



NORTH UTAH VALLEY ANIMAL SERVICES SPECIAL SERVICE DISTRICT

THE SCIENCE OF FERAL CATS

A Research Based Report

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EXECUTIVE SUMMARY

The North Utah Valley Animal Services Special Service District (NUVAS) provides animal sheltering, regulation, care, control, and services for the municipalities that exist within our district boundaries, including Alpine, American Fork, Cedar Fort, Cedar Hills, Eagle Mountain, Highland, Lehi, Lindon, Orem, Pleasant Grove, Saratoga Springs, unincorporated areas of Utah County, and Vineyard.

In May 2019 NUVAS formed an ad-hoc committee (TNR Committee) to consider a feral and free-roaming cat Trap-Neuter-Return (TNR) program that was proposed by Best Friends Animal Society (BFAS). The purpose of this report is to give an account of the TNR Committee's findings of their investigation and ultimately make a recommendation regarding the implementation of a TNR program in our district. This document is intended to provide information to the public, municipal or governing organizations, decision makers, and NUVAS board members regarding the management of local feral and free-roaming cat populations and the efficacy of Trap, Neuter, and Release (TNR) programs.

This report is based entirely on relevant, science-based information; we gathered and reviewed data and information from:

- Empirical reports
- National coalitions
- Government agencies
- Medical professionals
- Best Friends Animal Society
- Research papers and projects
- Institutions of higher education
- Published, peer-reviewed works
- Scientific journals and periodicals
- Utah animal shelters currently implementing TNR programs
- Veterinary, wildlife, public health, conservation, ecology, biology, and animal agencies and organizations

This report will show that, overwhelmingly, science does not support TNR programs as an effective method to reduce feral cat populations in the community. Additionally, TNR programs not only fail to adequately mitigate the significant threat to public health or alleviate the negative impact on wildlife that feral and free-roaming cats pose, but actually exacerbate these issues.

BEST FRIENDS ANIMAL SOCIETY PROPOSAL

Best Friends TNR program proposes that when a feral cat enters the shelter, it is taken to be surgically altered, vaccinated, ear-tipped, and is then returned to its original location. Any cat that enters the shelter without obvious identification (microchip, collar) is eligible for the TNR program, at the shelter's discretion. This includes feral cats, stray cats, and even friendly cats.

When a feral cat(s) enters the shelter, Best Friends will go to the intake address and speak with the feral cat(s) caregiver and any citizens who have complaints against the presence of the feral cat(s). If conflicts between a caregiver and the citizen(s) can be successfully mediated then the cat will be returned to its original location, if not then Best Friends will relocate the cat(s) elsewhere.

Best Friends can implement the proposed TNR program with approximately a two-week lead time. Best Friends will commit to fund this TNR pilot program completely for up to three years, however they will accommodate it for as short as six months if so desired.

During the Pilot Program Best Friends Will Provide:

- 100% funding for the duration of the pilot program, requires no public funds
- Staffing to implement and execute program
- Community cat hotline and email - staffed by Best Friends employees and volunteers Monday – Saturday
- Best Friends will relocate cats to a site of the shelter's choosing in situations where the return is not possible
- All spay and neuter surgeries for cats in program
- All needed medical procedures
- All required vaccinations including rabies and FVRCP
- Resident conflict resolution and mediation services, including deterrents and relocation
- Assistance implementing any necessary ordinance changes
- Provide spay and neuter and trapping assistance to residents
- Free microchips provided to district residents – to cat redemption rates
- Spay and neuter surgeries for all of NUVAS's adoptable cats

Best Friends Estimated Annual Program Costs:

▪ Surgeries @ \$35 per cat	\$12,320
▪ Vaccinations	\$1,200
▪ Medication	\$1,320
▪ Employee to administer program	\$37,360
▪ Fuel	\$1,100
▪ Traps, feral dens, safety equipment,	\$3,500
▪ TOTAL:	\$56,800

West Valley City Actual Annual Program Costs:

▪ Surgeries @ \$35 per cat	\$12,320
▪ Vaccinations	\$1,200
▪ Medication	\$1,320
▪ Employee to administer program	\$37,360
▪ Fuel	\$1,100
▪ Traps, feral dens, safety equipment,	\$1,500
▪ Feral dens	\$1300
▪ Misc safety equipment	\$700
▪ Food	\$5280
▪ Truck	\$45,000
▪ Fuel	\$1,100
▪ TOTAL	\$107,080

STATISTICAL COMPARISON BRIEF

PARTICIPATING AGENCY	YEARS WITH TNR	CAT INTAKE YEAR ONE	CAT INTAKE 2018	PERCENT DIFFERENCE
<i>Salt Lake County</i>	<i>2011-2018</i>	<i>4864</i>	<i>4073</i>	<i>16% decrease</i>
<i>West Valley City</i>	<i>2011-2018</i>	<i>2251</i>	<i>1577</i>	<i>30% decrease</i>
<i>Weber County</i>	<i>2016-2018</i>	<i>2096</i>	<i>2210</i>	<i>5% increase</i>
<i>Davis County</i>	<i>2016-2018</i>	<i>2356</i>	<i>2255</i>	<i>4% decrease</i>
<i>West Jordan City</i>	<i>2017-2018</i>	<i>962</i>	<i>940</i>	<i>2% decrease</i>

PARTICIPATING AGENCY	YEARS WITHOUT TNR	CAT INTAKE YEAR ONE	CAT INTAKE 2018	PERCENT DIFFERENCE
<i>South Utah Valley</i>	<i>2014-2018</i>	<i>2243</i>	<i>1197</i>	<i>15% decrease</i>
<i>North Utah Valley</i>	<i>2010-2018</i>	<i>3403</i>	<i>1785</i>	<i>48% decrease</i>

North Utah Valley Animal Shelter

YEAR	CAT INTAKE	DIED @ SHELTER	EUTHANIZED
2012	2568	558	1710
2018	1785	57	744

Average Feral Cat Intake since 2013 = 198

ADDRESSING INACCURATE CLAIMS

Proponents of feral cat TNR programs often make claims that are inaccurate and cite studies that, in fact, do not support their claims. The following (taken from *Report to Pompano Beach City Commissioners: The Science of Feral Cats*, written by Grant Sizemore of the American Bird Conservancy, bibliography included) outlines the truth in regards to four of these claims.

Claim #1 – Removing cats from the environment results in a vacuum effect that will only bring in more cats

Reality:

The “vacuum effect” refers to a situation in which a population is at carrying capacity, a scientific term that refers to the maximum number of animals that the local ecosystem can support. When an individual animal dies or is removed, the population has an opening for another individual to enter. The citation of the vacuum effect by feral cat activists is inappropriate for two reasons: 1) feral cats are unlikely to exclude one another from an area to begin with, and 2) the vacuum effect applies to TNR programs just as it does any other strategy for population reduction.

The carrying capacity of a local system may be determined by the limitation of food, water, shelter, etc. What TNR activities provide, unlike natural wild systems, is an increase in the carrying capacity. By continually feeding feral cats that arrive in a colony, “caretakers” never allow the population a chance to “even out.” On the contrary, this behavior encourages additional cats to immigrate into the colony and is one of the reasons that feral cats are observed at densities of 10-100 times that of similarly sized native predators.^{1,2}

Although feral cat activists often point to the vacuum effect as support for TNR, they fail to recognize or mention that this phenomenon would completely undermine the so-called management of a TNR program. TNR is sold as a way to diminish feral cat populations gradually through attrition. However, as each individual dies off in a colony, a “spot” opens up and creates the same “vacuum” as when cats are removed from the environment by other means. According to a peer-reviewed article in the journal *Conservation Biology*,³ activists “refer to a so-called vacuum effect in which new cats are said to immigrate to a location after removal programs,^{4,5} but fail to provide evidence that such a phenomenon ³ does not also occur when TNR colonies decrease in size.” To suggest that the vacuum effect only applies to non-TNR management programs is without merit.

1 Nowell K. and P. Jackson, editors. 1996. Status survey and conservation action plan: wild cats. IUCN, Gland and Cambridge.

2 Liberg O., M. Sandell, D. Pontier, and E. Natoli. 2000. Density, spatial organization and reproductive tactics in the domestic cat and other felids. Pages 119-147 in D.C. Turner and P. Bateson, eds. *The Domestic cat: the biology of its behavior*. Cambridge University Press.

3 Longcore T., C. Rich, and L. M. Sullivan. 2009. Critical assessment of claims regarding management of feral cats by trap-neuter-return. *Conservation Biology* 23: 887-894.

4 Patronek G. J. 1998. Free-roaming and feral cats – their impact on wildlife and human beings. *Journal of the American Veterinary Medical Association* 212: 218-226.

5 Gibson K. L., K. Keizer, and C. Golding. 2002. A trap, neuter, and release program for feral cats on Prince Edward Island. *Canadian Veterinary Journal* 43: 695-698.

Claim #2 – A reduced intake rate by shelters is evidence for the success of TNR

Reality:

The only conclusion that can be drawn from a reduced intake rate is that a shelter is taking in fewer animals. It makes perfect sense that a shelter would experience a reduced intake rate as a result of TNR because the feral cats are no longer being taken to the shelter. Instead, these cats are being maintained in colonies throughout the community through a program of systematic re-abandonment. A reduced intake rate is absolutely no indication of fewer cats or success for TNR. To use intake rate as a proxy for the success of TNR is highly illogical and misleading. The only accurate representation of TNR’s success would be a repeated complete census of the feral cat population beginning prior to the implementation of TNR and continuing throughout the implementation process.

Claim #3 – Feral cats are not at a higher risk of feline immunodeficiency virus (FIV) or feline leukemia virus (FeLV)

Reality:

The study often cited by feral cat activist organizations is “Seroprevalence of feline leukemia virus and feline immunodeficiency virus infection among cats in North America and risk factors for seropositivity.”⁶ Unfortunately, the activists are completely misusing the results of this study to support their agenda. Instead of showing that feral cats are not at an increased risk of FIV or FeLV, the results actually indicate quite the opposite. “Several factors were found in bivariate analyses to be significantly associated with risk of FeLV and FIV [infection]...Risk of [infection] was significantly higher in pet cats that were allowed outdoors than in pet cats that were kept strictly indoors.” Furthermore, the authors state that “feral cats had a significantly higher risk of FIV [infection] than did stray cats and relinquished pet cats.” The authors conclude that “this information can be used to support lifestyle recommendations to keep cats healthy, such as preventing cats from roaming outdoors.” Clearly, outdoor cats, including feral cats, are at an increased risk of FIV and FeLV.

In addition to being at an increased risk of FIV and FeLV, there is evidence to suggest that FeLV-infected cats are at an increased risk of contracting rabies. FeLV-positive cats should receive more frequent rabies vaccinations (every 6 months),⁷ yet this is far from standard procedure among TNR practitioners, where cats are lucky to be vaccinated for rabies even once.⁴

6 Levy J. K., H. M. Scott, J. L. Lachtera, and P. C. Crawford. 2006. Seroprevalence of feline leukemia virus and feline immunodeficiency virus infection among cats in North America and risk factors for seropositivity. *Journal of the American Veterinary Medicine* 228: 371-376.

7 Franchini M. 1990. Die tollwutimpfung von mit felinem Leukamivirus infizierten Katzen. Veterinary Dissertation. Zurich University.

Claim #4 – Toxoplasmosis is not a threat from feral cats

Reality:

Cats are the definitive host of the parasitic protozoan *Toxoplasma gondii*, which causes toxoplasmosis, and are the only animals known to shed the infectious eggs. As the definitive host, *T. gondii* relies on cats for reproduction, but intermediate hosts may also be infected and include all warm-blooded animals (i.e., birds, mammals). Infection rates have been shown to be higher in free-roaming cats than pet cats, with the lowest prevalence in cats kept indoors.⁸ Additionally, scientists have identified that as many as 74% of adult domestic cats have been infected by *T. gondii* at some point in their life.⁹ The infection rate changes depending on whether cats are kept indoors or not and is “usually higher in stray or feral cats.” An infected cat may shed hundreds of millions of infectious eggs in the environment. These eggs are extremely resistant to environmental conditions and may remain infectious for up to 18 months.¹⁰

The impacts of toxoplasmosis to humans may be severe. Consequences include sudden abortion of fetuses, fetal developmental defects, blindness, neurological impairment, and may particularly impact immunocompromised individuals (e.g., those suffering from HIV/AIDS). Behavioral manipulation is an innate part of *T. gondii*'s life history that increases its chances of reproductive success but may have adverse and unintended effects on people. Infected rats become attracted to cat urine and, thus, are more likely to be predated by cats and pass on the parasite to the definitive host. This manipulative power of *T. gondii* has been proposed to explain impacts on humans as well. *T. gondii* preferentially creates cysts in the central nervous system that may result in an increased chance of schizophrenia, autism, Alzheimer's and other neuro-inflammatory diseases.^{11,12}

Although contraction of toxoplasmosis may occur by ingesting infectious eggs where cats have defecated in a garden, yard, sandbox, or beach, environmental contamination may be much broader and more dangerous for both humans and wildlife. Potential watershed contamination is a serious risk that may result in additional infections. Toxoplasmosis was the cause of 16% of all southern sea otter deaths between 1998 and 2001¹³ and infected 52% of dead and 38% of live otters sampled between 1998 and 5 2004.¹⁴ Research has shown that those otters near heavy freshwater outflows were three times more likely to contract toxoplasmosis than individuals near low freshwater outflows.¹⁵ With the large number of cats defecating outdoors, toxoplasmosis contamination of watersheds may severely and negatively impact both people and wildlife.

8 Nutter F. B., J. P. Dubey, J. F. Levine, E. B. Breitschwerdt, R. B. Ford, and M. K. Stoskopf. 2004. Sero-prevalences of antibodies against *Bartonella henselae* and *Toxoplasma gondii* and fecal shedding of *Cryptosporidium* spp, *Giardia* spp, and *Toxocara cati* in feral and pet domestic cats. *Journal of the American Veterinary Medical Association* 225: 1394-1398.

9 Tenter A. M., A. R. Heckeroth, and L. M. Weiss. 2000. *Toxoplasma gondii*: from animals to humans. *International Journal for Parasitology* 30: 1217-1258.

10 Berdyev A. S. and E. A. Shevkunova. 1988. On the distribution of toxoplasmosis among wild vertebrates in Turkmenia (according to serological data). *Parazitologiya* 22: 378-383.

11 Fekadu A., T. Shibre, and A. J. Cleare. 2010. Toxoplasmosis as a cause for behavior disorders: overview of evidence and mechanisms. *Folia Parasitologica* 57: 105-113.

12 Prandota J. 2010. Autism spectrum disorders may be due to cerebral toxoplasmosis associated with chronic neuro-inflammation causing persistent hypercytokinemia that resulted in an increased lipid peroxidation, oxidative stress, and depressed metabolism of endogenous and exogenous substances. *Research in Autism Spectrum Disorders* 4: 119-155.

13 Kreuder C. M. A. Miller, D. A. Jessup, L. J. Lowenstine, M. D. Harris, J. A. Ames, T. E. Carpenter, P. A. Conrad, and J. A. Mazet. 2003. Patterns of mortality in southern sea otters (*Enhydra lutris nereis*) from 1998-2001. *Journal of Wildlife Diseases* 39: 495-509.

14 Conrad P. A., M. A. Miller, C. Kreuder, E. R. James, J. Mazet, H. Dabritz, D. A. Jessup, F. Gulland, and M. E. Grigg. 2005. Transmission of *Toxoplasma*: clues from the study of sea otters as sentinels of *Toxoplasma gondii* flow into the marine environment. *International Journal for Parasitology* 35: 1155-1168.

