*Avena fatua*	25	2.9	1.0	23.0			X
	HIIN3	*Hirschfeldia incana*	21	1.0	0.2	12.0			X
	CEME2	*Centaurea melitensis*	21	0.7	0.2	8.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Juglans californica was found in 2 of 24 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Bromus diandrus, Avena fatua, Hirschfeldia incana, Centaurea melitensis, Carduus pycnocephalus, Lactuca serriola, Bromus hordeaceus, Erodium cicutarium, Bromus madritensis, Marrubium vulgare, Nicotiana glauca, Avena, Foeniculum vulgare, Galium aparine, Lolium multiflorum, Melilotus indicus, Silybum marianum, Tropaeolum majus

Samples Used in Description: (n = 24)
AA0316cc, AA1103, AA1113, rap0466m, rap0983, rap1300, rap1316, rap1365, rap1460, rap1461, rap1499, rap1500m, rap1714m, rap1810, rap1816, rap1845, rap1848, rap1890, rap1924, rap1940, rap2006, rap2013m, rap2129, rap2301

Comments:
This association is the first to be defined from this alliance. The alliance and this association tend to be short lived because they are stimulated by fire and are fairly quickly taken over by native shrubs of the coastal sage scrub zone following fire. Keeley 2002 has suggested that *Leymus condensatus* was one of the species whose abundance was maintained by Native American burning. In the SAMO mapping area, *Leymus* does occur after fires; however, it may persist

independently of fire in areas of human disturbance and urban runoff or in areas of coastal sage scrub where natural slumping and seepage occur.

Phases:
None

COMMON NAME	Giant Wild Rye Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.a. Tall sod temperate grassland
ALLIANCE	*Leymus condensatus* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is likely to occur sporadically throughout central and southern coastal California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Keeley 2002

Leymus triticoides Herbaceous Alliance

Creeping Wild Rye Herbaceous Alliance

Mapping Code: 4030

Local Description

Summary:
Two stands of this herbaceous alliance occur on gentle to somewhat steep northeast and southeast slopes at low elevations between 224 and 305 m. They are dominated by *Leymus triticoides* in the herbaceous layer. *Baccharis pilularis, Baccharis salicifolia, Hazardia squarrosa,* and *Sambucus mexicana* are found in the shrub layer at low cover.

Distribution:
This association is sampled in the Dry Inland and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 224–305 m, mean 264.5 m
Aspect: northeast and southeast
Slope: range 2–20 degrees, mean 11 degrees
Topography (micro; macro): flat; lower
Litter Cover: range 30–90%, mean 60%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: fine silty clay

Vegetation Description:
Stands of this herbaceous alliance form a continuous herbaceous layer (75-80%, mean 77.5%) at 0.01-0.5 m tall. The shrub layer is sparse at 0-1 m tall. Total vegetation cover is 75-80%, mean cover is 77.5%.

In this alliance, the herbaceous layer is continuous and is dominated by *Leymus triticoides. Lactuca serriola* is frequently included in this layer at low cover. The shrub layer may include *Baccharis pilularis, Baccharis salicifolia, Hazardia squarrosa,* and *Sambucus mexicana* at sparse cover.

Leymus triticoides Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	50	0.1	0.2	0.2			
	BASA4	*Baccharis salicifolia*	50	0.1	0.2	0.2			
	HASQ2	*Hazardia squarrosa*	50	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	50	0.1	0.2	0.2			
Herb									
	LETR5	*Leymus triticoides*	100	71.0	70.0	72.0	X	X	
	LASE	*Lactuca serriola*	100	1.6	0.2	3.0		X	X
	SOOL	*Sonchus oleraceus*	50	5.0	10.0	10.0			X
	ASFA	*Asclepias fascicularis*	50	0.1	0.2	0.2			
	AVFA	*Avena fatua*	50	0.1	0.2	0.2			X
	BRNI	*Brassica nigra*	50	0.1	0.2	0.2			X
	BRCA10	*Bromopsis canadensis*	50	0.1	0.2	0.2			
	BRDI3	*Bromus diandrus*	50	0.1	0.2	0.2			X
	BRHO2	*Bromus hordeaceus*	50	0.1	0.2	0.2			X
	BRMA3	*Bromus madritensis*	50	0.1	0.2	0.2			X
	CAPY2	*Carduus pycnocephalus*	50	0.1	0.2	0.2			X
	CEME2	*Centaurea melitensis*	50	0.1	0.2	0.2			X
	CIVU	*Cirsium vulgare*	50	0.1	0.2	0.2			X
	HIIN3	*Hirschfeldia incana*	50	0.1	0.2	0.2			X
	PHAQ	*Phalaris aquatica*	50	0.1	0.2	0.2			X
	RUCR	*Rumex crispus*	50	0.1	0.2	0.2			X
	SIMA3	*Silybum marianum*	50	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Lactuca serriola, Sonchus oleraceus, Avena fatua, Brassica nigra, Bromus diandrus, Bromus hordeaceus, Bromus madritensis, Carduus pycnocephalus, Centaurea melitensis, Cirsium vulgare, Hirschfeldia incana, Phalaris aquatica, Rumex crispus, Silybum marianum

Samples Used in Description: (n = 2)
rap2421, rap2563rlv

Comments:
This alliance appears to be rare and is represented only by a few small stands in the study area. It seems to prefer mesic areas of grasslands in the inland Malibu Creek watershed, especially Las Virgines Canyon.

Phases:
None

COMMON NAME	Beardless Wild Rye Temporarily Flooded Herbaceous Alliance
SYNONYM	Creeping Wild Rye Grassland
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation

PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.j. Temporarily flooded temperate or subpolar grassland
ALLIANCE	*Leymus triticoides* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
This alliance is known from the Santa Monica Mountains as well as other parts of California including the Central Valley, central coast, and south coastal California (Evens and San 2004, Holland 1986, Holstein 2001, Keeler-Wolf and Vaghti 2000). It has been described from Oregon and Nevada as well (NatureServe 2005).

Nations:
United States

States or Provinces:
CA, OR, NV

Environmental Description:
Outside of California, this alliance is described from the Warner Valley of southeastern Oregon and the Cow Creek Basin on northwestern Nevada. Elevations range from 1,250–1,600 m. Climate is arid with mostly winter precipitation ranging from 10–25 cm annually. Stands occur in valleys in drainage bottoms, poorly drained floodplains, and historic lake basins. Sites are typically nearly flat but include moderate slopes (to 18%). It is found on the less xeric northeast and east aspects in Nevada. Soils are typically poorly drained, alkaline, with sandy loam to clay loam texture. The water table is shallow and causes mottles in the soil. Adjacent communities are shrublands dominated by *Artemisia tridentata*. Within California, this alliance occurs at elevations below 1,000 m on flat to moderate slopes of clay or loam soils where the climate is mediterranean (with cool wet winters and warm dry summers and precipitation ranging from 25 to 70 cm). Many stands may be relictual from preagricultural California, and nonnative grasses (or agriculture) probably have replaced many of the native stands. *Leymus triticoides* stands occur in open grassland habitats, drainage bottoms, floodplains, ravines/draws along coastal slopes, and so forth. Adjacent communities include other prairie or grassland habitats and oak savannas.

Vegetation Description:
As described in Oregon and Nevada, this vegetation occurs in bottomlands and lake basins. Stands have a moderate herbaceous layer (50–80% cover) codominated by the perennial graminoids *Elymus triticoides* with *Poa secunda* or *Carex* spp. Other frequent graminoid species include *Distichlis spicata, Hordeum californica, H. jubatum, Juncus balticus,* and forbs such as *Achillea millefolium, Agoseris glauca, Iris missouriensis, Scirpus* spp., *Triglochin maritima* and *Nitrophila occidentalis* in the saline/alkaline playas. In California, stands are equally high in cover and may be dominated by *Leymus triticoides* or codominated with annual grasses. Frequent

species include *Avena fatua, Bromus diandrus, B. hordeaceus, Carduus pycnocephalus, Distichlis spicata, Lactuca serriola, Lolium multiflorum,* and *Vulpia* spp.

Comments:
Stands of this vegetation in California have recently been described by Holstein 2001. This grassland was once much more widespread in the Central Valley prior to the development of low-lying lands for agriculture.

References:
Evens and San 2004, Holland 1986, Holstein 2001, Keeler-Wolf and Vaghti 2000, NatureServe 2005

Lolium multiflorum Herbaceous Association

Italian Ryegrass Herbaceous Association
***Lolium multiflorum* Herbaceous Alliance**
Italian Ryegrass Herbaceous Alliance

Mapping Code: 4210

Local Description

Summary:
This herbaceous association occurs on flat to somewhat steep slopes of variable aspect at elevations between 208 and 270 m. It is dominated by *Lolium multiflorum* in the herbaceous layer. *Baccharis pilularis* is occasionally found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 208–270 m, mean 230.3 m
Aspect: usually flat
Slope: range 0–15 degrees, mean 4.6 degrees
Topography (micro; macro): usually flat or undulating; most often bottom or lower
Litter Cover: range 90–90%, mean 90%
Small Rock Cover: range 0–1%, mean 0.7%
Large Rock Cover: range 0–1%, mean 0.3%
Bare Ground: range 0–10%, mean 5.7%
Parent Material: depositional
Soil Texture: fine clay or silty clay

Vegetation Description:
Stands of the *Lolium multiflorum* Herbaceous Association form an intermittent to continuous herbaceous layer (40–90%, mean 66.4%) at 0.01–1 m tall. The shrub layer is sparse (0–1%, mean < 0.2%) at 0–2 m tall. Total vegetation cover is 40–90%, mean cover is 66.4%.

In this association, the herbaceous layer is dominated intermittently to continuously by *Lolium multiflorum*. A variety of other nonnative species also occur at low cover. For example, *Bromus diandrus* and *Brassica nigra* are often included in this layer, while *Avena fatua, Phalaris aquatica,* and *Bromus hordeaceus* sometimes occur. The shrub layer occasionally includes *Baccharis pilularis* at sparse cover.

***Lolium multiflorum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	43	0.1	0.2	0.2			
Herb									
	LOLIU	*Lolium*	100	55.3	20.0	80.0	X	X	X
	BRDI3	*Bromus diandrus*	71	2.7	0.2	10.0			X
	BRNI	*Brassica nigra*	71	0.6	0.2	2.0			X
	AVFA	*Avena fatua*	43	0.6	0.2	3.0			X
	PHAQ	*Phalaris aquatica*	43	0.3	0.2	2.0			X
	BRHO2	*Bromus hordeaceus*	43	0.2	0.2	1.0			X
	VIVI	*Vicia villosa*	29	1.0	1.0	6.0			X
	BRMA3	*Bromus madritensis*	29	0.6	0.2	4.0			X
	CIVU	*Cirsium vulgare*	29	0.2	0.2	1.0			X
	RASA2	*Raphanus sativus*	29	0.2	0.2	1.0			X
	HEFA	*Hemizonia fasciculata*	29	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Lolium multiflorum, Bromus diandrus, Brassica nigra, Avena fatua, Phalaris aquatica, Bromus hordeaceus, Vicia villosa, Bromus madritensis, Cirsium vulgare, Raphanus sativus, Avena, Hirschfeldia incana, Erodium cicutarium, Phalaris caroliniana, Rumex crispus, Anthemis cotula, Bromus tectorum, Centaurea melitensis, Cynara cardunculus, Lactuca serriola, Malva parviflora, Marrubium vulgare, Medicago polymorpha, Sonchus asper, Sonchus oleraceus

Samples Used in Description: (n = 7)
rap0039, rap0065m, rap0068, rap1426, rap2529rlv, rap2530rlv, rap2849rlv

Comments:
This is a widespread and well-integrated nonnative graminoid vegetation alliance of much of California, and similar if not identical associations may occur throughout much of cismontane California below approximately 1,000 m elevation.

Phases:
None

COMMON NAME	Italian Ryegrass Herbaceous Association
SYNONYM	California Annual Grassland (Sawyer and Keeler-Wolf 1995), Nonnative Grassland (Holland 1986), *Bromus* (*diandrus, hordeaceus, madritensis*) Herbaceous Alliance (Reid et al. 1999)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.D. Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	V.D.2. Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUBGROUP	V.D.2.N. Natural/Seminatural
FORMATION	Short temperate annual grassland
ALLIANCE	*Lolium multiflorum* Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G5S5—While *Lolium multiflorum* is now established in California as an invasive exotic grass alliance, certain stands may contain sensitive plant species and may have conservation value.

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Although the pure *Lolium multiflorum* Association has been only defined here, it is likely to occur throughout much of cismontane California below approximately 1,000 m elevation in relatively low-lying areas that remain moist through much of the spring. It has only recently been separated from the broader California annual grassland alliance (Evens and San 2004, Evens et al. 2004, Keeler-Wolf and Vaghti 2000, Sawyer and Keeler-Wolf ms 2005).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
This alliance is likely to display a variety of associations in California. For example, it has been described on serpentine soils in central California (Santa Clara County), and another type has been defined in the Sierra Nevada foothills (Tuolumne County). Associations are also described from the margins of Suisun Marsh (Solano County).

References:
Evens and San 2004, Evens et al. 2004, Holland 1986, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf MS 2005, Sawyer and Keeler-Wolf 1995

Nassella lepida Herbaceous Alliance

Foothill Needlegrass Herbaceous Alliance

Mapping Code: 4090

Local Description

Summary:
One stand of this herbaceous alliance occurs on a moderately steep, southeast-facing slope at low elevation at 290 m. It is codominated by *Nassella lepida* and *Bromus hordeaceus* in the herbaceous layer. *Malosma laurina, Eriogonum cinereum, Rhus integrifolia,* and *Salvia leucophylla* are found in the shrub layer at low cover.

Distribution:
This alliance is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: 290 m
Aspect: southeast
Slope: 8 degrees
Topography (micro; macro): convex; upper to top
Litter Cover: no data
Small Rock Cover: 20%
Large Rock Cover: no data
Bare Ground: 28%
Parent Material: sedimentary
Soil Texture: no data

Vegetation Description:
One stand of this herbaceous alliance forms an intermittent herbaceous layer (41%) at 0.01–0.5 m tall. The shrub layer is 8% at 0.5–5 m tall. Total vegetation cover is 51%.

In this alliance, the herbaceous layer is intermittent and is codominated by *Nassella lepida* and *Bromus hordeaceus.* The shrub layer includes *Malosma laurina, Eriogonum cinereum, Rhus integrifolia,* and *Salvia leucophylla* at low cover.

Nassella lepida Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	3.0	3.0	3.0	X	X	
	ERCI5	*Eriogonum cinereum*	100	1.0	1.0	1.0		X	
	RHIN2	*Rhus integrifolia*	100	1.0	1.0	1.0		X	
	SALE3	*Salvia leucophylla*	100	1.0	1.0	1.0		X	
	ARCA11	*Artemisia californica*	100	0.2	0.2	0.2		X	
	HASQ2	*Hazardia squarrosa*	100	0.2	0.2	0.2		X	
	MIAU	*Mimulus aurantiacus*	100	0.2	0.2	0.2		X	
	OPLI3	*Opuntia littoralis*	100	0.2	0.2	0.2		X	
	YUWH	*Yucca whipplei*	100	0.2	0.2	0.2		X	
Herb									
	NALE2	*Nassella lepida*	100	30.0	30.0	30.0	X	X	
	BRHO2	*Bromus hordeaceus*	100	13.0	13.0	13.0	X	X	X

Other Noteworthy Species:
None

Nonnative Species:
Bromus hordeaceus

Samples Used in Description: (n = 1)
rap0176

Comments:
Part of the problem in describing this alliance was in the uncertain identification of *Nassella* species (either *pulchra* or *lepida*) due to sampling at nonflowering or fruiting seasons. This alliance appears to occur only rarely in the study area, and it may locally dominate following fire. The species is usually accompanied by relatively high cover of coastal scrub species. Such stands are considered shrublands.

Phases:
None

COMMON NAME	Foothill Needlegrass Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Nassella lepida* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This alliance occurs in northern, central, and southern cismontane California.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This bunchgrass alliance of California's valleys and foothills grows on deep soils with high clay content, often derived from sandstone or ultramafic parent material. Stands can occur on all topographic positions. However, because of climatic factors, they do not occur in more than 1,700 m elevation. The native California bunchgrasses are adapted to a mediterranean climate with moist, cool winters and long, dry summers. Precipitation varies from 25 and 70 cm per year and falls mostly between November and April. Stands typically include many nonnative annual grasses and herbs.

Vegetation Description:
This native grass forms a medium to tall bunch temperate or subpolar grassland with an open canopy less than 1 m in height. Emergent trees and shrubs may be present. This California native bunchgrass alliance is dominated by *Nassella lepida*. Other graminoids present may include *Festuca californica, Melica californica, Nassella pulchra, Nassella cernua, Calamagrostis koelerioides*, and *Poa secunda*. Many nonnative annuals, such as *Bromus hordeaceus and B. diandrus*, have invaded stands of this alliance. On sites with ultramafic-derived soils, serpentine-adapted species may be present.

Comments:
Stands of this and other central and southern California coastal native grassland alliances may have been maintained by Native American burning (Sawyer and Keeler-Wolf 1995, Keeley 2002).

References:
Sawyer and Keeler-Wolf 1995, Keeley 2002

Nassella pulchra Herbaceous Alliance

Purple Needlegrass Herbaceous Alliance

Mapping Code: 4020

Although most samples of this widespread cismontane California alliance fell into one specific local association that is described in the following text, five samples did not and will be briefly described here. These five stands are found on fine to moderately fine silty clay loam and range from flat to moderately steep slopes. In general, the stands of *Nassella pulchra* grassland are small and are typically associated with shrublands immediately adjacent to them. Unlike *Nassella lepida*, *N. pulchra* does not commonly occur in the understory of coastal scrub communities dominated by *Salvia* spp. or *Artemisia californica*. *Nassella pulchra* does associate with the early seral shrubs, *Baccharis pilularis* and *Hazardia squarrosa,* where these shrubs usually are colonizing grass-dominated stands. The most constant and abundant members of these five stands, aside from *Nassella pulchra*, are *Bromus diandrus* and *Avena fatua*.

This once extensive bunchgrass alliance of California's valleys and foothills grows on deep soils with high clay content (Holland 1986, Sawyer and Keeler-Wolf 1995). Stands can occur on all topographic positions. However, because of climatic factors, they do not occur in more than 1,300 m elevation. The native California and Baja California bunchgrass is adapted to a mediterranean climate with moist, cool winters and long, dry summers. Precipitation varies from 25 to 70 cm per year and falls mostly between November and April. Grazing and fire are important in maintaining the grassland communities, though uncertainty still exists concerning the optimum grazing type and intensity. Stands now typically include many nonnative annual grasses, and reduction in fire frequency has probably favored introduced annual grasses over native perennial bunchgrasses.

This native grass forms a medium to tall bunch temperate or subpolar grassland with an open canopy less than 1 m in height. Emergent trees and shrubs may be present. The alliance is dominated by *Nassella pulchra*, or the native grass cover is at least 10–15% relative to the nonnative grass cover. Other graminoids present may include *Elymus glaucus, Festuca californica, Melica californica, Nassella lepida, N. cernua, Melica imperfecta, Koeleria macrantha*, and *Poa secunda*. Many nonnative annuals, such as *Bromus diandrus, B. madritensis, B. hordeaceus, Avena barbata, A. fatua*, and *Lolium multiflorum*, have invaded stands of this alliance.

Samples classified to the alliance level only: (n = 5)
AA0699, AA1187, rap1121, rap1217, rap1876

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Nassella pulchra-Hazardia squarrosa Herbaceous Association

Purple Needlegrass-Sawtooth Goldenbush Herbaceous Association
***Nassella pulchra* Herbaceous Alliance**
Purple Needlegrass Herbaceous Alliance

Mapping Code: 4021

Local Description

Summary:
This herbaceous association occurs on gentle to steep often northeast or northwest slopes at low elevations between 52 and 422 m. *Nassella pulchra* is characteristically abundant in the herbaceous layer. *Hazardia squarrosa* is characteristically found in the shrub layer at low cover, and *Artemisia californica* is also usually present in this layer.

Distribution:
This association is sampled in the Immediate Coast, Western Fog Zone, Dry Inland, and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 52–422 m, mean 172 m
Aspect: variable, often northeast or northwest
Slope: range 2–35 degrees, mean 13.4 degrees
Topography (micro; macro): usually flat; variable, but often mid to upper
Litter Cover: range 15–85%, mean 50.3%
Small Rock Cover: range 0–23%, mean 5.8%
Large Rock Cover: no data
Bare Ground: range 2–36%, mean 19.6%
Parent Material: frequently sedimentary
Soil Texture: usually fine to moderately fine clay

Vegetation Description:
Stands of the *Nassella pulchra-Hazardia squarrosa* Herbaceous Association form an open to intermittent herbaceous layer (19–55%, mean 39.5%) at 0.01–1 m tall. The shrub layer is sparse to open (0–13%, mean 5%) at 0.01–2 m tall. Total vegetation cover is 28–58%, mean cover is 44.4%.

In this association, the herbaceous layer is open to intermittent, and *Nassella pulchra* is characteristically abundant. A variety of other herbaceous species occurs, and they may be subdominant. For example, *Avena fatua* is often present, and *Calochortus catalinae*, *Sisyrinchium bellum*, *Hemizonia fasciculate*, *Bromus madritensis*, *Bromus hordeaceus*, *Brassica nigra*, and *Erodium cicutarium* are sometimes found in this layer. The shrub layer characteristically includes *Hazardia squarrosa* and often includes *Artemisia californica* at low cover.

***Nassella pulchra-Hazardia squarrosa* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	HASQ2	*Hazardia squarrosa*	92	2.9	0.2	13.0	X	X	
	ARCA11	*Artemisia californica*	62	1.0	0.2	4.0			
	SALE3	*Salvia leucophylla*	46	0.5	0.2	3.0			
	LOSC2	*Lotus scoparius*	23	0.1	0.2	1.0			
	OPLI3	*Opuntia littoralis*	23	0.1	0.2	1.0			
Herb									
	NAPU4	*Nassella pulchra*	85	21.0	2.0	49.0	X	X	
	AVFA	*Avena fatua*	54	1.3	0.2	10.0			X
	BRMA3	*Bromus madritensis*	46	0.5	0.2	2.0			X
	CACA5	*Calochortus catalinae*	46	0.2	0.2	1.0			
	BRHO2	*Bromus hordeaceus*	38	1.8	1.0	8.0			X
	SIBE	*Sisyrinchium bellum*	38	0.7	0.2	6.0			
	BRNI	*Brassica nigra*	38	0.1	0.2	0.2			X
	ERCI6	*Erodium cicutarium*	38	0.1	0.2	0.2			X
	BRDI3	*Bromus diandrus*	31	1.5	0.2	15.0			X
	HEFA	*Hemizonia fasciculata*	31	0.7	0.2	5.0			
	GRCA	*Grindelia camporum*	31	0.4	0.2	2.0			
	LEFI11	*Lessingia filaginifolia*	31	0.1	0.2	0.2			
	MASA2	*Malacothrix saxatilis*	23	0.4	0.2	4.0			
	ANAR	*Anagallis arvensis*	23	0.3	0.2	3.0			X
	DICA14	*Dichelostemma capitatum*	23	0.2	0.2	1.0			
	SAAR10	*Sanicula arguta*	23	0.1	0.2	1.0			
	FOVU	*Foeniculum vulgare*	23	0.01	0.2	0.2			X
	MEPO3	*Medicago polymorpha*	23	0.01	0.2	0.2			X
	SOOL	*Sonchus oleraceus*	23	0.01	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Dichondra occidentalis was found in 1 of 13 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G4?, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Dudleya blochmaniae was found in 1 of 13 surveys of this plant community, which may be the rare *Dudleya blochmaniae* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and CNPS R-E-D Code is 2-3-2. Global rank is G2T2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Avena fatua, Bromus madritensis, Bromus hordeaceus, Brassica nigra, Erodium cicutarium, Bromus diandrus, Anagallis arvensis, Foeniculum vulgare, Medicago polymorpha, Sonchus

oleraceus, Hirschfeldia incana, Silene gallica, Avena, Avena barbata, Erodium moschatum, Euphorbia terracina, Vicia villosa, Erodium, Galium aparine, Lactuca serriola, Lolium multiflorum, Marrubium vulgare, Melilotus indicus, Phalaris aquatica, Senecio vulgaris, Silybum marianum, Sonchus asper

Samples Used in Description: (n = 13)
AA0481cc, rap0104, rap0922, rap0985, rap1146, rap2012, rap2532rlv, rap2533rlv, rap2534rlv, rap2795, rap2873rlv, rap2913rlv, rap2914rlv

Comments:
This is the most common native grassland in the study area and the primary representative of the widespread *Nassella pulchra* Alliance (Sawyer and Keeler-Wolf 1995). It shows a transitional and seral nature to scrubland by the constant presence of *Hazardia squarrosa*, a common early seral perennial subshrub of coastal southern California. Further, *Hazardia squarrosa/Nassella pulchra-Hemizonia fasciculata* Shrubland Association is also defined in the study area where the shrub layer is more developed. It would be useful to monitor several of these local stands with different fire histories to gain a better understanding of the persistence of this association under different fire regimes and soil types.

Phases:
None

COMMON NAME	Purple Needlegrass-Sawtooth Goldenbush Herbaceous Association
SYNONYM	Valley Needlegrass Grassland (Holland 1986, in part)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Nassella pulchra* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. Other associations of this alliance range throughout cismontane California.

Nations:
United States

States or Provinces: CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Sawyer and Keeler-Wolf 1995

Pennisetum setaceum Herbaceous Alliance

Fountain Grass Herbaceous Alliance

Mapping Code: 4060

Three samples of this dangerously invasive nonnative alliance were classified to the alliance level only and will be briefly described here. These occurred on steep southerly facing slopes in the eastern urban, immediate coastal, and Simi Hills regions of the park in similar settings to the described *Pennisetum* Association to follow.

The nonnative (African) fountain grass alliance tends to form monospecific stands although it may also have a number of emergent native or nonnative woody species such as *Rhus integrifolia, R. ovata, Artemisia californica, Encelia californica, Eriogonum fasciculatum,* or *E. cinereum* associated with the stands.

This is the first study in which this alliance has been identified in California. However, it is well understood to be commonly occurring as an invasive grassland along sea cliffs and road cuts from San Diego County to Santa Barbara County and has been noted inland as far as Anza-Borrego Desert State Park in San Diego County.

The alliance appears to be dangerously invasive (Bossard et al. 2000) and was initially established as ornamental plantings but has now begun colonizing cliffs and other steep slopes away from direct human disturbance such as road embankments. One association has already been defined in this study of the Santa Monica Mountains.

Samples classified to the alliance level only: (n = 3)
AA0936, rap1272, rap2279

References:
Bossard et al. 2000

Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina Herbaceous Association

Fountain Grass-Giant Coreopsis-Chaparral Yucca Herbaceous Association
***Pennisetum setaceum* Herbaceous Alliance**
Fountain Grass Herbaceous Alliance

Mapping Code: 4061

Local Description

Summary:
This herbaceous association occurs on flat to very steep, often southerly facing slopes at low elevations between 0 and 36 m. It is dominated solely by *Pennisetum setaceum* in the herbaceous layer. *Malosma laurina, Eriogonum cinereum,* and *Yucca whipplei* are characteristically found in the shrub layer at low cover, and *Washingtonia* sp. is infrequently in the tree layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–36 m, mean 12 m
Aspect: variable, but often southeast or southwest
Slope: range 0–60 degrees, mean 40.7 degrees
Topography (micro; macro): undulating or flat; variable, but often bottom to lower
Litter Cover: range 15–15%, mean 15%
Small Rock Cover: range 10–40%, mean 23.3%
Large Rock Cover: range 5–15%, mean 9.7%
Bare Ground: range 15–50%, mean 35%
Parent Material: igneous
Soil Texture: sand (class unknown) or medium loam

Vegetation Description:
Stands of the *Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina* Herbaceous Association form an open to intermittent herbaceous layer (22–40%, mean 32.1%) at 0.01–1 m tall. The shrub layer is open (2–14%, mean 8.9%) at 0.01–5 m tall. Total vegetation cover is 30–49%, mean cover is 40.3%.

In this association, the herbaceous layer is open to intermittent and is dominated solely by *Pennisetum setaceum*. *Brassica nigra, Foeniculum vulgare, Carpobrotus edulis, Bromus madritensis, Malacothrix saxatilis,* and *Medicago polymorpha* are occasionally included in this layer at sparse cover. The shrub layer characteristically includes *Malosma laurina, Eriogonum cinereum,* and *Yucca whipplei* and also usually includes *Salvia mellifera, Coreopsis gigantea*, and *Rhus integrifolia*. The tree layer infrequently includes *Washingtonia* sp. (introduced) as an emergent.

Pennisetum setaceum-Coreopsis gigantea-Yucca whipplei-Malosma laurina Association

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	MALA6	*Malosma laurina*	100	2.9	0.2	8.0	X	X	
	ERCI5	*Eriogonum cinereum*	86	1.1	0.2	2.0		X	
	YUWH	*Yucca whipplei*	86	0.9	0.2	3.0		X	
	SAME3	*Salvia mellifera*	71	0.5	0.2	1.0			
	COGI	*Coreopsis gigantea*	71	0.3	0.2	1.0			
	RHIN2	*Rhus integrifolia*	57	1.0	1.0	2.0			
	OPLI3	*Opuntia littoralis*	43	0.3	0.2	2.0			
	ENCA	*Encelia californica*	43	0.2	0.2	1.0			
	BRCA3	*Brickellia californica*	29	0.2	0.2	1.0			
	ISAR	*Isomeris arborea*	29	0.2	0.2	1.0			
	LOSC2	*Lotus scoparius*	29	0.2	0.2	1.0			
	ARCA11	*Artemisia californica*	29	0.1	0.2	0.2			
Herb									
	PESE3	*Pennisetum setaceum*	100	28.4	18.0	40.0	X	X	X
	BRNI	*Brassica nigra*	43	0.1	0.2	0.2			X
	FOVU	*Foeniculum vulgare*	43	0.1	0.2	0.2			X
	CAED3	*Carpobrotus edulis*	29	0.5	0.2	3.0			X
	BRMA3	*Bromus madritensis*	29	0.1	0.2	0.2			X
	MASA2	*Malacothrix saxatilis*	29	0.1	0.2	0.2			
	MEPO3	*Medicago polymorpha*	29	0.1	0.2	0.2			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 7 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Pennisetum setaceum, Brassica nigra, Foeniculum vulgare, Carpobrotus edulis, Bromus madritensis, Medicago polymorpha, Melilotus, Avena barbata, Avena fatua, Bromus hordeaceus, Erodium, Euphorbia terracina, Malva parviflora, Melilotus indicus, Nicotiana glauca, Ricinus communis, Sonchus oleraceus

Samples Used in Description: (n = 7)
rap0512, rap0670, rap0882, rap1138, rap1197m, rap1203, rap2897rlv

Comments:
This is the first association defined from this nonnative alliance in California. It is the most typical expression of the alliance in the Santa Monica Mountains, found on steep coastal cliffs, bluffs, and road cuts, immediately adjacent to the Pacific Ocean; it has also been found on sand dunes along the immediate coast. *Pennisetum setaceum* is a dangerously invasive nonnative grass.

Phases:
None

COMMON NAME	Fountain Grass-Giant Coreopsis-Chaparral Yucca Herbaceous Association
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural temperate or subpolar grassland
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Pennisetum setaceum* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	None, this is a nonnative alliance. However, it may have some conservation value if localized or rare native species are associated with it. As this association increases throughout southern California, fewer and fewer natural coastal bluff and cliff communities will remain.

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. However, it is well understood to be commonly invasive along sea cliffs and road cuts from San Diego County to Santa Barbara County and has been noted inland as far as Anza-Borrego Desert State Park in San Diego County (Bossard et al. 2000). It has escaped from plantings (e.g., San Diego Wild Animal Park) and is now becoming a significant invasive.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Bossard et al. 2000

Phalaris aquatica Herbaceous Alliance

Harding Grass Herbaceous Alliance

Mapping Code: 4070

Local Description

Summary:
This herbaceous alliance occurs on flat to moderately steep slopes of variable aspect at low elevations between 188 and 228 m. It is dominated by *Phalaris aquatica* in the herbaceous layer. *Baccharis pilularis* is sometimes found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Upper Elevation Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 188–228 m, mean 205 m
Aspect: variable
Slope: range 0–9 degrees, mean 3.7 degrees
Topography (micro; macro): flat; bottom to lower
Litter Cover: range 55–95%, mean 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 0–10%, mean 5%
Parent Material: igneous
Soil Texture: fine to moderately fine sandy or silty clay loam

Vegetation Description:
Stands of this herbaceous alliance form an open to continuous herbaceous layer (25–77%, mean 49%) at 0.1–1 m tall. The shrub layer is sparse to open (0–5%, mean 1.3%) at 0–0.5 m tall. Total vegetation cover is 25–70%, mean cover is 48.7%.

In this alliance, the herbaceous layer is open to continuous and is dominated by *Phalaris aquatica*. *Avena fatua* is occasionally included in this layer, and a variety of other herbs, such as *Bromus diandrus*, *Sisyrinchium bellum*, and *Melilotus indicus,* are infrequently present. The shrub layer occasionally includes *Baccharis pilularis,* and other shrubs may occur infrequently.

Phalaris aquatica Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	BAPI	*Baccharis pilularis*	33	0.5	0.2	3.0			
Herb									
	PHAQ	*Phalaris aquatica*	100	38.2	18.0	60.0	X	X	X
	AVFA	*Avena fatua*	33	0.4	0.2	2.0			X

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 6 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Phalaris aquatica, Avena fatua, Bromus diandrus, Melilotus indicus, Bromus hordeaceus, Bromus madritensis, Lolium multiflorum, Anagallis arvensis, Brassica, Euphorbia terracina, Foeniculum vulgare, Picris echioides

Samples Used in Description: (n = 6)
rap0040, rap0052m, rap0085, rap2531rlv, rap2894rlv, rap2895rlv

Comments:
In the Santa Monica Mountains, this vegetation alliance tends to favor moist low areas of grasslands including those with seasonally saturated soil. It seems to be found in areas that had experienced heavy grazing in the past.

Phases:
None

COMMON NAME	Harding Grass Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.d. Medium-Tall bunch temperate or subpolar grassland
ALLIANCE	*Phalaris aquatica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains
CONSERVATION STATUS RANK	None, introduced invasive exotic

Global Description

Distribution:
This alliance is not well sampled in California. However, it has been reported from several areas of coastal northern and central California including Colusa/Glen, Marin, Santa Clara, and Solano counties.

Nations:
United States

States or Provinces:
CA

Environmental Description:
The alliance has been introduced into California, while it is native to the Mediterranean region of Europe. In California, it has been found in inland sites below 800 m in elevation on gentle to moderately steep slopes with a thick layer and high surface cover of litter. Parent material is quite variable including volcanic, Fransciscan, serpentine, and alluvial, and soil is variable from coarse sandy loam to fine silty clay. It has been found in a variety of disturbed habitats including along levees in Suisun Marsh, upper slopes that were converted from chaparral vegetation in the north coast range, disturbed upper grassland slopes in central California, and so forth.

Vegetation Description:
This alliance is defined by *Phalaris aquatica* as the indicator species, with *P. aquatica* dominant or codominant with other nonnative species. One association has been described with *P. aquatica* co-occurring with *Bromus hordeaceus* and *Centaurea solstitialis* from the southern portion of the north coast ranges of California. Other species include annual forbs such as *Clarkia* sp.*, Galium* sp.*, Erodium* sp., *Trifolium dubium,* and *Yabea microcarpa.* A pure association of *P. aquatica* has been defined from Suisun Marsh in small stands along levees. An association of *P. aquatica* dominant to codominant with *Avena barbata* also occurs in the central coast south of San Jose, and characteristic species at low cover include *Lolium multiflorum, Bromus hordeaceus,* and *Erodium* sp. In southern California, *P. aquatica* has been found dominant, and *Avena fatua* was characteristic at low cover.

Comments:
This is aggressively invasive as nonnative grassland forming dense clumps in typically low-lying areas or disturbed areas (Bossard et al. 2000, Evens and San 2004, Jimerson et al. 2000, NatureServe et al. 2003a, Keeler-Wolf and Vaghti 2000). It is favored by frequent fire or clearing, and it appears to colonize and expand in areas formerly dominated by annual grassland, native *Nassella* grassland, or chaparral.

References:
Bossard et al. 2000, Evens and San 2004, Jimerson et al. 2000, NatureServe et al. 2003a, Keeler-Wolf and Vaghti 2000

Salicornia virginica/Algae Herbaceous Association

Pickelweed/Algae Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4528

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 1 and 3 m. It is dominated by algae in the herbaceous layer, and *Salicornia virginica* is characteristically found as a subdominant to codominant.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 1–3 m, mean 2 m
Aspect: flat
Slope: flat
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 40–90%, mean 71.7%
Parent Material: no data
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Salicornia virginica*/Algae Herbaceous Association form an open to intermittent herbaceous layer (15–56%, mean 36.6%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–8%, mean 1.6%) at 0–0.5 m tall. Total vegetation cover is 15–56%, mean cover is 37.8%.

In this association, the herbaceous layer is open to intermittent and is dominated by algae, while *Salicornia virginica* is characteristically abundant and subdominant to codominant. *Salicornia bigelovii* and *Triglochin concinnum* are infrequently included in this layer at low cover. *Suaeda taxifolia* and *Frankenia salina* are infrequently present at low cover in the shrub layer.

***Salicornia virginica/Algae* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SUCA	*Suaeda taxifolia*	20	0.4	2.0	2.0			
	FRSA	*Frankenia salina*	20	0.01	0.2	0.2			
Herb									
	ALGAE	*Algae*	100	28.0	10.0	50.0	X	X	
	SAVI	*Salicornia virginica*	100	10.8	5.0	30.0	X	X	
	SABI	*Salicornia bigelovii*	20	0.4	2.0	2.0			
	TRCO4	*Triglochin concinnum*	20	0.01	0.2	0.2			

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 1 of 5 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
None

Samples Used in Description: (n = 5)
rap0865, rap0870, rap0873, rap0875, rap2700

Comments:
This is the more open expression of pickleweed marsh in Mugu Lagoon within the study area and seems to be found in some of the wettest portions of the marsh. It is unclear which species of the algae is (are) present, and it is also unclear how ecologically different this association is from other similar local *Salicornia* associations. There is the possibility that with further detailed analysis of nonvascular flora, this association could be lumped with others of the same alliance. At this point these stands are classified here because of their generally less dense cover of *S. virginica* and the presence of algal mats, which are visible at low tide. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME	Pickelweed/Algae Herbaceous Association
SYNONYM	Coastal salt and brackish marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2

ECOLOGICAL REGIONS 261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains

CONSERVATION STATUS RANK G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to be found on other coastal salt marshes throughout California (Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

Salicornia virginica-Brassica nigra Herbaceous Association

Pickleweed-Black Mustard Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4529

Local Description

Summary:
This herbaceous association occurs on flat to gentle slopes of variable aspect at low elevations between 0 and 5 m. *Brassica nigra* is characteristically abundant in the herbaceous layer. *Salicornia virginica* is characteristically abundant in the shrub layer, and *Frankenia salina* is also often present at low cover in this layer.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 0–5 m, mean 2 m
Aspect: frequently flat
Slope: range 0–2 degrees, mean 0.7 degrees
Topography (micro; macro): flat; bottom
Litter Cover: range 65–65%, mean 65%
Small Rock Cover: range 0–1%, mean 0.3%
Large Rock Cover: no data
Bare Ground: range 20–55%, mean 41.7%
Parent Material: no data
Soil Texture: moderately fine sandy to silty clay loam

Vegetation Description:
Stands of the *Salicornia virginica-Brassica nigra* Herbaceous Association form an open to intermittent herbaceous layer (13–42%, mean 29.7%) at 0.01–1 m tall. The shrub layer is sparse to open (0–24%, mean 8.7%) at 0–5 m tall. Total vegetation cover is 30–43%, mean cover is 38.3%.

In this association, the herbaceous layer is open to intermittent with *Salicornia virginica* dominant, and *Brassica nigra* is characteristically subdominant to codominant. *Polypogon monspeliensis*, *Raphanus sativus*, *Carpobrotus edulis, Melilotus albus, Bromus madritensis*, and *Galium aparine* are occasionally included in this layer. *Frankenia salina*, *Atriplex lentiformis, Baccharis pilularis,* and *Myoporum laetum* are often present in the shrub layer and usually at low cover.

***Salicornia virginica-Brassica nigra* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	67	1.0	1.0	3.0			
	ATLE	*Atriplex lentiformis*	50	2.7	0.2	15.0			
	BAPI	*Baccharis pilularis*	50	0.1	0.2	0.2			
	MYLA5	*Myoporum laetum*	50	0.1	0.2	0.2			X
	BASA4	*Baccharis salicifolia*	33	0.2	0.2	1.0			
	OPOR	*Opuntia oricola*	33	0.1	0.2	0.2			
	SAME5	*Sambucus mexicana*	33	0.1	0.2	0.2			
Herb									
	SAVI	*Salicornia virginica*	100	19.8	9.0	35.0	X	X	
	BRNI	*Brassica nigra*	83	6.2	2.0	15.0	X	X	X
	POMO5	*Polypogon monspeliensis*	50	0.8	1.0	2.0			X
	RASA2	*Raphanus sativus*	50	0.1	0.2	0.2			X
	CAED3	*Carpobrotus edulis*	33	4.0	1.0	23.0			X
	UNHE	Unknown herbs/forbs	33	1.2	1.0	6.0			
	UNGR	Unknown annual grass	33	0.8	2.0	3.0			
	MEAL2	*Melilotus albus*	33	0.5	1.0	2.0			X
	MELIL	*Melilotus*	33	0.4	0.2	2.0			X
	MENO2	*Mesembryanthemum nodiflorum*	33	0.2	0.2	1.0			X
	BRMA3	*Bromus madritensis*	33	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	33	0.1	0.2	0.2			X

Other Noteworthy Species:
None

Nonnative Species:
Brassica nigra, Polypogon monspeliensis, Myoporum laetum, Raphanus sativus, Carpobrotus edulis, Melilotus albus, Melilotus, Mesembryanthemum nodiflorum, Bromus madritensis, Galium aparine, Arundo donax, Bromus diandrus, Bromus hordeaceus, Carpobrotus chilensis, Cotula coronopifolia, Foeniculum vulgare, Marrubium vulgare, Urtica urens

Samples Used in Description: (n = 6)
rap0898, rap0900, rap2710, rap2711, rap2712, rap2778

Comments:
This association represents the local expression of the coastal salt marsh edge, where adjacent weedy herbaceous vegetation borders upon it (Zedler 1982). The marsh edge position of this association is also indicated by the presence of several typically upland shrubby species such as *Atriplex lentiformis, Baccharis pilularis, and Opuntia oricola*. It is likely that such weedy marginal associations occur in other southern California coastal salt marshes and would be recognized with local stand level sampling. The field crews placed *Salicornia* spp. in the shrub layer when doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Phases:
None

COMMON NAME	Pickleweed-Black Mustard Herbaceous Association
SYNONYM	Coastal salt and brackish marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL:	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RAN:	G4S4?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory.

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

*Salicornia virginica-Frankenia salina-Suaeda taxifolia (*synonym *Suaeda californica* var. *taxifolia)* Herbaceous Association

Pickleweed-Alkali Heath-Sea Blite Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4524

Local Description

Summary:
This herbaceous association occurs on flat to gently sloped ground at low elevations between 0 and 6 m. *Salicornia virginica* is characteristically abundant and dominant in the herbaceous layer, while *Frankenia salina* and *Suaeda taxifolia* are characteristically found in the shrub layer at low cover.

Distribution:
This association is sampled in the Western Fog Zone region of the study area.

Environmental Description:
Elevation: range 0–6 m, mean 2 m
Aspect: flat
Slope: 0–2 degrees mean 0.3 degrees
Topography (micro; macro): flat; bottom
Litter Cover: range 30–30%, mean 30%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 20–90%, mean 53.3%
Parent Material: no data
Soil Texture: sand to clay

Vegetation Description:
Stands of the *Salicornia virginica-Frankenia salina-Suaeda taxifolia* Herbaceous Association form an open to intermittent herbaceous layer (1–65%, mean 35.9%) at 0.01–0.5 m tall. The shrub layer is sparse to continuous (0–67%, mean 11.1%) at 0–1 m tall. Total vegetation cover is 13–70%, mean cover is 47%.

In this association, the herbaceous layer is open to intermittent and is dominated by *Salicornia virginica.* It also occasionally contains *Distichlis spicata, Triglochin concinnum*, and *Limonium californicum* at low cover. The shrub layer characteristically includes *Frankenia salina* and *Suaeda taxifolia* at low cover.

***Salicornia virginica-Frankenia salina-Suaeda taxifolia* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	89	5.4	0.2	18.0	X		
	SUCA	*Suaeda taxifolia*	78	1.0	0.2	6.0	X		
	BAMA5	*Batis maritima*	56	3.1	0.2	19.0			
	ATLE	*Atriplex lentiformis*	22	0.01	0.2	0.2			
Herb									
	SAVI	*Salicornia virginica*	100	34.5	1.0	67.0	X		
	DISP	*Distichlis spicata*	39	0.7	0.2	8.0			
	TRCO4	*Triglochin concinnum*	39	0.2	0.2	2.0			
	LICA5	*Limonium californicum*	39	0.1	0.2	0.2			
	ALGAE	*Algae*	28	0.9	0.2	10.0			
	MOLI	*Monanthochloe littoralis*	22	0.5	0.2	7.0			

Other Noteworthy Species:
Abronia maritima was found in 1 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-2. Global rank is G4?, and state rank is S3?. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 14 of 18 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Arundo donax, Bromus madritensis, Melilotus indicus, Brassica, Mesembryanthemum nodiflorum, Myoporum laetum, Rumex crispus, Sonchus

Samples Used in Description: (n = 18)
rap0868, rap0874m, rap0878, rap0881, rap0905, rap0906, rap0909, rap2698, rap2699, rap2701, rap2702, rap2704, rap2705, rap2706, rap2708, rap2774, rap2775, rap2776

Comments:
This association is probably the most extensive of this *Salicornia* Alliance locally. It was found to have significant variability ranging from stands strongly dominated by *S. virginica* to stands with little cover of this species to stands with codominance of the three nominate species. The field crews placed *Salicornia* in the shrub layer upon doing species cover and total shrub cover estimates, although many species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

Both *Frankenia salina* and *Suaeda taxifolia* occurred in about 80–90% of the stands averaging 1 to 5% cover, while *Distichlis spicata* occurred in less than 40% of the stands, thus separating this association from the *Distichlis spicata-Salicornia virginica-Jaumea carnosa* Herbaceous Association. It does not contain marsh edge species as does the *S. virginica-Brassica nigra* Association. The presence of *Batis maritima* in > 50% of the samples suggests that this is a core marsh association with less dry periods than those associations with high frequencies of *Distichlis spicata.*

Phases:
Salicornia virginica-Frankenia salina-Batis maritima (Pickleweed-Alkali Heath-Saltwort) Phase [4526]
Salicornia virginica-Suaeda taxifolia (Pickleweed-California Sea Blite) Phase [45201]
Salicornia virginica-Frankenia salina-Suaeda taxifolia (Pickleweed-Alkali Heath-California Sea Blite [Provisional]) Phase [4524]

COMMON NAME	Pickleweed-Alkali Heath-California Sea Blite Herbaceous Association
SYNONYM	Coastal Salt and Brackish Marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G2S2?

Global Description

Distribution:
This association is only known from the Santa Monica Mountains region. Information about its global distribution is not available without additional inventory. It is likely to occur in other southern California salt marshes (Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
See local description.

Vegetation Description:
See local description.

Comments:
See local description.

References:
Holland 1986, Zedler 1982

Salicornia virginica-Salicornia subterminalis Herbaceous Association

Pickleweed-Parish's Glasswort Herbaceous Association
***Salicornia virginica* Herbaceous Alliance**
Pickleweed Herbaceous Alliance

Mapping Code: 4525

Local Description

Summary:
This herbaceous association occurs on flat ground at low elevations between 0 and 3 m. *Salicornia subterminalis* and *Salicornia virginica* are characteristically abundant in the herbaceous layer, and *Brassica nigra* is characteristically present at low cover.

Distribution:
This association is sampled in the Western Fog Zone and Immediate Coast regions of the study area.

Environmental Description:
Elevation: range 0–3 m, mean 2 m
Aspect: flat
Slope: no data
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 60–60%, mean 60%
Parent Material: no data
Soil Texture: fine to moderately fine silty clay

Vegetation Description:
Stands of the *Salicornia virginica-Salicornia subterminalis* Herbaceous Association form an open herbaceous layer (4–22%, mean 12.3%) at 0.01–0.5 m tall. The shrub layer is sparse to open (0–26%, mean 6.5%) at 0–1 m tall. Total vegetation cover is 10–30%, mean cover is 18.8%.

In this association, the herbaceous layer is open with *Salicornia subterminalis* and *Salicornia virginica* characteristically abundant and codominant. Sometimes *S. subterminalis* can dominate and *S. virginica* subdominate. *Brassica nigra* is characteristically present at low cover, and *Mesembryanthemum nodiflorum* is often present. *Frankenia salina, Batis maritima, Atriplex lentiformis*, and *Suaeda taxifolia* are also occasionally found in the shrub layer.

***Salicornia virginica-Salicornia subterminalis* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	FRSA	*Frankenia salina*	50	0.8	0.2	3.0			
	BAMA5	*Batis maritima*	25	1.0	4.0	4.0			
	ATLE	*Atriplex lentiformis*	25	0.1	0.2	0.2			
	SUCA	*Suaeda taxifolia*	25	0.1	0.2	0.2			
Herb									
	SASU2	*Salicornia subterminalis*	100	7.8	4.0	14.0	X	X	
	BRNI	*Brassica nigra*	100	0.4	0.2	1.0		X	X
	SAVI	*Salicornia virginica*	75	6.5	2.0	12.0	X	X	
	MENO2	*Mesembryanthemum nodiflorum*	50	1.0	0.2	4.0			X
	BROMU	*Bromus*	25	0.8	3.0	3.0			
	UNGR	Unknown annual grass	25	0.5	2.0	2.0			
	BRDI3	*Bromus diandrus*	25	0.3	1.0	1.0			X
	MOLI	*Monanthochloe littoralis*	25	0.3	1.0	1.0			
	CACH38	*Carpobrotus chilensis*	25	0.1	0.2	0.2			X
	GAAP2	*Galium aparine*	25	0.1	0.2	0.2			X
	LASE	*Lactuca serriola*	25	0.1	0.2	0.2			X
	MEAL2	*Melilotus albus*	25	0.1	0.2	0.2			X

Other Noteworthy Species:
*Suaeda taxifolia (*synonym *S. californica* var. *taxifolia)* was found in 1 of 4 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-1. Global rank is G3?, and state rank is S2S3. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Brassica nigra, Mesembryanthemum nodiflorum, Bromus diandrus, Carpobrotus chilensis, Galium aparine, Lactuca serriola, Melilotus albus

Samples Used in Description: (n = 4)
rap0877, rap0901, rap2703, rap2709

Comments:
Crews observed this association in areas where salt deposits accumulate into salt pans. The field crews placed the two *Salicornia* spp. in the shrub layer upon doing species cover and total shrub cover estimates, although these species in this genus are traditionally considered perennial herbaceous vegetation (UCB 2004, NatureServe 2005).

This provisional association is very closely related to the *Salicornia virginica-Brassica nigra* Association, differing only in the higher frequency of the regional salt marsh indicator *Salicornia subterminalis.* However, this association mixed *Salicornia* is also found in the San Dieguito Lagoon, where *Salicornia subterminalis* is subdominant to codominant with *S. virginica.*

Phases:
None. However, this is potentially a phase of the *Salicornia virginica-Brassica nigra* Association.

COMMON NAME	Pickleweed-Parish's Glasswort Herbaceous Association
SYNONYM	Coastal Salt and Brackish Marsh (Holland 1986)
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.B. Perennial forb vegetation
PHYSIOGNOMIC GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUBGROUP	V.B.2.N. Natural/Seminatural
FORMATION	Intermittentently flooded perennial herbaceous vegetation
ALLIANCE	*Salicornia virginica* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G3S3

Global Description

Distribution:
This association has been found in coastal salt marshes in southern California including Ventura and San Diego counties (Evens and San 2005, Zedler 1982).

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association has been observed in coastal salt marshes with silty clay or silty loam alluvial soils, while being mucky, and where salt deposits have accumulated. They are on flat to gentle bottoms such as lagoons. Litter and fine sediments are the prevalent ground surface.

Vegetation Description:
Salicornia virginica codominates with *Salicornia subterminalis*, while sometimes either *Salicornia* species is subdominant. Other species may occur at low cover including *Frankenia salina, Atriplex lentiformis, Mesembryanthemum* spp., *Carpobrotus chilensis, Bromus diandrus, Distichlis spicata*, and *Isocoma menziesii.*

Comments:
Additional sampling is needed to further verify this association's distribution and variation.

References:
Evens and San 2005, Holland 1986, Zedler 1982

Scirpus acutus-Scirpus californicus Herbaceous Alliance

California Bulrush Herbaceous Alliance

Mapping Code: 4410

Local Description

Summary:
Three stands of this herbaceous alliance occur on flat to gentle slopes at low elevations between 0 and 414 m. *Scirpus californicus* and/or *S. acutus* are characteristically abundant in the herbaceous layer. *Salix lasiolepis* is often found in the shrub layer at low cover.

Distribution:
This alliance is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: range 0–414 m, mean 139.3 m
Aspect: variable to flat
Slope: 0–2 degrees
Topography (micro; macro): flat; bottom
Litter Cover: no data
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: range 15–15%, mean 15%
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
Stands of this herbaceous alliance form an intermittent to continuous herbaceous layer (48–70%, mean 61%) at 1–5 m tall. Total vegetation cover is 48–70%, mean cover is 61%.

In this alliance, *Scirpus californicus* and/or *S. acutus* may be abundant in the herbaceous layer. In the three stands sampled, *S. californicus* is characteristic and most abundant. Other herbs, such as *Distichlis spicata*, *Juncus* sp., and *Typha* sp., are sometimes present. The shrub layer often includes *Salix lasiolepis*.

Scirpus acutus-S. californicus Alliance

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	SALA6-M	*Salix lasiolepis*	67	0.1	0.2	0.2	X		
Herb									
	SCCA	*Scirpus californicus*	100	44.3	33.0	60.0	X	X	
	SCACO4	*Scirpus acutus* var. *occidentalis*	67	6.7	5.0	15.0			
	CORTA	*Cortaderia*	33	0.3	1.0	1.0			X
	AMPS	*Ambrosia psilostachya*	33	0.1	0.2	0.2			
	CAMA	*Cakile maritima*	33	0.1	0.2	0.2			X
	CYDA	*Cynodon dactylon*	33	0.1	0.2	0.2			X
	DISP	*Distichlis spicata*	33	0.1	0.2	0.2			
	JUNCU	*Juncus*	33	0.1	0.2	0.2			
	LEMNA	*Lemna*	33	0.1	0.2	0.2			
	POAM8	*Polygonum amphibium*	33	0.1	0.2	0.2			
	RUCR	*Rumex crispus*	33	0.1	0.2	0.2			X
	TYPHA	*Typha*	33	0.1	0.2	0.2			

Other Noteworthy Species:
None

Nonnative Species:
Cortaderia, Cakile maritima, Cynodon dactylon, Rumex crispus

Samples Used in Description: (n = 3)
rap1013, rap2595, rap2614

Comments:
These stands are typically small in the study area, and they occur in perennial wetlands (e.g., lake margins, marshes, stream channels). In some cases, the phenology was not ideal to identify the species of *Scirpus*.

Phases:
None

COMMON NAME	Common Bulrush-California Bulrush Alliance
SYNONYM	*Scirpus acutus-(Scirpus tabernaemontani)* Semipermanently Flooded Herbaceous Alliance
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	Natural/Seminatural
FORMATION	V.A.5.N.I. Semipermanently flooded temperate or subpolar grassland
ALLIANCE	*Scirpus acutus-Scirpus californicus* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:

This *Scirpus acutus-S. californicus* Alliance is found in the midwest region (Nebraska, Iowa, South Dakota, North Dakota, and Minnesota), in the western region (California, Oregon, Washington, Idaho, and Montana), and in Canada (British Columbia, southern Manitoba, and northwestern Ontario).

Nations:
United States, Canada, Mexico

States or Provinces:
USA: NE, IA, SD, ND, MN, CA, OR, WA, ID, MT
Canada: BC, southern Manitoba, and northwestern Ontario

Environmental Description:
This relatively widespread alliance occurs on pond and lake margins and in backwater areas. It also occupies basins where the water table may remain relatively high but can drop below the soil surface late in the growing season. Elevations range from sea level in coastal areas to 2,025 m in Montana. Stands of this alliance are flooded for most or all of the growing season. Stands can have water from 0 (exposed soil) to approximately 1.5 m deep but usually are less than 1 m.

Vegetation Description:
Vegetation is characterized by medium to tall graminoids that typically range from 1 to more than 2 m. The vegetation is moderately dense to dense. Some stands are heavily dominated by one or two *Scirpus (S. acutus* or *S. californicus),* while others have several graminoids common throughout the stand. In the United States, the most abundant species are typically *Scirpus acutus*, *S. fluviatilis*, and *S. tabernaemontani*. Species composition and abundance can vary from year to year depending mostly on water level fluctuations. In most years, typical species include *Lemna* spp., *Phragmites australis*, *Scirpus americanus* (in alkaline stands), *Triglochin maritimum* (in alkaline stands), *Typha latifolia*, and *Utricularia macrorhiza*. *Potamogeton* species often occur in the deeper parts of stands of this alliance, where emergent species are not densely packed. Shrubs, such as *Salix* spp., are not common but may become established in shallow water areas. During droughts, species more tolerant of low water, such as *Polygonum amphibium*, may invade and alter the species composition of stands of this alliance.

Comments:
Traditionally, *Scirpus californicus* has not been included as a diagnostic component of this alliance, but in many stands in California both *S. acutus* and *S. californica* co-occur or the two species appear to be ecologically interchangeable, especially in Suisun Marsh and southern California (Evens and San 2005, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf 1995, Weaver 1960).

References:
Evens and San 2005, Keeler-Wolf and Vaghti 2000, Reid et al. 1999, Sawyer and Keeler-Wolf 1995, Weaver 1960

Selaginella bigelovii/Eriogonum fasciculatum Association

Bushy Spike Moss/California Buckwheat Association
***Selaginella bigelovii* Herbaceous Alliance**
Bushy Spike Moss Herbaceous Alliance

Mapping Code: 4811

Local Description

Summary:
This herbaceous association occurs on moderately steep to very steep slopes of variable aspect at low to mid elevations between 81 and 862 m. It is dominated by *Selaginella bigelovii* in the low layer. *Eriogonum fasciculatum* is characteristically abundant in the shrub layer, and *Quercus agrifolia, Schinus molle,* and *Eucalyptus* spp. are infrequently found in the tree layer at low cover.

Distribution:

This association is sampled in the Upper Elevation Santa Monica Mountains, Western Fog Zone, Eastern Urban, Simi Hills Inland, Dry Inland, and Lower Elevation Inland Santa Monica Mountains regions of the study area.

Environmental Description:
Elevation: range 81–862 m, mean 464.4 m
Aspect: variable (southwest and northwest most common)
Slope: range 7–55 degrees, mean 29.5 degrees
Topography (micro; macro): variable, but usually undulating; variable
Litter Cover: range 1–20%, mean 7.6%
Small Rock Cover: range 0–75%, mean 22.3%
Large Rock Cover: range 8–95%, mean 44.5%
Bare Ground: range 1–65%, mean 14.3%
Parent Material: often igneous, infrequently sedimentary or depositional
Soil Texture: moderately fine clay loam or sandy clay loam

Vegetation Description:
Stands of the *Selaginella bigelovii/Eriogonum fasciculatum* Association form an open to intermittent cryptogam layer (2–48%, mean 15.5%) at 0.01–1 m tall. The shrub layer is open (1–28%, mean 10.9%) at 0–5 m tall. Trees are infrequently emergent (0–2% cover, mean 0.1%) with hardwoods at 0–10 m tall. Total vegetation cover is 4–49%, mean cover is 26.1%.

In this association, *Selaginella bigelovii* is characteristically abundant in the cryptogam layer where lichens and mosses are also sometimes found. The herbaceous layer is diverse and can include many native and nonnative species. *Eriogonum fasciculatum* is characteristically common in the shrub layer at low cover. Other shrubs such as *Yucca whipplei, Adenostoma fasciculatum, Artemisia californica, Malosma laurina, Mimulus aurantiacus,* and *Ceanothus crassifolius* are occasionally present at low cover. The tree layer infrequently includes *Quercus agrifolia, Schinus molle,* and *Eucalyptus* spp. as sparse emergent trees.

***Selaginella bigelovii/Eriogonum fasciculatum* Association**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Shrub									
	ERFA2	*Eriogonum fasciculatum*	97	3.7	0.2	10.0	X	X	
	YUWH	*Yucca whipplei*	50	0.5	0.2	5.0			
	ADFA	*Adenostoma fasciculatum*	47	1.0	0.2	5.0			
	ARCA11	*Artemisia californica*	40	0.8	0.2	5.0			
	MALA6	*Malosma laurina*	37	0.4	0.2	2.5			
	MIAU	*Mimulus aurantiacus*	30	0.5	0.2	4.0			
	CECR	*Ceanothus crassifolius*	27	0.6	0.2	4.0			
	ERCI5	*Eriogonum cinereum*	20	0.4	0.2	7.5			
	RHIN2	*Rhus integrifolia*	20	0.4	0.2	3.0			
	ADSP	*Adenostoma sparsifolium*	20	0.3	0.2	4.0			
	LOSC2	*Lotus scoparius*	20	0.3	0.2	4.0			
	SAME3	*Salvia mellifera*	20	0.2	0.2	4.0			
Herb									
	BRMA3	*Bromus madritensis*	33	0.4	0.2	5.0			X
	BRDI3	*Bromus diandrus*	27	0.4	0.2	4.0			X
	AVENA	*Avena*	23	1.0	0.2	15.0			X
	BROMU	*Bromus*	20	0.7	0.2	6.0			
	DULA	*Dudleya lanceolata*	20	0.1	0.2	3.0			
	LEFI11	*Lessingia filaginifolia*	20	0.01	0.2	0.2			
Cryptogam									
	SEBI	*Selaginella bigelovii*	100	7.1	0.2	45.0	X	X	
	LICHEN	*Lichen*	47	1.9	0.2	10.0			
	MOSS	*Moss*	23	0.1	0.2	2.0			

Other Noteworthy Species:
Calochortus catalinae was found in 1 of 30 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and the CNPS R-E-D Code is 1-2-3. Global rank is G3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Delphinium parryi was found in 1 of 30 surveys of this plant community, which may be the rare *D. parryi* subsp. *blochmaniae.* Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and the CNPS R-E-D Code is 3-2-3. Global rank is G4T2, and state rank is S2.2. Federal listing is Species of Concern, and state listing is none (CNPS 2005, SAMO 2004).

Eriogonum crocatum was found in 4 of 30 surveys of this plant community. Regionally, the park considers this species as Rare. CNPS ranks this species as List 1B, and the CNPS R-E-D Code is 2-2-3. Global rank is G2, and state rank is S2.1. Federal listing is Species of Concern, and state listing is Rare (CNPS 2005, SAMO 2004).

Leptodactylon californicum was found in 1 of 30 surveys of this plant community, which may be the rare species *L. C.* subsp. *tomentosum*. Regionally, the park considers this species as Rare. CNPS ranks this species as List 4, and CNPS R-E-D Code is 1-2-3. Global rank is G5T3, and state rank is S3.2. Federal listing is none, and state listing is none (CNPS 2005, SAMO 2004).

Nonnative Species:
Bromus madritensis, Bromus diandrus, Avena, Bromus hordeaceus, Avena fatua, Avena barbata, Brassica nigra, Erodium cicutarium, Senecio vulgaris, Silene gallica, Centaurea melitensis, Galium aparine, Lolium multiflorum, Schinus molle, Erodium, Carduus pycnocephalus, Eucalyptus, Hypochaeris, Lamarckia aurea, Salsola tragus

Samples Used in Description: (n = 30)
AA0031cc, AA0351cc, AA0434, AA0742cc, AA0747cc, AA0749cc, AA1212, rap0370m, rap0603, rap0605, rap0726, rap0792, rap0793, rap0794m, rap1495, rap1534, rap1618, rap1786, rap2088, rap2222, rap2224, rap2259, rap2287, rap2323, rap2584, rap2652, rap2759, rap2764, rap2765, rap2812

Comments:
This is a characteristic rock outcrop association of both volcanic and sedimentary outcrops in the study area. It typically occurs on relatively gently to moderately sloping slabs of rock and over time may form a thin to moderately thick mat of intertwined roots and rhizomes. These catch soil and dust and build up enough soil to supply substrate for other herbaceous species. The presence of a *Selaginella bigelovii* Alliance has not been identified so far in the national vegetation classification system. These herbaceous stands are visible on outcrops at a distance and often show up as dark mats with emergent drying grass stems and scattered shrubs.

Phases:
None

COMMON NAME	Bushy Spike Moss/California Buckwheat Herbaceous Association
SYNONYM	None
FORMATION CLASS	V. Herbaceous vegetation
FORMATION SUBCLASS	V.B. Perennial forb vegetation
FORMATION GROUP	V.B.2. Temperate or subpolar perennial forb vegetation
FORMATION SUBGROUP	V.B.2.N. Natural/Seminatural temperate or subpolar perennial forb vegetation
FORMATION NAME	V.B.2.N.b. Low temperate or subpolar perennial forb vegetation
ALLIANCE	*Selaginella bigelovii* Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G4S3

Global Description

Distribution:
It is likely that this association and *Selaginella bigelovii* Alliance will prove to be fairly widespread in southern California along expansive rocky substrates including on some of the offshore islands. For example, sampling in inland San Diego County represented one stand of this *Selaginella bigelovii/Eriogonum fasciculatum* Association on south-facing granitoid rocky slopes. Further anecdotal observation suggests that this association may occur in several places in coastal southern California such as the Santa Susana Mountains and the San Gabriel Mountains.

Nations:
United States

States or Provinces:
CA

Environmental Description:
This association is characteristically found on exposed rock outcrops that are usually somewhat steep to steep slopes of igneous or sedimentary parent material.

Vegetation Description:
Stands contain *Selaginella bigelovii* usually as dominant at more than 10% cover. Other cryptogams may be present such as moss and lichen. The herbaceous layer is diverse and can include many native and nonnative species including *Dudleya* spp., *Lessingia filaginifolia, Phacelia* spp., *Bromus madritensis,* and *Avena* spp. Low woody shrubs and subshrubs are present (usually well under 10% cover) but lower in cover than the average *Selaginella* cover. *Eriogonum fasciculatum* is characteristically common in the shrub layer at low cover. Other shrubs may include *Yucca whipplei, Artemisia californica,* and *Adenostoma fasciculatum.*

Comments:
Other *Selaginella* alliances (e.g., *S. Selaginella [tortipila, rupestris]* Alliance*; Sedum nuttallianum* Sparsely Vegetated Alliance) are known from the national vegetation classification (NatureServe 2005). However, the *S. bigelovii* Alliance is the first to be described from California (Evens and San 2005).

References:
Evens and San 2005, NatureServe 2005

Typha sp. Herbaceous Alliance

Cattail Herbaceous Alliance

Mapping Code: 4420

Local Description

Summary:
One stand of this alliance occurs on relatively flat land at low elevation, in wetland habitats such as pond margins and coastal lagoons. It is dominated by *Typha* sp. in the herbaceous layer and has no shrubs or trees.

Distribution:
This association is sampled in the Immediate Coast region of the study area.

Environmental Description:
Elevation: no data
Aspect: flat
Slope: 2 degrees
Topography (micro; macro): flat; bottom
Litter Cover 80%
Small Rock Cover: no data
Large Rock Cover: no data
Bare Ground: no data
Parent Material: depositional
Soil Texture: sand (class unknown)

Vegetation Description:
One stand of this herbaceous alliance forms an intermittent herbaceous layer (60%) at 0.5–1 m tall. Total vegetation cover is 60%.

In this stand, the herbaceous layer is intermittent and dominated by *Typha*. *Scirpus californicus*, *Cakile maritime,* and *Distichlis spicata* are also included in this layer at relatively low cover.

