Communication from Public

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Comments for Public Posting: Please see letter and attachments from The Urban Wildlands
Group.

December 1, 2020

Personnel and Animal Welfare Committee
Councilmember Paul Koretz, Chair
Los Angeles City Council
200 North Spring Street
Los Angeles, CA 90012

**Re: December 2, 2020, Item 2. Citywide Cat Program FEIR (SCH No. 2013101008)
[Council File 17-0413 – Citywide Cat Program / Environmental Impact Report (EIR)]**

Dear Chair Koretz and Committee Members:

Your committee has before you the question of approving a Final Environmental Impact Report (FEIR) for the Citywide Cat Program that substantially diverges from the Draft Environmental Impact Report (DEIR) previously circulated for public comment. We provided a technical review of the substantially revised cat population model that is the basis of the FEIR in the 10-day period between the release of the FEIR and the hearing at the Board of Animal Services Commissioners. The City then released a response to our critique, in which it admits making technical errors in the model for a second time (the model in the DEIR also contained errors that the City had to correct). Our response to the City's ongoing attempts to rationalize reliance on a population model that makes the absurd assumption that adult, owned, pet cats throughout the City have a lifespan of less than 2 years follows below.

A mathematical population model that predicts future numbers of owned, shelter, and free-roaming cats is the lynchpin of the entire EIR. The City's position is that if the model shows fewer stray and feral cats in 30 years compared with the "no project" scenario, then the project has no significant impacts. The City does not, notably, require any statistical certainty in that conclusion, nor does it propose to survey numbers of free-roaming cats to see if the prediction comes to pass. Rather, the approach seems to be to assert that it is true, provide no means of accountability, and push forward anyway.

Model Results Conflict with Published Scientific Literature

As elaborated in the attached memorandum from Drs. Evans, Lepczyk, and Marra, the City's population model contradicts published (peer-reviewed) literature on the outcomes of free-roaming cat sterilization programs at similar levels of effort. The percentage of the total number of free-roaming cats to be sterilized each year has never been shown to reduce population sizes in any peer-reviewed study. In fact, investigations of sterilization as a means to control free-roaming cat populations have concluded, for example, that "no plausible combinations of life

history variables would likely allow for TNR to succeed in reducing population size" (Foley et al. 2005). The City does not even attempt to reconcile its conclusions with all of the literature that it contradicts. The model results cannot be considered substantial evidence if they are inconsistent with the published and peer-reviewed scientific literature as a whole.

Model Does Not Evaluate Impacts of Increase in Owned Cat Limit

The model does not reflect the predicted outcomes of the project that have motivated the City to include certain project elements. The project contains a change in the number of cats allowable per household, specifically to "encourage more adoptions and meet the City's no-kill goals" (DEIR, p. 2-13). The model to analyze the project, however, does not include any increase in owned cats resulting from this project element. The City does not prohibit roaming by pet cats, even in environmentally sensitive areas, and has proposed an unenforceable scheme to limit roaming of additional cats, the failings of which we have commented on in detail previously. Any environmental analysis that completely omits potentially significant impacts of a project element is *de facto* incorrect and inaccurate and therefore in violation of CEQA.

In their recent response, the City's consultants claim that they could not possibly imagine what the effects of an increase the cat limit would be and therefore they do nothing. It does not require a crystal ball to conclude that the number of owned cats will increase. From a modeling perspective, when you do not know the size of an effect, the answer is not to ignore it, but to obtain a range of reasonable estimates, run separate model versions for them, and draw some conclusions on how the factor will affect the system. CEQA does not require perfection in such estimates, but it does require agencies to put forth their best effort to estimate potentially significant impacts. The City has an obligation to at least estimate the number of additional animals they expect will be adopted when the cat limit is increased, otherwise there is no rationale for including it in the project because it does not further project goals. Because increasing the cat limit would potentially have adverse impacts on the environment (more waste, more escaped cats and associated depredation of wildlife, more food consumption, etc.), it cannot be included in the project if it is not accounted for in the model of impacts. CEQA's informational purposes would clearly be thwarted by an EIR that ignores potentially significant impacts of an important project element. The model is erroneous because the increase will not be zero and the City has at least two council files full of Animal Services officials insisting on the need to increase the cat limit *to adopt more animals out of the shelters* (CF 10-0982, 13-1513). Either Animals Services has been wrong for the past decade and increasing the pet limit will not increase the number of owned cats, or the model in the EIR is wrong now. Both cannot be correct.

Model Results Are Clearly Inaccurate and Erroneous

The model is clearly inaccurate because the predicted outcomes conflict with known reality in important ways. The model as revised in the FEIR is constructed such that it absurdly concludes that the life expectancy of adult owned, pet cats throughout the City currently is **less than two years**. The initial construction of the model assumes that cats will live 11.5 years (DEIR, p. J-9), but when the model is run, the carrying capacity function that is improperly applied to the owned population pushes the lifespan down below two years. When a model yields a result like this that

is out of whack with reality, it is evidence that the model cannot be relied upon. If the City is to conclude that the proposed project results in a substantial reduction of free-roaming cats, it does so by also concluding that adult owned, pet cats have extremely short lifespans and that somehow the lifespan of an adult owned, pet cat depends on how many other adult owned, pet cats there are in the City. There is no evidence in the EIR to support this conclusion.

What happens in the owned cat population is very important to the policy question facing the City — where should limited funds be allocated to maximally reduce euthanasia in shelters to meet the "no kill" goal? The reason the model assumes such a high death rate and associated short lifespan for adult owned cats is that the fecundity and survival of owned cats would otherwise cause the owned cat population to grow. Put another way, a low rate of spay/neuter in the owned cat population means that owned cats are producing more kittens than there are homes for them. In a realistic model of the current situation, these additional kittens would be transferred either to the shelter or free-roaming (stray and feral) subpopulations. This is probably what happens often in areas of the City with low spay/neuter rates for owned cats. As we elaborated in our comments on the DEIR, spay/neuter rates correlate with household income. If instead of simply "killing" the cats in the model, they were instead transferred to the stray and feral populations, it would lead to the conclusion that one can never address the unowned free-roaming cat problem without addressing the source of those cats. The resulting policy implication is, therefore, that the most effective means to reduce shelter intakes would be to use any additionally available funds for free spay/neuter to increase the owned cat sterilization rate.

If City Is to Follow the Flawed Model, Alternative 1 Is Superior Project Alternative

If one accepts the model that the City has produced as accurate (which the City does but we do not), then spay/neuter of owned cats is the superior project alternative for achieving core project objectives. We have identified continued fatal errors in the model, but for the sake of argument, given that the City stands behind it, the results for owned spay/neuter as an alternative to spay/neuter of unowned cats clearly indicate that owned spay/neuter is the best strategy to achieve the stated project objectives. It would facilitate spay/neuter of cats, reduce free-roaming cats over time, facilitate community education about animal-related topics, allow for engagement in collaborative efforts with rescue groups, and reduce euthanasia rates, which are all of the project objectives except for adopting TNR, which is a means to an objective and not a legitimate objective itself. The model analyzes owned spay/neuter as Alternative 1 in the EIR and the EIR text reports effects of Alternative 1 on the projected number of free-roaming cats. The EIR does not, however, report on how Alternative 1 would affect the number of cats in shelters or on owned cat numbers. These numbers are necessary to evaluate whether Alternative 1 fulfills project objectives. Our experts extracted the unreported results (impacts on owned and shelter subpopulations) from the unaltered model provided by the City and plotted them. The free-roaming cat population under the revised model presented in the FEIR declines below the no project alternative, the shelter population decreases nearly to zero, and the owned cat population declines to zero (Figure 1). The result for owned cats makes no literal sense, but if the City is relying on the model, it could interpret it to mean that the owned population would need to be supported through adoption of cats, which would be a desirable outcome according to the project objectives of reducing shelter euthanasia.
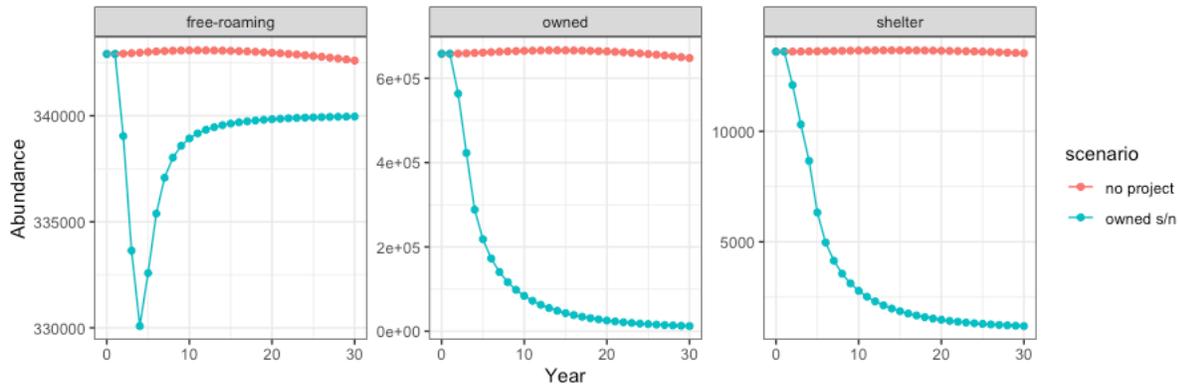
Figure 1. Trajectory of cat subpopulations under all model scenarios evaluated by the City. "Owned s/n" in blue is Alternative 1 as described in the DEIR.

These results, from the City's own model that it asserts "has no errors," show that shelter euthanasia of cats could be virtually eliminated by simply applying the 20,000 spay/neuter surgeries to owned cats instead of stray/feral cats. The only cats that would end up in shelters would be nuisance feral cats, or kittens of feral cats, which, according to the model, would have many homes available for adoption. Under the proposed project, in contrast, the shelter population of cats would remain stable through the entire project period and require continued sustained effort to adopt out animals to meet the "no kill" goal. This result confirms what we have said for years, that the most effective way to address the free-roaming cat problem in the City is to subsidize spay/neuter of owned cats, especially in areas with low owned cat sterilization rates.

We know that the model does not function properly, especially when it comes to owned cats and the disposition of additional owned cats when homes are not available for them. But taking the City's analysis at face value, Alternative 1 would not have any adverse impacts in the form of increasing the free-roaming cat abundance and so must be considered a preferable approach from a policy perspective since it has a far greater likelihood to lead to the City's preferred no-kill goal. Alternative 1 was eliminated in the FEIR (p. 2-22) because the model did not indicate it would reduce the free-roaming cat population as much as the proposed project. However, it would reduce the free-roaming cat population and according to the City's model would be far more effective at reducing shelter euthanasia and meeting all other project objectives (excluding the invalid objective of adopting TNR for its own sake).

