

Fact vs. fiction: What every **wildlife professional** should know about free-roaming cats

Trap-neuter-return (TNR) is a common-sense, cost-effective solution for managing populations of unowned, free-roaming cats (sometimes called stray, feral, or “community cats”) by preventing additional births — rather than trying to round up, house, feed, and kill more cats. Despite TNR becoming increasingly popular over the past 25 years, a great deal of misinformation exists regarding TNR, and outdoor cats in general.

To understand how TNR aligns with conservation interests, you need to know the facts.

Fiction: TNR doesn't work.

Facts: The science is quite clear: There are only two ways proven to reduce, and eventually eliminate, a population of free-roaming cats: (1) intensive TNR efforts or (2) intensive eradication efforts, such as those done using poison, disease, lethal trapping, and hunting on small oceanic islands.^{1,2} Given the horrendous methods employed — and costs that can exceed \$100,000 per square mile³ — eradication is a non-starter in the U.S. The only fiscally sound option, then, is TNR. Arguments about the limitations of its effectiveness, the alleged impact of outdoor cats on the environment and so forth largely miss the point. In the vast majority of instances, TNR is simply the best option available to humanely reduce the outdoor cat population.

Fiction: TNR poses a threat to wildlife, especially native birds.

Facts: The mortality “estimates” sometimes attributed to free-roaming cats⁴ simply cannot be reconciled with the best population estimates available,⁵ or with the population trends documented by the annual North American Breeding Bird Survey.⁶ In addition, such estimates leave no accounting for other well-documented causes of bird mortality, such as pesticide use, oil spills, habitat loss, window strikes, or other anthropogenic causes. Indeed, were these claims even remotely accurate, no birds would be left.

It's well known to biologists that all predators — cats included — tend to prey on the young, the old, the weak and the unhealthy. At least two studies have investigated this phenomenon in detail, revealing that birds killed by cats are, on average, significantly less healthy than birds killed through non-predatory events (e.g., collisions with windows or cars).^{7,8} As the U.K.'s Royal Society for the Protection of Birds notes: “It is likely that most of the birds killed by cats would have died anyway from other causes before the next breeding season, so cats are unlikely to have a major impact on populations.”⁹ In any case, because the most effective way to reduce most populations of community cats is through sterilization, TNR offers a benefit to wildlife as well.

Fiction: TNR doesn't eliminate the population of unowned, free-roaming cats.

Facts: Elimination of a particular population of cats can be quite difficult, as even the most intensive eradication programs have demonstrated. Complete elimination can also backfire when, for example, the population of an island's rodents skyrockets — threatening the very wildlife whose protection prompted the eradication campaign.^{10,11} Nevertheless, a number of TNR programs have demonstrated dramatic population reductions and, in some cases, have completely eliminated colonies of free-roaming cats. Among the most well-documented examples:^a

- In Florida, a campus TNR program led to the adoption of 47 percent of the 155 cats living on campus over an 11-year observation period — at the end of which, just 23 cats remained on campus.¹²
- In Rome, Italy, a survey of caretakers (caring for 103 cat colonies) revealed a 22 percent decrease overall in the number of cats, despite a 21 percent rate of “cat immigration.” Although some colonies experienced *initial* increases, the numbers began to decrease significantly after three years of TNR. From a report on the survey: “Colonies neutered three, four, five or six years before the survey showed progressive decreases of 16, 29, 28 and 32 percent, respectively.”¹³
- A recent survey conducted among 28 respondents involved with TNR efforts in Australia (with usable data from a total of 42 colonies) revealed a median decline in colony size “from 11.5 to 6.5 cats ... over a median of 2.2 years, and the median ... reduction was 31 percent; this was achieved by rehoming cats and kittens and reducing reproduction.”¹⁴
- A 17-year TNR effort on the waterfront in Newburyport, Massachusetts, resulted in the elimination of an estimated 300 cats.¹⁵
- In Chicago, Illinois, a citizen scientist implementing a targeted TNR program documented a mean population reduction (across 20 colonies) of 54 percent from entry levels and 82 percent from peak levels.¹⁶

Fiction: TNR programs “establish” colonies of cats.

Facts: TNR is a *response* to the presence of one or more cats in a given area. Relocating cats is done only rarely (as it is labor-intensive) and such cases generally involve integrating cats with no opportunity to be returned to their original location (e.g., because a property is being demolished) into *existing* colonies (e.g., via a “barn cat” program).