***Typha* sp. Alliance**

Layer	Code	Species Name	Con	Avg	Min	Max	A	C	N
Herb									
	TYPHA	*Typha*	100	55.0	55.0	55.0	X	X	
	SCCA	*Scirpus californicus*	100	3.0	3.0	3.0		X	
	CAMA	*Cakile maritima*	100	0.2	0.2	0.2		X	X
	CORTA	*Cortaderia*	100	0.2	0.2	0.2		X	X
	DISP	*Distichlis spicata*	100	0.2	0.2	0.2		X	
	RUCR	*Rumex crispus*	100	0.2	0.2	0.2		X	X

Other Noteworthy Species:
None

Nonnative Species:
Cakile maritima, Cortaderia, Rumex crispus

Samples Used in Description: (n = 1)
rap2615

Comments:
Typha stands are uncommon in small and local stands within the study area. They may occur in ponds, slow moving stretches of creeks, or along borders of coastal lagoons.

Phases:
None

COMMON NAME	Cattail Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	V. Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	V.A. Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	V.A.5. Temperate or subpolar grassland
PHYSIOGNOMIC SUBGROUP	V.A.5.N. Natural/Seminatural
FORMATION	V.A.5.N.I. Semipermanently flooded temperate or subpolar grassland
ALLIANCE	*Typha* sp. Herbaceous Alliance
CLASSIFICATION CONFIDENCE LEVEL	1
ECOLOGICAL REGIONS	261Bf Santa Monica Mountains, 261Be Simi Valley-Santa Susana Mountains
CONSERVATION STATUS RANK	G5S5

Global Description

Distribution:
This alliance is found at low to moderate elevations in virtually every state in the United States and probably most Canadian provinces.

Nations:
United States, Canada, Mexico

States or Provinces:
virtually all states and provinces in North America

Environmental Description:
This alliance is found most commonly along lake or pond margins, by slow-moving ditches, in shallow basins, adjacent to stream or river channels, in wet mud, in oxbows, and occasionally in river backwaters. Elevations range from near sea level to around 2,000 m in Colorado. Sites where this alliance occur are typically semipermanently flooded, inundated with 30 to 100 cm of water throughout the year. Lacustrine cattail marshes typically have a muck-bottom zone bordering the shoreline, where cattails are rooted in the bottom substrate and a floating mat zone where the roots grow suspended in a buoyant peaty mat. *Typha angustifolia* can grow in deeper water compared to *Typha latifolia*, although both species reach maximum growth at a water depth of 50 cm.

Vegetation Description:
Vegetation is characterized by *Typha* as the main dominant species including *T. angustifolia, T. latifolia,* and/or *T. domingensis* (Hansen et al. 1995, Reid et al. 1999, Sawyer and Keeler-Wolf

1995). Other wetland graminoids or forb species may be present at low cover including *Cyperus* sp., *Scirpus californicus,* and *Rumex* sp. *Typha* species are prolific seed producers, spreading rapidly to become the early colonizers of wet mineral soil, and will persist under wet conditions. Roots and lower stems are well adapted to prolonged submergence, but periods of drawdown are required for seed germination to occur.

Comments:
None

References:
Hansen et al. 1995, Reid et al. 1999, Sawyer and Keeler-Wolf 1995

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Appendix E

VEGETATION SAMPLING PROTOCOLS AND FIELD FORMS

APPENDIX 1. Vegetation Sampling Protocols and Field Forms

CALIFORNIA NATIVE PLANT SOCIETY –
VEGETATION RAPID ASSESSMENT PROTOCOL
CNPS VEGETATION COMMITTEE
(November 5, 2001, Revised SAMO July 23, 2002)

Introduction

The rapid assessment protocol is a reconnaissance-level method of vegetation and habitat sampling. It may be used to quickly assess and map the extent of all vegetation types in relatively large, ecologically defined regions. The California Native Plant Society (CNPS) has adopted this method to verify locations of known vegetation types, to gain information about new types, and to acquire general information about their composition, habitat, and site quality. Other agencies, such as California State Parks and the U.S. Forest Service, are also adopting this method for documenting vegetation patterns.

By using this method, biologists and resource managers can gain a broad ecological perspective, as the full range in ecological variation across broad landscapes can be reflected in the vegetation assessments. For example, changes in environmental elements (such as geology, aspect, topographic position) or physical processes (fire, flooding, erosion, and other natural or human-made disturbances) can influence the distribution of plants or patterning of vegetation, which are documented in the rapid assessments. In turn, these vegetation patterns can influence the distribution of animals across the landscape.

The quantitative vegetation data recorded in the rapid assessments can be described with standard classification techniques and descriptions, and they can be depicted in maps across any landscape. Additional information recorded in the assessments, such as disturbance history and anthropogenic impacts, can serve to define habitat quality and integrity for plant and animal distributions. Because this method provides an important means for representing the full array of biological diversity as well as habitat integrity in an area, it can also be an effective and efficient tool for conducting natural resource planning.

Purpose

The Vegetation Program has adopted the rapid assessment method to update the location, distribution, species composition, and disturbance information of vegetation types as identified in the first edition of *A Manual of California Vegetation* (MCV), a CNPS publication. The release of the MCV heralded a new statewide perspective on vegetation classification. The premise of the book – all vegetation can be quantified based on cover, constancy, and composition of plant species, yielding uniform defensible definitions of vegetation units – has proven to be very useful throughout California and the rest of the nation. The MCV has become the standard reference on California vegetation and has been adopted by many agencies such as

California Department of Fish and Game, the National Park Service, and the U.S. Forest Service as the standard approach to classify vegetation statewide.

One of the most important purposes of rapid assessments is to verify the locations of each vegetation type because much about the geography of vegetation remains uncertain in this state. To obtain a more accurate understanding of the location and distribution of the vegetation types, nothing short of systematic inventory will suffice. Using the rapid assessment method, CNPS Chapters and other organizations can work together in selected ecological regions to gather vegetation data over a short time period in a broad area. This geographic inventory of vegetation types can greatly advance the current distribution understanding of vegetation.

In addition, California is working with a new vegetation classification, and its parameters are largely untested. The rapid assessment method will be used to gather additional information on species composition, distribution, disturbance effects, and environmental influences of vegetation. Thus, this method will provide modifications to the existing vegetation classifications and information on new types.

This protocol can also be used in tandem with other resource assessment protocols such as California Wildlife Habitat Relationships (CWHR) protocols to obtain detailed records on habitat quality and suitability for vertebrate animals in any terrestrial habitat. The CWHR protocols can also help test the relationships between the vegetation type and habitat of various animals and thereby refine the understanding and predictability of the distribution of animals. A portion of the CWHR protocols is incorporated into the rapid assessment method to obtain suitability information for vertebrate species.

While people can quickly obtain information on the variety of vegetation types using this method, some of the vegetation types recorded in the rapid assessment process may be poorly defined in the current classification system. These poorly understood or unknown types will be identified and located and then will be prioritized for more detailed assessment using the CNPS relevé protocol. Thus, the rapid assessment method will be used in conjunction with the relevé method to provide large quantities of valuable data on the distribution and the definition of vegetation. These data will be entered into existing databases for summarizing and archiving, and they will be used to modify and improve statewide vegetation classification and conservation information.

<u>Why do we need to know about the composition and distribution of vegetation?</u>

- to have a more accurate understanding of the commonness and rarity of different forms of vegetation throughout the state
- to link the distribution of various rare and threatened plant species with the vegetation units
- to provide a clearer picture of relationships between vegetation types
- to help prioritize community-based land conservation goals based on the local representation of unique types, high diversity areas, etc.

- to do the same for regional vegetation throughout the state and the nation.
- to broaden the vegetation knowledge base for California
- to motivate people to do more to help identify, protect, and conserve vegetation in their area
- to link vegetation types with habitat for animals

Selecting stands to sample:

To start the rapid assessment method, stands of vegetation needs to be defined.
A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous.

Stands to be sampled may be selected by evaluation prior to a site visit (*e.g.* delineated from aerial photos or satellite images), or they may be selected on site (during reconnaissance to determine extent and boundaries, location of other similar stands, etc.).

Depending on the project goals, you may want to select just one or a few representative stands of each homogeneous vegetation type for sampling (*e.g.* for developing a classification for a vegetation mapping project), or you may want to sample all of them (*e.g.* to define a rare vegetation type and/or compare site quality between the few remaining stands).

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. It is usually denoted with an abbreviation of the sampling location and then a sequential number of that locale (*e.g.* CRRA-001 for Coyote Ridge rapid assessment number 1).

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for the first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects is NAD 27. However, other agencies and organizations may prefer another datum. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle "Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g.* binoculars, aerial photo).

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record using a GPS unit or USGS topographic map.

UTM zone: Universal Transverse Mercator zone. Zone 10S for California west of the 120th longitude; zone 11S for California east of 120th longitude.

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the roll number, frame number, direction, and the name of the person whose camera is being used. Take at least two photographs from different directions, and describe the location and view direction from compass bearings for each frame. Additional photographs of the stand may also be helpful. (Also, if using a digital camera or scanning the image into a computer, positions relative to the polygon/stand number can be recorded digitally.)

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top).

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.* igneous, metamorphic, sedimentary). *See code list for types.*

Soil: Record soil texture or series that is characteristic of the site (*e.g.* sand, silt, clay, coarse loamy sand, sandy clay loam, saline, et.). *See soil texture key and code list for types.*

% Large Rock (optional): Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.

% Small Rock (optional): Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.

% Bare/Fines (optional): Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.

General slope exposure (circle one and enter actual º): Read degree aspect from a compass or clinometer (or estimate). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (circle one and enter actual º): Read degree slope from compass (or estimate), using degrees from true north (adjusting for declination). Average the reading over entire stand.

Upland or Wetland (circle one) Indicate if the stand is in an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.* seasonally wet meadow).

Site history, stand age, and comments: Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Type / level of disturbance (use codes): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as L (=Light), M (=Moderate), or H (=Heavy). *See code list for impacts.*

VEGETATION DESCRIPTION

Basic alliance and stand description.

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g. Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field. If this is the case, also make sure to denote and explain this in the "Cannot identify alliance based on MCV classification" of the "**Problems with Interpretation**" section below.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g. Quercus agrifolia/Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g. Quercus agrifolia-Quercus kelloggii).*

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Number of encounters of this alliance (tally/circle once): This estimate can be done for a landscape-level project of a general area, ecological subsection, watershed, etc., though it is not required. Make an estimate of the total number of times that this alliance was seen in the project survey and recorded on field forms.

Please note: This estimation should only be done once, at the end of a project survey, for every alliance identified in the field. Please provide the tally once for each alliance, and provide the estimate on the first rapid assessment field form that was filled out for each alliance.

Habitat classification per California Wildlife-Habitat Relationships (CWHR)
For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree: Circle one of the tree size classes provided when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average dbh (diameter of trunk at breast height). In choosing a size class, make sure to estimate the mean diameter of all trees over the entire stand. Circle the size class 6 multi-layered tree if there is a size class 5 of trees over a distinct layer of size class either 3 or 4 (*i.e.*, distinct height class separation between different tree species) and the total tree canopy exceeds 60%.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent (except in desert types), please list the dominant species that occur in the overstory canopy.

Shrub: Circle one of the shrub size classes provided when shrub canopy closure exceeds 10 percent (except in desert types). Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herbaceous: Circle one of the herb height classes provided when herbaceous cover exceeds 2 percent. This height class is based on the average plant height at maturity.

Desert Palm/Joshua Tree: Circle one of the palm or Joshua tree size classes by averaging all the stem-base diameters (*i.e.*, mean diameter of all stem-base sizes). Diameter is measured at the plant's base above the bulge near the ground.

Desert Riparian Tree/Shrub: Circle one of the size classes by measuring mean stem height (whether tree and/or shrub stand).

Overall cover of vegetation
Provide an ocular estimate of cover for the following categories (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Modal height for conifer/hardwood tree, shrub, and herbaceous categories *(optional)*
If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value, estimating the modal height for each group. Use the following height intervals and record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

SPECIES LIST AND COVERAGE

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

List the species that are dominant or that are characteristically consistent throughout the stand.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per

stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height.

Also, provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals from the CNPS relevé form at first (*e.g.* <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%). Keeping these classes in mind, then refine your estimate to a specific percentage (*e.g* the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Major nonnative species in stand (with % cover): All exotic species occurring in the stand should be listed in this space provided (or they can be recorded in the above Species list). Make sure to give each exotic species an absolute coverage estimate.

Unusual species: List species that are either locally or regionally rare, endangered, or atypical (*e.g.* range extension or range limit) within the stand. This species list will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

PROBLEMS WITH INTERPRETATION

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Cannot identify alliance based on MCV classification? (Check if appropriate) and Explain: If the field-assessed alliance name is not defined by CNPS's present Manual of California Vegetation (MCV) classification, note this in the space and describe why. In some instances for specific projects, there may be the benefit of more detailed classifications than what is presented in the first edition of the MCV. If this is the case, be sure to substitute the most appropriate and detailed classification.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the

ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g.* in structure, density, or extent), please detail here.

Simplified Key to Soil Texture (Brewer and McCann, 1982)

Place about three teaspoons of soil in the palm of your hand. Take out any particles >2mm in size, and use the following key to figure out the soil texture (e.g. loamy sand). Then figure out the texture subclass by using the Code List attached (e.g. coarse loamy sand).

A1 Soil does not remain in a ball when squeezed.....sand

A2 Soil remains in a ball when squeezed..... B

B1 Add a small amount of water. Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you push up over your finger. Soil makes no ribbon.....loamy sand

B2 Soil makes a ribbon; may be very short.....C

C1 Ribbon extends less than 1 inch before breaking.....D

C2 Ribbon extends 1 inch or more before breaking.....E

D1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty .....loam or sandy loam

D2 Soil feels smooth.....silt loam

E1 Soil makes a ribbon that breaks when 1–2 inches long; cracks if bent into a ring.....F

E2 Soil makes a ribbon 2+ inches long; does not crack when bent into a ring.....G

F1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty.....sandy clay loam or clay loam

F2 Soil feels smooth.....silty clay loam or silt

G1 Add excess water to a small amount of soil; soil feels gritty or at least slightly gritty.....sandy clay or clay

G2 Soil feels smooth.....silty clay

CALIFORNIA NATIVE PLANT SOCIETY RELEVÉ FIELD FORM CODE LIST

(revised 7/8/02)

MACRO TOPOGRAPHY

00 Bench
01 Ridge top (interfluve)
02 Upper 1/3 of slope
03 Middle 1/3 of slope
04 Lower 1/3 of slope (lowslope)
05 Toeslope (alluvial fan/bajada)
06 Bottom/plain
07 Basin/wetland
08 Draw
09 Other
10 Terrace (former shoreline or floodplain)
11 Entire slope
12 Wash (channel bed)
13 Badland (complex of draws & interfluves)
14 Mesa/plateau
15 Dune/sandfield
16 Pediment
17 Backslope (cliff)

MICRO TOPOGRAPHY

01 Convex or rounded
02 Linear or even
03 Concave or depression
04 Undulating pattern
05 Hummock or Swale pattern
06 Mounded
07 Other

IMPACTS

01 Development
02 ORV activity
03 Agriculture
04 Grazing
05 Competition from exotics
06 Logging
07 Insufficient population/stand size
08 Altered flood/tidal regime
09 Mining
10 Hybridization
11 Groundwater pumping
12 Dam/inundation
13 Other
14 Surface water diversion
15 Road/trail construction/maint.
16 Biocides
17 Pollution
18 Unknown
19 Vandalism/dumping/litter
20 Foot traffic/trampling
21 Improper burning regime
22 Over collecting/poaching
23 Erosion/runoff
24 Altered thermal regime
25 Landfill
26 Degrading water quality
27 Wood cutting
28 Military operations
29 Recreational use (non ORV)
30 Nest parasitism
31 Nonnative predators
32 Rip-rap, bank protection
33 Channelization (human caused)
34 Feral pigs
35 Burros
36 Rills
37 Phytogenic mounding

PARENT MATERIAL

ANDE	Andesite
ASHT	Ash (of any origin)
GRAN	Granitic (generic)
GREE	Greenstone
DIOR	Diorite
BASA	Basalt
OBSI	Obsidian
PUMI	Pumice
IGTU	Igneous (type unknown)
MONZ	Monzonite
PYFL	Pyroclastic flow
QUDI	Quartz diorite
RHYO	Rhyolite
VOLC	General volcanic extrusives
VOFL	Volcanic flow
VOMU	Volcanic mud
BLUE	Blue schist
CHER	Chert
DOLO	Dolomite
FRME	Franciscan melange
INTR	General igneous intrusives
GNBG	Gneiss/biotite gneiss
HORN	Hornfels
MARB	Marble
METU	Metamorphic (type unknown)
PHYL	Phyllite
SCHI	Schist
SESC	Semi-schist
SLAT	Slate
BREC	Breccia (non-volcanic)
CACO	Calcareous conglomerate
CASA	Calcareous sandstone
CASH	Calcareous shale
CASI	Calcareous siltstone
CONG	Conglomerate
FANG	Fanglomerate
GLTI	Glacial till, mixed origin, moraine
LALA	Large landslide (unconsolidated)
LIME	Limestone
SAND	Sandstone
SETU	Sedimentary (type unknown)
SHAL	Shale
SILT	Siltstone
DIAB	Diabase
GABB	Gabbro
PERI	Peridotite
SERP	Serpentine
ULTU	Ultramafic (type unknown)
CALU	Calcareous (origin unknown)
DUNE	Sand dunes
LOSS	Loess
MIIG	Mixed igneous
MIME	Mixed metamorphic
MIRT	Mix of two or more rock types
MISE	Mixed sedimentary
CLAL	Clayey alluvium
GRAL	Gravelly alluvium
MIAL	Mixed alluvium
SAAL	Sandy alluvium (most alluvial fans and washes)
SIAL	Silty alluvium
OTHE	Other than on list

SOIL TEXTURE

COSA	Coarse sand
MESN	Medium sand
FISN	Fine sand
COLS	Coarse, loamy sand
MELS	Medium to very fine, loamy sand
MCSL	Moderately coarse, sandy loam
MESA	Medium to very fine, sandy loam
MELO	Medium loam
MESIL	Medium silt loam
MESI	Medium silt
MFCL	Moderately fine clay loam
MFSA	Moderately fine sandy clay loam
MFSL	Moderately fine silty clay loam
FISA	Fine sandy clay
FISC	Fine silty clay
FICL	Fine clay
SAND	Sand (class unknown)
LOAM	Loam (class unknown)
CLAY	Clay (class unknown)
UNKN	Unknown

DOMINANT VEGETATION GROUP

Trees:

TBSE	Temperate broad-leaved seasonal evergreen forest
TNLE	Temperate or subpolar needle-leafed evergreen forest
CDF	Cold-deciduous forest
MNDF	Mixed needle-leafed evergreen-cold-deciduous. forest
TBEW	Temperate broad-leaved evergreen woodland
TNEW	Temperate or subpolar needle-leaved evergreen woodland
EXEW	Extremely xeromorphic evergreen woodland
CDW	Cold-deciduous woodland
EXDW	Extremely xeromorphic deciduous woodland
MBED	Mixed broad-leaved evergreen-cold-deciduous woodland
MNDW	Mixed needle-leafed evergreen-cold-deciduous woodland

Shrubs:

TBES	Temperate broad-leaved evergreen shrubland
NLES	Needle-leafed evergreen shrubland
MIES	Microphyllus evergreen shrubland
EXDS	Extremely xeromorphic deciduous shrubland
CDS	Cold-deciduous shrubland
MEDS	Mixed evergreen-deciduous shrubland
XMED	Extremely xeromorphic mixed evergreen-deciduous shrubland

Dwarf Shrubland:

NMED	Needle-leafed or microphyllous evergreen dwarf shrubland
XEDS	Extremely xeromorphic evergreen dwarf shrubland
DDDS	Drought-deciduous dwarf shrubland
MEDD	Mixed evergreen cold-deciduous dwarf shrubland

Herbaceous:

TSPG	Temperate or subpolar grassland
TGST	Temperate or subpolar grassland with sparse tree
TGSS	Temperate or subpolar grassland with sparse shrublayer
TGSD	Temperate or subpolar grassland with sparse dwarf shrub layer
TFV	Temperate or subpolar forb vegetation

THRV	Temperate or subpolar hydromorphic rooted vegetation
TAGF	Temperate or subpolar annual grassland or forb vegetation

***Sparse Vegetation*:**

SVSD	Sparsely vegetated sand dunes
SVCS	Sparsely vegetated consolidated substrates

VEGETATION RAPID ASSESSMENT / RELEVE FIELD FORM

(Revised April 23, 2003--SAMO)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

LOCATIONAL/ENVIRONMENTAL DESCRIPTION — **FinalAISCode:** _____

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:	InitialAISCode	FieldCrewCode
_____	_____	_____	_____	_____	_____

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (NAD 27)** _____ **Is GPS within stand?** Yes / No

If No cite: distance _____**m, secant/100 + / -** _____**, bearing** _____ **If RELEVE, center of plot?** Yes / No **Error: ±**_____ **ft/m**

UTM field reading: UTME ___ ___ ___ ___ ___ ___ **UTMN** ___ ___ ___ ___ ___ ___ ___ **UTM zone:** _____

Elevation: _____ **ft/m Photograph #'s**: _____

Topography: flat____ **concave**____ **convex**____ **undulating**____ | **bottom**____ **lower**____ **mid**____ **upper**____ **top**____

Geology: _____ **Soil Texture:** _____ **% Large Rock**_____ **% Small Rock**_____ **% Bare/Fines**_____

Slope exposure: **NE**_____ **SE**_____ **SW**_____ **NW**_____ **Flat**__ **Variable**__ **%Litter**_____

Slope steepness: 0^o__ $1\text{-}5^o$ ____ $5\text{-}25^o$____ $> 25^o$____ **Size of stand**: <1 acre___ 1-5 acres___ >5 acres ___ **Upland or Wetland**

Site history, stand age, and comments: _____

_____

_____

_____

_____

_____

Type / level of disturbance (use codes): _____

VEGETATION DESCRIPTION

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Tree: T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)
If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.) **Desert Palm/Joshua Tree:** N/A **Desert Riparian Tree/Shrub:** N/A
% Overstory Conifer/Hardwood Tree cover: _____/_____ **Shrub cover:** _____ **Herbaceous cover:** _____ **Total Veg cover:**_____
Modal Conifer/Hardwood height: _____/_____ **Tall Shrub/Low Shrub height:** _____/_____ **Herbaceous height:** _____

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

Strata categories: T=tall, M=medium, L=low; **% cover** intervals for reference: **<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%**

Strata	Species	% cover		Strata	Species	% cover

Major non-native species (with % cover): _____

Unusual species: _____

PROBLEMS WITH INTERPRETATION — **Bino Assessed Only? Yes / No**

Confidence in identification: (L, M, H) ID problems: _____

Polygon is more than one type: (Yes, No) _____ **Other types:** _____
Has the vegetation changed since air photo taken? (Yes, No) _____ **If Yes, how? What has changed** (write N/A if so)**?** _____
_____

RELEVE INFO **Plot Length (m)** _____ **Plot Width** _____ **If circle, diam** _____ **Plot Permanent? Y / N**

Representativeness of plot in stand: _____

_____

_____

Releve Protocol
Santa Monica Mtns NRA

June 11, 2003

This document is intended to provide general instructions and guidelines for conducting Releves at SAMO NRA. Parts have been adapted from the Yosemite Releve Protocol or CNPS Rapid Assessment Protocol. For SAMO NRA, the Releve has essentially become an in-depth Rapid Assessment. That is to say essentially the same information is gathered for a Rapid Assessment as for a Releve with the addition of a complete species list. The other main difference between the two protocols is that for Releves, the species list is compiled from within a defined area as opposed to the entire stand.

The same field form is used for both RA and Releve information. However, not all fields are required for both data types.

Establishing a Plot

1) Figure out where to place your plot. This is a subjective process. You'll want to place your plots in areas that seem to be both relatively **homogenous** and **representative** of the vegetation of the polygon as a whole. In other words, avoid areas where the vegetation appears to be transitioning from one type to another, and areas with anomalous or heterogeneous structure or species composition. Take some time to do this carefully, because the plots you set up may become *permanent*; relocated and resampled over time in order to determine responses to management, and other useful things. Look at *all* the vegetation strata to determine if the area is structurally and floristically uniform and generally try to place your plots a fair distance from what you see as the 'boundary' between this vegetation type and any neighboring, distinctly different types. However, the rule-of-thumb is to conduct a reconnaissance of the plot if time and topography allows.

Note: In cases where a polygon is very heterogeneous, more than one plot may be needed. Again, look around, use that human perception.

2) Take GPS information from CENTER of plot. Remember that this may become a permanent plot, so being able to *find* it again will be key: use the GPS, rather than estimating! (If you cannot get a GPS reading, estimate the coordinates from the topo map and note on the form that you had to resort to this method.)

Note: You can deviate from the standard plot *shapes* where that makes sense, but the total plot *area* encompassed by the boundaries should be as listed above for each major class of vegetation. For example, forested riparian vegetation, may be sampled in a more linear, 10 x 100 m (1000 m^2) plot; herbaceous riparian or ridgeline vegetation in a 2 x 50 m (100 m^2) plot.

Standard plot sizes

If you're in a ...	You should make your plot...	Giving you a plot area of...
Forest (trees have their crowns overlapping, usually forming 60-100% cover)	20 m x 50 m	1000 m^2
Woodland (open stands of trees with crowns usually not touching. Canopy tree cover is 25-60% Or exceeds shrub, dwarf-shrub, herb, and nonvascular cover).	20 m x 50 m	1000 m^2
Shrubland (shrubs greater than 0.5 m tall are dominant, usually forming more than 25% cover OR exceeding tree, dwarf-shrub, herb, and nonvascular cover)	20 m x 20 m	400 m^2
Dwarf-shrubland (shrubs less than 0.5 m tall are dominant, usually forming more than 25% cover OR exceeding tree, shrub, herb, and nonvascular cover).	20 m x 20 m	400 m^2
Herbaceous (herbs dominant, usually forming more than 25% cover OR exceeding tree, shrub, dwarf-shrub, and nonvascular cover).	10 m x 10 m	100 m^2
Nonvascular (nonvascular cover dominant, usually forming more than 25% cover).	5 m x 5 m	25 m^2

Notes on Compiling Species list:

As you begin to collect the species, DBH, and cover information on page two, keep these four rules in mind—they will speed your data collection considerably:

1) If there are more than 25 trees over 10 cm DBH, measure a representative quarter of the plot (this may be any portion of the plot but should be 25% of the total plot area. CLEARLY NOTE on the form where this sub-sample was taken. Also, remember that DBH is an inherently inexact measurement (your 'breast height may be very different from the next ecologist's for one thing), so don't fret over this one—this should be a quick measurement!

2) Except in very diverse plots, don't spend more than **20 minutes** looking for new and different species to record. Remember that these plot data are to be used to classify the overall vegetation of the Park, not to make a complete species list for it. And if you had to spend much more than 20 minutes to *find* a species, it probably isn't going to be important in characterizing the vegetation type. For diverse plots with over 25 taxa you may take up to 30 minutes on the listing process.

3) We have asked you to estimate in cover classes, but often it is helpful to make and attempt to estimate an actual percent cover for certain species. This may be useful in getting a sense of total vegetation cover (by adding percentages) and in determining to which category a species that is a

borderline between two cover classes should be assigned. Try not to agonize over the percent cover column. This is only a rough visual estimate.

4) If you can't identify a plant to species, record the species on your form as "unknown species 1," "unknown species 2," "Carex unknown sp. 1," etC. Record cover class and other data for the unknown as you would for any other species.

If you need the species identified right away because it appears to be dominant or diagnostic (you're seeing it all over the place or you're seeing much more in this particular vegetation type than in others), take a sample of the species with as much of the plant as possible, especially intact sexual parts, if present. Place the sample in a baggie, and label the baggie with the plot code and the name you gave it on the data form. On an office day, take the time to key the plant out. If unable to get a definite ID, bag the plant and give it to the Inventory and Monitoring Botanist or send it to the UCLA herbarium curator.

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. If it is a polygon that AIS has requested information on, assign it the AIS number given on the In-house Field Map. If AIS has not requested information on the polygon (no AIS number to be assigned), use the next sequential number from your team's list of Releve numbers. Also be sure to label the location on paper copy of the photo overlay.

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for their first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

Initial AIS Code: 4-digit mapping classification code assigned by AIS at time of initial interpretation.

Field Crew Code: 4-digit code mapping classification code assigned by Field crew upon completion of form. This should correspond as closely as possible to the Field Alliance and Association Name (see below).

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects as well as SAMO projects is NAD 27. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle"Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand). For Releves, there is an additional field "If RELEVE, center of plot?". Be sure to describe location of the point if not taken at center.

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g.* binoculars, aerial photo).

If Releve, Center of plot? Yes/No If the plot being gathered is a releve, was the GPS point taken at the center of the releve? If it is not in the center, describe the location in the notes section.

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record UTMs using a GPS unit (preferred) or In-House Topographic Field Maps.

UTM zone: Universal Transverse Mercator zone. Zone is 11 for all of SAMO.

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the roll number, frame number, direction, and the name of the person whose camera is being used. Take at least two photographs from different directions, and describe the location and view direction from compass bearings for each frame. Additional photographs of the stand may also be helpful.

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top). . In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.* igneous, metamorphic, and sedimentary). *See code list for types.*

Soil: Record soil texture or series that is characteristic of the site (*e.g.* sand, silt, clay, coarse loamy sand, sandy clay loam, saline, etc.). *See soil texture key and code list for types.*

% Large Rock (optional): Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.

% Small Rock (optional): Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.

% Bare/Fines (optional): Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.

% Litter (optional): Estimate the percent surface cover of organic litter.

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate), using degrees from true north (adjusting for declination). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate). Average the reading over entire stand. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

Upland or Wetland (circle one): Indicate if the stand is an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.* seasonally wet meadow).

Site history, stand age, and comments: Briefly describe the stand age/serial stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Type / level of disturbance (use codes): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as L (=Light), M (=Moderate), or H (=Heavy). *See code list for impacts.*

VEGETATION DESCRIPTION

Basic alliance and stand description.

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g. Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g. Quercus agrifolia/Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g. Quercus agrifolia-Quercus kelloggii).*

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Number of encounters of this alliance (tally/circle once): This estimate can be done for a landscape-level project of a general area, ecological subsection, watershed, etc., though it is not required. Make an estimate of the total number of times that this alliance was seen in the project survey and recorded on field forms.

Please note: This estimation should only be done once, at the end of a project survey, for every alliance identified in the field. Please provide the tally once for each alliance, and provide the estimate on the first rapid assessment field form that was filled out for each alliance.

Habitat classification per California Wildlife-Habitat Relationships (CWHR)

For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree: Circle one of the tree size classes provided when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average dbh (diameter of trunk at breast height). In choosing a size class, make sure to estimate the mean diameter of all trees over the entire stand. Circle the size class 6 multi-layered tree if there is a size class 5 of trees over a distinct layer of size class either 3 or 4 (*i.e.*, distinct height class separation between different tree species) and the total tree canopy exceeds 60%.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent (except in desert types), please list the dominant species that occur in the overstory canopy.

Shrub: Circle one of the shrub size classes provided when shrub canopy closure exceeds 10 percent (except in desert types). Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herbaceous: Circle one of the herb height classes provided when herbaceous cover exceeds 2 percent. This height class is based on the average plant height at maturity.

Desert Palm/Joshua Tree: Circle one of the palm or Joshua tree size classes by averaging all the stem-base diameters (*i.e.*, mean diameter of all stem-base sizes). Diameter is measured at the plant's base above the bulge near the ground.

Desert Riparian Tree/Shrub: Circle one of the size classes by measuring mean stem height (whether tree and/or shrub stand).

Overall cover of vegetation

Provide an ocular estimate of cover for the following categories (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each

category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Modal height for conifer/hardwood tree, shrub, and herbaceous categories (optional)

If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value, estimating the modal height for each group. Use the following height intervals and record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

Species list and coverage: This Section should be skipped when performing a Releve. An extended table is provided on the back of the sheet.

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please) **Major nonnative species in stand (with % cover), Unusual species.** If using form for a releve, this information is filled out in a separate table. See Releve Info below.

PROBLEMS WITH INTERPRETATION

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this

alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g.* in structure, density, or extent), please detail here.

RELEVE INFO: This section is only for Releve use.

Plot Length (m): Record the long axis of the Releve plot in meters.

Plot Width: Record the short axis of the Releve plot in meters.

If circle, diam: If the Releve plot is a circle, record the diameter in meters.

Plot Permanent? If the Releve plot is marked permanently with rebar, etc, circle Y (yes).

Representativeness of plot in stand: Does this plot represent the full variability of the polygon? If not, were additional plots taken? Note additional species not seen in plot in the space provided below. You may also include notes about how this polygon compares to others you have seen of similar type.

Species Table (Releve)

This is found on the backside of the form. At the top of the page, be sure to fill out polygon/stand #, Air photo, and the number of pages the species list is on. List the species that are dominant or that are characteristically consistent throughout the plot.

When different layers of vegetation occur in the plot, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. Check a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height. Note that you may list the same species in more than one strata, based on the maximum height of the individuals, thus, those canopy tree-sized individuals should only be listed in the canopy tree category and those herb-size individuals should only be listed in the H layer.

For plots with trees, list the DBH (in cm) of all trees above 10 cm diameter (this would include each stem from a multi-stemmed tree). Separate the measurements with a comma. For plots with very high tree density DBH measurements will be done in a subplot. If the number of trees with a DBH greater than 10 cm is more than about 25, divide the plot into quarters and measure the DBH of trees in the most representative quadrant. CLEARLY NOTE on the form that this is what you've done.

Provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals (see below). Record the cover class, and then refine your estimate to a specific percentage (*e.g.* the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Cover Scale for Species Percent Cover

Code	Range of Class	Class midpoint
01	>0-1%	0.5%
02	1-5%	3%
03	5-25%	15%
04	25-50%	37.5%
05	50-75%	62.5%
06	75-100	87.5%

VEGETATION RAPID ASSESSMENT / RreleVE FIELD FORM

(Revised April 23, 2003--SAMO)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

LOCATIONAL/ENVIRONMENTAL DESCRIPTION — **FinalAISCode:** _____

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:	InitialAISCode	FieldCrewCode
_____	_____	_____	_____	_____	_____

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (NAD 27)** _____ **Is GPS within stand?** Yes / No

If No cite: distance _____**m, secant/100 + / -** _____**, bearing** _____ **If RELEVE, center of plot?** Yes / No **Error: ±**_____ **ft/m**

UTM field reading: UTME ___ ___ ___ ___ ___ ___ **UTMN** ___ ___ ___ ___ ___ ___ ___ **UTM zone:** _____

Elevation: _____ **ft/m Photograph #'s**: _____

Topography: flat____ **concave**____ **convex**____ **undulating**____ | **bottom**____ **lower**____ **mid**____ **upper**____ **top**____

Geology: _____ **Soil Texture:** _____ **% Large Rock**_____ **% Small Rock**_____ **% Bare/Fines**_____

Slope exposure: **NE**_____ **SE**_____ **SW**_____ **NW**_____ **Flat**__ **Variable**__ **%Litter**_____

Slope steepness: 0^o__ $1\text{-}5^o$ ____ $5\text{-}25^o$____ $> 25^o$____ **Size of stand**: <1 acre___ 1-5 acres___ >5 acres ___ **Upland or Wetland**

Site history, stand age, and comments: _____

Type / level of disturbance (use codes): _____

VEGETATION DESCRIPTION

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Tree: T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)
If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.) **Desert Palm/Joshua Tree:** N/A **Desert Riparian Tree/Shrub:** N/A
% Overstory Conifer/Hardwood Tree cover: _____/_____ **Shrub cover:** _____ **Herbaceous cover:** _____ **Total Veg cover:**_____
Modal Conifer/Hardwood height: _____/_____ **Tall Shrub/Low Shrub height:** _____/_____ **Herbaceous height:** _____

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

Strata categories: T=tall, M=medium, L=low; **% cover** intervals for reference: **<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%**

Strata	Species	% cover		Strata	Species	% cover

Major non-native species (with % cover): _____

Unusual species: _____

PROBLEMS WITH INTERPRETATION — **Bino Assessed Only? Yes / No**

Confidence in identification: (L, M, H) ID problems: _____

Polygon is more than one type: (Yes, No) _____ **Other types:** _____
Has the vegetation changed since air photo taken? (Yes, No) _____ **If Yes, how? What has changed** (write N/A if so)**?** _____
_____

RELEVE INFO **Plot Length (m)** _____ **Plot Width** _____ **If circle, diam** _____ **Plot Permanent? Y / N**

Representativeness of plot in stand: _____
_____
_____
_____

Releve Polygon/Stand # _____ Air Photo _____ **Species List** Page_____ of _____

SANTA MONICA Mountains VEGETATION MAPPING SPECIES INFORMATION

Cover Class Intervals: 1 (<1%), 2 (1-5%), 3 (>5-25%), 4 (>25-50%), 5 (>50-75%), 6 (>75%)

L	M	T	Vascular plant name or moss/lichen cryptogamic crust cover	DBH of all trees > 10 cm.	Cover Class	%

Total Vegetation Cover (Class/%): ____/_____ Total Nonnative (Class/%) _____/_____

Accuracy Assessment Protocol
Santa Monica Mountains NRA

Updated: August 11, 2004

Accuracy Assessments (AAs) are gathered to assess the accuracy and calibration level of the mapping units assigned to each polygon. AAs focus on the drawn polygon more than the actual stand.

Choose stands of which you have a good, representative view. Do not choose to AA a polygon that you can only see part of or ones that seem to be transitional. AAs need to be representative of all the diversity of mapped vegetation units in the entire mapping area, much like Rapid Assessments and Releves. A regularly-updated tracking matrix will be provided to the field crews to help insure spread of AAs across SAMO mapping area.

Definitions of Data Fields:

IDENTIFIERS/LOCATORS

Field Point Number: Number assigned to polygon. Each team has been provided with a list of consecutive numbers to be assigned to AA point. Select the next available number and be sure to label the location on the paper copy of the field overlay.

Air Photo: The number given to the aerial photo in a vegetation-mapping project.

Date: Date of the sampling.

Surveyors: The full names of each person assisting should be provided for their first accuracy assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

Park Site Name: Provisional name assigned by field worker that describes where the data were collected. It should represent an identifiable feature on a topographic map.

Quad Code: Appropriate name/scale from survey map used; use 7.5-minute quadrangle if possible. May often be found on photo overlay.

Primary Veg Assoc Name: Using the Vegetation Type Classification Key, assign the best-fitting Association name. Also record the 4-digit mapping code. If Classification Key is not completed, record best guess under Classification Comments.

Secondary Veg Assoc Name: Using the Vegetation Type Classification Key, assign the second-best-fitting Association name. Also record the 4-digit mapping code. If Classification Key is not completed, record best guess under Classification Comments.

Other Veg Assocs within 50m: Record the direction/location and the names of vegetation associations within 50 meters of polygon, as you see them onsite. This is used to double-check location of polygon surveyed.

Classification Comments: Does it key easily using the Vegetation Type Classification Key? Are all diagnostic species present in proper proportions? In not, how do they differ?

GPS File Name: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS Unit: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects as well as SAMO projects is NAD 27. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle"Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g*. binoculars, aerial photo).

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record UTMs from a GPS unit (preferred) or In-House Topographic Field Maps.

UTM zone: Universal Transverse Mercator zone. Zone is 11 for all of SAMO.

Corrected UTM: Not to be filled out in field.

ENVIRONMENTAL DESCRIPTION

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate) using degrees from true north (adjusting for declination).. Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate), Average the reading over entire stand.

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top).

Environmental Comments: Include comments on hydrology and fire history. Has the vegetation in polygon changed since photos?

Unvegetated Surface: Use the cover scale below to record % cover of Large rocks, Small rocks, Bare/Fine, Litter.

VEGETATION DESCRIPTION

Leaf phenology (of dominant stratum): Select the value which best describes the leaf phenology of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

EVERGREEN - Greater than 75% of the total woody cover is never without green foliage.

COLD-DECIDUOUS - Greater than 75% of the total woody cover sheds its foliage in connection with an unfavorable season mainly characterized by winter frost.

DROUGHT DECIDUOUS - Greater than 75% of the total woody cover sheds its foliage in connection with an unfavorable season mainly characterized by drought.

MIXED EVERGREEN - COLD-DECIDUOUS - Evergreen and deciduous species generally contribute 25-75% of the total woody cover. Evergreen and cold-deciduous species admixed.

MIXED EVERGREEN - DROUGHT DECIDUOUS - Evergreen and deciduous species generally contribute 25-75% of the total woody cover. Evergreen and drought-deciduous species admixed.

PERENNIAL - Herbaceous vegetation composed of more than 50% perennial species.

ANNUAL - Herbaceous vegetation composed of more than 50% annual species.

Leaf Type: Select one value which best describes the leaf form of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

BROAD-LEAVED - Woody vegetation primarily broad-leaved (generally contributes greater than 50 percent of the total woody cover).

NEEDLE-LEAVED - Woody vegetation primarily needle-leaved (generally contributes greater than 50 percent cover).

MICROPHYLLOUS - Woody cover primarily microphyllous.

GRAMINOID - Herbaceous vegetation composed of more than 50 percent graminoid/stipe leaf species.

FORB (BROAD-LEAF-HERBACEOUS) - Herbaceous vegetation composed of more than 50% broad-leaf forb species.

PTERIDOPHYTE - Herbaceous vegetation composed of more than 50 percent species with frond or frond-like leaves.

PHYSIOGNOMIC CLASS CHOOSE ONE:

FOREST: Trees with their crowns overlapping (generally forming 60-100% cover).

WOODLAND: Open stands of trees with crowns not usually touching (generally forming 25-60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.

SHRUBLAND: Shrubs generally greater than 0.5 m tall with individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees generally less than 25% cover). Shrub cover may be less than 25% where it exceeds tree, dwarf-shrub, herb, and nonvascular cover, respectively. Vegetation dominated by woody vines is generally treated in this class.

DWARF-SHRUBLAND: Low-growing shrubs usually under 0.5 m tall. Individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees and tall shrubs generally less than 25% cover). Dwarf-shrub cover may be less than 25% where it exceeds tree, shrub, herb, and nonvascular cover, respectively.

HERBACEOUS: Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover, respectively.

NONVASCULAR: Nonvascular cover (bryophytes, non-crustose lichens, and algae) dominant (generally forming at least 25% cover). Nonvascular cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and herb cover, respectively.

SPARSE VEGETATION: Abiotic substrate features dominant. Vegetation is scattered to nearly absent and generally restricted to areas of concentrated resources (total vegetation cover is typically less than 25% and greater than 0%).

Strata/Lifeform, Height, Cover, Diagnostic Species: Visually divide the community into vegetation layers (strata). Indicate the average height class of the stratum in the first column, using the Height Scale on the form. Enter the average percent cover class of the whole stratum in the second column, using the Cover Scale on the form. Height and Cover classes are also listed below.

List the *dominant* species and individual cover classes in each stratum. If species known to be diagnostic of a particular vegetation type are present, list these as well, marking them with an asterisk. Only note species of the dominant vegetation type. *Do not list species found in inclusions* (small patches in polygon of different vegetation types).

Note: All AA's collected before August 11, 2004, included all species found in inclusions in the species list in an effort to describe the entire mapping polygon.

Heterogeneity: Choose the one that best describes the heterogeneity of the polygon.

HOMOGENEOUS: a map unit with at least 85% of the area composed of a homogenous condition of vegetation (at the appropriate level in the classification hierarchy) or dominance types

COMPOSED OF SIMILAR TYPES: a map unit composed of a grouping of vegetation or dominance types (at the appropriate level in the classification hierarchy) with similar taxonomic composition and physiognomy. For example, a complex of scrub oak pure and scrub oak - interior oak patterns something different at the fine scale but is closely related in the vegetation classification.

COMPOSED OF DISSIMILAR TYPES: a map unit composed of a grouping of dissimilar vegetation types (at the appropriate level in the classification hierarchy) that are spatially and ecologically related on the landscape. For example, a small herbland and adjacent rock outcroppings complexing in a small area.

Inclusions: List the vegetation type of any inclusions found within the mapping polygon and the percent of the polygon composed of them. Additional descriptions of the inclusions such as location can be entered under *AA Comments*.

Cover Scale 1:

01	0-5%
02	>5-10%
03	>10-20%
04	>20-30%
05	>30-40%
06	>40-50%
07	>50-60%
08	>60-70%
09	>70-80%
10	>80-90%
11	>90-100%

Height Scale:

01	<0.5 m
02	0.5-1 m
03	1-2 m
04	2-5 m
05	5-10 m
06	10-15 m
07	15-20 m
08	20-35 m
09	35-50 m
10	>50 m

Cover Scale 2:

01	<1%
02	1-5%
03	>5-15%
04	>15-25%
05	>25-50%
06	>50-75%
07	>75-100%
00	0

Cover Scale 1 was used for all parts of the AA from the start of the project until August 30, 2004. It continues to be used for cover of unvegetated surface.

Cover Scale 2 was implemented for strata and species covers on August 30, 2004.

AA Comments: Describe polygon heterogeneity. How much of polygon was assessed? Certainty of AA?

Database Code _____ **Initial AIS** _____

PARK VEGETATION MAPPING PROGRAM: **ACCURACY ASSESSMENT** POINT FORM

IDENTIFIERS/LOCATORS Updated 12 August 2005

Field Point Number_____ Air Photo _____ Date_____ Surveyors_____

State CA Park Name Santa Monica Mtns. Park Site Name _____ Quad _____ Region ____

Primary Veg Assoc Name _____ Code_____

Secondary Veg Assoc Name_____ Code_____

Other Veg Assocs within 50 m _____

_____

Classification Comments: (does it key easily? Are all diagnostic species present in proper proportions? If not how does it differ?)

GPS File name_____ GPS Unit_____ GPS datum: (WGS 84)_____ GPS in Stand? Yes / No

Field UTME___ ___ ___ ___ ___ ___ m X Field UTMN___ ___ ___ ___ ___ ___ ___ m Y UTM Zone__11___

If not is stand: Distance (m) _____ Secant reading+/-_____ Compass bearing_____ GPS Error _____ ft / m

Corrected UTM X___ ___ ___ ___ ___ ___ m Corrected UTM Y___ ___ ___ ___ ___ ___ ___ m N

ENVIRONMENTAL DESCRIPTION

Elevation _____ft/m Slope exposure: NE_____ SE_____ SW_____ NW_____ Flat__ Variable__

Slope steepness: 0º__ 1-5º ____ 5-25º____ > 25º____

Topography: flat____ concave____ convex____ undulating____ | bottom____ lower____ mid____ upper____ top____

Environmental Comments (including hydrology, fire history)

Veg Changed since photo? Yes / No How?_____

Unvegetated Surface: *(please use the cover scale below)*

___ Large rocks (cobbles, boulders > 10 cm)
___ Small rocks (gravel, 0.2-10 cm)
___ Bare/Fine
___ Litter

VEGETATION DESCRIPTION

Leaf phenology (of dominant stratum)

Trees and Shrubs
___1 Evergreen
___2 Cold-deciduous
___3Drought-deciduous
___4 Mixed evergreen - cold-deciduous
___5 Mixed evergreen - drought-deciduous

Herbs
___1 Annual
___2 Perennial

Leaf Type (of dominant stratum)

___1 Broad-leaved
___2 Needle-leaved
___3 Mixed broad-leaved/Needle leaved
___4 Microphyllous
___5 Graminoid
___6 Forb
___7 Pteridophyte

Physiognomic class

___1 Forest
___2 Woodland
___3 Shrubland
___4 Dwarf Shrubland
___5 Herbaceous
___6 Nonvascular
___7 Sparsely Vegetated

Cover Scale for Unvegetated Surface

01	0-5%
02	>5-10%
03	>10-20%
04	>20-30%
05	>30-40%
06	>40-50%
07	>50-60%
08	>60-70%
09	>70-80%
10	>80-90%
11	>90-100%

Strata	Height	Cover Class/%	(mark any known diagnostic species with a *) Dominant Spp.	%cover	CvrCls	Dominant Spp.	%cover	CvrCls
T1 **Emergent**	_____	___/___						
T2 **Canopy**	_____	___/___						
T3 **Sub-canopy**	_____	___/___						
S1 **Tall shrub**	_____	___/___						
S2 **Short Shrub**	_____	___/___						
S3 **Dwarf-shrub**	_____	___/___						
H **Herbaceous**	_____	___/___						
N **Non-vascular**	_____	___/___						
V **Vine/liana**	_____	___/___						
E **Epiphyte**	_____	___/___						

Heterogeneity: Polygon is generally

_____ 1 Homogeneous (>85% 1 type)

_____ 2 Composed of similar types
(similar taxonomic composition and physiognomy)

_____ 3 Composed of dissimilar types

Inclusions: Other types in polygon (not included in species list) % of polygon

Cover Scale: Strata and Species		Height Scale: Strata	
01	<1%	01	<0.5 m
02	1-5%	02	0.5-1 m
03	>5-15%	03	1-2 m
04	>15-25%	04	2-5 m
05	>25-50%	05	5-10 m
06	>50-75%	06	10-15 m
07	>75-100%	07	15-20 m
00	0	08	20-35 m
CC scale changed August 30, 2004		09	35-50 m
		10	>50 m

AA Comments (Further describe polygon heterogeneity; how much polygon assessed?; aa certainty?)

Observation Protocol
Santa Monica Mountains NRA

June 11, 2003

The observation form has been developed as a way to efficiently provide photointerpretors with basic information on specified polygons. The photointerpretors do not always need the complete information of a Rapid Assessment but rather a quick confirmation or check of a photo signature. This form in combination with the Priority Categories listed below significantly speeds and focuses data collection.

The use of this form is up to the discretion of the field crew. If you feel the additional information in an RA would be very helpful to AIS, perform an RA. *Crews do not have to fill out form completely for each polygon* depending information needed and how close AIS is to correct code.

Remember to label these on the RA sheets so that other teams know information has already been gathered there.

Definitions of Data Fields

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photointerpreters have already done photointerpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank. Data from only one air photo should be recorded on the same observation sheet.

Date(s): Date(s) of the sampling.

Name(s) of surveyors: Initials of each person assisting can be recorded.

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling.

Initial AIS Code: 4-digit mapping classification code assigned by AIS at time of initial interpretation.

Field Crew Code: 4-digit code mapping classification code assigned by Field crew upon completion of form. This should correspond as closely as possible to the Field Alliance and Association Name (see below).

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

General slope exposures (circle one and enter actual º): Read degree aspect from a compass (or estimate), using degrees from true north (adjusting for declination). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

General slope steepness (circle one and enter actual º): Read degree slope from compass or clinometer (or estimate). Average the reading over entire stand. In general, this should describe both the entire stand and the Releve plot as the releve location should represent the overall conditions of the stand.

Bino Assessed Only? (circle one): If the polygon was only viewed through binoculars and was not entered into, circle yes.

Site history, stand age, and comments: Briefly describe the stand age/serial stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Also include any other notes that may be of help to photointerpretors.

Field-assessed alliance/association: Name of alliance (series) or association following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g.* *Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance or assocation name may not exist in present classification, in which you can provide a new alliance name in this field.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Species list and coverage

Species (List up to 6 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

List the species that are dominant or that are characteristically consistent throughout the stand.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height.

Also, provide a numerical ocular estimate of aerial coverage for each species. All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Other Notes: At bottom of the form, record additional notes about specific polygons or about photo in general. For example: There is no *Malosma laurina* in area, only *Rhus ovata*.

Observation Form---SAMO

Air Photo_____ Date(s)_____ Surveyors_____

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____
_____	_____	_____	Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

_____

_____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover

Other Notes: _____

_____

_____

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____
_____	_____	_____	Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

_____

_____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover

Polygon/Stand #:	InitialAISCode	FieldCrewCode	Confidence in identification: (L, M, H) _____
_____	_____	_____	Problems: _____

Topography: flat__ concave__ convex__ undulating__ | bottom__ lower__ mid__ upper__ top__

Slope exposure: **Actual_____ Flat__ Variable__ Slope steepness : 0°__ 1-5°_____ 5-25°_____ > 25°_____**

Bino Assessed Only? Yes/No **Site comments:** _____

_____

_____

Field-assessed alliance/association: _____

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____

Strata	Species	% cover		Strata	Species	% cover

Exhibit 21

WIKIPEDIA

Juglans californica

Juglans californica, the **California black walnut**, also called the **California walnut**, or the **Southern California black walnut**, is a large shrub or small tree (up to 30 feet tall) of the walnut family, Juglandaceae, endemic to California.

Contents

Distribution

Description

Uses

- Food
- Cultivation

Taxonomy

References

Further reading

External links

Distribution

Juglans californica is generally found in the southern California Coast Ranges, Transverse Ranges, and Peninsular Ranges, and the Central Valley. It grows as part of mixed woodlands, and also on slopes and in valleys wherever conditions are favorable. It is threatened by development and overgrazing. Some native stands remain in urban Los Angeles in the Santa Monica Mountains and Hollywood Hills. ***J. californica*** grows in riparian woodlands, either in single species stands or mixed with California's oaks (***Quercus*** spp.) and cottonwoods (***Populus fremontii***).

Description

Juglans californica can be either a large shrub with 1–5 trunks, or a small, single-trunked tree. The main trunk can fork close to the ground, making it look like two trees that have grown together, then diverged. It has thick bark, deeply channeled or furrowed at maturity. It has large, pinnately compound leaves with 11–19 lanceolate leaflets with toothed margins and no hair in the vein angles.[2] It has a small hard nut in a shallowly grooved, thick shell that is difficult to remove.

Uses

Juglans californica

California black walnut
Conservation status

Vulnerable (IUCN 2.3)
Scientific classification
Kingdom: Plantae
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Fagales
Family: Juglandaceae
Genus: Juglans
Section: Juglans sect. Rhysocaryon
Species: J. californica
Binomial name
Juglans californica S. Wats.[1]

Food

The Chumash Indians of the Channel Islands of California and Ventura County eat the nuts; however, they are not grown commercially for this purpose.

Cultivation

Juglans californica is cultivated throughout California to support the walnut industry, used as a rootstock in English walnut orchards. It is also cultivated as an ornamental tree where it is planted in California native plant, xeriscape, and wildlife habitat gardens and natural landscaping in California, and in Hawaii.



Natural range

Taxonomy

Some authorities (e.g. the California Native Plant Society) combine this species with ***J. hindsii***. On the other hand, a 2007 molecular analysis of the genus[3] suggests ***J. californica*** is sister to the remaining black walnuts (section Rhysocaryon). This article follows the conventions of ***The Jepson Manual***.[4][5]

References

1. Essa, Lora. "Index of Species Information" (http://www.fs.fed.us/database/feis/plants/tree/jugcal/all.html). U.S. Department of Agriculture, Forest Service,. Retrieved 2013. Check date values in: | accessdate= (help)
2. Kershner, Mathews, Nelson, and Spellenberg, National Wildlife Federation field Guide to Trees of North America, 2008, Chanticleer Press, Inc. p. 229
3. Aradhya, M. K, D. Potter, F. Gao, & C. J. Simon: "Molecular phylogeny of Juglans (Juglandaceae): a biogeographic perspective: Tree Genetics & Genomes (2007)3:363–378
4. Juglans californica S. Watson var. hindsii Jeps. (http://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?76333)
5. Juglans hindsii Jeps. ex R. E. Sm. (http://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?Juglans+hindsii&expand=1)

Further reading

- Anderson, E. N. "Some preliminary observations on the California black walnut (Juglans californica)" in Fremontia: A Journal of the California Native Plant Society. January 2002.

External links

- Jepson Manual Treatment – Juglans californica (http://ucjeps.berkeley.edu/cgi-bin/get_JM_treatment.pl?4732,4733,4734)
- Ecology (http://www.fs.fed.us/database/feis/plants/tree/jugcal/all.html)
- Juglans californica – U.C. Photo gallery (http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&where-taxon=Juglans+californica)
- Interactive Distribution Map for Juglans californica (http://www.plantmaps.com/nrm/juglans-californica-california-walnut-native-range-map.php)

Retrieved from "https://en.wikipedia.org/w/index.php?title=Juglans_californica&oldid=847495714"

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November 21, 2020

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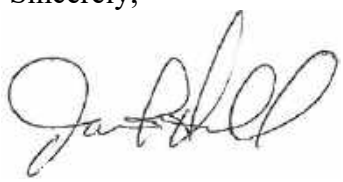
Re: CEQA Appeal for 11472 West Laurelcrest Drive, Los Angeles, California; CF 19-1134

Dear Council President Martinez and Councilmembers:

This firm represents Sunshine Hill Residence Association ("Appellant" or "Association"). Appellant has cited to a variety of reference materials in the letters submitted to the City thus far. This letter is intended to provide the City with copies of additional cited source documents to ensure that are made part of the Administrative Record. See Exhibits 22-24.

I may be contacted at 310-982-1760 or at jamie.hall@channellawgroup.com if you have any questions, comments or concerns.

Sincerely,



Jamie T. Hall

Exhibit 22

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

Artificial Night Lighting and Protected Lands

Ecological Effects and Management Approaches (Revised August 2017)

Natural Resource Report NPS/NRSS/NSNS/NRR—2017/1493



The Urban Wildlands Group

USC School of Architecture

USC Dornsife
Dana and David Dornsife College of Letters, Arts and Sciences

ON THE COVER
Example of controlling light direction to reduce environmental consequences
Illustration by Leigha DelBusso

Artificial Night Lighting and Protected Lands

Ecological Effects and Management Approaches (Revised August 2017)

Natural Resource Report NPS/NRSS/NSNS/NRR—2017/1493

Travis Longcore[1,2,3] and Catherine Rich[1] with illustrations by Leigha DelBusso[2]

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August 2017

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Report Series is used to disseminate comprehensive information and analysis about natural resources and related topics concerning lands managed by the National Park Service. The series supports the advancement of science, informed decision-making, and the achievement of the National Park Service mission. The series also provides a forum for presenting more lengthy results that may not be accepted by publications with page limitations.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

This report received formal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data, and whose background and expertise put them on par technically and scientifically with the authors of the information.

Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

This report is available in digital format from the Natural Resource Publications Management website. To receive this report in a format optimized for screen readers, please email irma@nps.gov.

Please cite this publication as:

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NPS 999/139639, August 2017

Contents

Page

Figures v
Executive Summary vii
Acknowledgments ix
Introduction 1
Effects of Artificial Night Lighting on Natural Ecosystems 3
Natural patterns of light and dark 3
Coastal dunes, beaches, and shorelines 6
Deserts and scrublands 8
Wetlands and rivers 10
Islands, oceans, and reefs 13
Grasslands 15
Deciduous and evergreen forests 16
Alpine and tundra habitats 17
Urban environments 19
Mitigating the Effects of Lighting on Protected Lands 23
Approaches to minimize lighting impacts 23
Need 23
Spectrum 24
Intensity 29
Direction 29
Duration 31
Lighting situations 33
Communication towers 34
Night hiking and mountain biking 34
Campsite lighting 34
Off-road vehicles 35
Monuments 35
Light-assisted fishing 35

Contents (continued)

Page

Security lighting 36
Bridges 36
Roadway lighting 36
Energy production installations 38
Indoor lighting 39
Lighthouses 39
Billboards 39
Literature Cited 43

Figures

Page

Figure 1. Natural horizontal illumination during the day, sunset, and at night (Beier 2006) 3

Figure 2. Relative sensitivity to light across the visual spectrum for honeybees (Menzel and Greggers 1985), moths (Cleve 1964), and human photopic vision (CIE 1932). 4

Figure 3. Proportion of major animal groups that are nocturnal 5

Figure 4. Beach environments are vulnerable to the effects of anthropogenic light because of their open nature 7

Figure 5. Lights in desert scrublands are visible for long distances and night lighting affects a disproportionate fraction of the wildlife because high daytime temperatures induce nocturnal activity patterns. 9

Figure 6. Lights along rivers and streams can disrupt predator–prey interactions, such as seals hunting salmon under lights. 10

Figure 7. Light in wetlands can suppress diel vertical migration of zooplankton and influence foraging behavior of amphibians. 11

Figure 8. Two tadpoles of the same age and kept in 12:12 L:D lighting 12

Figure 9. Cruise ships and squid boats are just two of the sources of artificial lighting on the oceans that attract seabirds and migrating songbirds. 13

Figure 10. Grasslands are vulnerable to disruption from even distant lights because of their open character 15

Figure 11. Illumination in deciduous forest (Buchanan 2006) 16

Figure 12. Species of the deciduous forest are adapted to the lower light levels found under the canopy 17

Figure 13. Alpine habitats can be affected by distant lights and those from recreational and industrial facilities. 18

Figure 14. Predator–prey interactions are affected by artificial lights during long nights on the tundra. 19

Figure 15. Cities are affected by altered light environments, which are exploited by synanthropic species such as crows and some bat species. 20

Figure 16. A pale-colored path can be just as effective as electric lights in some park situations. 24

Figure 17. Yellow light that does not contain blue or ultraviolet wavelengths attracts far fewer insects. 25

Figures (continued)

Page

Figure 18. Green lighting designed to minimize attraction of birds developed by Philips. Shell is using these lights on an oil platform in Alaska and Philips is adding the lights to its regular catalog 26

Figure 19. Green lights have been investigated for use on offshore structures and shown to be less attractive to birds. 27

Figure 20. Red light does not disrupt dark-adapted vision and is therefore appropriate for campsites and locations used for astronomical observation. 28

Figure 21. Illumination of a stairway at a campground by two low-intensity red bulbs instead of by a bright white spotlight (Wagner et al. undated). 28

Figure 22. The more focused light can be on its target, the less it will affect other species. 30

Figure 23. Embedded lights allow wayfinding with minimal intensity and good directional control. 30

Figure 24. A full cutoff shield being installed on an existing light on the lodge at Yellowstone National Park 31

Figure 25. Motion- and heat-detecting lights provide illumination only when it is needed. 32

Figure 26. Timed lights may affect species negatively during the transitional period of dusk, but may reduce impacts later at night. 33

Figure 27. Embedded roadway lighting 38

Executive Summary

Artificial night lighting represents a growing challenge for managers of parks and protected lands. The disruption of natural patterns of light and dark, which have been more or less reliable for millions of years, has a range of adverse consequences for wildlife across taxonomic groups and landscape types. This document reviews effects of artificial night lighting by habitat type and discusses the approaches available to land managers to mitigate and avoid certain adverse effects of artificial night lighting.

Coastal dunes, beaches, and shorelines are a transition zone between terrestrial and aquatic habitats. They often contain gradients of lighting influence from developed shorelines to darker lakes and oceans. Sea turtles are prominent victims of these disrupted lighting regimes. The foraging decisions of many other species are influenced by lighting conditions, embodying tradeoffs between predation risk and dietary needs.

Deserts and scrublands are open habitats with few barriers to light transmission. They are also often hot in the day, with large proportions of nocturnal and crepuscular species avoiding thermal stress. Many nocturnal desert species prefer low illumination levels and have good visual performance under the faint light of the darkest nights.

Wetlands and rivers are often dark spots surrounded by lights, especially when close to human settlement. Movement of species into and out of wetlands and streams is influenced by lights, as is the movement of animals, such as fishes or aquatic invertebrates, up and down rivers and streams. Downwelling light mediates most predator–prey interactions in the water column. Changing light levels cause predators and prey to change depth. Small prey species are influenced by the phase of the moon, and lighting can degrade conditions favorable to successful foraging. Emerging research demonstrates that lighting influences the developmental rates of wetland organisms such as amphibians.

Islands, oceans, and reefs are increasingly influenced by lights from onshore sources, hydrocarbon extraction platforms, fishing vessels, and all manner of ships. Downwelling light is also a dominant factor in structuring ecosystem processes in marine water columns, and many organisms are sensitive to extremely small changes in light levels. Extensive vertical migrations are driven by changes in surface illumination. Changes in surface lighting can have effects hundreds of meters below the surface. Lighting will alter reproduction and predator–prey interactions, and can attract organisms across wide areas.

Grasslands are also open habitats with few barriers to block lights. Research shows influence of lighting on nesting behavior of birds, distribution of predators, and signaling by bioluminescent organisms such as fireflies.

Deciduous and evergreen forests can block light and reduce its influence, but also contain communities of forest floor species adapted to lighting levels much dimmer than in exposed habitats. Therefore even low levels of light can influence foraging times or timing of reproductive activity.

Alpine and tundra habitats are well represented in protected lands. Many species have annual rhythms designed to avoid the harsh winter that are potentially disrupted by lighting cues. In alpine habitats, the slope of the land potentially exposes habitats to direct glare from downslope sources in addition to light reflected in the atmosphere.

Finally, *urban environments* have many artificial light sources, but still can support significant biodiversity in the form of both resident and migratory species. Migratory birds are attracted to lighted structures at night and collide with windows during the day. Some bat species are attracted to insects found under city lights, while others avoid them.

Mitigation of adverse effects of anthropogenic light in these different habitats is guided in five ways:

1. Need. Creative solutions are often available to avoid use of lights where they are not absolutely necessary. Especially in natural areas, managers should exercise discretion in limiting the lighting infrastructure.
2. Spectrum. Although no color of light is benign in all situations, managers should avoid lights that have ultraviolet or blue light (shorter wavelengths) and in general use lights with red and yellow hues.
3. Intensity. Reducing the intensity of lights can often improve visibility for humans by reducing the contrast between light and shadow, allowing people to see a larger area than they might otherwise be able to discern. Guidelines for lighting intensity from the lighting industry should not be followed when trying to reduce impacts to wildlife, because they are usually higher than necessary for human vision and do not take into account impacts to wildlife.
4. Direction. Lights should be shielded such that they only cast light where it is needed, and never be directed upwards.
5. Duration. Timers and motion detectors can reduce the time a light is on and may therefore reduce impacts. Curfew hours for lights can also enhance visitor experience.

In this report, many lighting situations are considered, including communication towers, night hiking and mountain biking, campsite lighting, off-road vehicles, monuments, light-assisted fishing, security lighting, bridges, roadway lighting, energy production installations, indoor lighting, lighthouses, and billboards. With careful planning and collaboration, usually with nearby jurisdictions, managers of parks and other protected lands can be leaders in the control of light pollution and increase enjoyment of natural lands from inner city parks to wilderness areas.

Acknowledgments

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Two natural forms of light at night — from the moon and bioluminescent plankton — contrast with coastal urban lighting in New Jersey, United States. Artificial lighting dramatically changes the intensity and spectrum of light available at night and homogenizes the nocturnal visual environment over space and time. Photograph by Flickr user catalano82 is reproduced with permission.

Introduction

Americans have long recognized that parks and protected lands can provide opportunities to see and enjoy the solitude of unspoiled nature, where the natural rhythms of life are allowed to flourish with minimal influence from humans. Managers of parks and protected lands balance the need to provide visitor facilities with the impacts of such infrastructure on the environment. Although night lighting may be a requirement for visitors in some circumstances, scientific research has documented a range of adverse consequences of night lighting on ecosystems and wildlife. The effects of lighting on species and ecosystems can be reduced, and in some instances avoided altogether. This report provides examples of assessing the impacts of night lighting on wildlife, and presents options to retrofit and design lighting that minimize impacts to wildlife and the nocturnal environment.

Extensive outdoor (and indoor) electric lighting is a recent phenomenon. Thomas Edison commercialized the electric light bulb in the late 1880s, and outdoor use was largely limited to cities until well into the 1900s. Electric lights were introduced in city centers as replacements for gas lamps in the late 1880s, with lethal effects on wildlife. Nearly 1,000 migratory birds were killed in collisions after being attracted to an electric light tower in Decatur, Illinois in 1886 (Gastman 1886). Significant outdoor lighting spread with the rural electrification programs of the 1930s and 1940s. More recently, other significant sources of outdoor lighting have spread across large swaths of the globe, primarily through illumination of human settlements and associated transportation infrastructure. Other sources of artificial night lighting have proliferated as well. Lighting associated with oil and gas development illuminates large terrestrial and offshore regions. Similarly, light-assisted fishing operations illuminate oceans in many regions and oceangoing freighters and passenger ships introduce mobile light sources along oceanic routes. Together, these and other light sources introduce novel lighting conditions that have no historical precedent in natural ecosystems. Natural patterns of darkness are lost or endangered globally (Bennie et al. 2015, Duffy et al. 2015, Marcantonio et al. 2015).

This document is divided into two sections. The first section reviews the effects of artificial night lighting on major habitat types. No single solution can mitigate all adverse effects of artificial night lighting. We therefore attempt to generalize the concerns that typify each biome. The second section provides recommendations for management approaches to minimize impacts from lighting. We address the characteristics of lights in terms of need, spectrum, intensity, direction, and duration, with reference to biomes in which each method of control would be applicable. This discussion addresses common lighting applications — roadways, parking, and walkways — as well as specialized situations like night hiking and mountain biking, vanity lighting, communication towers, and light-assisted fishing.