FEIR Has Been Used as Vehicle for Personal Attacks by a Councilmember

Finally, I have to address the comment letter on the DEIR the Councilmember Koretz signed (attached), which included several *ad hominem* attacks on me throughout the letter. Such personal attacks are not befitting an elected official, certainly not when directed at a constituent. Councilmember Koretz's letter included insinuations that I suffer from hallucinations and lunacy, and refers to "Longcore's cat mass execution fantasy." He presents as fact that I (and I alone, notwithstanding the six conservation organizations that were represented in the original lawsuit) have wasted City funds by forcing the preparation of an EIR. He then compares euthanasia of unowned feral cats to the Holocaust. I encourage Councilmember Koretz to engage in a more respectful manner and to avoid making false and disparaging comments about

individuals instead of engaging issues of fact and policy. Official City letterhead should not be used to convey inappropriate and potentially defamatory statements, especially by an elected official.

Councilmember Koretz made several false claims in his letter, which deserve correction. First, he accuses me of being the only person causing the City to have to follow the law and evaluate the environmental consequences of its cat program. This is not true. Although I have been the spokesperson by virtue of being a trained ecologist and the person most highly qualified to engage on the topic, our coalition includes six nonprofit organizations: The Urban Wildlands Group, Endangered Habitats League, Los Angeles Audubon Society, Palos Verdes/South Bay Audubon Society, Santa Monica Bay Audubon Society, and American Bird Conservancy, representing local, regional, and national membership constituencies. I would remind Councilmember Koretz as well that the only reason the City has found itself in this position is that it flagrantly violated the law when Ed Boks was the head of the Department of Animal Services and got caught.

Councilmember Koretz lays the expense of the EIR at my feet. Again, not true. We have made clear many times that an EIR would not be necessary if the City were to choose a project that did not have the possibility of causing significant impacts. The City elected to pursue a project that could have significant adverse impacts and CEQA requires preparation of an EIR in that context. That fact is simply the law, not the result of any actions except those voluntarily pursued by the City.

Councilmember Koretz asserts that I envision the City undertaking mass trapping and euthanasia of feral and stray cats. I have never said anything like this and this has never been our position. Rather, we have consistently presented the same priorities to pursue to reduce the stray and feral cat population and mechanisms to reduce impacts to wildlife and public health from free-roaming cats. For example, I wrote in a letter to Councilmember Koretz and this committee on April 18, 2017:

> Commissioner Zaft challenged those opposing the proposed Citywide Cat Program to offer alternatives. We have done so, repeatedly, and in detail, over the past 13 years. Yet, the City has been unwilling to implement even the most commonsense reforms that would address the freeroaming cat issue at the source, which would reduce the influx of stray animals. Specifically, such reforms would include:
>
> 1. Increase low-cost/free spay/neuter for owned cats.
> 2. Enforce the mandatory spay/neuter provision for owned cats.
> 3. Require cat licensing for owned cats.
> 4. Enact a prohibition on roaming that is enforceable on complaint so that owners must take responsibility for their companion animals and to reduce the impacts of owned animals on the environment, public health, and quality of life.
> 5. Enforce existing state and city regulations that ban feeding.
>
> Without these approaches, the influx of freeroaming cats will continue to be high and will furthermore increase with the proposed increase in the number of allowable cats per premises contained in the Citywide Cat Program.

These five policy recommendations are so far from being a "cat mass execution fantasy" that I question whether Councilmember Koretz is able to engage in an independent analysis of the facts in the Citywide Cat Program FEIR as required by CEQA.

Conclusion

To summarize, the cat population model on which the FEIR is based is demonstrably erroneous and inaccurate and therefore cannot constitute substantial evidence on which the City can make an argument that the project would not have adverse impacts. But, even if one accepts the model as an approximation of reality, its own results point to a much more effective policy choice of directing available funds toward owned cat spay/neuter instead of directing that effort to unowned feral/stray cats.

As a final note, we appreciate that the City has recognized that it is untenable to allow nuisance cats to be released back outdoors. The explicit language in the FEIR committing to the existing system of nuisance cat management wherein property owners and land managers can obtain permits, trap cats, and take them to the shelter without interference is a necessary reversal of previous attempts by the City to take away the right of property owners and land managers to keep areas free of unowned cats.

Sincerely,

Travis Longcore, Ph.D., CSE, GISP
Science Director

attachments

Literature Cited

Foley, P., J. E. Foley, J. K. Levy, and T. Paik. 2005. Analysis of the impact of trap-neuter-return programs on populations of feral cats. Journal of the American Veterinary Medical Association **227**:1775–1781.

To: City Council, City of Los Angeles

From: Brian S. Evans, Christopher A. Lepczyk, and Peter P. Marra

Date: December 1, 2020

Re: Population Modeling for Review of Citywide Cat Program

We have had the opportunity to review the response to our comments on the population model in the Final EIR for the Citywide Cat Program prepared by the consultants for the City of Los Angeles (Technical Memorandum No. 1). The responses are not persuasive, and our further interrogation of the model shows it to be clearly erroneous and inaccurate.

There is an oft-used adage in the scientific community that "a model is only as good as its underlying assumptions". Model assumptions determine the structure and behavior of the model and, most importantly, connect it to the real-world phenomenon that it is intending to describe or predict. The City's model necessarily contains many assumptions — several of which correctly simplify the system due to a dearth of empirical data, especially location-specific empirical data, needed to develop these models. Some of the assumptions made, however, are invoked only to improve the functioning of the model. For example, to stabilize their model, the City imposes unrealistically low survival rates for adult owned cats at the current population density — life spans of less than 2 years (see below). Throughout, the City's model deviates from reasonable assumptions and is untethered from the published literature upon which it is based. In doing so, they have generated a model with assumptions that stray so far from reality that it cannot be used to reliably predict populations under any management scenario.

Model Results Contradict Published Literature

The model makes predictions of efficacy that are not supported by published literature on the subject. For example, the preparers use Foley et al. (2005) to support their application of a carrying capacity for free-roaming cats. Crucially, the term carrying capacity in the quoted text is preceded by the word "local." While local populations in heterogeneous landscapes may achieve carrying capacities, these processes can be more complex than summary population numbers suggest. A continuation of the very paragraph that the authors use to support their point is telling:

> Population sizes, home range size, and local carrying capacity of feral cats all vary extensively, depending on habitat type and availability of food and safe den sites. Intrinsic control of feral cat populations may occur by density-dependent mechanisms including starvation, predation, control of reproductive success, and disease. Although cats, particularly males, are territorial, feral cat colonies receiving abundant food supplementation may have a reduction in apparent territoriality as cats co-occupy territories or attempt to maintain small territories (sometimes accompanied by stress and fighting) (Foley et al. 2005).

Furthermore, this very study is one of a host of studies that provide evidence that the suggested gains of their management proposal are not based in reality:

> In some ways, results were similar to those obtained in an earlier, stage-structured matrix model of feral cat demographic features. The matrix model forced $\lambda < 1$, analogously with the Ricker model forcing Rm < 1, for the population to decline. Implementation of the stage-structured model suggested that **no plausible combinations of life history variables would likely allow for TNR to succeed in reducing population size**, although neutering approximately 75% of the cats could achieve control (which is unrealistic), a value quite similar to results in the present study [emphasis added] (Foley et al. 2005).

Another relevant paper (Budke and Slater 2009) underscores that the City's model output, given the management intensity, is simply unrealistic:

> After the population stabilizes, this would equate to sterilizing approximately 14% of the total female population per year or having approximately 71% of the total female and 81% of the adult female population sterilized at all times. In the absence of juvenile sterilization, 91% of adult intact females would need to be sterilized annually to halt population growth. In comparison, with a 3-year nonsurgical contraception program, an annual contraception rate of 60% of female juvenile and adult intact cats would be required to halt population growth, assuming that treated cats were retrapped at the same rate after 3 years (Budke and Slater 2009).

Along similar lines, Miller et al. (2014), which is the reference that the authors used to support varying vital rates by 5% in their sensitivity analysis, found the following regarding the management intensity required to impact free-roaming cat populations:

> Successful population management under conditions of demographic connectivity would require removing 20% of the population; or, sterilizing 30% of the untreated segment of the population; or, temporarily contracepting at least 50% of the untreated segment of the population, every six months, on a sustained basis (Miller et al. 2014).

It is worth noting that Miller is an advocate for contraceptive programs for cat management and is on the Scientific Advisory Board for the Alliance in Contraception for Cats and Dogs (as is Levy, who was the among the authors of Foley et al. 2005). Notwithstanding personal beliefs, scientists are bound in their inference by the assumptions of their models and the empirical evidence. Conversely, the City has generated a model that promises a reduction in free-roaming cat populations for which there **no supportive evidence** in the scientific literature at the proposed intensity of management. Their arguments on page 16 Technological Memorandum No. 1, which suggest that their results are in line with previous literature, are misleading at best and in fact provide no true example of consistency between their results and those of published literature. Instead, they rely on explaining why previous outcomes cannot be compared with their own (Andersen et al. 2004, Foley et al. 2005). As such, the best the authors can assert about previous research is that "no one has modeled this the way we have."

We are to take on faith that the City's model better characterizes free-roaming cat populations than published research on the subject despite no empirical data nor supporting literature to corroborate their claims. Of course, they have achieved their modeled outcomes by selectively making changes to the underlying model structure in ways that deviate from the science upon which it is based (that is, the publication that is the basis of their model; Flockhart and Coe 2018). Their deviations include a misinterpretation of how density dependence and equilibrium abundance functions in free-roaming populations, misapplication of the notion of density dependence in the owned subpopulation, and reinterpreting demographic transitions with their sterilization matrix.