Best Friends does not support the maintenance of colonies in environmentally sensitive habitat or habitat where threatened and endangered prey species are present. To address concerns over colonies in wildlife-sensitive areas, we recommend a policy similar to what has been proposed in Burlington County, New Jersey. As part of a progressive pilot program designed by the New Jersey Feral Cat & Wildlife Coalition, colonies (and feeding) are permitted “without limitation” in parks and open spaces not considered “wildlife-related.” In areas that *are* considered wildlife-related, colonies are also permitted, but the colony “sponsor” is required to secure the permission of the land manager.¹⁷

^a For additional information, visit bestfriends.org/resources/feral-cats-and-tnr for resources such as “[Trap-Neuter-Return Success Stories: What the Research Tells Us.](#)”

Such a policy provides a reasonable balance between the concerns of conservationists and those of community cat advocates — and also recognizes the real-world challenges associated with attempts to enforce a colony ban on all public lands, given the limited resources available for such efforts.

Fiction: TNR increases the risk of rabies transmission to humans, domestic animals, and wildlife.

Facts: The Centers for Disease Control and Prevention (CDC) reports: “Over the last 100 years, rabies in the United States has changed dramatically. More than 90 percent of all animal cases reported annually ... now occur in wildlife.”¹⁸

Vaccination against rabies is common practice for TNR programs in the U.S., especially in parts of the country where rabies in cats occurs most frequently.^b In fact, a 2012 nationwide survey of feral cat groups conducted by Alley Cat Rescue revealed that 96 percent of the groups provide rabies vaccinations as part of their TNR programs.¹⁹ TNR therefore protects public health by creating a powerful barrier between wildlife and humans. And not every cat needs to be vaccinated to achieve “herd immunity”²⁰ (Figure 1). The public health benefit of TNR is therefore two-fold: The cats are vaccinated, and their numbers are reduced over time.

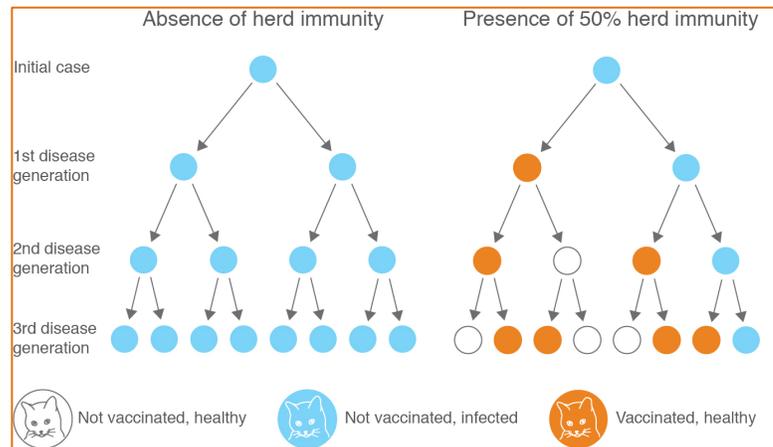


Figure 1. Achieving herd immunity. Adapted from Jekel, J. F. *Epidemiology, Biostatistics, and Preventive Medicine*. 3rd ed., 2007.

Fiction: TNR doesn’t reduce the spread of toxoplasmosis to wildlife.

Facts: Research has shown that cats living in close proximity to humans — typical of TNR cats — are much less likely to be exposed to the *Toxoplasma gondii* parasite than “solitary, feral domestic cats living in undeveloped landscapes.”²¹ Feeding community cats — common practice even where robust TNR programs don’t exist — therefore seems to be an effective measure for reducing the spread of toxoplasmosis in cats, humans, and wildlife. Of course, an active, targeted TNR program would likely reduce the population of community cats, further reducing the risks.

Fiction: Outdoor cats are responsible for the decline of various marine mammal populations caused by *T. gondii*-contaminated rainwater runoff.

Facts: The majority of California sea otter mortalities often attributed to cats²² were actually the result of a strain of *T. gondii* found almost exclusively in wild felids and only rarely in domestic cats.^{23,24} Indeed, research from the U.S. Geological Survey concluded that “spillover from wildlife, not pets” is likely responsible for infection in California sea otters.²⁵

^b Best Friends recommends that vaccination against rabies be included in all TNR programs, and that reasonable attempts are made to assure boosters are also administered.

And the agency's most recent census found that "the otter population is likely at its highest level in at least 100 years."^{26,27}

A similar scenario has played out in Hawaii, with cats blamed for declining numbers of the endangered Hawaiian monk seal. However, an examination of the evidence reveals a very different story. According to the National Oceanic and Atmospheric Administration, *T. gondii* has been implicated in the deaths of eight seals over a 15-year period — just 4.4 percent of mortalities overall.²⁸ And a 2016 report from the agency notes that "there have been an increasing number of seal sightings and births in the main Hawaiian Islands" since 1990 — just where one would expect the risk of toxoplasmosis to be greatest (since these are the most densely populated of the Hawaiian Islands, and therefore home to more cats).²⁹ Again, targeted TNR would likely reduce the population of cats in the environment, further reducing any risks of environmental contamination.