Effects of Artificial Night Lighting on Natural Ecosystems

Natural patterns of light and dark

In the natural world, sources of light are either very predictable or notably ephemeral. The dominant and structuring source of light is the sun, through daylight and the reflected light of moonlight. Patterns and intensity of sunlight and moonlight vary with geographic location, weather, and time, but they have certain predictable characteristics. For example, the daily, monthly, and seasonal patterns of moonlight and sunlight incident upon the Earth's atmosphere are only rarely interrupted (e.g., by a solar eclipse). Once the sun has set, the brightest possible constant light source is a full moon until the sun rises again (**Figure 1**). The length of the night varies by season and latitude and these patterns are, in the timescale of biological activity, fixed. Weather influences illumination during the day, and does not, with the exception of lightning, increase nocturnal illumination. Fires, lightning, bioluminescence, starlight, airglow, and zodiacal light contribute to nighttime illumination under natural conditions, and these transient sources are brief, rare, or dim in comparison with sunlight and moonlight.

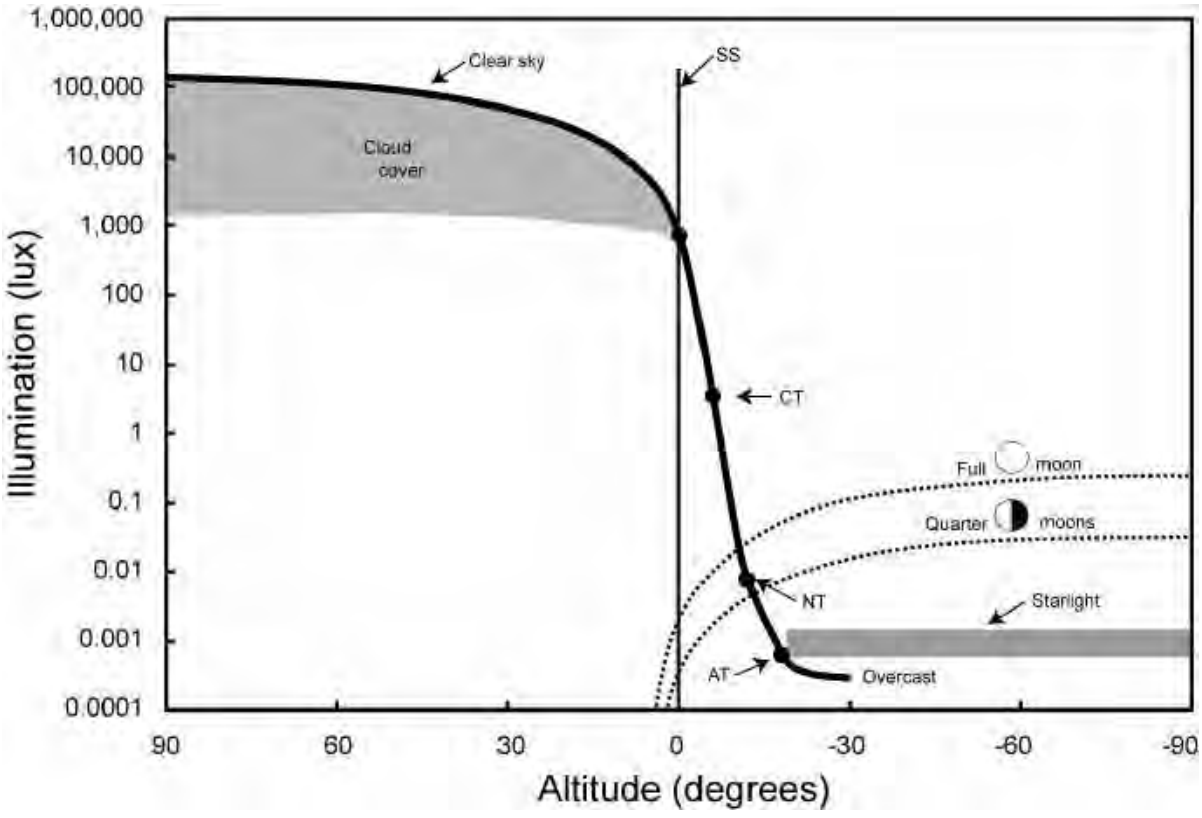


Figure 1. Natural horizontal illumination during the day, sunset, and at night (Beier 2006). Horizontal illumination on the y-axis; x-axis shows altitude above the horizon for the sun and moon. SS = sunset, CT = civil twilight, NT = nautical twilight, AT = astronomical twilight. Modified with permission from Beier (2006) and following Brown (1952).

Light falling on a surface is often measured in lux, a unit of illuminance that sums electromagnetic energy after filtering in accordance with the daytime (photopic) sensitivity of the human eye. Light

emitted from a source is often measured in lumens, a unit of luminance that also accounts for the photopic spectral sensitivity of the human eye. Measurements of lux and lumens place more weight on wavelengths to which the human eye responds most strongly, and less on those wavelengths to which the human eye is less sensitive. Similar measurements can be customized for the optic spectral sensitivities of different species by re-weighting the calculations to emphasize different wavelengths of light (Gal et al. 1999 and **Figure 2**).

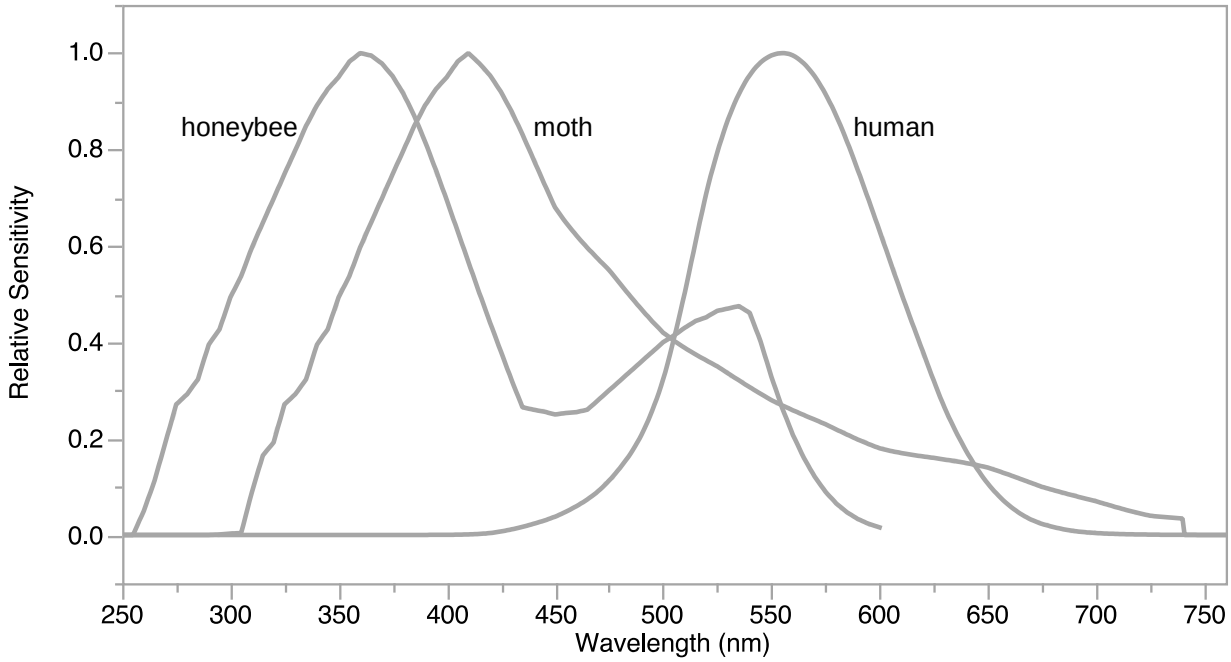


Figure 2. Relative sensitivity to light across the visual spectrum for honeybees (Menzel and Greggers 1985), moths (Cleve 1964), and human photopic vision (CIE 1932).

Outdoor illumination during the day ranges from 100,000 lux in full sunlight to 1,000 lux on a cloudy day (**Figure 1**). Dusk and dawn are transitions into and out of much darker conditions. These transitions are also characterized by predictable changes in the relative intensities of the wavelengths of light. As dusk falls, blue light increases, especially when the moon is new or not present. With moonlight, this blue pulse is diminished or absent and moonlight itself is red-shifted relative to sunlight (Sweeney et al. 2011). Airglow is dominated by green light while zodiacal light is reflected sunlight and will track its spectral composition quite closely, although very slightly shifted to the red (Leinert et al. 1998). Variations in illuminance and color trigger many behavioral and physiological processes (Sweeney et al. 2011, Walmsley et al. 2015). Circadian, circannual, and circalunar rhythms are linked to the predictable changes in the light environment. Light triggers can be at different illuminations depending on the environment. What is extraordinarily dim in one environment may be bright in another. For example, the illumination at which activity takes place on a forest floor is on average dimmer than illumination levels triggering the same activity for similar organisms in open grassland. Illumination that is within the natural range of variation on a beach may be far brighter than anything experienced at night at ground level in a dense forest.

Life evolved with predictable daily, monthly, and seasonal patterns of light and dark, and these patterns underlie the natural rhythms of nearly all living organisms. Artificial night lighting has long been known to affect these patterns. Nocturnal species, which represent the majority of some major taxonomic groups (**Figure 3**), are obviously vulnerable, as are diurnal or crepuscular species whose behavioral niches can be distorted by lighting. Concern about adverse effects of lighting dates to descriptions of the "destruction" of birds at lighthouses in the late 1800s (Allen 1880) and even the first electric urban lighting (Kumlien 1888). Mortality of hatchling sea turtles at lights was identified as a conservation issue in the 1960s (McFarlane 1963). Verheijen coined the term *photopollution* in 1985 (Verheijen 1985), which was followed by Ken Frank's classic review of the effects of lighting on moths (Frank 1988), and a series of unpublished reports (Outen 1998), conference proceedings (Schmiedel 2001), and research reports from Europe (De Molenaar et al. 2000, Kolligs 2000). In 2004, we described *ecological light pollution* as "artificial light that alters the natural patterns of light and dark in ecosystems" (Longcore and Rich 2004).

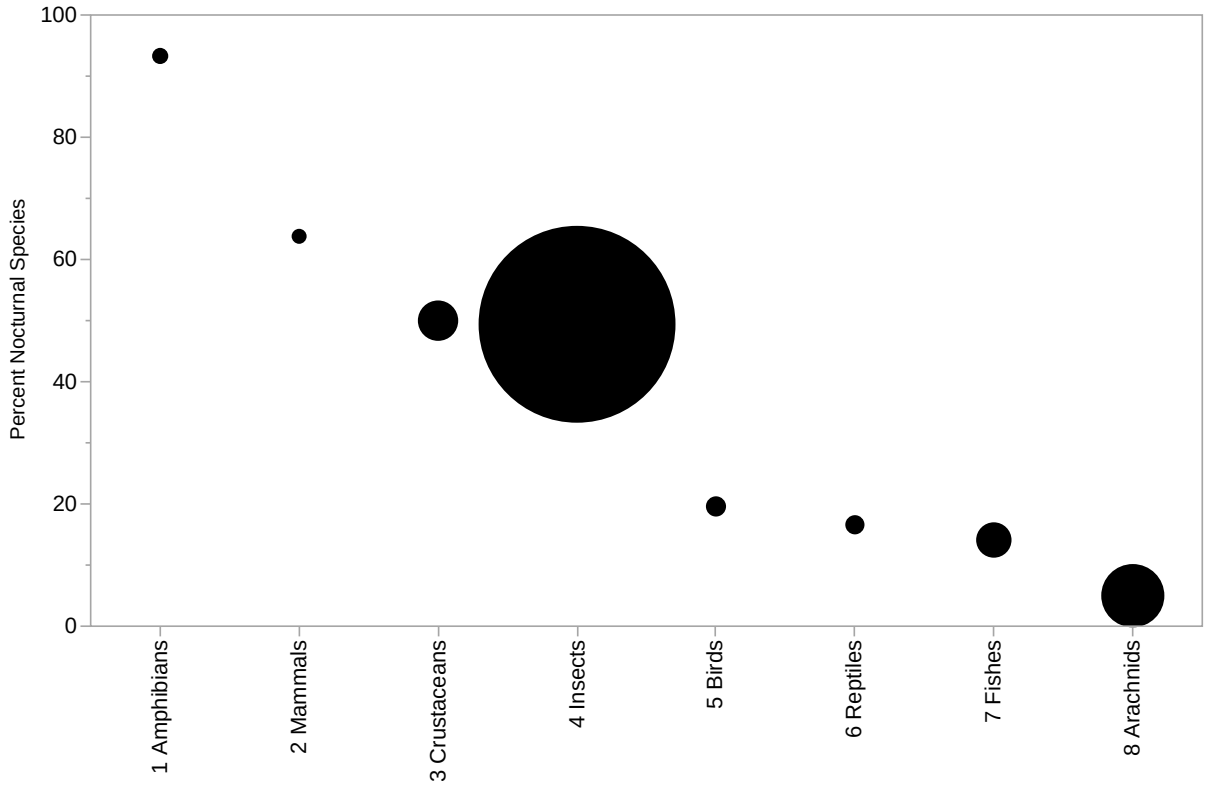


Figure 3. Proportion of major animal groups that are nocturnal. Area of markers is proportional to the number of species known in the group. Data from Hölker et al. (2010).

The disruptions caused by artificial night lighting occur whenever the natural patterns of light and dark are changed. This means that very low lighting levels (far below that of the full moon) can have important effects.

Reviews of the effects of artificial night lighting on different taxonomic groups can be found in Rich and Longcore (2006). Resource managers dealing with questions about specific groups of organisms

should consult this source, which contains chapters on mammals, birds, reptiles and amphibians, fishes, invertebrates, and plants. Taxonomically specific information is essential to devise lighting systems that minimize impacts on sensitive species when lighting is necessary. Sensitive species should be identified relative to a specific area and might include both those species that have a formal designation as being threatened or endangered or any species of concern that would be sensitive to changes in nocturnal illumination. Nocturnal, crepuscular, and diurnal species can be affected by nighttime lighting conditions.

In the sections that follow, we present short reviews of the effects of artificial night lighting in different habitat types.

Coastal dunes, beaches, and shorelines

Coastal dunes and beaches are generally open environments with low vegetation adapted to moving sand (**Figure 4**). Dunes present unique environmental conditions that are often quite distinct from their surroundings, and they are often populated by endemic species that thrive in these unique conditions. Coastal endemic species are often a focus of management concern because of the development pressure on coastal ecosystems in the United States (Schlacher et al. 2007a). Dunes are also ecological transition zones between land and water; light from development in coastal dunes illuminates adjacent water bodies, and animals such as turtles move from water to land to nest. Shorelines are essential for organisms such as amphibians and aquatic insects that have biphasic life cycles.

On a beach or coast under natural conditions, the view toward the land is almost always darker than the view toward the water. This is a function of landward vegetation and topography blocking light from the sky (Salmon 2006), in addition to moonlight and starlight reflected off the water. Organisms can use this pattern for orientation. Artificial lighting on the shore or from cities and other coastal development can reverse the natural conditions; the landward horizon becomes brighter, while the water is darker (Salmon 2006).

Stray light and sky glow from coastal development spread across and into many dune and shoreline environments. As in many environments, nocturnal activity near shorelines is significant (Salmon 2006). Beaches and coasts also regularly experience foggy and high-aerosol conditions, which scatter light and thereby amplify the local effects of lights (Kyba et al. 2011).

Artificial lighting has adverse consequences for sea turtles because the darkest horizon is no longer the landward horizon. Indeed, the lethal effects of lights on sea turtles have led to increased awareness of the adverse effects of artificial night lighting in general. Female sea turtles avoid illuminated beaches as nest sites, and hatchings are fatally affected by lights visible from beaches (Salmon 2003, 2006). This phenomenon was first recorded by MacFarlane (1963), and aversion of females to lights was confirmed experimentally by Witherington (1992). Habitat degradation by lights is caused both by lights adjacent to dunes and beaches and by regional sky glow (Salmon 2006).



Figure 4. Beach environments are vulnerable to the effects of anthropogenic light because of their open nature. Hatchling sea turtles are easily disoriented by onshore lights or sky glow and patterns of nocturnal foraging by shorebirds are also affected.

As a general rule, additional light — whether moonlight or anthropogenic light — increases foraging efficiency of predators and reduces activity of prey (Longcore and Rich 2004, Rich and Longcore 2006, Seligmann et al. 2007). This phenomenon has been shown many times in different habitats. On dunes, Bird et al. (2004) investigated the effects of lighting on foraging behavior of beach mice. Bird et al. (2004) used low-pressure sodium lights and yellow incandescent "bug" lights, which are commonly employed on beaches in Florida because they have limited effects on sea turtle hatchlings. They found that foraging by beach mice was significantly decreased in proximity to both types of turtle-friendly lights. Similar behavior by prey species has been shown for both natural and anthropogenic light. For example, ghost crabs are active only at night, and avoid activity under both the full moon (Schlacher et al. 2007b) and artificial light (Christoffers 1986). The exception to this pattern is that prey species that flock or school together can be aided by additional light that facilitates communal vigilance (Nightingale et al. 2006).

Effects from lights on beaches and shorelines may also affect aquatic ecosystems. For example, lights affect the predator–prey dynamics of fishes and marine mammals (Hobson 1965, Hobson et al. 1981, Yurk and Trites 2000, Nightingale et al. 2006).

Shorebirds sometimes forage at night (Dugan 1981, Burger and Gochfeld 1991, Rohweder and Baverstock 1996). Various explanations have been proposed: as a defense against predation (Robert

et al. 1989, McNeil et al. 1992, Thibault and McNeil 1994), as a result of slightly higher invertebrate activity on beaches at night (Dugan 1981, Evans 1987), and as a response to visual cues that are available due to higher levels of natural or anthropogenic light (Dwyer et al. 2012). Predator defenses of shorebirds are different during the night compared with the day; in an observational study, some proportion of Dunlins freeze and limit vocalizations as a defense at night while all individuals in a flock fly away in response to predators during the day (Mouritsen 1992). Owls are the major nocturnal predator of shorebirds and are aided by additional light when foraging (Clarke 1983). Timing of foraging by shorebirds, therefore, probably depends on tradeoffs between risks of becoming prey with ability to detect their own prey. Whether birds are flocking and have sufficient light for the associated communal predator vigilance probably also interacts with these factors.

Artificial night lighting on dunes and beaches can therefore have a variety of effects on species. Predator–prey relations are disrupted and key reproductive behaviors can be inhibited. Beaches and dunes also provide a gateway to adjacent water bodies, which have no barriers to block the propagation of light. Because there is usually less anthropogenic light at beaches and on shorelines than in surrounding urban or suburban areas, park visitors often use beaches and dunes to gaze at the night sky. Beaches and dunes should be kept as free from the influence of artificial lights as possible, with special attention paid to ensuring that any lights installed are absolutely necessary and that no lights are directly visible from the beach and points offshore.

Deserts and scrublands

Deserts and scrublands are open habitats with few barriers to the spread of light (**Figure 5**). Many animal species in hot deserts and scrublands adopt nocturnal behaviors to conserve water and avoid daytime temperature maxima. This shift to nocturnal activity may increase seasonally with higher temperature (Kronfeld-Schor and Dayan 2008). Consequently, artificial night lighting has the potential to change the ecology of these environments by disrupting the natural patterns of light and dark relied upon by a large proportion of fauna.

Desert animals can have narrow preferences for illumination levels. These preferences may be related to foraging opportunities, predation risk, or physiological requirements. For example, *Leucorchestris arenicola*, a trapdoor spider endemic to the Namib Desert, exhibits exclusively nocturnal activity patterns (Nørgaard et al. 2006). Males are active only during dark moonless nights, when they are able to navigate hundreds of meters across dune environments using only faint ambient light from stars, airglow, and zodiacal light (Nørgaard et al. 2006). For a species such as this, addition of illumination from any source in its habitat would eliminate its preferred habitat conditions.

Desert rodents also exhibit specific illumination preferences to manage their risk of becoming prey (Grigione and Mrykalo 2004, Beier 2006). Some species are active at twilight, others after twilight, and some during the darkest periods of moonless nights (Grigione and Mrykalo 2004, Upham and Hafner 2013). Anthropogenic light can disrupt these patterns; even the light from a camp lantern equivalent to a quarter moon ($\sim 10^{-2}$ lux) was sufficient to substantially inhibit foraging by a suite of rodent species (Kotler 1984). Those species vulnerable to this disruption lack other predator avoidance abilities such as exceptional hearing (Kotler 1984, Kotler 1985). Because many desert

animals exhibit circalunar patterns in their activities, especially predaceous arthropods such as scorpions (Skutelsky 1996, Tigar and Osborne 1999) and granivorous small mammals (Price et al. 1984, Daly et al. 1992, Upham and Hafner 2013), it follows that any artificial light that produces light equivalent to even a quarter moon can alter these patterns.

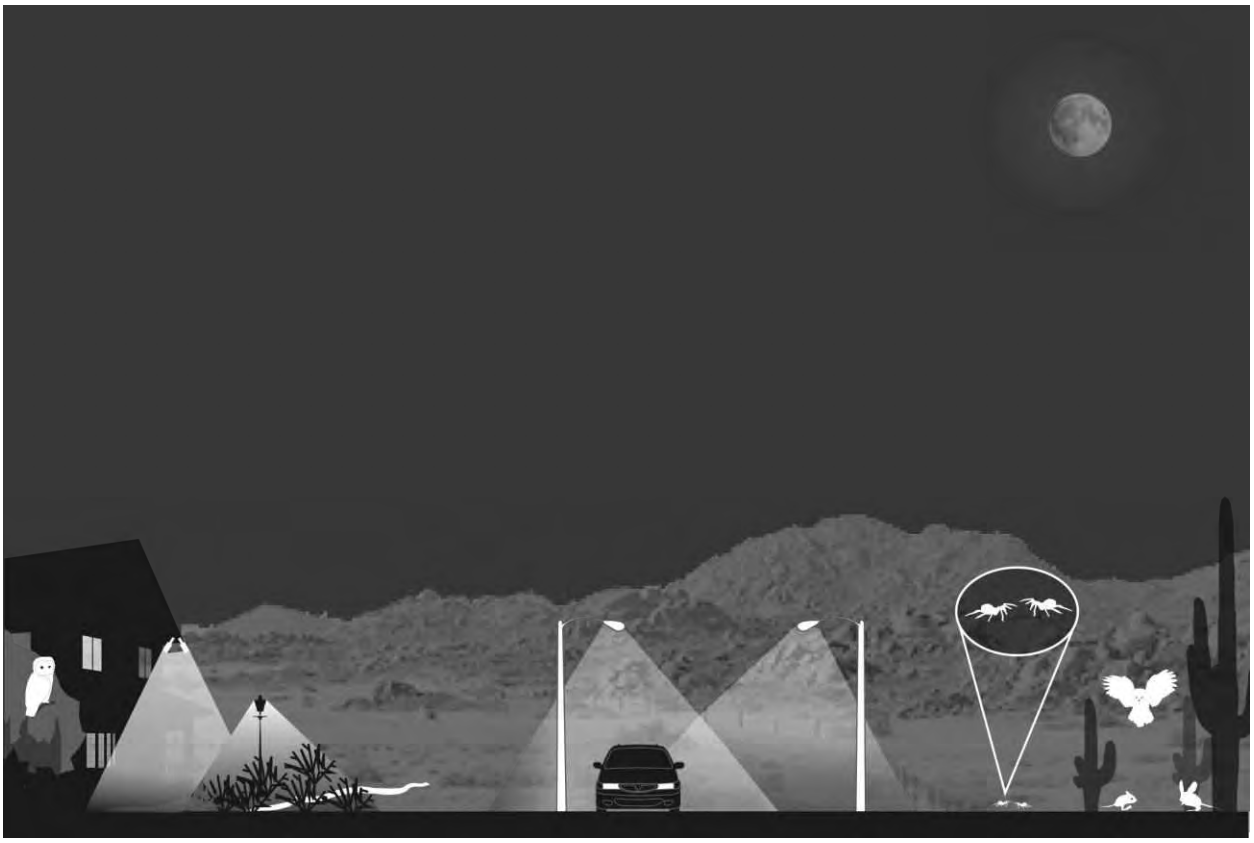


Figure 5. Lights in desert scrublands are visible for long distances and night lighting affects a disproportionate fraction of the wildlife because high daytime temperatures induce nocturnal activity patterns.

Scrubland environments share many characteristics with deserts, especially in Mediterranean climates. A disproportionate number of species is nocturnal at high temperatures, and the open vegetation structure of drier scrublands allows for light to propagate for unusually long distances.

Perry and Fisher (2006) describe the decline of nocturnal snake species in the scrublands of southern California. Long-nosed snake (*Rhinocheilus lecontei*), a nocturnal species, showed a pattern of decline consistent with the gradient of light pollution as estimated by satellite imagery (Fisher and Case, unpub. data). Otherwise suitable scrub habitats, which supported other diurnal species of snakes, lacked long-nosed snakes. The authors hypothesized that decreases in numbers of the snake's small-mammal prey, also associated with light pollution, were responsible for the decline (Perry and Fisher 2006).

Wetlands and rivers

In some places, wetlands and lakes are the last refuges of a natural night on the landscape (**Figure 6**). The difficulty of developing wetlands often leaves them as the only remaining unlighted sites in urban and suburban regions. Many aquatic organisms depend on daily cycles of light and dark and artificial lights disrupt critical behaviors in many species (Moore et al. 2006, Perkin et al. 2011, Henn et al. 2014).

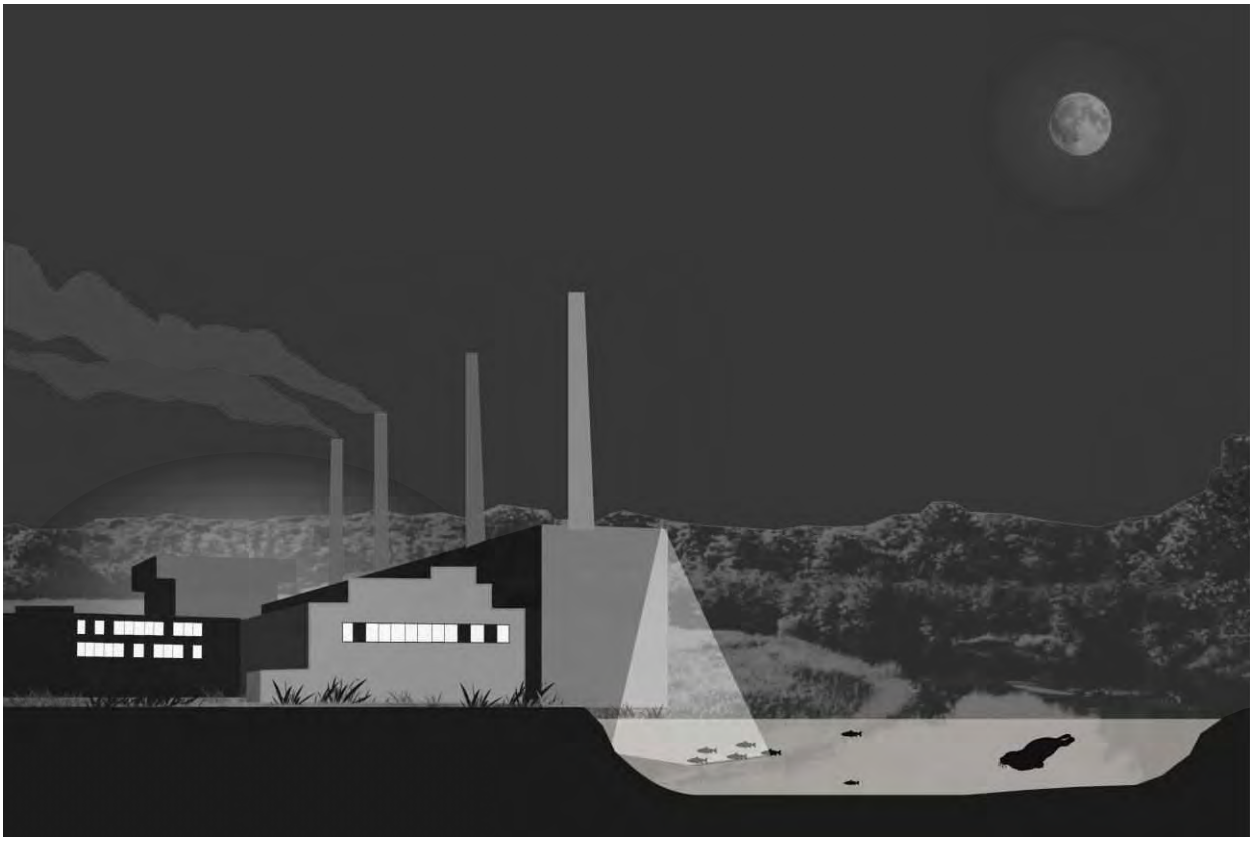


Figure 6. Lights along rivers and streams can disrupt predator–prey interactions, such as seals hunting salmon under lights.

Wetlands are often geographically fragmented, occurring as isolated patches or as linear features stretching across the landscape. Linear features are susceptible to disturbances such as artificial night lighting because they have a high edge-to-area ratio. They also tend to induce development along their edges, which leads to lighting from urban development on either side. Similarly, small wetlands are especially vulnerable to disturbances from their surroundings.

Aquatic invertebrates are important components of wetland ecosystems and provide an example of the sensitivity of wetlands to lighting levels (**Figure 7**). Many aquatic invertebrates migrate up and down in wetlands during the course of a night and day. This "diel vertical migration" presumably results from a need to avoid predation during lighted conditions so many zooplankton forage near water surfaces only during dark conditions. Light dimmer than that of a half moon ($<10^{-1}$ lux) is sufficient to influence the vertical distribution of aquatic invertebrates, and indeed diel vertical

migration follows a lunar cycle. When constant light from human development is added to the natural nocturnal illumination of the moon and stars, the darkest conditions are never experienced, and the magnitude of diel migrations (both range of vertical movement and number of individuals migrating) is decreased, which has been shown experimentally for *Daphnia* (Moore et al. 2000). Disruption of diel vertical migration by artificial lighting may have significant detrimental effects on ecosystem health. Moore et al. (2000) conclude that "[decreases in] vertical migration of lake grazers may contribute to enhanced concentrations of algae in both urban lakes and coastal waters. This condition, in turn, often results in deterioration of water quality (i.e. low dissolved oxygen, toxicity, and odor problems)."



Figure 7. Light in wetlands can suppress diel vertical migration of zooplankton and influence foraging behavior of amphibians.

Amphibians found in nearshore and wetland habitats also are particularly vulnerable to artificial lighting. Amphibians are highly sensitive to light and can perceive increases in illumination that are impossible for humans to detect (Hailman and Jaeger 1976). A rapid increase in illumination causes a temporary reduction in visual acuity, from which the recovery time may be minutes to hours (Buchanan 1993, Buchanan 2006). In this manner, a simple flash of headlights can arrest activity of a frog for hours (Perry et al. 2008). Amphibians are also sensitive to changes in ambient illumination from sky glow. Frogs in an experimental enclosure ceased mating activity during night football games when lights from a nearby stadium increased sky glow (Buchanan 2006). In an experiment to

investigate the effects of intermittent artificial light, male green frogs called less and moved more when exposed to the light of a handheld flashlight (Baker and Richardson 2006).

In naturally lit environments, some amphibians will forage only at extremely low light levels, and foraging times are partitioned among species with different lighting level preferences (Jaeger and Hailman 1976). The squirrel tree frog (*Hyla squirrela*) orients and forages at lighting levels as low as 10^{-6} lux and stops foraging at illumination above 10^{-3} lux (Buchanan 1998). The western toad (*Bufo boreas*) forages only at illuminations between 10^{-1} and 10^{-5} lux, while the tailed frog (*Ascaphus truei*) forages only during the darkest part of the night below 10^{-5} lux (Hailman 1984).

Laboratory experiments indicate that the development of amphibians is influenced by artificial light (Wise and Buchanan 2006, Wise 2007). Light interferes with the production of the hormone melatonin, which is involved in regulating many important functions, including sexual development, thermoregulation, adaptation of eyes to the dark, and skin coloration (Wise and Buchanan 2006, Wise 2007). Current research shows that artificial lighting slows larval amphibian development in the laboratory (**Figure 8**). The influence of artificial lighting on such physiological processes in the field is currently not well known, but the potential for lighting to harm amphibians and other wetland species is evident.

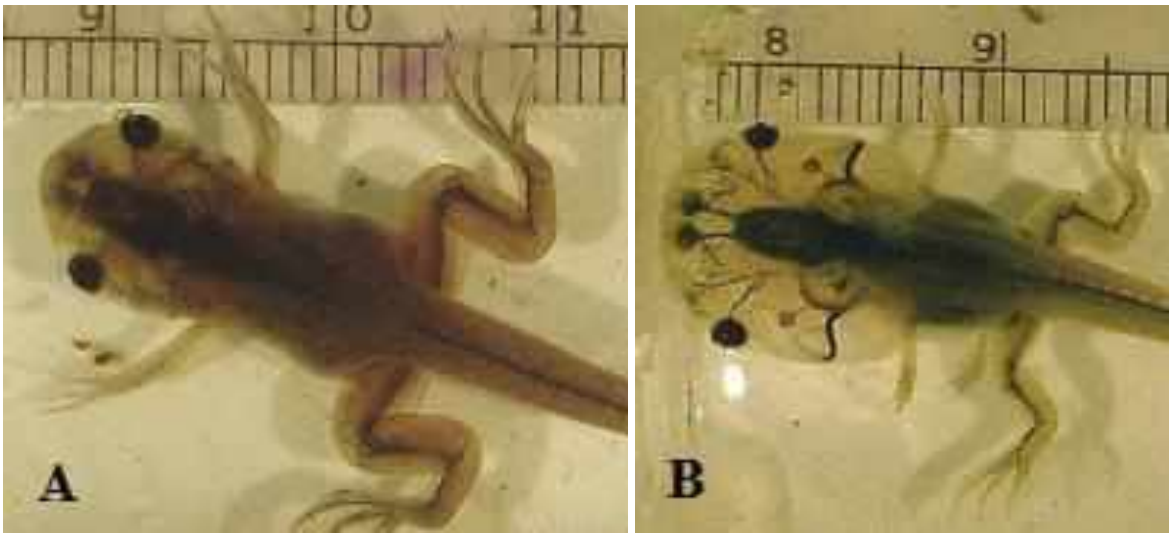


Figure 8. Two tadpoles of the same age and kept in 12:12 L:D lighting. (A) was kept in the equivalent of very dark night (10^{-4} lux) in the dark phase, while (B) was exposed to artificially bright illumination in the dark phase and is not yet metamorphosing (reprinted from Wise 2007).

Fishes are also highly attuned to natural ambient light conditions, with lighting levels influencing the distribution of predaceous species and the foraging behavior of their prey (Nightingale et al. 2006, Becker et al. 2013). Laboratory experiments have shown that the timing of downstream migration of salmon (*Salmo salar*) fry is significantly delayed and disrupted by lights of a similar illumination and spectrum as streetlights (Riley et al. 2013). Nocturnal downstream drift of insects is also delayed by artificial lighting (Henn et al. 2014).

Islands, oceans, and reefs

Light propagates unimpeded across open water, and its reach is extended beyond the curvature of the Earth by reflection off high clouds. Fog can increase local impacts of bright lights. Although light shining directly down on water tends to penetrate rather than reflect, light coming in at an angle is reflected. This physical property of water exacerbates the effects of coastal lighting as it is reflected and propagates out from the shoreline. Island, ocean, and reef environments are affected by artificial light sources that range from light-assisted fishing to urban sky glow to offshore hydrocarbon facilities (Davies et al. 2014) (**Figure 9**).

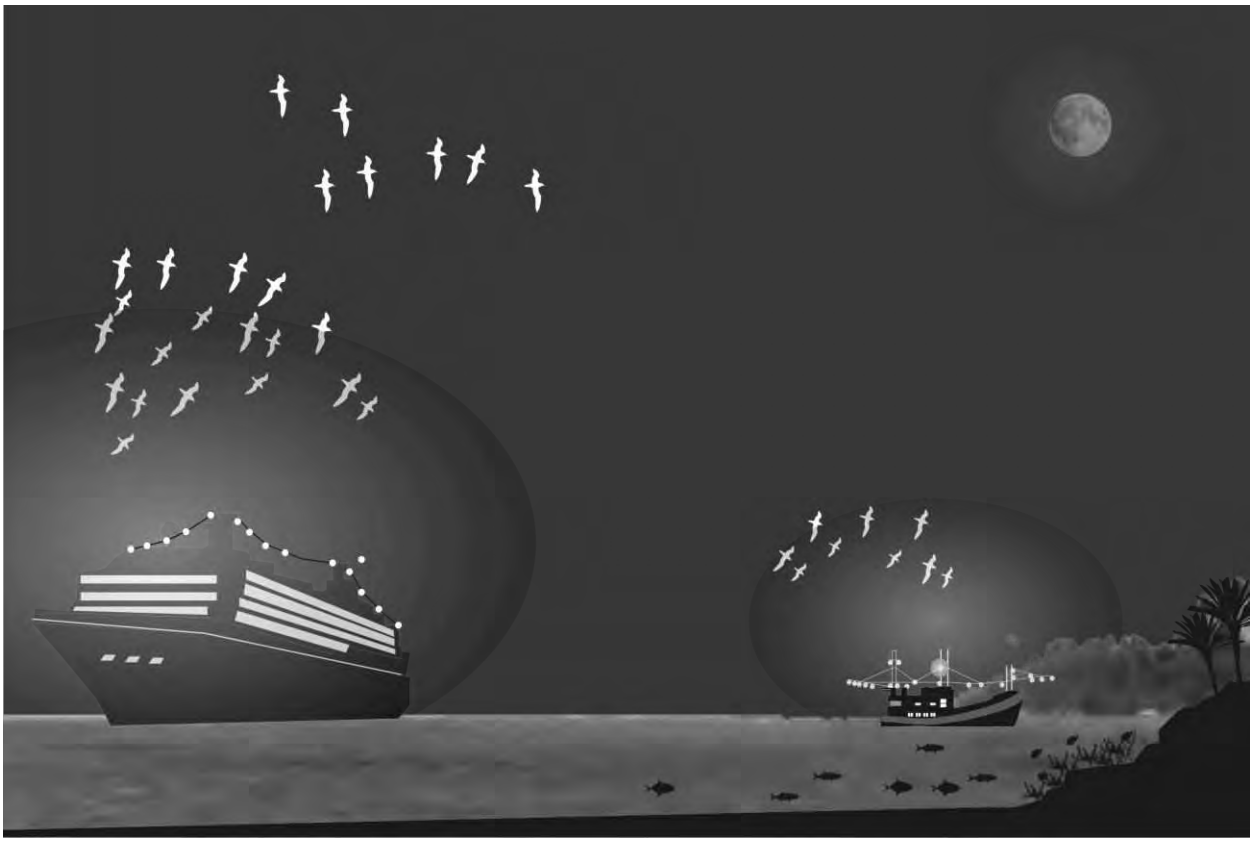


Figure 9. Cruise ships and squid boats are just two of the sources of artificial lighting on the oceans that attract seabirds and migrating songbirds.

In 1999, Xantus's murrelets (*Synthliboramphus hypoleucus*) nesting on Santa Barbara Island, part of Channel Islands National Park off the coast of southern California, were dying at twice the average annual rate. Park managers suspected this increase in mortality was directly related to a recent increase in fishing boats equipped with dusk-to-dawn floodlights to attract squid. Squid boats typically have 30,000 watts of light per boat. The number of squid boats increased dramatically in the 1990s, and in 1999 intense squid fishing occurred during murrelet nesting season (spring, while historically fishing was during fall and winter), and near important murrelet breeding islands. Managers believed that the nesting seabirds, without the safety of darkness, were subject to increased predation, especially from barn owls (*Tyto alba*). During the 1999 season, an unprecedented 165

dead Xantus's murrelets were found on Santa Barbara Island. Most of the dead were killed by barn owls, while five were victims of western gulls (*Larus occidentalis*). Researchers also recorded high nest abandonment closest to the most intensive squid boat activity. Faced with these observations, managers closed the areas around the islands to squid fishing, and death rates for the birds returned to normal. The excluded areas were subsequently incorporated into a permanent marine preserve with no fishing allowed to allow for replenishment of fish stocks. Also, the California Fish and Game Commission listed Xantus's murrelet under the California Endangered Species Act, citing artificial night lighting as one of the major threats to the species.

Nearly all seabirds are nocturnal, and an adverse response to decidedly unnatural conditions such as those suffered by Xantus's murrelets should not be surprising (Montevecchi 2006). Years of studies have shown that nocturnal seabirds are less active during moonlit nights, and those that are active suffer more predation during those times. Seabird chicks are directly affected by lighting levels; they are far less likely to be fed by adults during bright nights (Riou and Hamer 2008). Seabirds are attracted to lights perhaps because they naturally cue in on bioluminescent plankton to find prey (Montevecchi 2006). They have, therefore, long suffered from collisions with light sources on and adjacent to the ocean, including lighthouses, cruise ships, fishing vessels, lighted buoys, oil derricks, and streetlights on and near islands where they nest (Rodríguez and Rodríguez 2009, Rodrigues et al. 2012, Wilhelm et al. 2013); many of these collisions are fatal. Where lights correspond with critical habitat or high-use zones such as feeding or breeding areas, or migratory routes, the effects could be significant.

Other sources of artificial night lighting threaten the nighttime environment of the oceans. Cruise ships are pervasive, large, and are often brightly illuminated. Ships in the path of bird migrations, or near undersea food sources, may attract both migratory birds and foraging seabirds, which collide with the ships and can be stunned or killed. Anecdotal accounts have emerged where cruise ship staff frantically work to clear the decks of dead birds before passengers awake in the morning. Offshore hydrocarbon extraction platforms are also significant sources of light, and attract and kill birds through collision, exhaustion, and even by incineration in flares burning off natural gas. Many of these birds are long-distance migrants, and the losses at oil platforms may affect regional and global breeding populations.

Coral reefs are also threatened by artificial night lighting. Lighting has been used as a proxy for other impacts (urban development, intense fishing, hydrocarbon extraction) to assess risk to coral reefs on a global scale (Aubrecht et al. 2008). Aubrecht et al. (2008) also illustrated how artificial lighting would adversely impact reefs directly. Corals themselves are highly sensitive to light and synchronize spawning according to lunar cycles (Jokiel et al. 1985, Gorbunov and Falkowski 2002). Many coral reef species exhibit marked light-driven diel cycles or synchronize reproduction by monthly cycles (Sebens and DeRiemer 1977, Bentley et al. 2001, Levy et al. 2001). Predator–prey interactions are influenced by light levels, with diel vertical migration of both zooplankton (Yahel et al. 2005) and planktivorous fishes observed (Leis 1986). Natural light signals, such as bioluminescence, are important to marine organisms (Johnsen 2012), and can both attract and repel fishes (Holzman and Genin 2003, 2005). Artificial lighting at similar and greater intensity must

affect a range of marine organisms. Experimental investigation has now confirmed that lighting affects the colonization of marine invertebrates on surfaces (Davies et al. 2015).

Grasslands

Like other open habitats, light has few barriers in grasslands (**Figure 10**). Lights can thereby influence both illumination and direct glare over hundreds of meters or more, depending on topography. Artificial night lighting can be expected to influence habitat use and behavior of grassland species.



Figure 10. Grasslands are vulnerable to disruption from even distant lights because of their open character. Fireflies, often found in wet grasslands, can have their signals disrupted or be excluded by high illumination, while some grassland bird species, such as black-tailed godwit (*Limosa limosa*), have been shown to avoid streetlights in selecting nest sites (De Molenaar et al. 2006).

The lights of a road bisecting wet grassland in the Netherlands were shown to influence the spatial distribution of black-tailed godwit (*Limosa limosa*), a rare ground-nesting bird (De Molenaar et al. 2000, De Molenaar et al. 2006). When road lights were turned on during a breeding season, the birds nested slightly farther away from the road, with the effect extending 300 m (984 ft) from the lights. Birds that arrived first to the breeding area nested farther from the lights while those arriving later nested closer (De Molenaar et al. 2000, De Molenaar et al. 2006). The same research group investigated the behavior of mammals in wet grasslands and showed that some species (polecat, *Mustela putorius*, stout, *Mustela erminea*, weasel, *Mustela nivalis*, and fox, *Vulpes vulpes*) were

more likely to take paths near lights, while other species were not influenced or preferred darker areas (De Molenaar et al. 2003). Such differences in habitat use have the potential to change predation rates and distribution of prey species as well (Lima 1998).

Fireflies are another group of grassland species that can be adversely affected by artificial night lighting (Lloyd 2006). Because light is used for firefly communication, both for sexual behavior and in some interspecific interactions (where females attract males of other species to capture and eat them), any disruption of the ability to see light will have adverse effects. Artificial light washes out the signals used for communication and is potentially contributing to the decline of fireflies and other organisms that rely on bioluminescent communication (Lloyd 2006, Hagen and Viviani 2009, Bird and Parker 2014).

Deciduous and evergreen forests

Although the structural complexity of forests blocks light and reduces its propagation, species that inhabit the forest floor are sensitive to illumination at levels appropriate to the darker nighttime environment there (**Figure 11**). A review of the research on forest species shows some general patterns that illustrate the potential for lights to affect wildlife behavior.

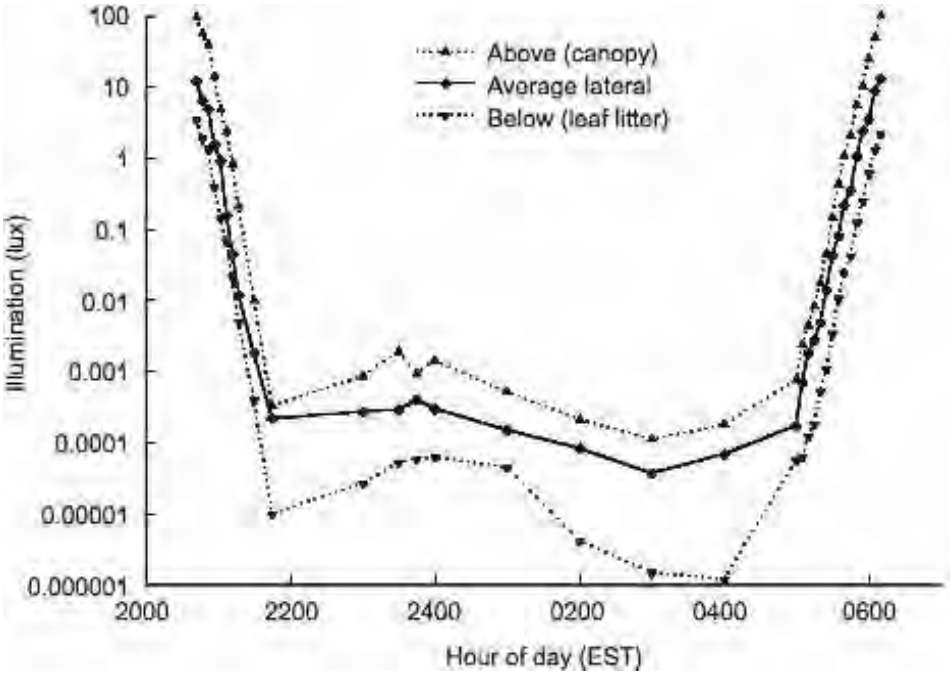


Figure 11. Illumination in deciduous forest (Buchanan 2006). Reprinted with permission.

As in many other ecosystems, salamanders in forests exhibit reactions to light equivalent to moonlight, under which foraging is reduced or delayed (Wise 2007) (**Figure 12**). This has been shown experimentally with dim artificial lights installed in a forest environment (Wise 2007). In two different experiments, lighting delayed the emergence time of nocturnal mammals (DeCoursey 1986, Barber-Meyer 2007) and reduced foraging activity (Barber-Meyer 2007). For sugar gliders, a

nocturnal forest mammal native to Australia, light equivalent to that produced by streetlights (7–12 lux) reduced the time individuals were active at night (Barber-Meyer 2007).



Figure 12. Species of the deciduous forest are adapted to the lower light levels found under the canopy. Flying squirrels and salamanders will delay their foraging under artificial lights.

In other instances, reproductive behavior can be affected by artificial lighting. The leafcutter ant *Atta texana* usually undertakes nuptial flights approximately 15 minutes before dawn, but in instances where security lights from homes and businesses were visible, the colonies flew 15 minutes after dawn (Moser et al. 2004). This change in timing interferes with behaviors that are carefully synchronized across colonies. Furthermore, artificial lights are also attractive to the flying ants and, as a result, may both decrease mating success and increase predation at the lights (Moser et al. 2004).

Alpine and tundra habitats

Alpine and tundra habitats are disproportionately represented in parks and other protected lands. They are on average less developed than other habitat types but can be, and are, developed for recreational and industrial infrastructure. Control of artificial lighting in alpine and tundra habitats is important to avoid disruptions of predator–prey interactions and to avoid disrupting annual rhythms that are entrained by day length.

The topography of mountainous habitats also makes them vulnerable to sky glow from distant sources (**Figure 13**). Because sky glow brightens horizons, areas of steep slopes are positioned to be

exposed to that light. In these locations, the aspect of the slope becomes important. Those facing bright horizons will be substantially brighter than nearby locations facing a different direction and therefore will be exposed to far less artificial lighting.

As in other habitats, predator–prey interactions in alpine environments are mediated by illumination (**Figure 14**). For example, small mammals of rocky outcrops typical of alpine regions are often nocturnal, foraging in open areas at night and retreating to the safety of outcrops for shelter (Kramer and Birney 2001). In experimental conditions one such species, long-eared mouse (*Phyllotis xanthopygus*), foraged less under 1.5 and 3.0 lux treatments (up to very bright moonlight) when compared with a 0.0 lux control (Kramer and Birney 2001). Similar results have been found for snowshoe hares (Gilbert and Boutin 1991), which are subject to more predation under brighter nocturnal conditions, especially during the winter (Griffin et al. 2005). Such small mammals depend on natural darkness for foraging to keep up body weight (Vasquez 1994).



Figure 13. Alpine habitats can be affected by distant lights and those from recreational and industrial facilities.

Circannual rhythms are found in most animals, but the environmental conditions that influence them are less well understood because of the long period necessary to conduct experimental research (Beier 2006). Light appears to have a large influence in setting these cycles, although temperature is also important (Beier 2006). Light can be important in determining when species react to the seasons (e.g., hibernation, Hock 1955), and consequently disrupting these signals has the potential to put

species out of phase with climate. In alpine and tundra environments, where conditions change so dramatically between the seasons, appropriate synchronization of activities is important. For example, reindeer (*Rangifer tarandus*) eyes change seasonally to reflect different wavelengths of light; color of the tapetum lucidum shifts from yellow in the summer to blue in the winter, which is associated with increased retinal sensitivity during the dark winter nights (Stokkan et al. 2013). Captive reindeer exposed to sodium vapor streetlights, not directly visible but just over the horizon, are reported to have green eyes in the winter, not completing the normal transition from yellow to blue, and with reduced visual sensitivity (Yong 2013).



Figure 14. Predator–prey interactions are affected by artificial lights during long nights on the tundra.

Urban environments

Even though urban environments have many sources of artificial lighting at night, variations within already light-polluted environments still make a difference to wildlife (**Figure 15**). For example, American crows (*Corvus brachyrhynchos*) choose roost sites in urban areas that are on average more brightly illuminated than non-roost sites (Gorenzel and Salmon 1995). Presumably, this allows the communal predator response behaviors of the flock to operate more efficiently, reducing predation from owls. Elevated populations of this native species have adverse consequences for other native species for which the crows are predators. In another example, urban-tolerant bat species are influenced by the degree of illumination on the exit hole of their roosts. Nightly emergence is delayed by illumination of the exit hole, which reduces fitness of individuals in the colony and can eliminate the colony altogether (Boldogh et al. 2007). Because of the importance of bats as

consumers of insects, and their conservation status, the adverse impacts of lighting are concerning (Stone et al. 2015).



Figure 15. Cities are affected by altered light environments, which are exploited by synanthropic species such as crows and some bat species.

Cities are also sites of mortality for nocturnally migrating birds, which are attracted to lights. Birds die either in collisions with buildings at night, or during the day when they attempt to regain their orientation and continue migration. This phenomenon is well documented in Chicago, Toronto, New York, and Washington, D.C. A notable example in a national park is the ongoing mortality of nocturnal migrant birds at the Washington Monument, which started when it was illuminated (Overing 1938).

The profusion of light in urban areas also has spillover effects on surrounding natural areas and open spaces within cities. For example, extremely high levels of ambient light are measured in the Santa Monica Mountains National Recreation Area near Los Angeles, with all-sky brightness exceeding natural levels by 18.4 times and maximum nocturnal vertical illuminance 32.4 times brighter than natural levels (J. White and C. Moore, pers. comm.). Although it is difficult to address the multitude of sources of light, it is worthwhile for parks to incorporate lighting and the night sky as part of their education, outreach, and engagement in communities adjacent to and near parks (Aubé and Roby 2014).

The evidence from across habitat types indicates that artificial lighting at night is either proven to, or has the potential to, disrupt the natural behavior of wildlife species, sometimes with lethal consequences. From this context we can identify practices that can reduce and minimize the effects of lighting in parks and other lands managed for natural resource values.

Mitigating the Effects of Lighting on Protected Lands

Knowledge about the effects of lighting on wildlife continues to grow. All indications are that lighting can have cumulative and additive consequences that are especially important for vulnerable species. Many general approaches to minimizing the effects of artificial lighting on wildlife are known. To reduce effects on certain target species, these mitigations may need to be adapted to craft desirable solutions for specific locations. In the following two sections, considerations for developing such mitigation measures are discussed. First we introduce the attributes of nighttime lighting that might be manipulated — spectrum, intensity, direction, and duration — and how different groups of species might be affected by them. Then we review the many contexts in which light is used (e.g., security lighting, vanity lighting, communication towers) and identify preferred mitigation strategies for them.

Approaches to minimize lighting impacts

The impacts of artificial lighting to wildlife can be reduced in five ways: 1) avoiding use of lighting that is not needed, 2) controlling color spectrum, 3) limiting light intensity, 4) managing the direction of light emissions, and 5) limiting the duration of light output. For some of these characteristics, a single approach applies in all instances. For others, the recommendation depends upon the context of use or the species that might be affected. A combination of mitigation approaches is likely to be more effective (e.g., reducing intensity and adjusting color spectrum) than would be any approach taken individually.

Need

The first question that should be asked about artificial lighting, especially in natural areas, is whether it is in fact needed. In some situations, a creative solution, such as the choice of a pale color for a pathway, curb, or steps, is all that is needed to guide visitors (**Figure 16**). In others, lighting can be left to the visitor to provide in the form of headlights or a flashlight. Only when the need is demonstrated and necessary for visitor experience, safety, or security, should lights be installed.



Figure 16. A pale-colored path can be just as effective as electric lights in some park situations.

Spectrum

It is tempting to believe that a certain spectrum of light will minimize the effects of lighting in all situations. Unfortunately, no universal solution exists. Rather, it is possible to identify spectra of light that have shown to affect wildlife less in certain contexts. The only 100% wildlife-friendly light is one that is switched off or never installed.

The higher efficiency of high-pressure and low-pressure sodium lamps resulted in their widespread adoption in street lighting applications and security lighting, replacing the older mercury vapor lamp technology. Recently, however, full-spectrum light sources such as metal halide lamps, compact fluorescent lamps, and LEDs are becoming more common (Gaston 2013). Full-spectrum lights appear white, in contrast with other lights such as sodium vapor lamps that appear yellow or orange. Earlier technologies, such as mercury vapor lamps, were also full-spectrum, but have largely been replaced by sodium vapor lamps. LEDs are more efficient than older lamps used for outdoor lighting, and have greater color rendition than sodium vapor light sources. This return to white light sources brings certain advantages for human use, but includes a wider range of wavelengths, potentially impacting more species (Stone et al. 2012) and exacerbating sky glow (Aubé et al. 2013).

The combination of colors that make up a full-spectrum light is described by the correlated color temperature (CCT) of the light. CCT is measured in degrees Kelvin and corresponds to the appearance of light that would be emitted from an idealized “black body” if it were heated to that temperature. Lower CCTs are dominated by yellow and other longer wavelengths, while higher

CCTs are dominated by blue and other shorter wavelengths. For example, an incandescent bulb has a CCT of 2600–2700 K (Elvidge et al. 2010), while a metal halide lamp has a CCT of 2900–4200 K (Elvidge et al. 2010) and direct sunlight 3000–30,000 K, but usually 5200–6000 K (Thorington 1985). Full-spectrum LEDs are offered in many color temperatures, from 6500 K to 2700 K. High-pressure sodium lamps have a CCT of around 2100 K (Elvidge et al. 2010) and low-pressure sodium lamps, which are almost monochromatic yellow, are measured at 1740–1800 K (Thorington 1985, Elvidge et al. 2010).

One general rule is to avoid any light that has emissions in the ultraviolet spectrum and adjacent short wavelengths. Ultraviolet light is not visible to humans, yet is visible to other species. Insects are highly attracted to ultraviolet light and their attraction and mass death at lights would be dramatically reduced by eliminating ultraviolet light from general use (Frank 1988, Eisenbeis and Hassel 2000, Eisenbeis 2006, Frank 2006). Mercury vapor lamps are high in ultraviolet radiation, while other commonly used outdoor lamps (e.g., metal halide, fluorescent) have some ultraviolet as well. LEDs have no ultraviolet emissions and therefore attract fewer insects than lamps of comparable intensity and color temperature that do have some ultraviolet emissions (Poiani et al. 2015, Longcore et al. 2015).

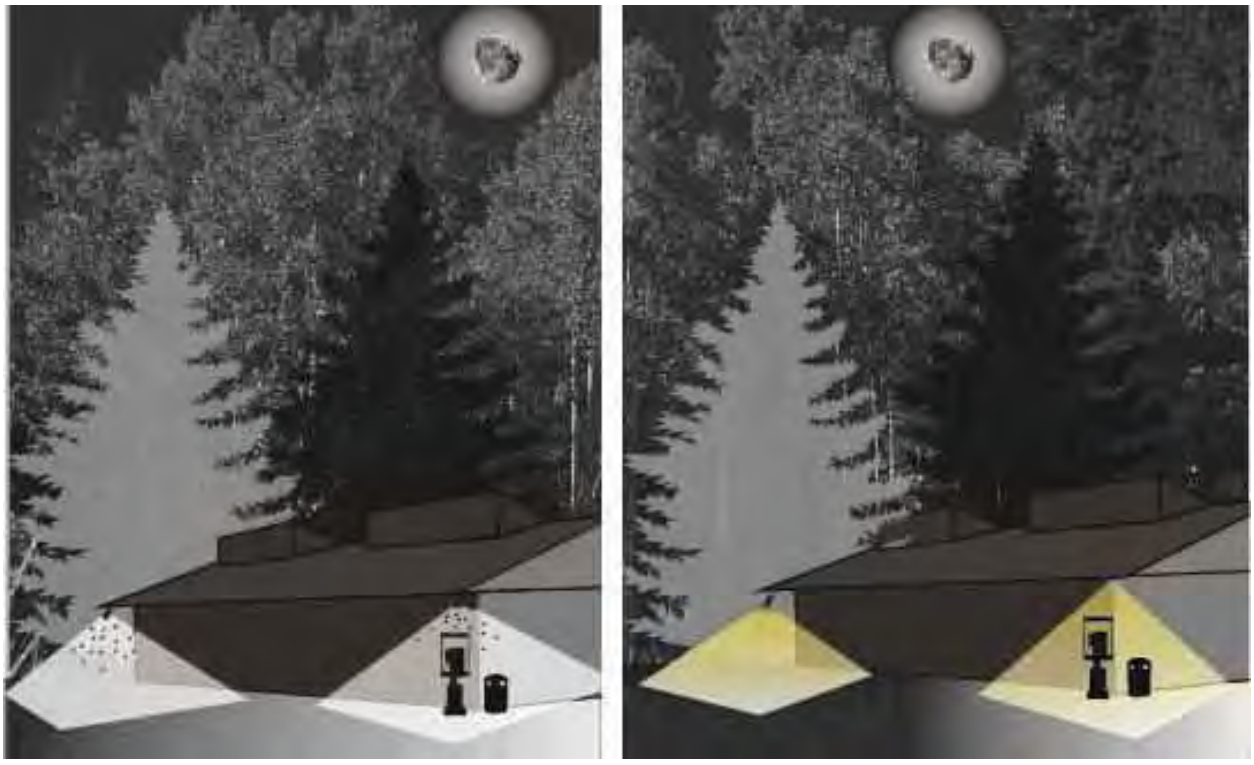


Figure 17. Yellow light that does not contain blue or ultraviolet wavelengths attracts far fewer insects.

Insects are also attracted to light in the short visible wavelengths (e.g., violet and blue) (**Figure 17**). Full-spectrum lighting that allows good color rendering for human vision is not advisable from the standpoint of ecological effects because it contains light in the blue spectrum (Eisenbeis and Eick

2011). All lights heavy in the blue portion of the spectrum, such as fluorescent lights, metal halide lights, and full-spectrum LED lights, will have greater impacts on insects than lights with longer wavelengths (e.g., low-pressure sodium vapor lamps or yellow/amber LEDs) (Eisenbeis and Eick 2011, Pawson and Bader 2014, Poiani et al. 2015, Longcore et al. 2015). If full-spectrum lighting is required, then the lowest possible color temperature is recommended (Longcore et al. 2015).

Blue light contains the most biologically active wavelengths for physiological processes such as the production of hormones and the timing of daily activities (Beier 2006, Brainard et al. 2015). This concern has been best expressed relative to human health (Pauley 2004, Brainard et al. 2015), but blue light also disrupts circadian rhythms in wildlife. To minimize disruption to circadian rhythms, shorter wavelengths such as blue and violet should be avoided. They might also be avoided to minimize influence on species that are phototactic to blue light, such as many frog species that have a blue light preference whereby they move toward blue light, presumably as an escape mechanism that leads them away from vegetation (and into water) in times of danger (Hailman and Jaeger 1974, Buchanan 2006); these preferences can vary depending on the intensity of illumination, however (Buchanan 2006).



Figure 18. Green lighting designed to minimize attraction of birds developed by Philips. Shell is using these lights on an oil platform in Alaska and Philips is adding the lights to its regular catalog. Photograph courtesy of Joop Marquenie.

Birds are able to orient to the Earth's magnetic field under monochromatic blue or green light, but such navigational ability apparently does not function under lights that are only red or yellow. The molecular mechanism that allows detection of the Earth's magnetic field requires light of a certain wavelength to be activated (Ritz et al. 2009), which presumably explains the inability of migratory birds to orient under light that lacks those wavelengths (Wiltschko et al. 1993, Wiltschko and Wiltschko 1995). Dutch researchers have experimented with the use of specially designed lamps that contain blue and green light at coastal locations and on offshore platforms to see if the number of

attracted and disoriented birds is decreased (van de Laar 2007, Poot et al. 2008). Results show blue and green lights influence birds less than red and full-spectrum (white) light, although the effects on other species have not been documented in the scientific literature (**Figure 18**; **Figure 19**).

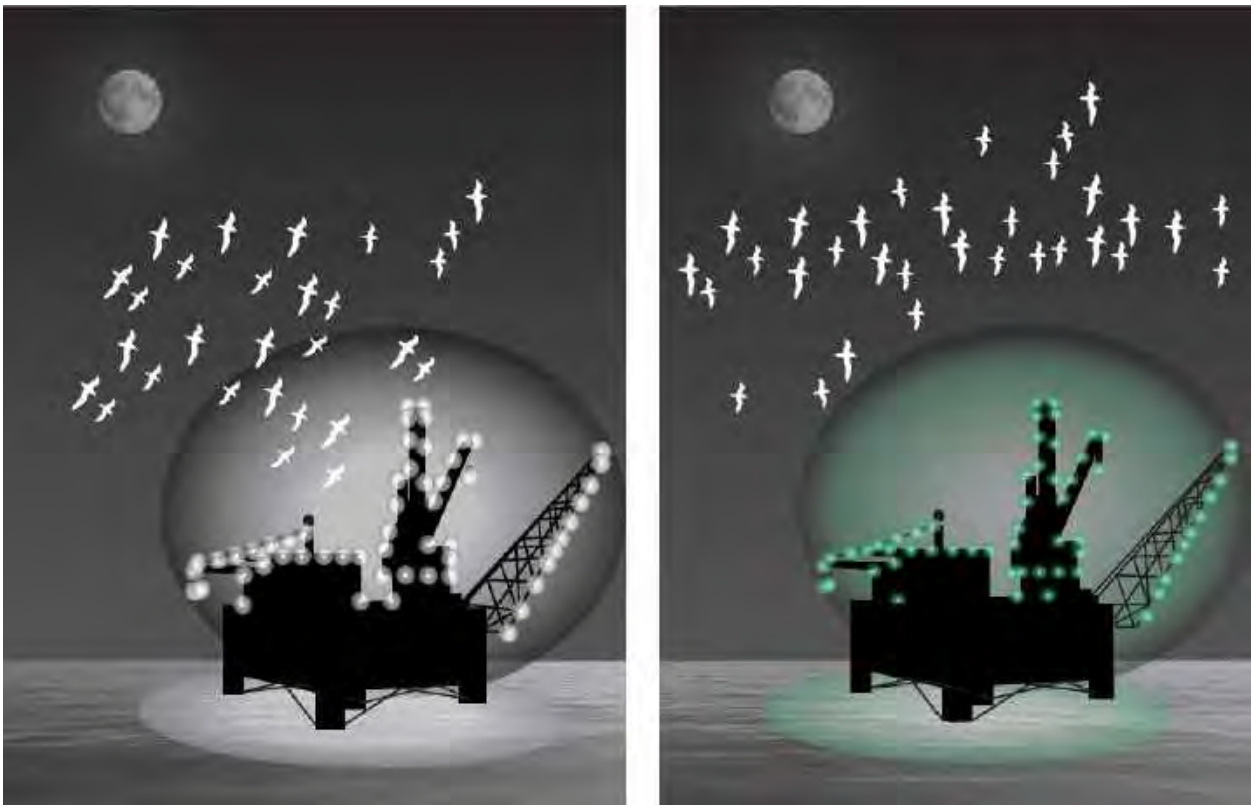


Figure 19. Green lights have been investigated for use on offshore structures and shown to be less attractive to birds.

In other situations, light that includes longer wavelengths appears to attract few insects and does not disrupt orientation of sea turtle hatchlings. For this reason, yellow lights are commonly identified as being wildlife-friendly (**Figure 17**). These same lights, however, reduce the foraging activity of native beach mice (some species of which are endangered) along the Florida coastlines where turtle-friendly lighting is recommended (Bird et al. 2004). Fireflies are vulnerable to impacts from yellow light because it is this part of the spectrum that is used by those species flying after dusk (Lloyd 2006).

Red light appears to disrupt the orientation capabilities of birds, but it seems to have the least effect on other species (**Figure 20**). Few insects are attracted to red light and dark-adapted eyes are not bleached by red light, making it the spectrum of choice for stargazers. In low-light environments in parks, red light might be preferable where lights are needed for safety reasons (**Figure 21**).



Figure 20. Red light does not disrupt dark-adapted vision and is therefore appropriate for campsites and locations used for astronomical observation.



Figure 21. Illumination of a stairway at a campground by two low-intensity red bulbs instead of by a bright white spotlight (Wagner et al. undated).

Through all the considerations for different taxa, a few general lessons emerge to guide use of spectrum: 1) the choice of color significantly affects the degree of biological disruption; 2) narrow-spectrum lights are preferable to broad-spectrum sources (i.e., white light); 3) ultraviolet light should be avoided; 4) blue and shorter wavelengths increase biological responses and generally should be avoided; and 5) concerns about individual species in an area may influence the choice of least disruptive color for lights.

Intensity

Land and facility managers have great latitude in selecting the intensity and quantity of lighting used. From a wildlife perspective, discretion should be exercised to use the minimum amount of light required. This can be accomplished by significantly decreasing the luminous output commonly specified by lighting designers. Land managers should not rely on standards promulgated by professional societies to guide lighting levels for natural areas because these are generally developed for urban/suburban areas with little to no regard for wildlife. Rather, every effort should be made to reduce the intensity of lights and still achieve the desired function.

Reduction in lighting intensity benefits species in the vicinity of lighting and also reduces the reflection of light in the atmosphere. The glow of lighted areas can thereby be reduced, decreasing impacts to natural systems and park visitor experience in wildlands. Often, illumination levels can be reduced without adverse consequence for human activity. In fact, reducing the contrast between light and dark areas increases the ability of humans to see. The human eye adapts to the brightest light in view. As the eye adapts to bright lights, acuity in darker areas is lost. Bright lights plunge the surrounding areas into dark shadows, while with dimmer lights the eye is able to retain some of its ability to see in darker areas.