15 Miller M. A., I. A. Gardner, C. Kreuder, D. M. Paradies, K. R. Worcester, D. A. Jessup, E. Dodd, M. D. Harris, J. A. Ames, A. E. Packham, P. A. Conrad. 2002. Coastal freshwater runoff is a risk factor for *Toxoplasma gondii* infection of southern sea otters (*Enhydra lutris nereis*). *International Journal for Parasitology* 32: 997-1006.

SCIENTIFIC EXCERPTS BY TOPIC OF CONCERN

TNR DOES NOT REDUCE THE POPULATION OF FERAL CATS IN THE COMMUNITY

“Overwhelmingly, the scientific literature indicates that Trap, Neuter, Release (TNR) programs fail to reduce feral cat populations and negatively impact people and wildlife.”

“Data contradicted the assertion that managed cat colonies decline in size over time and suggested that trap, neuter, and release programs are not an effective method to help control the population of unwanted feral and free-roaming cats.”

- **American Bird Conservancy (2019). *The evidence against trap, neuter, release*. www.abcbirds.org**

“TNR was not effective at reducing free roaming cat numbers...”

- **Schmidt, P. M., Swannack, T. M., Lopez, R. P., Slater, M. R., (2009). *Evaluation of euthanasia and trap-neuter-return programs in managing free-roaming cat populations*. *Wildlife Research* 36, 117-125.**

“A 1 year study of TNR programs...revealed that well-fed cat colonies encouraged illegal abandonment...the arrival of new cats prevented the reduction of the colonies...”

- **Levy, J. K., Crawford, P. C., (2004). *Humane strategies for controlling feral cat populations*. *JAVMA* 225, 1354-1360.**

“Our analysis indicated that any population-level effects were minimal...which indicated ongoing population growth...”

“...no plausible combinations of life history variables would likely allow for TNR to succeed in reducing population size...”

“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...”

- **Foley, P., Foley, J. E., Levy, J. K., Paik, T., (2005) *Analysis of the impact of trap-neuter-return programs on the populations of feral cats*. *JAVMA* 227, 1775-1781.**

“...virtually no information exists to support the contention that neutering is an effective long-term method for controlling free-roaming cat populations.”

“Immigration or abandonment of new cats may be a frequent event, and free-roaming cats do not appear to have sufficient territorial activity to prevent new arrivals from permanently joining colonies. These new arrivals could substantially limit the success of TNR...”

- **Levy, J. k., Gale, D. W., Gale, L. A., (2003) *Evaluation of the effect of a long-term trap-neuter-return and adoption program on a free-roaming cat population*. *JAVMA* 222, 42-46.**

“Overall, we did not find any significant differences in population counts across years.”

“...we counted more than twice as many cats in 2012 as we did in 2011.”

“...while we did find a statistically significant increase in the proportion of sterilized individuals...this increase was not enough to expect any decline in population numbers.”

- **Kilgour, R. J., Magle, S. B., Slater, M., Christian, A., Weiss, E., DiTullio, M., (2017) *Estimating free-roaming cat populations and the effects of a one year Trap-Neuter-Return management effort in a highly urban area*. *Urban Ecosyst* 20, 207-216**

“Neither study reduced cat numbers.”

“Reducing cat survival (by increasing euthanasia rates) would likely have a greater effect on cat population growth than reducing fecundity (by increasing sterilization rates).”

“A 50% increase in annual euthanasia rates would likely result in a population decline of 10% per annum; whereas a 75% increase in annual sterilization rates would likely result in an increasing population.”

“Trap-ethanize strategies have proven effective at reducing cat populations...In contrast, TNR programs alone have never been shown to stabilize a feral cat population in the scientific literature.”

- **Gotsis, T., (2014) Feral cats: Do trap-neuter-return programs work? *NSW Parliamentary Research Service 18/2014, 1-19***

“...numerous scientific studies have found that trap-neuter-release operations fail to reduce populations within a colony.”

- **Bies, L., (2019) Feral cats: impacts of an invasive species. *The Wildlife Society Fact Sheet, wildlife.org***

“It cannot be stated definitively that the total number of cats on campus decreased...”

- **Hughes, K. L., Slater, M. R., (2002) Implementation of a feral cat management program on a university campus. *Journal of Applied Welfare Science 5(1), 15-28***

“Free-roaming cat populations have a high intrinsic growth rate, and euthanasia is estimated to be more effective at reducing cat populations than trap-neuter-return programs.”

“Thus, TNR programs are not likely to convert increasing cat populations into declining populations or even stable populations...”

- **Andersen, M. C., Martin, B. J., Roemer, G. W., (2004) Use of matrix population models to estimate the efficacy of euthanasia versus trap-neuter-return for management of free-roaming cats. *JAVMA 225, 1871-1876***

“The model suggested that TNR...will not lead to long-term reduction in the numbers of cats because colonies can re-establish due to immigration.”

- **Stoskopf, M., Nutter, F. (2004) Analyzing approaches to feral cat management – one size does not fit all. *JAVMA 225, 1361-1364***

“...all these (TNR) efforts...are a waste of money, time, and energy.”

- **Natoli, E., et. al. (2006) Management of feral domestic cats in the urban environment of Rome (Italy). *Preventative Veterinary Medicine 77, 180-185***

“Stray dogs, cats, and ferrets should be removed from the community...”

“Stray and feral cats serve as a significant source of rabies exposure risk.”

- **Brown, C. M., Slavinski, S., Ettestad, P., Sidwa, T. J., Sorhage, F. E., (2016) National Association of Public Health Veterinarians Compendium of animal rabies prevention and control. *JAVMA 248, 505-517***

“...free-roaming cats are not native to any environment in the United States. Many scientific studies report that non-lethal (TNR) programs do not reduce the numbers of feral cats in the environment.”

- **Frey, N., (2015) Stray cats in your neighborhood. *Utah State University Extension, Featured Animal September 2015***

“A study of TNR implemented countywide in San Diego showed that feral cat populations had not decreased after 10 years, and a similar result was found after 7 years in Alachua County, Florida, where feral cat populations increased (Foley et al. 2005).”

“Two colonies subject to TNR in Florida were tracked for over a year and population size of both colonies increased owing to the influx of new cats dumped at the highly visible sites (Castillo & Clarke 2003).”

- **Longcore, T., Rich, C., Sullivan, L. M., (2009) Critical assessment of claims regarding management of feral cats by trap-neuter-return. *Conservation Biology 23(4), 887-894***

“TNR programs require consistent funding and commitment and cannot be expected to lead to eradication as long as the environment is hospitable to cats and cats are available for immigration into the area.”

- **Kustritz, M.V.R., (2011) Managing feral cat colonies. *DVM Proceedings May 01, 2011***

“In a survey of 101 cat feeders...the total surveyed cat population was reportedly 920 before participation in TNR and 678 after TNR. However, the total number of cats (n=920) minus deaths (151), disappearances (149), and adoptions (238) and plus births (498) and immigrations (103) equals 983, not 678.”

- **Winter, L., (2004) Trap-neuter-release programs: the reality and the impacts. *JAVMA 225, 1369-1376*.**

“The practice of trapping, neutering, and then re-releasing cats into managed cat colonies does not effectively control cat populations and their adverse impacts on wildlife and should be opposed...”

“The most effective and humane method of dealing with feral cats is to remove them through trapping followed by adoption or euthanasia”

“...eradication is the only real answer, however unpleasant...”

“...studies and practical experience with cat colonies have shown that they are the wrong solution to cat overpopulation.”

- **Wallace, G., Ellis, J., (2003) Impacts of feral and free-ranging domestic cats on wildlife in Florida. *Issue Assessment-Florida Fish and Wildlife Conservation Commission.***

FERAL CATS SPREAD DISEASE TO HUMANS

“Unowned free-roaming cats pose important threats to human health. Zoonotic concerns include the rabies virus, *Toxoplasma gondii*, *Bartonella* species, *Toxocara cati*, *Microsporium canis*, *Cryptosporidium* species, *Campylobacter* species, *Yersinia pestis*, *Cheyletiella* species and *Francisella tularensis*.”

- **Folfer, W. R., Lovelace, K., Robertson, S., Rose, C., (2013) American Association of Feline Practitioners: Free-roaming, abandoned and feral cats. *Journal of Feline Medicine and Surgery*, 821-822**

“As a rabies vector, cats pose a disproportionate risk for potential human exposures...”

“A study of 67 counties in Pennsylvania found that 44% of postexposure prophylaxis administration was due to cats, most of which (82%) were feral, stray, or unowned.”

“Many other potential zoonotic and cat-specific diseases are harbored in feral cat populations in addition to rabies. Among these are bartonellosis, toxoplasmosis, plague, endo-and ectoparasites, feline immunodeficiency (FIV), feline leukemia virus (FeLV), and rickettsial diseases.”

“Group feeding of cats by colony caretakers puts cats at a greater risk for contracting diseases whose transmission is augmented by increased animal density and contact rates among cats...Group feeding also increases risk for contracting rabies and other wildlife diseases by enabling greater contact along the interface between cat colonies and wildlife reservoirs...Feeding sites that attract raccoons, skunks, and foxes are particularly dangerous because these species are rabies reservoirs in the U.S.”

“TNVR does not adequately meet feral cat population control needs that public health and animal welfare necessitate.”

“One recent study, which modeled costs and benefits for TNVR as compared to trap and euthanize programs, found that in all scenarios trap and euthanize programs were cheaper to conduct and had a higher economic benefit.”

“TNVR...should not be endorsed as an effective approach...for mitigating health concerns related to feral cat colonies.”

- **Roebing, A. D., Johnson, D., Blanton, J. D., Levin, M., Slate, D., Fenwick, G., Rupprecht, C. E., (2014) Rabies prevention management of cats in context of trap, neuter, vaccinate, release programs. *Zoonoses Public Health* 61(4), 290-296.**

“Domestic cats shed 3 to 349 million *T gondii* oocysts 3 to 5 days after consuming infected animal tissues...”

“Annual fecal deposition...by owned cats in the 3 communities was estimated to be 76.4 tons...Feral cats...could be contributing 29.5 tons of feces to environment per year...”

“*T gondii* oocysts...can remain viable for more than a year in the soil. Contaminated soil is an important source of infection for humans, herbivores, rodents, and birds.”

- **Dabritz, H. A., Atwill, R., Gardner, I. A., Miller, M. A., Conrad, P. A., (2006) Outdoor fecal deposition by free-roaming cats and attitudes of cat owners and nonowners toward stray pets, wildlife, and water pollution. *JAVMA* 229, 74-81**

“Rabies is a disease of great significance in all species, including humans. In the most recently published survey of rabies surveillance in the United States, rabid animals were identified in 49 states...cats represented...nearly 4 times that reported for dogs.”

“In one survey of feral cats in Italy, two of eight rabid cats were from known feral cat colonies that were managed by human caregivers.”

“*Toxoplasma gondii* always is present in feral cat colonies...”

“One study estimated that in a single community, the amount of feces deposited outdoors by the 2046 feral cats living there every year was about 29.5 tons. A study tracking sources of *E. coli* in storm sewers feeding rivers and streams demonstrated that the highest percentage from any one source came from cats.”

- **Kustritz, M.V.R., (2011) Managing feral cat colonies. *DVM Proceedings* May 01, 2011**

“Of the more common zoonotic diseases spread by free-roaming cats, rabies is the most worrisome...the disease is diagnosed in cats more often than in any other domestic animal.”

“Among the other zoonoses of concern are plague, which has been spread from rodents to cats to humans; toxoplasmosis, which has been spread by free-roaming cats soiling water sources; and Lyme disease, which has been spread by infected ticks brought into the home by free-roaming cats.”

- **How do free-roaming and feral cats impact humans and wild animals? (1998) *Animal Sheltering*, May-June 1998**

“When *T. gondii* infects...pregnant women it may cause a congenital syndrome that includes deafness, seizures, retinal damage, and mental retardation in the fetus or neonate. In immunocompromised individuals...it may produce severe central nervous system damage...Additional concerns have been raised by recent studies of schizophrenia, depression, suicidal behavior, obsessive-compulsive disorder, rheumatoid arthritis, brain cancer, and scholastic underachievement in children, which have reported correlations between such conditions and elevated *T. gondii*...”

“...10% of all deaths of people with HIV are directly from Toxoplasmosis.”

“*T. gondii* alone is sufficient reason to stop conducting TNR...”

“...a recent study...confirms previous reports of higher suicide rates in those infected with *T. gondii*.”

“...ocular toxocariasis...is terribly debilitating...blindness is the most common result, with children bearing the high portion of cases.”

“...many of the cat associated zoonoses are severe and can even include life threatening conditions, such as bubonic plague...”

- **Hillsborough Animal Health Foundation (2012) *Public Health Issues*. Hahf.org/awake/public-health-issues/**

“...stray cats serve as major reservoirs for the bacterium *Bartonella* spp. And *B. clarridgeiae*. Consequently, stray cats and their fleas are the only known vectors for infecting house bound cats and humans with this bacterium. Human infections that may result from exposure of this bacterium via stray cats include: cat scratch disease...bacillary angiomatosis, hepatic peliosis...endocarditis, bacteremia, osteolytic lesions, pulmonary nodules, neuroretinitis, and neurological diseases.”

- **United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, United States Department of the Interior (2003) Management of feral and free-ranging cat populations to reduce threats to human health and safety and impacts to native wildlife species in the commonwealth of Puerto Rico. *Environmental Assessment*, 1-65**

“...the Centers for Disease Control and Prevention has determined that feral cat colonies pose a threat to human health.”

“Up to 74 percent of all cats will host the toxoplasmosis-causing parasite in their lifetime and shed hundreds of millions of infectious eggs as a result. Any contact, either directly or indirectly, with cat feces risks human and wildlife health.”

“Multiple peer-reviewed studies, including the CDC’s, have found that TNR programs do not adequately reduce feral cat populations or effectively mitigate health concerns.”

“The only sure way to simultaneously protect wildlife and people is to remove feral cats from the landscape.”

- **American Bird Conservancy + 199 other agencies/organizations (2014) Letter to the Honorable Sally Jewell, Secretary, U.S. Dept. of the Interior. www.abcbirds.org**

FERAL CATS PREDATE ON OTHER ANIMALS

“...cats are responsible for the extinction of at least 33 species of birds around the world.”

“Estimates from Wisconsin indicate that between 500,000 and 8 million birds are killed by rural cats each year in that state (urban cats are not included in these estimates).”

“Predation by cats has an economic impact of more than \$17 billion dollars per year in the U.S.”

- **Hildreth, A. M., Vantassel, S. M., Hygnstrom, S. E., (2010) Feral cats and their management. *University of Nebraska, Extension, EC1781***

“We estimate that free-ranging domestic cats kill 1.4-3.7 billion birds and 6.9-20.7 billion mammals annually. Un-owned cats, as opposed to owned pets, cause the majority of this mortality. Our findings suggest that free-ranging cats cause substantially greater wildlife mortality than previously thought and are likely the single greatest source of anthropogenic mortality for US birds and mammals.”

“Domestic cats...have been listed among the 100 worst non-native invasive species in the world.”

“We estimate that between 258 and 822 million reptiles and between 95 and 299 million amphibians could be killed by cats in the contiguous United States each year.”