Application of "Carrying Capacity" to Owned Cats is Wrong Solution to Real Problem

The use of density dependence in the owned population is quite revealing of the failure of the model to perform reasonably. While we are population ecologists, it does not take a scientist to understand that an increase in cat ownership in Los Angeles will not affect the survival or fecundity of owned cats — but this is exactly what the City is asking us to believe in this model. For evidence, they suggest that the population dynamics of owned cats is paradoxical, because without limiting survival and fecundity, the population grows exponentially. Even at first glance, this is antithetical to scientific population modeling — we do not bend reality to fit our models, we bend our models to better fit reality. A closer look, however, shows that even the interesting paradox presented by the City is simply yet another error in their model. On page 12 of Technological Memorandum No. 1, the authors provide the demographic rates that, in combination with Equation 10 (page 5) yields the following trend for the owned population if it were a closed population (Figure 1. Change in owned subpopulation of cats excluding interactions with other subpopulations, according to the City's assumed demographic rates on page 12 of the Technological Memorandum No. 1.).
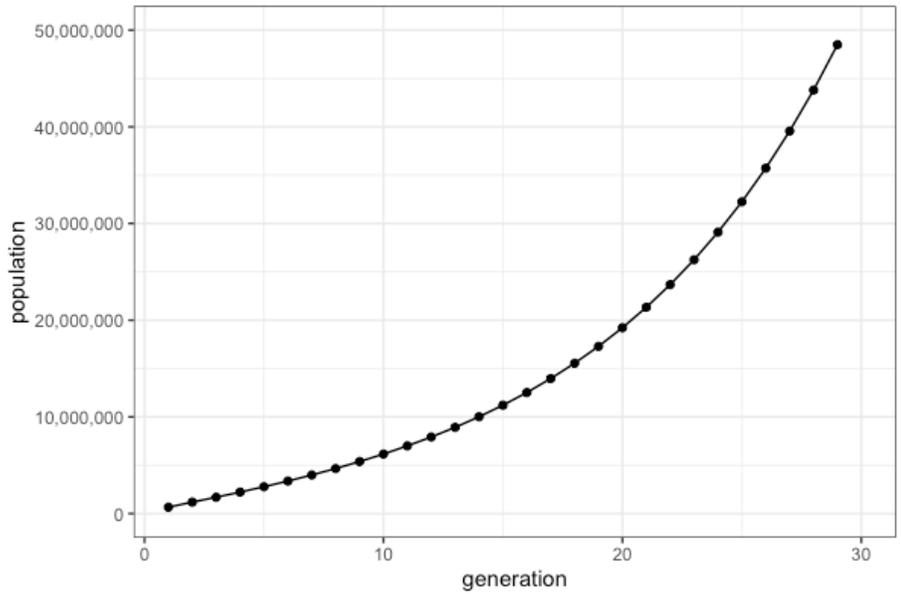
Figure 1. Change in owned subpopulation of cats excluding interactions with other subpopulations, according to the City's assumed demographic rates on page 12 of the Technological Memorandum No. 1.

This curve seems to support the City's "paradox", but we discovered that it can only be obtained by applying the same fecundity to juveniles as to adults, which is wrong. In the models used in the DEIR, juvenile fecundity is equivalent to the fecundity of adults x 0.4192. Applying this to the demographic rates provided in Technical Memorandum No. 1 (page 12), a closed owned subpopulation yields a very different result (Figure 2; using the population starting values from the provided R code).
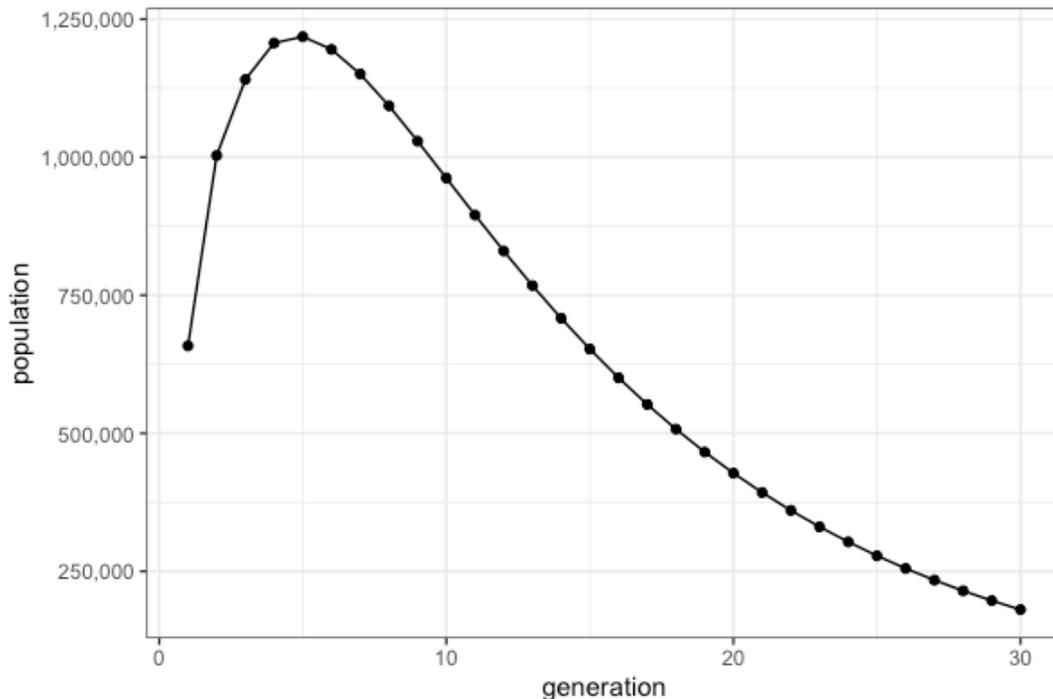
Figure 2. Trajectory of owned subpopulation of cats after correcting the City's code to apply the correct juvenile fecundity rate.

The City has misapplied their own model and then used their own misinterpretation to justify their incredulity (see Technical Memorandum No. 1, page 12). Our suggestion was to limit transfers into the owned population if it was at the limit of the number of available homes, and, inversely, excess cats from the owned population would transfer to shelters or the stray and eventually feral population. This is consistent with the current situation on the ground where offspring of unsterilized owned cats, especially common in lower-income areas, provide an endless supply of new stray and then feral cats.

To the larger question, however, the City complains that we objected to an owned subpopulation that grew uncontrolled in the original model and then we objected to their solution of applying a completely inappropriate solution to that real problem by stating there is "no third approach available." There are, of course, ways to fix the model, and it is incumbent on modelers faced with results that conflict with relevant empirical data, the scientific literature, and an understanding of how biological populations function, to ask "why did my model do that?". The City needs to question their model assumptions, test how those assumptions shape the output, and use previous literature as a guide, rather than simply as data inputs for their model. As it stands, however, the model continues to be useless to evaluate different project scenarios because it does not even approximate reality in the no project scenario.

Current Free-roaming Cat Population is Not Necessarily at Carrying Capacity

The City's assertion that the free-roaming cat population must be at carrying capacity because it has not increased dramatically in recent years reveals a fundamental misunderstanding of

ecology. Their assertion that "Given that long history of human habitation, a free-roaming cat population below the carrying capacity necessarily implies an even smaller population in the very recent past" is a gross misunderstanding of the science behind population dynamics, which includes examples of how populations persist at levels below carrying capacity (Lidicker Jr. 1962, Pulliam and Danielson 1991). In making this argument, the City invokes a definition of population growth and carrying capacity by which populations rise to and stabilize at a carrying capacity (or rise exponentially without). This mathematical abstraction has rarely been observed in wildlife populations and is not representative of current scholarly understanding of density dependence (see Dhondt 1988, Price 1999).

Critically, an assumption of the City's models is that the free-roaming population is already at carrying capacity. Thus, despite claims to the contrary, the subpopulations cannot markedly increase above that value within their deterministic model. The City apparently thinks that there can be no more free-roaming cats in the City if they are not fed by people, and because it would be expensive to feed more cats, it will not happen. They are apparently unfamiliar with the resourcefulness of stray and feral cats to locate resources and the degree to which populations persist below carrying capacity in the real world.

Sensitivity Analysis Is Not Informative

The authors suggest that they have successfully dealt with uncertainty by acknowledging the degree of uncertainty in their estimates — this is quite different from explicitly incorporating uncertainty within a model itself. In regard to the sensitivity analysis, the authors provide a single citation to support their claim that the analysis was adequate (Miller et al. 2014), which evaluated sensitivity for a *stochastic* model but is not itself a paper on how to implement sensitivity analysis in models. The City's sensitivity analysis was inadequate and it is telling that the authors provided no interpretation of their own analysis (see, e.g., Caswell 2012). Additionally, we again highlight the need to employ a stochastic analysis prior to implementation — as Flockhart and Coe (2014) stated in the paper that was the basis of the current analysis, "[stochastic models] are necessary to better realize the potential outcomes of management strategies, avoid misleading expectations of different management actions, and provide decision-makers with the relative odds of a given strategy being successful of reaching a management objective". Acknowledging uncertainty without evaluating the implications of that uncertainty on predicted outcomes does not meet scientific standards nor is it useful.

Population Model Is Clearly Erroneous and Inaccurate

The population model must yield reasonable results in all subpopulations where conditions are known, or it draws into question the predictions in other subpopulations. If one subpopulation is wrong at the outset, it means that the model does not adequately describe the system and its use to inform policy or compare impacts is null. We have such an example with the owned cat subpopulation.

In the DEIR, the owned cat subpopulation expanded exponentially (according to the City). This turned out not to be true based on our analysis above (another coding error), but to remedy

this unrealistic outcome, the City assumed that the owned cat subpopulation was controlled through competition for resources. This is not simply a cap to growth — survival modified by density dependence describes a process by which the population of owned cats in Los Angeles cats compete for resources (predominantly food) and a reduction in available resources negatively impacts survival. This assumption is clearly not biological reality for owned cats. On its face, this is not how the system works and it has the result of killing off cats in the owned subpopulation at young ages. If the City is to rely on the model at all, it has to reconcile the predictions that at the maximum owned cat subpopulation size, owned cats would only live < 2 years. We obtained this number and plotted the lifespan of cats by the number of owned cats by using the starting adult survival rate of 0.917 from the code (*demography_params.R*), the density dependence exponent of owned cats (-0.4685815) from the code (*main.R*), and carrying capacity of 737,952 from the code (*main.R*). Annual survival can be calculated from the standard density-dependent survival formula (Equation 4 in Appendix J), but is also available in the City's provided function *create.subpopulation.demography.matrix* (*demography_funcs.R*). To calculate life expectancy, we used the formula *life expectancy = -1/ln(annual survival*) where annual survival is the output of Equation 4. The results show that none of the plausible owned cat subpopulations levels yield a life expectancy anywhere near normal for an owned cat. The model predicts that if the City had 850,000 owned cats, then they each would only live for 1 year. At 400,000 owned cats, each would live for 3 years (Figure 3).