Direction

Shielding lights is a common mitigation measure to reduce impacts to natural lands and species (**Figure 22**). Usually this involves shielding a fixture so that little or no light is emitted above the horizontal plane, and less than 10% of the light is emitted within ten degrees below the horizontal plane. This is the definition of a full cutoff lighting fixture. Shielding in this manner greatly reduces (but does not eliminate) sky glow. Light still reflects off the ground and scatters, so reduction in intensity should be combined with shielding. Downward-directed lights may still have adverse ecological consequences such as attracting insects and species that feed on the insects (e.g., bats, frogs, birds), or directing light into sensitive habitats such as wetlands and rivers.

Land managers should endeavor to shield lights beyond full cutoff to ensure that light falls only on the intended surfaces. Such mitigation will minimize direct glare, which can affect the orientation of organisms across distances (Reed et al. 1985, Telfer et al. 1987, Beier 1995, Longcore and Rich 2004); this will also minimize the area that is artificially illuminated. Design solutions to achieve these goals include the use of embedded lights to illuminate important surfaces (**Figure 23**) and simple retrofits to shield existing lights (**Figure 24**).

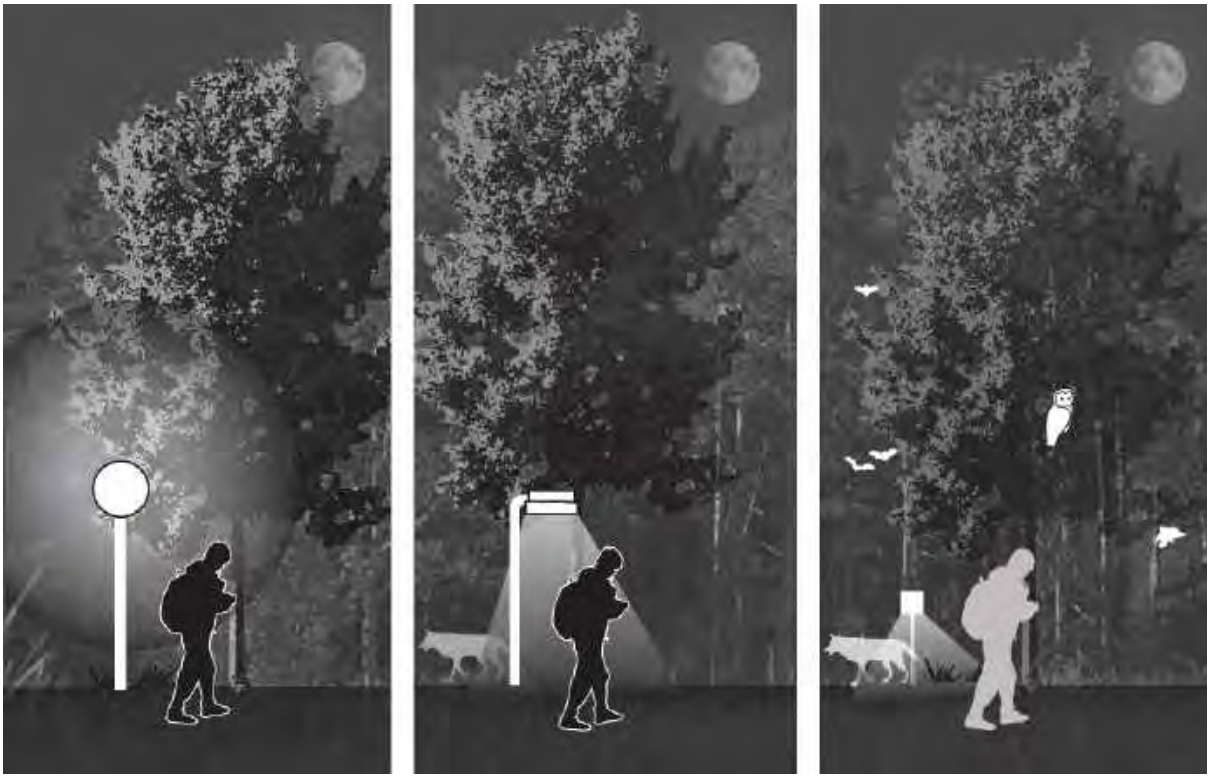


Figure 22. The more focused light can be on its target, the less it will affect other species.

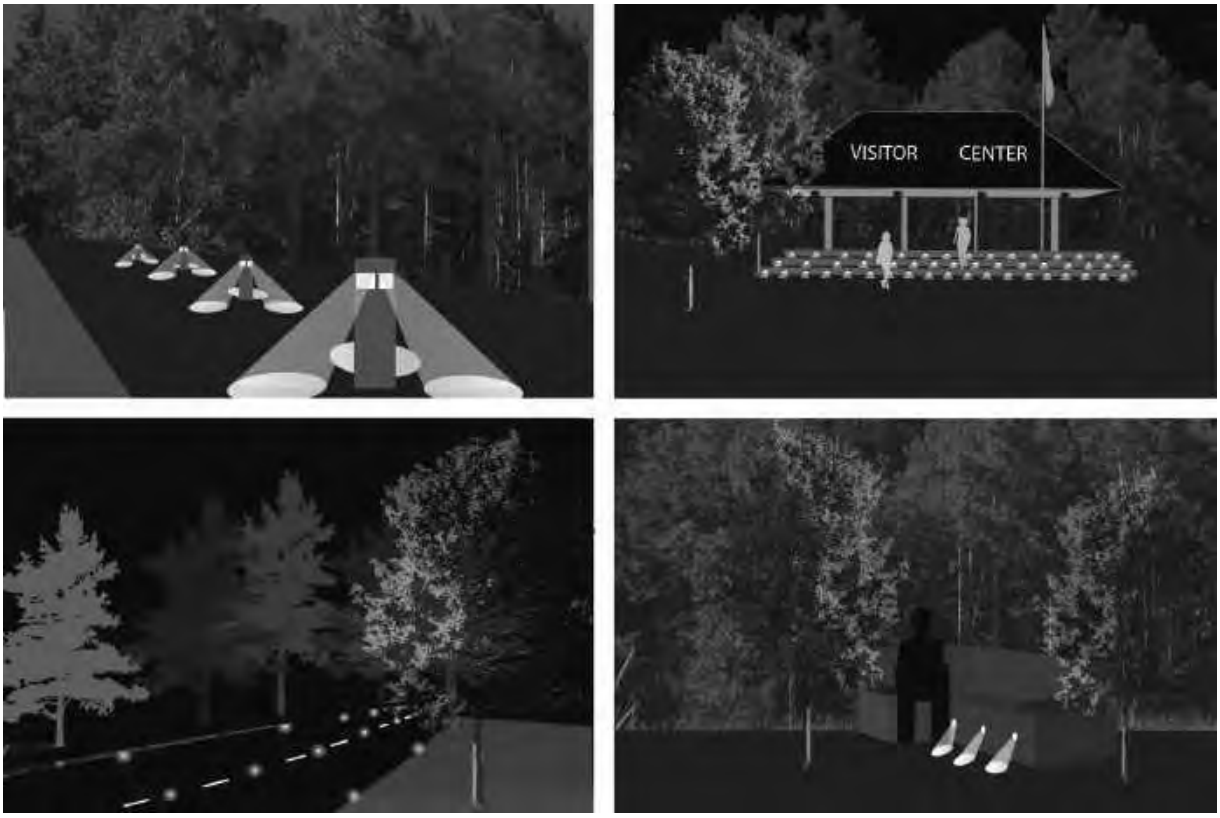


Figure 23. Embedded lights allow wayfinding with minimal intensity and good directional control.



Figure 24. A full cutoff shield being installed on an existing light on the lodge at Yellowstone National Park. This previously unshielded light was visible across the lake and from the backcountry. Photograph by Travis Longcore.

Duration

Impacts from lighting can be reduced by changing the duration of illumination. This approach reduces some impacts, but it may have some adverse consequences for those species sensitive to a changing light environment and so should be implemented with these limitations in mind. One common way to reduce the duration of illumination is to install a motion detector so that a light is only on when there is activity in a particular area (**Figure 25**). Although this limits the amount of time lights are on, lights that go on and off at irregular intervals may disrupt the nocturnal behavior of some species. For example, green frogs (*Rana clamitans*) reduce calling behavior and move away when a light is shining on them (Baker and Richardson 2006); return to a dark-adapted state can take hours (Buchanan 2006).

Another restriction on duration is setting a time for lights to be extinguished each night (**Figure 26**). For example, the lights that illuminate Mount Rushmore are only on for a few hours each night. This approach, known as part-night lighting, reduces impacts by allowing darkness during the late night and early morning hours. Depending on the timing of the lighting, darkness can be maintained for the majority of the activity period for a target species (Day et al. 2015). This approach, however, may still disrupt activities during the specific light conditions at dusk that are required by other species (Longcore et al. 2003, Day et al. 2015). Rather than a smooth range of illumination conditions occurring as the sun goes down and darkness falls, sites will experience a single illumination level until the lights are turned off. Many groups of species share resources across lighting levels; that is, one species may forage at dusk, another right after dusk, and another in the dark of night (Hailman 1984). Increased illumination, even on a temporary basis at dusk or dawn, reduces the time available

for critical behaviors and could eliminate them altogether if a species prefers the transitional lighting levels of dusk when lights are illuminated. If artificial lighting eliminates a significant period of potential activity time for a species, the long-term consequences will be negative. In studies of bats, part-night lighting has been found to be ineffective in avoiding the activity periods of most species in the locations studied (Azam et al. 2015, Day et al. 2015).



Figure 25. Motion- and heat-detecting lights provide illumination only when it is needed.



Figure 26. Timed lights may affect species negatively during the transitional period of dusk, but may reduce impacts later at night.

There may be instances where avoiding lighting during a particular time when animals are active is an appropriate way to mitigate impacts. Many species are active during the crepuscular periods of dusk and dawn. If lighting can be avoided until after dark, or closer to dark, certain impacts on those species might be avoided. Setting photodetectors to activate lights only at very low levels of illumination will avoid the biologically active crepuscular period, reduce insect attraction, and limit light to after civil twilight when it is really needed.

Whenever lights are required, reducing their intensity or turning them off during periods they are not needed should always reduce impacts. For example, the Dutch government has mitigated lighting impacts on sensitive wet grassland habitats by turning off roadway lighting at 11 P.M. and replacing it with 7-watt incandescent bulbs halfway up the light standards (De Molenaar et al. 2006). These lights allow for wayfinding and have not changed the number of accidents occurring on the road.

Lighting situations

In addition to controlling for spectrum, intensity, direction, and duration, mitigation measures can be devised for many other situations in which lighting might be installed in parks. In the sections that follow, we discuss the issues involved with mitigating impacts from a series of different situations that might be faced by a park manager.

Communication towers

Each tower in the United States that is taller than 200 ft (61 m) must have obstruction lighting in accordance with Federal Aviation Administration (FAA) guidelines. Lighting is a primary factor resulting in the attraction to and mortality of birds at towers. An estimated 6.8 million birds per year are killed at tall towers (Longcore et al. 2012), including many species of conservation concern (Longcore et al. 2013). Reviews of previous work, and subsequent studies, have shown that mortality can be reduced by using a lighting system that has flashing lights only, whether these are strobe lights or red flashing lights (Gehring and Kerlinger 2007). White strobe lights have long been approved as lighting on towers and the FAA has updated its regulations to allow red flashing lights only (see FAA Advisory Circular 70/7460-1K). It is also important that towers do not have ground-level lighting around them because these lights can attract birds that then collide with tower guy wires (Longcore et al. 2008). Another option for tower lighting is an audio-visual warning system like OCAS (http://www.ocasinc.com). This approach uses radar to detect nearby aircraft, activating marker lights and emitting a verbal warning on aviation band radio. It is essentially a motion detector for tower lighting.

Night hiking and mountain biking

Night hiking and mountain biking have become popular activities in natural areas. The lights used in these activities, especially those used in mountain biking, have become brighter in recent years. For example, full-spectrum LED lights that emit 3,600 lumens (approximately the same as a 200-watt incandescent bulb) are advertised for use by bikers. Activities such as these expose wildlife to unnatural disturbance at night; this affects behaviors both because of the disturbance itself and because of the potential bleaching of eye pigments ("blinding") from which recovery time can take minutes to hours.

Managers can mitigate the impacts of night hiking and biking by employing various strategies. These include:

1. Restrict the time of month when illuminated nocturnal recreation is allowed to the days before and after the full moon. In this manner animals are allowed the darkest part of the month as a refuge from disturbance.
2. Restrict the total luminous intensity of lights used in these activities.
3. Set curfews for illuminated nocturnal recreation.
4. Restrict nocturnal recreation activities to areas that are already disturbed by night lighting, leaving more remote wildland areas protected from nocturnal disturbance.

Campsite lighting

Although "traditional" camping with firelight and flashlights is certainly still a popular activity, more and brighter portable lights are being brought to campsites. Large arrays of lights are readily available and increasingly used by campers. Such lights can degrade the nighttime camping experience for other campers and will have greater impacts on wildlife than a campfire or small personal flashlight. Park managers might consider establishing guidelines for nighttime lighting at campsites, including limits on overall illumination, lighting curfews, and recommendations to use

flashlights instead of area lighting. Lighting restrictions could be established in conjunction with quiet hours, and address portable lanterns and recreational vehicle lights. In especially dark areas, managers could recommend the use of red filters on flashlights. Such actions should be paired with minimizing lighting from the existing infrastructure (e.g., converting lights on bathrooms to low-intensity red lamps).

Off-road vehicles

Deserts and beaches often accommodate vehicular recreation. Vehicles commonly have 1,000–1,500 lumens of forward-facing light, and because this is concentrated in a fairly narrow cone, the light intensity can be very high, with low-beam headlights exceeding 4,000 candela on axis (candela is a unit measuring the brightness of a light emitted in a particular direction). For wildlife along the axis of the headlight, the intensity of a directional headlight is equivalent to an unrestricted 100,000-lumen light source (Schoettle et al. 2004). This disruption can be an intermittent impact or, in some situations, a chronic one. For example, vehicles on a beach will often park with the headlights kept on, in which case multiple headlights will be directed into the shoreline environment and have the effect of a much larger number of streetlights due to their concentrated and directed nature. The most effective mitigation would be to prohibit vehicles from these environments during sensitive times for wildlife. Additional mitigations may include restricting headlights to when the vehicle is moving or requiring low beams only.

Monuments

Parks must consider the need to preserve natural and cultural resources when making decisions related to lighting cultural monuments. For example, the Washington Monument is bathed in white light and is known to attract and kill migratory birds (Overing 1938). Because the Washington Monument has been illuminated at night since the 1930s and is so powerfully symbolic of Washington, D.C., it is not feasible to propose elimination of lighting altogether. Limitation on the hours of illumination is probably the best management action in such situations. Lighting for monuments should be designed to illuminate the monument only, and with the lowest intensity possible. Bright lighting that might have been required to accommodate photography in the past is no longer needed with current digital imaging technology.

Lighting schemes at monuments could also play a role in pest management. At the Lincoln Memorial, the lights are turned on at twilight when midges and gnats fly over from the Potomac River and onto the Memorial. This in turn attracts many spiders that weave webs on the monument and require extensive and frequent cleaning (C. Moore, pers. comm.). It might be possible to turn the lights on slightly later, after the crepuscular period, or to change the spectrum of light used to eliminate short blue and ultraviolet wavelengths. In such a manner the lighting scheme then becomes part of an Integrated Pest Management program.

Light-assisted fishing

Offshore lighting poses threats both to aquatic and terrestrial ecosystems. Light has a long history of use as a method to attract fishes for capture. In artisanal fisheries, dim lamps may be used on small human-powered boats. Current industrial-scale fisheries, however, use extremely bright lights (equivalent to 30,000 watts incandescent) to attract squid and other fishes. Even boats that do not use

lights to attract their catch operate during the night and are highly illuminated. Illumination in this manner affects behavior of fishes (Nightingale et al. 2006) and other aquatic organisms (Forsythe et al. 2004). Lighting is also implicated in the mortality of seabirds in fisheries (Dick and Donaldson 1978, Carter et al. 2000). Spillover light on seabird nesting colonies has the potential to increase predation on vulnerable species (Keitt et al. 2004). Park managers should take action to reduce fishing activity with disruptive lighting near sensitive island habitats and in marine protected areas. A range of options is available to do so, including outright bans, limiting light-assisted fishing by phase of the moon (to dates around the full moon), and limiting total luminance allowed in protected waters.

Security lighting

Managers are often faced with pressure to install security lighting in hopes of decreasing illegal activity. The evidence that increased illumination reduces crime is unclear at best (Tien et al. 1977, Sherman et al. 1997), and dimming or shutting off lights may in fact reduce crime (Steinbach et al. 2015). Some schools use a "dark campus" approach, wherein all lights are extinguished at a certain hour. Lights seen after this time are then quickly recognized as indicative of unauthorized activity (Mizon 2012). Park managers should think very carefully about installation of any dusk-to-dawn security lighting. It has very little chance of being effective if staff members are not on site to observe activity. Complete darkness at night for areas in parks and protected areas that are off-limits and unoccupied should be considered in consultation with law enforcement.

Bridges

Bridges can introduce artificial lighting into natural areas through roadway lighting for safety or through architectural lighting. Both of these have the potential to disrupt natural habitats. For example, harbor seals used the lights on the Puntledge Bridge in British Columbia to form a "feeding line" and intercept outmigrating juvenile salmonid smolts (Yurk and Trites 2000). Extinguishing these lights led to a decrease in salmon mortality. Other studies document increased predation on fishes under illuminated bridges and docks (Nightingale et al. 2006). For bridges with tall structures, illumination of these towers may result in attraction of migratory birds. Such lighting should be avoided to the extent possible, such that obstruction lighting is limited to red flashing lights (if lighting is required by the FAA) and any roadway lighting is carefully directed onto the roadway with little or no spillover into the river. Furthermore, use of yellow light is preferable under most circumstances to minimize the attraction of insects, although selection of yellow lights alone will not eliminate the effects of lighting on foraging behavior of mammals (Bird et al. 2004). Other considerations with bridges include the synergistic effects of lighting and polarization that misleads insects and may even result in bridges being dispersal barriers along rivers (Horváth et al. 2009, Málnás et al. 2011).

Roadway lighting

Roadway lighting is a major source of outdoor illumination and contributes significantly to sky glow. In a study of lighting in Tucson, Arizona, roadway lighting accounted for 12% of upward directed lighting, following only commercial lights (36%) and sports fields (32%) as a proportion of total uplight (Luginbuhl et al. 2009). To maintain natural illumination conditions inside parks, managers must work with communities outside park boundaries to address these sources. Inside park

boundaries, managers must make the decision whether roadway lighting is necessary in the first place, and if so, what characteristics it should have. To minimize impacts on wildlife, roadway lighting should be avoided to the extent possible, and where used should only be designed for the required intensity. The recommended lighting for a local road with low pedestrian conflict in the United States is 3–4 lux (ANSI/IES RP-8-14), which is more than 30 times brighter than the full moon's maximum intensity, so no roadway lighting is ecologically trivial. Recommended illumination for most roadways ranges from 6–15 lux (ANSI/IES RP-8-14).

One issue with reducing illumination for roadways is a concern that any reduction will increase traffic collisions. Studies of changes to roadway lighting in England and Wales, however, found no significant effect on number of traffic collisions from part-night lighting, switching off roadway lighting entirely, or changing the spectrum of roadway lighting (Steinbach et al. 2015).

Where light is essential, fixtures should be full cutoff and shielded to minimize glare from any non-road site, especially in areas with known sensitive species. The best overall choice for spectrum is probably yellow (e.g., low-pressure sodium or yellow/amber LED), but technical considerations may lead to use of a broader spectrum (e.g., high-pressure sodium). Yellow/amber LED streetlight fixtures are commercially available in response to demand for lighting with minimal impacts on bats (e.g., Innolumis bat lamp from the Netherlands) and other wildlife (e.g., Star Friendly® lights, C&W Energy Solutions).

Other alternatives are available to further reduce the impacts of street lighting. Embedded roadway lighting (**Figure 27**) has been investigated in Florida as a way to minimize impacts on nesting sea turtles (Bertolotti and Salmon 2005). Such lights may be useful in locations where snow plowing is not necessary. Another alternative is the use of dynamic lighting systems that decrease illumination based on the time of day or traffic volume so that lights are extinguished by a certain time at night or at a percentage of peak traffic (Collins et al. 2002).

Interested park managers can consult reviews on the impacts of light from street lighting systems, which recommend against full-spectrum lamps because of ecological, physiological, and dark-sky impacts (Falchi et al. 2011, Bierman 2012).

Vehicles along roads can cause the type of periodic changes in lighting levels that can affect animal behavior (Baker and Richardson 2006) and influence views of the night sky (Luginbuhl et al. 2009). Birds, especially migratory species and seabirds, can be attracted to vehicle headlights (Gauthreaux and Belser 2006). Although additional research on this topic would be welcome, managers can mitigate impacts from headlights by providing shielding of sensitive receptors using a range of physical barriers, including berms, dense shrubs, or even walls in particularly sensitive areas.



Figure 27. Embedded roadway lighting. These LED lights installed in the pavement are not visible to sea turtles nesting on the adjacent beach and are well received by motorists and pedestrians (Bertolotti and Salmon 2005). Photograph courtesy of Michael Salmon.

Energy production installations

Efforts to increase domestic energy production have resulted in pressure to explore and extract fossil fuels and develop industrial-scale facilities for wind and solar energy both on land and water. Energy production facilities have the potential to affect natural resources on park properties that may be found intermixed with other public and private lands approved for such activities. The direct impacts of such activities are of great conservation concern, but are not discussed here. In the event that such facilities are evaluated in the environmental review process, the following recommendations could be made to minimize the impacts of artificial night lighting.

Wind energy installations are generally illuminated with red flashing lights at the corners of arrays of turbines. Not all turbines have obstruction lighting. Researchers documenting mortality of animals (both bats and birds) at wind turbines have concluded that these flashing lights do not attract birds, but that constant illumination of ancillary structures on the ground is associated with increased bird mortality at nearby turbines (Kerlinger 2004, Kerlinger et al. 2010). Wind turbines currently are estimated to kill on the order of 100,000 (Kerlinger et al. 2011) and 573,000 (Smallwood 2013) birds per year, with this number likely to grow 30-fold in the next 20 years to meet federal goals for renewable energy. Ensuring that lighting is only red flashing with no steady-burning lights on any accessory structures would reduce mortality of nocturnal migrant birds, but would not mitigate the significant bat mortality that is associated with wind turbines (Kunz et al. 2007, Smallwood 2013).

Solar power plants are proposed and being built in open desert areas near parks and protected natural lands. Such facilities should not require dusk-to-dawn night lighting. If security lighting is desired, the recommendation should be made that it be fully shielded, low intensity, and on a motion detector.

Oil and natural gas facilities are often brightly illuminated at night. This light can have adverse consequences for any habitat in which it is found. For example, offshore oil platforms attract seabirds, usually to their detriment (Wiese et al. 2001, Montevecchi 2006). Terrestrial oil and gas facilities are often the only sources of light in remote open spaces. Parks can work with existing facilities to retrofit lights. For marine facilities, some initially positive data have been collected suggesting that using a green light on an offshore platform reduces the number of birds that are attracted to it (van de Laar 2007, Poot et al. 2008). By retrofitting the platform from white lights to green lights, Dutch researchers documented a reduction in the number of birds observed circling a platform (van de Laar 2007). The cause of this reduction could have been the wavelength of light used, or an overall decrease in lighting intensity that was a byproduct of the lighting change. The research shows that decreasing illumination and restricting the spectrum of light is a promising approach to reducing impacts to biological resources while still maintaining safe operations.

Indoor lighting

Although outdoor lighting is usually the focus of efforts to reduce impacts of night lighting on wildlife, indoor lighting should be considered as well. Indoor lighting may contribute substantially to ecological light pollution. In the extreme example of all-glass structures, greenhouses in Germany attract insects and migratory birds (Abt and Schultz 1995, Kolligs 2000). Furthermore, office buildings in urban cores can contribute as much to sky glow as billboards or roadway lighting (Oba et al. 2005). In darker environments, even the lights from a residence may have some effect on local wildlife behavior and degrade the experience of visitors in adjacent natural areas. Managers can be aware of these issues and seek to shield interior lights through use of curtains. This also gives an additional reason to cluster developments within parks. For urban areas and office buildings, guidelines are available to minimize the effects on birds, including through steps to reduce interior illumination (New York City Audubon Society 2007).

Lighthouses

The fatal attraction of birds to lighthouses has been observed for well over a century (Dutcher 1884, Miller 1897, Hansen 1954). In the United States, mortality of birds is more commonly reported on the East Coast than on the West Coast (Allen 1880, Merriam 1885), although mortality has been recorded on the West Coast as well (Squires and Hanson 1918). There has been some conflicting research on lighting color and flashing since the early 1900s (see review in Gauthreaux and Belser 2006), but the view has solidified that mortality can be decreased through the use of a flashing rather than constant light (Baldwin 1965, Jones and Francis 2003, Gauthreaux and Belser 2006). It is important that the light itself flashes, extinguishing completely between flashes, rather than the flashing effect being created by a rotating beam that remains illuminated. Reduction in lighting intensity also reduces bird mortality (Jones and Francis 2003).

Billboards

Billboards and other signage can affect wildlife behavior when illuminated. For example, light from a single billboard was sufficient to change the concealment behavior of juvenile salmon in a stream (Contor and Griffith 1995). While the significance of such behavioral changes is unknown, illumination of billboards and other signs should be controlled to minimize cumulative effects of lighting on wildlife, especially as digital billboards proliferate. Illumination from a typical digital

billboard proposed for installation in endangered species habitat in southern California would have caused lighting levels to exceed 10^{-1} lux (equivalent to that of a full moon) up to 1,000 ft (305 m) from the sign, according to the lighting engineers for the applicant (Longcore 2015; the proposal was not approved). Such intense lighting has the potential to influence nearby sensitive resources and contribute to sky glow.

Conclusion

Light pollution within parks and protected lands can have a measurable impact upon the habitat quality of the park, even if the light itself originates outside of the park's administrative boundary. Minimizing ecological impacts requires that land managers adopt an ethic of using only the minimum light necessary for human needs and being cautious when introducing light into or near a natural landscape. This report provides examples of the range of negative consequences that may arise from artificial night lighting. Though not a compendium of information for every species and every environment, it should provide adequate evidence for reasonable management of lighting in natural areas.

Park managers should first inventory their resources and determine if and where sensitive species or habitats exist. This information can then guide the development of the prescription of lighting zones within a park where different levels of lighting are allowed, depending on the uses and experiences desired for those zones. Lighting zones may be designed to minimize wildlife impacts only or also to integrate other aspects of a park experience. The most sensitive zone would have a prohibition on outdoor lighting or impose restrictions that define a narrow range of allowable artificial lighting. Looser restrictions that still provide adequate mitigation would be delineated for developed areas in parks and those with substantial human nighttime activity. In all instances, mitigation should address spectrum, intensity, direction, and duration. When all four aspects are addressed, mitigations can be effective at reducing ecological disruption from artificial night lighting.

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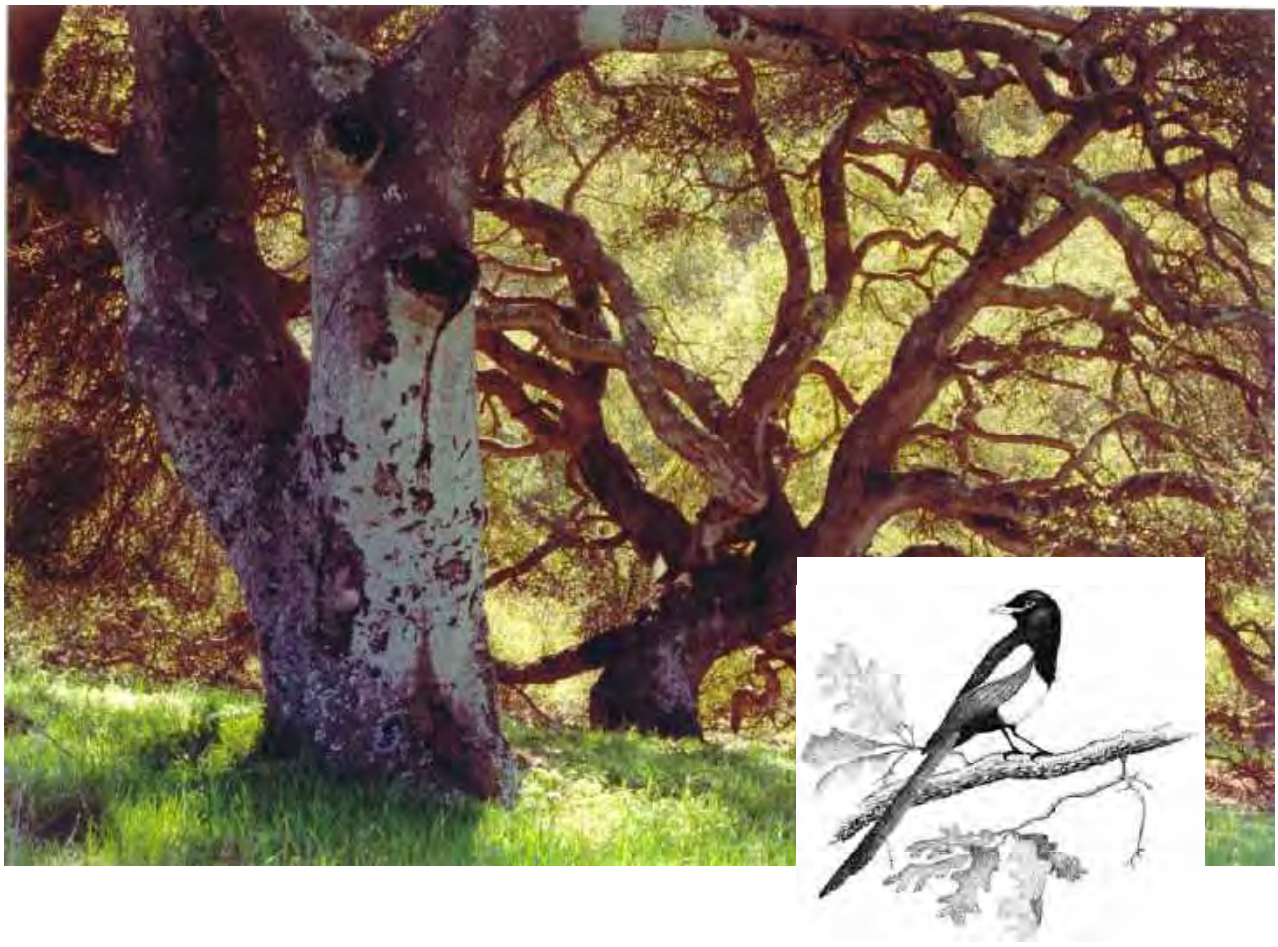
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Exhibit 23

The Oak Woodland Bird Conservation Plan

A Strategy for Protecting and Managing Oak Woodland Habitats and Associated Birds in California



A Project of California Partners In Flight and PRBO Conservation Science

WCS

California Partners in Flight — Compañeros en Vuelo

PRBO Conservation Science

The Oak Woodland Bird Conservation Plan

A Strategy for Protecting and Managing Oak Woodland Habitats and Associated Birds in California

Version 2.0

2002

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Table of Contents

Executive Summary **8**
Biological Need 8
Mission and Objective 10
Findings and Recommendations 11
Chapter 1. Introduction **14**
Oaks in Peril 14
Birds and Oaks 15
Partners in Flight 15
Objective of the Oak Woodland Bird Conservation Plan 16
Chapter 2. Oak Woodland Habitats in California **17**
Geologic History of Oak Woodlands 17
Classification of Oak Woodland Types 17
Chapter 3. Conservation Planning Process **21**
Importance of Oak Habitats for Wildlife 21
Focal Species 22
Ecological Relationships 24
Chapter 4. Problems Affecting Oak Woodland Birds **35**
Habitat Loss 35
Lack of Oak Regeneration 35
Fire and Oak Woodlands 36
Over-grazing by Cattle 37
Sudden Oak Death 37
Oak Woodland Viability 40
Chapter 5. Species-Specific Recommendations and Population Targets **43**
Lark Sparrow 44
Oak Titmouse 45
Acorn Woodpecker 46
Western Bluebird 48
Blue-gray Gnatcatcher 49
Population Targets 50
Chapter 6. Bioregional Conservation Objectives **54**
Sacramento Valley 55
San Joaquin Valley 56
Modoc 57
Klamath 57
Central Coast 58
Bay-Delta 60
South Coast 61
Mojave and Colorado Desert 61
Sierra 61
Chapter 7. Implementation of Conservation Plan Recommendations **63**
The North American Bird Conservation Initiative 63
Chapter 8. Conservation Action Recommendations **66**
Habitat Protection Recommendations 66
Habitat Restoration Recommendations 69
Management Recommendations 72
Monitoring/Research Recommendations 79
Policy Recommendations 84

Chapter 9. Outreach and Education 86
Project-Based Learning 86
Classroom Education 87
Volunteer Involvement 89
Interpretation at Natural Areas 89
Participation in Birding Festivals and Environmental Fairs 90
Oak Woodland Outreach 90
Future Outreach Priorities 93
Chapter 10. Literature Cited and Additional References 98
Appendix A. Resources 118
Appendix B. How to Monitor Bird Populations 124
Research and Monitoring 124
Monitoring Strategically 125
Long-term Monitoring 126
Standardized Methods 126
Area Search 126
Point Count 126
Mist Netting 126
Territory Mapping 126
Nest Monitoring 127

Tables and Figures

Figure 2-1. Approximate current coverage of oak woodland habitats throughout California based on the California GAP Analysis Project, 1998 and potential coverage based on Kuchler 1976. 19
Table 2-1. Approximate current coverage of oak woodland habitat types by bioregion (in hectares) based on California GAP Analysis Project, 1998. 20
Table 3-1. Birds associated with oak woodlands in California, with information on their use of acorns, nesting substrate, general foraging habitat in oak woodlands, and whether the species is endemic to California. 25
Table 3-2. Essential habitat elements for focal species, based on California Wildlife habitat Relationships System Version 7.0.1 26
Figure 3-1. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Acorn Woodpecker in California 28
Figure 3-2. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Blue-Gray Gnatcatcher in California 29
Figure 3-3. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Lark Sparrow in California 30
Figure 3-4. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Oak Titmouse in California 31
Figure 3-5. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Western Bluebird in California 32
Figure 3-6. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Western Scrub-Jay in California 33
Figure 3-7. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Yellow-Billed Magpie in California 34
Table 4-1. The Oak Trees (and Tanoak) of California and the presence/absence of conservation problems discussed in the text. 42
Table 5-1. Suggested population targets by species and bioregion 51
Table 5-2. Sources of population data in Table 5-1. 53



Executive Summary

This Oak Woodland Bird Conservation Plan is a collaborative effort of California Partners in Flight (CalPIF). It has been developed to guide conservation policy and action on behalf of oak woodland habitats and wildlife. The plan has focused on data concerning bird species that are dependent on oak woodlands, but conservation recommendations have broad applicability for all oak woodland habitats and, if implemented, would benefit many oak woodland species. The plan, which includes both this written document and an associated web site, is meant to provide a source of information on oak woodland bird conservation for landowners, managers, agencies and non-governmental organizations.

This conservation plan, along with the associated Geographic Information System (GIS) database of oak woodland habitats and monitoring data maintained at the Point Reyes Bird Observatory (PRBO), is the first iteration of a continuous process of updating habitat conservation recommendations based on the latest scientific monitoring and research data. This is not a regulatory document, nor does it represent the policies of any agency or organization.

A major extension of this conservation plan is the on-line GIS database of oak woodland monitoring projects and species breeding status available through the CalPIF section of PRBO's website at http://www.prbo.org/calpif/. Contributing to and managing data in this database is accomplished through a web interface, to which access is available by request. This database, in particular, is used for cataloguing new information and new analyses and for updating conservation recommendations and goals. Analyses of bird data will be posted on the PRBO website (www.prbo.org), periodically updated, and made available for use by the public. Therefore, this conservation plan is a dynamic, "living" document.

Biological Need

Oak woodlands have the richest wildlife species abundance of any habitat in California, with over 330 species of birds, mammals, reptiles, and amphibians depending on them at some stage in their life cycle (Verner 1980; Barrett 1980; Block and Morrison 1998). Wilson and others (1991) suggest that California oak woodlands rank among the top three habitat types in North America for bird richness. Oak woodlands are able to sustain such abundant wildlife primarily because they produce acorns, a high quality and frequently copious food supply (Koenig 1990; Ostfeld et al. 1996; McShea and Schwede 1993, and McShea 2000). Oaks also provide important shelter in the form of cavities for nesting (Waters 1988; Purcell 1995). Moreover, oak woodlands are among the most highly prized of California's



Acorn Woodpecker *photo by Ian Tait*

landscapes, for both aesthetic reasons and utilitarian needs such as firewood collection and grazing.

Yet, as with most of California's native habitats, oak woodlands have not escaped impacts from intensive human settlement: today only two-thirds of California's original oak woodlands remain (approximately 7 million acres). Of those, only about four percent enjoy protected status (Thomas 1997). This trend continues today, through loss of oak woodlands to urbanization and intensive agriculture such as vineyards (Tobin 1999, Larson 1999).

If loss of oak woodlands could be stemmed through protection and management incentives the problem might not be viewed as dire. However, oak woodlands are also faced with more insidious threats. Even today's existing oak woodlands in many cases are not regenerating naturally (i.e. young trees are not establishing to replace older trees as they senesce and die). Thus Californians continue to lose their oak woodland heritage, even in sites that are protected from development.

The causes of lack of natural regeneration are many, varied and inter-related in complex ways that are not completely understood. These include fire suppression (Biswell 1989; Stephens 1997) and overgrazing (Fleischner 1994; Belsky et al. 1999), both of which contribute to invasion of non-native annual grasses and cause long-term changes in habitat structure (Barnhart et al.1996). Annual grasses tend to outcompete native perennials and young oak seedlings for soil moisture, while herbivory by cattle can also stymie oak sapling development (Hamilton 1997).

The newest threat to California's oak woodlands is Sudden Oak Death (SOD). This pathogen started attacking California oaks in 1985 and became a full-scale epidemic by 1999. In the summer 2000, a previously unknown species of *Phytophthora*, the same genus responsible for the Irish potato famine, was identified as the pathogen causing SOD (Hansen et al. 2000). Oaks of many species infected with SOD die quickly, and there are currently no known cures or prophylactic measures for stopping the disease. The disease is currently present over more than 350 miles of California coastal forests (and into southern Oregon) and will most likely continue to spread (as it has recently to bigleaf maples in the Sierras).

Lack of recruitment of young oaks combined with the SOD epidemic affect 7 of the 10 acorn-bearing species of oak tree in California, including tanoak (Table 4-1). Thus, the combined effect of these two problems on native wildlife populations is likely to be considerable. Surprisingly, several recent assessments of biodiversity and environmental problems in the Unites States make no special mention of the major problems facing California's oak woodlands (e.g., Noss et al. 1995, Mac et al. 1998, Ricketts et al. 1999, Stein et al. 2000).

Mission and Objective

The mission of Partners in Flight (PIF) is to stop the decline of, maintain, or increase healthy populations of landbirds in North America. This mission translates into identification of habitat conservation and management priorities for bird species at risk in California, a priority of the associated Joint Ventures. By developing the Oak Woodland Bird Conservation Plan, California PIF (CalPIF) seeks to promote conservation and restoration of oak woodland habitat to support long-term viability and recovery of both native bird populations and other native species. The goals of the CalPIF oak woodland conservation effort are to:

- Define the conservation implications of three key problems facing California's oak woodlands: the long-term lack of recruitment, the new pathogen (*Phytophthora* sp.) that causes Sudden Oak Death, and the loss of oak woodland habitats.

- Collect data and analyze existing scientific information to inform land managers, planners, and the public of the complex and interrelated issues affecting California's oak woodlands and their management.

- Provide technical support for private landowners, land managers (state, federal, and non-profit), funders, agencies, and conservation organizations for assisting in the selection, design, and implementation of the highest priority conservation and land management actions.

- Support and inform efforts to increase the quantity (acreage) and quality (ecosystem function) of oak woodland habitat in California by providing funding information and promoting on-the-ground conservation projects.

Designing conservation efforts for oak woodland habitats based on the needs of birds is useful because birds occupy a diverse range of niches within oak woodlands: from those that nest on the ground to those that nest in the cavities of mature trees, those that feed primarily on insects and those that rely heavily on the acorn mast from year to year. Evidence and experience indicate that by managing for a diversity of birds, diverse oak woodland habitat structure will be maintained and many other elements of terrestrial biodiversity will be conserved (Martin 1995, Askins 2000).

CalPIF recognizes that the subject of land management and land use, whether on private or public lands, can be contentious. Because 85% of all oak woodlands are on private lands (Griffin and Muick 1990), CalPIF supports the need for land managers and landowners to have flexibility to develop systems that accommodate their needs while seeking to achieve the desired habitat characteristics that will maximize benefits to wildlife. CalPIF supports and will seek to maximize the benefits of new and ongoing efforts, such as the Integrated Hardwood Range Management Program, to work with viticulturists, ranchers, and public land managers with the ultimate goal of ensuring a thriving oak woodland heritage for future generations of Californians.

Findings and Recommendations

This Conservation Plan has been developed collaboratively by the leading bird researchers in California through a process designed to:

- capture the conservation needs of the complete range of oak woodland habitat types throughout the state, and
- develop biological conservation objectives for selected oak woodland bird species.



Lark Sparrow *PRBO*

At over 120 sites throughout California, monitoring data on oak woodland birds have been collected continuously over the past ten years. This document places an emphasis on a suite of seven bird species chosen because of their conservation interest to serve as focal species representative of the range of oak habitats in the state (Acorn Woodpecker, Blue-gray Gnatcatcher, Lark Sparrow, Oak Titmouse, Western Bluebird, Western Scrub-Jay, Yellow-billed Magpie). Visit http://www.prbo.org/calpif/ to view maps of oak woodland habitat coverage, focal species ranges and PIF monitoring sites in California. Preliminary analyses of the seven focal species' habitat requirements reveal the following:

- Four of seven focal species have experienced significant population declines, local extirpations, or both. The only species that appears to be significantly and consistently increasing is the Western Scrub-Jay, a bird that adjusts readily to urbanization but is also an important nest predator of many other native bird species.
- Loss of habitat or habitat structure (such as dead standing trees, mature trees with cavities, or a shrubby understory component) is implicated as a likely cause of decline and/or other problems for five of the seven focal species.

Accordingly, a series of conservation recommendations are provided, focusing primarily on protection, restoration and management of habitat that will facilitate and promote natural oak woodland regeneration. Other recommendations focus on the need to promote nest success, by retaining mature oaks in altered landscapes to provide nest cavities and by keeping down the number of native and introduced nest predators. Species-specific conservation recommendations for the Western Bluebird, Blue-gray Gnatcatcher and Acorn Woodpecker are also defined.

High priority conservation areas or "portfolio sites," distinguished by their protected status and potential for managing oak woodland habitat through restoration, are identified within

the ten bioregions of California as defined by the California Biodiversity Council. Setting conservation goals by bioregion facilitates planning site-specific projects in a broader context, and provides a comparable framework to other conservation planning efforts such as the North American Bird Conservation Initiative (NABCI). Setting and achieving conservation goals by bioregion will:

- Ensure that a suite of ecological communities representative of California's diversity will be conserved throughout the state.
- Ensure the broadest range of biodiversity and locally adapted races of species will be conserved.
- Facilitate action at the local level.

California's Oak Woodland Conservation Act provides funds for protection and conservation of oak woodlands. This program is administered by the Wildlife Conservation Board. It offers financial incentives to private landowners to protect and promote biologically functional oak woodlands over time. Conservation easements, land improvements, public education and outreach are some of the activities that may be funded by AB 242, initiated by the California Oak Foundation and carried by Assemblywoman Helen Thomson.

Finally, scientific efforts for conservation have little impact without the support of affected local communities, including private landowners, government land managers, and the general public (Askins 2000). This is particularly true for oak woodlands in California, which are 85% privately owned. To gain crucial public support, research and management programs must share their findings and involve the interested parties at all levels of the conservation enterprise. Therefore, this plan provides a list of current programs focusing on oak woodland conservation and management, educational and volunteer opportunities for children and adults, and a list of resources and organizations for those interested in involving their families and communities in oak woodland conservation.

Species Account Authors:

Acorn Woodpecker (***Melanerpes formicivorus***) by Corrina Lu and Colin Lee, California Partners In Flight

Blue-gray Gnatcatcher (***Polioptila caerulea***), by Diana Humple, Point Reyes Bird Observatory

Western Scrub-Jay (***Aphelocoma californica*)** by Sue Guers, Point Reyes Bird Observatory

Yellow-billed Magpie (***Pica nuttalli***) by Mark Reynolds, Ph.D., The Nature Conservancy

Oak Titmouse (***Baeolophus inornatus***) by Moe Flannery, Point Reyes Bird Observatory

Western Bluebird (***Sialia mexicana***) by Mike Lynes, Point Reyes Bird Observatory

Lark Sparrow (***Chondestes grammacus***) by Diana Humple, Point Reyes Bird Observatory

California Partners in Flight Executive Steering Committee:

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Wildlife Conservation Society (WCS)
Ventana Wilderness Society/Big Sur Ornithology Lab



Chapter 1. Introduction

The quintessential landscape of California is oak woodland. Oaks are the central features of the landscape that most Californians identify with. Yet, California's oak woodlands are imperiled in many ways. Moreover, the forces that put California's oaks at risk endanger the birds and other wildlife dependent upon them.



Blue Oak Woodland *photo by Sandy Scoggin, PRBO*

Oaks in Peril

The conservation concerns outlined here for oak woodlands, particularly the consequences of Sudden Oak Death, the lack of regeneration of several oak species, and the loss of oak habitat to development seem to be harbingers of the future for all the wildlife of California's oak woodlands.

Birds and Oaks



Coast Live Oak *photo by Rich Stallcup*

The birds of California's oak woodlands are connected to this distinctive habitat mainly through acorns, the fruits of oaks that are eaten and stored by dozens of species. This ecological relationship is reciprocal: species like Western Scrub-Jays, Steller's Jays, and Yellow-billed Magpies do not completely retrieve cached acorns and thus act as dispersers of oak seedlings across the landscape. In crucial ways, oaks provide key food for many birds, and some birds provide seed dispersal for oaks. Large oak trees also provide cavities for cavity-dependent nesting birds and other wildlife, as well as caching sites for acorn woodpeckers, nuthatches, and other species. Additionally, oaks commonly host mistletoe, which is an important food for Western Bluebirds, Phainopepla, and other species. The ties between oaks and birds are profound and diverse.

As is true for most natural landscapes, the loss of oak woodland habitat continues as our ever-growing population converts ranches into suburbia, foothills into vineyard, and forest into prime real estate. Further, the lack of recruitment of new oaks in many species represents a crisis in the making, but one that is not currently widely acknowledged. Nonetheless, our existing oak woodlands are frequently not regenerating new oaks to replace the old ones. Finally, a new threat dubbed "Sudden Oak Death," or SOD, is killing coastal oaks and tanoaks. This new pathogen represents a very urgent crisis indeed. The majority of California's oak tree species are affected either by lack of regeneration or SOD, or both (Table 4-1).

Partners in Flight

This Oak Woodland Bird Conservation Plan is part of a series of California Partners in Flight (CalPIF) Bird Conservation Plans. Bird scientists and ecologists working in oak woodlands have attempted to bring an understanding of these threats to California's oak woodlands and to discern how these issues are affecting and will affect the birds that are an integral part of these ecosystems. Perhaps unlike other CalPIF Conservation Plans, the primary focus here is on habitat problems over the immediate problems of the birds that inhabit them, but like other plans, conservation solutions are generally habitat based.

The Oak Woodland Bird Conservation Plan is an outgrowth of the national movement known as Partners in Flight (PIF). It is a plan produced by California Partners in Flight. CalPIF was formed in 1992 with the full participation of state, federal, and private land managers, scientists, and researchers interested in the conservation of nongame landbirds. Recognizing that the major cause of population declines in California was due to habitat loss, CalPIF began identifying critical habitats important to birds. The first effort was on riparian

habitat (see the "Riparian Bird Conservation Plan", PRBO website www.prbo.org for current information).

Objective of the Oak Woodland Bird Conservation Plan

The objective of the Oak Woodland Bird Conservation Plan is to promote conservation and restoration of oak woodland habitat in California to support the long-term viability and recovery of native bird populations and the associated natural diversity tied to oak woodlands. The main goals of our endeavor are to:

- Present an overview of the conservation implications of three key problems facing California's oak woodlands: the long-term lack of recruitment of many species of oaks and the recent pathogen (*Phytophthora* sp.) threat to tanoaks, coast live oak, interior live oak, and black oak (Sudden Oak Death), and the loss of oak woodland habitats.

- Collect data and analyze existing scientific information to help inform land managers, planners, and the public of the complex and interrelated issues affecting California's oak woodlands and their management.

- Provide technical support for private landowners, land managers (state, federal, and non-profit), funders, agencies, and conservation organizations for assisting in the selection, management design, and implementation of the highest priority conservation/land management projects and activities.

- Support and inform efforts to increase the quantity (acreage) and quality (ecosystem function; i.e., facilitate the regeneration of oaks and restoration of native perennial grasses) of oak woodland habitat in California by identifying and promoting on-the-ground conservation activities and projects (ones that are demonstrating success in habitat restoration and recruitment).



Chapter 2. Oak Woodland Habitats in California

Geologic History of Oak Woodlands

Oaks appeared in southwestern North America, including California, beginning in the Eocene (ca. 50+ million years before present) (Axelrod 1988). The history of oaks and oak woodlands in geologic time in California is a complicated one of community assembly and disassembly with the vicissitudes of climate change. In general, oaks increase in prominence in warmer, drier conditions, and decline in cooler, wetter conditions (Axelrod 1988). By the Miocene (ca. 24 million years before present) many of California's present oak species were evident (e.g., tanoak, coast live oak, interior live oak, blue oak, and valley oak).

Finer-scale fluctuations in oak abundance and distribution are evident in the Holocene (from 10,000 years ago to the present), as shown in pollen studies (Byrne et. al. 1991). Oaks began to reestablish themselves following the last glacial period in California. Oaks were more abundant than at present during the mid-Holocene (ca. 6,000 years ago).

Classification of Oak Woodland Types

Oaks are in the plant family Fagaceae. The members of this family include *Lithocarpus* (tanoaks, the majority of species (ca. 300) are in Asia), *Castanopsis* (now more frequently referred to as *Chrysolepis*) (the chinquapins), *Castanea* (chestnuts), and *Quercus* (oaks). All produce hardened fruits. Hardened fruit evolution in the Fagaceae and related families, the associated dispersal of such fruits by vertebrates, and a great explosion of plant diversity among such families all occurred in the Eocene (Tiffney 1986). *Lithocarpus* is considered the most plesiomorphic ("primitive") while *Quercus* is considered the most apomorphic ("advanced"), as evidenced from floral morphology (Kaul 1986).

There is a long history of classification of present vegetation in California (see review in Sawyer and Keeler-Wolf 1995). Holland (1986) identified 18 natural communities dominated by oaks in California. Six are forest communities (e.g., coast live oak riparian forest), four are chaparral communities (e.g., scrub oak chaparral), and eight are woodland and savanna communities (e.g., blue oak woodland and Oregon oak woodland).

In their own treatment of California vegetation, Sawyer and Keeler-Wolf (1995) note no fewer than 15 series of oak dominated by shrubs and 14 series of oak (and tanoak) dominated by trees; a total of 81 tree series are described in total. Among the tree series, the black oak, blue oak, coast live oak, mixed oak, Oregon white oak, tanoak, and valley oak series occur over significantly large areas of California.

Griffin (1988) noted that oak woodlands have "little floristic unity", but nonetheless partitioned oak woodlands broadly into "Foothill Woodland", "Southern Oak Woodland", "Northern Oak Woodland", and "Riparian Forest" region, with each category having several subcategories, or phases. In the Foothill type, valley oak, blue oak, and interior live oak predominate. It is in the Southern oak woodland type that we find coast live oak. Griffin's

main emphasis, however, is that oak woodland represents an "ill-defined zone of oak-dominated communities growing between open grassland and montane forest."

Thus, for our purposes, we define oak woodlands as simply those forests or woodlands where oaks (or tanoaks) are common or predominate. We wish instead to emphasize that for wildlife, including the bird community, the key issue of oak woodlands is not so much in the detail of which oak species are present, but rather that all oaks (and tanoaks) produce acorns. Acorns are perhaps the most important food product for wildlife produced in California's many diverse habitats.



Blue Oak Acorns *photo by Steve Zack, Wildlife Conservation Society*

The diverse oak woodland types in California support a range of bird communities. For example, coastal oak forests in western California support high breeding densities of forest species, such as Dark-eyed Juncos, that are not common in oak savanna habitats further inland, although both habitats support many oak-associated species such as Oak Titmouse (Tietje and Vreeland 1997, Verner et al. 1997).

Figure 2-1. Approximate current coverage of oak woodland habitats throughout California based on the California GAP Analysis Project, 1998 and potential coverage based on Kuchler 1976. See back cover for color version of this map.

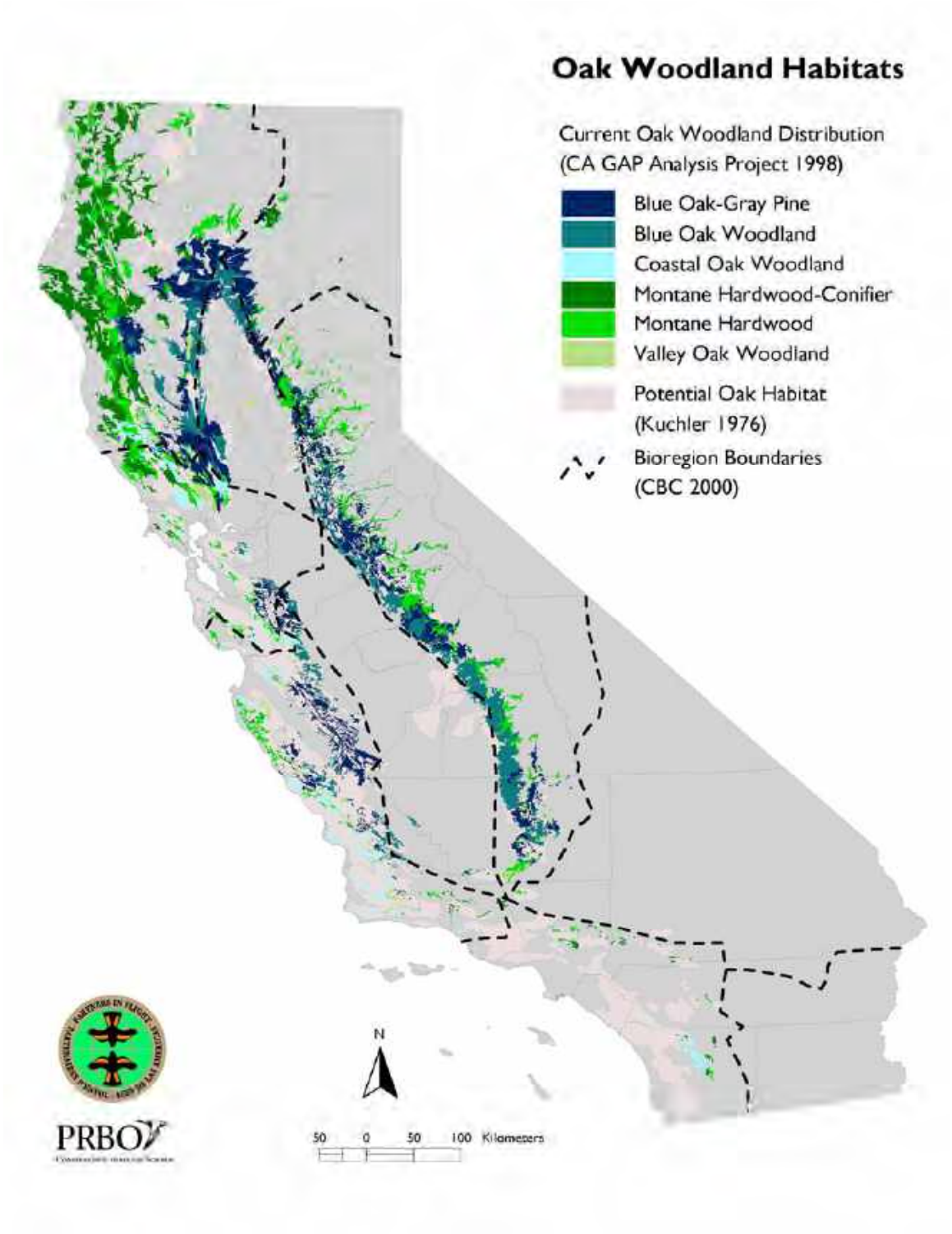


Table 2-1. Approximate current coverage of oak woodland habitat types by bioregion (in hectares) based on California GAP Analysis Project, 1998 [a].

	Klamath	Modoc	Sacramento Valley	Sierra	Bay/Delta
Blue Oak / Gray Pine	475,068	137,409	81,639	479,547	84,644
Blue Oak Woodland	286,506	78,650	44,781	547,501	27,581
Coastal Oak Woodland	40,183	0	18,896	0	119,425
Montane Hardwood / Conifer	985,011	22,315	0	23,027	68,019
Montane Hardwood	401,129	25,988	34,564	352,588	110,044
Valley Oak Woodland	64,531	0	9399	31,049	76,232
% Covered by Oak Woodland	**34.8%**	**7.9%**	**12.6%**	**17.7%**	**21.3%**

	San Joaquin	Central Coast	Mojave	South Coast	Colorado Desert	California Total
Blue Oak / Gray Pine	9210	215,811	3453	0	0	1,966,477
Blue Oak Woodland	23,286	131,707	2458	0	0	1,690,086
Coastal Oak Woodland	0	153,465	0	40,561	262	372,830
Montane Hardwood / Conifer	0	17,477	0	19,209	341	1,158,540
Montane Hardwood	1322	59,469	2793	16,580	1108	1,358,275
Valley Oak Woodland	1653	72,728	657	0	0	287323
% Covered by Oak Woodland	**1.3%**	**21.8%**	**0.1%**	**2.9%**	**0.1%**	**13.2%**

[a] Davis et al. (1998)



Chapter 3. Conservation Planning Process

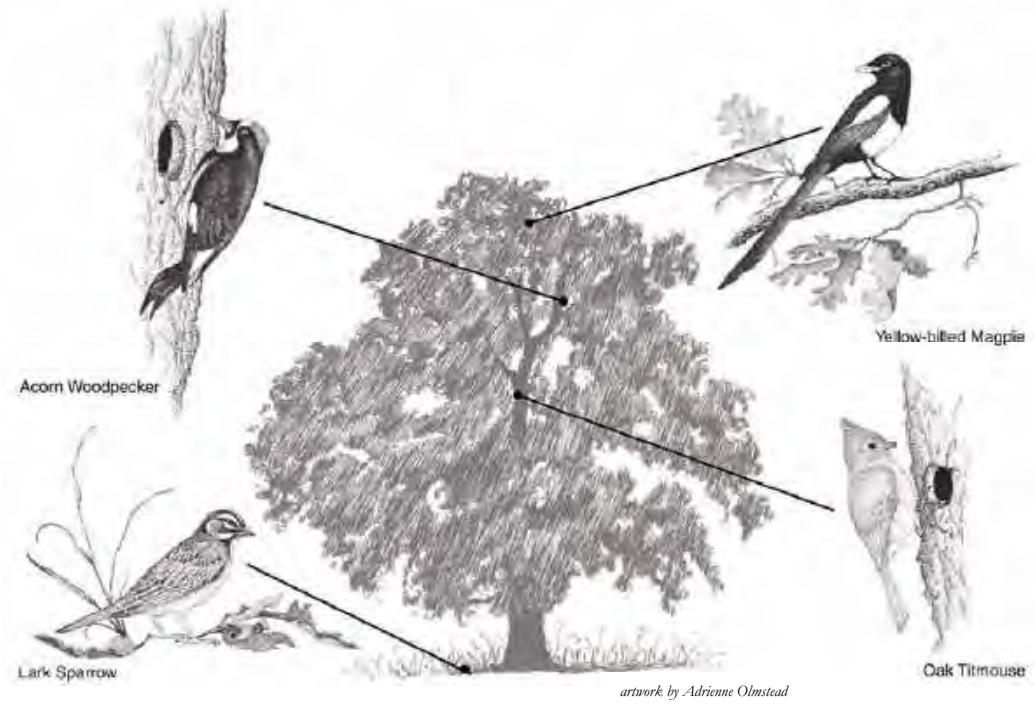
Oak woodlands are thought to have the richest wildlife species abundance of any habitat in California, as some 331 species depend on this habitat to varying degrees (Verner 1980; Barrett 1980; Block and Morrison 1998). The key connection between much of the wildlife and oak woodlands is through the oak's production of acorns. Acorn production varies in time and space between and among species (Sork and Bramble 1993; Healy et al. 1999), including species in California (Koenig et al. 1994). So-called "mast" years in oaks, when acorn production is copious in an area, are critical to triggering pulses in vertebrate populations and reproduction (Koenig 1990; Ostfeld et al. 1996; McShea and Schwede 1993; and McShea 2000). Forests with at least some oaks have higher mean vertebrate diversity than similar forests without oaks (Rosenstock 1998). This difference is due both to acorn production and the increased cavity-nesting sites afforded by large oak trees in the landscape.

Importance of Oak Habitats for Wildlife

Large oak trees in oak woodland habitats are important for cover, nesting sites for cup nesting species and cavity nesting species, as well as caching sites for birds storing acorns. In oak woodlands with large oaks, the abundance of cavity nests is important to many species of wildlife, including birds (Waters 1988; Purcell 1995). Old, large oak trees are mosaics of living and dead branches, providing ample sites for woodpeckers to excavate cavities. Dead branches and trunks in both living and dead large oaks are critically important for storage sites of acorns by Acorn Woodpeckers (Gutierrez and Koenig 1978).

There are a few studies of bird communities in California's oak woodlands (Block 1989; Block et al. 1990; Tietje et al. 1997; Verner et al. 1997; Sisk et al. 1997). These studies indicate many of the ecological connections between oak woodlands and birds. They make clear the strong link between the bird community and the production of oaks (through acorn dispersal), the importance of cavity nests in large trees, and the often complex interactions and connections between habitat features and bird species.

Fragmentation studies and efforts to identify minimal size and shape requirements of oak woodland habitat are few but important (see for example Aigner et al. 1998, Merenlender et al. 1998, Stralberg and Williams, 2002). Land managers need to know tradeoffs in habitat size and the consequences for wildlife. Restoration efforts can also be guided by knowing how many species might be present with what effort of scale.



artwork by Adrienne Olmstead

Birds in Oak Woodlands
This schematic shows nest placement for four of the plan's focal species. Studies show a strong link between the bird community and the production of oaks (through acorn dispersal), the importance of cavity nests in large trees, and the often complex interactions and connections between habitat features and bird species.

Focal Species

Because birds occupy a wide diversity of ecological niches, they serve as useful tools in the design of conservation efforts (Martin 1995, Askins 2000). Birds are relatively easy to monitor in comparison with other taxa and can serve as "focal species", whose requirements define different spatial attributes, habitat characteristics and management regimes representative of a healthy system**.** For example, the bird that requires the largest area to survive in a certain habitat will determine the minimum suitable area for that habitat type. Likewise, the requirements of non-migratory birds that disperse short distances to establish new territories will define the attributes of connecting vegetation. The species with the most demanding or exacting requirements for an ecological characteristic such as territory size determines its minimum acceptable value in an area that is protected or managed for biodiversity. Therefore, the assumption is that a landscape designed and managed to meet the focal species' needs encompasses the requirements of other species (Lambeck 1997).

Because focal species lists are explicitly based on numerous hypotheses and assumptions, the choice of focal species should be tested as part of the ongoing adaptive conservation planning process. Thus, this oak woodland focal list may be revised in the future to include new species identified by research and monitoring.

Twenty-two bird species were selected by consensus as "focal species" for preparing the Oak Woodland Bird Conservation Plan. The focal species list for oak woodlands includes both a suite of species representing various habitat elements and ecological characteristics and a number of species that are good indicators for monitoring (species that are common and respond strongly and/or consistently to habitat attributes). Unlike the Riparian Bird Conservation Plan, none of the "focal species" have any special status designations. Species accounts have been prepared, or are in process, for the following bird species:

Focal Species and Species Account Authors:

- **Acorn Woodpecker** (***Melanerpes formicivorus***) by Corrina Lu and Colin Lee, California Partners In Flight

- **Blue-gray Gnatcatcher** (***Polioptila caerulea***), by Diana Humple, Point Reyes Bird Observatory

- **Western Scrub-Jay** (***Aphelocoma californica*)** by Sue Guers, Point Reyes Bird Observatory

- **Yellow-billed Magpie** (***Pica nuttalli***) by Mark Reynolds, Ph.D., College of Sciences, San Diego State University

- **Oak Titmouse** (***Baeolophus inornatus***) by Moe Flannery, Point Reyes Bird Observatory

- **Western Bluebird** (***Sialia mexicana***) by Mike Lynes, Point Reyes Bird Observatory

- **Lark Sparrow** (***Chondestes grammacus***) by Diana Humple, Point Reyes Bird Observatory

Additional focal species of similar conservation concern have been identified, but species accounts have not yet been completed for these species. We anticipate and encourage future accounts for these species.

Additional Focal Species:

- **Wood Duck (*Aix sponsa*)**
- **Red-shouldered Hawk (*Buteo lineatus*)**
- **Wild Turkey (*Meleagris gallopavo*)**
- **California Quail (*Callipepla californica*)**
- **Band-tailed Pigeon (*Columba fasciata*)**
- **Northern Pygmy Owl (*Glaucidium gnoma*)**
- **Lewis Woodpecker (*Melanerpes lewis*)**
- **Nuttall's Woodpecker (*Picoides nuttallii*)**
- **Ash-throated Flycatcher (*Myiarchus cinerascens*)**

- **Hutton's Vireo (*Vireo huttoni*)**
- **White-breasted Nuthatch (*Sitta carolinensis*)**
- **Bewick's Wren (*Thryomanes bewickii*)**
- **California Thrasher (*Toxostoma redivivum*)**
- **European Starling (*Sturnus vulgaris*)**
- **California Towhee (*Pipilo crissalis*)**

Ecological Relationships

The birds on our lists represent diverse ecological relationships with California's oak woodlands (Tables 3-1 and 3-2). Many of the bird species consume acorns. Clearly, species like Acorn Woodpeckers (Koenig 1990), Western Scrub-Jay and Oak Titmouse are highly dependent on acorns. Verner (1980) names 30 bird species as consumers of acorns, six of which have diets that are more than 25% acorns. Acorn Woodpeckers and Western Scrub-Jays cache (store) many thousands of acorns annually. Western Scrub-Jay individuals may store as many as 5,000 acorns annually (Vander Wall 1990), whereas a population of Acorn Woodpeckers may store up to 43,000 in a year (Koenig 1990; Vander Wall 1990). The Western Scrub-Jay, Steller's Jay (not on our lists; see Fuchs et al. 1997), and, to a lesser degree, the Yellow-billed Magpie cache acorns individually in the ground, and thus, among caching birds, are the only species to facilitate regeneration because many acorns remain unretrieved and germinate.



Western Scrub-Jay

photo by Steve Zack
Wildlife Conservation Society

Table 3-1. Birds associated with oak woodlands in California, with information on their use of acorns, nesting substrate, general foraging habitat in oak woodlands, and whether the species is endemic to California.

Species	Consumes Acorns?	Caches Acorns?	Nest[1]	Foraging Habitat in Oak Woodlands	California Endemic?
Wood Duck	**Yes**		**2º Cavity**	Wooded Streams	
Red-shouldered Hawk			Platform	Woodlands	**?**
Wild Turkey (I[2])	**Yes**		Ground	Woodlands	
Band-tailed Pigeon	**Yes**		Platform	Woodlands	
California Quail	**Yes**		Ground	Woodland-shrub	
N. Pygmy Owl			**2º Cavity**	Woodlands	
Acorn Woodpecker	**Yes**	Tree, many	**1º Cavity**	Woodlands	
Lewis Woodpecker	**Yes**		**1º Cavity**	Woodlands	
Nuttall's Woodpecker	**Yes**		**1º Cavity**	Woodlands	**YES[3]**
Ash-throated Flycatcher			**2º Cavity**	Open Woodlands	
Western Scrub-Jay	**Yes**	**Ground, many**	Cup	Woodland-Scrub	
Yellow-billed Magpie	**Yes**	**Ground, few**	Cup	Woodlands	**YES**
Oak Titmouse	**Yes**	Tree, few	**2º Cavity**	Woodlands	**YES[3]**
White-breasted Nuthatch	**Yes**	Tree, few	**2º Cavity**	Woodlands	
Bewick's Wren			**2º Cavity**	Woodland-Scrub	
Blue-gray Gnatcatcher			Cup	Woodlands	
Western Bluebird			**2º Cavity**	Open Woodlands	
California Thrasher			Cup	Woodland-Scrub	**YES[3]**
European Starling (I)			**2º Cavity**	Agriculture edge	
Hutton's Vireo			Cup	Woodlands	
California Towhee			Cup	Woodland-Scrub	**YES[4]**
Lark Sparrow			Ground	Grass - Woodland	

Notes: 1. Cavity nesting species differ as to whether they excavate their own cavities (1º cavity nester) or they take over disused nests or naturally occurring cavities (2º cavity nester). 2. (I) denotes an introduced, nonnative species. 3. Also occurs in Baja California, Mexico. 4. Also occurs in Baja California, Mexico, and extreme southern Oregon.