- **Loss, S. R., Will, T., Marra, P. P., (2013) The impact of free-ranging domestic cats on wildlife of the United States. *Nature Communications DOI: 10.1038/ncomms2380***

“...scientists now list invasive species, including cats, as the second most serious threat to declining and rare wildlife.”

“The Mammal Society of England found that a minimum of 44 species of wild birds comprised 24% of the prey that cats brought home to their owners.”

“Studies of prey items that pet cats bring home reveal only the bare minimum of what those cats actually kill. Animals killed by cats but consumed or left elsewhere, animals that escaped the cat but died later because of trauma or secondary infection, or young animals that starved to death or died of exposure because cats killed one or both parents are not counted in such studies.”

“Scientific studies have also documented that declawing cats, putting bells on their collars, or keeping them well fed do not prevent them from killing animals...hunger and hunting behavior are controlled by different portions of a cat’s brain.”

“...well-fed cats were observed stalking and killing birds...”

- **Winter, L., (2004) Trap-neuter-release programs: the reality and the impacts. *JAVMA 225, 1369-1376.***

“Even when cats do not directly kill birds, their mere presence has been shown to result in a reduction in the feeding of nesting chicks by one-third and an increased likelihood of nest failure by an order of magnitude.”

- **Sizemore, G., (2015) Do a little, save a lot: keep cats indoors. *Louisiana Ornithological Society Newsletter, Winter 2015, 7.***

“Feral cats are almost exclusively carnivorous and generally obtain most of their food resources by hunting live prey.”

“Predation by feral cats can jeopardize conservation programs...and have non-lethal impacts on susceptible populations through competition, disease transmission, induced predator-avoidance behavior and hybridization.”

- **Doherty, T. S., Bengsen, A. J., Davis, R. A., (2015) A critical review of habitat use by feral cats and key directions for future research and management. *Wildlife Research 10.1071/WR14159***

“...cats...hunt even when fed daily by humans. Laboratory studies of cats suggest that hunger and hunting are controlled by separate neurological centers in the brain.”

- **Wallace, G., Ellis, J., (2003) Impacts of feral and free-ranging domestic cats on wildlife in Florida. *Issue Assessment-Florida Fish and Wildlife Conservation Commission.***

“...TNVR can cost over \$100 per cat (including trapping, spaying/neutering, vaccination, and transport), and the cats are still able to prey on native birds and mammals.”

- **Opar, A., (2010) Feral cat predation on birds costs billions of dollars a year. *Audubon, December 3, 2010***

FERAL CATS HAVE A NEGATIVE IMPACT OF BIODIVERSITY

“Invasive mammalian predators are arguably the most damaging group of alien animal species for global biodiversity. Species such as cats...threaten biodiversity through predation, competition, disease transmission, and facilitation with other invasive species.”

“The decline and extinction of native species due to invasive predators can have impacts that cascade throughout entire ecosystems. For example, predation by feral cats and red foxes has led to the decline or extinction of two thirds of Australia’s digging mammal species...”

“Rodents are linked to the extinction of 75 species...and cats to 63 extinctions...”

“Introduced rodents and cats are major agents of extinction, collectively being listed as causal factors in 44% of modern bird, mammal, and reptile species extinctions.”

- **Doherty, T. S., Glen, A. S., Nimmo, D. G., Ritchie, E. G., Dickman, C. R., (2016) Invasive predators and global biodiversity loss. *Proceedings of the National Academy of Sciences* 113 (40), 11261-11265**

“...the rate of species extinctions is accelerating, with grave impacts on people around the world...”

“The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide.”

“The number of invasive alien species per country have risen by about 70% since 1970”

- **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019) *The global assessment of biodiversity and ecosystem services. 7th session, IPBES Plenary***

“The list of ‘100 of the World’s Worst Invasive Alien Species’ that is presented here is designed to enhance awareness of...the terrible consequences, of invasive alien species.”

“100 of the World’s Worst Invasive Alien Species...domestic cat (*Felis catus*)”

- **Lowe, S., Browne M., Boudjelas, S., De Poorter, M., (2000) *100 of the World’s Worst Invasive Alien Species. Special lift-out in Aliens* 12, December 2000, 12pp.**

“Attempting to maintain cats in colonies only compounds the problem by causing massive killing and crippling of native wildlife, jeopardizing biodiversity, undermining traditional animal control, enabling irresponsible people to abandon cats, and sending mixed messages about the...commitment to serve the welfare of all species, including cats and wildlife.”

- Jessup, D. A., (2004) The welfare of feral cats and wildlife. *JAVMA* 225 (9), 1377-1383

FERAL CATS HAVE A VERY POOR QUALITY OF LIFE

“People for the Ethical Treatment of Animals (PETA) has called TNR “subsidized abandonment” and states that “feral cats do not die of ‘old age.’ They are poisoned, shot, tortured by cruel people, attacked by other animals, or hit by cars, or they die of exposure, starvation, or...contagious diseases.... In one feral cat colony, half of 32 cats were shot by a man who claimed that they were attacking his children. Cats in another colony were shot with darts. A loose dog killed several cats in another colony. Ferals often scratch their ears bloody, driven crazy by pain and itching of ear mites and accompanying infections. Others die of blood loss or anemia from worms and fleas. Urinary tract infections, which frequently lead to blockage in male cats, cause extremely painful, lingering death if not treated. Untreated upper respiratory infections leave eyes and noses so caked with mucus that animals can barely see or breathe.”

Many feral cats live short, brutal lives. Figures vary, but the AVMA has used the figure of 2 years as opposed to 10 for the mean lifespan of owned cats; others estimate that feral cats live approximately half as long as owned cats. Mortality rates for feral cats can be up to 80%/y. Feral cats suffer considerably higher rates of injury and disease. Many feral cats succumb to vehicle trauma, predation, disease, or severe weather. Winter has presented a number of examples of the dangerous and unsanitary conditions found at feral cat feeding sites. Clearly these conditions and outcomes are not serving the welfare of feral cats.”

- **Jessup, D. A., (2004) *The welfare of feral cats and wildlife. JAVMA* 225 (9), 1377-1383**

“The average life expectancy of an “outdoor cat” is about two to five years compared with 12 to 15 years for a cat who lives indoors. Feral cats, as well as homeless domesticated cats who have been set loose outdoors by shelters seeking to avoid the criticism that they might face from euthanizing them, commonly suffer and die from feline leukemia, feline AIDS, and other infectious diseases—even rabies. They also succumb to ailments like anemia and upper respiratory infections—conditions that are easily treatable were the cats to be taken to a veterinarian—but they are not. In winter, cats in cold climates endure subzero temperatures, some losing ears, tails, or limbs to frostbite; others being cut to shreds when they climb into car engines seeking warmth; and still others simply freezing to death. Many cats “disappear”—and while some are hit by cars or attacked by dogs or wild predators and some succumb to parasites or starvation...others are victims of foul play.”

- **Nachminovitch, D., (2017) TNR is dangerous both to cats and to other animals. *Voices for Wildlife*, March 8, 2017**

“Parasitism is the most common transmissible problem of feral cats...92% were infested with fleas and 37% had ear mites.”

“A study of 80 feral cats...revealed that 54% carried intestinal ascarids, compared with only 4% of 70 pet cats. Tapeworms and coccidia were found in 26% and 13% of feral cats, compared to 4% and 0% of pet cats, respectively. More feral cats (20%) were seropositive for *Toxoplasma gondii* than pet cats (3%)...In another study, *Bartonella henselae* was the most common infection identified in 553 (34%) feral cats...”

“...a kitten mortality rate of >50%...”

- **Levy, J. K., Crawford, P. C., (2004). Humane strategies for controlling feral cat populations. *JAVMA* 225, 1354-1360.**

“The welfare of free-roaming cats concerns society because they are frequent victims of vehicular collisions and fights between themselves and other animals.”

“Published figures for survival rates of adults include 33% over a 42 month period...Anecdotal reports estimate adult life span of feral cats at 2 to 3 years.”

- **Andersen, M. C., Martin, B. J., Roemer, G. W., (2004) Use of matrix population models to estimate the efficacy of euthanasia versus trap-neuter-return for management of free-roaming cats. *JAVMA* 225, 1871-1876**

“There are ethical concerns about the well-being of free-roaming cats, as individual health and survival may be severely challenged in urban populations...”

“...Nutter et al. 2004 examined free-roaming cat populations...as part of a Trap-Neuter-Return study, and found kitten mortality...as high as 75%.”

- **Kilgour, R. J., Magle, S. B., Slater, M., Christian, A., Weiss, E., DiTullio, M., (2017) Estimating free-roaming cat populations and the effects of a one year Trap-Neuter-Return management effort in a highly urban area. *Urban Ecosyst* 20, 207-216**

“Overall, 127 of 169 (75%) kittens died or disappeared before 6 months of age. Trauma was the most common cause of death.”

- **Nutter, F. B., Levine, J. F., Stoskopf, M. K., (2004) Reproductive capacity of free-roaming domestic cats and kitten survival rate. *JAVMA* 225(9), 1399-1402**

SUMMARY OF SCIENTIFIC LITERATURE

Title: Trap/Neuter/Release methods ineffective in controlling domestic cat “colonies” on public lands

Authors: D. Castillo, A. L. Clarke

Affiliations: Florida International University

Journal: Natural Areas Journal

Year: 2003

Summary

A study was conducted to identify the outcome of a managed trap-neuter-release (TNR) program in two county parks in Miami, Florida. TNR failed to reduce the population of cats at either park and the population at one park actually increased. Stray cats were attracted by food provided to the colony by caretakers, and the community pet owners used the colony as a dumping ground for abandoning pets.

Key Quotes

“The establishment of cat colonies in public parks and natural areas creates a number of wildlife conservation problems. The most serious of these problems are wildlife predation and disease transmission. Despite the fact that cat colony supporters assert that well-fed colony cats will not prey on wildlife, numerous scientific studies provide evidence to the contrary (e.g., Adamec 1976; Biben 1979; Leyhausen 1979; Liberg 1984; Fitzgerald 1988; Fitzgerald and Turner 2000).” (p. 248)

“Several outbreaks of toxoplasmosis in humans have been attributed to soil and water contaminated with oocysts shed from the feces of free-roaming cats (Patronek 1998).” (p. 248)

“In 1994, five Florida children were hospitalized with encephalitis that was associated with cat-scratch fever (Patronek 1998).” (p. 248)

“Our results contradict the assertion that managed cat colonies decline in size over time.” (p. 251)

“The high number of cats and kittens that were dumped at the colonies throughout the course of our study confirms that the establishment of cat colonies on public lands with unrestricted access encourages illegal dumping of cats and creates...[a] nuisance.” (p. 252)

“Our results suggest that trap, neuter, and release programs are not an effective method to help control the population of unwanted feral and free-roaming cats on public lands.” (p. 252)

“We suggest that supporters of managed cat colonies seek a long-term solution to the pet overpopulation issue by redirecting their efforts toward the underlying problem of managing irresponsible pet owners.” (p. 252)

Title: Professional, ethical, and legal dilemmas of trap-neuter-return

Authors: P. L. Barrows

Affiliations: Active Environments Inc.

Journal: Journal of the American Veterinary Medical Association

Year: 2004

Summary

The author provides a veterinary medical practitioner’s perspective to the issue of how to deal with the problem of free-roaming cats. Specifically discussed are the professional, ethical, and legal dilemmas and disease concerns for people.

Key Quotes

“Cats are variably and correctly identified as nonnative, exotic, introduced, alien, foreign, or invasive species. Invasive species are defined as “species (animals, plants, microbes, etc.) alien or nonnative to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm, or harm to human health.” (p. 1)

“Although well meaning, many advocates of TNR lack professional training in the biological, ecologic, and wildlife sciences. Consequently, they may misunderstand, minimize, or choose to ignore the documented concerns regarding the ecologic, domestic animal and public health, legal, humane, and social nuisance impacts of feral cats, including those in TNR programs.” (p. 1)

The American Veterinary Medical Association's Council on Environmental Issues (CEI) *"has concluded [that] managed cat colonies do not solve the problems of cat overpopulation and suffering, wildlife predation, or zoonotic disease transmission."* (p. 1366)

The CEI *"strongly supports and encourages humane elimination of feral cat colonies."* (p. 1366)

The CEI *"opposes passage of local or state ordinances that legalize the maintenance of managed (i.e., TNR) cat colonies."* (p. 1366)

"Despite cats being the most frequently reported rabid domestic animal in the United States, proponents of TNR rarely address the fatal nature of untreated human rabies infections, nor do they readily acknowledge that nearly all TNR colonies contain unvaccinated cats or previously immunized cats whose immunity against rabies is diminished or has disappeared." (p. 1367)

"The CEI has expressed its concern regarding potential legal liability for veterinarians and other allied professionals who opt to participate in TNR programs." (p. 1368)

"Free-roaming dog colonies have not been condoned and neither should free-roaming cat colonies. Arguing that cats warrant preferential treatment ignores the damage they cause and the risks they pose." (p. 1368)

Title: The welfare of feral cats and wildlife

Author: D. A. Jessup

Affiliations: Marine Wildlife and Veterinary Care and Research Center

Journal: Journal of the American Veterinary Medical Association

Year: 2004

Summary

The author discusses the impacts of Trap-Neuter-Release (TNR) programs on the welfare of cats and wildlife, identifies why TNR is inappropriate, and suggests alternative actions to address the feral cat population.

Key Quotes

"Attempting to maintain cats in colonies only compounds the problem by causing massive killing and crippling of native wildlife, jeopardizing biodiversity, undermining traditional animal control, enabling irresponsible people to abandon cats, and sending mixed messages about the veterinary profession's commitment to serve the welfare of all species, including cats and wildlife." (p. 1377)

"Providing abundant food for outdoor cats, even overfeeding, does not stop this...hunting behavior." (p. 1377)

"The loss of [wildlife caused by cats] reduces biodiversity, even in somewhat degraded ecosystems. Loss of their ecosystem services has implications for such basic life processes as insect population dynamics, soil fertility and stability, pollination, and seed dispersal." (p. 1378)

"Wild animals are not only killed by cats but are also maimed, dismembered, ripped apart, and gutted while still alive, and if they survive the encounter, they often die of sepsis because of the virulent nature of the oral flora of cats." (p. 1378)

"In the world of TNR, unless a stray cat has a collar or is microchipped, it is very difficult to distinguish from a truly feral animal. Once trapped, neutered, and marked, these lost cats are much less likely to ever be found and returned to their owners or adopted. Trap, neuter, and reabandonment is a cruel fate for many former pet cats." (P. 1378)

"Figures vary, but the AVMA has used the figure of 2 years as opposed to 10 for the mean lifespan of owned cats; others estimate that feral cats live approximately half as long as owned cats. Mortality rates for feral cats can be up to 80%/yr. Feral cats suffer considerably higher rates of injury and disease. Many feral cats succumb to vehicle trauma, predation, disease, or severe weather." (p. 1379)

"Maintaining feral cats where they can deposit cat feces in national, state, county, or city public parks; on campuses; and around schools and hospitals constitutes a public health risk." (p. 1379)

"Trap-neuter-return's failures are, in part, attributable to its being based on several false assumptions, including the following: rates of abandonment and immigration are relatively low; cats at existing sites will exclude others (in reality the presence of food attracts others); feral cats will stay where you put 9

them (you cannot herd cats, well fed or not); all cats can be caught; and populations of cats in colonies will behave in general as if they were isolated and in a closed system." (p. 1380)

Title: Critical assessment of claims regarding management of feral cats by trap-neuter-return

Authors: T. Longcore, C. Rich, and L. M. Sullivan

Affiliations: The Urban Wildlands Group, University of Southern California Los Angeles

Journal: Conservation Biology

Year: 2009

Summary

The authors compared claims made by feral cat advocates to the scientific literature. Advocate claims were found to be contradictory to the literature, and the authors suggest a role for conservation biologists in conducting research and disseminating the results of that research to educate the general public and policy makers.