The idea that owned cats would only live to 1–2 years old is clearly not accurate. The simple notion that the longevity of owned cats in the City depends on how many owned cats there are total is clearly erroneous. Yet this is what the City is relying upon as evidence for its impact analysis.
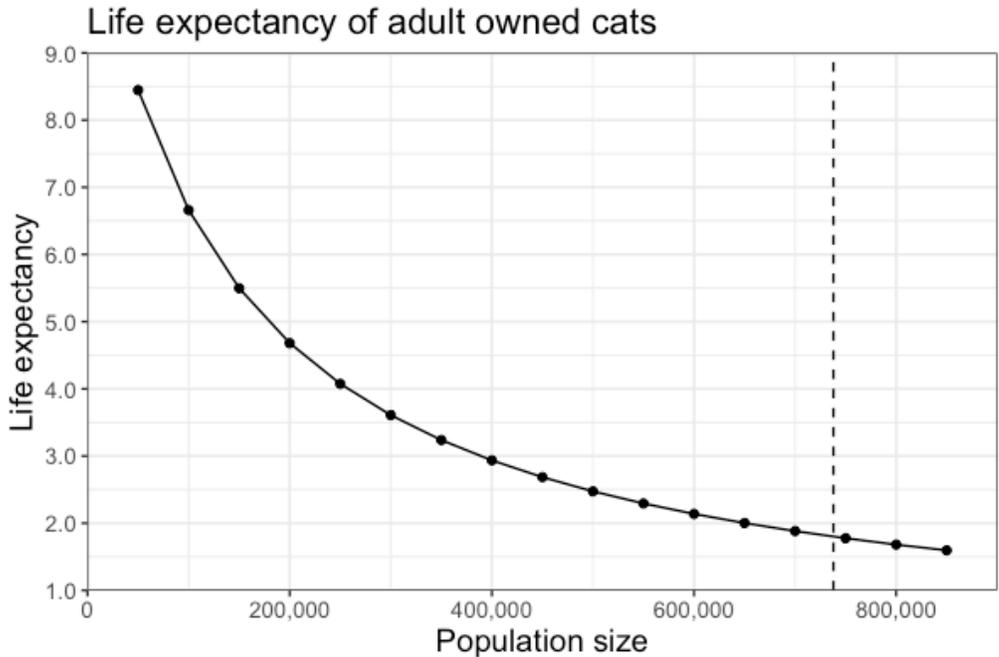
Figure 3. Life expectancy of adult owned cats in Los Angeles as a function of number of total owned cats in Los Angeles, according to City of Los Angeles. The vertical dashed line indicates the City's assumed carrying capacity of owned cats (~738,000).

Model Cannot Be Relied Upon to Inform Policy or Impact Analysis

We have found errors each time we have investigated the population model produced by the City. Technical Memorandum No. 1 asserts that "there are no errors in the final EIR model." Consider, however, the track record. The Draft EIR contained major mathematical errors that likely arose from not intuitively recognizing the function of variables in the model. The City repeated a typo from the Flockhart and Coe paper that would have been obvious as a typo to a population modeler. In the FEIR we identified an error where the model did not include a transition term from shelter to feral, which the City has not bothered to correct but simply asserts is irrelevant. In the current model, the cost of density dependence on the survival of owned (and free-roaming cats) is so prohibitively high that the model cannot begin to approximate reality. We are confident that the FEIR population model does indeed include even more errors that would come to light upon further investigation.

The standard for usefulness in environmental management, however, is not the absence of mathematical errors, but the presence of useful and reliable information with some estimates of statistical confidence.

At a minimum the model results need to be consistent with previous published research, existing data, and the principles of population biology. This model fails even this modest test. It predicts population declines for free-roaming cats at sterilization levels not found in any peer-reviewed study, yields implausible results for the trajectories of subpopulations, assumes owned cats only live 2 years, and posits some sort of magical process through which one family

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adopting another pet cat will reduce the lifespan of every other owned cat in the City. Given these facts, the model is clearly inaccurate and erroneous and therefore useless to inform decision-making. We could stop here.

In the interest of completeness, however, a useful population model would also include statistical confidence intervals for the comparison of different scenarios and provide insight on which variables are driving the outcomes of interest. This model provides no statistical confidence estimates at all, and therefore leaves the decisionmaker with no ability to rely on the single model output. As we reviewed in our initial comments, we have been involved in many natural resource management decision-making processes and a single run of a deterministic model is simply not considered to be substantial evidence of any future result. Finally, a model, when it is reasonably accurately portraying the dynamics of a complex system, can be used to answer key questions about interventions at different points in the system.

Qualification of Authors

Dr. Brian S. Evans has been a researcher at the Migratory Bird Center at the Smithsonian Conservation Biology Institute since 2007, specializing in environment-bird interactions with a focus on the landscape ecology of Greater Washington, D.C. His research integrates field work, citizen science, ecological time-series data, and analytic techniques. He received a Ph.D. in quantitative ecology from the University of North Carolina in 2015. He has been using R, the programming language used to develop the population model in the EIR, for over a decade and has been teaching classes and workshops in R and data management since 2012 for George Mason University, the University of North Carolina at Chapel Hill, and the Smithsonian Institution.

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Affiliations and biographies are presented to establish credentials and identification of the authors as experts and do not represent review or action by their employers.

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Analysis of the impact of trap-neuter-return programs on populations of feral cats

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Objective—To evaluate 2 county trap-neuter-return (TNR) programs for feral cat population management via mathematical modeling.

Design—Theoretical population model.

Animals—Feral cats assessed from 1992 to 2003 in San Diego County, California (n = 14,452), and from 1998 to 2004 in Alachua County, Florida (11,822).

Procedure—Data were analyzed with a mathematical Ricker model to describe population dynamics of the feral cats and modifications to the dynamics that occurred as a result of the TNR programs.

Results—In both counties, results of analyses did not indicate a consistent reduction in per capita growth, the population multiplier, or the proportion of female cats that were pregnant.

Conclusions and Clinical Relevance—Success of feral cat management programs that use TNR can be monitored with an easily collected set of data and statistical analyses facilitated by population modeling techniques. Results may be used to suggest possible future monitoring and modification of TNR programs, which could result in greater success controlling and reducing feral cat populations. (*J Am Vet Med Assoc* 2005;227:1775–1781)

Populations of feral cats are large, have high intrinsic rates of growth, and are highly adaptable to different and sometimes harsh habitats. Feral cats often are regarded as pests on the basis of their predatory habits and the negative effect they may have on wildlife populations.[1-4] They may function as hosts for diseases and vectors that can infect humans, domestic animals, or wildlife[5-7]; yet, colonies of feral cats often are maintained through feeding and care by people who have strong affection for these cats.[8]

There have been many attempts to eradicate populations of feral cats or to regulate their population sizes at low numbers. Such projects have included intentional release of panleukopenia virus, poisoning, predator introduction, euthanasia, and neutering.[9-13] Often, despite intense effort, attempted control programs fail because growth rates within the population do not decline or because of additional recruitment of cats into the population, although some programs have reported[14-16] successful reduction in feral populations with humane trapping programs. The general public often finds extermination programs for feral cats unacceptable, yet also often is intolerant of cat predation on wildlife. It has proven difficult to assess program success; theoretical models would be helpful to guide interpretation of data from control programs and to provide motivation for changes that could increase success.

Feral cats are territorial animals, and their highest potential for population increase occurs when populations are low. The maximum per capita rate of increase is the maximum mean number of female cats produced annually from each female cat, including the cat and its female kittens. A cat population size tends to increase until a carrying capacity is reached. This carrying capacity depends mainly on food and appropriate area for territories. After the carrying capacity has been reached, density dependence forces the per capita growth rate to drop to 0. Matrix methods are used to study the sensitivity of long-term population growth rates to perturbations in survivorship and fecundity and have been used to evaluate feral cat population dynamics.[17] By use of a logistic (Ricker) model to lower feral cat populations, 2 general approaches are possible: the carrying capacity can be decreased (eg, by discouraging public feeding of feral cats), or the maximum per capita rate of increase can be lowered (eg, by increasing mortality rate[18] or by neutering female cats). For feral cat populations to decline, the maximum per capita rate of increase needs to decrease to < 0. Temporarily lowering the population size below the carrying capacity yields no long-term population reduction if this is not accomplished. The cat population will simply increase back to carrying capacity.

The objective of the study reported here was to use data from 2 **trap-neuter-return (TNR)** programs to evaluate development and implementation of models that could determine program success and calculate the rate of neutering needed to decrease the feral cat population.

Materials and Methods

Modeling—Statistical analyses and modeling were performed with computer software.[a,b] For all statistical tests, a value of $P < 0.05$ was considered significant. Cat population regulation was modeled on the basis of a Ricker model:

$$R_t = e^{\,r_m(1-\frac{N_1}{K})}$$

where R_t is an annual population multiplier or net fundamental reproductive rate, r_m is the maximum per capita rate of increase, N_1 is the population size at time 1, and K is the carrying capacity. If $R_t = 1$, the net annual growth of

the population r_t is 0 (ie, the population size is multiplied by 1.0).

To apply the model to TNR data, results from trapping were inserted into the model as index values (linear multipliers of the actual values) and interpreted with the assumption that trapped cats represented some fraction of all cats in the county; this fraction was divided into an index value (eg, the index carrying capacity) to yield an estimated county-wide value. The county-wide feral cat population size was approximated; there were 1,040,149 households in San Diego County in 2000, of which 8.9% of those interviewed reported that they fed a mean of 2.6 feral cats/household.[19] Thus, a minimum county-wide estimate of feral cat population size for 2000 was 240,690 feral cats. In Alachua County, 12% of interviewed households reported that they fed a mean of 3.6 feral cats each. There were 84,963 households in 1999 and approximately 36,398 feral cats.[20]

Estimates of feline population growth rate (R_t) were obtained from the trapped cat data. The R_t was calculated as follows:

$$R_t = N_{t+1}/N_t \text{ and } r_t = \ln R_t$$

where N_t and N_{t+1} are indices of the actual population size, equal to the total number of cats neutered at clinics for that year. It was not necessary to estimate either K or N_t directly because the growth rates describe population trajectories independent of absolute or index values of population size and carrying capacity. The regression of per capita growth rate on population size provided the estimate of maximum per capita rate of increase (y-intercept) and, for convenience, an index of carrying capacity (x-intercept).[21] The actual carrying capacity was obtained by multiplying the index carrying capacity by the estimated total feral cat population in that county and dividing by the total cats trapped.

Program success was evaluated with several methods. Evidence for density-dependent population regulation was sought by plotting per capita growth rate as a function of year to determine a significant reduction in per capita growth rate as detected by a significant negative linear regression of per capita growth rate on time. Similarly, evidence of reduced fecundity was sought by use of linear regression for the proportion of female cats pregnant when neutered over time. The Malthusian parameter r_m (maximum per capita rate of increase) calculated for each county was used to obtain a Malthusian multiplier, $R_m = e^{r_m}$.