Table 3-2. Essential habitat elements for focal species, based on California Wildlife habitat Relationships System Version 7.0.[1]

Focal species	Acorns	Cavities	Trees	Shrub	Grass/ herb	Snags	Brush piles	Water/ Riparian
Wood Duck		X						X
California Quail			X	X	X		X	X
Red-shouldered Hawk			X	X				X
Northern Pygmy Owl		X	X			X		
Band-tailed Pigeon	X		X					
Acorn Woodpecker	X	X	X			X		X
Lewis's Woodpecker	X	X	X					
Nuttall's Woodpecker		X	X			X		
Ash-throated Flycatcher		X	X	X				
Western Scrub-Jay	X		X	X				
Yellow-billed Magpie	X		X					X
Oak Titmouse		X	X			X		
White-breasted Nuthatch	X		X			X		
Bewick's Wren		X	X	X				
Blue-gray Gnatcatcher			X	X				
California Thrasher				X				
Western Bluebird		X	X		X	X		X
Hutton's Vireo			X	X				X
Lark Sparrow					X			
California Towhee				X				X

[1] Includes selected elements classified by CWHR as "essential" or "secondarily essential".

Half of the birds on our lists are cavity-nesting species. Their dependency on particularly large oak trees, with their mosaic of live and dead branches, the latter containing the cavities for nesting, cannot be overestimated (Purcell 1995). Acorn Woodpeckers are the most common cavity excavating species in oak woodland habitats, particularly the valley, blue, black and interior live oak woodlands. The secondary cavity nesting species, those that do not excavate their own cavities, typically appropriate unused woodpecker nesting cavities. Cavities can and often are used for many years, often by many species over time.



Acorn Woodpecker *photo by Ian Tait*

Several bird species were chosen that respond to specific types of understory habitat within oak woodlands, including Lark Sparrow, Bewick's Wren, and California Quail. The list also includes several species that are sensitive to habitat fragmentation and residential development density: Lark Sparrow and Ash-throated Flycatcher respond negatively, and Western Scrub-jay responds positively (Stralberg and Williams, 2002).

Several bird species on our lists are endemic (unique) to California, or nearly so (it is uncertain whether Red-shouldered Hawks of California are distinct from eastern hawks). And, of these, the Nuttall's Woodpecker, Yellow-billed Magpie, and Oak Titmouse are intricately tied to oak woodlands specifically. Several birds on our focal list use habitat elements such as woody debris or shrubs (Bewick's Wren, California Towhee) and others use wetland or riparian habitat elements (Red-shouldered Hawk and Wood Duck). These components of oak woodland habitats are also important to many species of mammals, amphibians and reptiles in oak woodlands.



Nuttall's Woodpecker *photo by Ian Tait*

Two species are non-native, and enter our list and consideration for different reasons. The Wild Turkey is an important game bird in California and an important consumer of acorns. The European Starling is included because it is a major competitor for cavities in oak woodlands. It is typically more aggressive than other species, and so prevents native cavity nesting species from accessing nesting sites. As many of our oak woodlands abut agricultural areas, they are susceptible to colonization by Starlings - an abundant pest with which our native species must contend.

Figures 3-1 through 3-7 show oak woodland distribution in California based on the California GAP Analysis (Davis 1998), current range, historic range, study sites and breeding status at these sites for the primary focal species, Acorn Woodpecker, Blue-gray Gnatcatcher, Lark Sparrow, Oak Titmouse, Western Bluebird, Western Scrub-Jay, and Yellow-billed Magpie.

Figure 3-1. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Acorn Woodpecker in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

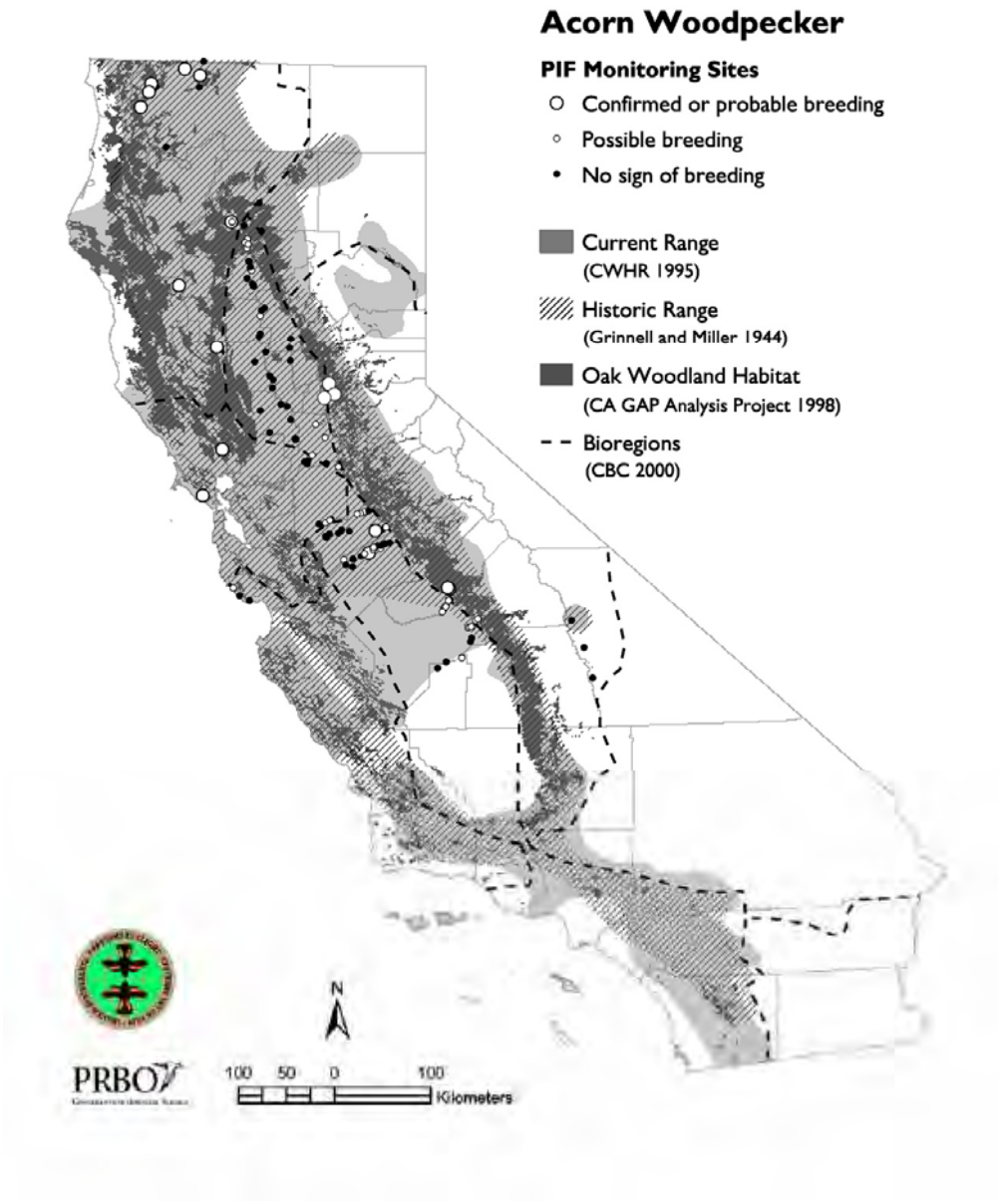


Figure 3-2. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Blue-Gray Gnatcatcher in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

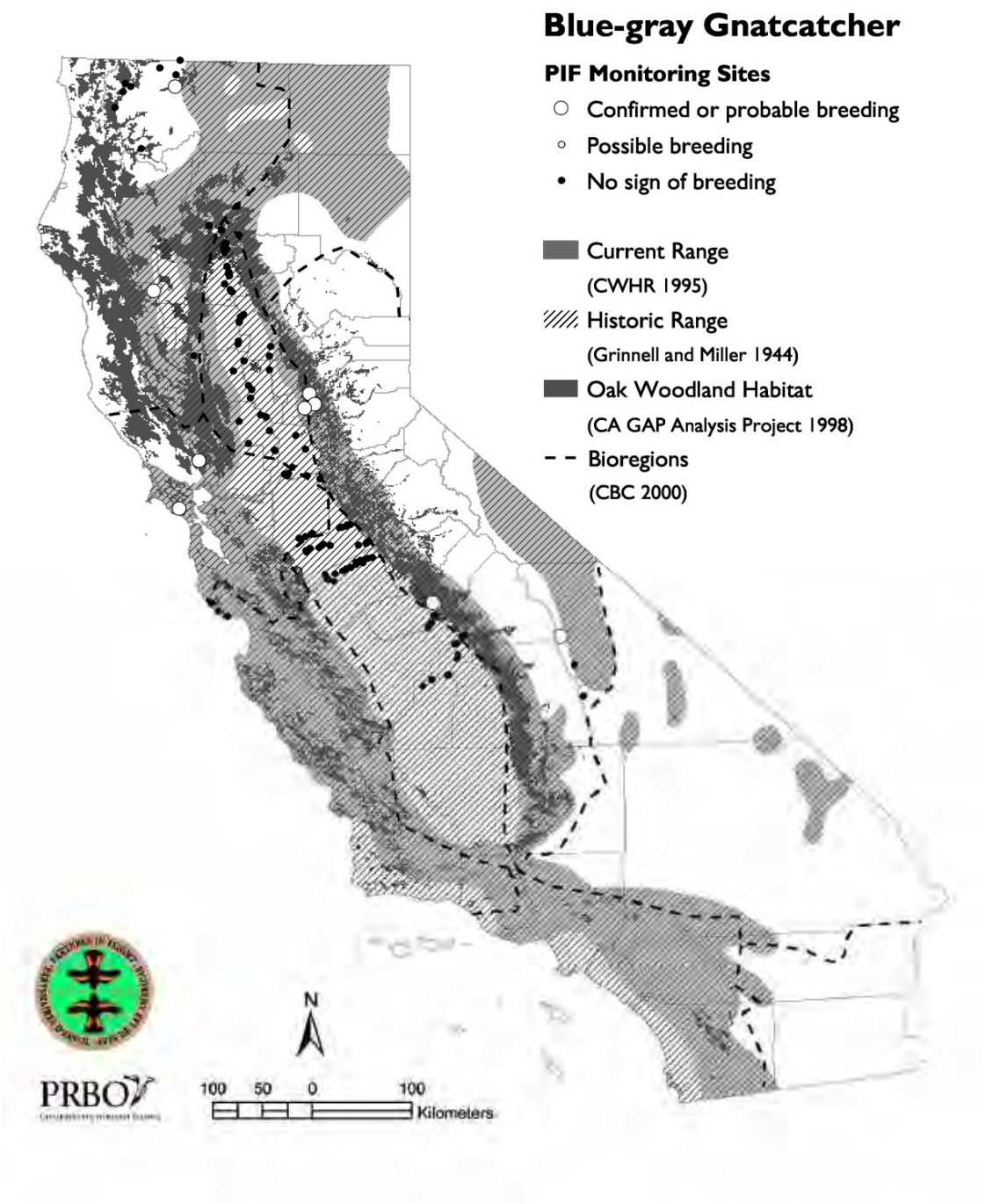


Figure 3-3. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Lark Sparrow in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

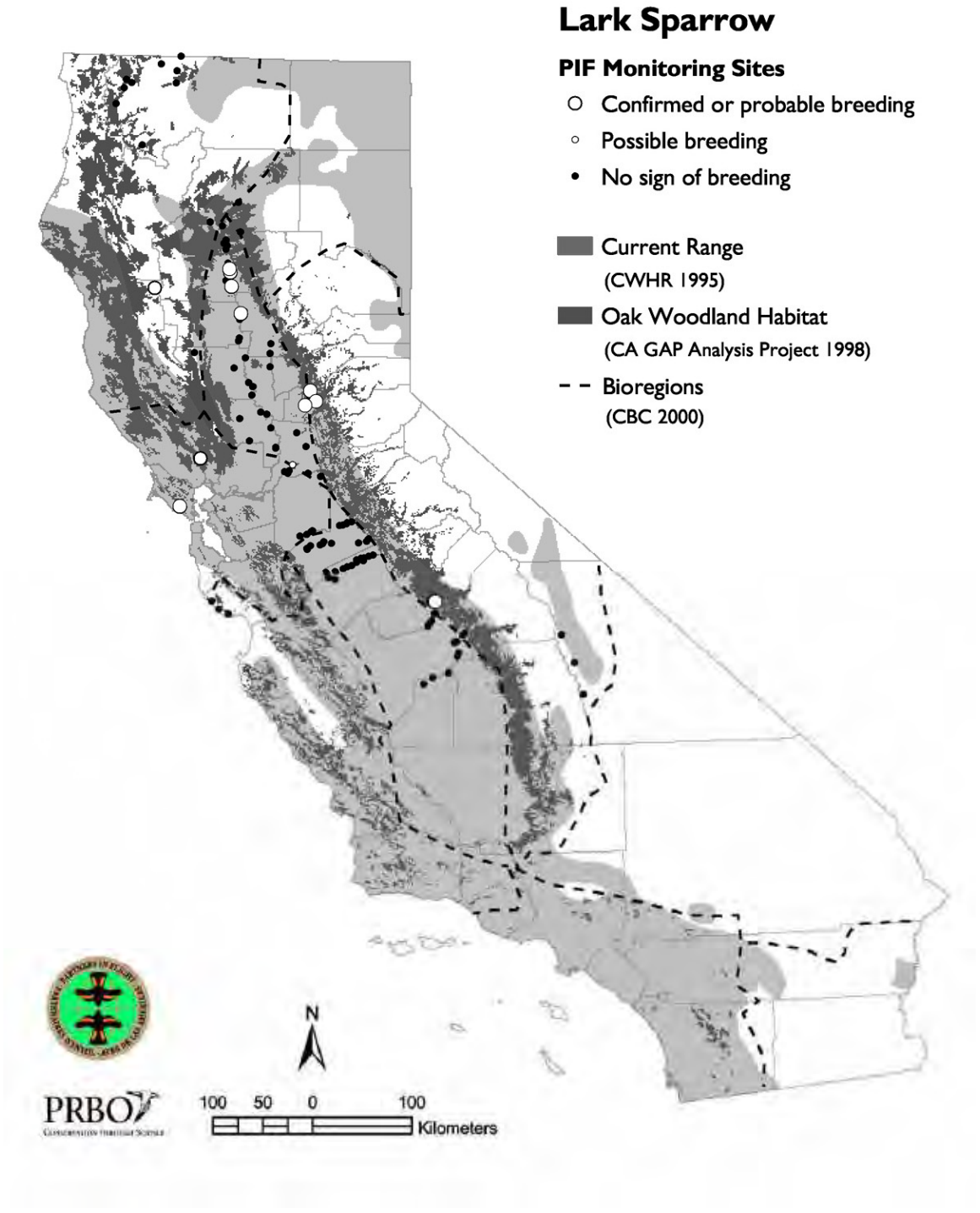


Figure 3-4. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Oak Titmouse in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

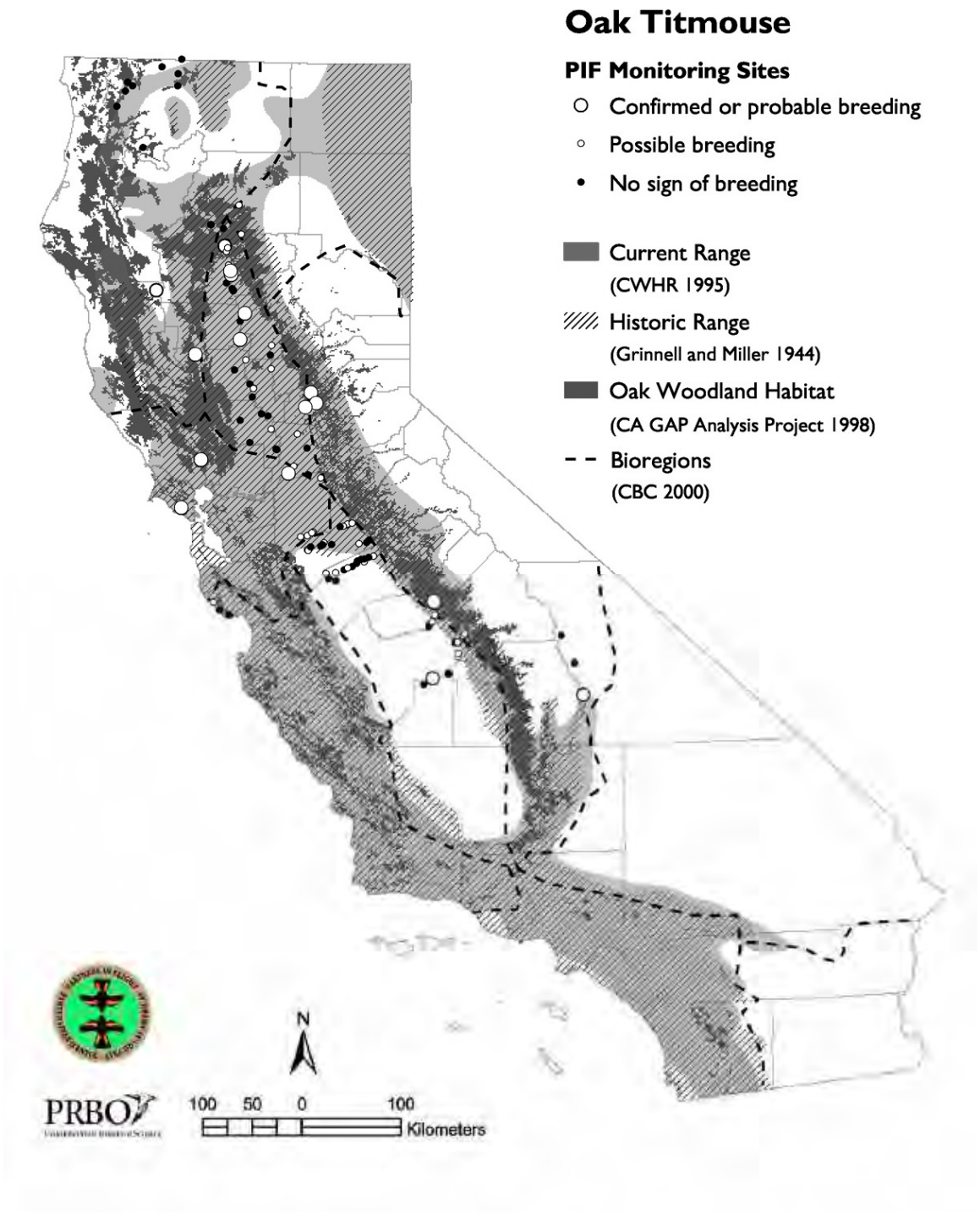


Figure 3-5. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Western Bluebird in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

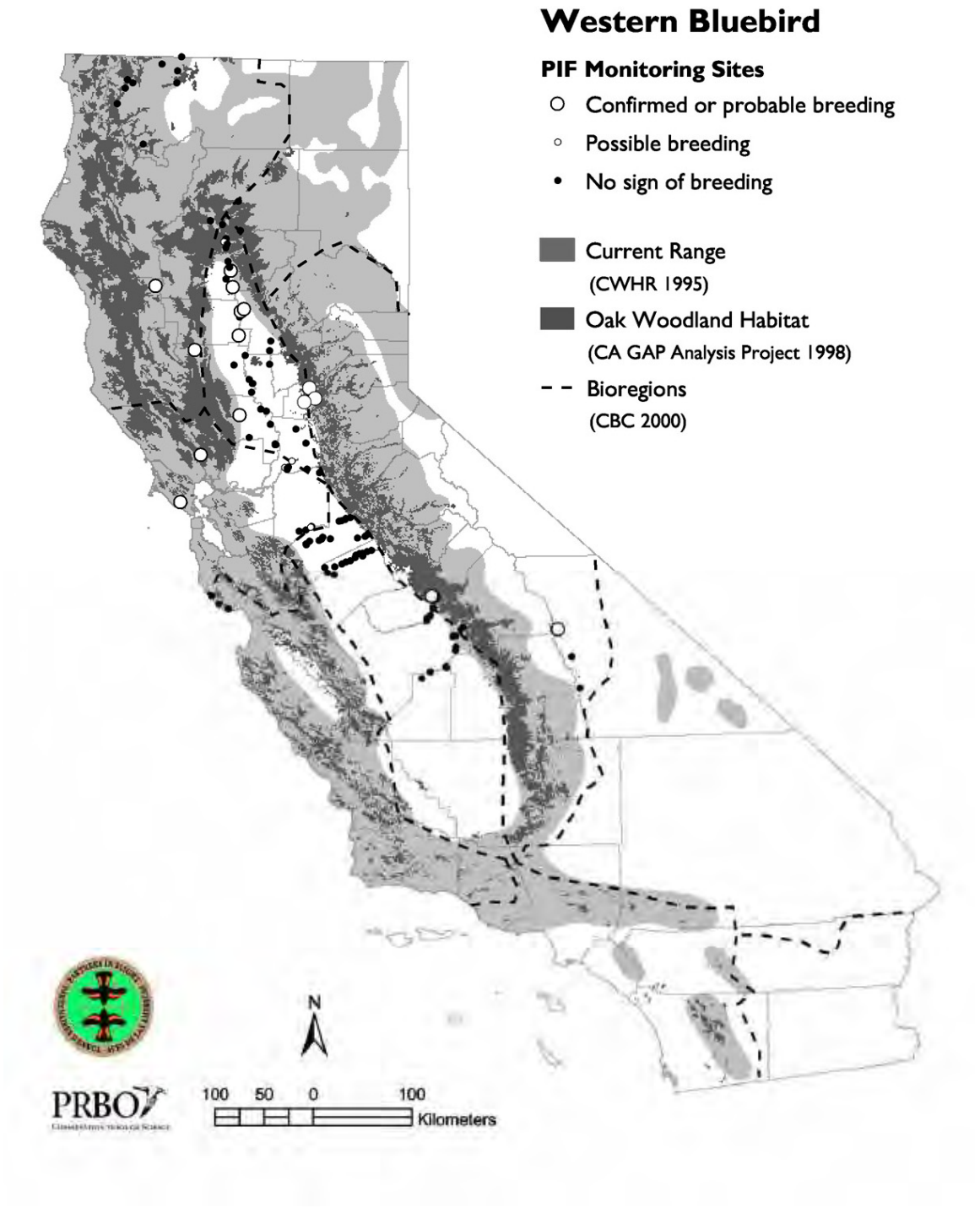


Figure 3-6. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Western Scrub-Jay in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.

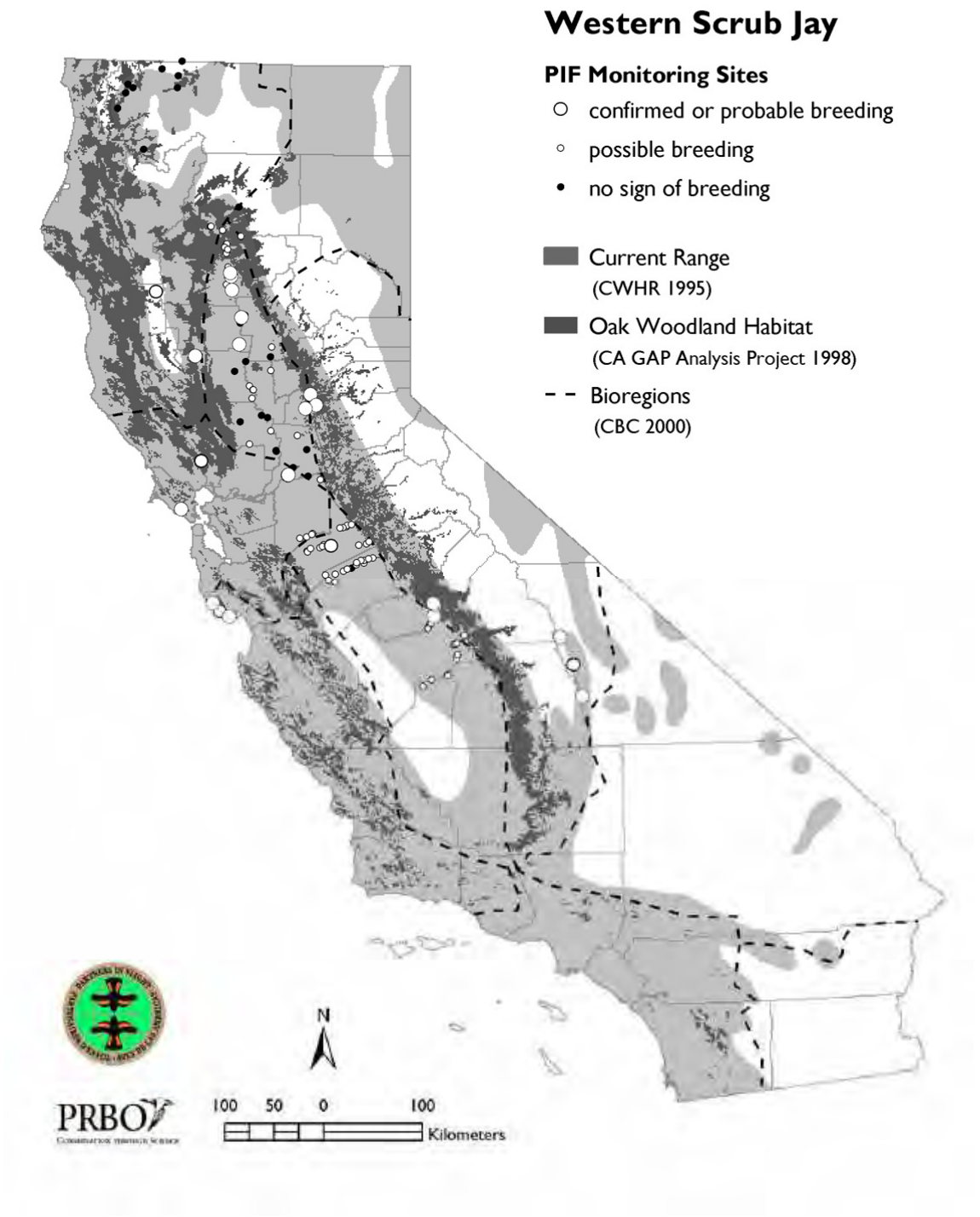
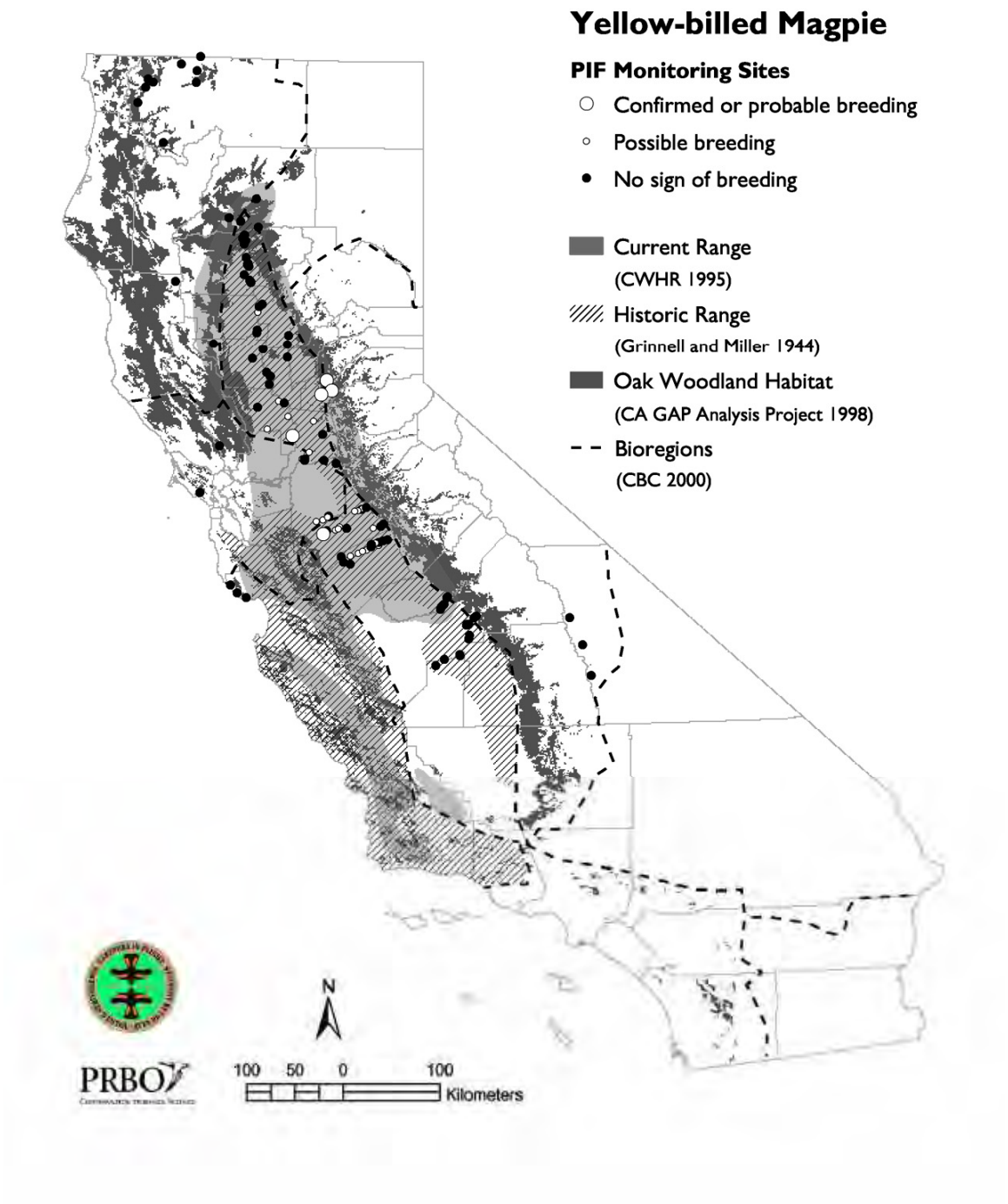


Figure 3-7. PIF monitoring sites, breeding status at these sites, current and historic ranges for the Yellow-Billed Magpie in California. Please see **www.prbo.org/calpif/maps.html** for interactive color focal species maps.





Chapter 4. Problems Affecting Oak Woodland Birds

Habitat Loss

More than a third of all oak woodlands have been lost since the settlement of California by Europeans; of an estimated 10-12 million acres, only some seven million remain. Of the remaining oak woodlands, most have been modified or degraded, and only about four percent are formally protected (Thomas 1997). Most of the loss of oak woodlands has been due to the ever-increasing urban and suburban growth of California. The city of Oakland, the town of Thousand Oaks, and many other town names recall the former prevalence of oak woodlands, and their importance to earlier communities. The clearing of oaks has also been done on ranches to "improve" forage quantity (Bolsinger 1988), and for firewood (Bolsinger 1988; Griffin and Muick 1990; Aigner et al. 1998).



Yellow-billed Magpie on oak stump *photo by Ian Tait*

A comparatively new challenge to conservation of oak woodlands is loss to expanding vineyards. A recent example in Santa Barbara County where a prominent winery removed a small grove of oaks, causing a backlash among citizens (Van de Kamp 1996, 1997; Burns 1998a, b; Sage 1998a, b), provides evidence for the value that Californians place on their remaining woodlands and large oak trees. The accelerated clearing of oak trees in rural areas of Santa Barbara County led to the initiation of a collaborative process to develop a new oak protection ordinance (Leider in press). The wine industry is attempting to come to grips with this conflict of economic growth and the aesthetic and biological effects of oak clearing (Tobin 1999; Larson 1999). For example, the California Association of Winegrape Growers (CAWG) hosted a workshop on the interaction between wildlife and vineyards in February 2002. CAWG plans to publish a guide to wildlife-friendly vineyard management that will present case studies and resources for growers. Adina Merenlender and others from the Integrated Hardwood Range Management Program are working with vineyard owners to identify ways to manage oaks in and around vineyards (Merenlender et al, 1998).

Lack of oak regeneration

A major threat to the oak woodlands of California is that several species have experienced very little regeneration this past century (White 1966; Griffin 1971, 1976). This general problem is not unique to California (Watt 1919, for problems in Britain's oak woodlands). The problem is not in acorn production or acorn viability, rather it is in the inability of seedlings to survive to become young trees (Borchert 1990). The causes and influences of this phenomenon are many and interconnected. It is a "cryptic" conservation crisis because it is not clearly evident as one looks across the oak woodland landscapes that surround so many of California's population centers. The classic park-like appearance of many oak

woodlands seems intact – large trees spreading over grassy areas. But, upon closer inspection, little to no young trees are growing. In fact, in many areas, small trees are old trees of suppressed growth, not recent recruits. The consequence for several species of oaks is that existing trees will senesce, die and not be replaced unless there is active management for a different outcome.

There are several factors that contribute to this problem, and each interacts with others in ways that are often not fully understood. The factors include fire suppression, cattle grazing, invasion of European weedy annual grasses that have largely replaced native perennial grasses, and herbivory of oak shoots by cattle and native mammals.

The tree oaks known to have serious problems with lack of regeneration include valley oak (Thompson 1961), blue oak (Swiecki and Berhhardt 1998), coast live oak (Parihk and Gale 1998), and island oak (Pavlik et al. 1991) (Latin names are provided in Table 4-1). Grazing pressure is greatest where valley oak and blue oak occur. Some regeneration problems have been observed in some regions for black oak. There has been intensive research and some multiple management solutions to the recruitment problem. There is a large and diverse literature available on facilitating regeneration in oak trees, through such diverse means as seedling shelters from grazing, prescribed fire, progressive cattle management and other techniques that vary in management intensity (Adams et al. 1997; Alpert et al. 1999; Bernhardt and Swiecki 1997; Borchert 1990; Callaway 1992a,b; Gordon and Rice 1993; Griggs and Peterson 1997; Holmes 1996a, b; Jansen et al. 1997; Larsen and Johnson 1998; McCarthy 1993; McCreary and Tecklin 1997; Momen et al. 1994; Muick 1990, 1997; Parikh and Gale 1998; Phillips et al. 1997; Plumb and De Lasaux 1997; Rogers and Johnson 1998; Schwan et al. 1997; Standiford et al. 1997; Strong and George 1990; Swiecki et al. 1997a, b; Swiecki and Bernhardt 1998; Techlin et al. 1997.)

The key issue of the regeneration problem is that many diverse solutions have been identified and implemented (citations above). Management of oak recruitment can be and has been successful; the challenge is in facilitating large-scale implementation, particularly in collaborating with private landowners that collectively hold the vast majority of oak woodland habitat.

Fire and oak woodlands

Fire and oak woodlands are profoundly tied together in evolutionary and ecological ways (Reich et al. 1990; Abrams 1992; Stephens 1997). Frequent, low intensity fires gave oak woodlands in and around the Central Valley their open, park-like appearance. Frequent fires acted to thin out the understory of shrubs and small trees, and thus provide less competition for soil nutrients and water among larger, established oaks. Fire suppression arrived with European settlement. Prior to European settlement, Native Americans of California had augmented natural fire regimes by setting fires, often on an annual basis, for a variety of reasons, including to facilitate an increased acorn harvest (see Biswell 1989; McCarthy 1993). Fire suppression began in earnest in California early in the 20th century (Biswell 1989). Although California has devastating fires annually, the overall effect of fire suppression has

led to widespread changes in forest and woodland structure and function (Biswell 1989, Bonnicksen 2000).

Another effect of fire suppression on oaks is the change in vegetation structure that arises as a result. For example, fire suppression has led to an increase in incense-cedar (*Calocedrus decurrens*) and white fir (*Abies concolor*) in Yosemite National Park, which in turn has reduced the density of black oaks there (Phillips et al. 1997). In northern California, fire suppression has led to increased densities and a lower elevation occurrence of Douglas-fir (*Pseudotsuga menziesii*) at the expense of white oak, which has declined in number (Barnhart et al. 1996) This scenario is also true in the Willamette Valley of Oregon (Johannessen et al. 1971).

Over-grazing by Cattle

Over-grazing by cattle has been shown to have multiple and strong detrimental effects to ecosystems in the West (see reviews by Fleischner 1994; Belsky et al. 1999). Over-grazing has severely disrupted ecosystem structure and function generally (Fleischner 1994), and in California oak woodlands as well (Stromberg and Griffin 1996; Jackson et al. 1998; Swiecki and Bernhardt 1998). Over-grazing by cattle has directly and indirectly facilitated the invasion of weedy (European) annual grasses and the associated decline (and often loss) of native perennial grasses (Hamilton 1997). The weedy annual grasses compete for soil moisture with oak seedlings. Cattle also consume young oak shoots, as do feral pigs and native wildlife like pocket gophers and deer.



Dead Tanoak *photo by Steve Zack Wildlife Conservation Society*

Sudden Oak Death

The newest threat to our California oaks emerged very dramatically in recent years. Tanoaks in Marin County were found to be dying in 1995 (Svihra 1999a,b,c). Soon, varied reports on tanoak death were noted elsewhere in the coastal forests of the Bay Area. In 1999, at a CalPIF meeting at Pfeiffer State Park in Big Sur, participants noticed the majority of tanoaks there were dead, conspicuous with their brown leaves still clinging to the trees. Soon, others noted that coast live oaks and black oaks near infected populations of tanoak were also showing similar symptoms and dying. The disease was christened as Sudden Oak Death Syndrome or SODS, and now is generally known simply as Sudden Oak Death or SOD.

In 2000, pathologist Prof. Dave Rizzo of University of California, Davis, isolated the pathogen and discovered it to be a previously unknown species of *Phytophthora* (Standiford 2000). *Phytophthora* is a fungus-like pathogen of the same genus that caused the Irish potato famine and that has been attacking Port-Orford-cedar (*Cupressus lawsoniana*) to the risk of extinction (Hansen et al. 2000, Fimrite 2000). A *Phytophthora* species has attacked Mediterranean oaks (Brasier 1996), another species has crippled alders (*Alnus* spp) in Europe (Cech 1998), another is attacking *Eucalyptus* forests in Australia (Hansen 1999), and the genus has been a serious pest to innumerable agricultural crops worldwide (Erwin and Ribeiro 1996).



Sapwood bleeding *photo by Steve Zack, Wildlife Conservation Soc.*

The *Phytophthora* attacking California's oaks results in very distinctive symptoms. The symptoms include dark discolored patches of bark on the lower trunk, often exuding a reddish sap ("sap bleeding"), the presence of fruiting bodies of the fungus *Hypoxylon* sp., and the frass of bark and ambrosia beetles (*Coleoptera*: *scolytidae*). The leaves turn brown quickly (Svihra 1999a,b,c; Standiford 2000). This particular *Phytophthora*'s DNA does not match any known species, raising the possibility of it being a new pathogen through interspecific hybridization (see Brasier et al. 1999) or a new mutant form of an existing or introduced pathogen. Different *Phytophthora* spp. have been isolated from diseased oaks in California before this problem (Raabe 1990), but they have not caused anything near the widespread infestation and death that this new pathogen has. Brasier (1996) argues that global warming enhances the oak decline in southern Europe, caused by *Phytophthora cinnamomi*.

To date, valley oaks, blue oaks, and Oregon oaks show no symptoms of SOD. Thus, it seems possible that only those oaks in the "Red" group, plus *Lithocarpus* tanoaks, (Tucker 1980) are susceptible, while those of the "White" Group are immune (Table 4-1).

Phytophthora species are oomycetes and now placed in their own Kingdom, Chromista, with another genus (Erwin and Ribeiro 1996), and are no longer considered true fungi because of their distinctive flagella and DNA. Their zoospores are mobile in moist soil and water, which can become resting spores (oospores and chlamydospores) in drier conditions. In the case of *P. lateralis*, the agent killing Port-Orford-cedar, the spores are easily transported by vehicles between watershed on the mud of tires, and by wildlife and cattle, as well as hikers and others in the woods.

During the summer of 2000, a research team sponsored by the *Wildlife Conservation Society* investigated the geography of the SOD epidemic. *WCS* surveyed the range of tanoak for the presence or absence of symptoms. The native range of tanoak runs along coastal forests in southern Oregon, down through coastal California to just north of Santa Barbara, with isolated populations in the Klamath Mountains and in the Sierras (Tappeiner et al. 1990). The team combined roadside surveys with plot samples. Preliminary results indicated that the disease was evident over some 350 miles of California coastal forest. Subsequent pathology studies have indicated that a different *Phytopthora, P. illisis*, may be responsible for symptomatic trees in northern California. Then, the northern boundary of symptomatic trees was at Humboldt Redwoods State Park, just south of Eureka, and symptomatic trees of all three species were found in regular patches along coastal forests to the Santa Lucia Range north of San Simeon (Steve Zack, unpublished data.). Currently (April 2002), the disease has spread to southern Oregon (although very local and patchy there) and to the Sierras (detected in Bigleaf Maples, but not yet in tanoaks or oaks there) (see the website www.suddenoakdeath.org for updates on range and species affected by the pathogen). Preliminary results from 2000 also reveal considerable regional variation in the extent of the disease. In northern California, approximately 10 percent of the tanoaks had disease symptoms, whereas in Big Sur (Pfeiffer State Park) nearly 90 percent were dead or diseased.



Dead Coast Live Oak – Felton, California *photo by Steve Zack, Wildlife Conservation Society*

Other areas particularly hard hit (ca. 40-45% of trees were symptomatic or dead) are tanoaks at Muir Woods National Monument, coast live oaks at China Camp State Park (near San Rafael), and tanoaks at Henry Cowell Redwoods State Park (in Felton). It is clear that this pathogen has spread very quickly, perhaps more quickly than other tree epidemics known in North America (Little 1995). It is not all clear if the disease is still spreading as quickly as in the late 90's or if healthy trees in infected areas are immune. Unfortunately, it seems reasonable to guess that the disease would continue to spread north, as it seems to have spread very far very fast. It would also seem that the percentage of infected trees will likely grow such that northern infected populations may become more similar to those around Marin County and at Big Sur.

The effect on wildlife of this die-off of tanoaks and oaks in coastal California is inestimable. With nearly 90% of tanoaks dead in Pfeiffer State Park in Big Sur, the loss of tanoaks to animals as diverse as black bear, deer, California Quail, and Steller's Jays, plus the several score of other species directly or indirectly dependent on acorns will be dramatic. The *Wildlife Conservation Society* is undertaking studies of wildlife effects of this pathogen in coastal California.

Oak Woodland Viability

The joint concerns of lack of recruitment and the new SOD epidemic dramatically affect most of the nine *Quercus* oak tree species and tanoak in California (Table 4-1). Of the ten acorn-bearing trees, seven have one or both of the problems, with black oak and coast live oak afflicted by both (Table 4-1). Solving the problem of lack of recruitment of white oaks, such as Valley oak and Blue oak, is especially important given that they appear to be unaffected by SOD, and therefore may be critical to the long-term viability of oak woodland-dependent wildlife.

The striking need for progressive management of California's oak woodlands is challenging for those concerned with oaks and wildlife. Yet, it must be recognized that 85% of oak woodlands are on private lands (Griffin and Muick 1990), and thus the capacity to manage these lands professionally and consistently varies and is challenging, to say the least. Working with private landowners is a significant challenge for conservationists (Knight 1999; Dale et al. 2000), but essential to guaranteeing a future of viable oak woodlands and wildlife in the future (Askins 2000).

Recent volumes directly concerned with the California landscape have raised concerns of oak woodland viability, particularly the recruitment problem (Barbour et al. 1993; Pavlik et al. 1991; Johnston 1994). The Oaks of California by Pavlik et al. (1991) is a particularly beautiful and well-designed book. Within Calfornia, a few conservation planning efforts have singled out oak woodlands, including the Nature Conservancy's ecoregional plans and the Sierra Nevada Ecosystem Project.

Surprisingly, other recent assessments of biodiversity and environmental problems make no special mention of the major problems facing California's oak woodlands, particularly the recruitment problem (Sudden Oak Death is too new). For example, a major overview of

imperiled ecosystems in the United States by Noss et al. (1995) has no significant discussion of California oaks, but cites only a 14% loss of hardwood woodlands (Bolsinger 1988), and cites the 99.9% loss of "riparian oak woodland" (those dominated by valley oak, Martin 1986). A two volume effort to assess the nation's biological resources by the U.S. Geologic Survey (Mac et al. 1998) makes scarce mention of oak woodlands in it's California section. The recent assessment of habitats and biodiversity by the *Nature Conservancy* (Stein et al. 2000) makes no particular mention of California's oak woodlands. Likewise, a major assessment of North America produced by the *World Wildlife Fund* (Ricketts et al. 1999) emphasizes much of California's distinctive endemic diversity, but again makes no particular mention of California's oak woodlands.

Less attention may be given to oak woodlands than to other habitats, such as riparian or coastal sage scrub, which are inhabited by numerous species of special concern. However, oak woodlands are especially well-loved and support a large diversity of animal and plant species. Clearly, the issue of oak woodland viability still needs considerably more recognition before it can be adequately addressed.



photo by Steve Zack, Wildlife Conservation Society

Table 4-1. The Oak Trees (and Tanoak) of California and the presence/absence of conservation problems discussed in the text.

Common Name	Latin Name	Group[1]	General Distribution in California[2]	Recruitment Problems?[3]	Infected by SOD?[4]
Tanoak	*Lithocarpus densiflorus*	--	Coastal forests, spotty in Klamaths and Sierras		Yes
Black Oak	*Quercus kelloggii*	Red	Northern foothills	Occasional	Yes
Blue Oak	*Quercus douglasii*	White	Central Valley foothills, dry coastal	Yes	
Canyon Oak	*Quercus chrysolepis*	Interm.	Foothills throughout state		
Coast Live Oak	*Quercus agrifolia*	Red	Central, southern coastal forests	Yes	Yes
Engelmann Oak	*Quercus engelmannii*	White	Extreme southern, coastal CA		
Interior Live Oak	*Quercus wislizenii*	Red	More interior foothills		Yes
Island Oak	*Quercus tomentella*	Interm.	Channel, Guadelupe Islands	Yes	
Oregon Oak	*Quercus garryana*	White	N CA (coastal and Klamaths), spotty along Sierras		
Valley Oak	*Quercus lobata*	White	Central Valley, dry coastal	Yes	

Notes:

1. Taxonomic group (from Tucker 1980: Red oaks are those with pointed lobes and densely hairy inner shells of acorns, among other characteristics; White oaks have round lobes and smooth inner shells of acorns, among other characteristics; Intermediate oaks (Interm.) are just that with respect to characters.)
2. The general distribution was described from range maps of *Lithocarpus* from Tappeiner et al. 1990, and of *Quercus* in Pavlik et al. 1991.
3. If recruitment (regeneration) is problematic for oaks, as noted by studies from the literature, a "Yes" or "Occasional" is entered in the column.
4. If oaks have been observed to have symptoms of the new *Phytophthora* infection (Sudden Oak Death), a "Yes" is entered in the column.



Chapter 5. Species-Specific Recommendations and Population Targets

The birds of California's oak woodlands share many of the same needs and threats. Large-scale conversion due to urbanization and expanding industrial agriculture continues to rapidly reduce available habitat. Human encroachment subsidizes nest predators such as raccoons, rats, and skunks and introduces exotic species of plants and animals, including domestic cats, European Starlings, and House Sparrows. These invasive bird species often out-compete native cavity-nesting birds resulting in reproductive failure and out-right extirpation of local breeding birds. Finally, the apparent problem of oak regeneration threatens the future generations of all birds reliant on oaks.

Species-Specific Recommendations

In preparation for this conservation plan, CalPIF developed a series of species accounts on a suite of oak-associated bird species in California. Species were chosen because they represented niches and particular habitat needs, with the rationale that they represented other species with similar requirements. These detailed accounts described historical and current ranges, life history traits, habitat needs, and management concerns for each species. The accounts are available as electronic appendices to this plan at http://www.prbo.org/calpif/. Below are recommendations, derived from these accounts, for five of the focal species.

Although CalPIF strongly endorses the concept of multiple-species management, it recognizes that the needs of select focal and secondary species, representative of the different aspects of California's oak woodlands, may need to be specifically addressed. It also recognizes that managing for the specific requirements of some species is likely to affect, in either positive or negative ways, other species in the community. The challenge is that conservation actions must attempt to benefit multiple species while simultaneously tailoring their management activities for birds with very specific requirements.

One of the consistent issues raised with oak-associated birds is the need for further research into their habitat needs and management concerns. These recommendations need to be implemented, monitored, and altered as necessary. As this plan is a "living document," so are these recommendations. With future research, management decisions can be made that best benefit both the birds and humans using oak woodlands.

Lark Sparrow *(Chondestes grammacus)*

Population:



Lark Sparrow *artwork by Adrienne Olmstead*

One of California's most beautiful sparrows, the Lark Sparrow often frequents open woodlands and grasslands. It usually nests on the ground, though it makes frequent use of available shrubs for perching and foraging. Overall in North America, its population appears reduced since 1968, and some data indicate decline in California's oak-dominated foothill region and in grasslands (Sauer et al. 2000). Local extirpations may be due to habitat loss and other problems of human encroachment. Still, the Lark Sparrow continues to occupy much of its historic range.

Management:

Fire Management:
Managed burns that reduce the vegetative density of an area may encourage habitation by Lark Sparrows. However extremely hot fires may reduce potential nest sites and kill the native plant communities upon which this species relies. Fire suppression may allow the growth of overly dense habitat unsuitable to Lark Sparrows.

Brown-headed Cowbird Parasitism:
Lark Sparrows frequently host Brown-headed Cowbirds and suffer reduced productivity. Efforts to manage for cowbirds would likely benefit this species.

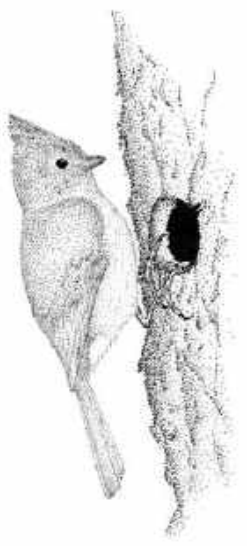
Pesticides:
Insects compose nearly 25% of the food matter consumed by this species. This species is known to nest in active agricultural areas, including row crops and orchards. Pesticide application in these areas may reduce prey availability and have other deleterious affects. More study in this area is needed.

Invasion of Exotic Vegetation:
In some areas, Lark Sparrows no longer breed where native vegetation has been replaced by invasive exotic grasses. Along with many other plants and animals, they would benefit from efforts to control exotics and restore native vegetation.

Disturbance:
Because they prefer to nest on the ground, Lark Sparrows are particularly vulnerable to such disturbance as grazing, off-trail recreation, burning, and mowing. Their nests are also

exposed more readily to predators such as domestic cats, raccoons, and dogs. Managers should take steps to limit this kind of disturbance during the breeding season (March through August).

Research Needs:
The Lark Sparrow's preference for edge habitats may have excluded it from many research and monitoring efforts. Few studies have focused on this species and its low densities render broad studies less effective. More studies on this species' life history, current range, and habitat requirements are needed.



Oak Titmouse
artwork by Adrienne Olmstead

Oak Titmouse (*Baeolophus inornatus*)

Population:
Given its name, it's no surprise that this species populates many of California's oak and oak-pine woodlands. Usually preferring areas of moderate canopy cover, they nest in natural cavities or holes previously excavated by woodpeckers. While the species continues to appear in every bioregion with oaks in the state, Breeding Bird Surveys indicate a significant decline in California since 1980.

While the Oak Titmouse readily nests near human settlement, and can often seem fearless when faced with human observers, it suffers from the human related invasion of nest-competitors such as European Starlings and House Sparrows.

Management:

Canopy Cover:
The Oak Titmouse prefers woodlands with a canopy cover between 40-70%. Thinning of trees for lumber or firewood cutting may render habitat unsuitable. Land owners and managers should be encouraged to maintain stands with sufficient canopy cover for this species.

Acorn Woodpecker (*Melanerpes formicivorus)*



Acorn Woodpecker
artwork by Adrienne Olmstead

Population:
Of all the birds that rely upon California's oaks, the Acorn Woodpecker is the one most intimately linked to the habitat. With its distinctive clown-like face and "waka-waka" calls, it is easily detectable by most observers and hard to forget once seen. Acorn Woodpeckers breed cooperatively throughout the oak woodlands and oak-pine hillsides of California. They usually live in family groups of 2-15 individuals and cluster around a few granary trees, in which they store acorns. They readily appear on Christmas Bird Counts and Breeding Bird Surveys and can be found both near to and away from human settlements and other disturbance.

The geographic distribution and density of Acorn Woodpeckers in California are significantly correlated with oak species diversity (Bock and Bock 1974, Koenig and Haydock 1999). Reproductive success and population size appear regulated by granary tree availability and the amount of acorns stored during the preceding autumn (Trail 1980; Koenig and Mumme 1987, Stacey and Ligon 1987). Population trend estimates based on Breeding Bird Surveys are inconclusive, though local extirpations due to oak removal have probably occurred and invasion by European Starlings may also pose a threat.

Conservation and Management:

Acorn Harvests:
Acorn Woodpeckers actively harvest and store acorns. Family groups collect acorns and hammer them into drilled holes in granary trees on the territory. This pantry serves to supplement their diet throughout the year, particularly in the winter months when insect prey is sparse. In Arizona, where acorn crops are light, populations do not form family groups and the birds will migrate over the winter to search for food. In California, the fate of Acorn Woodpecker family groups is often closely tied to that of their local oaks; years of low acorn production are often followed by less productive breeding seasons (Trail 1980; Koenig and Mumme 1987; Stacey and Ligon 1987). A reduction in acorn availability, through an overall reduction in oaks, may endanger local populations and groups have been forced to emigrate from an area during years of poor acorn production (Hannon et al. 1987). Managers should seek to maintain large tracts of land to include a natural diversity of oak species or intraspecific oak varieties with different seeding phenologies. This will help avoid synchronous or wide geographic-scale crop failures (Koenig and Haydock 1999).

Granary Trees:
Granary trees anchor Acorn Woodpeckers to a site, providing supplemental food throughout the year. Such trees are often dead or have many dead limbs, which are easier to

bore into. The soft, dead wood is also attractive to fire-wood cutters, whose activities can reduce available habitat for the woodpeckers (Koenig et al. 1995). Managers should encourage the maintenance of all trees used as granaries (trees and limbs filled with tell-tale holes for acorns), even if they are not currently in use by an Acorn Woodpecker group. On average, Acorn Woodpecker groups maintain 2.1 granary trees per 6 ha territory (range 1-7) (MacRoberts and MacRoberts 1976). Land managers should maintain a similar high density of snags and dead tree limbs, or soft-wooded live trees such as pines or sycamores (35 granary trees/100 ha, or 1 snag every 2.86 ha). Dead tree limbs or snags from 17 cm to greater than 100 cm can be used as both a granary and nest site (Hooge 1989).

Grazing and Oak Recruitment:
Damage from cattle grazing in pine-oak woodlands and montane riparian areas may threaten some populations of Acorn Woodpeckers. While Acorn Woodpeckers are still common throughout their range, the low recruitment of new oaks on intensively grazed land will likely not sustain populations in the future. For example, a lack of potential granary trees due to poor recruitment has the potential to cause eventual population declines (Ligon and Stacey 1996).

Land Conversion:
Land conversion from oak woodland to other uses, such as residential or agricultural, can affect woodpecker populations if adequate food resources are compromised. However, Acorn Woodpeckers show a strong ability to adapt to suburban and city-park development if acorns are available. They will often use utility poles and wooden structures, such as sheds and barns, as roosts and granaries (Koenig et al. 1995).

European Starlings:
Starlings often out-compete many native birds for nest cavities. While Acorn Woodpeckers will successfully defend an initiated nest, they usually fail to do so for cavities invaded before nest initiation or egg laying. Starlings are most common near human settlements and their presence can signal of habitat fragmentation. Large tracts of land, away from disturbance, should be maintained whenever possible to discourage invasion of Acorn Woodpecker territories.

Structural and Species Diversity:
Current population levels may rely upon a diverse age structure and species composition of oak trees (Ligon and Stacey 1996, Koenig and Haydock 1999) . Managers can achieve structural and floristic heterogeneity through less intensive grazing methods, planting and protection of multiple species of oak seedlings (using 'tree-pees' etc.), and by creating optimal conditions for oak woodland regeneration.

Western Bluebird (*Sialia mexicana)*

Population:
Western Bluebirds are a common site on fence posts and low snags in oak woodlands and savannas throughout the state. They prefer fairly open areas, though they avoid clear cuts and agricultural fields. Breeding populations of Western Bluebirds appear to be declining in some regions of the state, primarily due to human development and subsequent invasion by European Starlings. Winter populations fluctuate with annual mistletoe crops, and may be excluded from areas where mistletoe, or the oaks it parasitizes, is cleared.



Western Bluebird *photo by Ian Tait*

Management:

Nest box Programs:
Recent efforts to expand nest box building programs may help curtail bluebird declines. Nest box programs should include a monitoring component which:

1. Ensures that boxes are being used by native species. Those that are not should be reviewed and perhaps removed to avoid use by unwanted species such as House Sparrows or European Starlings.
2. Ensures that predators are not regularly taking nestlings or killing adults.
3. Maintains boxes in good condition. For example, woodpeckers will enlarge holes that will allow predators, especially European Starlings and House Sparrows, to get into nest boxes and destroy nests.

You can find guidelines from the **North American Bluebird Society** on-line at http://www.nabluebirdsociety.org/.

Logging Practices:
The practice of "thinning" is less detrimental to bluebirds than "clearcutting." This problem is particularly relevant in areas where oaks are cleared to install vineyards or conifers (for logging). Leaving at least some oaks may mitigate these losses. Bluebirds, like many cavity nesters, require older trees with naturally occuring or previously excavated cavities. Furthermore, they prefer live trees rather than ones that have completely died.

Urbanization:
This problem extends to all animals reliant on oak woodlands. Increased urbanization leads to the introduction of nest-site competitors and predators such as House Sparrows, European Starlings, and an increase of mammals associated with urban areas (such as cats, skunks, and raccoons).

Blue-gray Gnatcatcher (*Polioptila caerulea*)

Population:



Blue-gray Gnatcatcher at nest *photo by Ian Tait*

Blue-gray Gnatcatchers historically bred in oaks and chaparral stands throughout most of California's bioregions. Data from the past thirty years show some declines and extirpations, possibly connected with the expansion of Brown-headed Cowbirds and the heavy parasitism gnatcatchers incur. There have been no recent surveys that adequately estimate their current breeding range. Where nests have been found, nest success is extremely low and parasitism common, a characteristic shared with other gnatcatcher species, including California and Black-tailed, signaling a need to gather more conclusive information about the California population.

Management:

Brown-headed Cowbirds:

Until recently, Blue-gray Gnatcatchers appeared extirpated from San Diego County, probably due to overwhelming parasitism pressures. Conservation efforts on behalf of the Least Bell's Vireo and California Gnatcatchers may benefit Blue-gray Gnatcatchers in the region. Monitoring of the two listed species should be extended to include Blue-grays to establish whether their population is expanding with control efforts as well.

Diverse Habitat Structure:

Blue-gray Gnatcatchers prefer to nest in open scrubby areas and forage in more dense vegetation. Protected and managed habitat should maintain such diverse structure, including mosaics of oaks and shrubs.

Research and Monitoring:

Few recent data are available for Blue-gray Gnatcatchers in California. Breeding Bird Surveys and Point Counts poorly sample populations because these birds live in relatively low densities, though they are easily recognized when found. Breeding Bird Atlas data may provide valuable insight to local population changes. However, much more detailed study is needed. The few nest studies that do include Blue-gray Gnatcatchers demonstrate an extremely low nest success rate.

Population Targets

Partners in Flight seeks to develop avian population targets that will guide conservation efforts and provide land managers with a gauge of success for their restoration and management activities. Although ambiguous and hard to develop, numerical population targets provide a compelling means of communicating with the public and policy makers. In some cases, targets may simply require maintenance of populations at existing levels. However, targets for rare or declining species will encourage actions that increase existing populations to sustainable levels.

Bioregionally-based population targets for many of the primary and secondary oak woodland species have been developed using all available data (Table 5-1). These targets are simply the highest densities (either indirectly through point counts, or directly through spot mapping) found for that species within a given bioregion. These data are currently lacking from most bioregions and for many species. More data likely exist for some of these species, and contributions of data to CalPIF is encouraged for incorporation into future versions of this "living" document.

Two types of data are presented. The first is spot map data, in which the number of territories per 40 hectares is estimated based on Breeding Bird Census plots (plots are usually less than 40 hectares, but are converted for purposes of standardization). The second is point count data, in which the average number of individuals detected within 50 meters of a point count station is presented. These two types of data are not necessarily comparable to one another, nor convertible. Such reference density estimates are useful as population density targets that can translate into habitat acreage protection for some species, or be considered in restoration goals.

Table 5-1. Suggested population targets by species and bioregion[1]. See Table 5-2 for a key to data sources, indicated here by superscripts [A-K].

Species	Bay-Delta		South Coast		Sierra		San Joaquin		Central Coast	
	Point Count[A]	Spot Map	Point Count	Spot Map[C]	Point Count[D]	Spot Map	Point Count	Spot Map	Point Count	Spot Map
Acorn Woodpecker	0.16	-	-	-	0.56	7.0[E]	-	-	-	6.7[G]
Ash-throated Flycatcher	0.12	-	-	10	0.31	10.6[E]	-	-	-	8.2[H]
Bewick's Wren	0.46	-	-	2.5	0.23	9.2[F]	-	-	-	23.3[H]
Blue-gray Gnatcatcher	0.10	-	-	2.5	0.27	10.0[A]	-	-	-	23.3[H]
Hutton's Vireo	0.19	15.6[B]	-	7.5	0.01	1.4[E]			-	3.3[I]
Lark Sparrow	-	-	-	-	0.39	0.5[E]	-	-	-	2.3[I]
Lewis' Woodpecker	-	-	0	0	-	-[3]	?	?	-	-
Nuttall's Woodpecker	-	-	-	-	0.09	1.6[E]	-	-	-	2.3[H]
Oak Titmouse	0.40	15.4[L]	-	35	1.33	26.4[E]	-	-	-	49.4[I]
Western Bluebird	-	-	-	-	0.38	5.0[A]	-	-	-	8.2[H]
Western Scrub-Jay[2]	0.61	-	-	-	0.31	10.9[F]	-	-	-	7.0[H]
White-breasted Nuthatch	-	-	-	-	0.82	4.3[E]	-	-	-	10.2[I]
Yellow-billed Magpie	-	-	0	0	-	-	-	-	-	-

[1]Numbers provided from point counts are the average number of detections within 50 meters (*n* / # points / # visits) of the observer during five minute counts during the breeding season. Point count data provide an index of abundance, generally thought to be conservative. Numbers from spot mapping are pairs per 40 hectares during the breeding season, unless otherwise noted. *Reference populations are cited and may not be representative of healthy populations.* Dashes represent no data and zeroes indicate the species probably never bred in that bioregion.

[2]Not an appropriate species to set population targets according to high counts/ high breeding densities, due to implications for other species.

[3]No Lewis' Woodpeckers have been found nesting at San Joaquin Experimental Range[E,F] during a long-term nest searching effort, although they are abundant winter residents (K. Purcell, personal communication).

Table 5-1 (cont.).[1]

Species	Klamath[3]		Sacramento Valley		Modoc		Mojave		Colorado Desert	
	Point Count[J]	Spot Map	Point Count[J]	Spot Map[K]	Point Count	Spot Map	Point Count	Spot Map	Point Count	Spot Map
Acorn Woodpecker	0.04	-	0.20	3.75	-	-	0	0	0	0
Ash-throated Flycatcher	-	-	0.49	8.75	-	-	-	-	-	-
Bewick's Wren	-	-	-	12.5	-	-	-	-	-	-
Blue-gray Gnatcatcher	0.16	-	-	2.5	-	-	-	-	-	-
Hutton's Vireo	-	-	-	-			0	0	0	0
Lark Sparrow	0.15	-	0.03	-	-	-	-	-	0	0
Lewis' Woodpecker	-	-	?	?	-	-	0	0	0	0
Nuttall's Woodpecker	-	-	0.12	5	-	-	-	-	0	0
Oak Titmouse	0.19	-	1.5	20	-	-	0	0	0	0
Western Bluebird	0.10	-	-	-	-	-	-	-	?	?
Western Scrub-Jay[2]	0.03	-	0.65	5	-	-	-	-	?	?
White-breasted Nuthatch	0.10	-	0.33	-	-	-	-	-	-	-
Yellow-billed Magpie	0	0	-	-	0	0	0	0	0	0

[1]Numbers provided from point counts are the average number of detections within 50 meters (*n* / points / # visits) of the observer during five minute counts during the breeding season. Point count data provide an index of abundance, generally thought to be conservative. Numbers from spot mapping are pairs per 40 hectares during the breeding season. *Reference populations are cited and may not be representative of healthy populations*. Dashes represent no data and zeroes indicate the species probably never bred in that bioregion.
[2]Not an appropriate species to set population targets according to high counts/ high breeding densities, due to implications for other species.
[3]Additional data on territory densities can be found in Wilson et al. 1991 for Mendocino County.

Table 5-2. Sources of population data in Table 5-1.

Alpha code	Data source, habitat type, location, and year.
A	PRBO unpublished data. Bay-Delta data are from Marin Co. (Holmes et al. 1998) except for Oak Titmouse, which are from the Cosumnes River Preserve, Sacramento Co. Sierra data are from Independence Creek, mixed black oak and riparian habitat (1999 for Blue-gray Gnatcatchers, 2000 for Western Bluebird).
B	Van Fleet 1919; live oak woodland.
C	May and Peters 1979; coast live and Engelmann oak woodlands, Orange Co.,1978.
D	PRBO unpublished data; Tehama Co. foothills, 2001.
E	Verner et al. 1997; grazed oak woodland, San Joaquin Experimental Range, Madera co., averaged over nine years (1985-1993).
F	Verner et al. 1997; ungrazed oak woodland, San Joaquin Experimental Range, Madera co., averaged over nine years (1985-1993).
G	MacRoberts and MacRoberts 1976; Hastings Reservation, Monterey Co., territory density based on average territory size of 6 ha (average number of adults per territory = 4.4; Koenig et al. 1995).
H	Williams 1979, 1980, Joste 1981; blue oak woodlands, Monterey Co., averaged over three years 1978-1980.
I	Tietje et al. 1997b, Camp Roberts, San Luis Obispo Co., averaged over two years (1994-1995).
J	PRBO unpublished data. Klamath data are from Brewer's Oak forests in the Mendocino National Forest, Mendocino Co (1996); Sacramento Valley data are from blue oak forests at East Park Reservoir, Colusa Co.
K	Gaines 1979; blue and interior live oak woodlands, Sutter Co.
L	Cicero 2000; San Francisco Bay region, based on average territory size of 2.6 ha.



Chapter 6. Bioregional Conservation Objectives

California has a higher biodiversity of wildlife and plants than any comparable area in the northern temperate zone (Biosystems Analysis 1994). The state also has more endemic species, particularly plants and birds, than any other state except Hawaii. This great diversity provides significant challenges in conservation planning, particularly over a state as large and geographically diverse as California.

As with the other habitat plans, we have adopted the California Biodiversity Council's 10 bioregions as a guideline for dividing the geography of California into natural communities organized by biota, climate, topography and soils (RAC 1998). See Figure 3.1 for bioregion boundaries. These contrast slightly with the 11 discrete regions recognized by Sawyer and Keeler-Wolf (1995) and Biosystems Analysis (1994).

Setting conservation goals by bioregion helps facilitate planning site-specific projects in a broader context, and provides a similar framework to other conservation planning efforts. Setting and achieving conservation goals by bioregion will:

- Ensure that a suite of ecological communities representative of California's diversity will be conserved throughout the state.
- Ensure that the broadest range of biodiversity and locally adapted races of species will be conserved.
- Facilitate action at the local level.

This section introduces each of the 10 bioregions considered in this plan. These descriptions are offered as an overview; the issues and needs may vary depending on particular sites within a bioregion. For more information on each, please consult the Resource Agency of California's *Preserving California's Natural Heritage* (RAC 1998).