Key Quotes

“Domestic cats are on the list of the 100 worst invasive species globally (Lowe et al. 2000).” (p. 888)

“The stated goals of [no kill programs] is for feral cats to be recognized as ‘protected healthy wildlife [that] should not enter shelters in the first place.’” (p. 888)

“Unfortunately, TNR does not eliminate feral cat colonies under prevailing conditions (Jessup 2004; Winter 2004, 2006) and many false claims used to support the approach go unchallenged.” (p. 888)

“[TNR] advocates argue that studies showing adverse effects of feral cats on islands do not apply to continents (Gorman and Levy 2004; Alley Cat Allies 2005). In urban and suburban areas, natural habitats resemble islands, where fragments are surrounded by an inhospitable matrix, but unlike on islands, the inhospitable areas serve as an ongoing source of subsidized predators (Walter 2004).” (p. 888)

“Feral cats are exotic and do not fill an existing niche.” (p. 889)

“Feral cats are generally found at densities 10-100 times higher than similarly sized native predators (Nowell and Jackson 1996; Liberg et al. 2000).” (p. 889)

“Feeding by humans reduces the average range size of free-roaming cats, but increases densities, concentrating predation on wildlife where feeding occurs (Schmidt et al. 2007).” (p. 889)

“Contrary to claims that well-fed cats pose little threat to wildlife, hunting and hunger are not linked in domestic cats (Adamec 1976). Even well-fed cats hunt and kill lizards, small mammals, birds, and insects (Liberg 1984; Castillo and Clarke 2003; Hutchings 2003).” (p. 889)

“We argue that it is philosophically inappropriate for population-level impacts to be the only criteria by which the effects of cats are judged... We see no justification for valuing birds and other wildlife only as populations while valuing cats as individuals.” (p. 890) 11

“Over 80% of the prophylactic treatments administered to humans in the United States for possible exposure to rabies resulted from contact with stray or feral cats (Moore et al. 2000).” (p. 890)

“Studies show elevated infection rates of disease-causing pathogens in stray and feral cats compared with owned cats as a whole, including those that roam (Dubey 1973; Nutter et al. 1974; Norris et al. 2007).” (p. 890)

“Fecal matter from feral and free-roaming cats degrades water quality (Dabritz et al. 2006).” (p. 890)

“The definition of a successful TNR program for feral cat advocates is almost always different from what a conservation biologist or policy maker might view as a successful feral cat management program. For many TNR advocates, success is not defined by elimination of feral cats in an area, but rather by the welfare of the cats.” (p. 891)

“Feral cat advocates usually argue that managed colonies are stable and resist invasion by cats from surrounding areas (Berkeley 2004), but this assertion is not consistent with scientific literature or reports from TNR colonies (Stull 2007).” (p. 891)

Title: Zoonotic diseases associated with free-roaming cats

Authors: R. W. Gerhold, D. A. Jessup

Affiliations: The University of Tennessee, California Department of Fish and Game

Summary

The authors review the various diseases of free-roaming cats and the public health implications associated with free-roaming cat populations.

Key Quotes

“Free-roaming cats often lack the necessary preventative care to control [infectious diseases] and consequently pose a potential health threat to other domestic animals, wildlife, and humans.” (p. 1)

“Since 1988, rabies has been detected more frequently in cats than dogs in the United States (Rupprecht 2002), and in 2008 the number of rabies cases in cats (n = 294) was approximately four times the number of cases in dogs (Blanton et al. 2009). In 2010, rabies cases declined in all domestic animals, except for cats, which comprised 62% (n = 303) of all rabies cases in domestic animals (Blanton et al. 2011).” (p. 2)

“Multiple studies have disclosed that human exposure to rabies is largely associated with free-roaming cats because of people being more likely to come in contact with cats, large free-roaming cat populations, and lack of stringent rabies vaccination programs (Childs 1990; Cole and Atkins 2007; Roseveare et al. 2009; Eidson and Bigman 2010).” (p. 2)

“Individuals exposed to potentially rabid animals are administered PEP, and cat exposures account for approximately 1/3 of all PEP recipients. Post-exposure prophylaxis regimen generally costs \$5000-\$8000 for each individual, which is mostly borne by public health agencies (Recuanco et al. 2007).” (p. 2)

“TNR advocates are unlikely to administer rabies immunization of all free-roaming cats. This is significant because one rabid cat in an aggressive (i.e., furious rabies) condition can lead to multiple exposure events because furious rabid animals often seek potential hosts to bite...rabid cats were significantly more likely than rabid dogs to bite a person (62% vs. 36%) (Eng and Fishbein 1990).” (p. 2)

“The risk of being seropositive for [feline leukemia virus or feline immunodeficiency virus] was most frequently associated with being free-roaming, followed by having access to outdoors.” (p. 3)

“The 2011 Compendium of Animal Rabies Prevention and Control states that stray animals including cats should be removed from the community through local health departments and animal control officials (Brown et al. 2011).” (p. 3)

“Data suggest that neutered cat groups act as attractant of sexually intact free-roaming cats, thus negating the belief that TNR program leads to [a] decrease in free-roaming cat populations.” (p. 3)

“Free-roaming cat colony feeding stations attract wild mesocarnivores (Gehrt 2003), potentially exacerbating human rabies exposure incidents.” (p. 3)

“Domestic and wild felids are the definitive host for...Toxoplasma gondii and the ascarid Toxocara cati...The host-defecated eggs (Toxocara) or oocysts (Toxoplasma) of these parasites are extremely environmentally resistant (Long 1990; Kazacos 2001), and human infections can occur months or possibly even years after the cat has excreted the parasite egg. For this reason, cat feces-contaminated playgrounds, garden soil, sandboxes, and other outdoor recreational areas may serve as a source of infection for humans (Holland and Smith 2006; Lee et al. 2010).” (p. 3-4)

“Toxoplasma infections can manifest as ocular diseases, neurological impairment, and lead to blindness, abortions, and birth defects, particularly hydrocephalus, in humans (Dubey and Odening 2001). Toxoplasmosis is also a significant risk for individuals receiving immunosuppressive therapy, transplant recipients, and is a major cause of systemic infection and death for immunosuppressed (e.g., HIV/AIDS) patients (Elmore et al. 2010). An increased risk of schizophrenia, autism, Alzheimer's, and other neuro-inflammatory diseases has been proposed with T. gondii infection (Fekadu et al. 2010; Prandota 2010).” (p. 4)

“Approximately 75% of free-roaming cats in Florida were positive for [one species of hookworms], and 33% were positive for [another hookworm species] (Andersen et al. 2003).” (p. 4)

“Three major flea-associated diseases of cats in the United States include cat-scratch disease (CSD), flea-borne typhus, and plague (McElroy et al. 2010).” (p. 4)

“Human bacterial diseases, including tularemia...and plague...have been associated with direct contact with cats or cat fleas (Liles and Burger 1993; Gage et al. 2000; McElroy et al. 2010). Approximately, 8% of plague cases in the United States are associated with transmission from cats, and cases of cat exposure associated plague are reported year round where flea-associated cases are generally restricted to warmer months (Gage et al. 2000).” (p. 5)

“Rabies exposure in humans is disproportionately associated with free-roaming cats compared to other domestic animals. This fact should be of paramount concern to public health officials because of the high mortality rate of clinical rabies and the significant cost of PEP in exposed people.” (p. 5)

Title: The impact of free-ranging domestic cats on wildlife of the United States

Authors: Scott R. Loss, Tom Will, Peter P. Marra

Affiliations: Smithsonian Conservation Biology Institute, U.S. Fish and Wildlife Service

Journal: Nature Communications

Year: 2013

Summary

Using a data-driven systematic review of previously published studies that estimated predation rates of owned and un-owned cats, the authors quantitatively estimated total mortality caused by cats in the contiguous United States. The results showed that free-roaming domestic cats kill 1.4-3.7 billion birds and 6.9-20.7 billion mammals every year. The majority of this mortality is caused by un-owned cats, whose predation rates averaged three times greater than rates for owned cats.

Key Quotes

“Cat predation on wildlife...may exceed all other sources of anthropogenic mortality of U.S. birds and mammals.” (p. 2)

“We excluded high local predation rates and used assumptions that led to minimum predation rates for un-owned cats; therefore, actual numbers of birds killed may be even greater than our estimates.” (p. 4)

“Native species make up the majority of the birds preyed upon by cats.” (p. 4)

“For all North American land birds, the group of species most susceptible to mainland cat predation, existing estimates range from 10-20 billion individuals in North America.” (p. 5)

“Threatened species in close proximity to cat colonies – including managed TNR colonies – face an especially high level of risk; therefore, cat colonies in such locations comprise a wildlife management priority.” (P. 5)

“Claims that TNR colonies are effective in reducing cat populations, and, therefore, wildlife mortality, are not supported by peer-reviewed scientific studies.” (p. 5)

Title: Feral cats: Do Trap=neuter-Return programs work?

Authors: Tom Gotsis

Affiliations: New South Wales Parliamentary Research Service

Journal: NSW Parliamentary Research Service, e-brief issue 18/2014

Year: 2014

Summary

Utilizing 100 previously published studies the author summarizes their findings and concludes that TNR programs are ineffective at reducing feral cat populations and that they pose a significant threat to native wildlife.

Key Quotes

“For medium or large populations of feral cats the BBN calculated that the optimal population control measure was euthanasia. As Loyd and DeVore explain, other studies support their results: Trap-euthanize strategies have proven effective at reducing cat populations and mitigating adverse effects on wildlife in a number of locations. In contrast, TNR programs alone have never been shown to stabilize a feral cat population in the scientific literature.”

“Andersen, Martin and Roemer’s matrix population model predicted cat populations to have high intrinsic growth rates. It further predicted that euthanasia was likely to be more effective at controlling cat populations than TNR: Reducing cat survival (by

increasing euthanasia rates) would likely have a greater effect on cat population growth than reducing fecundity (by increasing sterilisation rates)."

"Castillo and Clarke studied two TNR programs in Florida... Neither study reduced cat numbers."

Title: Evaluation of euthanasia and trap-neuter-return (TNR) programs in managing free-roaming cat populations

Authors: Paige M. Schmidt, Todd M. Swannack, Roel R. Lopez, Margaret R. Slater

Affiliations: College of Veterinary Medicine, Texas A&M University, Department of Wildlife and Fisheries Sciences

Journal: Wildlife Research

Year: 2009

Summary

The authors evaluated free-roaming cat control methods using a demographic population model for a 25 year period to determine the effectiveness of both TNR and euthanasia.

Key Quotes

"Our results are consistent with long-term evaluations of TNR colonies that showed population abundance failed to decrease because of immigration (Castillo and Clark 2003) and with studies that showed high rates of transients and population turnover in feral cats (Langham and Porter 1991; Genovesi et al. 1995)."

"Our model results also are consistent with initial evaluations of TNR campaigns (Castillo and Clark 2003; Foley et al. 2005; Natoli et al. 2006). TNR was not effective at reducing free-roaming cat numbers..."

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

Authors: Patrick Foley, Julie K. Levy, Terry Paik

Affiliations: Department of Biological Sciences, University of California, College of Veterinary Medicine, University of Florida

Journal: Journal of American Veterinary Medical Association

Year: 2005

Summary

Using a theoretical population model, the authors evaluate two county TNR programs to assess the impact they have on feral cat populations.

Key Quotes

"Our analysis indicated that any population-level effects were minimal."

"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."

"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."

Title: Evaluation of the effect of a long term trap-neuter-return and adoption program on a free-roaming cat population

Authors: Julie K. Levy, David W. Gale, Leslie A. Gale

Affiliations: College of Veterinary Medicine, University of Florida

Journal: Journal of American Veterinary Medical Association

Year: 2003

Summary

The authors evaluated the effect of a long-term trap-neuter-return program, with adoption whenever possible, on the dynamics of a free-roaming cat population.

Key Quotes

“More than 1,000 veterinary members of the California Veterinary Medical Association neutered more than 170,000 cats between July 1999 and May 2002 in a \$12 million project funded by Maddie’s Fund. However, virtually no information exists to support the contention that neutering is an effective long-term method for controlling free-roaming cat populations.”

“A 1-year study of TNR programs in 2 southern Florida parks revealed that the presence of well-fed cat colonies encouraged illegal abandonment of additional cats. While the original population of 81 cats declined 20% during 1 year, the arrival of new cats prevented reduction of the colonies, and 88 cats were present at the end of the study. Results of the study also refuted an oft-cited claim that an established colony of cats will defend its territory and prevent the immigration of new arrivals.”

“It is proposed that a mortality rate of > 50% in free-roaming kittens prior to maturity contributes to the relatively stable population of cats.”

“Immigration or abandonment of new cats may be a frequent event, and free-roaming cats do not appear to have sufficient territorial activity to prevent new arrivals from permanently joining colonies. These new arrivals could substantially limit the success of TNR...”

SUBJECT MATTER EXPERT STATEMENT

Grant Sizemore, Director of Invasive Species Programs – American Bird Conservancy, wrote an authoritative white paper that was submitted to the City of Albuquerque to educate them regarding the realities and impacts of TNR programs. Because of its depth and relevancy we have included it in our report.

Expert Statement of Grant C. Sizemore Trap, Neuter and Release (TNR) Programs Harm Wildlife, the Environment, Public Health, and the Cats They are Designed to Aid; They also Fail to Control Cat Populations

A Need for Management

Management of animal populations is an important element of maintaining a safe, healthy, and enjoyable environment for people and wildlife. When animal populations become too large or adversely affect the communities around them, human intervention is required. In the United States estimates suggest there are 114-188 million domestic cats (*Felis catus*) and that the number of owned cats has tripled in the last 40 years.^{2,3,4} Of these, 60-160 million roam outdoors without restriction.^{2,3} The presence of these outdoor cats has serious implications for the health and welfare of cats, wildlife, and people. Thus, outdoor domestic cats require effective management solutions.

Although many governments and institutions agree that managing outdoor cats is both necessary and desirable, how to appropriately manage feral domestic cats – those cats that live in a “wild” state – is a matter of public debate. To be effective, management programs for the 2 growing number of feral cats, which have been estimated to number from 30-100 million, should eliminate the conditions which necessitated management in the first place.^{3,5} The City of Albuquerque’s Animal Welfare Department has instituted a feral cat program called Trap, Neuter, Return (TNR)⁶. TNR programs trap feral cats, spay or neuter them, and then release the cats back to the location from which they were trapped. The City’s feral cat management strategy is inappropriate because TNR programs are ineffective as a means of population control and do not properly account for animal welfare, ecological, or public health concerns.⁷

TNR Is Ineffective at Population Control

TNR programs are often hailed as the most humane and effective means of feral cat population control by its supporters, despite a preponderance of scientific evidence that suggests otherwise. Numerous studies have analyzed TNR programs to determine their impact on feral cat populations. Overwhelmingly, studies indicate that population control via TNR is either impractical or unachievable. Below is a summary of peer-reviewed scientific studies that assess the efficacy of TNR programs.