Management of feral cat R_m means getting a new value, R_m'. Population decline occurs when R_m' is < 1.0; R_m can be written as the sum of survivorship (p) and offspring production ($R_m - p$). The critical fraction (s) of cats that would need to be neutered in a population to induce a decline can be obtained by solving the following equation:

$$1 = R_m' = p + (R_m - p)(1 - s)$$

to get

$$s = \frac{R_m - 1}{R_m - p}$$

One can also approximate the proportion of cats that must be neutered each year (M) to gradually reach M = s • N neutered cats. Neutered cats accumulate in the population because they survive at rate p from year to year. If the number of cats neutered annually is m and the program continues many years, when neutered individuals are counted right after neutering but before death,

$$M = m\sum_{i=0}^{\infty} p^i = m\frac{1}{1-p}$$

To achieve the neutering level s = M/N, the annual neutering rate s_a must satisfy the following equation:
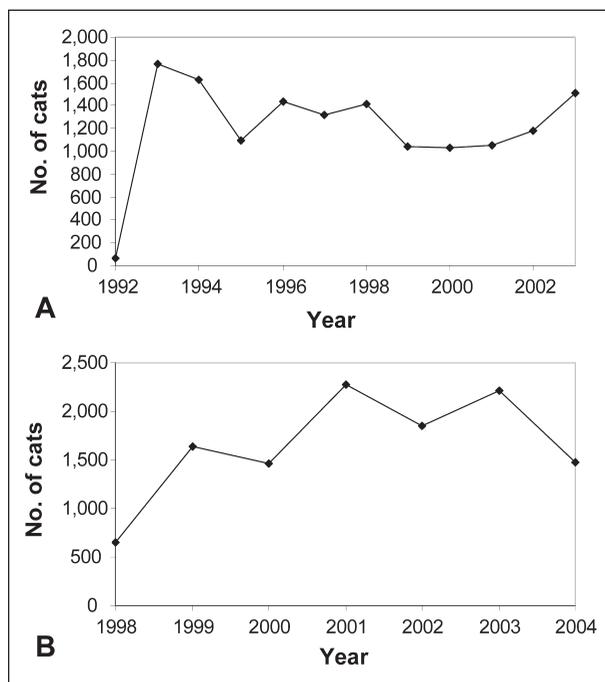
$$s_a = \frac{m}{N} = s(1 - p)$$

Figure 1—Yearly distribution of all feral cats evaluated for neutering in San Diego County (A) and Alachua County (B).
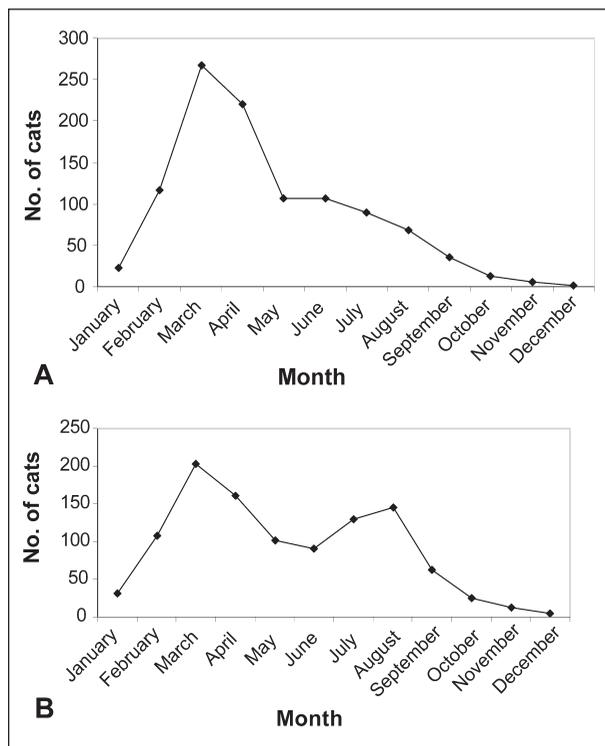

Figure 2—Monthly distribution of pregnant feral female cats evaluated for ovariohysterectomy in San Diego County (1992 to 2003, all years summed [A]) and Alachua County (1998 to 2004, all years summed [B]).

When survivorship (p) is close to 1.0, this is a much lower burden for the neutering program. The calculation is only approximate because N is not constant over the lifetime of the neutering program, survivorship may differ between neutered and non-neutered cats, and cats do not live indefinitely. In the absence of field data, the annual survival rate (p̂) can be estimated from the mean cat life span as follows:
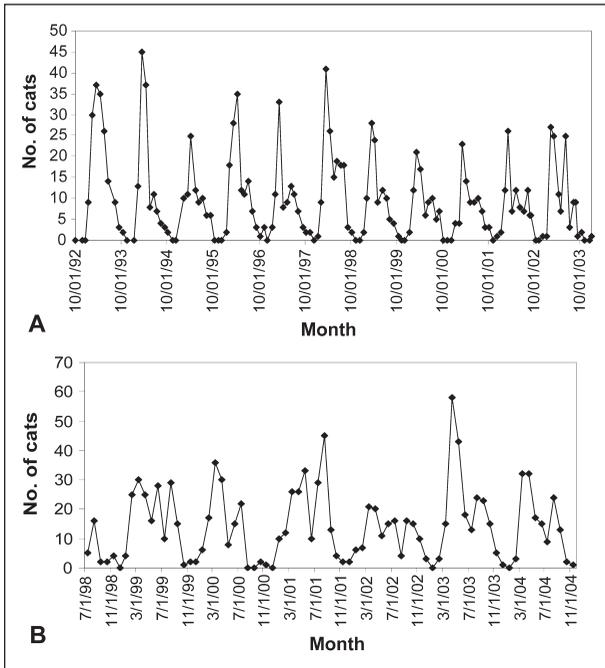
$$\hat{p} = 1 - \frac{1}{\text{mean life span}}$$

Figure 3—Monthly distribution of pregnant feral female cats evaluated for ovariohysterectomy in San Diego County (1992 to 2003 [A]) and Alachua County (1998 to 2004 [B]).
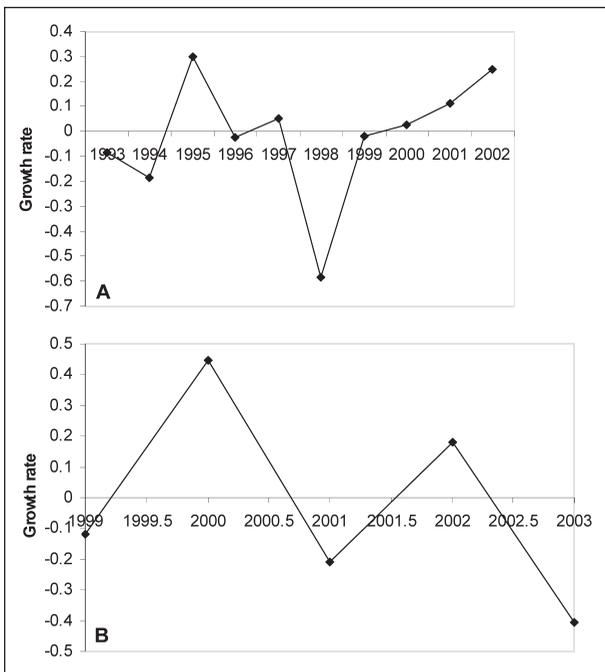

Figure 4—Annual per capita feral cat population growth rate by year for feral cats evaluated for neutering in San Diego County (1992 to 2003 [A]) and Alachua County (1998 to 2004 [B]).

and if such data were available, the life span and annual survival rate should be estimated at low population sizes.

Data—Data from the Feral Cat Coalition were acquired during a trapping program involving volunteers from across San Diego County, California, from 1992 to 2003 and from a similar program from 1998 to 2004 run by Operation Catnip Inc in Alachua County, Florida. Cats were live-trapped, transferred approximately once per month to participating veterinary clinics, examined, vaccinated, surgically neutered, and returned to their colonies after a short postoperative recovery period. For each day that clinics were held, data compiled included clinic number and date, location of the clinic, number of males neutered, number of females neutered, number of cats already neutered when trapped, and total females subdivided into the categories pregnant and not pregnant. Data regarding San Diego County demographics were obtained from the California Department of Finance[22] and included number of humans in the county and number of households. For Alachua County, demographic data were obtained from the US Census Bureau. Data regarding cat ownership, feeding of feral cats, approximate county-wide cat numbers, and number of feral cats were obtained or calculated from published surveys of San Diego and Alachua County households.[19,20]
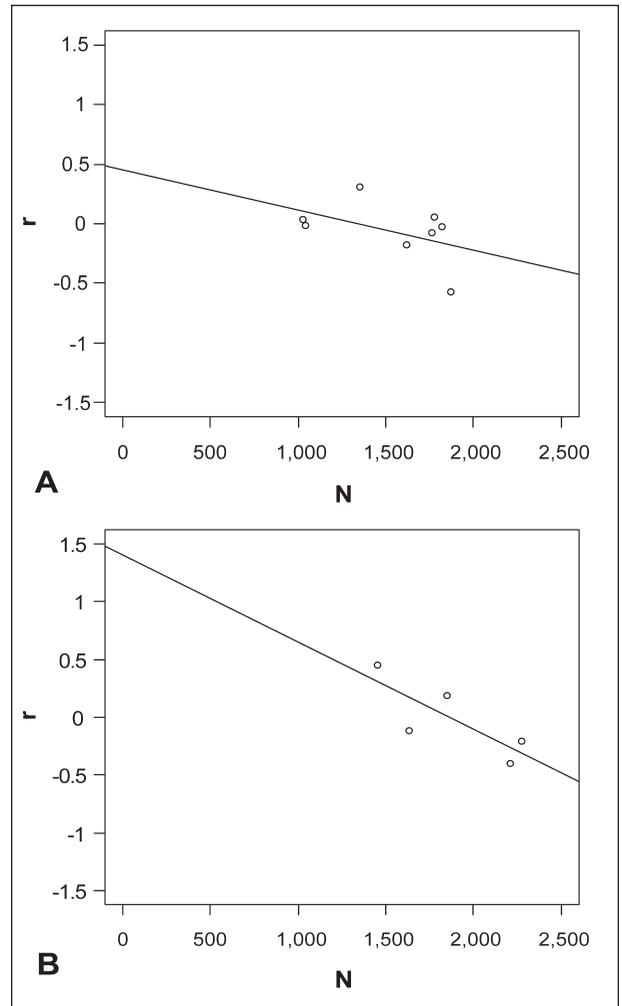

Figure 5—Regression of annual per capita growth (r) on annual index population size (N) for feral cats evaluated for neutering in San Diego County (1992 to 2003 [A]) and Alachua County (1998 to 2004 [B]).