For each bioregion, we list potential "Portfolio Sites", areas that are distinguished by their protected status and potential for managing oak woodland habitat through restoration. Many of these Portfolio Sites contain oak woodland habitat located near other habitats of concern. Thus, there is considerable potential for management of such areas to achieve goals for the many CalPIF habitat plans. This list is not comprehensive and will be updated as the Plan is revised. These sites have been identified by our own experience in oak woodland habitat and by drawing from the excellent volume by Pavlik et al. (1991). We ask that individuals and groups working in these bioregions bring important sites and activities to our attention.

It is important to make a distinction between our use of the term "Portfolio Site" and its use by other organizations. Most notably, The Nature Conservancy of California has identified a list of sites which are prime candidates for conservation and which are ranked in order of priority based on their biological richness and the immediacy of threats to them. Some of these sites are also considered as Portfolio Sites in this and other CalPIF Bird Conservation Plans, and more may be included in the future as they become protected and efforts to manage for oak woodland are expanded.

Sacramento Valley

The northern portion of the Central Valley, the Sacramento Valley is a region characterized by hot, dry summers, and cool, foggy winters. The great Central Valley of California is a region that has undergone considerable transformation in the past century, from a mosaic of wetlands, riparian forests and dry grasslands containing millions of waterfowl, elk, pronghorn and other wildlife (an "American Serengeti"), to a virtual agricultural machine. Nonetheless, in the uplands that surround the valley floor and in localized bottomlands there remain several areas important to oak woodland habitat. These upland areas are among the many regions in California where conversion of habitat to vineyards poses a serious threat to oak woodlands. The lowland areas include areas that are or historically were valley oak woodland and have been degraded or reduced through development, agriculture, and the damming of California's rivers.

Portfolio Sites

East Park is a Bureau of Reclamation (BOR) site of oak woodland and riparian habitat surrounding the East Park Reservoir, in the foothills of the Coast Range near the town of Maxwell. Extensive blue oak woodland is found here along with few, but large, valley oaks. BOR is interested in managing this area for wildlife. There is good potential for management beneficial to oak woodland habitat, which would be crucial for supporting recruitment in both valley and blue oaks.



East Park, Sacramento Valley Portfolio Site *photo by Geoff Geupel, PRBO*

Bidwell Park has many acres for valley oak (2,250 acres) woodland in Northern California. The ownership is the City of Chico, Parks and Recreation, and it is the second largest municipal park in the country.

The Sacramento River region now includes areas under intensive restoration. Efforts are underway to re-establish valley oak (Alpert et al. 1999). Partners include the Nature Conservancy, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Wildlife Conservation Board and stakeholders participating in the Sacramento River Conservation Area. This area is also a Portfolio site in the Riparian Bird Conservation Plan.

Cache Creek is an important area in northern California with large stands of both valley and blue oak. This land is administered by BLM, and has potential for restoration of recruitment and regeneration of these imperiled trees.

San Joaquin Valley

Also a major part of California's Central Valley, the San Joaquin Valley has been thoroughly transformed by intensive agriculture and development. Another industry important to the region's economy has been oil. The region is characterized by similar weather to the Sacramento Valley, including hot, dry summers and cool, foggy winters. Along with the rest of the wetlands, native grasslands and riparian vegetation, the valley oak riparian forests once characteristic of this region are almost gone (Bolsinger 1988). The water flow and habitat along the San Joaquin River itself, for instance, has been significantly diminished by the development of agriculture or mining along nearly every mile of its reach and by the construction of the Friant Dam (RHJV 2000). Nonetheless, crucial remnant pockets of valley oaks remain. Additionally, some upland areas containing oak woodland habitats exist in the foothills of the surrounding mountain ranges, including regions where conversion to wine vineyards has occurred or continues.



San Joaquin Valley *photo by Geoff Geupel, PRBO*

Portfolio Sites

Kaweah Oaks Preserve has one of the last valley oak riparian forests remaining in the region. This 324-acre preserve, owned originally by The Nature Conservancy and now by the Sierra Los Tulares Land Trust, is a private wildlife sanctuary created for the purpose of protecting valley oaks and associated wildlife. Valley oak regeneration has taken place (as well as many other native vegetation changes) since cattle were removed.

Caswell Memorial State Park also protects one of the last remnant valley oak riparian forests in the San Joaquin Valley. These 258 acres located northwest of Modesto have been owned and managed by the California state parks system since the 1950's. CalPIF and other organizations have documented the high use and clear importance of this small park to birds.

Oak Grove Regional Park is the site of a cattle ranch where valley oaks were retained (Pavlik et al. 1991). Today, this 170-acre park located near the city of Stockton is managed by the San Joaquin County Department of Parks and Recreation.

Modoc

Of all the California bioregions, perhaps Modoc most resembles its historic state. It is host to the least number of human inhabitants of all ten bioregions, but continued human growth is likely as pressures increase along with California's population expansion. The landscape is characterized by extensively forested mountains, vast reaches of high desert, and volcanic uplands. Typical weather includes hot dry summers and cold, wet winters, with snow at higher altitudes. Oak woodlands are sparse and few, with black oak most common and Oregon oak also present. As in other montane habitats, changes in the fire cycle, due to fire suppression and increased fuel accumulation, has had an impact on the structure and ecology of hardwood forests in this bioregion.

Portfolio Sites

Quail Spring is identified as an area where black oak co-occurs in mixed conifer stands (Pavlik et al. 1991). It is located east of MacArthur on Highway 299 and managed by the Modoc National Forest.

Klamath

The Klamath region is home to some of the most dramatic geologic landscapes on earth. It is known for its steep, rocky shorelines, rich coniferous forests of coast redwoods and Douglas firs, extensive mountain ranges and salmon runs. No other bioregion in California receives as much rainfall, and the bioregion is characterized by cool, foggy summers along the coast and rainy winters throughout. Its high mountains create a dramatic rain shadow, resulting in stark contrast between the north coast climate and the nearby interior. Ranges in this mountainous region include the Klamath, Siskiyou, Marble, Salmon, Trinity, and Cascade Mountains, and the North Coast Range.

The bioregion is home to five national forests, the Siskiyou, Six Rivers, Klamath, Shasta-Trinity, and Mendocino. Also in this region is Redwood National Park, a network of state parks and wilderness areas, Jackson State Forest, as well as forests on private land (such as the well-known Headwaters redwood forest in Humboldt County). Although the region has received much attention for its ancient redwood forests, some areas also contain extensive tanoak forests. The northernmost detection of tanoaks infected with Sudden Oak Death (SOD) were found in the Klamath bioregion.

Portfolio Sites

Redwood National Park is known for redwoods, of course, but also contains extensive tanoak forests. To date these tanoaks are not infected with the pathogen causing Sudden Oak Death (SOD). Oregon oak, black oak, and canyon oak occur on the drier slopes and bottomlands.

Humboldt Redwoods State Park also contains stands of tanoaks. This was the furthest north location that SOD was detected in 2000, with 11% of the tanoaks infected.

Hopland Field Station on the Russian River is engaged in active efforts at oak regeneration (Pavlik et al. 1991). This University of California field station is a site of active research on oak woodland issues (see Merenlender and Crawford 1998; Merenlender et al. 1998).

McLaughlin Reserve is a recent addition to the UC Davis Natural Reserve System and is located in the inner North Coast Range, at the junction of Napa, Lake and Yolo Counties, on land owned by the Homestake Mining Company. The 2,800 ha (7,050 acre) site, of which 20 % is oak woodland, is in transition: the Homestake gold mine is in its last phases of operation, and the McLaughlin Reserve is beginning to be used for teaching and research. It is surrounded by some 30,000 hectares (75,000 acres) of land managed by the US Bureau of Land Management (BLM).

The Northern California Coast Range Preserve is an immense region (7,800 acres) managed jointly by The Nature Conservancy and the University of California. Oak habitats include tanoak, black oak, Oregon oak and others. SOD infection occurs in populations of tanoak and black oak. If SOD continues to expand, this region would be important in understanding how to manage the acorn production of other oak species as tanoaks and black oaks decline.

Central Coast

California's Central Coast is characterized by a mild climate, beautiful coastline, small mountain ranges that roughly parallel the coastline, and a wide variety of habitat types. The favorable climate in this region supports a robust agricultural industry that includes vineyards, row crops and grazing.

In recent years, the Central Coast has undergone a dramatic population increase, fueled largely by prosperous industries such as Silicon Valley's booming computer industry. This sudden and expansive growth threatens the region's habitats through land conversion, water

diversion, logging, resource extraction, grazing, and habitat clearing. Some of the worst effects of SOD are visible on the coastal forests in this region, predominantly affecting tanoak and coast live oak, and occasionally black oak.

Portfolio Sites

Hunter-Ligget Military Reservation is an extensive area where considerable research has been conducted on oak woodland ecology and prescribed fires (Tietje et al. 1997). This reservation may be an important area for various management ideas on the SOD epidemic and other oak woodland issues to be implemented and explored.



Hunter-Ligget Military Reservation *photo by Sandy Scoggin, PRBO*

Pfeiffer Big Sur State Park contains 800 acres of oaks and other forested habitats. Of all the sites monitored in 2000, this was one of the hardest hit by SOD. Nearly 90% of tanoaks and more than half of other oak species (coast live oak, interior live oak and black oak) were dead or dying. Understanding how the acorn-dependent bird community copes with such devastation over the next few years will be crucial.

Henry Cowell Redwood State Park is located within the Santa Cruz Mountains and is home to a number of forest habitats, including tanoak, coast live oak, redwood, ponderosa pine, madrone and Douglas-fir. It is another area hit particularly hard by SOD. Some 47% of the tanoaks here were dead or dying in 2000.

Hastings Natural History Reservation is located in the foothills of the Santa Lucia Mountains in Monterey County. Its 2000 acres are administered by the Museum of Vertebrate Zoology at the University of California, Berkeley as part of the UC Natural Reserve System. Oak woodlands dominate the landscape, including valley and blue oak hillsides as well as live oak and mixed hardwood forests. The reserve is a biological field station containing numerous long-term data sets pertaining to the natural history and population biology of native species in these oak woodland habitats. It is a prime area for conducting research on the region's wildlife and ecology. Bird data sets it is renowned for include the long-term study of Acorn Woodpeckers and of Western Bluebirds.

Sedgewick Reserve is a UC Natural Reserve administered by UC Santa Barbara. Encompassing 2,382 hectares (5,883 acres) in the Santa Ynez Valley, the reserve in includes

several types of oak woodland habitats: coast live oak forest, blue oak woodland, and valley oak savannah. The site is home to several studies on oak ecology and the factors influencing oak regeneration.

Bay-Delta

The Bay Area-Delta Bioregion includes the San Francisco Bay area and spreads eastward to encompass the sprawling Sacramento-San Joaquin River Delta. The climate is relatively mild, with fog on the coast, warm summers inland, and wet winters. The pressure for development in this very populous region is high. This area is host to a great variety of habitat types and associated avifauna. In fact few areas in the country have such a mix of dense population centers amongst a fairly diverse wildlife setting. It is in this region that SOD was first discovered in 1995. The vineyard industry is also booming in this region.

Portfolio Sites

Marin Municipal Water District is an area containing many habitats, including tanoaks, black oaks and coast live oaks. Many of these forests are also infected with SOD. Because the Point Reyes Bird Observatory conducted extensive point counts in the watershed before the emergence of SOD in this region, there is a unique opportunity for evaluating the effect on the bird community of this epidemic as it progresses, particularly those species dependent on acorns. Researchers from the University of California (Don Dahlsten and Bill Tietje) are also studying the impact of SOD on birds and other small vertebrates in this area.

Point Reyes National Seashore and the Golden Gate National Recreation Area are also areas in Marin County that are host to very diverse habitats, including those where oaks are present or predominant. These lands are owned and managed by the National Park Service. Many of these forests are also infected with SOD. The Point Reyes Bird Observatory also conducted extensive point counts in all habitat types within these parks before the emergence of SOD in this region.

China Camp State Park, located on the San Pablo and San Francisco Bays, is another site of extensive research on the new SOD problem. Coast live oak and black oak are dead and dying here. Valley oak nearby is, to date, unaffected.

Cosumnes River Preserve contains one of the finest stands of valley oak forests remaining in the Central Valley. This nature preserve is cooperatively owned and managed by The Nature Conservancy, Ducks Unlimited, U.S. Bureau of Land Management, California Department of Fish and Game, Department of Water Resources, and Sacramento County Department of Parks and Recreation. An ambitious regeneration project has been implemented (Pavlik et al. 1991).

The **Mount Hamilton** Region is an extensive open space in the central Diablo coastal range south and east of San Jose. The area contains extensive public lands, including the

Sunol Regional Wilderness and the **Henry Coe State Park**. The Nature Conservancy is building on this basis by securing the permanent protection of key private properties that surround and connect the public lands. This provides a rare opportunity to manage for oak woodland viability on a landscape scale.

South Coast

The South Coast Bioregion includes miles of sandy beaches and steep cliffs along the coast, small mountain ranges, and extensive conifer and scrub habitats. The climate is arid and warm throughout the year. The human population is very large and continues to expand rapidly, converting and fragmenting native landscapes at an alarming rate. Much land falls under the jurisdiction of forest service (Angeles, Los Padres, Cleveland, and San Bernardino National Forests), state and local parks, state beaches, and federal wilderness, recreation areas and wildlife areas. The Channel Islands off the coast of Los Angeles contain several endangered endemic species of California, including island oak. Island oak is the rarest of all oak tree species in California.

Portfolio Sites

Santa Cruz Island Preserve, managed by The Nature Conservancy, contains numerous stands of island oak and at least seven other oak species (Pavlik et al. 1991). The ongoing removal of feral ungulates (goats, sheep, and pigs) will hopefully provide opportunities to manage and restore regeneration in this key species.

Santa Rosa Plateau Ecological Reserve, a 8,300 acre Nature Conservancy property in Riverside County, is an important reserve for Engelmann Oak savannah habitat.

The **Nature Reserve of Orange County**, although perhaps better known for its coastal sage scrub habitat, also contains oak woodlands and is the site of a demographic bird monitoring project. This 38,000-acre reserve combines 21,000 acres of Irvine Company land with 17,000 acres of county and state parks, as well as other public and private lands

Mojave and Colorado Desert

These regions are dominated by the expansive deserts of southeastern California. Climate is characterized by hot, dry summers and fairly cold winters. Few people inhabit this bioregion, but it is already growing as population pressures in the rest of the state increase. Oak woodland is very sparse in these regions (less than a 10^{th} of a percent of the total area) but small pockets do exist, including blue oak woodland, oak/pine foothill, and black oak habitats.

Sierra

The Sierra Bioregion spans a vast and mountainous area, characterized primarily by the extensive and rugged Sierra Mountains and the arid eastern portion of the state. It is a region rich in biodiversity, containing over half the plant species found in California and more than 400 of the state's terrestrial wildlife species (RAC 1998). Evidence suggests that many of the region's more common birds may be in decline (Siegel and DeSante 1999). In the montane regions this area is the key domain for black oak in California, and blue oak

woodland and blue oak/foothill pine habitats are found in the foothills. The booming vineyard industry certainly extends into and threatens these blue oak habitats of the Sierra Bioregion. While almost all of the blue oak woodlands in this region are on private land (SNF 2000), the majority of the Sierra Bioregion lands are managed by public agencies, and much of the black oak forests are in national forests. Resource managers and landowners appear willing to invest time and money into finding more ecologically sound management practices and are incorporating conservation recommendations into work plans and project goals (Siegel and DeSante 1999, SNF 2000).

An extensive review of the conservation needs and recommendations for much of this region has been provided in the Avian Conservation Plan for the Sierra Nevada Bioregion (Siegel and DeSante 1999), the Sierra Nevada Ecosystem Project (Davis and Stoms 1996), and the Sierra Nevada Framework (SNF 2000). The Sierra Nevada Framework summarizes the history, ecology and conservation issues in Sierran oak (and other) habitats, and recommends management alternatives to be implemented in national forests of this region (www.r5.fs.fed.us/sncf).

Portfolio Sites

San Joaquin Experimental Range is a USDA Forest Service research facility located in the foothills of Madera county. The oldest rangeland research station in California, its 1875 hectares (4600 acres) consist of blue oak/foothill pine woodlands and annual grasslands. The site has a long history of research and education on oak ecology, wildlife, range management, water quality, and other aspects of the ecosystem. It also contains one of the longest-running bird monitoring efforts in California oak woodlands (Verner et al 1997, Purcell et al. in press). Currently SJER is managed by California State University Fresno, under a long-term agreement with the USDA Forest Service, Pacific Southwest Research Station.

Yosemite Valley, in Yosemite National Park, is undergoing extensive restoration of once-extensive black oak woodlands (Pavlik et al. 1991).

The **Lassen Foothills** region is an extensive area of grasslands and Blue Oak woodlands. The Nature Conservancy is working to protect this area from fragmentation by promoting conservation easements and acquiring land. Two preserves here run demonstration projects that include habitat restoration, rotational grazing, prescribed burning, and other range management techniques with potential to benefit oak woodlands.



Chapter 7. Implementation of Conservation Plan Recommendations

An implementation strategy for the Oak Woodland Bird Conservation Plan is in development. It will include the engagement of local, bioregional conservation efforts to better define bioregional priorities for acquisition, restoration, and focused conservation efforts. The implementation process will eventually include a series of local workshops to:

- Familiarize local organizations with the Conservation Plan and the Implementation Plan
- Identify local initiatives, projects, and organizations capable of working as local partners to achieve habitat, restoration, and population targets.
- Develop conservation and restoration acreage objectives based on inventory, assessment and biological need.

The North American Bird Conservation Initiative



Yellow-billed Magpie
artwork by Adrienne Olmstead

In 1998, participants at a meeting of the International Association of Fish and Wildlife Agencies developed a vision to link all of the major bird conservation initiatives in Canada, the U.S. and Mexico (CEC 1998). The participants represented each of the four major bird conservation initiatives already underway on the continent: The North American Waterfowl Management Plan (the oldest and most successful of bird conservation initiatives), Partners in Flight, the Shorebird Conservation Plan, and the Colonial Waterbird Conservation Plan. This new overarching program, known as the North American All Bird Conservation Initiative (NABCI), seeks to synthesize the efforts of all these groups by creating "regionally based, biologically driven, landscape-oriented partnerships delivering the full spectrum of bird conservation across the entirety of the North American continent, including simultaneous, on-the-ground delivery of conservation for both game and nongame birds." See www.nabci-us.org for more information.

State, provincial, federal and non-governmental representatives from Canada, Mexico, and the U.S. adopted an ecological framework that facilitates coordinated conservation planning,

implementation, and evaluation among major bird initiatives. These Bird Conservation Regions (BCRs) were defined by adopting the hierarchical framework of nested ecological units delineated by the Commission for Environmental Cooperation (CEC).

Existing joint ventures as formed under the North American Waterfowl Management Plan (NAWMP) are recognized as important vehicles for local and regional delivery of bird conservation goals. Joint venture focus areas do not always correspond with BCR boundaries, but joint ventures are coordinating with the BCRs encompassed within their boundaries. Many joint ventures in North America have embraced the concept of "all-bird" conservation.

California is encompassed within five BCRs: the Northwestern Pacific Rainforest region, the Sierra Nevada region, the Coastal California region (which includes the Central Valley), the Great Basin region, and the Sonoran and Mohave Deserts region. The state currently hosts five Joint Ventures: the Central Valley Habitat Joint Venture, the San Francisco Bay Joint Venture, and the Riparian Habitat Joint Venture (all located entirely within the state), and the Intermountain West Joint Venture and the Pacific Coast Joint Venture (both located partially within the state). Future bird conservation in priority habitats of California will be achieved by encouraging adoption of the all-bird conservation concept within existing joint ventures of the North American Waterfowl Management Plan and/or by expansion of the Riparian Habitat Joint Venture to include other habitat types.

The following is only a partial list of programs and agencies with which CalPIF intends to interface in implementing this plan:

Non-governmental Organizations:
American Farmland Trust
California Oak Foundation
California Native Grass Association
California Native Plant Society
California Farm Bureau Federation
Cosumnes River Project
California Cattleman's Association
Solano Farmlands and Open Space Foundation
Point Reyes Bird Observatory
Wildlife Conservation Society
National Audubon Society
National Fish and Wildlife Foundation
The Nature Conservancy
Wildlife Conservation Society

Private Organizations:
Hedgerow Farms
California North Coast Grape Growers Association
Wine Institute
Napa Valley Vintners Association
Sonoma County Vintners and Growers Association
Carneros Quality Alliance

Certified Rangeland Managers
Registered Professional Foresters

University Organizations:
University of California Integrated Hardwood Range Management Program
University of California Cooperative Extension (UC-Berkeley, UC-Davis)

State of California Organizations:
California Department of Fish and Game
California Department of Forestry and Fire Protection
Sonoma County Agricultural Preservation and Open Space District
Resource Conservation Districts (many occurring in the range of oak woodlands)
State Park System in California
Wildlife Conservation Board

Federal Organizations:
USDA Forest Service
US Fish and Wildlife Service
Bureau of Land Management
Natural Resource Conservation Service
Bureau of Reclamation



Chapter 8. Conservation Action Recommendations

Specific recommendations for conservation action are offered here. Each recommendation is accompanied by a brief discussion of the scientific evidence that supports it. These recommendations cover actions in several areas:

- habitat protection and restoration
- land management
- monitoring and research
- policy

Many of these recommendations follow those made by other organizations, or complement them. The goal of these recommended actions is to facilitate the protection and restoration of oak woodland habitat, including the successful recruitment of new oaks for future generations of the wildlife that depend on them. Only by restoring the processes involved in oak regeneration can oak woodland birds be secured a future, and thus avoid their listing as threatened or endangered species. Likewise, restoring oak regeneration will contribute to preserving sustainable working landscapes. It is our hope that these recommendations will help galvanize and guide the programs of conservation organizations, expenditures of government agencies, and the actions of private and public land managers.

Most recommendations are supported by the most recent scientific data and analysis available and a synthesis of ecological literature on oak woodlands. Additionally, recommendations were derived from focal species accounts (see http://www.prbo.org/calpif/). Some recommendations are, as of yet, poorly supported by data, but can be evaluated through biological research, monitoring, and adaptive management. This process will allow the continuing refinement of these recommendations and the development of more effective management and restoration strategies.

Habitat Protection Recommendations

OBJECTIVE 1

Prioritize oak woodland sites for protection.

Recommendations

1.1. Prioritize sites with intact oak regeneration and decay processes.

One of the greatest threats to oak woodland habitat in California is the lack of oak regeneration, specifically in blue, interior live, Oregon white, and valley oak communities. Habitats that presently harbor healthy bird populations will fail to support future generations of oak woodland-associated bird species if regenerative processes are not intact.

Regeneration may be considered to be adequate if the number of seedling and sapling oaks is sufficient to offset mortality (Standiford and Tinnin 1996). Oak recruitment may be episodic, and therefore sites that currently lack young oaks may still be viable in the future. However, prioritizing sites that are presently demonstrating healthy oak regeneration constitutes a step towards insuring viable habitat for future bird populations.

Other important parts of an ecologically functioning oak woodland system are acorn production and oak tree decay. Four oak woodland-associated species, Acorn Woodpecker, Yellow-billed Magpie, White-breasted Nuthatch and Western Scrub-Jay, depend on acorn production as a food source and in turn, are instrumental in the dispersal process needed for oak regeneration. Ten of the oak woodland-associated focal species depend on decaying trees and limbs for nest cavities and also, in the case of Acorn Woodpecker, Oak Titmouse and White-breasted Nuthatch, for storing food.

1.2. Prioritize sites according to current indicators of avian population health.

Conservation efforts should use the most recent information regarding the present quality of habitat and wildlife populations to prioritize the acquisition and protection of sites. Although it is unknown whether demographic bird monitoring data can predict the regenerative potential of oak woodland habitats, they do provide a means to prioritize habitat quality in its present condition.

1.3. Prioritize sites to include diverse age structure of oak trees, especially large old oak trees.

Protecting sites with a diverse age structure of oak trees will provide a continuum of seeding phenologies, preventing synchronous or wide-scale acorn crop failures. Maintaining large old oaks within a diverse age structure will provide decaying limbs necessary for bird nesting sites in addition to high output acorn production. McDonald (1990) demonstrated that Black Oaks much reach 30 years before producing viable acorns and seldom produce large quantities of acorns until they reach 80-100 years. Good acorn producing trees can continue abundant production up to 200 years.

Territorial requirements for the Acorn Woodpecker, a species instrumental in acorn dispersal, include large central trees for nesting, granary and roosting, surrounded by a periphery of smaller or medium sized trees.

1.4. Prioritize sites to represent a diversity of oak woodland types.

The full range of variation in oak woodland habitat types (and associated animal species) can be protected by: 1) protecting a diverse portfolio of sites located in different parts of the geographic and elevation range of oak woodlands, and 2) protecting individual sites that contain a variety of oak woodland types. Protecting the variety of oak woodland types may help protect the various birds that are associated with different types of oak woodland habitats. For example, Lark Sparrows are likely to be found more often in open, savanna-like oak habitats (Small 1994), while Dark-eyed Juncos may be more abundant in denser

woodlands with a thick understory (Tietje et al. 1997). Some bird species also appear to occur in higher numbers when the diversity of oak woodland types present in the surrounding landscape is higher (Stralberg and Williams, 2002).

1.5. Prioritize sites according to surrounding land use.

Certain uses of land adjacent to oak woodland habitat may negatively impact the quality of that habitat for native birds. For example, oak woodlands that are adjacent to pastures or residential developments may be more accessible to European Starlings, which compete for nest cavities with other secondary cavity nesters (Verner et al. 1997, Merenlender et al. 1998). Urban or suburban development may also have a negative effect on the presence or abundance of some bird species, including Lark Sparrow and Rufous-crowned Sparrow, in adjacent oak woodlands (Stralberg and Williams, 2002).

1.6. Prioritize oak woodland sites adjacent to intact chaparral, grassland, pine or and riparian habitats.

Riparian areas are especially important to many species of birds and other wildlife that are also found in adjacent oak woodlands (RHJV 2000). An analysis using the California Wildlife Habitat relationships System (CWHR) predicted that 150 species of birds use riparian habitat within or adjacent to oak woodlands for breeding, feeding and/or cover (see Chapter 4 in Standiford and Tinnin 1996). Many birds that are more typical of chaparral or grassland habitats can also be found in adjacent oak woodlands. Thus, the bird community found within oak woodland patches is strongly influenced by the type of habitat that surrounds them (Sisk et al. 1997).

1.7. Prioritize sites according to landscape variables (patch size, shape, connectivity) that adequately support the desired populations of oak woodland-dependent species.

Large, unfragmented, and connected areas of oak woodland should have high priority for protection, for a number of reasons. Bird species composition can be altered by habitat fragmentation. For example, the proportion of neotropical migrant species in the bird community was found to be higher in undeveloped oak woodland than in ranchette developments (Merenlender et al. 1998). The same study found a number of bird species to be more abundant in subdivided oak woodlands. These include Western Scrub-Jay, a common predator on the nests of other birds, and European Starling, an exotic competitor of cavity nesting birds (Purcell and Verner 1999). Stralberg and Williams (2002) found several bird species, mostly neotropical and short distance migrants, to increase in abundance with the proportion of oak woodland habitat remaining in the surrounding landscape.

1.8. Prioritize sites according to management options.

Sites in which management can be used to restore natural ecosystem processes should be given a high priority for protection. For example, sites in which a natural fire regime can be

re-established might be assigned a higher priority than sites in which there is a need for strong fire suppression. Sites in which the impacts of grazing can be strictly managed may also be priorities for protection.

1.9. Prioritize sites based on conservation threats and opportunities for protection.

The above guidelines are useful for identifying the highest quality oak woodland sites in the state, however, not all of these sites will be equally threatened by imminent habitat loss and degradation. Therefore, an analysis of impending threats and conservation funding potential should be included in the prioritization process. Habitat quality, vulnerability, and conservation potential all must be considered in designing the best conservation strategies.

OBJECTIVE 2

Increase acreage of protected oak woodland.

Using the above prioritization guidelines, a variety of preservation tools should be applied to increase the acreage of oak woodland in California that is managed for birds and other wildlife. These tools include: conservation easements, fee ownership of preserves, partnerships between government agencies and nonprofits, sustainable forestry and ranching, and woodland grass banking. Future versions of this plan should contain quantitative goals for oak woodland protection.

Habitat Restoration Recommendations

OBJECTIVE 3

Prioritize oak woodland sites for restoration.

Recommendations

3.1. Prioritize restoration sites according to their proximity to existing high quality sites.

Restoration sites may be more likely to be colonized by oak woodland birds if they are close to areas of high quality habitat that can serve as sources of immigrants. Dispersal distances of oak woodland birds are largely unknown, with one exception: Acorn Woodpeckers have been shown to dispersal relatively long distances (Koenig et al. 2000). However, many of the smaller, resident bird species in oak woodlands may have relatively restricted dispersal ability. If so, bird populations may be more likely to be reestablished and to persist in restoration sites that are close to areas of high quality habitat that can serve as sources of immigrants. Further research is needed to evaluate the influence of habitat isolation on oak woodland birds.

3.2. Prioritize restoration sites according to likely success of regeneration and transplanted oak viability.

Restoration sites should be prioritized according to their regenerative potential. This includes not only sites with adequate acorn production and dispersal capabilities, but also with adequate biophysical (conditions e.g., soil, water table, etc.) to support seedling growth and cultivated transplants. A GIS-based system for evaluating site suitability for valley oak restoration is being developed for Santa Barbara County by Frank Davis and associates at the University of California, Santa Barbara (Davis and Kuhn, in press, http://www.biogeog.ucsb.edu/projects/sboak/sboak.html).

OBJECTIVE 4

Restore protected oak woodland systems to benefit healthy bird populations.

Recommendations

4.1. Restore oak woodlands to promote oak regeneration.

Regeneration is a problem in oak woodlands with a large amount of oak mortality and not enough growth of seedlings and saplings to replace dying trees. In these areas, land managers may want to promote regeneration by protecting young trees from grazing and browsing animals or by planting acorns or seedlings. Because planting oaks requires intensive effort, it may be more efficient in some sites to protect seedlings and saplings where they are already present. Small oak trees may need protection from grazing animals until they have grown taller than the browse line. Active restoration of oak trees may be needed most on drier south-facing slopes (Brooks and Merenlender 2001). A variety of devices, such as screens and plastic tubing, as well as brush piles, can discourage browsing of small trees. A recent University of California manual on "Regenerating Rangeland Oaks in California" (McCreary 2001) is available through the UC Integrated Hardwood Range Management Program (IHRMP). Contact information for IHRMP and sources of other information on how to implement oak woodland restoration are available in Chapter 9.

4.2. Restore understory components of oak woodland systems.

Many oak woodland birds are associated with grassland and shrub components of oak woodlands (Tables 3-1 and 3-2). Oak woodlands with a shrubby understory and downed woody material support greater numbers of small vertebrates (Tietje and Vreeland 1997, Teitje et al. 1997). The presence of shrubs and brush piles in the understory of oak woodlands may also help promote the survival of oak seedlings (Callaway 1992b, Callaway and Davis 1998, Weitkamp et al. 2001).

4.3. Replace non-native annual grasses with native perennial grasses in oak woodland systems.

Re-establishing or conserving native perennial grasses in oak woodlands may benefit oak regeneration, because non-native annual grasses tend to outcompete young oak seedlings for soil moisture (Gordon and Rice 1993). Also, some birds, such as the Lark Sparrow, may benefit from the presence of native grasses (Martin and Parrish 2000).

4.4. Restore upland oak woodland habitats in conjunction with adjacent riparian restoration.

Many bird species use both riparian and upland oak habitats for different parts of their life cycle. For example, birds that breed in oak woodland habitat may use riparian habitat as corridors for the dispersal of juveniles and non-breeding adults. Riparian habitat may also be used for foraging and as migratory stopover grounds. In addition, birds nesting in riparian habitat adjacent to native upland habitat may experience lower rates of nest predation or cowbird parasitism (RHJV 2000).

4.5. Restore natural fire regimes in oak woodlands whenever possible.

Higher fire frequencies in the era before widespread fire suppression (before the 1950's) may have created conditions that favored oak regeneration (Chapter 10 in Standiford and Tinnin 1996). Thus, restoring natural fire frequencies may contribute to improved oak recruitment. Also, low-intensity prescribed burns may help reduce fuel levels and prevent large, higher intensity fires that destroy oak stands. However, oak woodlands may also be damaged when fire frequency is too high, and the idea that changes in fire frequency have influenced oak regeneration is not entirely supported by recent studies (McCreary 2001, Swiecki and Bernhardt in press). More study is needed to identify the optimal fire frequency in oak woodlands. Therefore, this is a good area for adaptive management, which requires monitoring of the effects of different prescribed burning regimes on oak woodland plants, birds, and other wildlife.

4.6. Restore a mosaic configuration of a diversity of oak woodland types.

See Recommendation 1.4.

4.7. Restore oak woodlands to meet the requirements of cavity-nesting birds.

Cavity-nesting birds make up a large proportion of the bird species and a majority of the individual birds breeding in oak woodlands (Wilson et al. 1991). Therefore restoration programs should give special consideration to meeting the habitat requirements of this guild, including both primary and secondary cavity nesters. See Recommendations 6.3, 6.4, and 6.7.



Oak Titmouse *photo by Ian Tait*

4.8. Plant multiple species of oak tree when restoring oak woodlands

Sites with more than one species of oak present are more likely to support stable populations of Acorn Woodpeckers (Koenig and Haydock 1999). Other acorn-consuming species will benefit from this as well, because high oak species diversity helps to ensure that acorns will be available from at least one type of oak in a given year.

Management Recommendations

OBJECTIVE 5

Implement and time land management activities in oak woodlands to increase avian reproductive success and enhance populations.

Recommendations

5.1. Avoid the construction or use of facilities and pastures that attract and provide foraging habitat for European Starlings and Brown-headed Cowbirds.

European Starlings and Brown-headed Cowbirds are insectivorous ground feeders, and therefore are attracted to pastures, other open, short-grass areas and feedlots (Morris and Thompson 1998, Purcell et al. in press). Brown-headed Cowbirds parasitize songbird nests and European Starlings compete with native species for nesting cavities (Troetschler 1976). Recent studies suggest that European Starling populations may be increasing in oak woodlands and may be more likely to nest and forage in or near grazed oak woodlands or pastures than in the center of ungrazed areas (Verner et al. 1997, Purcell et al. in press). The degree to which Starlings and Cowbirds impact native oak woodland bird populations is still

uncertain, but their presence is likely to be detrimental for some native species. Further research is also needed to investigate whether pastures and rangelands can be managed so as to reduce their attractiveness to Starlings and Cowbirds.

5.2. Brown-headed Cowbird trapping should only be used as an interim/ emergency measure.

Cowbird control has been effective in stabilizing declines of endangered species in limited populations breeding in riparian habitats. For example, cowbird trapping lowered parasitism rates in a Willow Flycatcher population on the South Fork Kern River (RHJV 2000), and populations of Least Bell's Vireos at Camp Pendleton appear to be increasing as a result of cowbird trapping (USFWS 1998). However, endangered species can never fully recover as long as they rely upon human intervention for their survival (Kus 1999). A National Cowbird Advisory Council was formed to address trapping issues, review trapping programs on a case by case basis, and advise land managers and regulatory agencies. Expert opinion suggests that cowbird trapping is at best a temporary stopgap solution, and it is preferable to manage habitat and human use in ways that lessen the negative impacts of cowbirds (Morrison et al. 1999, and the National Cowbird Advisory Council).

5.3. Limit restoration activities and disturbance events such as grazing, prescribed fire, firewood harvesting, disking, and herbicide to the non-breeding season (which varies by region, but is typically August through February in California).

Such disturbances during the breeding may have direct impacts on the nesting success of oak woodland species, especially ground or shrub nesters. These activities may be much less detrimental to birds if conducted during the non-breeding season. Although few studies have directly tested this hypothesis, a recent study found no effect of an October prescribed burn on bird abundance in coastal-central California oak woodland (Tietje and Vreeland, in press).

The effects of grazing in particular need further study. While grazing did not appear to have a large effect on oak woodland bird densities at the San Joaquin Experimental Range (Verner et al. 1997), further study is needed into possible effects on primary population parameters such as reproductive success. Grazing probably contributes to the long-term lack of oak recruitment in many areas, which will in time have serious consequences for bird populations. Thus, grazing should be managed so as to promote oak recruitment. There is some evidence suggesting that winter grazing is less damaging to blue oak seedlings than spring or summer grazing (Hall et al. 1992).

Grazing, prescribed fire, and mechanical treatments such as disking can be useful tools in habitat restoration, for example to promote the growth of native perennial grasses (Tu et al. 2001). In some cases, these treatments may be most effective during the breeding season. If so, land managers should carefully weigh the long-term benefits of the management action against the short-term costs to avian productivity. Long-term use of such treatments in the breeding season should be avoided.

5.4. Manage for a grass and shrub understory where bioregionally appropriate.

See Recommendations 4.2 and 4.3.

5.5. Manage or influence management at the landscape level.

Managing at the landscape level means taking into account interactions among the different habitat patches and ecosystems that make up a region. The presence and abundance of birds in a patch of oak woodland can be influenced by characteristics of the habitat mosaic surrounding the patch, as well as by characteristics of the individual patch (Sisk et al. 1997, Stralberg and Williams, 2002). Linking and buffering large sections of oak woodland and associated habitats may restore top predators, such as coyotes or bobcats, to the oak woodland system. These predators may, in turn, reduce populations of avian nest predators such as skunks, raccoons, and snakes (Soulé et al. 1988). Landscape-scale land-use patterns may affect the population levels of Brown-headed Cowbirds and avian predators in an area, and thus reduce avian productivity. However, research on the demographic effects of habitat fragmentation is lacking for California oak woodlands, and one study in a western landscape suggests that fragmentation may not always cause increased nest predation (Tewksbury et al. 1998). More generally, the theory of island biogeography predicts the gradual extirpation of small populations from isolated habitat fragments (MacArthur and Wilson 1967). Landscape-scale management is also needed to prevent the invasion of protected habitat patches by exotic plants and animals (e.g., Suarez et al. 1998). Implementing landscape level management often will require cooperation with regional organizations such as regional fire councils, weed abatement districts, watershed conservancies, and Resource Conservation Districts.

OBJECTIVE 6

Protect, enhance or recreate natural oak woodland processes and characteristics.

Recommendations

6.1. Maintain diverse age structure of oak trees.

See Recommendation 1.3.

6.2. Protect seedling and sapling trees to enhance oak recruitment.

Oak seedlings and saplings remain vulnerable to damage by herbivorous animals, including grazers, browsers, and small mammals, until they have grown taller than the grazing line (usually about 5 feet). Mangers may want to consider placing protective structures around these young trees.

6.3. Retain decaying or dead oak trees, limbs, snags and mistletoe.

Some cavity-nesting birds, such as the Plain Titmouse and White-breasted Nuthatch, nest primarily in natural cavities (Wilson et al. 1991). Therefore, the injured and decaying trees in which these cavities often form are an important habitat element for these species. Allowing dead limbs to remain on living trees may provide entry points for decay-enhancing organisms, which in turn allow birds to excavate cavities in the rotting wood. An analysis using the California Wildlife Habitat relationships System (CWHR) estimated that over 50 species of birds use snags for breeding, feeding and/or cover (Guisti et al. 1996). Mistletoe is known to be an important winter food for Western Bluebirds (see Species Account for details).

6.4. Retain large oak trees whenever possible.

Acorn Woodpeckers will benefit from the presence of large diameter trees (> 50 cm DBH), which they prefer to use for nesting and as granary trees (Gutierrez and Koenig 1978, Wilson et al. 1991). One study in the Bay/Delta bioregion found that granaries were almost exclusively found in deciduous oaks greater than 75 cm in diameter (Wilson et al. 1991), while softwoods such as pines are preferred in other areas (see species account for more details). Sustaining Acorn Woodpecker populations is likely to be beneficial to secondary cavity nesting species, such as Western Bluebirds, which often use old excavated nests. Large trees often contain many natural cavities for nesting birds, and are disproportionately chosen for site sites by Red-tailed Hawks (Tietje et al. 1997a) . See recommendation 1.3.

Large oak trees also produce more acorns than smaller trees, providing both a source of oak recruitment and food for wildlife. Therefore, in the absence of any data on actual acorn production, the largest trees should be retained. Also, certain individual trees may produce more acorns, have more large branches and produce larger snags and logs for wildlife use than other trees. Therefore, these especially valuable individual trees can be identified and retained to benefit birds and other wildlife. The acorn production of individual trees can be visually estimated in early fall (for instructions, see McKibben and Graves 1987 or Guisti et al. 1996). Acorn crops vary from year to year, so Guisti et al. (1996) recommend observing individual trees over 2-3 years and McKibben and Graves (1987) recommend observing trees in at least one high acorn production year. If data from multiple years are not available, it would still be beneficial to retain those trees that produce the most acorns in any given year, because the same individual trees tend to be good producer from year to year (Chapter 9 in Standiford and Tinnin 1996).

6.5. Control and eradicate non-native animal species.

The presence of non-native animals, such as European Starlings, feral cats, and pigs, may be harmful to native birds. Non-natives may compete with or prey on native birds, or may impact the suitability of oak woodlands for birds via their effects on vegetation. A recent study suggests that feral pigs may have significant negative impacts on acorn availability for wildlife and the establishment and growth of oak seedlings (Sweitzer and Van Vuren in press).

6.6. Utilize thinning of oak woodlands as a replacement for complete oak removal in rangelands.

It may be very difficult for oak woodlands to reestablish themselves after being completely removed (Brooks and Merenlender 2001). Much regeneration takes place under the canopy of larger trees where optimal conditions for establishment exist, e.g. moisture, nutrients (Swiecki and Bernhardt 1998). For example, blue oak seedlings do not survive well in areas without some canopy cover. The conversion of oak woodlands to grasslands will obviously cause reductions in the numbers of oak woodland birds present. There is some evidence that thinning of oak woodlands may not have dramatic negative effects on common oak woodland birds, especially if small patches are thinned (3 ha or less), if thinning reduces the basal area of trees by < 25%, and if large trees, trees with nest cavities, and Acorn Woodpecker granary trees are preserved (Aigner et al 1998). Leaving brush piles after thinning may cause increases in population density of some bird species, such as California Quail and Bewick's Wren. However the effects of thinning on uncommon species is uncertain. If oak woodlands are thinned, the most valuable trees for wildlife should be preserved (Garrison and Standiford 1997), as outlined above in Recommendations 6.3 and 6.4.

6.7. Manage for a diversity of oak species within the appropriate bioregion.

Research has shown that cavity-nesting birds use a variety of trees for nest sites, suggesting that these birds will benefit from having many alternative nesting substrates available (Wilson et al. 1991). Because different oak species do not mast synchronously, high oak species diversity will also help ensure that acorns will be available from at least one type of oak in a given year, thus benefiting acorn-consuming birds (Koenig and Haydock 1999).

6.8. Design and implement cultivated restoration projects that mimic the diversity and structure of a natural oak woodland plant community.

The response of birds to riparian habitat restoration suggests that cultivated restoration sites are more beneficial to birds if they mimic the diversity and structure of naturally occurring habitats (RHJV 2000). If this is also true in upland habitats, then some of the cultivated restoration recommendations in the Riparian Bird Conservation Plan may be applicable to oak woodlands. For example, this would suggest that restoration projects should include the planting of multiple species of trees as well as native understory plants such as shrubs, herbs, and grasses. Also, planting oak trees in a clustered pattern or planting young trees under the canopy of existing trees may promote the recruitment of additional oaks and benefit birds.

6.9. Maintain corridors between oak woodlands and other habitats.

Many of the birds found in oak woodlands use other habitat types during parts of their life cycles. Therefore, the diversity of birds and the health of their populations will likely be greater when oak woodlands are connected to other habitats by corridors of native vegetation.

6.10. When harvesting firewood in oak woodlands, identify and retain important resources for wildlife.

The results of one study on light firewood harvesting (basal area of trees reduced by less than 25%) in a California oak woodland suggest that protecting granary trees, nest cavities and some dead limbs, creating brush piles, and harvesting in small patches may help maintain bird populations in harvested oak woodlands (Aigner et al. 1998). In addition, Standiford (1996) recommended that following guidelines be followed: preserve individual trees which produce the most acorns, preserve at least one snag (i.e., dead tree) per acre, allow buffer zones with no harvesting adjacent to riparian areas, and protect sprouting stumps and existing small seedlings and saplings. Guidelines for how to identify which blue oaks produce the most acorns can be found in McKibben and Graves (1987). More research is needed to understand the long-term, large-scale effects of firewood harvesting in oak woodlands.

OBJECTIVE 7

In private commercially managed oak woodland habitats (i.e. vineyards, agricultural fields, and housing developments), maintain habitat characteristics sufficient to support native bird populations. Work cooperatively with agricultural researchers to encourage vineyards and orchards adjacent to existing oak woodlands to be more "bird friendly."

Recommendations

7.1. Retain connected oak patches within managed landscapes.

Developed or agricultural areas may still provide habitat for some oak woodland birds if oak patches are retained (Scott 1993, Stralberg and Williams, 2002). The long-term health of these bird populations is not known, but is likely to be improved by connectivity among retained oak patches. See recommendation 10.1.

7.2. Retain oak trees in addition to herbaceous, grass or scrub understory.

Oak removal has historically been recommended to increase forage production for livestock. However, research suggests that removing blue oaks results in little or no improvement in forage production in areas receiving less than 20 inches of rain per year (see review of research in Chapter 5 of Standiford and Tinnin 1996). Indeed, in drier parts of the state, deciduous oak canopy cover can enhance forage production. Rangeland experts also recommend that areas where oaks are thinned should retain oak canopies of at least 25-35% to help maintain soil fertility, minimize soil erosion, and provide wildlife habitat (ibid.).

7.3. Maintain oaks around residences and other landscaped areas by avoiding soil compaction and over-watering.

Native oaks are valued parts of many yards and parks, and may be harmed by soil compaction or inappropriate irrigation. For example, watering near the base of a native oak during the warm season can cause root and crown rot. Detailed instructions for oak care are available from the California Oak Foundation and the UC Integrated Hardwood Range Management Program (see Appendix A for contact information).

7.4. Retain patches of chaparral, riparian or grassland habitats adjacent to patches of retained oaks.

The presence of these habitats adjacent to oak patches may improve conditions for native birds. See also recommendation 1.5, 1.6, and 4.4

7.5. Avoid attracting non-native bird species.

Non-native birds may compete with native birds for resources, including nest cavities. In oak woodlands, European Starlings are of particular concern in this regard. See also recommendations 5.1 and 6.5.

7.6. Avoid attracting or supporting inflated populations of nest predator species.

Homeowners can avoid this by not providing food for avian nest predators such as jays, magpies, crows, and ravens in the breeding season and by not feeding stray or feral cats.

7.7. Refrain from utilizing pesticides or herbicides if possible.

Within developed areas, landowners may benefit bird populations by avoiding landscaping methods that require the use of pesticides. Agricultural landowners adjacent to oak woodland habitat may use integrated pest management or organic productions as an alternative to pesticide use. This prevents damage to nesting birds and increases available foraging habitat.

7.8. Retain natural cavities instead of using nest boxes, whenever possible.

The loss of naturally occurring cavities cannot be completely mitigated by providing nest boxes. Although nest boxes can provide good nesting sites for several species of cavity nesting birds, they also have the potential to alter the composition of the bird community by benefiting some species more than others (Purcell et al. 1997, Mummert et al. in press). Also, if not properly maintained year after year, nest boxes can provide nest sites for non-native species such as European Starlings. Therefore, it is preferable to retain natural cavities whenever possible. In addition, nest cavities may not be a limiting factor in all oak woodlands, and natural nest availability should be assessed before implementing nest-box programs in oak woodlands (Waters et al. 1990).

7.9. Conduct management activities such as mowing herbaceous and grass layers in the non-breeding season.

See recommendation 5.3.

7.10. Seek opportunities to work with landowners and influence the layout of new vineyards to be located in oak woodlands, to ensure that oak harvest or reduction conforms as much as possible to the above recommendations.

OBJECTIVE 8

Inform private landowners of the imminent decline of oak woodlands due to habitat loss and lack of regeneration, and of the subsequent effect on landbird populations.

Recommendations

8.1. Support active outreach to private landowners through established programs such as local Resource Conservation Districts, the Natural Resources Conservation Service, and UC Cooperative Extension.

Many landowners may be interested in managing for oak woodland birds if given the opportunity to do so on a voluntary basis. Resource Conservation Districts can use their established contacts with private landowners as the basis for providing information on how to manage for oak woodland birds. For example, wine-grape growers are often interested in deploying nest boxes on their land to benefit cavity nesting songbirds and owls that may prey on pest insects and rodents. Therefore, the Southern Sonoma Resource Conservation District has recently begun a project to monitor avian reproductive success in nest boxes on Sonoma County vineyards. This project, which is a collaboration between private landowners, the RCD, UC Extension researchers, and PRBO, will provide information to landowners about the use of nest boxes in vineyard-oak woodland habitats. Such programs should be encouraged to help inform and build partnerships with private landowners.

Monitoring/Research Recommendations

OBJECTIVE 9

Provide data on pressing conservation issues affecting birds.

Recommendations

9.1. Consider reproductive success and survival rates when monitoring populations, assessing habitat value, and developing conservation plans.

The value of a habitat for oak woodland birds depends largely on their ability to survive and reproduce there (Block and Morrison 1987). Although many monitoring programs focus on species' abundances, abundance alone is an inadequate, and sometimes misleading, measure of habitat quality (Van Horne 1983). Likewise, long-term trends in bird populations depend

on survival and reproductive success rates. Therefore, monitoring programs should include the estimation of these demographic parameters whenever possible.

9.2. Conduct intensive, long-term monitoring at selected sites. In order to analyze trends, long-term monitoring should continue for more than 10 years.

Intensive long-term monitoring can provide crucial, habitat-specific information on bird population trends. Because oak woodland bird numbers are highly variable from year to year (e.g., Verner and Purcell 1999), most monitoring projects will need to continue for at least 10 years to be able to detect significant trends in abundance or to provide reliable baseline data (Verner et al. 1996). A long-term study of oak woodland birds by Forest Service biologists at the San Joaquin Experimental Range has produced many useful guidelines for designing and implementing a monitoring program (Verner and Ritter 1985, Verner 1987, Verner and Milne 1989, Verner et al. 1996). A project is currently underway, using this long-term dataset, to determine the optimal sample size and number of years required to detect population trends using point counts.

Because apparent trends in oak woodland bird populations can be caused by climatic factors, such as a period of low precipitation, rainfall and temperature should be included as explanatory variables in trend analyses (Purcell et al. in press).

9.3. Conduct selective monitoring at critical sites to determine the factors influencing nest success of representative open cup nesters: Lark Sparrow, Blue-gray Gnatcatcher, Western Scrub-Jay, California Thrasher, California Towhee and Hutton's Vireo.

Low productivity can be an important factor leading to population declines and local extinctions in open-cup nesting birds (Johnson and Geupel 1996, Gardali et al. 2000). By determining the factors associated with low reproductive success, research may identify which management and restoration actions will help prevent or reverse songbird population declines. Land managers, owners and regulatory agencies gain greater freedom in their decision-making if they conserve bird species before special-status listing becomes necessary. Monitoring key species provides gauges that allow management changes before it is too late.

Monitoring sites ideally should be selected in a methodical, randomized fashion so that the effects of various local habitat, landscape, and management conditions on reproductive success can be evaluated through statistical inference. Anthropogenic factors of interest include: grazing, prescribed fire, mowing, development density, landscaping and garden characteristics, and abundance of non-native predators.

9.4. Monitor nests in natural or excavated cavities.

Because cavity nesters make up a significant proportion of oak woodland birds, it is essential to understand the influences on their productivity when nesting in natural cavities (as opposed to artificial nest boxes). The impact of competition for nesting cavities by European Starlings on native birds should also be monitored.

9.5. Monitor effects of Western Scrub-Jay and Yellow-billed Magpie populations on other oak woodland species.

Western Scrub-jays and Yellow-billed Magpies can act as predators on the nests of other native birds (Purcell and Verner 1999). Although jays and magpies are native to oak woodland habitats, they may be a conservation threat in areas where their populations are increased due to human activities. For example, Western Scrub-jays are known to be more abundant near human developments (Merenlender et al. 1998, Stralberg and Williams, 2002).

9.6. Monitor effects of Brown-headed Cowbird and European Starling populations on other oak woodland species and research how habitat management can be used to minimize adverse effects.

See recommendation 5.2.

OBJECTIVE 10

Use information gathered in avian monitoring programs to test specific oak woodland habitat needs for bird species.

Recommendations

10.1. Identify minimum thresholds of connected oak woodlands in urban, agricultural and vineyard fragments.

To assist in conservation planning, we need to know, for example, what is the minimum number of oaks and maximum spacing between oaks that will still provide habitat for oak woodland bird species. Such information will help landowners practice "bird friendly" agriculture and development.

10.2. Study edge effects in oak woodland habitats.

Research into how oak woodland habitat edges relate to bird use, nest predation and cowbird parasitism is needed. There is some evidence suggesting that nest predation rates are lower at "soft" habitat edges than at abrupt, "hard" edges (Suarez et al. 1997, Soderstrom et al. 1998). However, no research on this subject has been conducted in western oak woodlands. Given that many of our protected oak woodlands may border unprotected or developed lands, it is important to know if edges can be managed or restored so as to minimize negative edge effects.

10.3. Compare areas heavily affected by Sudden Oak Death with those that are not, with attention to effects on acorn production, and how that affects the food chain.

Sudden Oak Death might affect bird populations through changes in forest structure and resulting changes in acorn supply and invertebrate numbers, which could potentially spread throughout the food web. Because the effects of SOD on bird populations will probably develop over a long time period, long-term, large-scale monitoring as well as shorter-term, intensive research efforts are needed. Bird monitoring projects in oak woodlands should routinely include the standardized collection of data on stand structure, including numbers of dead or dying trees, along with other habitat data.

10.4. Examine winter use of oak woodlands by bird species.

Relatively little is known about the winter ecology of oak woodland birds. More study is needed to understand which species depend on oak woodlands in winter and what characteristics of oak woodland best promote over-winter survival.

10.5. Study the association between the shrub understory and oak woodland avian diversity and composition.

Continued research on the current and historic occurrence of shrub understory and its value for birds is needed to evaluate the importance of managing for this vegetation layer in oak woodlands (Tietje and Vreeland 1997, Teitje et al. 1997).

OBJECTIVE 11

Study the effects of management practices on oak regeneration and bird populations.

Recommendations

11.1. Monitor the effectiveness of progressive grazing regimes for increasing the rate of successful oak tree regeneration.

It has been suggested that rotational grazing on subdivided pastures can increase the vigor of native grass species, reduce weeds, and promote oak regeneration (George 1991), but little research has yet been done to evaluate this management technique in oak rangelands (but see Jansen et al. 1997). The effects of specific grazing management strategies on oak regeneration and avian productivity should be studied in an adaptive management framework.

11.2. Study the effectiveness of prescribed fire to reduce non-native annual grasses and facilitate germination and growth of oak seedlings.

As outlined in Recommendation 4.5, fire is a natural process that influences oak recruitment and oak woodland structure. While light intensity fires may benefit oak growth by reducing competition with annual grasses, higher intensity fires can also damage young oaks (Teitje et al. 2001). More research on issues such as fire timing and frequency is needed to understand

how prescribed fire can best be used to promote oak regeneration, while also benefiting oak woodland birds.

11.3. Study the effectiveness of "wildlife-friendly" agricultural practices in vineyards and vineyard landscapes.

The winegrape growing industry is increasingly interested in making vineyard development and management less detrimental to birds and other wildlife. The effects of these efforts on birds should be monitored and compared with more traditional management practices in several bioregions.



Vineyards in oak habitat *photo by Geoff Geupel, PRBO*

OBJECTIVE 12

Maximize the effectiveness of ongoing monitoring and management efforts.

Recommendations

12.1. Increase communication and coordination between land managers and specialists hired to implement specific projects or conduct monitoring.

Adaptive management is given much attention and is widely discussed, but land managers rarely have adequate time to evaluate the effects of their projects. When managers work with specialized experts, they have an excellent opportunity to conduct "adaptive management" on an informal basis. Experts, such as those conducting endangered species or biodiversity inventories, should be consulted and included as part of project implementation teams. By doing so, managers can quickly and easily access a wealth of detailed information about local birds, other wildlife, and their responses to management activities.

12.2. Use standardized monitoring protocol.

By standardizing monitoring techniques, researchers ensure that results can be compared across space and time. The USDA Forest Service published guidelines for standardized techniques of monitoring birds (Ralph et al. 1993). Please refer to Appendix B for more information. Standardized methods for measuring habitat variables, such as vegetation structure and composition also should be developed and adopted. Oak woodland databases should also be standardized to facilitate the sharing of Geographic Information System (GIS) datasets.

12.3. Sierra Nevada Framework efforts should seek to incorporate a program of monitoring bird populations to assess avian responses to blue oak woodland and montane hardwoods management alternatives.

12.4. Natural Communities Conservation Planning (NCCP) and development mitigation projects initiated by cities, counties, developers or other land managers should seek to incorporate long-term monitoring and current information on avian populations.

Policy Recommendations

OBJECTIVE 13

Encourage the development of new programs with two complementary goals: (1) make it easier for private landowners to foster oak regeneration on their property, and (2) make it more difficult for large-scale clearing of oak woodland to take place without adequate mitigation.

Recommendations

13.1 Support focused and creative action by the California Wildlife Conservation Board (WCB) in implementing the recently (2001) passed Assembly Bill No. 242, the Oak Woodland Conservation Act (the Act).

This bill authorizes the establishment of the Oak Woodland Conservation Fund for the protection and conservation of oak woodlands throughout the state of California, to be administered by the WCB. The Oak Woodland Conservation Fund may be used to offer financial incentives to private landowners to protect and promote biologically functional oak woodlands over time. Conservation easements, land improvement, and public education and outreach are some of the activities that may be funded as a result of this bill.

The WCB program has exciting potential for working creatively and constructively with landowners to promote good land stewardship. A program to encourage and facilitate efforts to improve oak regeneration on private lands should be emphasized statewide.

Conservation groups, Resource Conservation Districts, city and county planning departments, parks departments and private landowners should focus on the following specific objectives with respect to implementation of the Oak Woodland Conservation Act:

1. Support continued legislative appropriations to the Oak Woodland Conservation Fund on an annual basis.
2. Seek to maximize the benefits of proposed oak woodland conservation programs and projects by coordinating with local land use planning agencies and zoning guidelines.
3. Seek to influence the development of local jurisdiction "oak management plans" (required by the Act) to ensure that the ecological components necessary to support a diverse avian/wildlife oak woodland community are incorporated.
4. As provided for in the Act, seek to participate in developing the guidelines and criteria for awarding grants under this program.
5. Support or promote the use of appropriate sources of federal conservation funding for deposit into the Oak Woodland Conservation Fund. Appropriate federal sources include CARA (the Conservation and Reinvestment Act).

13.2. Promote the passage of legislation that would make large-scale removal of oaks in intact oak woodlands subject to the California Environmental Quality Act (CEQA).

Unless the environmental and cumulative impacts of oak woodland removal are considered prior to approval of land development projects, continued unmitigated habitat loss and fragmentation will occur. CEQA compliance for oaks woodland impacts may help to decelerate the loss and fragmentation of oak woodland habitats, particularly in the wine growing regions of Northern California.

13.3 Promote legislation that provides funding for oak woodland research, monitoring and management.

13.4. Promote the passage of oak preservation ordinances and smart-growth planning initiatives at the local (city and county) level, including:

- County and city general plan updates.
- Collaborative, inter-agency regional planning efforts.

County planning agencies are often interested in incorporating the conservation of oak woodland habitats into their comprehensive plans. Examples include the effort of Santa Barbara county to design an Oak Protection Program for the county's rural areas (Leider, in press, www.sbcountyplanning.org) and Placer County's Legacy Open Space and Agricultural Conservation Program (www.placer.ca.gov/planning/legacy/legacy.htm). Although often controversial, such policies and ordinances should be supported by conservation science and should include measurable performance standards that focus on protecting large patches of oak woodland habitat, not just individual trees (Harris and Kocher, in press).



Chapter 9. Outreach and Education

Scientific efforts for conservation have little impact without the support of affected local communities, including private landowners, government land managers, and the general public. To gain crucial support, research and management programs must share their findings and involve the interested parties at all levels of the conservation enterprise.

For the purposes of this chapter, outreach refers to communication with land managers, agencies, planners, business interests, nonprofit organizations, academia, and volunteers. Outreach activities include conferences and workshops that facilitate communication among experts, participation in land use planning, volunteer restoration and monitoring programs, field trips and classes for school children, and ecotourism.

Education, an important component of outreach, refers to the range of activities that educate and involve students and adults. Education activities include visits for classes and groups to field sites, interpretive displays, specialized curricula, and participation in festivals.

Project-Based Learning

One method of educational outreach, called project-based learning, allows an open-ended approach to solving a conservation problem. Students identify a conservation issue in their community and plan and implement conservation projects from beginning to end. Teachers and students make the important decisions, while working with biologists, business people, private landowners and others in the community. Because of this investment, students take ownership of their work, and the lessons learned are profound and long-lasting (Rogers, pers. comm.).

Conservation education sensitizes people to environmental problems and encourages them to seek solutions. As they become involved, people develop a greater connection to issues such as habitat degradation and loss, songbird declines, and species extinction. Conservationists have little hope of achieving their goals without cultivating this interest in the public.

Education programs engage participants most effectively when they involve hands-on activities. Conservation education has the whole of the outdoors as a classroom–what better way to elicit the interest and enthusiasm of students and the public?

Education Opportunities

Since oak habitats are such noticeable and accessible habitats, they provide excellent opportunities for hands-on experience for school groups. In fact, many schools and homes are surrounded by areas of open space containing oak woodland habitat. This close

proximity creates easy access for field visits to observe birds and other wildlife in this habitat. In addition, many oak woodland areas contain a bluebird nest box program. If you are involved in a bluebird nest box program make sure you are not doing more harm then help by following the guidelines of the North American Bluebird Society (http://www.nabluebirdsociety.org/) for proper installment, monitoring, and maintenance of nest boxes. If you would like to start a nest box program or install a nest box at your school, nature center or even home follow all the guidelines of the North American Bluebird Society.

The following is a list of key topics to emphasize in Oak Woodland educational projects:

- The different types of oaks
- The oak lifecycle and its dependency on birds for propagation
- Cavity abundance in oak woodlands supports a high diversity of cavity nesting birds
- The influence of acorns on native peoples culture and their use of fire to stimulate acorn production

The concepts and guidelines outlined above and in the Conservation Education section can be presented to the public and to students through a variety of media. Following is a list of common education opportunities and some suggestions for content:

Classroom Education

Programs in the classroom should focus on communicating key concepts to students through hands-on activities. Lessons should stress studying birds in the field - whether in the backyard, on school grounds, or in a nearby natural area - and include keeping field notes and observing natural behaviors of birds. Field trips to sites with bird conservation and monitoring projects, fosters interest and enthusiasm for wildlife and teaches students the importance of conserving birds.



photo by PRBO staff

A great way to get students interested in birds is to get them out looking at them. While access to binoculars is sometimes limiting, you can contact your local Audubon Society, Nature Center or other local wildlife education group to see if sets are available for check out. If you feel uncertain of your birding skills, contact your local Audubon Society or Nature Center to arrange for docents or naturalists who will be able to join your class for a

day of birding in the field. An invaluable experience that catches students' interest immediately is to visit a mist-netting site where students will have the opportunity to examine birds up close and interact with biologists.

There are many excellent sources for curriculum and hands-on bird activities to be done in the classroom. Through the Point Reyes Bird Observatory, Teacher Resource Packets are available containing lesson plans and activities for students of all ages, geared towards teaching students how to observe and study birds. To acquire the PRBO Teacher Resource packets contact Melissa Pitkin, 4990 Shoreline Hwy, Stinson Beach, CA 94970 (415) 868-1221 ext. 307, or email at **mpitkin@prbo.org**.

Each year PIF produces a resource directory containing bird related resources on education programs and materials, education web sites, activities for kids, workshops, and more. To acquire this guide contact Susan Bonfield, PO Box 23398, Silverthorne, CO 80498 or email Sbonfield@aol.com. Another useful source is *A Guide to Bird Education Resources* produced by Partners In Flight and National Fish and Wildlife Foundation. Copies of this book are available from American Birding Association Sales, PO Box 6599, Colorado Springs, CO 80934, phone 1-800-850-2473, member@aba.org.

Other Oak Woodland Educational Resources

- **North American Bluebird Society:** Bluebird Poster and Pocket Field Guide Student Packet, Bluebird Nestbox Plans, and Bluebird Newsletter P.O. Box 74 Darlington, WI 53530 608/329-6403, email: nabluebird@aol.com; Online at: http://www.nabluebirdsociety.org/.

- **Acorn Naturalists Materials:**
  Available at: http://www.acornnaturalists.com/p905.htm or at 155 El Camino Real P.O Box 2423 Tustin, CA 92781-2423 Phone 1-800 422-8886

- **Investigating the Oak Community**: a curriculum designed to involve 4th through 8th grade students in activities that will develop their awareness, understanding, and knowledge of the important role of oaks in the California landscape. Available at http://www.californiaoaks.org/html/merch2.html.

- **Books on Oaks and Oak Woodland Habitat:**

  Grandmother Oak, Rosi Dagit, Gretta Allison (Illustrator); Roberts Rinehart Pub., Jan. 1997.

  In a Nutshell, (Sharing Nature with Children Book), Joseph Anthony, Cris Arbo (Illustrator); Dawn Publications, Sept. 1999.

  Oaks of California, Bruce Pavlik, Pamela Muick, Sharon Johnson; Cachuma Press, 2000 (revised).

Webs of Life (Oak Tree), Paul Fleisher, Jean Cassels; Library Bindings, January 1998.

The Life of an Oak Tree: An Intimate Portrait, Glen Keator, Susan Bazell (Illustrator); Heydon Books, April 1998.

- **The California Environmental Resources Evaluation System** (http://www.ceres.ca.gov/) has a great list of resources for Natural Sciences Educators at: http://www.ceres.ca.gov/education/educators/nat_sci.html

- **Cal Alive!** An interactive CD-Rom for 4th-8th graders focusing on CA biological diversity. Software is available at the following website: http://www.calalive.org/index-big.html.

Volunteer Involvement

Enlisting volunteers to aid in data collection and restoration is an excellent way to gain additional help. It is one of the best ways to teach people about conservation. Increasingly, families and school groups have opportunities to participate in cultivated habitat restoration projects at local parks or nature preserves. Volunteers that participate in counting and studying birds quickly develop a connection to them, which intimately involves the volunteer in the conservation effort. Furthermore, volunteers provide additional support and resources that make long-term monitoring of songbirds viable. To ensure reliable data collection, supervisors must match monitoring techniques with the skill level of the volunteer.

Volunteer projects monitoring bluebird nest boxes are an excellent way to ensure that bluebird boxes are monitored as well as providing a wonderful opportunity for volunteer involvement. If you are coordinating a volunteer bluebird nest box project please follow the guidelines of the **North American Bluebird Society**. You can find these guidelines on-line at http://www.nabluebirdsociety.org/.

Interpretation at Natural Areas

Interpretation is an excellent way to disseminate key concepts about bird conservation to the public. Displays at preserves, nature trails, picnic areas, and other natural areas should highlight the birds using the habitats and show the specific features of the habitat that are critical to bird reproduction and survival, including native plants. Some effective displays illustrate how individuals can make a difference at home, by planting native plants in their yards or restraining cats from killing birds. These displays should be aimed at the general public, emphasizing the causes of the decline of songbirds. Again, integrating people as part of the solution encourages their support for conservation issues.

Participation in Birding Festivals and Environmental Fairs

Birding festivals are becoming a popular means of increasing ecotourism, which can help to promote local support for conservation of natural areas–a requirement for long-term sustainability of conservation actions. Festivals also present an excellent opportunity to further educate people already familiar with birds about the scientific reasons behind bird conservation. Birders already recognize and love birds and can easily be taught the reasons for bird conservation and what a healthy population of birds needs to survive. They also constitute a pool of experienced observers who may volunteer for monitoring programs. The second Saturday in May is International Migratory Bird Day and National Keep Your Cat Indoors Day. Creating a display or festival in honor of these days is a great way to spread the word about bird conservation to your community.