Fiction: Most people are opposed to TNR for managing the unowned, free-roaming cats in their neighborhood.

Facts: Results of a 2014 national survey commissioned by Best Friends revealed a 68 percent preference for TNR over impoundment followed by lethal injection of unadoptable cats (24 percent).³⁰ More recently, a 2017 survey (also commissioned by Best Friends) found nearly identical results: 72 percent of respondents supported TNR, compared to just 18 percent favoring impoundment and lethal injection.

Results of a 2006 survey commissioned by Alley Cat Allies found that 81 percent of respondents thought "leaving [a] cat where it is outside" was more humane for the cat, compared to the alternative of "having the cat caught and then put down" (14 percent).³¹ When respondents were asked the same question — but told to assume the cat would die two years later after being hit by a car — the support for "leaving the cat" remained strong, at 72 percent (with 21 percent preferring to have the cat caught and euthanized). The same questions were asked in two subsequent surveys, and the results again indicated a strong preference (e.g., 73–86 percent of respondents for the first question) for "leaving the cat where it is outside."^{32,33} Such attitudes are in line with the results of a 2011 national survey in which just 25 percent of respondents agreed that animal shelters "should be allowed to euthanize animals as a necessary way of controlling the population of animals."³⁴

Literature cited

- (1) Bester, M. N.; Bloomer, J. P.; Aarde, R. J. van; Erasmus, B. H.; Rensburg, P. J. J. van; Skinner, J. D.; Howell, P. G.; Naude, T. W. A Review of the Successful Eradication of Feral Cats from Sub-Antarctic Marion Island, Southern Indian Ocean. *South African Journal of Wildlife Research* **2002**, *32* (1), 65–73.
- (2) Ratcliffe, N.; Bell, M.; Pelembe, T.; Boyle, D.; Benjamin, R.; White, R.; Godley, B.; Stevenson, J.; Sanders, S. The Eradication of Feral Cats from Ascension Island and Its Subsequent Recolonization by Seabirds. *Oryx* **2009**, *44* (01), 20–29.
- (3) Campbell, K. J.; Harper, G.; Algar, D.; Hanson, C. C.; Keitt, B. S.; Robinson, S. Review of Feral Cat Eradications on Islands. In *Island invasives: eradication and management*; Veitch, C. R., Clout, M. N., Towns, D. R., Eds.; IUCN: Gland, Switzerland, 2011.
- (4) Loss, S. R.; Will, T.; Marra, P. P. The Impact of Free-Ranging Domestic Cats on Wildlife of the United States. *Nature Communications* **2013**, *4*.
- (5) Partners in Flight Science Committee 2013. PIF Population Estimates Database pif.birdconservancy.org/PopEstimates/ (accessed Mar 5, 2018).