Results

Feral cat demographics—From 1992 to 2003, 14,452 cats were submitted as feral cats to veterinary clinics in San Diego County for neutering (**Figure 1**; data for 1992 represent only part of the year, when the program began). Of these cats, 565 (4%) had already been neutered; 14,129 surgeries were performed on 6,494 (46%) male and 7,635 (54%) female cats. The number of cats neutered over the months of the year did not vary significantly ($P = 0.13$), but the presence of pregnant cats was strongly seasonal, with numbers increasing in spring, compared with winter and fall (**Figures 2 and 3**). Overall, 17.2% of trapped female cats were pregnant.

In Alachua County, 11,822 cats were submitted for neutering from 1998 to 2004 (Figure 1). Of these, 258 (2%) cats had previously been neutered; 11,564 surgeries were performed on 4,928 (43%) male and 6,636 (57%) female cats. Evaluation of pregnant cats revealed a double peak, with increases in March and August (Figures 2 and 3). Sixteen percent of trapped female cats were pregnant.

Model results—Per capita growth rate in San Diego County ranged from −0.58 to 0.30, with a value of 0.25 for 2002 (**Figure 4**). Values for Alachua County were similar. Regressing per capita growth rate on population size yielded estimates of the index carrying capacity (x-intercept) and maximum per capita rate of increase (y-intercept) of 1,323 and 0.45 ($P = 0.09$), respectively, for San Diego County and 1,855 and 1.41, respectively, for Alachua County ($P = 0.1$; **Figure 5**). In the last year of data

for each county, the total numbers of trapped cats were 1,514 (0.63% of the total estimated feral cats) in San Diego County and 2,213 (9.6%) for Alachua County. Thus, the county-wide carrying capacities were estimated as 210,325 and 19,323 feral cats,
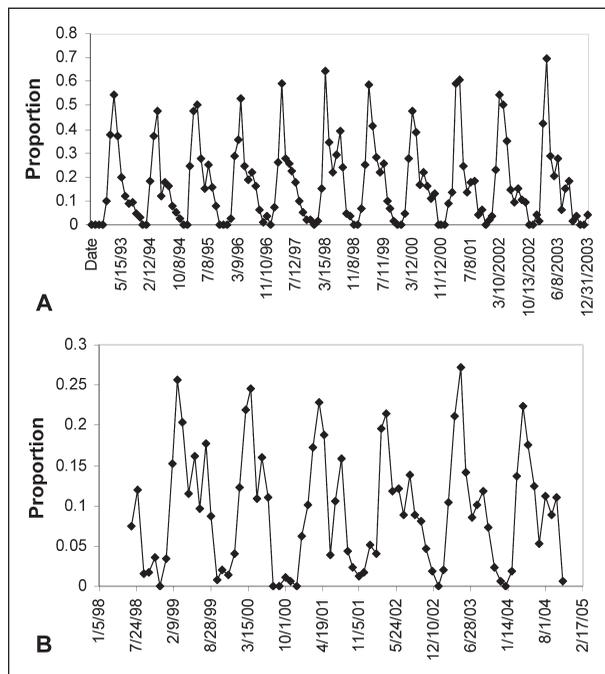

Figure 6—Monthly distribution of pregnant feral female cats evaluated for neutering in San Diego County (1992 to 2003 [A]) and Alachua County (1998 to 2004 [B]).

Table 1—Critical overall neutering rate required to bring growth rate in a feral cat colony to 1.0 for various growth rate, life span, and survivorship (p) estimates.

| Growth rate and p | Mean life span (y) |||||||||||| |
	1	2	3	4	5	6	7	8	9	10	11	12
p	0.00	0.50	0.67	0.75	0.80	0.83	0.86	0.88	0.89	0.90	0.91	0.92
1.0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0.33	0.50	0.60	0.67	0.71	0.75	0.78	0.80	0.82	0.83	0.85	0.86
2.0	0.50	0.67	0.75	0.80	0.83	0.86	0.88	0.89	0.90	0.91	0.92	0.92
2.5	0.60	0.75	0.82	0.86	0.88	0.90	0.91	0.92	0.93	0.94	0.94	0.95
3.0	0.67	0.80	0.86	0.89	0.91	0.92	0.93	0.94	0.95	0.95	0.96	0.96
3.5	0.71	0.83	0.88	0.91	0.93	0.94	0.95	0.95	0.96	0.96	0.96	0.97
4.0	0.75	0.86	0.90	0.92	0.94	0.95	0.95	0.96	0.96	0.97	0.97	0.97
4.5	0.78	0.88	0.91	0.93	0.95	0.95	0.96	0.97	0.97	0.97	0.97	0.98
5.0	0.80	0.89	0.92	0.94	0.95	0.96	0.97	0.97	0.97	0.98	0.98	0.98

Table 2—Critical annual neutering rate required to bring growth rate in a feral cat colony to 1.0 for various growth rate, life span, and p estimates.

| Growth rate and p | Mean life span (y) |||||||||||| |
	1	2	3	4	5	6	7	8	9	10	11	12
p	0.00	0.50	0.67	0.75	0.80	0.83	0.86	0.88	0.89	0.90	0.91	0.92
1.0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0.33	0.25	0.20	0.17	0.14	0.13	0.11	0.10	0.09	0.08	0.08	0.07
2.0	0.50	0.33	0.25	0.20	0.17	0.14	0.13	0.11	0.10	0.09	0.08	0.08
2.5	0.60	0.38	0.27	0.21	0.18	0.15	0.13	0.12	0.10	0.09	0.09	0.08
3.0	0.67	0.40	0.29	0.22	0.18	0.15	0.13	0.12	0.11	0.10	0.09	0.08
3.5	0.71	0.42	0.29	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.09	0.08
4.0	0.75	0.43	0.30	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.09	0.08
4.5	0.78	0.44	0.30	0.23	0.19	0.16	0.14	0.12	0.11	0.10	0.09	0.08
5.0	0.80	0.44	0.31	0.24	0.19	0.16	0.14	0.12	0.11	0.10	0.09	0.08

respectively. The calculated values for R_m for each county were 1.57 for San Diego County and 4.1 for Alachua County.

Critical neutering rates depend on R_m and survivorship (**Tables 1 and 2**). Reported[9,23] mean life spans in feral cats range from 2 to 8 years. By use of a median life span of 5 years for San Diego County, the critical neutering fraction (s) would be approximately 71% (94% for Alachua County). The needed annual neutering fraction (s_a) was 14% for San Diego County and 19% for Alachua County. Hypothetical feral cat populations would decrease between these values.

To assess the success of the TNR program, data were evaluated for density-dependent population regulation and a significant reduction in the proportion of female cats that were fertile. When per capita growth rate was regressed on year, there were no indications of a significant reduction in per capita growth rate (ie, evidence for density dependence) in either of the counties (P = 0.24 and 0.1 for San Diego and Alachua counties, respectively; Figure 4). The proportion of pregnant females cycled annually, but an overall reduction in either of the counties was not detected (**Figure 6**).

Discussion

Feral and stray cats represent more than 40% of all cats in the United States, are fed by an estimated 10% to 20% or more of households, and are rarely neutered.[20,24,25] It is desirable to reduce feral cat populations because of welfare concerns for the cats, concern about the effects of feral cats on vulnerable wildlife, and public health considerations. The American Association of Feline Practitioners supports appropriately managed feral cat colonies, but that group's position statement indicates that the goal of colony management should be the eventual reduction of the colony.[24] Additionally, feral cat colonies should not be located near at-risk wildlife. Although several control methods including TNR have been proposed and implemented, assessment of their efficacy has typically been missing or at most anecdotal. This is unfortunate given the substantial investment of resources required to run an effective program and the skepticism with which TNR is regarded by many people.

Feral cat populations are extraordinarily capable of reaching local carrying capacities as a function of reproductive mechanisms that emphasize breeding efficiency. These include induced ovulation, weaning of kittens as young as 50 days old, an age of first reproduction as early as 8 months, and many (approx 130) days pregnant per year.[9,26] Consequently, cats have some of the highest maximum per capita rates of increase among carnivores, estimated in 1 study[27] at 23.3%. Population sizes, home range size, and local carrying capacity of feral cats all vary extensively, depending on habitat type and availability of food and safe den sites. Intrinsic control of feral cat populations may occur by density-dependent mechanisms including starvation, predation, control of reproductive success, and disease. Although cats, particularly males, are territorial,[28,29] feral cat colonies receiving abundant food supplementation may have a reduction in apparent territoriality as cats co-occupy territories or

attempt to maintain small territories (sometimes accompanied by stress and fighting).[30]

The purpose of TNR programs is rarely articulated in the language of population ecology but often is motivated by an attempt to reduce population size (N_t) and per capita growth rate (r_t) by reducing reproduction. Additional goals of TNR may include provision of veterinary care and vaccines to reduce the threat of feline and zoonotic diseases, improve the quality of life of homeless cats, avoid euthanasia as a control method, and, in some programs, reduce the population size.[14,31] In many TNR programs, including those described here, direct assessment of possible changes in population size is not possible because data collection and population structure do meet assumptions of capture-recapture or other similar methods of estimating population size. Although index values were necessarily used for parameters because actual population counts were not available or practical, the trajectories of populations (whether or not populations were declining) could be determined from calculation of maximum per capita rate of increase without accurately detecting population size or carrying capacity.

The models reported here also have the flexibility of providing statistics that could be used to evaluate success of control programs, methods for calculating the fraction of cats that must be neutered to force population decline, and the annual neutering rate required to eventually achieve the required neutered fraction. The assessment statistics are R_m (multiplier for the maximum per capita rate of increase), which can be calculated from the time series and, as a multiplier, must be < 1.0 for the population to be in decline; the proportion of cats that are pregnant, which should be declining significantly in a successful program; and the proportion of trapped cats that already are neutered, which should increase. This last statistic was not evaluated in the data given here because the TNR programs specifically avoided retrapping cats, which was unfortunate because keeping account of previously ear-tipped cats would have made the calculation of the proportion neutered more accurate.