Representation of bird conservation at environmental fairs is another way to reach large numbers of people and convey the key concepts behind bird conservation. Booths displaying information on how individuals can help birds along with interactive games or activities for children engage families and visitors in bird conservation topics.
The National Fish and Wildlife Foundation has published Bridges to Birding, an interactive program for introducing birds, bird watching and bird conservation to your community. It contains step by step instructions on how to put on a festival or fair focusing on birds. To obtain a copy contact IMBD Information Center at (703) 358-2318 or **IMBD@fws.gov**. For more information on National Keep Your Cat Indoors Day, contact the American Bird Conservancy or visit **http://www.abcbirds.org/cats/catsindoors.htm.**

Oak Woodland Outreach

Many groups are already working together on projects to preserve and educate people about Oak Woodland habitats. Activities ranging from workshops, management guidelines, new partnerships, and educational curriculum are being conducted by these groups. The groups and their activities are summarized below:

The California Oak Foundation (COF) was founded in 1988, and provides technical assistance and educational materials to those engaged in protecting oak woodlands and planting oak trees.

The California Oak Foundation works to:

- Encourage adoption of state laws protecting oaks, general plan amendments, ordinances by local, regional, and state agencies to conserve oaks;

- Co-publish oak books and educational materials, including "Oaks of California," "The Life of an Oak," and "Compatible Plants Under and Around Oaks;"

- Develop educational curriculum and provide information to schools and other community groups for acorn planting and tree maintenance projects;

- Educate decision makers, individuals and communities about threats to our endangered oak heritage;

- Sponsor technical conferences on oak preservation and workshops on estate tax planning and conservation easements in urban and rural environments for planners, developers and landowners.

For more information see Appendix A: Resources.

University of California Integrated Hardwood Range Management Program
http://128.48.5.253/ihrmp/

The Program's purpose is developing alternative land use planning and range management strategies to ensure multiple use of hardwood rangelands while improving oak regeneration and maintaining diverse wildlife habitat.

Objectives:

- Develop methods to sustain hardwood rangeland ecosystems and landscapes;
- Maintain wildlife habitat on hardwood rangelands;
- Restore degraded hardwood rangelands;
- Ensure land use planning utilizing available information to conserve hardwood rangeland ecosystems;
- Maintain economically viable private hardwood rangeland enterprises;

Regional cooperative extension specialists are located throughout the State to develop applied research and outreach programs addressing conservation of hardwood rangelands with local Cooperative Extension offices and various agencies and interest groups. The Extension program also develops newsletters and educational materials. http://128.48.5.253/ihrmp/person.html

Projects of the Program include:

- **Workshops on Guidelines for Managing Hardwood Rangelands** -- 10 workshops were presented in FY 97-98 to extend the concepts in the recently revised handbook, "Guidelines for Managing California's Hardwood Rangelands." Presented in collaboration with local county Cooperative Extension offices. Over 450 ranchers, homeowners, local conservation groups, and resource management professionals participated.

- **Development of Local-Based Oak Woodland Conservation Policies** -- The State Board of Forestry has adopted a hardwood rangeland policy to encourage local or regionally-based conservation strategies, rather than statewide regulations. IHRMP and county CE staff have helped facilitate development of these local policies. During FY 97-98, Sonoma, Fresno, and El Dorado counties implemented new hardwood rangeland

policies. These add to the other 27 counties that have already adopted local hardwood rangeland conservation policies.

- **Monitoring of Hardwood Rangeland Resources** -- Provide local feedback into state-level monitoring carried out by USDA Forest Service (USFS) and the California Department of Forestry and Fire Protection (CDF). Change detection evaluation of seven counties in the southern Sierra Nevada was completed in cooperation with local CE advisors. Work on monitoring sources of hardwood rangeland change started in the central and northern Sierra Nevada regions.

- **Develop and Extend Restoration Efforts** -- Educational programs were held with restoration professionals, native plant nurseries, and landowners on IHRMP-developed hardwood rangeland restoration technologies. Over 150 professionals were reached directly with educational workshops dealing with this topic.

- **Vineyards in an Oak Landscape** --Conversion of hardwood rangelands to vineyards identified as key area for new program thrust. Leaflet developed to describe hardwood rangeland conservation strategies in areas being developed for new vineyards. Local regulatory restrictions proposed in Sonoma, Napa, and Santa Barbara counties, and IHRMP and county CE advisors worked closely in developing educational opportunities to present research-based information in this policy debate. Five educational workshops were held this fiscal year on this topic. A pilot GIS mapping project started in Sonoma County.

- **Economic Value of Hardwood Rangelands** --Concerns about validity of Williamson Act appraisal processes used in the Southern Sierra Counties led to contract with Tulare County Assessor's Office to determine a scientifically defensible appraisal process. This work completed, and extended to southern Sierra Nevada county assessors in a workshop and through printed case studies. Work has helped quantify amenity and conservation value of hardwood rangelands to support developing interest in conservation easements and land trusts to conserve habitat values of hardwood rangelands.

- **California Oak Symposia** –Together with a number of other organizations and agencies, IHRMP recently convened the fifth in a series of symposia on oaks in California. These conferences and their proceedings are rich sources of information on a wide variety of subjects related to oak ecology, management, and conservation (Standiford 1991, Pillsbury et al. 1997).

California Association of Winegrape Growers

CAWG was founded in 1974 to represent the interests and concerns of wine and concentrate grape growers. CAWG has begun to work with the scientific and environmental community to develop and promote awareness of wildlife-friendly vineyard practices. In 2002, CAWG organized a workshop on Vineyards and Wildlife Habitat, and plans to follow up with a publication on the subject. www.cawg.org

Eastern Madera County Coarsegold Resource Conservation District Voluntary Oak Woodland Management Guidelines http://www.crcd.org/
The Coarsegold Resource Conservation District has provided this forum to furnish landowners with the latest information and provide educational material for their use in the management of their property. The data included on this site was developed to assist landowners in becoming better land stewards and direct them to publications and agencies for help in the management of their property.

Phytosphere Research -- (http://phytosphere.com) provides information needed to effectively manage plant resources in urban and rural environments, natural ecosystems, and agricultural systems. They focus especially on ecology, restoration, and management of native California oaks and oak woodlands. Their site *Understanding blue oak regeneration*: (http://phytosphere.com/BLUEOAKF.HTM)
provides and indepth overview of blue oak regeneration, including details on the effects of canopy and site conditions, accounting for historical regeneration patterns, sustainable management, and effects of fire and grazing. They also offer a guide to growing California oak species (http://phytosphere.com/oakplanting/oakplanting.htm)

Future Outreach Priorities

Outreach activities must maintain and build interest in conservation and restoration efforts in the state. To this purpose, outreach efforts should develop:

- **Greater collaboration** between woodland managers (include public and private agencies) and biologists to examine wildlife response to management practices throughout California's varied oak woodland habitats.

- **More contact with resource-based constituencies**, such as the wine-making industry, to foster collaboration in land management, in order to improve habitat for birds while ensuring that landowners can make a sustainable living.

- **Partnership with the National Association of Service and Conservation Corps** (NASCC), of which the California Conservation Corps is a part. The California Association of Local Conservation Corps also has 11 members throughout the state with a trained labor force capable of restoring habitat. These programs improve environmental quality while providing opportunities for young people to learn and develop new skills.

- **Further educational outreach**, particularly the promotion and support of volunteer monitoring programs. Volunteer monitoring programs are most needed at reference sites and others that will require long-term monitoring.

- **Oak Woodland conferences and symposia**. These will highlight recent developments in restoration biology, innovative government programs and public and private

partnerships. They will also facilitate communication among restoration biologists, regulatory agencies, land managers, and landowners throughout the state.

Opportunities for Involvement: What Can One Person Do?

An individual can have a profound impact on the life of a bird and the livelihood of a species. Human activities can encourage predation of adult birds and their nests by animals such as domestic cats, raccoons, and jays. They can alter available food resources by depleting local insects with pesticides. Finally, they can destroy or disrupt much-needed habitat for nesting and feeding young. But thoughtful activity by humans can limit these impacts and even encourage successful nesting by songbirds, contributing to the health of their population.

The guidelines below can make a critical difference in enhancing the health of a songbird population. These recommendations apply to most bird species, including oak woodland birds.

If you are a bird watcher, volunteer for a monitoring program.

There are increasing opportunities for bird watchers of all skill levels to gain training and experience in various bird monitoring techniques. Participants gain knowledge in a subject area of interest, learn new skills, and can directly contribute to the science of conservation while enjoying birds in the outdoors. There are increasing opportunities to contribute to bird monitoring projects in riparian habitats throughout the state. (See the PRBO web site http://www.prbo.org for ways to get involved and Appendices A and B for more information on bird monitoring techniques and the information they provide.)

If you own a cat, help reduce the impact of cats on bird populations.

Domestic cats kill hundreds of millions of native birds, reptiles and small mammals every year. This unnecessary impact can easily be reduced if cat owners would keep their cats indoors. The American Bird Conservancy's Cats Indoors! campaign seeks to educate the public on the facts of cat predation on birds and other wildlife, and the hazards to free roaming cats. This information is available at the American Bird Conservancy's web site at **http://www.abcbirds.org**.

Other actions that cat owners can take to help birds:

- **Keep cats as indoor pets.**
- **Spay and neuter your cats**.
- **Cats on ranches or farms, kept to control rodent populations, should be kept to a minimum.** Spayed females tend not to stray or wander from the barn area. Keeping feed in closed containers also helps reduce rodent populations (Coleman et al. 1997). Trapping rodents can also be more effective than relying on cats to do the job.

- **Don't feed stray or feral cat populations**. A more humane alternative for cats and wildlife is to reduce the unwanted cat population by limiting reproduction and facilitating adoption by responsible pet owners.
- **Remove food dishes or garbage that may attract stray cats.**
- **Support local efforts to remove feral cats.**

If you camp, hike, or picnic in the outdoors help maintain the natural balance between predator and prey.

Do not feed wildlife or allow wildlife access to your trash. This may lead to an increase in natural predators such as raccoons, fox, ravens, crows, jays, and opossum. Increased numbers of these predators can depress bird populations.

If you feed birds, avoid doing more harm than good.

Feeding wildlife can be beneficial if properly done, but it always carries the potential for upsetting the natural balance between native predators and prey species. Improper feeding can help to spread disease, support predator populations that prey on birds and other organisms, or increase non-native populations that displace the natives.

•Feeder placement should be away from shrubs or bushes that provide places for cats to ambush birds (Coleman et al. 1997).

•Avoid feeding birds in the spring and summer. Feeding birds supplements their natural diet, but springtime feeding may encourage a lower quality diet for nestlings who need high-protein insects, which are naturally abundant throughout the breeding season.

•Do not supplement the diet of avian nest predators such as jays, magpies, crows and ravens by feeding them during the breeding season. These predators tend to benefit disproportionately from human habitation, and as their populations expand they are negatively affecting the health of other bird populations. The National Audubon Society produces bird feeders that discourage use by avian predators.

•Avoid supplementing the diet of Brown-headed Cowbirds, which parasitize songbird nests. If cowbirds come to your feeder, try eliminating millet from the birdseed you provide. Evidence indicates that Brown-headed Cowbirds are attracted to bird feeders primarily for millet. Sunflower seeds and other types of birdseed attract many songbird species, but may not attract cowbirds.

•When feeding birds in winter, feed them consistently. Some wintering birds may become dependent upon winter bird feeders, thus a consistent supply of food is important. Change birdseed if it gets wet from rain as the moisture may promote mildew or sprouting, which can cause birds to become ill.

•In feeding hummingbirds, use a solution of four parts water to one part sugar. Do not use brown sugar, artificial sweeteners or red dye. Place the feeders in the shade and change the feeder solution every three to four days to avoid cultivating pathogens that can cause hummingbirds to become ill. In freezing weather, bring feeders indoors at dusk and return them with lukewarm fluid at dawn. Clean feeders every 10 days using a few drops of bleach in the wash water, and let stand before rinsing. Rinse thoroughly many times.

If you find an injured bird or a baby bird:

•Baby birds will often leave the nest before they look fully-grown. Such birds are often mistaken for "abandoned." Their parents, however, can find them on the ground and will feed them. Most fledglings will continue to be fed by their parents even after leaving the nest. It is therefore best to leave young uninjured birds alone, as it is likely their parents are nearby. It is not true that parents will avoid young after humans have handled them. Fledglings should not generally be returned to their nest, as this may disturb the nest site. Trampled vegetation and human activity can alert predators to the presence of the nest. Allowing baby birds to remain in the care of their parents provides them their best opportunity for survival.

•Injured birds can be taken to wildlife rehabilitation clinics and programs. It is best to keep injured birds in a warm, dry, quiet place free from disturbance (such as a shoebox with the lid on and a few holes for air) until they can be transferred to a licensed wildlife rehabilitation facility. Call the facility before you visit.

•Be aware that it is against federal law to collect birds or their nests without a permit.

KEY CONCEPTS ABOUT BIRD CONSERVATION

The following list of key concepts for bird conservation should be communicated through education and outreach programs. These concepts are important to include in any program concerning conservation, and are indispensable in programs focusing on birds and riparian habitats.

- **Reproductive success may be the most important factor influencing population health.** It contributes directly to a population's size and viability in an area. A number of factors influence reproductive success, including predation, parasitism, nest site availability, and food availability.
- **Nesting habitat requirements vary among species.** Different bird species place their nests in different locations, from directly on the ground to the tops of trees. Most birds nest within five meters of the ground. Managers should consider that habitat needs for different species vary. Leave grass and forbs greater than 6 inches in height for ground nesters, shrubs and trees for low to mid-height nesters, dead trees and snags for cavity nesters, and old, tall trees for birds that build their nests in the canopy.
- **The breeding season is a short but vital period in birds' lives.** Birds nest during the spring and early summer of each year and raise their young in a rather short period. Nestlings are particularly sensitive to changes in the environment and are sensitive indicators of ecosystem health. Disturbance, such as vegetation clearing, habitat restoration, and recreation may result in nest abandonment, remove potential nest sites, directly destroy nests, expose nests to predators, and decrease food sources such as insects. Predators, such as domestic cats, skunks and jays, can decimate breeding populations, and managers should avoid subsidizing their populations.
- **Understory (the weedy, shrubby growth underneath trees) is crucial to birds.** A healthy and diverse understory with lots of ground cover offers well-concealed nest and foraging sites. Manicured parks and mowed lawns provide poor nesting conditions for all but a few bird species.
- **Native plants are important to birds.** Native bird populations evolved with the local vegetation, learning to forage upon and nest in certain species. Introduced plant species may not provide the same nutrition or nest site quality. Introduced plants can also quickly dominate an area, reducing the diversity of vegetation. Less diverse vegetation can lower the productivity and viability of a bird population.
- **Natural predator-prey relationships are balance, but human disturbance creates an imbalanced system.** Interactions with predators are a natural and essential part of an ecosystem. However, a preponderance of non-native predators or a sustained surplus of natural predators severely affects the health and persistence of bird populations. Feeding wildlife, especially foxes, raccoons, and skunks, should be discouraged. Feeders that are frequented by jays and crows and cowbirds should not be maintained during the breeding season (most songbirds feed their young insects). Domestic and feral cats are responsible for an estimated 4.4 million birds killed each day by cats (Stallcup 1991). It is not true that a well-fed cat will not hunt! In fact, a healthy cat is a more effective predator.
- **Natural processes, such as flood and fire, are integral to a healthy ecosystem.** They provide the natural disturbance needed in an area to keep the vegetative diversity high, an important factor for birds.



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Appendix A. Resources

The Oaks of California by Pavlik et al. (1991)

The California Oak Foundation
http://www.californiaoaks.org/
The California Oak Foundation (COF) is dedicated to protecting and perpetuating California's native oak woodlands and the wildlife habitat and watershed benefits they provide.

Contact information:

California Oak Foundation
1212 Broadway, Suite 810
Oakland, CA 94612
Tel: (510) 763-0282
Fax: (510) 208-4435
E-mail: oakstaff@californiaoaks.org

Also available at this site: *The California Oak Report* Beginning in January 2000, our Current Issues page will feature a monthly report, which will provide information to the general public about the biological role of California's oak woodlands in the landscape and the planning processes applicable to oak woodland habitats. The column also hopes to function as an interactive forum for the discussion of oak issues and as a site for the general public to submit comments, queries, oak news, etc. Automatic monthly electronic mailings of The California Oak Report are available upon request by contacting *oakstaff@californiaoaks.org*.

University of California Integrated Hardwood Range Management Program
http://128.48.5.253/ihrmp/
The Program's purpose is in developing alternative land use planning and range management strategies to ensure multiple use of hardwood rangelands while improving oak regeneration and maintaining diverse wildlife habitat. This site is a tremendous resource for information on anything related to oak woodlands.

OBJECTIVES:

- Develop methods to sustain hardwood rangeland ecosystems and landscapes;
- Maintain wildlife habitat on hardwood rangelands;
- Restore degraded hardwood rangelands;
- Ensure land use planning utilizing available information to conserve hardwood rangeland ecosystems;
- Maintain economically viable private hardwood rangeland enterprises;

- Maintain statewide information base about trend, condition, and extent of hardwood rangelands; and
- Help focus public awareness about the importance of hardwood rangeland habitats.

The Sierra Nevada Ecosystem Project
http://ceres.ca.gov/snep/pubs/web/v1/v1_default.html
Sierra Nevada Ecosystem Study (SNEP) was a congressionally mandated 3 year study of the entire Sierra Nevada range. The study was managed by the University of California Centers for Water and Wildland Resources, Davis, CA under a research agreement with the U. S. Forest Service, Pacific Southwest Research Station, Albany, CA. Posted on the above web site are final reports from this intensive study by an independent science team. Formal release of the report to Congress occurred on June 7, 1996.

Hastings Natural History Reservation
http://www.hastingsreserve.org/OakStory/OakIntro.html
Hastings is a Biological Field Station of the University of California providing the wildlands and facilities to conduct college and graduate level studies of natural systems in the Santa Lucia range in Monterey County, California. Our research reveals that every species has a fascinating story. Their stories put our lives in perspective. We hope that sharing these stories will inspire individuals to protect and appreciate whatever is still wild and under their care.

The Sierra Nevada Framework for Conservation and Collaboration
http://www.r5.fs.fed.us/sncf/
In early 1998, the USDA Forest Service Pacific Southwest Region, the Pacific Southwest Research Station and the Intermountain Region renewed their efforts to work with tribes, county governments, state and federal agencies, interest groups and individuals interested in improving the health of Sierra Nevada ecosystems and communities. The effort integrates recent science into natural resource management through a variety of approaches and at a variety of geographic scales. It also works toward more effective means of coordination, cooperation and collaboration among the various parties.

The Sierra Nevada Forest Plan Amendment Environmental Impact Statement is one of several Framework activities. At this site, you will find links to several other projects and activities going on in the Framework. The Design Paper outlines many of the commitments the Forest Service is making as part of its contribution toward improving natural resource management and collaboration among tribes, agencies, local governments and citizens.

US Department of Agriculture—Natural Resources Conservation Service Programs
While there are a variety of USDA programs available to assist people with their conservation needs, the following primarily financial assistance programs are the principal programs available. Locally led conservation groups are encouraged to contact the State offices of the appropriate agency for specific information about each program.

For more information about any of the following NRCS programs: http://www.nrcs.usda.gov/
Natural Resources Conservation Service
Attn: Conservation Communications Staff
P.O. Box 2890
Washington, DC 20013

Forestry Incentives Program
http://www.nhq.nrcs.usda.gov/CCS/FB96OPA/FBillLnk.html
The 1996 Farm Bill extends the Forestry Incentives Program (FIP), which was originally authorized in 1978 to share up to 65 percent of the costs of tree planting, timber stand improvements, and related practices on non-industrial private forest lands FIP's forest maintenance and reforestation provide numerous natural resource benefits, including reduced wind and soil erosion and enhanced water quality and wildlife habitat as well as helping to assure a reliable future supply of timber. Improving timber stands, which help to sequester greenhouse gases, also contributes to the President's Climate Change initiative. FIP is administered by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) and Forest Service.

Program Availability
FIP is a nationwide program available in counties designated on the basis of a Forest Service survey of total eligible private timber acreage that is potentially suitable for production of timber products. Federal cost-share money is available-with a limit of $10,000 per person per year with the stipulation that no more than 65 percent of the cost may be paid. To find out if your county participates in FIP, check with your local USDA office, State forester, conservation district, or Cooperative Extension office.

The Wildlife Habitat Incentives Program (WHIP)
http://www.nhq.nrcs.usda.gov/PROGRAMS/Animals/whip/index.htm
A voluntary program for people who want to develop and improve wildlife habitat primarily on private lands. It provides both technical assistance and cost-share payments to help establish and improve fish and wildlife habitat.

Participants who own or control land agree to prepare and implement a wildlife habitat development plan. The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) offers participants technical and financial assistance for the establishment of wildlife habitat development practices. In addition, if the landowner agrees, cooperating State wildlife agencies and nonprofit or private organizations may provide expertise or additional funding to help complete a project.

Conservation Technical Assistance (CTA)
The purpose of the program is to assist land-users, communities, units of state and local government, and other Federal agencies in planning and implementing conservation systems. The purpose of the conservation systems are to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.

Conservation Reserve Program (CRP)
The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.

US Fish and Wildlife Service—Partners for Fish and Wildlife
The mission of the U.S. Fish and Wildlife Service is, by working with others, to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The Service's Partners for Fish and Wildlife program, formerly named the Partners for Wildlife program, helps accomplish this mission by offering technical and financial assistance to private (non-federal) landowners to voluntarily restore wetlands and other fish and wildlife habitats on their land. The program emphasizes the reestablishment of native vegetation and ecological communities for the benefit of fish and wildlife in concert with the needs and desires of private landowners.

For more information about any of the following US Fish and Wildlife programs:
http://partners.fws.gov/index.htm

Partners for Fish and Wildlife
State Coordinator
2800 Cottage Way W-2610
Sacramento, CA 95825
916-414-6446

The assistance that the U.S. Fish and Wildlife Service offers to private landowners may take the form of informal advice on the design and location of potential restoration projects, or it may consist of designing and funding restoration projects under a voluntary cooperative agreement with the landowner. Under the cooperative agreements, the landowner agrees to maintain the restoration project as specified in the agreement for a minimum of 10 years.

Restoration projects may include, but are not limited to:
- planting native grasslands and other vegetation

- planting native trees and shrubs in formerly forested wetlands and other habitats
- prescribed burning as a method of removing exotic species and to restore natural disturbance regimes necessary for some species survival
- removal of exotic plants and animals which compete with native fish and wildlife and alter their natural habitats

B. General Information

The Information Center for the Environment, at *http://ice.ucdavis.edu/* is a cooperative effort of environmental scientists at the University of California, Davis and collaborators at over thirty private, state, federal, and international organizations interested in environmental protection. Within this site, find the California Ecological Restoration Projects Inventory (CERPI) (direct link: **http://endeavor.des.ucdavis.edu/cerpi/**) and the California Noxious Weeds Projects Inventory (CNWCPI). (direct link: **http://endeavor.des.ucdavis.edu/weeds/**)

CERPI is a combined private/non-profit/government effort to establish a database, accessible through the Internet, containing information on restoration projects in California. This information will further the practice and science of restoration and assist agencies and practitioners during restoration planning and implementation.
CNWCPI is a combined government/private/non-profit effort to establish a database, accessible through the Internet, containing information on noxious weed control in California. This information will further the practice and science of noxious weed control and assist agencies and practitioners doing noxious weed control throughout the state. CERPI and CNWCPI are both programs of the Natural Resource Projects Inventory (NRPI)

The California Environmental Resources Evaluation System
http://www.ceres.ca.gov/index.html
CERES is an information system developed by the California Resources Agency to facilitate access to a variety of electronic data describing California's rich and diverse environments. The goal of CERES is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors and by making it available and useful to a wide variety of users.

California Wildlife Habitat Relationships, at *http://www.dfg.ca.gov/whdab/*
California Wildlife Habitat Relationships (CWHR) is a state-of-the-art information system for California's wildlife. CWHR contains life history, management, and habitat relationships information on 675 species of amphibians, reptiles, birds, and mammals known to occur in the state. CWHR products are available to purchase by anyone interested in understanding, conserving, and managing California's wildlife (Mayer and Laudenslayer 1988).

A Manual of California Vegetation (Sawyer and Keeler-Wolf) on line at *http://endeavor.des.ucdavis.edu/cnps/*

Forest Service Technical Reports can be ordered from 970-498-1392.

Other Sources of Assistance on Hardwood Rangelands

California Department of Fish and Game
1416 Ninth St.
Sacramento, CA 95814
916-653-1738

California Department of Forestry and Fire Protection
1416 Ninth St.
Sacramento, CA 95814
916-322-0623

California Cattleman's Association
1221 H. St., Suite 101
Sacramento, CA 95814
916-444-0845
email: staff@calcattlemen.org

The Nature Conservancy
785 Market St.
San Francisco, CA 94103
415-777-0487

California Native Plant Society
909 12th St., Suite 116
Sacramento, CA 95825

California Farm Bureau Federation
1601 Exposition Blvd.
Sacramento, CA 95815
916-561-5500
email: cfbf@cfbf.com

Appendix B. How to Monitor Bird Populations

Adaptive management requires the periodical gathering of information to ascertain whether management actions are achieving desired results. The most comprehensive and rigorous way of collecting this information is through a strategic program of monitoring using standardized methods that can be compared between years and between regions. Restoration and land stewardship programs need to build in long-term monitoring programs to assess the effectiveness of their activities. Without such data in the long term, such programs will ultimately have little on which to base claims of success or the need for continued funding.

Research and Monitoring

If habitat restoration or management is undertaken to benefit wildlife species, wildlife monitoring becomes the ultimate measure of success. There are many reasons that bird monitoring should be adopted as a basic component of long-term stewardship in preserves with significant habitats or significant bird populations:

- Birds are highly visible and cost effective to monitor.
- Birds can show relatively quick response in abundance and diversity to restored habitats (3 to 5 years).
- Birds can serve as indicators for key components of ecosystem health, such as acorn productivity, oak age structure, and understory vegetation composition.
- As secondary consumers (i.e., insectivores), birds are sensitive indicators of environmental change.
- By managing for a diversity of birds, most other elements of biodiversity are conserved.
- Bird monitoring can avoid future listing of declining species by identifying problems and solutions early.
- The only way to measure special-status bird species response to management and restoration is by monitoring bird populations.
- Because of the increasing popularity of birdwatching, there is great potential for public participation in bird monitoring.
- Birds are tremendously important culturally and economically and their popularity can help raise awareness of land-stewardship needs.

Monitoring Strategically

Monitoring can be conducted at varying levels of intensity, depending on the objectives to be achieved and the resources available. The standardization of protocols is critical to comparing results across space and time. Many recent programs (Ralph et al. 1995, Martin et al. 1997, DeSante et al. 1999a) and publications (Ralph et al. 1993, Geupel and Warkentin 1995, DeSante et al. 1995, 1998, 1999b, Nur et al. 1999) have summarized methods, objectives, and how to use results.

Monitoring programs should always include an analysis plan and identification of issues or site-specific projects to be assessed. The primary purpose of site-specific monitoring is to assess the effects on wildlife of natural and anthropogenic stressors or disturbances in the environment. This knowledge is critical in determining the relative priority of identified conservation problems and in developing effective measures to address those problems. Monitoring is an integral component of the adaptive management feedback loop, allowing land managers, conservation groups, and land owners to assess the effectiveness of their habitat management and restoration programs.

Standardized monitoring across many sites at varying scales can be analyzed to highlight broad changes or trends in species presence, diversity, abundance and productivity. Ideally, a series of reference sites with long-term monitoring, using most if not all protocols below, will be developed for each California bioregion. Other sites will be monitored more opportunistically, depending on the objectives of the landowner.

The following is a list of common monitoring regimes from least to most intensive.

1) Rapid assessment of habitat or designation of Important Bird Areas based on general vegetation characteristics and presence/absence of indicator species.
Method: area search or point count as little as one census per site per year.

2) Determine breeding status, habitat association, restoration evaluation and/or evaluation of changes in management practices.
Method: area search or point count two or more times per year for 3 years. For restoration evaluation every other year, censusing should continue for at least 10 years.

3) Determination of population health or source/sink status.
Method: census combined with demographic monitoring for a minimum of 3 years (4 years preferable).

4) Reference site.
Method: point count census, constant effort mist netting and nest monitoring at a minimum of every other year for 10 years.

Long-term Monitoring

Long-term monitoring provides a wealth of useful information about bird populations. In addition to parameters that can be determined by both short- and long-term monitoring (such as annual productivity, abundance, and diversity), patterns of variation in reproductive success and trends in abundance and diversity may also be described. Long-term monitoring is also the only method to monitor natural and human-induced changes in bird populations.

The Palomarin Field Station of the Point Reyes Bird Observatory provides an excellent example of the utility of a long-term monitoring program. Biologists have conducted mist-netting at the site for over twenty years. With the data collected, they have documented a population decline of Warbling Vireos and linked it to reproductive failure on the breeding grounds (Gardali et al. 2000).

Standardized Methods Adopted by the Western Working Group and Monitoring Working Group of Partners in Flight

These are listed from least to most intensity of effort. All are described in detail in Handbook of Field Methods for Monitoring Landbirds (Ralph et al. 1993).

Area Search

The Area Search, adopted from the Australian Bird Count, is a habitat specific, time constraint census method to measure relative abundance and species composition. It may also provide breeding status. While still quantitative, this technique is ideal for volunteers as it mimics the method that a birder would use while searching for birds in a given area, allowing the observer to track down unfamiliar birds.

Point Count

The point count method is used to monitor population changes of breeding landbirds. With this method, it is possible to study the yearly changes of bird populations at fixed points and differences in species composition between habitats and assess breeding status and abundance patterns of species. The objective of point count vegetation assessment is to relate the changes in bird composition and abundance to differences in vegetation. These vegetation changes can either be over time or differences between habitats or study sites.

Mist Netting

Mist netting provides insight into the health and demographics of the population of birds being studied. Mist nets provide valuable information on productivity, survivorship, and recruitment. With these data, managers will have information on the possible causes of landbird declines or their remedies. This method is currently being used nationwide in the Monitoring Avian Productivity and Survivorship (MAPS) program (DeSante 1992).

Territory Mapping

Also known as "spot mapping," based on the territorial behavior of birds, where locations of birds are marked on a detailed map during several visits (a minimum of eight) in the breeding

season. By counting the number of territories in an area, this method estimates the density of birds. Distribution of territories, species richness, and diversity is also documented. This is an excellent method for assessing areas with limited habitat. Standard methods are described by Robbins (1970) and used by The Cornell Laboratory of Ornithology's resident bird counts.

Nest Monitoring

Also called nest searching, this technique measures nesting success in specific habitats and provides information on trends in recruitment; measurement of vegetation associated with nests may identify habitat influences on breeding productivity. Examination of nests also allows collection of life-history data (e.g., clutch size, number of broods, numbers of nesting attempts), which provide important insight into vulnerability of species to decimation or perturbations (Martin and Geupel 1993).



Western Scrub-Jay on nest *photo by Ian Tait*

Exhibit 24

Bird-Friendly Building Design



Vassar's Bridge for Laboratory Sciences, shown here under construction in October 2015. The building is scheduled to open in January 2016. Cover rendering and photos courtesy of Ennead Architects



Exterior glass detail



Glass detail, showing frit pattern

Cover rendering and photo this page: The new Bridge for Laboratory Sciences building at Vassar College, designed by Richard Olcott/Ennead Architects, redefines the identity of the sciences on the College's historic campus and provides technologically advanced facilities for students, faculty, and researchers.

Fundamental to the building's design is its seamless integration with the natural landscape, scale, and campus aesthetic of the College. In this natural wooded setting, the need for strategies to reduce bird collisions with the building was apparent. In response, the building was designed to comply with LEED Pilot Credit 55: Bird Collision Deterrence.

Ennead managing partner Guy Maxwell is a nationally recognized champion of bird-friendly design and has led Ennead's innovative approach to make the building's glazing safer for birds, employing patterned glass, screens and sunshades, and Ornilux glass, a specialty glass product that uses a UV coating visible to birds but not humans.

By framing and showcasing views of the landscape, the building celebrates and connects students with the surrounding environment, while the overall development of the precinct repurposes an underutilized sector of campus.

Table of Contents

Executive Summary 4

Introduction....6
- Why Birds Matter....7
- The Legal Landscape....7
- Glass: The Invisible Threat....7
- Lighting: Exacerbating the Threat....8
- Birds and the Built Environment....8
- Impact of Collisions on Bird Populations....9
- Bird Collisions and Sustainable Architecture....9
- Defining What's Good For Birds....11

Problem: Glass....12
- Properties of Glass....13
- Reflection....13
- Transparency....13
- Black Hole or Passage Effect....13
- Factors Affecting Rates of Bird Collisions for a Particular Building....14
- Building Design....14
- Building Size....14
- Orientation and Siting....14
- Time of Day....16
- Green Roofs and Walls....16

Solutions: Glass....18
- Netting, Screens, Grilles, Shutters, Exterior Shades....19
- Awnings and Overhangs....20
- Angled Glass....20
- Patterns on Glass....20
- UV Patterned Glass....22
- Opaque and Translucent Glass....22
- Window Films....24
- Solutions Applied to Interior Glass....24
- Decals and Tape....24
- Temporary Solutions....26
- Remediation Case Study: Javits Center....27

Light: Problems and Solutions....28
- Solutions....30
- Lights Out Programs....31

Solutions: Policy....32
- Legislation....33
- Priorities for Policy Directives....34
- Sustainability Rating Programs....34
- Model Ordinance....35

The Science of Bird Collisions....36
- Magnitude of Collision Deaths....37
- Patterns of Mortality....38
- Species at Risk....38
- Characteristics of Buildings....39
- Amount of Glass....39
- Time of Day....40
- Local Landscape....40
- Avian Vision and Collisions....41
- Avian Orientation and the Earth's Magnetic Field....42
- Birds and Light Pollution....42
- Light Color and Avian Orientation....44
- Research: Deterring Collisions....45
- The 2 x 4 Rule....47

Evaluating Collision Problems....48
- —A Toolkit for Building Owners
- Solutions....49
- Seasonal Timing....50
- Weather....50
- Diurnal Timing....50
- Location....50
- Local Bird Populations....51
- Post-Mitigation Monitoring....51

References....52

Acknowledgments....57

Disclaimer....57

ABC's Bird-Friendly Building Standard....59



The area of glass on a façade is the strongest predictor of threat to birds. There are also other reasons to limit glass. Skidmore Owings Merril's Bronx, New York, Emergency Call Center is a handsome example of creative design with restricted glass, for a building intended to be both secure and blast-resistant. Photo by Chris Sheppard, ABC

For updates and new information, see **collisions.abcbirds.org**

Executive Summary



A bird, probably a dove, hit the window of an Indiana home hard enough to leave this ghostly image on the glass. Photo by David Fancher

Collision with glass claims the lives of hundreds of millions of birds each year in the United States. It is second only to domestic cats as a source of mortality linked directly to human action. Birds that have successfully flown thousands of miles on migration can die in seconds on a pane of glass; impacts kill fledglings before they can truly fly. Because glass is dangerous for strong, healthy, breeding adults, as well as sick or young birds, it can have a particularly serious impact on populations.

Bird kills occur at buildings across the United States and around the world. We know most about mortality patterns in cities, because that is where most monitoring takes place, but virtually any building with glass poses a threat wherever it is. The dead birds documented by monitoring programs or provided to museums constitute merely a fraction of the birds actually killed. The magnitude of this problem can be discouraging, but there are already effective solutions and an increasing commercial commitment to developing new solutions, if people can be convinced to adopt them.

That artificial lighting at night plays a significant part in mortality from glass is widely accepted, but often misunderstood. The majority of collisions with buildings take place during daylight. There are many well-documented instances of bright lights at night disorienting large numbers of birds—usually night-migrating passerines but also seabirds—some of which may circle in the light, sometimes until dawn. Nocturnal mortality associated with circulation events is caused by collision with guy wires and other structures. Such events were described starting in the late 19th century at lighthouses, and later at the Washington Monument, Statue of Liberty, and Empire State Building, which were the only brightly lit structures in their areas. Today, such events occur mostly at offshore drilling platforms and communication towers. These situations have in common bright light surrounded by darkness, and their frequency has decreased in cities as areas of darkness around bright structures have also become lit. However, there are strong indications that birds are still being disoriented by urban lights and that lights are linked to mortality, even though mortality patterns have changed.

Advances in glass technology and production since the mid-twentieth century have made it possible to construct skyscrapers with all-glass walls, homes with huge picture windows, and miles of transparent noise-barriers on highways. There has been a general increase in the amount of glass used in construction—and the amount of glass on a building is the best predictor of



Newhouse III, designed by Polshek Partnership Architects, is part of Syracuse University's S.I. Newhouse School of Public Communications. This building incorporates an undulating, fritted glass façade with the words of the first amendment etched in letters six feet high along the base. Photo by Christine Sheppard, ABC

the number of birds it will kill. However, while glass is important for bringing light into buildings, a façade with over 30-40% glass dramatically increases energy use for heating and cooling. Bird-friendly design is becoming recognized as part of sustainable design, required increasingly by legislation across North America.

New construction can incorporate from the beginning bird-friendly design strategies that are cost neutral. There are many ways to reduce mortality from existing buildings, with more solutions being developed all the time. Because the science is constantly evolving, and because we will always wish for more information than we have, the temptation is to postpone action in the hope that a panacea is just around the corner. But we can't wait to act. We have the tools and the strategies to make a difference now. Architects, designers, city planners, and legislators are key to solving this problem. They not only have access to the latest building construction materials and concepts; they are also thought leaders and trend setters in the way we build our communities and prioritize building design issues.



The steel mesh enveloping Zurich's Cocoon in Switzerland, designed by Camenzind Evolution, Ltd, provides privacy, reduces heating and cooling costs, and protects birds, but still permits occupants to see out. Photo by Anton Volgger

This publication aims to provide planners, architects, and designers, bird advocates, and local, municipal, and federal authorities, as well as the general public, with a clear understanding of the nature and magnitude of the threat glass poses to birds. Since the first edition, in 2011, there has been increased awareness of collisions, evidenced by new ordinances and guidelines for bird-friendly construction, new materials to retrofit existing buildings, and promotion by the glass industry of bird-friendly materials.

This edition includes an updated review of the underlying science, examples of solutions that can be applied to both new construction and existing buildings, and an explanation of what information is still needed. We hope it will spur individuals, businesses, communities, scientists, and governments to address this issue and make their buildings safer for birds. Constructing bird-friendly buildings and eliminating the worst existing threats require only imaginative design, effective retrofits, and recognition that birds have intrinsic and cultural as well as economic and ecological value to humanity.

American Bird Conservancy's Collisions Program works at the national level to reduce bird mortality by coordinating with organizations and governments, developing educational programs and tools, evaluating and developing solutions, creating centralized resources, and generating awareness.



The façade of Sauerbruch Hutton's Brandhorst Museum is a brilliant example of mixing glass and non-glass materials. Photo by Tony Brady

INTRODUCTION



Why Birds Matter

For many people, birds and nature have intrinsic worth. Birds have been important to humans throughout history, often symbolizing cultural values such as peace, freedom, and fidelity. In addition to the pleasure they can bring to people, we depend on them for critical ecological functions. Birds consume vast quantities of insects and control rodent populations, reducing damage to crops and forests and helping limit the transmission of diseases such as West Nile virus, dengue fever, and malaria. Birds play a vital role in regenerating habitats by pollinating plants and dispersing seeds. Birds are also a direct economic resource. According to the U.S. Fish and Wildlife Service, bird watching is one of the fastest growing leisure activities in North America, an over $40 billion industry accounting for many jobs.

The Legal Landscape

At the start of the 20th century, following the extinction of the Passenger Pigeon and the near extinction of other bird species due to unregulated hunting, laws were passed to protect bird populations. Among them was the Migratory Bird Treaty Act (MBTA), which made it illegal to kill a migratory bird without a permit. The scope of this law, which is still in effect today, extends beyond hunting, such that anyone causing the death of a migratory bird, even if unintentionally, can be prosecuted if that death is deemed to have been foreseeable. At present, the scope of the MBTA is under challenge in federal court and it is impossible to say whether it will ever be used to curb glass collisions. However, courts in Canada have ruled that building owners are responsible for mortality caused by glass.

Violations of the MBTA can result in fines of up to $500 per incident and up to six months in prison. The Bald and Golden Eagle Protection Act (originally the Bald Eagle Protection Act of 1940), the Endangered Species Act (1973), and the Wild Bird Conservation Act (1992) provide further protections for birds that may apply to building collisions. Recent legislation, primarily at the city and state levels, has addressed the problem of mortality from building collisions and light pollution. Starting with Toronto, Canada, in 2009 and San Francisco, California, in 2010 an increasing number of states and municipalities have passed laws mandating bird-friendly design, while other authorities have passed voluntary measures.

Glass: The Invisible Threat

Glass is invisible to both birds and humans. Humans learn to see glass through a combination of experience and visual cues like mullions and even dirt, but birds are unable to use these signals. Most birds' first encounters with glass are fatal when they collide with it at full flight speed. Aspects of bird vision contribute to the problem. Whereas humans have eyes in the front of their heads and good depth perception, most birds' eyes are placed at the sides of their heads. Birds thus have little depth perception beyond the range of their bills but extensive fields of view to the side and behind. They judge their flight speed by the passing of objects to their sides, so their focus in flight is not necessarily ahead. Besides simply using designs with less glass, we can protect birds by using screens, shutters, and details that partly obscure glass while still providing a view, or by using two-dimensional patterns that birds perceive as actual barriers. However, birds have poor contrast sensitivity compared to humans: shapes at a distance merge into a blur at closer range for birds. This means that most signals that make glass safe for birds will probably be readily visible to people.



Reflections on home windows are a significant source of bird mortality. The partially opened vertical blinds here may break up the reflection enough to reduce the hazard to birds. Photo by Christine Sheppard, ABC



Birds may try to reach vegetation seen through two or more glass walls or windows; the single decal here is not enough to solve the problem, but two or three could do the trick. Photo by Christine Sheppard, ABC

(Opposite) The White-throated Sparrow is the most frequent victim of collisions reported by urban monitoring programs. Photo by Robert Royse

Lighting: Exacerbating the Threat

Most birds, with obvious exceptions, are active by day, with eyes best adapted for daylight sight. However, many bird species migrate by night, allowing them to use daylight hours for feeding. We still don't know everything about how night-flying birds navigate. We do know that birds probably have two special senses that allow them to determine location and direction using the Earth's magnetic field. One of these, located in the eye, may allow birds to "see" magnetic lines in the presence of dim blue light. Star maps, landmarks, and other mechanisms are also involved.

Artificial night lighting seemingly disrupts orientation mechanisms evolved to work with dimmer, natural light sources and can cause birds to deviate from their flight paths. The problem is compounded for birds flying in mist or cloud, which can cause them to fly lower and closer to artificial light sources, depriving them of celestial and magnetic cues. As birds fly near light sources, they may become disoriented and eventually land in the built environment.



Light at night can disorient birds, and the problem is not restricted to tall buildings. This scene of Las Vegas by night depicts a threat to any bird migrating nearby at night. Photo by BrendelSignature, Wikipedia

The majority of collisions with buildings actually take place by day. As birds seek food to fuel their next migratory flight, they face a maze of structures, and many, unable to distinguish between habitat and reflections, hit glass. The amount of light emitted by a building is a strong predictor of the number of collisions it will cause, more so than building height. Patterns of light intensity across a nocturnal landscape may influence the pattern of birds landing in that landscape at the end of migration stages. Thus, reducing light trespass from all levels of buildings and their surroundings is an important part of a strategy to reduce collisions with glass. There is some recent evidence that electromagnetic radiation outside the visible spectrum may also disorient birds.

Birds and the Built Environment

Humans first began using glass in Egypt around 3500 BCE. Glass blowing, invented by the Romans in the early first century CE, greatly increased the ways glass could be used, including the first crude glass windows. The 17th century saw the development of the float process, enabling production of large sheets of glass. This technology became more sophisticated, eventually making glass windows available on a large scale by the 1960s. In the 1980s, development of new production and construction technologies culminated in today's glass skyscrapers and increasing use of glass in all types of construction.

Sprawling land-use patterns and intensified urbanization degrade the quality and quantity of bird habitat across

the globe. Cities and towns encroach on riverbanks and shorelines. Suburbs, farms, and recreation areas increasingly infringe upon wetlands and woodlands. Some bird species simply abandon disturbed habitat. For resident species that can tolerate disturbance, glass is a constant threat, as these birds are seldom far from human structures. Migrating birds are often forced to land in trees lining our sidewalks, city parks, waterfront business districts, and other urban green patches that have replaced their traditional stopover sites.

The amount of glass in a building is the strongest predictor of how dangerous it is to birds. However, even small areas of glass can be lethal. While bird kills at homes are estimated at one to 10 birds per home per year, the large number of homes multiplies that loss to millions of birds per year in the United States, representing over 46% of the total problem. Other factors can increase or decrease a building's impact, including the density and species composition of local bird populations; local geography; the type, location, and extent of landscaping and nearby habitat; prevailing wind and weather; and patterns of migration through the area. All must be considered when planning bird-friendly buildings.

Impact of Collisions on Bird Populations

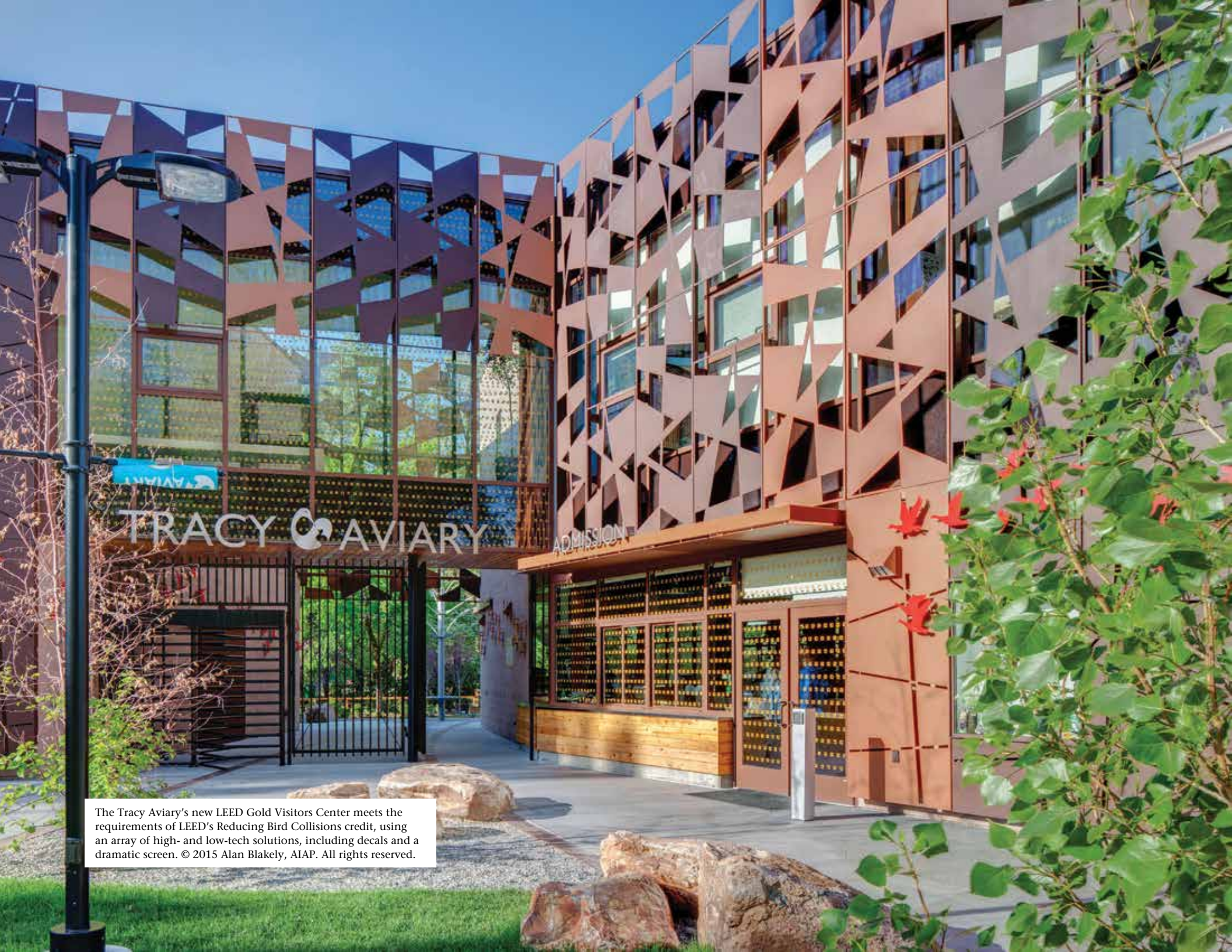
About 25% of species are now on the U.S. Watch List of birds of conservation concern (abcbirds.org/birds/watchlist/), and even many common species are in decline. Habitat destruction or alteration of both breeding and wintering grounds remains the most serious man-made problem, but collisions with buildings are second only to domestic cats as direct fatality threats. Nearly one-third of the bird species found in the United States—more than 258 species, from hummingbirds to falcons—are documented as victims of collisions. Unlike natural hazards that predominantly kill weaker individuals, collisions kill all categories of birds, including some of the strongest, healthiest birds that would otherwise survive to produce offspring. Without action, the cumulative effect of these deaths will result in significant population declines. Most of the mortality is avoidable. This document is one piece of a strategy to keep building collisions from increasing and, ultimately, to reduce them.

Bird Collisions and Sustainable Architecture

In recent decades, advances in glass technology and production have made it possible to construct tall buildings with all-glass walls, and we have seen a general increase in the amount of glass used in all types of construction. This is manifest in an increase in picture windows in private homes, glass balconies and railings, bus shelters, and gazebos. New applications for glass are being developed all the time. Unfortunately, as the amount of glass increases, so does the incidence of bird collisions.



The Cape May campus of Atlantic Cape Community College inherited a building with large areas of glass that did not have coatings or film to control temperature and glare—and there were many collisions. The addition of Collidescape has eliminated the threat to birds while reducing heating and cooling costs. Photo by Lisa Apel-Gendron



The Tracy Aviary's new LEED Gold Visitors Center meets the requirements of LEED's Reducing Bird Collisions credit, using an array of high- and low-tech solutions, including decals and a dramatic screen. © 2015 Alan Blakely, AIAP. All rights reserved.

In recent decades, growing concern for the environment has stimulated the creation of "green" standards and rating systems for development. The best known is the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design, or LEED. While the USGBC concurred that sustainable buildings should not kill birds, it was initially difficult to create recommendations within the LEED credit system. The solution was based on a technique called "tunnel testing," a non-lethal method using live birds that permits a relative threat score to be assigned to patterned glass and other materials. (The section on Research in Chapter 6 reviews the work underlying the assignment of threat scores.)

On October 14, 2011, USGBC added Pilot Credit 55: Bird Collision Deterrence to its Pilot Credit Library. The credit was drafted by American Bird Conservancy (ABC), members of the Bird-Safe Glass Foundation, and the USGBC Site Subcommittee. Building developers that wish to earn this credit must quantify the threat level to birds posed by various materials and design details. These threat factors are used to calculate an index, or weighted average, representing the building's façade; that index must be below a standard value to earn the credit. The index is intended to provide wide latitude in creating designs that meet the criteria. The credit also requires adopting interior and exterior lighting plans and post-construction monitoring.

Pilot Credit 55 has been the most widely used credit in the pilot library. A revised version of the credit, posted in the fall of 2015, expands its availability to all LEED rating systems except "neighborhoods."

ABC is a registered provider of the American Institute of Architects (AIA) Continuing Education System, offering classes on bird-friendly design and LEED Pilot Credit 55 in face-to-face and webinar formats. Contact Christine Sheppard, csheppard@abcbirds.org, for more information.

Defining What's Good for Birds

It is increasingly common to see the term "bird-friendly" used in a variety of situations to demonstrate that a particular product, building, legislation, etc., is not harmful to birds. All too often, however, this term is unaccompanied by a clear definition and lacks a sound scientific foundation to underpin its use. Ultimately, defining "bird-friendly" is a subjective task. Is bird-friendliness a continuum, and if so, where does friendly become unfriendly? Is "bird-friendly" the same as "bird-safe?" How does the definition change from use to use, situation to situation? It is impossible to know exactly how many birds a particular building will kill before it is built, and so, realistically, we cannot declare a building to be bird-friendly before it has been carefully monitored for several years.

There are factors that can help us predict whether a building will be particularly harmful to birds or generally benign, and we can accordingly define simple "bird-friendly building standards" that, if followed, significantly reduce potential hazard to birds. That said, a 75% reduction of mortality at a structure that kills 400 birds a year means that structure will still kill 100 birds a year. Because window kills affect reproductively active adult birds, the cumulative effect of saving some birds is amplified by their reproductive output. Because a 100% reduction in mortality may be difficult to achieve, ABC takes the position that it is better to take reasonable available actions immediately than to put off taking action until a perfect solution is possible or to take no action at all.



Hariri Pontarini Architects with Robbie/Young + Wright Architects used botanical imagery in 3M laminates to depict the plants that produce many of the compounds used by students at the University of Waterloo School of Pharmacy, Canada. Photo by Christine Sheppard, ABC

Problem: Glass



The glass in this Washington, D.C., atrium poses a double hazard, drawing birds to plants inside as well as reflecting sky above. Photo by Christine Sheppard, ABC

Properties of Glass

Glass, as a structural material, can range in appearance from transparent to mirrored to opaque. Its surface can completely reflect light or let virtually 100% of light pass through. A particular piece of glass will change appearance depending on environmental factors, including position relative to the sun, the difference between exterior and interior light levels, what may be reflected, and the angle at which it is viewed. Combinations of these factors can cause glass to look like a mirror or a dark passageway, or be completely invisible. Humans do not actually "see" clear glass, but are cued by context such as mullions, dirt, or window frames. Birds, however, do not perceive right angles and other architectural signals as indicators of obstacles or artificial environments: they take what they see literally. While local birds may become familiar with individual pieces of glass, they do not ever grasp the concept "glass."



The glass-walled towers of the Time Warner Center in New York City appear to birds as just another piece of the sky. Photo by Christine Sheppard, ABC

Reflection

Under the right conditions, even transparent glass on buildings can form a mirror, reflecting sky, clouds, or nearby habitat attractive to birds. When birds try to fly to the reflected habitat, they hit the glass. Reflected vegetation is the most dangerous, but birds also attempt to fly past reflected buildings or through reflected passageways, with fatal results.

Transparency

Birds strike transparent windows as they attempt to access potential perches, plants, food or water sources, or other lures seen through the glass, whether inside or outside. Large planted atria are frequent problems, as are glass balcony railings and "skywalks" joining buildings. The increasing trend toward glass used in landscapes, as walls around roof gardens, as handrails or walkway dividers and even gazebos is dangerous because birds perceive an unobstructed route through them to habitat beyond.

Black Hole or Passage Effect

Birds often fly through small gaps, such as spaces between leaves or branches, into nest cavities, or through other small openings that they encounter. In some light, the space behind glass can appear black, creating the appearance of just such a cavity or "passage" with unobstructed access through which birds try to fly.



Transparent handrails are a dangerous trend for birds, especially when they front vegetation. Photo by Christine Sheppard, ABC



Large facing panes of glass can appear to be a clear pathway. Photo by Christine Sheppard, ABC



The same glass can appear transparent or highly reflective, depending on weather or time of day.



Photos by Christine Sheppard, ABC

Factors Affecting Rates of Bird Collisions for a Particular Building

Every site and every building can be characterized as a unique combination of risk factors for collisions. Some of these, particularly aspects of a building's design, are very building-specific. Many problem design features can be readily improved, or, in new construction, avoided. Others of these—for example, a building's location relative to migration stopover sites, regional ecology, and geography—are difficult if not impossible to modify.

Building Design

People like glass and it has become a popular building material. All-glass buildings have become more and more common as glass has become a low-cost material for construction. Glass causes virtually all bird collisions with buildings. Studies based on monitoring data have shown a direct relationship between the amount of glass on a building and the number of collisions at that site—the more glass, the more bird deaths.

Mirrored glass is often used intentionally to make a building "blend" into a vegetated area by reflecting its surroundings, making those buildings especially deadly to birds. However, all-glass buildings are coming increasingly into question. According to groups like the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the International Code Council, when there is more than 30-40% glass on a façade, heating and cooling costs begin to increase.

Building Size

Glass skyscrapers, because of their height and visibility, are often the main focus of collision documentation, and they do account for more collisions per building than smaller structures. However, because there are many more homes and low-rise buildings, the latter account for more total mortality. A study published by scientists at the Smithsonian in 2014 estimated 508,000 annual bird deaths for high-rises, 339 million for low-rises, and 253 million for homes. More collisions probably occur at glass on lower floors, where most bird activity takes place, but when monitors have had access to setbacks and roofs, they have consistently found at least some carcasses, indicating that glass at any level can be a threat.

Orientation and Siting

Because migrating birds are frequent collision victims, it is often assumed that more collisions will occur on north- and south-facing façades. However, most building collisions take place during the day, and building orientation in relation to compass direction has not been implicated as a factor. Siting of buildings with respect to surrounding habitat and landscaping has more



Birds flying from a meadow on the left are channeled toward the glass doors of this building by a rocky outcrop to the right of the path. Photo by Christine Sheppard, ABC



Mirrored glass is dangerous at all times of day, whether it reflects vegetation, sky, or simply open space through which a bird might try to fly. Photo by Christine Sheppard, ABC



Plantings on setbacks and rooftops can attract birds to glass they might otherwise avoid. Chris Sheppard, ABC

implications. Physical features like walkways that provide an open flight path through vegetated landscape, or obstacles like outcrops of rock or berms, can channel birds toward or away from glass and should be considered early in the design phase. Movement patterns of birds within surrounding habitat may cause unanticipated collisions. Birds often fly between landscape features, for example, between two stands of trees, and may be at risk from structures along their route.

Glass that reflects shrubs and trees causes more collisions than glass that reflects pavement or grass. Studies that measured vegetation within only 15 to 50 feet of a façade have led to the misconception that plantings beyond a certain distance don't influence collisions, but vegetation at much greater distances can easily be visible in reflections. Vegetation around buildings will bring more birds into the vicinity of the building; the reflection of that vegetation brings more birds into the glass. Taller trees and shrubs correlate with more collisions. It should be kept in mind that vegetation on slopes near a building will reflect in windows above ground level. Studies using bird feeders (Klem *et al*. 1991) have shown that fatal collisions result when birds fly toward glass from more than a few feet away.

Time of Day

Collisions tend to happen most when birds are most active. Many studies have documented that although collisions peak during the early morning, they can happen at almost any time of day. Most monitoring programs have focused on early morning before cleaning crews have swept sidewalks because of the increased likelihood of finding birds and because it is easier to obtain volunteer searchers in the pre-work hours.

Green Roofs and Walls

Green roofs bring elements attractive to birds to higher levels, but often they are built in close proximity to glass. However, recent work shows that well-designed green roofs can become functional ecosystems, providing food and even nest sites for birds. Siting of green roofs, as well as green walls and rooftop gardens, should therefore be carefully considered, and glass adjacent to these features should have protection for birds.



Green roofs and walls can provide food and other resources to birds, but they can also attract birds to glass that they might not otherwise encounter. Emilio Ambasz's ACROS building in Fukuoka, Japan, is an interesting example. Photo by Kenta Mobuchi



This atrium has more plants than anywhere nearby on surrounding streets, making the glass deadly for birds seeking food or shelter in this area. Photo by Christine Sheppard, ABC

Solutions: Glass



It is possible to design buildings that can reasonably be expected to kill few or no birds. Numerous examples already exist, not necessarily designed with birds in mind but simply to be functional and attractive. These buildings may have many windows, but their screens, latticework, louvers, and other devices outside, or patterns integrated into the glass, warn birds before they collide. Finding glass treatments that can eliminate or greatly reduce bird mortality, while minimally obscuring the glass itself, has been the goal of several researchers, including Martin Rössler, Daniel Klem, and Christine Sheppard. Their work, discussed in more detail in the Science chapter, has focused primarily on the spacing, length, width, opacity, color, and orientation of elements marked on glass, and has shown that patterns covering as little as 5% of the total glass surface can deter most strikes under experimental conditions. They have shown that as a general rule, most songbirds will not attempt to fly through horizontal spaces less than 2 inches high or through vertical spaces 4 inches wide or less. We refer to this as the 2 x 4 rule, and it is clearly related to the size and shape of birds in flight. (See chart on page 47).

Designing a new structure to be bird-friendly does not require restricting the imagination or adding to the cost of construction. Architects around the globe have created fascinating and important structures that incorporate little or no dangerous glass. In some cases, inspiration has been borne out of functional needs, such as shading in hot climates; in others, from aesthetics. Being bird-friendly usually has been incidental. Now, however, buildings are being designed with birds in mind, and materials designed for this purpose are multiplying. Until recently, retrofitting existing buildings has been more difficult and costly than it is today. However, new materials are appearing and costs can be controlled by targeting problem areas rather than entire buildings.

Bird-friendly materials and design features often overlap in function with materials to control heat and light, security measures, and decorative design details. Bird-friendly building-design strategies also fall into three general categories, although all three could be combined in a single structure. These are:

1. Using minimal glass (Bronx Call Center, U.S. Mission to the United Nations)
2. Placing glass behind some type of screening (de Young Museum, Cooper Union)
3. Using glass with inherent properties that reduce collisions (Brooklyn Botanic Garden Visitors Center; Student Center at Ryerson University, Toronto; and Cathedral of Christ the Light)

Netting, Screens, Grilles, Shutters, Exterior Shades

There are many ways to combine the benefits of glass with bird-friendly design by incorporating elements that preclude collisions while providing light and views. Some architects have designed decorative façades that wrap entire structures. Decorative grilles are also part of many architectural traditions. Exterior, motorized solar screens and shades are effective at controlling heat and light, increase security, and can be adjusted to maximize view or bird and sun protection at different times. Netting, grilles, and shutters are common elements that can make glass safe for birds on buildings of any scale. They can be used in retrofit or be an integral part of an original design and can significantly reduce bird mortality.



The Brooklyn Botanic Garden's Visitors Center, designed by Weiss/Manfredi, was intended to be bird-friendly from its inception—a challenge, as it makes extensive use of glass. Photo @ Alber Vecerka, ESTO



Glass walls and doors at the Brooklyn Botanic Garden's Visitors Center include a custom fritting pattern that meets bird-friendly criteria. Monitoring for collisions after the building opened indicates that the design was successful. Photo by Christine Sheppard, ABC

(Opposite) The external glass screen on the GSA Regional Field Office in Houston, Texas, designed by Page Southerland Page, helps control heat but also reduces the likelihood of collisions. Photo by Timothy Hursley



Overhangs block viewing of glass from some angles, but do not necessarily eliminate reflections. Photo by Christine Sheppard, ABC



Reflections in this angled façade can be seen clearly over a long distance, and birds can approach the glass from any angle. Photo by Christine Sheppard, ABC

Before the current age of unopenable windows, screens protected birds in addition to serving their primary purpose of keeping bugs out. Screens are still among the most cost-effective methods for protecting birds, and, if insects are not an issue, nearly invisible netting can often be installed. Screens and netting should be installed at some remove from the window so that the impact of a strike does not carry birds into the glass. Several companies sell screens that can be attached with suction cups or eye hooks for small areas of glass. Others specialize in much larger installations. (Find sources at collisions.abcbirds.org).

Awnings and Overhangs

Overhangs have been frequently recommended to reduce collisions. However, there are many situations in which overhangs do not eliminate reflections and only block glass from the view of birds flying above. They are thus of limited effectiveness as a general strategy. Overhangs work best when glass is shadowed from all sides. Functional elements such as balconies and balustrades can block the view of glass, protecting birds while providing an amenity for residents.

Angled Glass

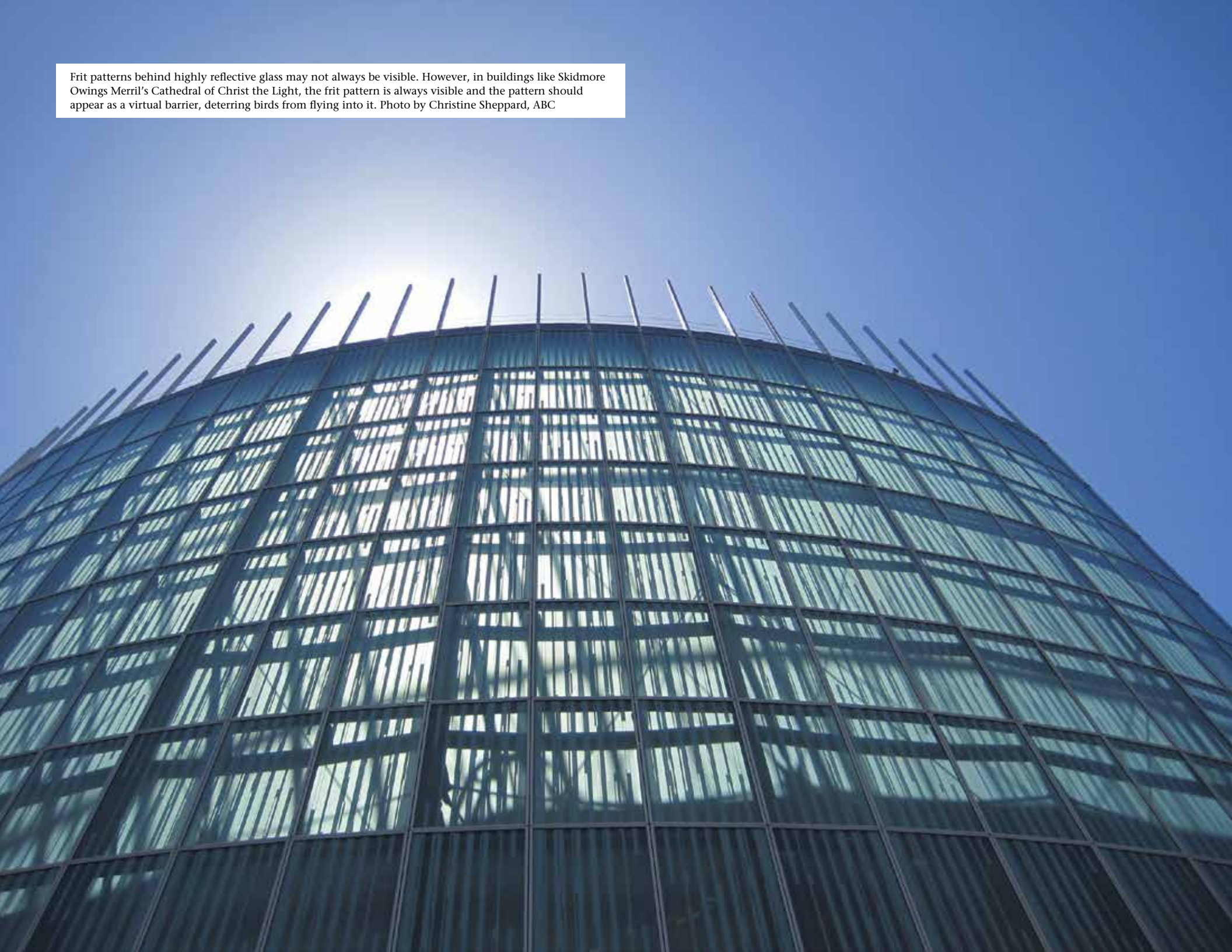
In a study (Klem et al., 2004) comparing bird collisions with vertical panes of glass to those tilted 20 or 40 degrees, the angled glass resulted in less mortality. Klem speculated that this was because the glass reflected the ground, not vegetation. Using angled glass has become a common recommendation as a bird-friendly feature. However, while angled glass may be useful in special circumstances, the birds in the study were flying parallel to the ground from nearby feeders, hitting the glass at acute angles, with less force than a perpendicular strike. In most situations, however, birds may approach glass from any angle.

Patterns on Glass

Ceramic dots, other types of "frits," and other materials can be screened, printed, or otherwise applied to glass surfaces. This is often done to reduce the transmission of light and heat and can also provide design detail. In some cases, frit patterns are hardly visible, but when designed according to the 2 x 4 rule (see p. 47), patterns on glass can also prevent bird strikes. Patterns on the outside surface of glass deter collisions most effectively because they are always visible, even with strong reflections. This type of design, useful primarily for new construction, is currently more common in Europe and



A custom frit pattern was designed by Ennead Architects for Vassar College's Bridge for Laboratory Sciences building. Elements of the pattern occur on two separate surfaces, increasing visibility to birds in flight, who will see a constantly changing pattern that may appear to move. Photo by Christine Sheppard, ABC



Frit patterns behind highly reflective glass may not always be visible. However, in buildings like Skidmore Owings Merril's Cathedral of Christ the Light, the frit pattern is always visible and the pattern should appear as a virtual barrier, deterring birds from flying into it. Photo by Christine Sheppard, ABC



While some internal fritted glass patterns can be overcome by reflections, Frank Gehry's IAC headquarters in Manhattan is so dense that the glass appears opaque. Photo by Christine Sheppard, ABC



Ornilux Mikado's pattern reflects UV wavelengths. The spiderweb effect is visible only from very limited viewing angles. Photo courtesy of Arnold Glass

Asia, but is being offered by an increasing number of manufacturers in the United States. New technologies allowing printing of ceramic inks on the outside surface of glass may greatly increase options for bird-friendly design in the U.S.