Castillo and Clarke (2003)⁸

In a study that analyzed two managed TNR programs in public parks in South Florida, data “contradict[ed] the assertion that managed cat colonies decline in size over time” and “suggest[ed] that trap, neuter, and release programs are not an effective method to help 3 control the population of unwanted feral and free-roaming cats.” Not only did these colonies not reduce in size, in one colony the number of cats present actually significantly increased, likely due to illegal dumping of cats and/or the attraction of large numbers of stray cats to food provided by colony caretakers.

Andersen et al. (2004)⁹

TNR and humane euthanasia were evaluated as potential feral cat population control methods. By constructing population models using data from cat populations in urban environments, researchers were able to vary the percentage of cats spayed/neutered or humanely euthanized and to determine the subsequent impact on population. Results indicated that a 50% humane euthanasia rate would yield a reduction in the feral cat population by 10% per year, but even a 75% spay/neuter rate would still yield an increasing feral cat population. A spay/neuter rate as high as 88% of the feral cat population would be needed to merely stabilize population growth.

Foley et al. (2005)¹⁰

In a study published in the Journal of American Veterinary Medicine, scientists evaluated a county TNR program in San Diego County, California, from 1992 to 2003 and a county TNR program in Alachua County, Florida, from 1998 to 2004. Researchers identified the critical neutering fraction, the fraction of the population of feral cats that would have to be spayed or neutered to result in a population decline. The critical neutering fractions were 71% for San Diego County and 94% for Alachua County. In the last year of data collection, the numbers of spayed or neutered cats represented only 0.63% and 9.6% of all feral cats in San Diego County 4

and Alachua County, respectively. In other words, in Alachua County the spay/neuter rate was approximately one tenth of what the researchers concluded was needed to achieve a population decline; in San Diego County the spay/neuter rate was approximately one hundredth of the rate required. Analyses “indicated that any population-level effects were minimal” and that population growth continued. The authors even commented that results were similar to a previous study, which indicated that “no plausible combination of life history variables [e.g., survival, fecundity] would likely allow for TNR to succeed in reducing population size.”

Natoli et al. (2006)¹¹

Researchers in Rome, Italy, evaluated data from an urban feral cat TNR campaign conducted from 1991 to 2000. After evaluating the resulting populations, the authors stated that “although many feral cats are neutered and many neutered cats die (from car accidents, etc.), many cats are introduced into colonies (mainly by abandonment of house cats).” Despite a massive effort that spayed or neutered almost 8,000 cats and removed kittens from colonies, the researchers concluded that, alone, TNR is a “waste of money, time, and energy.”

Schmidt et al. (2009)¹²

This study evaluated the effects of TNR and humane euthanasia over a 25-year period on a free-roaming cat population in Texas. By using a population model, researchers were able to vary implementation rates of both management strategies and alter immigration rates – the number of cats moving into a feral cat colony – to determine impacts on population size. 5 Results of the models indicated that humane euthanasia was consistently more effective than TNR with any degree of immigration and at least comparable when no immigration occurred (which is a highly improbable likelihood unless a colony is completely and physically enclosed). The authors also addressed the vacuum effect – the notion that an animal may be “sucked” into a location by resource or niche availability – often cited by TNR practitioners as a benefit of TNR over humane euthanasia. According to the study’s authors, “regardless of the treatment type [humane euthanasia or TNR], any population reduction below carrying capacity would result in open niches that would eventually be filled by immigrants.” Therefore, it is inappropriate for advocates of TNR programs to claim any superiority in this aspect of population control on the basis of the vacuum effect. Furthermore, the study’s authors noted that the conditions often found in feral cat colonies, perpetuated in TNR programs (e.g., provisioning of food), increase the likelihood of immigration, thus suggesting that the vacuum effect actually applies more to TNR programs than any strategy that removes feral cats from the environment.

Gunther et al. (2011)¹³

Researchers monitored free-roaming cats in an urban environment and examined population differences between four colonies, two spayed or neutered via a TNR program and two consisting of sexually intact cats. The percentage of cats spayed or neutered in the two spayed and neutered colonies was 73% and 75%. The study’s results indicated that the number of cats in the TNR colonies significantly increased during the study period because of higher immigration into the colony, largely from cats not simply abandoned but living a feral lifestyle. 6 The number of cats in the sexually intact colonies actually decreased during the same period. The study’s authors proposed that a “behavioral vacuum” led to increased immigration when cats were spayed or neutered because of decreased aggressive behaviors by resident cats following surgery, allowing other cats to move into the colony. This finding is in direct contradiction to the frequent claim by TNR practitioners that spayed or neutered cats will hold a territory and keep other cats out, a major tenet of TNR philosophy.

Summary

These studies confirm that TNR programs do not successfully reduce feral cat populations. The sterilization percentage required for each feral cat colony even to merely stabilize populations is impractical and potentially unachievable. For example, even for the 10-year, intensive TNR programs in San Diego County and Alachua County, the percentage of feral cats spayed or neutered required for program success (i.e., population decline) was “far greater than what was achieved.”¹⁰ In addition, Gunther et al. (2011) found that, even with relatively high spay/neuter rates, cat colony numbers still did not decline.¹² Furthermore, due to the conditions within cat colonies (e.g., feeding cats), TNR programs are likely to actually increase the number of cats in an area. The City of Albuquerque’s Animal Welfare Department has stated it is following the advice of organizations such as The Humane Society of the United States, which advocates that TNR programs feed cat colonies. ^{14,15} Even if Albuquerque staff do not feed the colonies, the colony presence often encourages individuals to provide food.¹³ Finally, because TNR programs do not completely enclose feral cat colonies, immigrant or abandoned cats are drawn into colonies and ensure that the population will not reduce.

TNR Sacrifices Animal Welfare

Although animal welfare concerns are often used to justify TNR programs, these programs actually decrease the welfare of both cats and wildlife by enabling feral cats to continue to roam outdoors. Feral cats are subject to disease, predation, trauma, and poisoning from toxic materials. For feline leukemia virus and feline immunodeficiency virus, for example, risk of infection with these two potentially fatal viruses is significantly greater in cats living outdoors.¹⁶ In fact, studies indicate that stray and feral cats are far more likely to be infected by disease-causing pathogens than owned cats, including those that roam.⁶ Feral cats are also a potential reservoir for parasites like hookworms, and one study found that over 92% of randomly selected feral cats were infested with fleas, which are both uncomfortable and dangerous for cats.^{17,18} Outdoor cats are also at risk of being attacked and/or killed by dogs, raptors, or coyotes. Coyotes, in particular, are adept cat predators. Although not always killing cats for food, studies have found coyote diets with

up to 42% cat content.^{19,20} Conditions are such that People for the Ethical Treatment of Animals vigorously opposes TNR, taking the position that it is inhumane for the cats as well as the wildlife they hunt, injure, and/or kill.²¹ In the *Journal of American Veterinary Medicine*, veterinarian David Jessup acknowledged the implications for wild animal welfare as well, stating that “wild animals are not only killed by cats but are also maimed, dismembered, ripped apart, and gutted while still alive, and if they survive the encounter, they often die of sepsis because of the virulent nature of the [bacteria in the mouths] of cats.”²⁵ The cumulative result of these threats for cats and wildlife is an often an untimely death and what the American Veterinary Medical Association calls “a national tragedy of epidemic proportions.”²²

TNR Sacrifices Wildlife

Domestic cats are a product of thousands of years of artificial selection, and these cats are now a distinct and separate species from their wild ancestors. As a domesticated species, cats have not shaped and been shaped by their natural environment as many other predators have. Consequently, domestic cats are a non-native species that has been artificially introduced by people into environments in the United States and globally, with significant impacts to natural systems. TNR programs, by maintaining cats in the environment, facilitate these impacts.

Feral and free-roaming cats are a well-known threat to wildlife. Globally, cats have contributed to the extinction of 33 species and remain the principal threat to 8% of the critically 9 endangered birds, mammals, and reptiles.²³ Due to the scale and severity of their impacts outdoors, the International Union for the Conservation of Nature (IUCN) lists domestic cats as one of the world’s worst non-native invasive species.²⁴ An invasive species is one whose introduction causes “economic, or environmental harm or harm to human health.”²⁵ Cat impacts to wildlife are particularly severe because domestic cats are instinctive predators that will hunt and kill regardless of hunger. While indoors, this prey drive is evident when cats chase feather toys, balls of yarn, or lasers. When outdoors, however, these toys are replaced by birds, mammals, and reptiles. This instinctive predatory drive of cats and the resulting environmental impacts are amplified with feral cats because of their constant presence outdoors and their ability to maintain a much closer affiliation with people than native predators. Cats are generally far more comfortable around people, and people are generally more comfortable around cats than native predators (e.g., coyotes, skunks, or cougars). Furthermore, outdoor cats may exist in densities 10-100 times greater than native predators and reach over 3,885 animals per square mile.^{26,27}

In the United States and Canada, predation by outdoor cats is the number one source of direct, human-caused mortality to birds.^{4,28} A study by scientists from the Smithsonian Conservation Biology Institute and the U.S. Fish and Wildlife Service in 2013 estimated that cats kill approximately 2.4 billion birds and 12.3 billion mammals every year in the lower 48 states alone.⁴ In this study, 69% of bird mortality and 89% of mammal mortality was caused exclusively by un-owned (e.g., feral) cats. These estimates are often surprising to many people, including cat owners, because cat owners significantly underestimate their owned cat’s hunting prowess. In a study that attached cameras to owned cats allowed outdoors, researchers identified that only 23% of all wildlife kills made by cats were returned to the home, thus suggesting that personal observations are insufficient to accurately evaluate total wildlife mortality caused by cats.²⁹

Even when feral cats do not directly kill or maim wildlife, their mere presence is enough to cause sublethal effects (e.g., altered prey behavior) that can have lethal results. Scientists have evaluated the sublethal effects of cats on nesting birds and observed a reduction in feeding of young and an increase in nest predation by other predators when cats are simply nearby.³⁰ This observed phenomenon may contribute to the “reduced chick conditions and smaller clutch sizes that characterize urban bird populations [where cats are more abundant] in comparison with their rural [counterparts].”^{27,31} By altering the behavior of wildlife, outdoor 11 cats disrupt ecological communities with potentially fatal consequences for individuals and widespread consequences for populations.

TNR Endangers Public Health

TNR programs fail to address the public health concerns associated with colonies of feral cats roaming outdoors. Not only do feral cats have the potential to bite or scratch, they also carry a number of parasites and diseases. The Centers for Disease Control and Prevention (CDC) recognizes 16 separate diseases and parasites that cats may transmit to people.³² These include cat scratch disease, hookworms, *salmonella*, roundworms, and plague. Since 2004, 70 cats have tested positive for plague in New Mexico alone.³³ The Centers for Disease Control and Prevention recognizes cats as a “highly susceptible” and “common source of...infection in humans.”³⁴ Perhaps the most insidious of the diseases cats can spread to people, however, are rabies and toxoplasmosis.

Rabies is a fatal viral disease that affects all mammals, including cats and people. Although wildlife species account for the majority of rabid animals in the United States, domestic cats are consistently the top source of rabies among domestic animals.³⁵ Furthermore, domestic cats represent a far greater risk of human exposures to the disease because people, especially children, are more likely to interact with cats than wildlife.³⁶ According to a study led by CDC scientists, TNR programs – even those that incorporate a one-time rabies vaccine – “[do] not adequately meet feral cat population control needs that public health and animal welfare necessitate” and “should not be endorsed as an effective approach for mitigating health concerns related to feral cat colonies.”³⁶ In 2012, at least a dozen residents in Carlsbad, New Mexico, were forced to undergo post-exposure prophylaxis injections and 30 dogs had to be euthanized after being exposed to rabies by feral cats released back into the environment through the city’s TNR program.³⁷ The National Association of State Public Health Veterinarians’ (NASPHV) *Compendium of Animal Rabies Prevention and Control, 2011*, which is endorsed by the American Public Health Association, American Veterinary Medical Association, Association of Public

Health Laboratories, Council of State and Territorial Epidemiologists, and National Animal Control Association, recommends that stray cats should be removed from the community.³⁸ The NASPHV, recognizing the public health risks from feral cats, also takes the position that “there is no evidence that colony management programs will reduce diseases such as bartonellosis, larval migrans, toxoplasmosis, and vector-borne diseases. Rabies will also continue to be a risk, as such colonies are not closed.”³⁹

Toxoplasmosis, a disease caused by infection with the parasite *Toxoplasma gondii*, is another public health risk that TNR entirely fails to address and, in fact, exacerbates. *T. gondii* relies on felids, animals in the cat family – including domestic cats – to complete its life cycle but may infect a wide variety of intermediate hosts, including humans and all other warm-blooded species.⁴⁰ As many as 74% of all domestic cats will acquire *T. gondii* during their lifetime and excrete hundreds of millions of tiny, infectious eggs called oocysts in their feces.⁴⁰ These highly resilient eggs can survive periods of cold and dehydration and may remain infectious in the environment for up to 18 months.^{40,41} A study published in 2013 by scientists from The Stanley Medical Research Institute and Johns Hopkins University admitted that “because cats are now so ubiquitous in the environment, one may become infected by neighboring cats which defecate in one’s garden or play area, or by playing in public areas such as parks or school grounds. Indeed, as cats increasingly contaminate public areas with *T. gondii* [eggs] it will become progressively more difficult to avoid exposure.”⁴²

Toxoplasmosis in humans can be contracted in multiple ways and may be severe. Humans may acquire infection with *T. gondii* by ingesting or inhaling the parasite’s eggs, by eating undercooked and infected meat, from a pregnant woman to her fetus, or through blood transfusions and organ transplants.^{40,43} Although tracking the source of infection has historically been difficult and pathways may vary by country, exposure in the United States is 14 most likely from infectious eggs excreted in cat feces because there is not a strong tradition of eating undercooked foods. Indeed, evidence suggests that infections from *T. gondii* eggs excreted by cats are more prevalent than from eating undercooked meat, and one study of mothers with infants born with toxoplasmosis found that 78% were infected by cat-excreted parasitic eggs.^{44,45} TNR programs purposefully maintain cats outdoors, where they are likely to acquire and transmit *T. gondii* infection.

The consequences of human infection vary depending on how the parasite is acquired. Toxoplasmosis acquired by a fetus from its mother may experience blindness, deafness, seizures, mental retardation, abortion, or neonatal death.^{40,42} Infection can also be fatal for individuals with weakened immune systems, such as those with HIV, AIDS, or undergoing chemotherapy.^{40,42,46} Even in adults with healthy immune systems toxoplasmosis has been linked to chorioretinitis, lymphadenopathy, multi-organ failure, schizophrenia, Alzheimer’s Disease, depression, and brain cancer.^{40,42,44,47,48} A 2014 study found a “remarkable” 35% reduction in certain memory capabilities in elderly adults infected with *T. gondii*.⁴⁹ These varied 15 negative health effects and clear connection with cats indicate that any program, such as TNR, that keeps cats roaming outdoors jeopardizes public health.

Conclusion

The need to humanely and effectively manage feral cat populations in Albuquerque and the rest of the United States is evident; however, the scientific evidence and New Mexico Department of Game and Fish concur that TNR is not a viable solution.⁵⁰ TNR programs not only fail to reduce populations of feral cats, they also diminish the health and welfare of cats, wildlife, and people. The City of Albuquerque’s Animal Welfare Department, in the interest of animals and people, should discontinue its TNR program and instead establish an evidence-based feral cat management program that is proven to reliably reduce cat populations and simultaneously eliminate the many risks posed by roaming feral cats.