- (6) Sauer, J. R.; Niven, D. K.; Hines, J. E.; Ziolkowski, D. J. J.; Pardieck, K. L.; Fallon, J. E.; Link, W. A. *The North American Breeding Bird Survey, Results and Analysis 1966–2015. Version 2.07.2017*; USGS Patuxent Wildlife Research Center, Laurel, MD, 2017.
- (7) Møller, A. P.; Erritzøe, J. Predation against Birds with Low Immunocompetence. *Oecologia* **2000**, *122* (4), 500–504.
- (8) Baker, P. J.; Molony, S. E.; Stone, E.; Cuthill, I. C.; Harris, S. Cats about Town: Is Predation by Free-Ranging Pet Cats *Felis Catus* Likely to Affect Urban Bird Populations? *Ibis* **2008**, *150*, 86–99.
- (9) RSPB. Are Cats Causing Bird Declines? **2016**.
- (10) Carnie, T. ‘Killer Mice’ Wreak Havoc on Marion Island. *IOL News*. 2015.
- (11) Bergstrom, D. M.; Lucieer, A.; Kiefer, K.; Wasley, J.; Belbin, L.; Pedersen, T. K.; Chown, S. L. Indirect Effects of Invasive Species Removal Devastate World Heritage Island. *Journal of Applied Ecology* **2009**, *46* (1), 73–81.
- (12) Levy, J. K.; Gale, D. W.; Gale, L. A. Evaluation of the Effect of a Long-Term Trap-Neuter-Return and Adoption Program on a Free-Roaming Cat Population. *Journal of the American Veterinary Medical Association* **2003**, *222* (1), 42–46.
- (13) Natoli, E.; Maragliano, L.; Cariola, G.; Faini, A.; Bonanni, R.; Cafazzo, S.; Fantini, C. Management of Feral Domestic Cats in the Urban Environment of Rome (Italy). *Preventive Veterinary Medicine* **2006**, *77* (3–4), 180–185.
- (14) Tan, K.; Rand, J.; Morton, J. Trap-Neuter-Return Activities in Urban Stray Cat Colonies in Australia. *Animals* **2017**, *7* (6), 46.
- (15) Spehar, D. D.; Wolf, P. J. An Examination of an Iconic Trap-Neuter-Return Program: The Newburyport, Massachusetts Case Study. *Animals* **2017**, *7* (11).
- (16) Spehar, D. D.; Wolf, P. J. A Case Study in Citizen Science: The Effectiveness of a Trap-Neuter-Return Program in a Chicago Neighborhood. *Animals* **2018**, *7* (11).
- (17) n.a. *Pilot Program: Ordinance & Protocols for the Management of Feral Cat Colonies in Wildlife-Sensitive Areas in Burlington County, New Jersey*; New Jersey Feral Cat & Wildlife Coalition, 2007; p 17.
- (18) CDC. Rabies in the U.S.: Public Health Importance of Rabies. **2011**.
- (19) ACR. Alley Cat Rescue’s National Feral Cat Survey. *PR Newswire* **2012**.
- (20) Jekel, J. F. *Epidemiology, Biostatistics, and Preventive Medicine*, 3rd ed.; Elsevier Health Sciences, 2007.
- (21) VanWormer, E.; Conrad, P.; Miller, M.; Melli, A.; Carpenter, T.; Mazet, J. K. *Toxoplasma Gondii*, Source to Sea: Higher Contribution of Domestic Felids to Terrestrial Parasite Loading Despite Lower Infection Prevalence. *EcoHealth* **2013**, *1*–13.
- (22) Jessup, D. A.; Miller, M. A. The Trickle-Down Effect. *The Wildlife Professional* **2011**, *5* (1), 62–64.
- (23) Conrad, P. A.; Miller, M. A.; Kreuder, C.; James, E. R.; Mazet, J.; Dabritz, H.; Jessup, D. A.; Gulland, F.; Grigg, M. E. Transmission of *Toxoplasma*: Clues from the Study of Sea Otters as Sentinels of *Toxoplasma Gondii* Flow into the Marine Environment. *International Journal for Parasitology* **2005**, *35* (11–12), 1155–1168.
- (24) Miller, M. A.; Miller, W. A.; Conrad, P. A.; James, E. R.; Melli, A. C.; Leutenegger, C. M.; Dabritz, H. A.; Packham, A. E.; Paradies, D.; Harris, M.; et al. Type X *Toxoplasma Gondii* in a Wild Mussel and Terrestrial Carnivores from Coastal California: New Linkages between Terrestrial Mammals, Runoff and *Toxoplasmosis* of Sea Otters. *International Journal for Parasitology* **2008**, *38* (11), 1319–1328.
- (25) Lafferty, K. D. Sea Otter Health: Challenging a Pet Hypothesis. *International Journal for Parasitology: Parasites and Wildlife* **2015**, *4* (3), 291–294.
- (26) Tinker, M. T.; Hatfield, B. B. *California Sea Otter (Enhydra Lutris Nereis) Census Results, Spring 2016*; U.S. Geological Survey Data Series 1018, 2016; p 10.
- (27) Rogers, P. California Sea Otter Population Reaches Record High Number. *The Mercury News*. September 19, 2016.
- (28) Barbieri, M. M.; Kashinsky, L.; Rotstein, D. S.; Colegrove, K. M.; Haman, K. H.; Magargal, S. L.; Sweeny, A. R.; Kaufman, A. C.; Grigg, M. E.; Littnan, C. L. Protozoal-Related Mortalities in Endangered Hawaiian Monk Seals *Neomonachus Schauinslandi*. *Diseases of aquatic organisms* **2016**, *121* (2), 85–95.
- (29) Sprague, R. S.; Walters, J. S.; Baron-Taltre, B.; Davis, N. *Main Hawaiian Islands Monk Seal Management Plan*; National Marine Fisheries Service, Pacific Islands Region: Honolulu, HI, 2016.
- (30) Wolf, P. J. New Survey Reveals Widespread Support for Trap-Neuter-Return. *Humane Thinking* **2015**.
- (31) Chu, K.; Anderson, W. M. *Law & Policy Brief: U.S. Public Opinion on Humane Treatment of Stray Cats*; Alley Cat Allies: Bethesda, MD, 2007.
- (32) Beall, A. E. *Community Cats: A Journey into the World of Feral Cats*; iUniverse, 2014.
- (33) Robinson, B. Letter: How to Manage Green Bay’s Feral Cats. *Green Bay Press Gazette*. Jan. 25, 2018.
- (34) Karpusiewicz, R. AP-Petside.Com Poll: Americans Favor No-Kill Animal Shelters. **2012**.