More commonly, frit is applied to an internal surface of insulated glass units. This type of design may not be visible if the amount of light reflected by the frit is insufficient to overcome reflections on the outside surface of the glass or if frit is applied as dots below the visual threshold of birds. Some internal frits may only help break up reflections when viewed from some angles and in certain light conditions. However, with the right combination of surface reflectivity and frit application, a pattern on an inside surface can still be effective. The headquarters of the internet company IAC in New York City, designed by Frank Gehry, is composed entirely of fritted glass, most of high density and always visible. No collision mortalities have been reported at this building after two years of monitoring by New York City Audubon. FXFOWLE's Jacob Javits Center, also in Manhattan, reduced collisions by as much as 90% with a renovation that eliminated some dangerous glass and replaced other glass with a visible frit pattern. Another example of a visible internal frit pattern is seen in Skidmore Owings Merril's Cathedral of Christ the Light in Oakland, California.

UV Patterned Glass

Songbirds, gulls, parrots, and other birds can see into the ultraviolet (UV) spectrum of light, a range largely invisible to humans (see page 41). Other bird types, including raptors, kingfishers, hummingbirds, and pigeons, are less sensitive to UV. Ultraviolet reflective and/or absorbing patterns "invisible to humans but visible to birds" are frequently suggested as the optimal solution for many bird collision problems, but few such products are available commercially as of 2015. Progress in development of bird-friendly UV glass has been slow, but with legislation in multiple locations mandating bird-friendly design, glass manufacturers and distributors, as well as window-film manufacturers, are taking an active role in developing new solutions for this application. Research indicates that UV patterns need strong contrast to be effective, especially in the early morning and late afternoon, when UV in sunlight is at low levels. However, UV patterns may be ineffective for many species that have been reported as victims of collisions with glass, including hummingbirds, flycatchers, American Woodcock, and woodpeckers.

Opaque and Translucent Glass

Opaque, etched, stained, or frosted glass and glass block are excellent options to reduce or eliminate collisions, and many attractive architectural applications exist. They can be used in retrofits but are more commonly used in new construction. Frosted glass is created by acid etching or sandblasting transparent glass. Frosted areas are translucent, but various finishes are available with differing levels of light transmission. An entire surface can be frosted, or frosted patterns can be applied. Patterns should conform to the 2 x 4 rule described on page 47. For retrofits, glass also can be frosted by sandblasting on site. Stained glass is typically seen in relatively small areas but can be extremely attractive and is not conducive to collisions. Glass block is versatile, can be used as a design detail or primary construction material, and is also unlikely to cause collisions. Another promising material is photovoltaic glass, which has been used in stained-glass windows and highway noise barriers. This solution is especially interesting, because



The Wexford Science and Technology Building in Philadelphia, designed by Zimmer, Gunsul, Frasca, uses translucent glass to provide light without glare, making it safe for birds. Photo courtesy of Walker Glass

transparent highway noise barriers can cause collisions, and such barriers are beginning to be installed in the United States.

Window Films

Most patterned window films were initially intended for use inside structures as design elements or for privacy. Now, outside surface applications intended to reduce bird collisions are coming onto the market, and some have proved highly effective and popular. The oldest such product creates an opaque white surface on the outside of glass that still permits viewing from the inside. Patterns can be printed on this material, although images of trees and other habitat are not recommended.

A film with a pattern of narrow, horizontal stripes has eliminated collisions at the Philadelphia Zoo Bear Country exhibit for over five years (see photo opposite) and has been similarly successful in other installations when applied to outside surfaces of glass. In these cases, the response has been positive. Another option is to apply vinyl patterns like window film but with the transparent backing removed.



A Zen Wind Curtain is an inexpensive but extremely effective way to deter collisions. Lengths of parachute cord or similar materials are strung vertically, every four inches, in front of problem glass, creating both a visual and a physical barrier. Photo by Glenn Phillips, ABC

Solutions Applied to Interior Glass

Light colored shades have been recommended as a way to deter collisions. However, when visible, they do not effectively reduce reflections, and reflections may make them completely invisible. Closed blinds have the same problems, but if visible and partly open, they can produce the appearance of a 2 x 4 pattern. If an exterior solution is not possible and tape or sticky notes are applied to the inside of windows, be sure to check the windows several times a day to ensure that these materials are visible.

Decals and Tape

Decals are probably the most familiar solution to bird collisions, but their effectiveness is widely misunderstood. Birds do not recognize decals as



This window at the Philadelphia Zoo Bear Country exhibit was the site of frequent bird collisions until window film was applied. Collisions have been eliminated for over five years, with no complaints from visitors about visibility of bears! Photo courtesy of the Philadelphia Zoo

ABC BirdTape



ABC, with support from the Rusinow Family Foundation, has produced ABC BirdTape to make home windows safer for birds. This easy-to-apply tape lets birds see glass while letting you see out, is easily applied, and lasts up to four years. For more information, visit abcbirdtape.org



Photos by Dariusz Zdziebkowski, ABC

silhouettes of falcons, spiderwebs, or other natural objects, but simply as obstacles that they may try to fly around. Decals can be very effective if applied following the 2 x 4 rule on the outside of glass, but in general, they must be replaced frequently, at least annually. Tape is generally more cost effective and quicker to apply, but most household tapes don't stand up well to the elements. Tape intended to last for several years on the outside of windows has become commercially available and is effective when applied following the 2 x 4 guide.





The Consilium Towers, a mirror-glass complex in Toronto, once killed thousands of birds each year. After being taken to court, its owners retrofitted the lower 60 feet of glass with a Feather Friendly dot pattern that has greatly reduced bird mortality.

Reflected in this glass is Michael Mesure, the founder of Toronto's Fatal Light Awareness Program. Photos by Christine Sheppard, ABC

Temporary Solutions

In some circumstances, especially for homes and small buildings, quick, low-cost, temporary solutions, such as making patterns on glass with paint, stickers, or even post-its, can be very effective in the short term. Even a modest effort can reduce collisions. Such measures can be applied when needed and are most effective following the 2 x 4 rule. (For more information, see ABC's flyer "You Can Save Birds from Flying into Windows" and other sources at collisions.abcbirds.org).

ABC BirdTape was effective at the Forest Beach Migratory Reserve in Wisconsin (left), and also performed well in tunnel tests conducted in Austria. Photo by Christine Sheppard, ABC

REMEDIATION CASE STUDY: Javits Center

In 2009, the New York City Audubon Society identified the Jacob K. Javits Convention Center as having one of the highest bird-collision mortality rates in New York City.

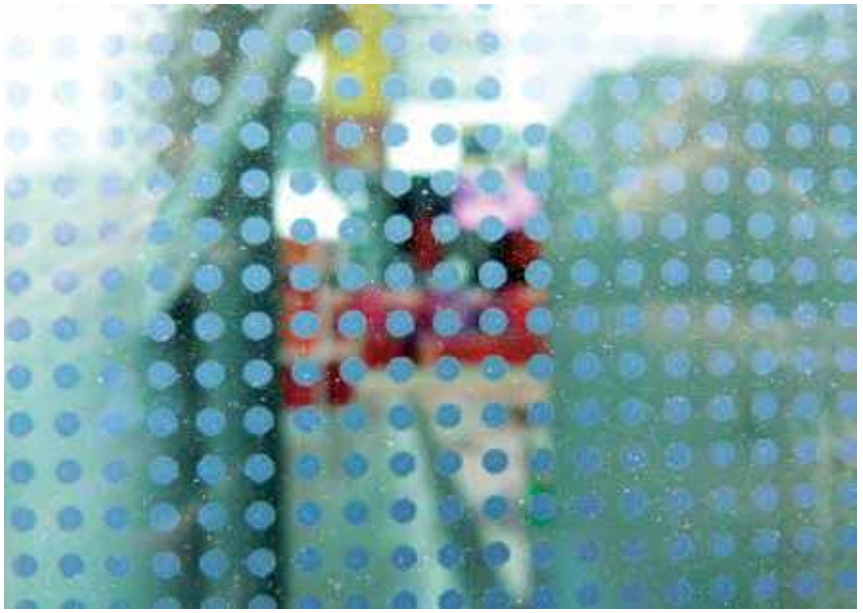
A major renovation and expansion, designed by the bird-friendly architectural firm of FXFOWLE, was completed in 2014. Some especially deadly glass at street level was replaced with opaque panels. Large panes of clear fritted glass with varying surface characteristics were brought to the site and compared to find the right combination for birds and people.

A 6.75-acre green roof, with adjacent translucent glass, crowns the building and is already providing resources for birds.

Best of all, collisions at the now much larger site have been reduced by 90%.



From a distance, the Javits Center looks like a potential threat to birds.



At close range, a visible pattern of frit dots breaks up reflections, making the glass safe for birds.
Photos by Glenn Phillips, ABC

Light: Problems and Solutions



Fixtures such as these reduce light pollution, saving energy and money and reducing negative impacts on birds. Photo by Dariusz Zdziebkowski, ABC

Birds evolved complex complementary systems for orientation and vision long before humans developed artificial light. We still have much more to learn, but recent science has begun to clarify how artificial light poses a threat to birds, especially nocturnal migrants. Although most glass collisions take place during daylight hours, artificial lighting at night plays a role in the number and distribution of collisions across the built environment. Unfortunately, the details of how birds respond to night lighting are less well understood than has been commonly believed.

Many collision victims, especially songbirds, are ordinarily active by day and have eyes specialized for color vision and bright light. But although they migrate at night, these birds have poor night vision. Instead, they have magnetic senses that allow them to navigate using the Earth's magnetic field. One of these is located in the retina and requires dim blue natural light to function. Red wavelengths found in most artificial light have been shown to disrupt that magnetic sense. Studies in Germany and Russia have documented birds flying through beams of light and diverting from their course anywhere from a few degrees to a full circle. Areas with significant light pollution may be completely disorienting to birds.

Birds are attracted to relative brightness, and by day often orient toward the sun. If a songbird flies into a home, darkening the room and opening a bright window is the best way to release it. Birds are thought to be attracted to artificial light at night, but we don't know what light level at what distance is sufficient to cause attraction or other behavioral impacts. Gauthreaux and Belser, discussing impacts of night lighting on birds, speculated that in fact, birds affected by night lighting may simply be on course to pass over the lights, not necessarily attracted from a distance. Marquenie and Van de Laar, studying birds and lights on a drilling rig in the North Sea, estimated that when all the lights on the platform were lit, they affected birds up to 3 to 5 kilometers away, causing many to circle the platform.

The science is inconclusive: Lights may only impact birds as they end a migratory stage and come down close to the built environment, or lights may divert birds that would ordinarily pass by. Bad weather can cause birds to fly lower and closer to lights, while also eliminating any visual cues. The interactions that produce correlations between building light emissions and collisions may take place at relatively close range. Once birds come close to a light source, the electromagnetic radiation actively interferes with their magnetic orientation mechanism.



Overly lit buildings waste electricity and increase greenhouse gas emissions and air pollution levels. They also pose a threat to birds. Photo by Matthew Haines



Houston skyline at night. Photo by Jeff Woodman

Examples of Acceptable/Unacceptable Lighting Fixtures



Reprinted courtesy of DarkSkySociety.org

Some combination of attraction and disorientation may result in larger numbers of birds in the vicinity of brighter buildings and thus, by day, in more collisions. Interestingly, there seem to be no reports of lights attracting or disorienting migrants as they take off on a new migratory stage.

There has been a tendency to associate collision events with very tall structures, though published reports clearly document impact from light at all levels. Early reports of this phenomenon came from lighthouses. Contemporary reports of light-associated circling events are common at oceanic drilling rigs, and disoriented birds have been reported at night skiing sites. A study in Toronto, using the number of lighted windows on a series of buildings as an index of emitted light, found that the amount of light emitted, not the height of the building, was the best predictor of bird mortality.

Solutions

Poorly designed or improperly installed outdoor fixtures add over $1 billion to electrical costs in the United States every year, according to the International Dark Skies Association. Recent studies estimate that over two-thirds of the world's population can no longer see the Milky Way, just one of the nighttime wonders that connect people with nature. Glare from poorly shielded outdoor light fixtures decreases visibility and can create dangerous conditions, especially for older people, and recent studies suggest that long-term exposure to night lighting can increase the risk of breast cancer, depression, diabetes, obesity, and sleep disorders. Together, the ecological, financial, and cultural impacts of excessive building lighting are compelling reasons to reduce and refine light usage.

Reducing exterior building and site lighting has proven effective at reducing mortality of night migrants at

individual buildings, but achieving overall reduction in collisions will require applying those principles on a wider scale. At the same time, these measures reduce building energy costs and decrease air and light pollution. Efficient design of lighting systems plus operational strategies to reduce light trespass or "spill light" from buildings while maximizing useful light are both important strategies. In addition, an increasing body of evidence shows that red light and white light (which contains red wavelengths) particularly confuse birds, while green and blue light may have far less impact.

Light pollution is largely a result of inefficient exterior lighting, and improving lighting design usually produces savings greater than the cost of changes. For example, globe fixtures permit little control of light, which shines in all directions, resulting in a loss of as much as 50% of energy, as well as poor illumination. Cut-off shields can reduce lighting loss and permit use of lower powered bulbs. Most "vanity lighting" is unnecessary. However, when it is used, down-lighting causes less trespass than up-lighting. Where light is needed for safety and security, reducing the amount of light trespass outside of the needed areas can help by eliminating shadows. Spotlights and searchlights should not be used during bird migration. Communities that have implemented programs to reduce light pollution have not found an increase in crime.

Using automatic controls, including timers, photosensors, and infrared and motion detectors, is far more effective than relying on employees turning off lights. These devices generally pay for themselves in energy savings in less than a year. Workspace lighting should be installed where needed, rather than in large areas. In areas where indoor lights will be on at night, minimize perimeter lighting and/or draw shades after dark.

Switching to daytime cleaning of office buildings is a simple way to reduce lighting while also reducing costs.

Lights Out Programs

Despite the complexity of reducing bird collisions with glass, there is one simple way to decrease mortality: turn lights off. Across the United States and Canada, "Lights Out" programs at the municipal and state levels encourage building owners and occupants to turn out lights visible from outside during spring and fall migration. The first of these, Lights Out Chicago, was started in 1995, followed by Toronto in 1997. The programs themselves are diverse. Some are directed by environmental groups, others by government departments, and still others by partnerships of organizations. Participation in most, such as Houston's, is voluntary. Minnesota mandates turning off lights in state-owned and leased buildings.



Powerful beams of light, even in a landscape of urban light pollution, can entrap migrating birds, seen here circling in the beams of the 9/11 Memorial Tribute in Light in New York City. Because birds may circle for hours, monitors watch all night, and the light beams are temporarily turned off to release large accumulations of birds. Photo by Jason Napolitano

Many jurisdictions have monitoring components. Monitoring programs can provide important information in addition to quantifying collision levels and documenting solutions. Ideally, lights-out programs would be in effect year-round and be applied widely, saving birds and energy costs and reducing emissions of greenhouse gases. ABC stands ready to help develop new programs and to support and expand existing programs.

Solutions: Policy



Legislation

Changing human behavior is generally a slow process, even when the change is uncontroversial. Legislation can be a powerful tool for modifying behavior. Conservation legislation has created reserves, reduced pollution, and protected threatened species and ecosystems. Policies that promote bird-friendly design and reduction of light pollution have recently proliferated across the United States and Canada, following the early examples of Toronto and San Francisco. They vary considerably in scope and detail, often reflecting local politics. (A real-time database of ordinances and other instruments mandating or promoting bird-friendly action, including links to source language, can be found at collisions.abcbirds.org).

An early challenge in creating effective legislation was the lack of objective measures that architects could use to accomplish their task. For example, a common recommendation, to "increase visual noise," because it was unquantified and undefined, made it difficult for architects and planners to know whether a particular design complied with requirements. Material testing (see p. 45) has made it possible to assign relative threat factors to various building façade materials and to use those scores to create quantitative guidelines and mandates.

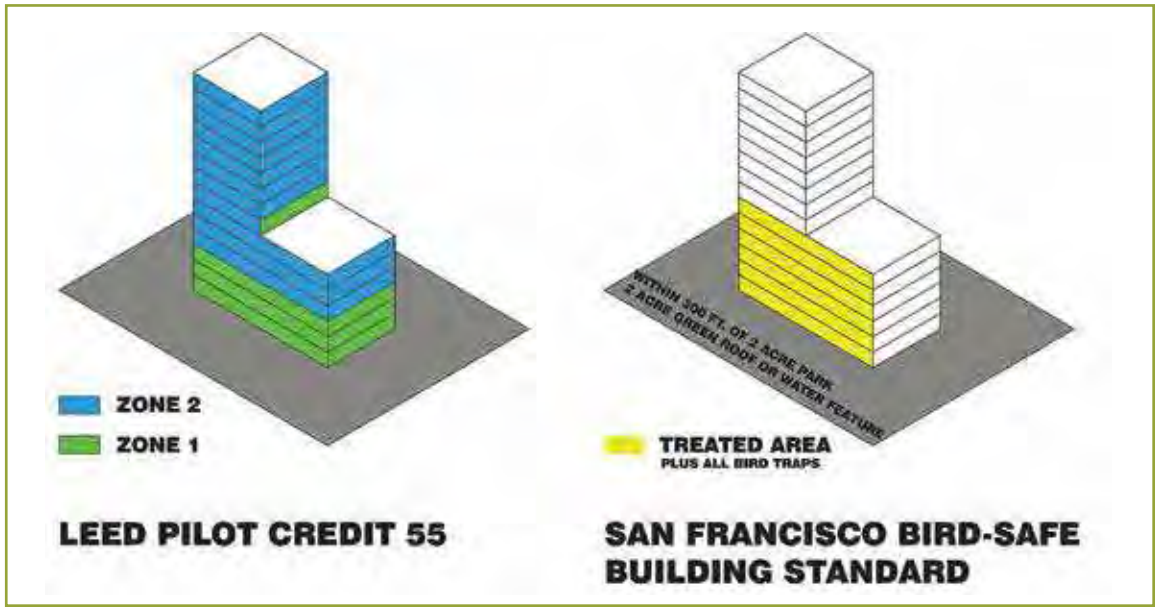
The illustration to the right broadly compares San Francisco's Bird-safe Building Standard with LEED Pilot Credit 55, both based on the use of materials with quantified threat levels. San Francisco's standard applies generally to new construction and is restricted to façades within 300 feet of a two-acre park or pond. The LEED credit is intentionally very flexible. It applies to all building facades and allows for restricted amounts of high-threat glass, or larger amounts of bird-friendly glass. Because birds are found throughout the built environment, ABC prefers the LEED model. (ABC's model legislation can be found on page 35.)

Bird lovers across the country are proposing bird-friendly design ordinances at both local and state levels. ABC is ready to actively support such efforts. Both mandatory and voluntary instruments can be effective. Voluntary guidelines are easier to modify if they prove to have unintended consequences and can lead to a mandate, but can also be ignored. Generally ABC recommends mandatory guidelines, beginning with a small subset of buildings and expanding as community support increases and resistance decreases.

Incorporating bird-friendly design issues into local sustainability policies is another way to drive change. An interesting example of this is the Fairfax County, Virginia, proffer system. New construction projects are required to address a series of sustainability issues, including potential bird mortality, and either to describe



The design of the Grange Insurance Audubon Center in Columbus, Ohio, includes many panels of glass, fritted with the silhouettes of species of birds in flight. Photo by Christine Sheppard, ABC



courtesy of Deborah Laurel

(Opposite) United States Capitol, Washington, D.C. Photo by stock.xchng



For its new Visitors Center in Sempach, opened in May 2015, the Swiss Ornithological Institute designed a mandala from bird silhouettes (below) that was applied on the inside of all glass using digital printing. The design provides 40-50% coverage and generates much discussion among visitors, an achievement second only to preventing bird collisions.



Photos by Hans Schmid

how these will be addressed by the project or explain why such action is not possible.

Priorities for Policy Directives

ABC generally recommends against attempting to map locations where bird-friendly design is required because birds can be found in almost every environment, even in seemingly inhospitable ones. However, there may be occasions when it is necessary to compromise on the scope of legislation. In such cases, it must be recognized that proximity to undeveloped land, agricultural areas, parks, and water often correspond to increased bird populations and therefore increased risk of collisions. In addition, areas located in between landscape features desirable to birds may also pose higher risks. For example, in New York City some evidence suggests that birds approach Central Park from due south during spring migration, creating a greater risk zone directly south of the park. Also, building features such as green roofs should be considered when determining greater risk zones for policy purposes.

Sustainability Rating Programs

Another driver of bird-friendly policies consists of sustainability rating programs like the Green Building Council's LEED program, Green Globes, Living Building Challenge, and others. There is general agreement that sustainable buildings should not kill birds. This tenet appears with differing levels of robustness in different systems, with the most specific being the LEED program, which grants Pilot Credit 55: Bird Collision Deterrence. The credit is calculated using a weighted average of the relative threat rating of each material on a building's façade. The credit has attracted a lot of attention, with many projects applying for it. The new Vassar Bridge for Laboratory Sciences on the cover of this publication was one of the first to be designed with the credit in mind and to earn the credit.

Because a number of glass-walled buildings have been awarded LEED certification at the highest level, at one point there was concern that sustainable design was not compatible with bird-friendly design. This was ironic, as in addition to providing natural light, glass on sustainable buildings is intended to link people inside with the natural world outside. However, according to both ASHRAE and ICC, costs for heating and cooling increase when total glass surface exceeds 30-40% of the total building envelope, depending on climate. This is more than sufficient for providing light and views when glass placement is considered thoughtfully. This is a great place to start the design of a bird-friendly structure.



The façade of the WÜRTH Building in Switzerland is mostly glass, laminated with a fabric that is black on the inside but aluminium-coated outside. The inner surface delivers good visibility, and the fabric provides shade and interesting visual effects outside. Preliminary studies by the Swiss Ornithological Institute suggest that the materials used in this building may also deter bird collisions. Photo by Hans Schmid

Model Ordinance for Bird-Friendly Construction

[ORDINANCE Name] Sponsored by: [list names]

WHEREAS, birds provide valuable and important ecological services,

WHEREAS, [location] has recorded [ ] species of resident and migratory bird species,

WHEREAS, birding is a hobby enjoyed by 64 million Americans and generates more than $40 billion a year in economic activity in the United States,

WHEREAS, as many as one billion birds may be killed by collisions with windows every year in the United States,

WHEREAS, reducing light pollution has been shown to reduce bird deaths from collisions with windows,

WHEREAS, new buildings can be designed to reduce bird deaths from collisions without additional cost,

WHEREAS, there exist strategies to mitigate collisions on existing buildings,

WHEREAS, more than 30% glass on a façade usually increases costs for heating and cooling

WHEREAS, bird-friendly practices often go hand-in-hand with energy efficiency improvements,

And WHEREAS [any additions specific to the particular location]

NOW, THEREFORE, BE IT ORDAINED, by [acting agency] [title of legislation and other necessary language]

(a) In this section the term "Leadership in Energy and Environmental Design (LEED)" means a green building rating system promulgated by the United States Green Building Council (USGBC) that provides specific principles and practices, some mandatory but the majority discretionary, that may be applied during the design, construction, and operation phases, which enable the building to be awarded points from reaching present standards of environmental efficiency so that it may achieve LEED certification from the USGBC as a "green" building.

b) [acting agency] does hereby order [acting department] to take the steps necessary to assure that all newly constructed buildings and all buildings scheduled for capital improvement are designed, built, and operated in accordance with the standards and requirements of the LEED Green Building Rating System Pilot Credit 55: Bird Collision Deterrence.

(c) The USGBC releases revised versions of the LEED Green Building Rating System on a regular basis; and [acting department] shall refer to the most current version of the LEED when beginning a new building construction permit project or renovation.

(d) New construction and major renovation projects shall incorporate bird-friendly building materials and design features, including, but not limited to, those recommended by the American Bird Conservancy publication *Bird-Friendly Building Design*.

(e) [acting department] shall make existing buildings bird-friendly where practicable.



The Studio Gang's Aqua Tower in Chicago was designed with birds in mind. Strategies included fritted glass and balcony balustrades. Photo by Tim Bloomquist

The Science of Bird Collisions



Hundreds of species of birds are killed by collisions. These birds were collected by monitors with FLAP in Toronto, Canada. Photo by Kenneth Herdy

Magnitude of Collision Deaths

The number of birds killed by collisions with glass every year is astronomical. Quantifying mortality levels and impacts on populations has been difficult, however. Until recently, local mortality studies—despite producing valuable information—aimed more at documenting mortality than quantifying it, and did not follow rigorous protocols. Loss *et al*. (2012) created methodology and techniques of analysis to determine the magnitude of anthropogenic mortality, using existing data sets. The authors comprehensively acquired published and unpublished data sets on collisions with buildings (Loss *et al*., 2013). Data sets were filtered using a variety of criteria to ensure that they could be used in single analyses. Loss *et al*. (2014b) have also comprehensively described how to collect meaningful data on collisions.

The authors calculated the median annual mortality at homes at 253 million, or 2.1 birds per structure. Urban residences without feeders account for 33% of this mortality cumulatively, as there are more such residences, even though residences with feeders produce more collisions individually. Rural residences without feeders account for 31% of residential mortality, followed by urban residences with feeders (19%) and rural residences with feeders (17%). Median mortality at low-rise buildings (4 to 11 stories), calculated from two data sets, was averaged as 339 million, or 21.7 birds per building. High-rises, although collectively causing the least mortality (508,000), individually had the highest median rate of 24.3 bird collisions per building. Combining all building classes produces an estimate of 365 and 988 (median 599) million birds killed annually in the United States.

Machtans, *et al*. (2013) estimated that about 25 million (ranging from 16 to 42 million) birds are killed by colliding with windows in Canada annually, with 90% of building-related mortalities caused by houses, slightly less than 10% by low-rise buildings, and approximately 1% by tall buildings. In both cases, the total mortality caused by houses is a function of their large number compared to the two other classes of buildings.

Previously, Dunn (1993) surveyed 5,500 people who fed birds at their homes and recorded window collisions. She derived an estimate of 0.65-7.7 bird deaths per home per year for North America. Klem (1990) estimated that each building in the United States kills one to 10 birds per year. Using 1986 U.S. census data, he combined numbers of homes, schools, and commercial buildings for a maximum total of 97,563,626 buildings, producing an estimate of 100 million to one billion birds killed annually.

Klem *et al*. (2009a) used data from New York City Audubon's monitoring of 73 Manhattan building façades to estimate 0.5 collision deaths per acre per year in urban environments, for a total of about 34 million migratory birds annually colliding with city buildings in the



This Barn Swallow illustrates the type of acrobatic flying that may keep swallows from being frequent collision victims. If birds do identify glass as a barrier at close range, perhaps by sound or air movements, most species may be unable to react fast enough to avoid striking the surface. Photo by Keith Ringland



A sample of collision victims from Baltimore.
Photo by Daniel J. Lebbin, ABC



Sharp-shinned Hawk. Photo by Ted Ardley

United States. However, there could be major differences in collision patterns in cities across the United States, and these numbers should be confirmed using data from additional locations.

In *The American Bird Conservancy Guide to Bird Conservation* (Lebbin *et al.*, 2010) the authors state "…we have reached a point in history when the impacts of human activities are so profound and far-reaching that from now on, it will always be impossible to untangle the completely natural declines from those that are partially or completely anthropogenic. From a conservation standpoint, it is largely irrelevant, anyway. Any human-caused stress that we can alleviate from a declining species can potentially benefit its population, and we should take action to lessen that stress if we can." This is abundantly true for bird mortality from glass because there are actions that many, if not most, individuals can take themselves, directly, to reduce the toll taken by existing glass.

Patterns of Mortality

It is difficult to get a complete and accurate picture of avian mortality from collisions with glass. Collision deaths can occur at any time of day or year. Monitoring programs focus on cities, and even intensive monitoring programs cover only a portion of a city, usually visiting the ground level of a given site at most once a day and often only during migration seasons. Many city buildings have stepped roof setbacks that are inaccessible to monitoring teams. Some studies have focused on reports from homeowners on backyard birds (Klem, 1989; Dunn, 1993) or on mortality of migrants in an urban environment (Gelb and Delacretaz, 2009; Klem *et al.*, 2009a; Newton, 1999). Others have analyzed collision victims produced by single, large-magnitude incidents (Sealy, 1985) or that have become part of museum collections (Snyder, 1946; Blem *et al.*, 1998; Codoner, 1995). There is general support for the fact that birds killed in collisions are not distinguished by age, sex, size, or health (for example: Blem and Willis, 1998; Codoner, 1995; Fink and French, 1971; Hager *et al.*, 2008; Klem, 1989), but the majority of work has focused on data taken during migratory periods, primarily east of the Mississippi River.

Species at Risk

Snyder (1946), examining window collision fatalities at the Royal Ontario Museum, noted that the majority were migrants and "tunnel flyers"—species that frequently fly through small spaces in dense, understory habitat. Conversely, resident species well adapted to and common in urban areas, such as the House Sparrow and European Starling, are not prominent on lists of fatalities, possibly because individuals surviving their first collision may teach offspring to avoid windows.

It is well known that zoo birds in exhibits with glass walls can and do learn about specific pieces of glass, but birds do not learn about glass as a general concept.

Dr. Daniel Klem maintains running totals of the number of species reported in collision events in countries around the world. (This information can be found at http://tinyurl.com/ob3nc4s). In 2015, the site identifies 868 species globally, with 274 from the United States. The intensity of monitoring and reporting programs varies widely from country to country, however.

Hager *et al.* (2008) compared the number of species and individual birds killed at buildings at Augustana College in Illinois with the density and diversity of bird species in the surrounding area. The authors concluded that the

total window area, the habitat immediately adjacent to windows, and behavioral differences among species were the best predictors of mortality patterns, rather than the mere size and composition of the local bird population. Kahle *et al*. (2015) reached similar conclusions in an analysis of five years of data at the California Academy of Sciences, also finding that migrants do not make up the preponderance of birds killed and that males are overrepresented relative to their abundance in habitats adjacent to the museum. Dunn (1993), analyzing winter data from homes with bird feeders, found that the frequency distribution of birds at the feeders closely paralleled the distribution of species killed by nearby windows. Dunn found few collisions on windows of less than one square meter, and an increase in collisions with an increase in window size.

Species such as the White-throated Sparrow, Ovenbird, and Common Yellowthroat appear consistently on top 10 lists from urban areas. It is possible that these species respond more readily to light and thus are more likely to



Common Yellowthroat. Photo by Owen Deutsch

end migratory stages in the built environment, but this needs to be confirmed. Additionally, Loss *et al*. (2013) noted that Golden-winged Warbler, Painted Bunting, Canada Warbler, Wood Thrush), Kentucky Warbler, and Worm-eating Warbler—species identified as birds of conservation concern—were also disproportionately represented in building kills. Hager (2009) noted that window-strike mortality was reported for 45% of raptor species found frequently in urban areas of the United States and was the leading source of mortality for Sharp-shinned Hawks, Cooper's Hawks, Merlins, and Peregrine Falcons. Because most data on glass collisions are from the eastern half of the United States, these lists are presumably biased toward species occurring in that range.

Characteristics of Buildings

Amount of Glass

From a study of multiple buildings in Manhattan, Klem *et al.* (2009a) concluded that both the proportion and absolute amount of glass on a building façade best predict mortality rates, calculating that every increase of 10% in the expanse of glass correlates to a 19% increase in bird mortality in spring and 32% in fall. How well these equations predict mortality in other cities remains to be tested. Collins and Horn (2008), studying collisions at Millikin University in Illinois, concluded that total glass area and the presence/absence of large expanses of glass predicted mortality level. Hager *et al.* (2008, 2014) came to the same conclusion, as did Dunn (1993) and Kahle *et al.* (2015). However, the "patchiness" of glass across a façade—how many pieces, their size, how they are separated, etc. (another way of saying "visual noise")—has not yet been explored in detail but could be important.



The façade of the New York Times building, by FXFOWLE and Renzo Piano, is composed of ceramic rods, spaced to let occupants see out while minimizing the extent of exposed glass—good for controlling heat and light, and safe for birds. Photo by Christine Sheppard, ABC



Snohetta's Student Learning Centre at Ryerson University is one of the first constructed under Toronto's design law. Photo by Rick Ligthelm

Time of Day

Most monitoring programs focus on early morning hours to document mortality during migration, often starting monitoring routes at dawn, before sidewalks are cleared. This can, however, lead to the misperception that night-flying migrants are crashing into lighted buildings at night, or only in early morning, whereas in fact most collisions take place during the day. It should be noted that "dawn" is a time that varies among species (Thomas *et al.* (2002), with some bird species active before humans start to see light in the sky.

Hager and Craig (2014), in a study of resident population collisions in northwestern Illinois between June and early August, found that 66% of birds died between sunrise and 4:00 p.m., with no collisions between 4:00 p.m. and sunset. Delacretaz and Gelb (2006) found collisions from early morning until mid-afternoon, but with a peak during morning hours. This finding is confirmed by monitoring programs like that of Pennsylvania Audubon, where routes were followed three times in succession early each day, with birds found at each pass (Keith Russell, pers. comm.) and where people living or working in buildings report window strikes through afternoon hours (Olson, pers. comm).

Local Landscape

Gelb and Delacretaz (2006, 2009) evaluated data from collision mortality at Manhattan building façades. They found that sites where glass reflected extensive vegetation were associated with more collisions than glass reflecting little or no vegetation. Of the 10 buildings responsible for the most collisions, four were "low-rise." Klem (2009) measured variables in the space immediately associated with building façades in Manhattan as risk factors for collisions. Both increased height of trees and increased height of vegetation increased the risk of collisions in fall. Ten percent increases in tree height and the height of vegetation corresponded to 30% and 13% increases in collisions in fall. In spring, only tree height had a significant influence, with a 10% increase corresponding to a 22% increase in collisions. Confusingly, increasing "facing area," defined as the distance to the nearest structure, corresponded strongly with increased collisions in spring and with reduced collisions in fall. Presumably, vegetation increases risk both by attracting more birds to an area and by being reflected in glass.

Bayne *et al.* (2012) confirmed that the risk of bird–window collisions varies according to location (urban versus rural, home versus apartment, with or without feeders, and age of neighborhood). They used online surveys and determined that rural residences had more collisions than urban ones and residences with feeders had almost twice as many collisions as those without feeders. For urban dwellings, incidence of collisions increased with age of neighborhood, associated with presence of mature trees. Frequency of collisions varied seasonally: 24% in fall, 35% summer, 25% spring, 16% winter. Mortality patterns were similar: 26% fall, 31% summer, 26% spring, 17% winter. Forty-eight species were reported.

Hager *et al.* (2013) noted that estimates of bird-collision mortality often postulate a relatively constant range of collisions at all buildings (for example, Klem, 1990). However, they suggested that each building in a landscape has its own mortality "signature," based not only on characteristics of the structure but also on the distribution of resources throughout the local landscape, including land cover, habitat type, water, and pavement. Their protocol selected buildings at random and has recently been expanded to multiple other sites across North America.

Avian Vision and Collisions

Bird species like falcons are famous for their acute vision, but taking a "bird's-eye view" is much more complicated than it sounds. To start with, where human color vision relies on three types of sensors, birds have four, plus an array of color filters that together allow birds to discriminate between many more colors than people (Varela *et al.* 1993) (see figure this page).

There is also variation in vision among different groups of birds. While some birds see only into the violet range of light, many birds, including most passerines (Ödeen and Håstad, 2003, 2013) see into the ultraviolet spectrum (UVS species).

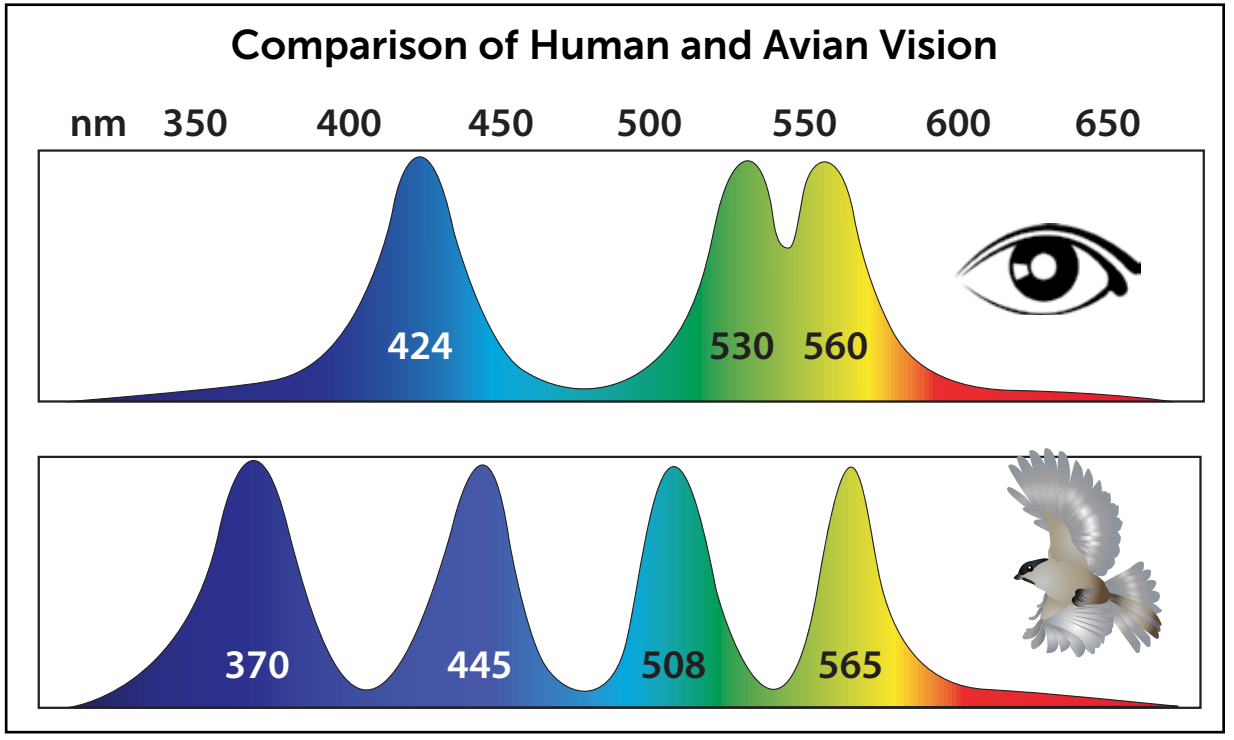
Ultraviolet can be a component of any color (Cuthill *et al.* 2000). Whereas humans see red, yellow, or red + yellow, birds may see red + yellow, but also red + ultraviolet, yellow + ultraviolet, and red + yellow + ultraviolet—colors for which we have no names. Every object absorbs, reflects, and transmits ultraviolet light along with the other wavelengths in the visible spectrum. UV patterns on glass are often cited as desirable solutions to collisions—visible to birds but not to humans. However, aside from manufacturing complexities, many bird taxa that collide frequently with glass, including raptors, pigeons, woodpeckers, and hummingbirds, may not be able to perceive UV patterns (Håstad and Ödeen, 2014). Additionally, birds are often active in early morning, when UV light levels are low.

Humans and other primates have relatively flat faces, with eyes close together. The overlap of visual fields means that humans have good depth perception and a tendency to focus on what is ahead. Most birds have eyes at the sides of their heads, giving them excellent peripheral vision but poor depth perception, often limited to the length of their beaks, presumably to judge potential food items. They may be much less intent on what is in front of them (Martin 2011, 2012) but able to watch for potential predators to the side or behind them. Many species' most acute vision is to the side. Without much 3D vision, birds use a mechanism called "visual flow fields" to judge their speed and rate of progress in flight by the passage of environmental features to their sides (Bhagavatula *et al.* 2011). Collisions with glass may be partly a result of birds expecting open air ahead, combined with relatively poor forward vision.

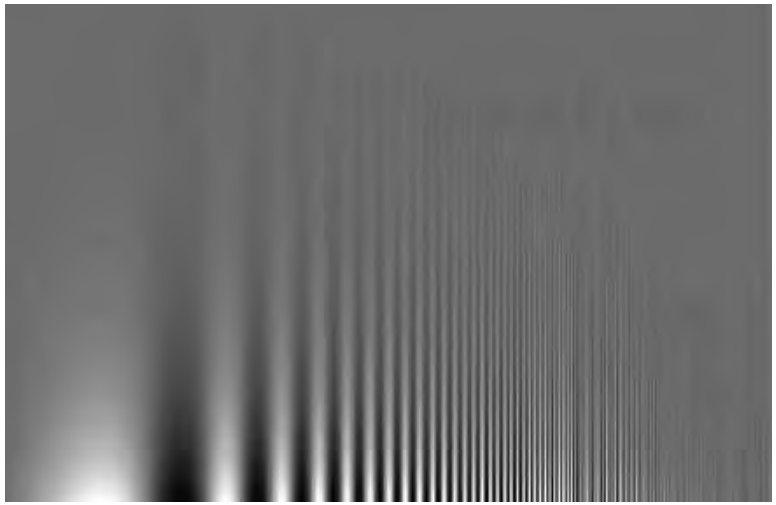
Birds process images faster than humans; where we see continuous motion in a movie, birds would see flickering images (D'Eath, 1998; Greenwood *et al.* 2004; Evans *et al.* 2006). This speed helps many birds maneuver quickly in



Painted Bunting. Photo by Ted Ardley



Based on artwork by Sheri Williamson



Contrast sensitivity is a measure of the limit of visibility for low-contrast patterns. Each person's contrast sensitivity can be measured by the extent to which he or she can see the bars that form an arch in this photograph. The exact location of the peak of the curve varies with one's distance from the image; the area within the arch is larger when one is closer. For a given distance, the area under the arch is smaller for birds. Image courtesy of Izumi Ozawa, Berkeley Neuroscience Laboratory

response to unexpected obstacles as they fly through complex habitats. In one respect however—spatial contrast sensitivity—human vision outperforms avian (Ghim and Hodos, 2006). Contrast sensitivity is "the ability of the observer to discriminate between adjacent stimuli on the basis of their differences in relative luminosity (contrast) rather than their absolute luminances." Birds' lack of contrast sensitivity may be an impediment to creating signals to prevent collisions that are effective for birds but not visually intrusive to humans.

Avian Orientation and the Earth's Magnetic Field

In the 1960s, it was discovered that migrating birds possess the ability to orient themselves using cues from the sun, polarized light, stars, the Earth's magnetic field, visual landmarks, and possibly even odors to find their way. Exactly how this works—and it likely varies among species—is still being investigated. (For a comprehensive review of the mechanisms involved in avian orientation, see Wiltschko and Wiltschko, 2009).

The Earth's magnetic field can provide both directional and positional information. It appears that night-flying migrants, and perhaps all bird species, have magnetic field-detecting structures in the retina of the eye that depend on light for function and provide compass orientation. This magnetic sense is wavelength-dependent. Experiments have shown that the compass is disrupted by long wavelength light but requires low-intensity short wavelength light (Wiltschko *et al.* 2007). This research has taken place only in laboratories, and it is important to determine how it translates to the real world.

In addition, anthropogenic electronic noise, found throughout urban environments, has recently been shown to disrupt magnetic compass orientation in European Robins at very low intensities (Engels *et al.* 2014). This finding may have serious implications for strategies aimed at reducing collisions by reducing artificial night lighting alone and should be a priority for additional work.

A second magnetic mechanism, providing birds with positional information, has been postulated, but its details have not been determined. (For a review of magnetoreception and its use in avian migration, see Mouritsen, 2015.)

Birds and Light Pollution

The earliest reports of mass avian mortality caused by lights were from lighthouses, but this source of mortality essentially disappeared when steady-burning lights were replaced by rotating beams (Jones and Francis, 2003). Flashing or interrupted beams apparently allowed birds to continue to navigate, which has also been found more recently at cell towers with strobe lighting (Gehring *et al.* 2009). The emphasis on tall structures by Lights Out programs ignores the fact that light from many sources, from urban sprawl to parking lots, can affect bird behavior and potentially strand birds in the built environment (Gauthreaux and Belser, 2006). Evans-Ogden (2002) showed that light emission levels of 16 buildings, ranging in height from 8 to 72 floors and indexed by the number of lighted windows observed at night, correlated directly with bird mortality, and

that the amount of light emitted by a structure was a better predictor of mortality level than building height, although height was a factor. Parkins *et al.* (2015) made similar findings.

Mass collision events of migrants associated with light and often with fog or storms have been frequently reported (Weir, 1976; Avery *et al.* 1977; Avery *et al.* 1978; Crawford, 1981a, 1981b; Gauthreaux and Belser, 2006; Newton, 2007). But these are no longer the predominant sources of mortality, possibly because the night landscape has changed radically since early reports of mass collision events at tall structures like the Washington Monument and Statue of Liberty. These and other structures were once beacons in areas of relative darkness, but are now surrounded by square miles of light pollution. While collisions at structures like cell towers continue to take place at night, the majority of collisions with buildings now take place during the day. (Hager, 2014; Kahle *et al.*, 2015; Olson, pers. comm.)

Patterns of light intensity seem to play a role in the distribution of collisions in the built environment, however. Birds may land in patterns dictated by the pattern of light intensity in an area, so the brightest buildings are the most likely to cause collisions early in the day. As birds move through the landscape seeking food, patterns related to distribution of vegetation appear. Studies using radar to map movement of birds through the built environment are starting to appear, but we need information at the level of species and individuals to truly understand how light is impacting birds.

It is often said that birds are attracted to lights at night (Gauthreaux and Belser, 2006; Poot *et al.* 2008). However, we do not have direct evidence that birds are, in fact, attracted to lights; they may simply *respond* to lights they encounter. Gauthreaux and Belser quote Verheijen as suggesting that "capture" might be a better word for birds' response to night lighting. While "capture" does seem appropriate to describe the phenomenon of birds circling drilling platforms, or in the lights of the 9/11 Memorial's Tribute in Light in Manhattan, "disorientation" is a term that covers more of the spectrum of behaviors seen when birds interact with light at night. Gauthreaux and Belser (2006), reporting unpublished data, stated that "exposure to a light field causes alteration of a straight flight path (for example hovering, slowing down, shifting direction, or circling)," and this has been reported by other authors.

Larkin and Frase (1988, in Gauthreaux and Belser, 2006) used portable tracking radar to record flight paths of birds near a broadcast tower in Michigan. Birds showed a range of response, from circling to arcs to linear flight. Haupt and Schillemeit (2011) described the paths of 213 birds flying through up-lighting from several different outdoor lighting schemes. Only 7.5% showed no change in behavior, while the remainder deviated from their courses by varying degrees, from minimal course deviation through circling. It is not known whether response differences are species related.

Bolshakov *et al.* (2010) developed the Optical-Electronic Device to study nocturnal migration behaviors of songbirds. Inspired by the more limited techniques of moon watching and watching birds cross ceilometer light beams, the device uses searchlights to illuminate birds from the ground, while a recording unit documents the birds' movements. With this technique, they can study 1) ground- and airspeed; 2) compensation for wind drift on the basis of direct measurements of headings and track directions of individual birds; 3) wing-beat pattern and its variation depending on



Swainson's Thrush. Photo by Owen Deutsch



The glass walls of this atrium, coupled with nighttime illumination, create an extreme collision hazard for birds. Photo courtesy of New York City Audubon


Canada Warbler. Photo by Ted Ardley

wind direction and velocity. In some cases, species can be identified. Bolshakov *et al.* (2013) examined the effects of wind conditions on numbers of birds aloft and flight trajectories of birds crossing the light beam from the apparatus. They determined that numbers of birds do differ with wind strength, but that birds may be attracted to the light beam under calm conditions. They also found that the light beam disturbs straight flight trajectories, especially in calm wind conditions. Regression models suggest that the probability of curved flight trajectories is greater for small birds, especially when there is little or no moon.

Bulyuk *et al.* (2014) used the same device to compare behaviors of night-migrating passerines under natural nocturnal illumination (at the Courish Spit of the Baltic Sea) with birds passing through an urban light environment (inside the city limits of St. Petersburg, Russia). Songbirds were distinguished as either small passerines or thrushes. The illuminated background caused a decrease in image quality. The shape of flight tracks was compared for the two groups, and a larger proportion of small songbirds changed flight path while crossing the light. This could be explained by flight type or flight speed. The proportion of songbirds changing flight trajectory in the lighted condition was much smaller than under the dark condition.

To understand exactly how light affects birds and what actions must be taken to reduce those effects, we need to know much more. For example, at what range (horizontal and vertical) and under what conditions do birds feel disruption from light, and of what intensity and wavelength composition? How do these factors change their behavior? Does night lighting have any effect on birds departing at the beginning of migratory stages? Do we ever actually see birds changing course to move toward a bright light source?

Light Color and Avian Orientation

Starting in the 1940s, ceilometers—powerful beams of light used to measure the height of cloud cover—came into use and were associated with significant bird kills. Filtering out long (red) wavelengths and using the blue/green range greatly reduced mortality, although we don't know whether the intensities of these two colors of lights were equal. Later, replacement of fixed-beam ceilometers with rotating beams essentially eliminated the impact on migrating birds (Laskey, 1960). A complex series of laboratory studies in the 1990s demonstrated that birds required light in order to sense the Earth's magnetic field. Birds could orient correctly under monochromatic blue or green light, but longer wavelengths (yellow and red) caused disorientation (Rappli *et al.,* 2000; Wiltschko *et al.,*1993, 2003, 2007). Wiltschko *et al.* (2007) showed that above intensity thresholds that decrease from green to UV, birds showed disorientation. Disorientation occurs at light levels that are still relatively low, equivalent to less than half an hour before sunrise under clear sky.

Poot *et al.* (2008) demonstrated that migrating birds exposed to various colored lights in the field responded the same way as they do in the laboratory. Birds responded strongly to white and red lights and appeared disoriented by them, especially under overcast skies. Green light provoked less response and minimal disorientation; blue light attracted few birds and did not disorient those that it did attract. Birds were not attracted to infrared light. Evans *et al.* (2007) also tested different light colors but did not see aggregation under red light. However, they subsequently determined that the intensity of red light used was less than for other wavelengths, and when they repeated the trial with higher intensity red, they did see aggregation (Evans, pers. comm. 2011).

Scientists working in the Gulf of Mexico (Russell, 2005), the North Atlantic (Wiese *et al.* 2001), and the North Sea (Poot *et al.* 2008) report that bright lights of oceanic drilling rigs induce circling behavior and mortality in birds at night. Working on a rig in the North Sea, Marquenie *et al.* (2013), estimated that birds were affected up to five kilometers away. Replacing about half the lights with new bulbs emitting minimal red light reduced circling behavior by about 50%. The authors speculate that completely re-lamping the platform would reduce bird aggregation by 90%. Gehring *et al.* (2009) demonstrated that mortality at communication towers was greatly reduced if strobe lighting was used as opposed to steady-burning white, or especially red lights. At the 9/11 Memorial Tribute in Light in Manhattan, when birds aggregate and circle in the beams, monitors turn the lights out briefly, releasing the birds (Elbin, 2015, pers. comm.). Regular, short intervals of darkness, or replacement of steady-burning warning lights with intermittent lights, are excellent options for protecting birds, and manipulating light color also has promise, although additional field trials for colored lights are needed.

Research: Deterring Collisions

Systematic efforts to identify signals that can be used to make glass visible to birds began with the work of Dr. Daniel Klem in 1989. Testing glass panes in the field and using a dichotomous choice protocol in an aviary, Klem (1990) demonstrated that popular devices like "diving falcon" silhouettes were effective only if they were applied densely, spaced two to four inches apart. Owl decoys, blinking holiday lights, and pictures of vertebrate eyes were among items found to be ineffective. Grid and stripe patterns made from white material, one inch wide, were tested at different spacing intervals. Only three were effective: a 3 x 4-inch grid; vertical stripes spaced four inches apart; and horizontal



Glass panes are being tested at the Powdermill Tunnel, as seen from the outside. Photo by Christine Sheppard, ABC



Susan Elbin tests a bird in the tunnel at the Carnegie Museum's Powdermill Banding Station in southwestern Pennsylvania. Photo by Christine Sheppard, ABC



The tunnel: an apparatus for safely testing effectiveness of materials and designs for deterring bird collisions. Photo by Christine Sheppard, ABC



A bird's-eye view of glass in the tunnel. Photo by Christine Sheppard, ABC

stripes spaced about an inch apart across the entire surface. (A summary of Klem's results can be found at collisions.abcbirds.org).

Building on Klem's findings, Rössler developed a testing program in Austria starting in 2004 and continuing to the present (Rössler and Zuna-Kratky, 2004; Rössler, 2005; Rössler, *et al.,* 2007; Rössler and Laube, 2008; Rössler, 2010; Rössler, 2012; Rössler, 2013). The banding center at the Hohenau Ringelsdorf Biological Station outside Vienna, Austria, offered a large sampling of birds for each test, in some instances permitting comparisons of a particular pattern under differing intensities of lighting. This program has focused primarily on geometric patterns, evaluating the impact of spacing, orientation, and dimensions. Birds are placed in a "tunnel," where they can view two pieces of glass: one unmodified (the control) and the other with the pattern to be tested. Birds fly down the tunnel and are scored according to whether they try to exit through the control or the patterned glass. A mist net keeps the bird from hitting the glass, and it is then released. The project focuses not only on finding patterns effective for deterring collisions, but also on effective patterns that cover a minimal part of the glass surface. To date, some patterns that cover only 5% of the glass have been found to be highly effective. (A summary of Rössler's results can be found at collisions.abcbirds.org).

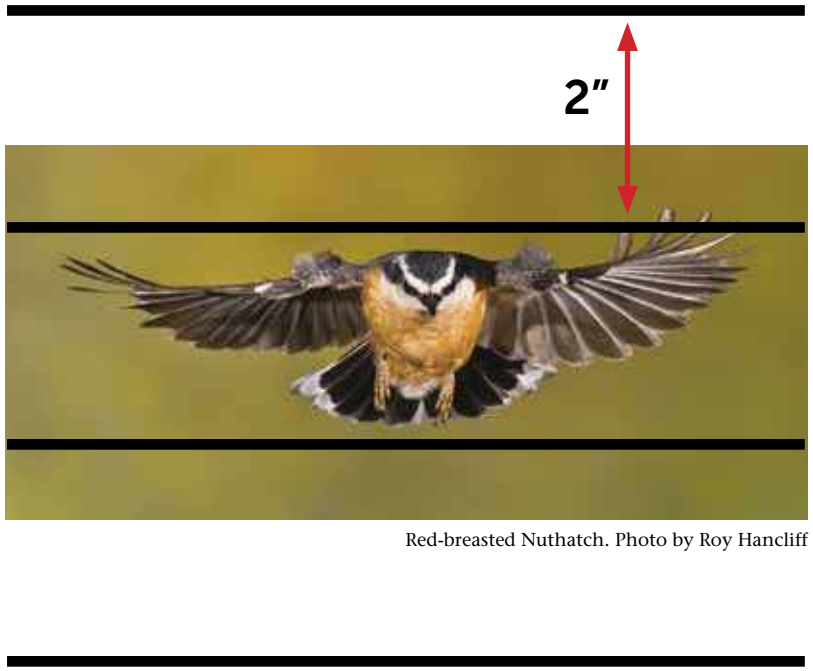
The tunnel at Powdermill, showing the framework where the background will be mounted. Photo by Christine Sheppard, ABC



Building on Rössler's work, ABC collaborated with the Wildlife Conservation Society, New York City Audubon, and the Carnegie Museum to construct a tunnel at Powdermill Nature Reserve's banding station, primarily to test commercially available materials. Results from the first season showed that making an entire surface UV-reflective was not an effective way to deter birds. With UV materials, contrast seems to be important. Glass fritted in patterns conforming to the 2 x 4 rule, however, scored well as deterrents. (A summary of results from Powdermill can be found at collisions.abcbirds.org).

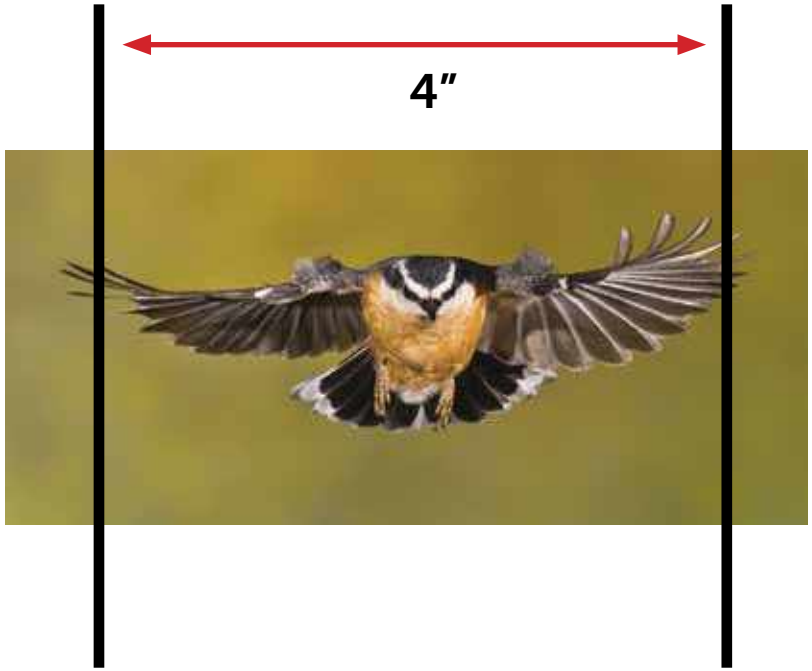
Most clear glass made in the United States transmits about 96% and reflects about 4% of light falling perpendicular to the outside surface. The amount of light reflected increases at sharper angles: clear glass reflects about 50% of incident light at angles over 70 degrees. Light on the inside of the glass is also partly reflected and partly transmitted. The relative intensities of light transmitted from the inside and reflected from the outside surfaces of glass combined with the viewing angle determine whether the glass appears transparent or mirrors the surrounding environment. Patterns on the inside surfaces of glass and objects inside the glass may not always be visible. These changeable optical properties support the argument that patterns applied to the outer surface of glass are more effective than patterns applied to the inner surface. Efforts have been made to model freestanding glass, glass installed on a building, and reflections on glass in some trials. (The testing protocol for freestanding glass, developed at Hohenau, and the testing protocols used at Powdermill can be found at collisions.abcbirds.org).

Horizontal lines with a maximum spacing of 2 inches



Red-breasted Nuthatch. Photo by Roy Hancliff

Vertical lines with a maximum spacing of 4 inches



The 2 x 4 Rule

Research on songbirds, the most numerous victims of collisions, has shown that horizontal lines must be two or fewer inches apart to deter the majority of birds. Vertical spaces must be four or fewer inches apart. This difference presumably has to do with the shape of a flying bird. (Narrower spacing is required to deter collisions by hummingbirds.) Schiffner *et al.* (2014) showed that budgies have a very precise understanding of their own physical dimensions. Trained to fly in a tunnel, the birds were then challenged to pass through ever narrowing gaps. They were able to assess the width of the gaps relative to their body size and adjust their flight behavior accordingly. It seems likely that this is a general avian trait, useful for navigating complex environments at flight speed. Bhagavatula *et al.* (2011) used the same tunnel setup to investigate how optical flow cues guide flight. It appears that birds balance the speeds of images perceived by both eyes, in this case, images to the birds' sides. This reinforces the suggestion of Martin (2011) that humans experience the world as something ahead of them, while for birds in flight, what is ahead of them is not necessarily their primary focus.

Evaluating Collision Problems—A Toolkit for Building Owners



American Woodcock are often victims of collisions. This bird hit a window in Washington, D.C., in March, 2011, and was recovered by ABC's Jason Berry. Photo by Dariusz Zdziebkowski, ABC

Often, only part of a building is responsible for causing most of the collisions. Evaluation and documentation can help in the development of a program of remediation targeting that area. Remediation can be almost as effective as modifying the entire building, as well as less expensive. Documentation of patterns of mortality and environmental features that may be contributing to collisions is essential. Operations personnel are often good sources of information for commercial buildings, as they may come across bird carcasses while performing regular maintenance activities. People who work near windows are often aware of birds hitting them.

Regular monitoring not only produces data on the magnitude and patterns of mortality, but also provides a baseline for demonstrating improvement. The best monitoring programs feature consistent effort, careful documentation of collision locations, and accurate identification of victims. Effective monitoring should document at least 18 months of collisions before mitigation is attempted, unless collision rates are especially high. (Resources for monitoring, from simple to sophisticated, can be found at collisions.abcbirds.org).

Solutions

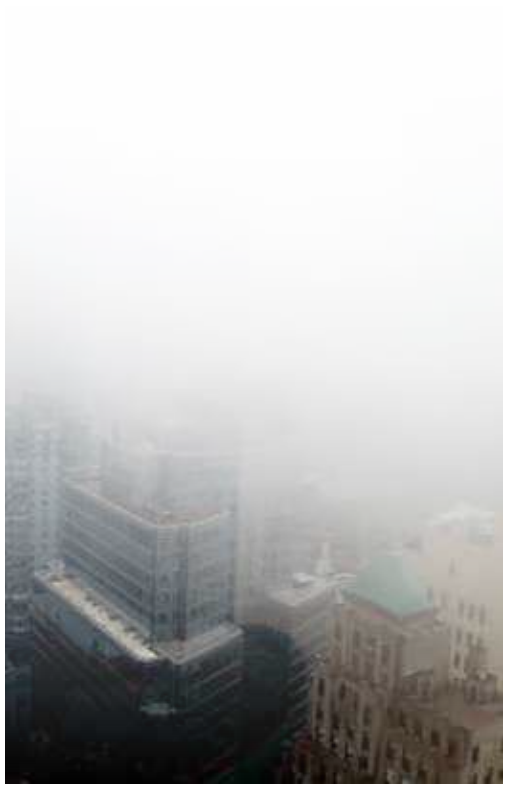
Many factors come into play in selecting how to make glass safe for birds. The table below compares common solutions according to their effectiveness, appearance, relative cost, ease of application, longevity, and required maintenance. Effective patterns on the exterior surface of glass will combat reflection, transparency, and passage effect. Within the 2 x 4 guidelines, however, considerable variation is possible when devising bird-friendly patterns. We recommend that lines be at least ¼-inch wide, but it is not necessary that they be only vertical or horizontal. Contrast between pattern and background is important, however, and designers should be aware that the background—building interior, sky, vegetation—may change in appearance throughout the day.



This security grille creates a pattern that will deter birds from flying to reflections. Photo by Christine Sheppard, ABC

COMPARISON OF RETROFIT OPTIONS

Material	Effectiveness	Cost	Application	Appearance	Longevity	Upkeep
Seasonal, temporary solutions	*****	$	*	*	na	na
Netting	*****	$$	**	***	****	***
Window film	*****	$$$	****	*****	***	****
Screens	*****	$$	***	****	*****	****
Shutters	*****	$$$	***	****	*****	****
Grilles	*****	$$$	****	*****	*****	****
Replace glass	*****	$$$$$	*****	*****	*****	****
5 stars/dollars =	**highly effective**	**expensive**	**easy**	**attractive**	**long-lasting**	**minimal**



Fog increases the danger of light both by causing birds to fly lower and by refracting light so it is visible over a larger area. Photo by Christine Sheppard, ABC

The following questions can guide the evaluation and documentation process by helping to identify features likely to cause collisions and other important factors.

Seasonal Timing

Do collisions happen mostly during migration or fledging periods, in winter, or year round? If collisions happen only during a short time period, it may be possible to apply inexpensive, temporary solutions during that time and remove them for the rest of the year. Some birds will attack their own reflections, especially in spring. This is not a true collision. Territorial males, especially American Robins and Northern Cardinals, perceive their reflection as a rival male. They are unlikely to injure themselves, and temporarily blocking reflections in the offending window (and those nearby) from the outside should resolve the problem. Taping up paper and smearing a soap paste can both be effective.

Weather

Do collisions coincide with particular weather conditions, such as foggy or overcast days? Such collisions may be light-related, in which case an email notification system, asking building personnel to turn off lights when bad weather is forecast, is advisable.

Diurnal Timing

Do collisions happen at a particular time of day? The appearance of glass can change significantly with different light levels, direct or indirect illumination, and sun angles. It may be possible to simply use shades or shutters during critical times.



Lower-floor windows are thought to be more dangerous to birds because they are more likely to reflect vegetation. Photo by Christine Sheppard, ABC

Location

Are there particular windows, groups of windows, or building façades that account for most collisions? If so, it may be cost effective to modify only those sections of glass. Is glass located where birds fly between roosting or nesting and feeding sites? Are there areas where plants can be seen through glass—for example, an atrium, courtyard, or glass building connectors?

Are there architectural or landscaping features that tend to direct birds toward glass? Such features might include a wall or rock outcropping or a pathway bordered by dense vegetation. Solutions include using a screen or trellis to divert flight paths. Are there fruit trees, berry bushes, or other plants near windows that are likely to attract birds closer to glass? These windows should be a high priority for remediation. The glass itself can be modified, but it may also be possible to use live or inanimate landscaping elements to block the view between food sources and windows.

Local Bird Populations

What types of birds are usually found in an area? Local bird groups or volunteers may be able to help characterize local and transitory bird populations, as well as the most likely routes for birds making short flights around the area. The American Birding Association, *Bird Watchers Digest*, Audubon chapters, and Birding.com are good places to start finding such resources. Universities, colleges, and museums may also be helpful.

Post-Mitigation Monitoring

Monitoring efforts should continue for at least 18 months after mitigation efforts are made, and for at least two peak collision seasons (often the fall in urban areas, but spring and summer may also be peak seasons in more rural locations). Collision rates vary along with local bird populations, so a year of high population and high collisions may be followed by a year of low populations and low collisions, regardless of the effectiveness of any mitigation.



Use of glass with a highly effective horizontal frit pattern, together with sunshades, earned this retrofitted building on the SUNY Brockport campus the LEED "collision deterrence" credit. Photo by Paul Tankel



This Ovenbird survived a collision and was recovered alive during a Lights Out monitoring effort in Baltimore, Maryland. Photo by Daniel J. Lebbin, ABC

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A dramatic use of glass block characterizes the Hecht Warehouse in Washington, D.C., designed by Abbott and Merkt. Photo by Sandra Cohen-Rose/Colin Rose

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The World Trade Center of New Orleans, designed by Edward Durrell Stone, uses a simple bird-friendly strategy; almost all windows have exterior shutters. Photo by Christine Sheppard, ABC

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For the Langley Academy in Berkshire, U.K., Foster + Partners used louvers to control light and ventilation, also making the building safe for birds. Photo by Chris Phippen Ofis

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The Institut Arabe du Monde in Paris, France, provides light to the building interior without using glass. Photo by Joseph Radko, Jr.

American Bird Conservancy is the Western Hemisphere's bird conservation specialist—the only organization with a single and steadfast commitment to achieving conservation results for native birds and their habitats throughout the Americas. With a focus on efficiency and working in partnership, we take on the toughest problems facing birds today, innovating and building on sound science to halt extinctions, protect habitats, eliminate threats, and build capacity for bird conservation.

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The Orange Cube, a commercial and cultural complex, was designed by Jacob + McFarlane Architects as part of redevelopment of the harbor in Lyons, France. The external skin virtually eliminates threats to birds while permitting natural illumination of the interior and sightlines for those inside. Photo © Nicolas Borel

American Bird Conservancy's Bird-Friendly Building Standard

The U.S. Green Building Council's LEED Pilot Credit 55 represents the best current understanding of what constitutes a bird-friendly building. Briefly, a bird-friendly building is one where:

- At least 90% of the material in the exposed façade from ground level to 40 feet (the primary bird collision zone) has a threat score of 30 or less, derived from controlled experiments.
- At least 60% of material in the exposed façade above the collision zone meets the above standard.
- All glass surrounding atria or courtyards meets the above standard.
- There are no "see through" passageways or corners.
- Outside lighting is appropriately shielded and directed to minimize attraction to night migrating or nocturnal birds.
- Interior lighting is turned off at night if not in use and designed to minimize light escaping through windows during night operation.
- Landscaping is designed without features known to increase collisions.
- Actual bird mortality is monitored and compensated for (for example, in the form of habitat preserved or created elsewhere, mortality from other sources reduced, etc.).



The Burj Qatar, designed by Jean Nouvel, was named Best Tall Building Worldwide in 2012. The façade, created with multi-layered screens, expresses local culture while providing protection from high temperatures and sand. Photo by Marc Desbordes

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David Chipperfield's expansion of the Anchorage Museum has a surface of mirror glass, made bird-friendly by a frit pattern that conforms with 2 x 4 recommendations. Museum staff confirm that while collisions do occur in the area, the museum sees few, if any. Photo by Larry Vincent