1 Grant C. Sizemore is the Director of Invasive Species Programs for the American Bird Conservancy. Mr. Sizemore has received a Masters in Science in Wildlife Ecology and Conservation and a Bachelor of Science in Zoology and Environmental Science. His curriculum vitae is attached as Exhibit A.

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POSITION STATEMENTS

The following is a small sampling of position statements, letters, and resolutions from various professional agencies and organizations declaring their opposition to TNR programs.

THE UNITED STATES MARINE CORPS FORCE, PACIFIC

TNR Position Statement

The U.S. Marine Corps Force, Pacific has looked into the issues with TNR and advises against it. Trap-Neuter-Release (TNR) as a viable program has been debunked in a number of scientific, peer-reviewed studies and summarized in a meta-analysis titled “Critical Assessment of Claims Regarding Management of Feral Cats by Trap-Neuter-Return” by Longcore et al. (2009) in the journal Conservation Biology. This analysis has shown TNR to be ineffective at its primary goal of reducing the number of cats on the landscape. TNR also does not mitigate the primary impacts of feral cats on native wildlife or humans. TNR cats can continue to prey on native wildlife and continue to spread disease that is harmful to wildlife and humans. Wildlife veterinarians, public health officials, natural resources agencies, and other animal-focused organizations oppose TNR.

FLORIDA VETERINARY MEDICAL ASSOCIATION

FVMA 2014 Position Statement on Free Roaming Cats

The Florida Veterinary Medical Association (FVMA) promotes animal health, public health and responsible pet ownership through support of the veterinary medical profession in Florida. The FVMA embraces the concept of the human-animal bond and seeks to provide guidance for the welfare and care of all animals in Florida: domestic, livestock, captive wildlife and free-ranging native species. In fulfilling this mission, the FVMA seeks to address issues related to the management of free-roaming, abandoned, and feral cats in Florida.

The FVMA encourages and supports efforts to eliminate the problem of free-roaming, abandoned and feral cats. It is believed that millions of these cats exist in Florida. Unfortunately, most of these cats will suffer premature mortality from disease, starvation or trauma. The magnitude of their suffering is a tragedy of epidemic proportions. Free-roaming, abandoned and feral cats are a significant factor in the deaths of hundreds of millions of birds, small mammals, reptiles, amphibians, and fish. Free roaming cats also pose a significant zoonotic disease risk to the general public, especially children.

According to the Florida Department of Health, domestic cats maintained indoors, without the risk of contact with wildlife and environmental threats, pose little to no risk of disease transmission to people. On the other hand, free-roaming, feral and abandoned domestic cats are a persistent threat to our communities because these cats do not receive appropriate preventive veterinary medical care. Additionally, free-roaming/feral cats present a risk to native Florida wildlife, including the Florida Panther.

The FVMA supports the use of properly designed and appropriately maintained enclosures for the management of feral cat colonies. Such a management strategy mitigates the risk to the public at large, to the sensitive Florida ecological system, and allows for improved welfare of the cats.

The FVMA encourages public education that reduces abandonment of domestic cats and eliminates public feeding of free-roaming feral cats in compliance with existing statutes.

NEW JERSEY FISH AND GAME COUNCIL

WHEREAS, free-ranging domestic cats are a non-native, invasive predator species; and

WHEREAS, free-ranging domestic cats annually kill millions of native birds, small mammals, reptiles, and amphibians; and

WHEREAS, free-ranging domestic cats are a threat to the survival of endangered and threatened species, and also those that are considered rare and those designated as being of special concern); and

WHEREAS, free-ranging domestic cats kill many of the species that serve as prey for a variety of native wildlife, including raptors, which, by depriving these native species of valuable food unnecessarily compounds the difficulty of their survival, and places unnecessary stress on the larger ecosystem; and

WHEREAS, the "management" (supplemental feeding, trap-neuter-release etc.) of domestic cat colonies does not moderate unacceptable negative impacts on natural resources as even well-fed cats kill native wildlife and in fact, are in better physical condition and therefore better able to kill native wildlife; and

WHEREAS, domestic cat colonies are sometimes established in areas that are considered to be of little value but, in fact, these areas provide temporary, essential resting and foraging areas for migrant species, especially birds; and

WHEREAS, any time large numbers of animals congregate in one area, as in domestic cat colonies, there is increased risk for the spread of diseases, including feline leukemia, toxoplasmosis, and rabies, among others; and

WHEREAS, food provided for free-ranging cats also attracts skunks, raccoons, black bears and other species that are capable of contracting and/or spreading rabies through interactions with vector species; and

WHEREAS, these diseases not only endanger native wildlife, but rabies, toxoplasmosis, and other diseases also pose significant health risks to people: and

WHEREAS, the National Association of State Public Health Veterinarians has stated that there is no evidence that colony management programs will reduce diseases; and

WHEREAS, NJSA 23:2A-14 makes it illegal to intentionally leave out food that can be accessed by or attractive to bears; therefore, be it

RESOLVED, that the New Jersey Fish and Game Council does not support non-native, invasive domestic cats being allowed to roam freely anywhere in New Jersey.

NATIONAL WILDLIFE REHABILITATORS ASSOCIATION

NWRA Policy on Free-Ranging Domestic Cats

Considering the following:

- free-ranging domestic cats, both pets and feral, are those that roam freely for periods of time from a few minutes to their entire lives; and
- free-ranging domestic cats are a non-native, frequently invasive predator species; and
- free-ranging domestic cats annually kill, injure or alter the natural behavior of millions of native birds, small mammals, reptiles and amphibians; and
- free-ranging domestic cats can be a significant threat to the survival of rare, endangered and threatened species, those designated as being of special concern, and other native wildlife; and
- free-ranging domestic cats kill many of the species that serve as prey for a variety of native wildlife which, by depriving these native species of valuable food compounds the difficulty of their survival, and places unnecessary stress on the larger ecosystem; and
- supplemental feeding and the trap-neuter-release of feral domestic cats does not significantly reduce the negative impacts on natural resources, as even well-fed cats kill native wildlife; and
- domestic cat colonies are sometimes established in areas that are considered to be of little wildlife value but, in fact, these areas can provide temporary, essential resting and foraging areas for migrant species, especially birds; and
- any time large numbers of animals congregate in one area, as in domestic cat colonies, there is an increased risk for the concentration and spread of infectious diseases, including feline leukemia, toxoplasmosis, and rabies, among others, which not only affect domestic cats but can spread to susceptible wildlife species; and
- food provided for free-ranging cats also attracts skunks, raccoons, foxes and other species that are capable of contracting and/or spreading rabies through interactions with vector species; and
- these diseases not only endanger native wildlife, but rabies, toxoplasmosis and other diseases also pose significant health risks to people; and
- the National Association of State Public Health Veterinarians has stated that there is no evidence that feral cat colony management programs will reduce diseases; the NWRA does not support domestic cats being allowed to roam freely.

NWRA supports (recommends) that all domestic cats be kept indoors, or if allowed outside they be securely restrained physically (by means of a harness and leash, for example) or kept in a fully secured enclosure. NWRA does not support feral domestic cat colonies unless they are actively managed in a secure enclosure to prevent movement of any animals, including wildlife species, in or out of the colony. Allowing domestic cats, whether pets or feral, to be free-ranging is not supported or condoned by NWRA in any manner.

PEOPLE FOR THE ETHICAL TREATMENT OF ANIMALS

It's a debate that can turn even the mildest-mannered "cat people" into snarling, hissing adversaries: trap, neuter, release (TNR). The topic is heating up as so-called "no-kill" lobbyists are pressuring animal shelters to embrace TNR in an effort to make their "saved" statistics look better. But are cats who are turned back out onto the streets actually "saved"?

The statistics say otherwise.

The average lifespan of a cat who lives outdoors is just 1 to 5 years, compared to 12 to 20 years for a cat who lives indoors. So when people turn cats loose, they often aren't buying them much—if any—time. Some worry that animals taken to shelters will be euthanized, but the very definition of euthanasia is "good death." On the streets, cats' deaths are inevitably *bad*. They die of deadly contagious diseases, traffic accidents, parasite infestations, dehydration, exposure, attacks by predators (including cruel humans), and other terrible fates. Just a few recent examples include the following:

-A cat who was allowed to roam outdoors without supervision was found dead, impaled by an arrow, in the yard of an abandoned house in Iowa. Another "outdoor cat" was shot and killed by a neighbor in Connecticut who said that he was "annoyed" that the animal was in his backyard.

-A stray cat was reportedly tortured and killed in a Maryland alley by five teenagers who threw cinder blocks at the cat's head and burned the animal with a cigarette lighter, among other abuses.

-A free-roaming cat in Indiana was found frozen to death near an apartment complex, and one in Nebraska froze to death, even though the animal had a "shelter." Another cat in the area was found barely alive under a car. Despite treatment, the animal later succumbed to frostbite and exposure.

Moreover, not all TNR cats are "feral"—many are quite tame. Not only are such cats adoptable, they may also be someone's lost companion. Refraining from taking these animals to shelters means that they lose their best chance of being reclaimed by their guardians, who may be frantically searching for them.

Even if you set aside the risks associated with turning cats loose to fend for themselves, there are the dangers that the cats themselves pose to native wildlife, whose welfare must be taken into account by anyone who considers him- or herself a defender of *all* animals' rights. Cats are the leading cause of human-related bird deaths, killing as many as 3.7 billion birds in the U.S. every year. Even so-called "ferals" (who are genetically identical to tame cats) are domesticated animals—they're native to nowhere and therefore invasive everywhere. In fact, cats are considered the most deadly invasive species in the world, responsible or partly responsible for the extinctions of more than 60 species.

As "subsidized predators" (i.e., predators fed by humans), cats can far exceed the carrying capacity of a habitat, making them even more lethal than native predators. Feeding them doesn't stop them from hunting, something tacitly acknowledged by those who promote releasing cats to "catch rodents" (while downplaying that they will also hunt birds and other animals).

And then there's the "inconvenient truth" that TNR doesn't even work. On the contrary, it actually encourages *more* people to abandon their cats because they think the animals will be cared for. The food set out for "managed" colonies also attracts more cats (as well as wildlife, including rabies-vector species). Show of hands: How many of you who put out food for cats have had new cats (as well as opossums, foxes, raccoons, and even rats) show up at meal times? I thought so.

The bottom line is that TNR makes humans feel better, not cats. Veterinarian and syndicated animal-advice columnist Dr. Michael W. Fox doesn't mince words when he says that it's "unconscionable" to abandon cats who are considered "unadoptable" and calls TNR a "blight" on the animal-sheltering community. "It is time to reevaluate the 'no-kill' policies that incentivize these terrible outcomes for cats and wildlife, and it is time to work for responsible solutions," he says.

Instead of abandoning cats, we must address feline homelessness at its roots by requiring that all cats be spayed and neutered, vaccinated, licensed, microchipped, and kept indoors. If your local shelter is considering adopting a policy of refusing to admit cats

and/or spaying/neutering and abandoning them, remind shelter officials that cats should be their top priority—not deceptive, feel-good statistics.

What is PETA’s stance on programs that advocate trapping, spaying and neutering, and releasing feral cats?

Sadly, our experience with trap, spay-and-neuter, and release programs and “managed” feral cat colonies has led us to question whether or not these programs are truly in the cats’ best interests. We receive countless reports of incidents in which cats—“managed” or not—suffer and die horrible deaths because they must fend for themselves outdoors. Having witnessed firsthand the gruesome things that can happen to feral cats, we cannot in good conscience advocate trapping and releasing as a humane way to deal with overpopulation.

Advocates argue that feral cats are just as deserving as other felines and that it is our responsibility to alleviate their suffering and assure their safety. We absolutely agree. It is precisely because we would never encourage anyone to let their own cats outdoors to roam that we do not encourage the same for feral cats. In fact, the act of releasing a feral cat is, in the eyes of the law, abandonment and is illegal in many areas.

We believe that although altering feral cats prevents the suffering of future generations, it does little to improve the quality of life for the cats who are left outdoors and that allowing feral cats to continue their daily struggle for survival in a hostile environment is not usually a humane option.

Nevertheless, PETA’s position has never been that all feral cats should be euthanized. We believe that trap, vaccinate, spay/neuter, and release programs are acceptable when the cats are isolated from roads, people, and other animals who could harm them; regularly attended to by people who not only feed them but care for their medical needs; and situated in an area where they do not have access to wildlife and where the weather is temperate.

THE AMERICAN SOCIETY OF MAMMALOGISTS

Position of the American Society of Mammalogists on Trap-Neuter-Release (Return) of Feral Cats

Trap–Neuter–Release (TNR) programs in which feral cats (*Felis catus*) are sterilized and then released back into the environment have been proposed as a non-lethal alternative to control feral populations of this predator and to lessen their environmental impact. TNR programs have been adopted or tacitly allowed by a number of metropolitan areas in the US, despite lack of evidence of their efficacy and despite accumulation of data confirming the negative effect of free-ranging cats on birds and mammals.

As mesocarnivores, domestic cats commonly prey upon native vertebrates, including mammals. Whereas predators are normally in low abundance in natural communities, feral populations of cats are frequently maintained at high levels through recruitment from human-maintained sources and through food subsidies. Although feeding feral cats lessens their dependence on predation, it does not necessarily lessen their frequency of predation.

Cats have been implicated in population decreases of mammals, birds, and reptiles on islands, as well as in mainland communities. Further, fragmentation of natural environments through agriculture and urbanization results in mammalian assemblages that more closely resemble insular than continental communities, which magnifies the impact of subsidized predators on natural populations. In addition to their direct impact through predation, feral cats are sources of parasites and diseases transmissible to humans, livestock, pets, and native populations.

It is the position of the American Society of Mammalogists that maintenance of high populations of these non-native predators through TNR or similar programs, or by subsidizing feral populations with supplemental food, is extremely detrimental to native mammalian assemblages. The American Society of Mammalogists strongly opposes TNR and urges municipalities to ban use of such programs and to prohibit feeding of feral cats. We further encourage effective measures to reduce or eliminate feral populations of these introduced predators.

TEXAS PARKS AND WILDLIFE DEPARTMENT

Management of feral cat colonies & Trap, Neuter, and Release (TNR) Programs

BACKGROUND: Municipalities are often asked to mediate public debate on the issue of managing feral cat populations and provide solutions to address the conflicting priorities of different stakeholders within a community. TNR programs are sometimes suggested as a humane way to address public concerns about the threats feral and free-roaming cats pose. TPWD provides this objective, science-

based statement to organizations and governments tasked with balancing the needs of feral and free-roaming cats, public health, and local ecosystem health.

TPWD POSITION: Feral (non-owned) and free-roaming cats pose a direct threat to the health of our natural resources. Feral cat colonies negatively impact songbirds, small mammals, amphibians, and other native wildlife populations. Feeding programs are not recommended because they concentrate cats and wild animals into single areas, which can increase disease transmission and pose greater threats to native wildlife in the area. Neither intentional feeding of free-roaming cats or the sanctioning of managed cat colonies addresses ecological, animal health, or public health concerns, nor does it address population control. Additionally, TNR programs are not effective at alleviating the threats of feral and free-roaming cat colonies on feline health, human health or native wildlife populations. Sterilization programs are ineffective in managing feral and free-roaming cat populations, and do not address the ecological impacts that these cat populations can have on our natural resources. For these reasons, which are explained in detail below, TPWD does not support the creation or perpetuation of feral or free-roaming cat colonies or feeding, sterilization, or Trap, Neuter, and Release programs.