The present study yielded mixed results regarding the success of large TNR programs in San Diego and Alachua counties. Results of the programs had previously been summarized[16] regarding the number of cats neutered, but the effect of neutering on the free-roaming cat population had not been analyzed. Our analysis indicated that any population-level effects were minimal, with R_m (the multiplier) ranging from 1.5 to 4, which indicated ongoing population growth (similar to values in previous studies), and critical needed values of neutered cats (ie, the proportion of all cats that needed to be neutered to reduce R_m to < 1.0) of 71% to 94%, which was far greater than what was actually achieved. There are several potential limitations to the data; the net reproductive rate was estimated under the assumption that trapping effort and efficiency were unbiased across sites and trapping periods. Retrapping success for feral cats probably was underestimated because cats were marked after neutering by removal of a small distal portion of the pinna and ear-tipped cats usually were released from cages without count-

ing. The estimate of total numbers of feral cats was somewhat inaccurate because it was calculated from general surveys of how many people feed how many feral cats. However, this statistic was not used in the model itself but rather provided an estimate of the calculated proportion of all available feral cats that were being neutered, to allow for interpretation of model successes. The regression of per capita growth rate on population size was not significant for either San Diego or Alachua counties, possibly reducing confidence in the estimate of population growth rates. However, this was not surprising given that a time series of at least 20 years is typically required before such a regression is found to be significant.[32] Nevertheless, the coefficient of regression (y-intercept) still represented the maximum likelihood estimator for maximum per capita rate of increase.

In some ways, results were similar to those obtained in an earlier, stage-structured matrix model of feral cat demographic features.[17] The matrix model forced $\lambda < 1$, analogously with the Ricker model forcing $R_m < 1$, for the population to decline. Implementation of the stage-structured model suggested that no plausible combinations of life history variables would likely allow for TNR to succeed in reducing population size, although neutering approximately 75% of the cats could achieve control (which is unrealistic), a value quite similar to results in the present study. An important distinction between the 2 models was the incorporation of density-dependent reduction of fecundity and possible saturation of the population with neutered cats in the present model.

Feral cat control programs are notoriously difficult, and in many cases, short-term control has been followed by a long-term return to precontrol conditions. Attempted control of a feral cat population on Marion Island in the Indian Ocean had poor success for many years.[9] The population size on the island was estimated by use of a line transect at approximately 2,200 cats, and in 1979, virulent panleukopenia virus was released on the island. Although in 1 study[9] it was concluded that the population density of cats had declined, this conclusion was based on questionable statistical analyses. Within 5 years, intrinsic population growth rates were reported to have increased 4 times, and although population sizes had supposedly declined, predation on seabirds continued. Hunting was instituted, and ongoing population estimates were assessed by use of the highly biased index of cat sightings.[10] The authors acknowledged that control (ie, suppression) would only succeed with ongoing intensive hunting. Feral cats have been eliminated from at least 48 islands, including Marion Island, primarily through hunting (sometimes with dogs), trapping, poisoning, and disease and typically on fairly small islands with low cat density.[33]

In contrast with hunting, disease, or other methods of feral cat control that increase mortality rates, TNR has the potential advantage of allowing niches to become saturated with neutered individual cats. If, concurrently with the reduction in maximum per capita rate of increase, carrying capacity is reduced (typically by reduction of food oversupplementation) and immigration is controlled, there may be a humane, gradual reduction in overall cat numbers. Future feral cat management programs could potentially achieve better success with a few modifications of the TNR paradigm. Despite the substantial expenditure of resources to operate the 2 TNR programs described here, they probably were performed on too large a scale; many cats were neutered, but this constituted a very small overall proportion of the cats. Moreover, feral cats within a county surely do not constitute a single population, further diluting the enormous overall effort into numerous smaller efforts with less impact. Trap-neuter-return programs should be focused on well-defined, preferably geographically restricted, cat populations, rather than diluting effort across multiple populations. In future TNR studies, it would be helpful if trapping efforts were standardized to allow for the least biased index estimates of population size from trapping efficiency (catch per unit effort[34]), although with such an intelligent species, cats may modify behavior after experience with the traps. If population growth actually is declining, then per capita growth rate should decline consistently. Also, retrapping statistics, which were not obtained in these programs, are particularly valuable because they allow for comparison of observed retrapped (neutered) proportions with the critical proportions needed to reduce R_m to < 1.0.

Focused TNR programs have had some success. A survey-based assessment[8] of TNR for small colonies (mean, 7 cats) revealed moderate success, with reduction of mean colony size by as much as half. A two-thirds reduction in population size was obtained in a feral cat colony on a university campus where every cat was specifically included in the census.[16] Although causes of loss from the population included euthanasia of sick cats, adoption, and deaths (often vehicular trauma), increases in population were attributable to immigration but not births because virtually all resident cats were neutered. For these programs, managers were able to evaluate success because every cat could be counted. In larger programs, such enumeration is impossible and index-level assessment, such as that described here, becomes necessary.

Statistical assessment of the impact of TNR programs on population size is critical to help gain credibility for such programs. Because of the increasing will to address humane, conservation, and public health concerns associated with free-roaming cats, tools to evaluate program success will increasingly contribute to achieving management goals.

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PAUL KORETZ
Councilmember, Fifth District

October 22, 2019

Dr. Jan Green Rebstock
City of Los Angeles
Public Works, Bureau of Engineering
Environmental Management Group
1149 S. Broadway, 6th Floor, Mail Stop 939
Los Angeles, CA 90015-2213

RE: Citywide Cat Program Draft EIR (E1907610)

Dear Dr. Rebstock:

PK-1

I am writing to offer my comments on the Environmental Impact Report (EIR) for the Citywide Cat Program.

First, let me offer my congratulations and thanks to the Bureau, its consultants, you personally, and the City's own Cat Program advisors for preparing a pioneering and thorough document that I believe is more than responsive to the requirements of the California Environmental Quality Act. I know it's been a team effort thus far and will continue to be as the process heads toward a conclusion.

The constrained scope of the EIR as determined by the Initial Study actually confirms the wisdom of the Bureau's original decision to prepare a Mitigated Negative Declaration in 2012-13 because of the limited number of mandated issue areas the Proposed Project potentially impacts.

My specific comments on Sections of the document are as follows:

2.3.1 – Environmentally Sensitive Areas (ESAs)

PK-2

The incorporation and use of ESAs in the EIR raises a couple of issues. First, the ESAs denoted on maps in Section 4.2-2a and b have existed for a number of decades. Given that these ESAs are likely to have been encroached upon and/or altered by development or natural changes over

Proudly serving the communities of: Bel Air, Bel Air Knolls, Benedict Canyon, Beverly Glen, Beverly Hills, Brentwood, California Country Club,
Cheviot Hills, Carthay Square, Crestwood Hills, Century City, Cheviot Hills, Comstock Hills, Encino, Fairfax, Hollywood,
Holmby Hills, Melrose, Miracle Mile, Pico-Robertson, Rancho Park, Sherman Oaks, South Carthay, Toluca Lake, West Los Angeles, Westside Village, Westwood, Westwood Hills...

PK-2

the years, I question whether they should be rigidly adhered to for the purpose of excluding cat colonies unless and until their boundaries are reviewed and updated by the City.

PK-3

Second, more effort should be given to determining what wildlife exists in each given ESA and whether there actually are threatened or protected species in them for which colony cats could pose a problem. If there are not, the Trap-Neuter-Return (TNR) restrictions should be reconsidered for those locations. This should not be a one-size-fits-all consideration.

PK-4

Third, there appears to be a relationship between ESAs and the County's Sensitive Environmental Areas (SEAs) described in Section 4.2.2.1. I have been unable to identify whether that relationship has any direct bearing on the Cat Program and whether any program restrictions are prescribed for SEAs in addition to those prescribed for ESAs. This should be clarified.

Last and most important, I believe that keeping TNR out of these areas is a completely absurd and boned-headed approach, that accepts the value of this concept as advanced by Travis Longcore. While he is a leader in the Urban Wildlands group which teamed with local Audubon Society chapters in the litigation which led to this EIR, other Audubon leaders in other places support TNR. No other place in the country has required an EIR for something that can only be helpful in reducing the number of stray and feral cats.

PK-5

By creating ESA's which could cover as much as 40% of our city, we are likely to be creating huge Cat Reproduction Zones! We have already done so citywide due to the injunction that has halted our efforts to spay and neuter free-roaming cats for a decade. Under the current proposal, 60% of the city will have a slow but steady reduction, while in 40% we will continue shooting ourselves in the paw with a steady, unnecessary increase. This is all brought on by Longcore's Fantasyland beliefs. His alternative is to create ESA's (preferably for him the whole city) where we would go in, trap and execute thousands of cats, rather than spaying/neutering and returning. This is NOT going to happen. We would be the worldwide standard in cruelty, and a worldwide laughingstock. This would be a cat Holocaust, a citywide "catastrophy." This whole study is premised on his hallucinations. So, based on the reality of the situation, nothing will be done in the 40% (hopefully a lower percentage because those areas are overly broad and outdated) that are ESA's and cats will increase exponentially there. If their presence indeed poses any threat to fauna, that unfortunate situation will be exacerbated, not mitigated.

PK-6

I could see a couple of wildlife refuge areas where we could trap a hundred or so cats and remove them from the area, and adopt them out as working cats. But that is probably the extent of how many we could successfully enroll in the program. For anything beyond those numbers, we would be talking about Longcore's cat mass execution fantasy.

PK-7

We were forced by the court to ultimately allow Longcore to waste one million dollars of city funds on a cat EIR, and the accompanying criticism we received, because we believe this will be a net savings in our efforts to reduce cat overpopulation. Please do not let one man's lunacy devastate a critical program, and the very birds he is trying to save.

2.5.1 – Implementation

The text refers to "pre-qualified spay-and-neuter veterinarians" being eligible to participate in the Task Order Solicitation process. I presume the pre-qualification process is undertaken by the Department of Animal Services (LAAS), but I believe that what that constitutes should be made clear. There are a variety of spay-neuter providers in the city, including some very reputable, experienced ones who have provided LAAS with their services in the past, which are under the impression that for some reason they may not be eligible to participate because for some reason they are not currently providing such services. The EIR should not be conveying any misimpressions with regard to that important matter. The program should allow any spay-neuter provider deemed qualified by the Department to participate at the Department's discretion, no matter when the Department makes that decision.

2.5.2 – Program Implementation Guidelines, etc.

It appears that the Implementation Guidelines allow for TNR-related trapping to take place in both ESAs and in the proposed one-mile buffer zones around them, which I support. The recommendation that the cats, after being sterilized and treated, not be returned to colony sites in those locations raises issues I allude to in my mention of ESAs above and is problematic.

As I mentioned above, attempting to eliminate or prohibit colonies in those areas eliminates a substantial portion of the city's acreage from the Cat Program and runs the risk of creating conditions whereby trappers will not trap in those areas. That, in turn, means that potentially thousands of free-roaming cats will live and breed unabated in precisely the areas we'd rather they not do so.