KEY INFORMATION:

ECOLOGICAL EFFECTS ON WILDLIFE: Because hunting is a deeply instinctive behavior of cats, even well-fed cats will prey on native wildlife.⁵ They prey on native species, especially impacting declining, rare, or sensitive populations, including birds, reptiles, and mammals. Domestic and feral cats are not native predators in Texas, and their hunting behaviors disrupt natural ecological processes. Feral and free-roaming cats alter the ecological balance of a region, as does any other feral non-native (exotic) animal. Feral cats' diets have been shown to consist of 69 percent mammal (including native voles, rabbits, and mice), 24 percent birds, and around 5 percent reptiles/amphibians. Scientific research shows that free-roaming domestic cats kill between 1.4–3.7 billion birds and 6.9–20.7 billion mammals annually and that free-roaming cats are likely the single greatest source of anthropogenic mortality for US birds and mammals. Studies have also shown that food provisions from colonies attract immigrating cats and other wildlife species, and that native wildlife closest to feeding stations are at the greatest risk of depredation by feral cats. This is of particular concern when managed cat colonies are located in sensitive or particularly diverse natural areas.

PUBLIC HEALTH EFFECTS. Rabies in cats is more than twice as common as in dogs or cattle, and cats are the domestic animal most commonly reported rabid.¹⁰ Zoonotic diseases and their agents known to be associated with cats include rabies, toxoplasmosis (*Toxoplasma gondii*), cat scratch disease (*Bartonella spp.*), roundworm (*Toxocara cati*), ringworm (*Microsporium canis*), cryptosporidiosis (*Cryptosporidium spp.*), campylobacteriosis (*Campylobacter spp.*), plague (*Yersina pestis*), *Cheyletiella* mites, and tularemia (*Francisella tularensis*). Feeding stations intended for cats actually attract a variety of animals such as rats, raccoons, skunks, opossums, and foxes, putting these animals in unusually close contact with humans, cats, and each other. This close contact increases the risk of contracting and spreading diseases, including rabies, to other wildlife, cats, and humans.

HEALTH OF INDIVIDUAL CATS. Wild and free-roaming cats lead a stressful life. Diseases, depredation, and accidental or intentional injuries significantly decrease the quality of life for feral and free-roaming cats, even if municipal staff or volunteers have the resources to intensively manage a colony. In addition to the zoonotic diseases listed above, several diseases commonly found in cat colonies impact the health of cats, including rabies, feline leukemia, feline immunodeficiency virus, roundworm, ringworm, fleas, ticks, ear mites, abscesses, respiratory infections, urinary tract infections, and eye infections. Some of these maladies are incurable, and others require multiple treatments or vaccinations. Cats that have been previously trapped to administer medical treatment often become shy of traps and are difficult to trap again for immunization or continued treatment for illness or injury. Feral cats are also particularly vulnerable to vehicle impacts, injury, and depredation by native wildlife. Cat colonies lead to a stressful, painful and unhealthy existence for individual cats within a colony.

EFFICACY OF TNR PROGRAMS. TNR programs are ineffective. Managers of these programs cannot prevent new cats from being added to a population, and they cannot neuter the vast majority (70% to 90%) of the population, both of which are required assumptions for population reduction. TNR programs repeatedly fail to eliminate or control cat colonies due to ongoing cat immigration from surrounding areas. Scientifically vetted studies have demonstrated that TNR programs do not prevent overpopulation of feral cats, reduce population size over time, prevent losses to native wildlife, or prevent disease transmission.

UNITED STATES DEPARTMENT OF THE INTERIOR: FISH AND WILDLIFE SERVICE

This letter is in regard to the Seacoast Area Feline Education and Rescue (SAFER) program to encourage and assist with feral cat feeding stations near beaches in the Towns of Seabrook and Hampton, New Hampshire. Promoting cat feeding stations and Trap, Neuter and Release (TNR) programs in areas where federally-listed threatened piping plovers (*Charadrius melodus*) occur

has resulted in the documented mortality of piping plovers by cats, an unauthorized taking under the Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. § 1531 et seq.).

Many people believe that cats should be permitted to roam free and exercise their predatory instincts; however, domestic cats are not native to North America and are, therefore, an introduced predator and not part of a naturally functioning ecosystem. It has been estimated that hundreds of millions of birds and small mammals are killed annually by free-roaming cats (Hatley 2003). Piping plovers, which are the focus of intensive recovery efforts by federal, state, and numerous other partners, are highly vulnerable to cat predation. Two essential plover behaviors make them especially susceptible to cats. First, adult plovers are famous for feigning a broken-wing to distract predators away from their nests and chicks, then flying away at the last minute. Unfortunately, a plover may not be able to actually escape from a predator that is more agile than those that are native to their natural environment. We believe this was the fate of at least one adult plover killed at Seabrook Beach in 2005. Second, plover chicks are precocial, which means that they must move around on the beach to feed themselves during the approximately 25 days before they become capable of flight. Again, this behavior makes them highly vulnerable to cat predation during this life-stage. In light of these behaviors, we advise you as president of SAFER that releasing or maintaining feral cats within dispersal distance of a piping plover breeding site may cause take in violation of the ESA.

Predation of nests and chicks of the piping plover has been an ongoing issue at Seabrook and Hampton Beaches. New Hampshire Fish and Game biologists have documented cat tracks within piping plover nesting areas. Moreover, cat predation was likely the most significant cause of chick and adult plover mortality in 2002, 2004 and 2005. In 2003, the Seabrook Conservation Commission chairperson wrote to the Selectmen of the Town of Seabrook, requesting that the town take steps to prevent feeding stations and remove feral cats from the beach area. In 2005, two cats with SAFER-notched ears were removed from Hampton Beach State Park and turned over to a representative of SAFER for holding until after the plover season. However, it is our understanding that the cats have since been returned to the Hampton Beach area and therefore may continue to disturb and/or predate nesting piping plovers upon the birds' return this spring.

Through this letter, the Service informs you that should free-ranging cats from managed cat colonies in Seabrook and Hampton kill, injure, harass or harm nesting piping plovers or their young, SAFER may be liable for this unauthorized take in violation of Section 9 of the ESA and its implementing regulations. Unless a cat colony is confined to an escape-proof enclosure that prevents cats from ranging at-large, SAFER and associated volunteers are unable to ensure that cats from a managed colony would not prey upon or harass piping plovers or their young and, thus, cause take of a federally-listed species.

The following information is provided to assist SAFER in understanding its responsibilities for protecting federally-listed threatened and endangered species.

- Under the ESA and its implementing regulations, it is unlawful for any person to "take" a threatened species, or cause such take to occur. 16 U.S.C. § 1538(a)(1)(G); 50 C.F.R. §§ 17.31(a), 17.21(a & c).
- The ESA defines "take" to mean: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. 16 U.S.C. § 1532(19).
- The ESA defines "person" to mean "an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State, municipality, or political subdivision of a State, or of any foreign government; any State, municipality, or political subdivision of a State; or any other entity subject to the jurisdiction of the United States." 16 U.S.C. § 1532(13).
- The Service's regulations further define harassment and harm. Harassment in the definition of "take" in the Act means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding or sheltering. 50 C.F.R. § 17.3. Harm in the definition of "take" in the Act means any act that actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where the act actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

The ESA provides a variety of enforcement mechanisms, including the imposition of civil penalties, criminal fines, and the ability for third parties to bring citizen lawsuits. See, e.g., 16 U.S.C. § 1540(a), (b) & (g).

As shown above, an entity that carries out, authorizes, or encourages others to engage in an activity that is likely to result in take of a federally-listed species, such as the establishment and maintenance of a managed TNR cat colony, may be held responsible for violations of Section 9 of the ESA. To ensure protection of federally-listed species, the Service strongly advises SAFER to discontinue

its current practice of encouraging and maintaining the establishment of feral cat colonies through cat-feeding stations and TNR activities within five miles of any piping plover beaches, including Seabrook and Hampton Beaches.

THE WILDLIFE SOCIETY

Final Position Statement – Feral and Free-ranging Domestic Cats

Feral and free-ranging domestic cats are exotic species to North America. Exotic species are recognized as one of the most widespread and serious threats to the integrity of native wildlife populations and natural ecosystems. Exotic species present special challenges for wildlife managers because their negative impacts on native species are poorly understood by the public to the point that many exotic species are perceived as a natural component of the environment. Some exotic species have advocacy groups that promote their continued presence, and few policies and laws deal directly with their control. Perhaps no issue has captured more of the challenges for contemporary wildlife management than the impacts of feral or free-ranging domestic cats and their impacts on native wildlife.

Domestic cats originated from an ancestral wild species, the European and African wild cat (*Felis silvestris*). The domestic cat (*Felis catus*) is now considered a separate species, and is found on all 7 continents, with 600 million cats worldwide and 148-188 million within the U.S.. Domestic cats have great reproductive potential. Individuals become sexually mature as early as 6 months of age, and reproduction can occur throughout the year. A single female may produce as many as 3 litters each year with 2 to 4 kittens per litter, with the capacity to successfully raise as many as 12 offspring in any given year.

A growing body of literature strongly suggests that domestic cats are significant predators on small mammals, birds, reptiles, and amphibians. Feral and free-ranging cats also serve as reservoirs for several diseases, including rabies, toxoplasmosis, bartonellosis, typhus, and feline immunodeficiency virus, that can have significant effects on the health of humans, wildlife, and other domestic animals. Because humans often feed free-ranging cats, they can reach population levels that may result in abnormally high predation rates on wildlife and increase the spread of diseases. Domestic cats have tremendous impacts on wildlife and are responsible for the extinction of numerous mammals, reptiles, and at least 33 bird species globally. Effects of cat predation and disease spread are most pronounced in island settings (both actual islands and islands of habitat), where populations of wildlife are already low or stressed by other factors. Effects are also significant in natural areas where cat colonies become established. Competition with native predators, disease implications for native wildlife populations, and pet owners' attitudes toward wildlife and wildlife management also are important issues.

Extensive popular debate over absolute numbers or types of prey taken by feral and free-ranging cats is not productive. The number of cats is undeniably large. Even if conservative estimates of prey taken are considered, the number of prey animals killed is immense. The supplemental feeding of cats does not deter them from killing wildlife; often they do not eat what they kill. Likewise, population-level impacts of diseases associated with cats have only been established in a few wildlife species, such as southern sea otters (*Enhydra lutris nereis*), but negative individual impacts clearly occur in an extremely wide range of species. Humans introduced cats to North America, and humans are ultimately responsible for the effects these animals have on native wildlife species.

The policy of The Wildlife Society regarding feral and free-ranging domestic cats is to:

1. Support and encourage the humane elimination of feral cat populations, including feral cat colonies, through adoption into indoor-only homes of eligible cats and humane euthanasia of unadoptable cats.
2. Support the passage and enforcement of local and state ordinances prohibiting the feeding of feral cats, especially on public lands, and the release of unwanted pet or feral cats into the wild.
3. Oppose the passage of any local or state ordinances that legalize the maintenance of "managed" (trap/neuter/release) free-ranging cat colonies.
4. Support educational programs and materials that provide scientific information on feral cats and the negative effects on cats from living outdoors, and call on pet owners to keep cats indoors, in outdoor enclosures, or on a leash.
5. Support programs to educate and encourage pet owners to neuter or spay their cats, and encourage all pet adoption programs to require potential owners to spay or neuter their pet.
6. Support the development and dissemination of information on what individual cat owners can do to minimize predation by free-ranging cats, and to minimize potential disease transmission to humans, wildlife, cats, and other domestic animals.

7. Pledge to work with the conservation and animal welfare communities to educate the public about the effects of free-ranging and feral cats on native wildlife, including birds, small mammals, reptiles, amphibians, and endangered species.
8. Support educational efforts to encourage the agricultural community to keep farm-cat numbers at low, manageable levels and use alternative, environmentally safe rodent control methods.
9. Support efforts to reduce risks to the health of humans and other animals posed by diseases and parasites of feral cats, including but not limited to removal of free-ranging cats and elimination of feral cat colonies. Encourage researchers to develop, obtain, and disseminate information on the impacts of feral and free-ranging cats on native wildlife populations, relative to predation, competition, and diseases.
10. Recognize that cats as pets have a long association with humans, and that responsible cat owners are to be encouraged to continue caring for the animals under their control.

CHICAGO WILDERNESS

Position Statement on Feral and Unattended Domestic Cats Outdoors

POSITION: Chicago Wilderness is a regional alliance of organizations working together to restore local nature and improve the quality of life for all who live here, by protecting the lands and waters on which we all depend. Chicago Wilderness members believe that people need to actively manage and conserve our region's natural communities based on scientific principles and best management practices.

Alliance members recognize that pets provide many benefits to people, including companionship and comfort. However, we also recognize that feral cats, and domestic cats that are let outside unattended, kill hundreds of millions of birds and more than a billion small mammals in the United States each year. Therefore, Chicago Wilderness supports efforts to encourage responsible pet ownership, to keep domestic cats indoors or controlled on a leash, and to manage feral cat overpopulation by establishing alternatives to feral cat colonies.

BACKGROUND: The domestic cat (*Felis catus*) originated from the European and African wild cat (*Felis silvestris*) but is now considered a separate species. Domestic cats are not native to North America, yet their numbers have increased to the point where they may be more abundant than any native carnivore. Of the more than 140 million domestic cats estimated to be in the United States, 50 to 70 percent are feral or abandoned.

There is a strong consensus among wildlife professionals that feral and unattended outdoor domestic cats negatively impact wildlife. A cat's instinctive behavior to hunt, rather than its need for food, drives it to take prey, and feral and unattended domestic cats routinely prey upon native birds, small mammals, reptiles and amphibians. In addition to the negative impacts that these cats have on wildlife populations, they serve as potential vectors of diseases to humans, pets, and wildlife and are themselves exposed to many other health risks, such as collisions with vehicles, larger predators (e.g., coyotes), disease, and adverse weather conditions.

Feral cats are a growing concern for communities and land managers nationwide, and advocates for feral cats often favor trap-neuter-return (TNR) programs to address issues regarding overpopulation and disease exposure of feral or abandoned cats. These programs usually involve capturing animals in "feral cat colonies," where people are providing feeding stations and shelter. The cats are neutered, sometimes vaccinated against certain diseases, and then released at the capture site. TNR programs are popular with domestic cat advocates because neutering prevents individual cats from directly contributing to overpopulation, and vaccinations presumably reduce the prevalence of certain diseases in these populations. However, despite their popularity with some people, these programs remain controversial, especially with wildlife advocates and managers, because they are not effective in reducing feral cat numbers.

A growing body of literature has documented the negative impacts associated with feral and unattended domestic cats that are let outdoors:

- Most cats that are allowed to roam outdoors live only 2 to 5 years, while cats that are cared for and kept exclusively indoors live up to 15 years.
- Feral and unattended cats that roam outdoors kill hundreds of millions of birds and more than a billion small mammals each year in the United States. Feral cat colonies support high densities of cats which, in turn, may have even greater negative effects on local wildlife populations.
- Even though members of feral cat colonies benefit when people feed them, they still routinely prey on wildlife. Even a well-fed cat is genetically programmed to hunt.

- Although the goal of managed feral cat colonies is to reduce the population through adoption (when possible) or natural attrition, any reductions are offset by the illegal dumping of additional unwanted cats and the attraction of other feral cats to a provided food source.
- Research has shown that 70 to 90 percent of the cats in feral cat colonies must be sterilized, and no new cats must join the colony, in order for the colony cat population to begin to decline – a result that is impractical to achieve.
- Native wildlife such as raccoons, skunks and coyotes are attracted to cat colony feeding stations, which increases interaction with feral cats and promotes the transmission of disease.
- A number of diseases and parasites are associated with feral and unattended domestic cats that roam outdoors, such as ringworm, hookworm, cat scratch fever, toxoplasmosis, feline distemper, feline leukemia, and rabies. In fact, cats represent the majority of reported rabid domestic animals in the United States annually. Unvaccinated cats may also become reservoirs for diseases and transmit them to wildlife, pets, and people. Many TNR programs do not vaccinate cats against any diseases, and the TNR programs that do usually only vaccinate against rabies and distemper.

RECOMMENDATIONS: The Chicago Wilderness alliance supports the following actions related to feral and unattended outdoor domestic cats.

- We support efforts to educate and encourage cat owners to keep cats indoors or controlled on leashes when outdoors, and to have their pets spayed or neutered.
- We support and encourage the humane reduction of feral cat colonies.
- We support the development and implementation of education efforts that foster an understanding of the biological and social impacts of allowing cats to roam outdoors.
- We support the development and dissemination of educational information to municipalities, residents, veterinarians, and other stakeholders on the negative impacts of feral cat colonies, including information on the effects on wildlife, disease transmission, and the health risks to cats.
- We support the passage and enforcement of state legislation and local ordinances prohibiting the establishment of feral cat colonies and the release of feral or unwanted cats outdoors.
- We oppose the passage of state legislation and local ordinances that condone or legalize the deliberate establishment of feral cat colonies.
- We recommend that if a community feels it must allow the establishment of feral cat colonies, that the colonies be considered only an interim solution, and should not be placed on public lands or in areas that could threaten at-risk wildlife or pose public health threats.
- We encourage research to provide additional insight into the effects that feral and outdoor, unattended domestic cats have on native wildlife populations.

SUMMARY: The Chicago Wilderness region is critical for wildlife survival. More than 300 species of birds alone—many threatened, endangered, or seriously declining due to threats such as habitat loss and fragmentation—use the protected areas in our region, as well as parks and backyards, for migration or year round homes. Significant resources are invested each year to protect areas that can support these species and their tens of millions of members, and feral and unattended domestic cats only detract from these efforts, while also posing a threat to native ecosystems and overall biodiversity. People are responsible for introducing domestic cats to North America, and it is our responsibility to manage cats that prey on native wildlife.

RESEARCH-BASED CONCLUSIONS

Over the past several months the TNR Committee of the North Utah Valley Animal Services Special Service District has examined hundreds of peer-reviewed research studies, white papers, and position statements, analyzed several meticulous, systematic, literature reviews, and conducted a comprehensive study of relevant empirical data. At the conclusion of our exhaustive investigation we find it evident that science simply does not support the effectiveness of Trap-Neuter-Release (TNR) programs.

Overwhelmingly, the scientific literature indicates that TNR programs not only fail to effectively reduce feral cat populations but also adversely affect the health and well being of cats, humans, other animals, and ecosystems. Again and again we discovered that the evidence-based data contradicted claims that TNR is a viable solution to the management of feral and free-roaming cats.

Our own data, from the North Utah Valley Animal Shelter, when compared against five animal shelters in Utah that are currently participating in a TNR program, reveal that our current method is far superior in reducing cat intake at the animal shelter than any of the other five shelters utilizing a TNR program.

Therefore, we feel it is incumbent upon us to recommend to the Administrative Control Board of the North Utah Valley Animal Services Special Service District, and all other decision makers who come into possession of this report, that, in the interest of the animals and people of our communities, not to support, endorse, or implement a TNR program in our community.

ORGANIZATIONS OPPOSED TO TNR PROGRAMS

Accipiter Enterprises, Educational Birds of Prey
Alaska Wild Animal Recovery Effort Inc.
Allamakee County Protectors
Allegheny Highlands Alliance
Alliance for the Wild Rockies
American Association of Wildlife Veterinarians
American Bird Conservancy
American Birding Association
American River Parkway Foundation
American Society of Mammalogists
Anne Arundel Bird Club
Audubon Minnesota
Audubon Naturalist Society
Audubon Society of Kalamazoo
Audubon Society of New Hampshire
Audubon Society of Northern Virginia
Audubon Society of Rhode Island
Bexar Audubon Society
Bird Ally X
Bird City Wisconsin
Bird Conservation Network
Black River Audubon Society
Black Swamp Bird Observatory
Bridgerland Audubon Society
Central New Mexico Audubon Society
Central Valley Bird Club
Centre Wildlife Care
Chesapeake Audubon Society
Chicago Audubon Society
Chicago Bird Collision Monitors
Chicago Ornithological Society
Citizens Committee to Complete the Refuge
Clearwater Audubon Society
Coastal Bend Audubon Society
Coastal Virginia Wildlife Observatory
Colorado Wild Rabbit Foundation
Connecticut Audubon Society
Cooper Ornithological Society
Cornell Lab of Ornithology
Coulee Region Audubon Society
Delmarva Ornithological Society
Department of Fisheries and Wildlife, Oregon State University
Desert Rivers Audubon Society
Detroit Audubon Society
Eastern Long Island Audubon Society
Elisha Mitchell Audubon Society
Endangered Habitats League
Environmental Protection Information Center (EPIC)
Evergreen Audubon
Five Valleys Audubon Society
Flathead Audubon
Florida Keys Hawkwatch
Florida Wildlife Federation
Foothills Audubon Club
Freedom Center for Wildlife Inc.
Friends of Atascadero Wetlands
Friends of Beautiful Pendleton County
Friends of Dyke Marsh
Friends of the Kalmiopsis
Friends of the Tampa Bay National Wildlife Refuges
Georgia Important Bird Areas Conservation Program
Georgia Ornithological Society
Geos Institute
Golden Eagle Audubon Society
Grand Valley Audubon Society
Great South Bay Audubon Society
Greater Ozarks Audubon Society
Greater Wyoming Valley Audubon Society
High Country Audubon Society
Hilton Pond Center for Piedmont Natural History
Hope Valley Audubon Society
Houston Audubon
Howard County Bird Club
Hoy Audubon Society
Huntington-Oyster Bay Audubon Society
Idaho Conservation League
Illinois Audubon Society
Illinois Ornithological Society
International Wildlife Rehabilitation Council
Ivy Creek Natural Area
John Burroughs Natural History Society
Juniata Valley Audubon Society
Kalmiopsis Audubon Society
Kansas Wildlife Federation
Kerncrest Audubon Society
Kettle Range Conservation Group
Kissimmee Valley Audubon Society
Klamath Forest Alliance
Lab of Avian Biology – University of Maine
Lahontan Audubon Society
Lake County Audubon Society
Lake-Cook Audubon
Lane County Audubon
Lehigh Valley Audubon Society
Lindsay Wildlife Museum
Los Angeles Audubon Society
Madison Audubon Society
Madrone Audubon Society
Magic
Manistee Audubon
Maricopa Audubon Society
Maryland Ornithological Society
Maryland/Delaware Chapter of The Wildlife Society
Mid-Coast Audubon Society
Minnesota Chapter of The Wildlife Society
Minnesota Herpetological Society
Minnesota River Valley Audubon Chapter
Monmouth County Audubon Society
Montana Audubon
Montana Falconers Association
Montana Fish, Wildlife, and Parks
Montgomery Friends of Open Space
Mt. Diablo Audubon Society
Native Songbird Care & Conservation
Natural History Museum of Los Angeles County
New Hampshire Audubon
New Jersey Association of Wildlife Rehabilitators
New Jersey Audubon
New York City Audubon Society
New York State Wildlife Rehabilitation Council
North Carolina Chapter of The Wildlife Society
North Dakota Birding Society
Northern Flint Hills Audubon Society
Oconee Rivers Audubon Society
Ohlone Audubon Society
On A Wing And A Prayer
Otter Creek Audubon Society
Pamela Jo Hatley Professional Association
People for the Ethical Treatment of Animals

Peregrine Audubon Society
 Pomona Valley Audubon Society
 Progressive Democrats, Sonoma County
 Queens County Bird Club Inc.
 Quick Reference Publishing
 Rainforest Biodiversity Group
 Ralph T. Waterman Bird Club
 Redbud Avian Rehabilitation Center, Inc.
 Redwood Region Audubon Society
 Robert Cooper Audubon Society
 Sacramento Audubon Society
 Salem Audubon Society
 San Diego Audubon Society
 San Francisco Bay Joint Venture non-federal partners
 Sangre de Cristo Audubon Society
 Santa Barbara Audubon Society
 Santa Clara Valley Audubon Society
 Sassafras Audubon Society
 Save Our Allegheny Ridges
 Save Our Cabinets
 Saving Birds Thru Habitat
 Seattle Audubon Society
 Sequoia Audubon Society
 Shadow Oaks Wildlife Care
 Skagit Audubon Society
 Society for Conservation Biology
 Soda Mountain Wilderness Council
 SoHo Dogs Inc.
 Songbird Care and Education Center
 South Bend-Elkhart Audubon Society
 South Florida Audubon Society
 Southeastern Arizona Bird Observatory
 Southern Adirondack Audubon Society
 Southwestern New Mexico Audubon Society
 St. Louis Audubon Society
 St. Lucie Audubon Society
 Stockbridge Audubon Society
 Tampa Audubon Society
 Tennessee Chapter of Sierra Club
 Tennessee Ornithological Society
 The Biodiversity Group
 The Institute for Bird Populations
 The Nature Conservancy - Kentucky Field Office
 The Rural Alliance
 The Trumpeter Swan Society
 The Wildlife Center of Virginia
 The Wildlife Society
 Tippecanoe Audubon Society
 United States Department of the Interior
 United States Fish and Wildlife Service
 United States Marine Corp
 Virginia Beach SPCA Wildlife Program
 Virginia Bluebird Society
 Virginia Society of Ornithology
 Wabash Valley Audubon Society
 Warioto Audubon Society
 Weeden Foundation
 Western Nebraska Resources Council
 Whitescarver Natural Resources Management LLC
 Wild Utah Project
 Wildbird Recovery
 Wildlife Care Alliance
 Wildlife Care Association
 Wildlife Center of Silicon Valley
 Wildlife Emergency Services
 Wildlife Rehabilitation and Release
 Wildlife Research and Consulting Services LLC
 Will County Audubon Society
 Winnebago Audubon Society
 Wisconsin Audubon Council
 Wisconsin Society for Ornithology
 World Safaris/Safari Professionals
 Wyncote Audubon Society
 Yellowstone to Uintas Connection
 Yellowstone Valley Audubon Society
 York Audubon Society
 Yosemite Area Audubon Society
 Youth Environmental Alliance
 Zumbro Valley Audubon Society
 American Bird Conservancy
 The Wildlife Society
 National Audubon Society
 Cornell Laboratory of Ornithology
 American Ornithologists Union
 PRBO Conservation Science
 Association of Zoos & Aquariums
 National Wildlife Rehabilitators Association
 Alabama Ornithological Society
 Conservation Committee
 Arkansas Audubon Society
 Morning Star Wildlife
 Rehabilitation Center
 Southeastern Arizona Bird Observatory
 Los Angeles Audubon Society
 Sequoia Audubon Society
 Endangered Habitats League
 The Urban Wildlands Group
 South Bay Wildlife Rehab
 Rancho Palos Verdes, California
 Rocky Mountain Bird Observatory
 Center for Native Ecosystems
 The Trumpeter Swan Society
 Environment for the Americas
 Connecticut Audubon Society
 Delmarva Ornithological Society
 South Florida Audubon Society
 Environmental Protection in the Caribbean (EPIC)
 Oconee Rivers Audubon Society
 Atlanta Audubon Society
 Georgia Ornithological Society
 Conservation Council for Hawai'i
 Bird Conservation Network
 Wildcat Creek Wildlife Center, Inc.
 Songbirds of Northern Indiana, Inc.
 Northeast Regional Migration Monitoring Network
 Laboratory of Avian Biology, University of Maine
 Frederick Bird Club
 Chesapeake Wildlife Heritage Society for the Conservation and Study of Caribbean Birds
 Saving Birds Thru Habitat
 Rogue River Bird Observatory
 Wings of Wonder, Inc.
 Detroit Audubon Society
 Carpenter St. Croix Valley Nature Center
 Pheasants Forever, Inc. and Quail Forever
 St. Louis Audubon Society
 Flathead Audubon Society
 Internet Center for Wildlife Damage Management
 Western Nebraska Resources Council
 New Hampshire Audubon
 Concord, New Hampshire
 Freedom Center for Wildlife, Inc.
 Woodford Cedar Run Wildlife Refuge
 Operation Migration Inc.
 Audubon New York
 North Shore Audubon Society
 Four Harbors Audubon
 Huntington-Oyster Bay Audubon Society
 Eastern Long Island Audubon Society
 Weeden Foundation
 Rochester Birding Association
 Great South Bay Audubon Society
 Central New Mexico Audubon Society

Elisha Mitchell Audubon Society
Audubon Miami Valley
Salem Audubon Society
Rogue Valley Audubon Society
Gifford Pinchot Task Force
Friends of the Kalmiopsis
President Fund for Wild Nature
Cascades Raptor Center
Delaware Valley Ornithological
Club
Skye's Spirit Wildlife
Rehabilitation Center
Bird Refuge of York

White Flicker Wild Bird
Rehabilitation Clinic
Tennessee Ornithological Society
Cumberland-Harpeth Audubon
Society
Coastal Bend Audubon Society
Council for Environmental
Education
Virginia Society of Ornithology
Wildlife Center of Virginia
Wisconsin Society for Ornithology
Invasive Species Working Group
Coulee Region Audubon Society

Hoy Audubon Society, Inc.
Chappee Rapids Audubon Society
Riveredge Bird Club
Raptor Education Group, Inc.
Trees For Tomorrow
Florida Department of Health
Florida Fish and Wildlife
Conservation Commission
Florida Veterinary Medical
Association
National Association of State Public
Health Veterinarians

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CITY	FY 2019-20	Total With TNR Costs at \$56,800	Increase with TNR Costs at \$56,800	Total With TNR Costs at \$107,080	Increase With TNR Costs at \$107,080
Alpine	\$ 8,769	\$ 9,875	\$1,106	\$ 10,902	\$2,133
American Fork	\$ 48,396	\$ 54,500	\$6,104	\$ 60,168	\$11,772
Cedar Hills	\$ 6,327	\$ 7,125	\$798	\$ 7,866	\$1,539
Eagle Mountain	\$ 26,862	\$ 30,250	\$3,388	\$ 33,396	\$6,534
Highland	\$ 18,093	\$ 20,375	\$2,282	\$ 22,494	\$4,401
Lehi	\$ 76,146	\$ 85,750	\$9,604	\$ 94,668	\$18,522
Lindon	\$ 21,312	\$ 24,000	\$2,688	\$ 26,496	\$5,184
Orem	\$ 140,415	\$ 158,125	\$17,710	\$ 174,570	\$34,155
Pleasant Grove	\$ 48,618	\$ 54,750	\$6,132	\$ 60,444	\$11,826
Saratoga Springs	\$ 17,538	\$ 19,750	\$2,212	\$ 21,804	\$4,266
Vineyard	\$ 7,992	\$ 9,000	\$1,008	\$ 9,936	\$1,944
Utah County	\$ 4,440	\$ 5,000	\$560	\$ 5,520	\$1,080