As noted above, the ridiculous ESA prohibition should at a minimum be fine-tuned to acknowledge ESA locations wherein maintaining colonies would not create meaningful impacts on flora and fauna. Likewise, the one-mile buffer recommendation, while apparently derived from "best practices," is based on free-roaming cat range estimates that are contested by experienced TNR practitioners. I am aware of arguments that one-third of a mile would be more realistic, especially considering that a managed colony with regular feedings is likely to motivate the cats to remain relatively close to their primary food source (which in the case of a colony is going to be the feeding site). Additionally, it is a known fact that male cats roam much further than females in search of potential mates and neutering them would have a mitigating impact on their likelihood to wander for a full mile in such a search. I recommend that appropriate reductions to the buffer zones be considered, which I believe will cause no additional impacts, especially if done in conjunction with a fine-tuning of the ESA restrictions as I've suggested, or even better, eliminating them.

Regarding feeding hours, I am concerned that the suggested 6 a.m. – 8 p.m. and 30-minute limitations could prevent working persons who manage colonies and also have to deal with

PK-8

PK-9

PK-10

PK-10

congested commutes to and from work will not be able to effectively carry out the tasks necessary to effectively feed the cats. I recommend that this be adjusted at least to 5 a.m. – 9 p.m. and 1-hour, respectively, or made even more flexible so as to accommodate the needs of colony managers who will be the engine driving the success of the program.

PK-11

Regarding the Working Cat Program, I am very supportive as long as it's implemented in manageable locations. I am aware that the concept has been successful in a variety of locations, including several Los Angeles Police Department stations, the Downtown L.A. Flower Mart, barns and so on. I believe we will have some work to do to convince "non-believers" to allow the program to be installed in buildings they manage, but I am hopeful it can be accomplished.

4.2.2.9 – Biological Resources

PK-12

As noted above, the evolving nature of ESAs and SEAs suggests that the analysis of predation can lead to the more nuanced treatment of those locales I've previously set forth, at a minimum.

4.2.2.10 – Cat Density

PK-13

The analysis of cat density implicitly argues that the population control offered by the implementation of TNR would be beneficial to the fauna in ESAs, SEAs and buffer zones.

4.2.3.2 – Impacts Analysis

Because trapping for TNR is non-lethal, it should not place small wildlife in mortal danger should non-feline animals venture into the cage traps. And trappers will be able to release them promptly, so the risk to these animals should be minimal.

PK-14

The expressed concern regarding the potential for trappers to trample vegetation can be mitigated by providing trappers with instructions and guidelines for avoiding disruption of flora. Because trappers are trying to lure cats, not frighten them away, disrupting vegetation would be counterproductive.

BIO-3 – Interference with Wildlife Movement, etc.

PK-15

As the author of the City's proposed Wildlife Corridor plan, I am very sensitive to the potential for disrupting the safe movement of wildlife in the urban setting. I believe the EIR's analysis of the risks associated with the presence of free roaming cats is at least slightly exaggerated. Clearly small felines are not a threat to larger animals ranging from bobcats and servils up to deer and mountain lions. They may pose a modest threat to birds, rodents and other small animals smaller than themselves, but that threat should recede as TNR population controls are asserted. I support the EIR's conclusion that this likely is to be the case. Additionally, I believe those birds and smaller animals undertake movement that is not restricted to corridors, per se, so the risk posed by outdoor cats is further dissipated. And the choice is a program to reduce free-roaming cats, or to do nothing and INCREASE their numbers. So how could having fewer free-roaming cats impact wildlife movement anyway?

PK-16

BIO-4 – Wetlands Habitat, etc.

I support the EIR's conclusion that the impact of TNR on wetland habitats will not be significant, and if anything would be positive, with a number of cats being reduced. However, I could see identifying a wetlands area and removing a small cats for use in the working cats program.

5.2 – Alternatives

PK-17

The array of project alternatives presented primarily includes useless proposals that will not have the beneficial impact for free roaming cat population control that the Cat Program provides. Two alternatives, number 6 (free trapping and surrender) and number 12 (free trapping and euthanization) are objectionable as a matter of City policy and because the City's reliance on volunteer trappers makes them impractical and indeed impossible. The City's trapping partners will not undertake the activity if it leads directly or indirectly to killing cats. Thus, they become comparable to the No Project alternative, which straightforwardly ensures that every negative impact the critics of TNR warn of is essentially guaranteed to occur. The alternative proposing a reduction to the household cat limit is directly in conflict with an aspect of the Citywide Cat Program calling for an increase in that limit which already has been approved in concept by the Los Angeles City Council. Requiring a lower number of indoor cats one can own will simply

PK-18

make adoption of cats through our shelters more difficult, and more of them euthanized, a result desirable only to Mr. Longcore and the rare, out-of-step animal activist organization.

PK-19

In conclusion, with significant modifications to the guidelines and mitigation measures, I believe this EIR paves the way for an effective Cat Program that will reduce environmental impacts as well as the number of cats (especially neo-natal kittens) killed in the City animal shelters. Absent the kinds of implementation modifications I suggest, however, I believe the City may be setting itself up to fail with regard to controlling the population of free roaming cats. That would be an unacceptable outcome for the City, the cats, the birds and the people who care about them.

Sincerely,

PAUL KORETZ
Councilmember, 5th District

Communication from Public

Name: Jennifer Pimentel

Date Submitted: 12/01/2020 12:44 PM

Council File No: 17-0413

Comments for Public Posting: To the Honorable Members of the Personnel and Animal Welfare Committee, My name is Jennifer Pimentel and I am the Executive Director of LA Programs for Best Friends Animal Society. I am writing to you all today in support of the Citywide Cat Program. The release of the final Environmental Impact Report (FEIR) represents a critical step to Los Angeles becoming a no-kill community—a goal we share with?the city's animal welfare organizations, elected officials, and residents.?? ? Attached, please find an accompanying letter of support. Best Friends will be attending the PAW Committee meeting on Wednesday, December 2 to give public comment. Thank you for your continued support to the animals of Los Angeles. Jennifer Pimentel Executive Director Best Friends Animal Society, Los Angeles

Jennifer Pimentel
Executive Director, Best Friends Los Angeles
jenniferp@bestfriends.org

November 30, 2020

Members of the PAW Committee:

Councilmember Paul Koretz, Chair
Councilmember John S. Lee
Councilmember Curren D. Price, Jr.

200 North Spring Street
Los Angeles, CA 90012

Honorable Members of the Personnel and Animal Welfare Committee (PAW):

My name is Jennifer Pimentel, I am the Executive Director of LA Programs for Best Friends Animal Society.

Best Friends is a national animal welfare organization with a strong presence (consisting of nearly 24,000 supporters in Los Angeles) for over 30 years. Currently, we operate out of two city-owned buildings, the Northeast Valley Animal Shelter and the Jefferson Park Shelter, a successful private/public partnership since 2012. In addition to our physical operations, we have spearheaded the No-Kill Los Angeles Initiative (NKLA) since 2012, which in partnership with LA Animal Services achieved an 88.7% save rate in 2019, up from a 57% save rate in 2012.

We are pleased to see the publication of the Final Environmental Impact Report (FEIR) for the Citywide Cat Program (CCP), as it represents a critical step in Los Angeles becoming a no-kill community — a goal we share with the city's animal welfare organizations, elected officials, and residents.

Best Friends operates more large-scale trap-neuter-return (TNR) programs, than any other organization in the country and we know firsthand of their many benefits.

We are very grateful to the Bureau of Engineering, LA Animal Services, and the Board of Animal Services Commissioners, who on November 24, 2020, unanimously voted to approved the FEIR, and of course, to the members of the

PAW Committee for your collective, tireless efforts and ongoing commitment to make this critical program a reality.

By almost any measure, the injunction against city-supported TNR has been a failure. Perhaps the most obvious metric is the number of underage kittens coming into city shelters — more than 13,054 in 2019 alone, representing a 20% percent increase over the previous year (2018). After more than 10 years of living with the injunction, it is clear that its impact has been devastating.

We agree with the FEIR's conclusion that the proposed CCP will produce "no significant impacts" and welcome the allocation of funding for the surgical sterilization of 20,000 free-roaming cats in Los Angeles. This, as the FEIR's analysis indicates, will likely result in a significant reduction in the population of these cats throughout the city.

We were also encouraged to see that the buffer zones around Environmentally Sensitive Areas (ESA), which were included in the draft version of the EIR (DEIR), and which contained many restrictions which would have impeded the CCP, have been removed from the FEIR.

Lastly, we are in support of the Municipal Code being amended to increase the number of cats allowed per household from 3 to 5.

We respectfully encourage the PAW Committee to approve the FEIR, moving it as quickly as possible to the full City Council.

If you have any questions please do not hesitate to contact me at jenniferp@bestfriends.org or by phone at 559-908-3815. Thank you for your continued support of the animals and the people that care for them.

With gratitude,

Jennifer Pimentel

Communication from Public

Name: Karn Myers
Date Submitted: 12/01/2020 11:39 AM
Council File No: 17-0413
Comments for Public Posting: Please see attached.

December 1, 2020

PAW Committee:

As the first and largest provider of free and low-cost spay/neuter surgery for cats in Los Angeles County, we at FixNation are very pleased to see the publication of the final Environmental Impact Report (EIR) for the Citywide Cat Program. We are grateful to the Bureau of Engineering, L.A. Animal Services, the Board of Animal Services Commissioners, and the L.A. City Council, for their commitment to the City's companion animals—owned and unowned alike—and the people who care for them.

Our high-volume, high-quality nonprofit clinic has experienced firsthand the disastrous impact of the 2010 injunction against city-supported trap-neuter-return (TNR). In the first year alone, FixNation was hit with a decrease in revenue of 20 percent as L.A. Animal Services' voucher program was suspended. In response, we have made every effort to make our services available to L.A. residents at no cost—but this poses obvious challenges for sustainability. We therefore welcome the Program's allocation of funding for the surgical sterilization of 20,000 free-roaming cats annually from Los Angeles.

FixNation and its programs have sterilized nearly 200,000 cats to date, processing approximately 17,000 felines each year. We currently spay/neuter 100+ cats a day, a daunting reminder of the urgent need to implement TNR to manage the city's skyrocketing population of community cats—and, by extension, the importance of the resources necessary to support such programs. We encourage the City Council to approve the EIR and implement the Citywide Cat Program as soon as possible.

Again, thank you for your continued support of the animals that share our communities with us and the many Angelenos who care for and about them.

Sincerely,

Karn Myers
FixNation, Co-Founder & Executive Director
NKLA Steering Committee