

## ARTICLE

# The effects of free-roaming cats on native wildlife populations

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## Abstract

Free-roaming cats pose a threat to wildlife in several ways, including predation, disease transmission and food competition. They have been specifically implicated in at least 33 bird extinctions, primarily on islands, making them one of the most important causes of bird extinctions worldwide (Danner et al. 2010). Free-roaming cats are extremely dangerous to wildlife, not only due to the internal and external trauma that can be caused by their bites and claws, but also from the bacteria present in their saliva. They are also responsible for the spread of several zoonotic diseases, including rabies. Free-roaming cats compete with other wild animals for the same food source and can quickly take over a wild animal's territory and habitat. The outdoor cat's lifespan is one-third of that of indoor cats due to the high potential for predation, starvation, disease, exposure and being hit by a vehicle. One solution to the problem of free-roaming cats is a method called "Trap-Neuter-Release" (TNR), in which feral cats are humanely captured, spayed or neutered by a veterinarian and then released back to where they were originally found. The best solution to the problem of free-roaming cats is public education. Veterinarians can and should play a major role in this educational effort.

## BIO

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## Introduction

Every year, billions of wild animals are injured or killed by free-roaming cats (National Geographic 2004). This number includes birds, small mammals, amphibians and reptiles, with small mammals such as rabbits, squirrels and chipmunks most commonly affected (National Geographic 2004). Free-roaming cats pose a threat of disease transmission to wildlife species and compete with them for food sources. Furthermore, they pose a zoonotic risk to humans who may care for them, potentially spreading disease through bites, scratches, urine and faeces.

## What is a free-roaming cat?

A free-roaming cat may be classified as a feral cat, outdoor cat or stray cat. Feral cats are defined as "the offspring of stray or abandoned household pets. Raised without human contact, they quickly revert to a wild state and form colonies wherever food and shelter are available" (National Geographic 2004). Feral cats are considered to be an "exotic" or "non-native" species, and by living

## Keywords

Feral cat; outdoor cat; stray cat; free-roaming cat; wildlife; Trap-Neuter-Release

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## Abbreviations

AVMA: American Veterinary Medical Association  
ESA: Endangered Species Act  
MBTA: Migratory Bird Treaty Act  
TNR: Trap-Neuter-Release

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in the wild greatly threaten ecosystems and native wildlife populations. 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" (Barrows 2004). Feral cats are usually not spayed or neutered, are unvaccinated and have received no veterinary care. Outdoor cats are household pet cats that are allowed to roam freely outdoors unsupervised. These pet cats may or may not be spayed or neutered as well as vaccinated. Because of this, these cats carry the risk of interacting with feral cats, during which reproduction or disease transmission could take place. If human care of a pet cat is discontinued, either intentionally or accidentally, the cat is then considered to be a "stray" cat.

## Natural history of the cat

The domestic cat (*Felis catus*) was introduced into the United States about 400 years ago (Patterson 2003) and has become a very popular pet. Approximately 30% of urban households have a cat as a pet, and this percentage

doubles for households in rural areas (The Wildlife Society 2011). However, only approximately 35% of those who owned cats are kept exclusively indoors (American Bird Conservancy 2010). Cats are such a popular pet because they are clean, relatively self-sufficient and low maintenance. However, cats are greatly predisposed to overpopulation due to the fact that they reach puberty at a very early age (5–9 months on average) and have multiple heat cycles throughout the spring, summer and fall months.

They typically produce 2–3 litters per year with an average of 4–6 kittens per litter (Griffin 2006). Cats are prolific breeders, and they can become pregnant whilst still nursing a new litter. It is estimated that there are approximately 70–100 million homeless cats in the United States (Lloyd & DeVore 2010).

### Threats of free-roaming cats to wildlife

Free-roaming cats pose a threat to wildlife in several ways including predation, disease transmission and food competition. Many people will keep cats as pets to serve as “rodent control.” However, cats do not differentiate amongst their prey. They are just as likely to attack small mammal species as birds and small reptiles and amphibians. Feline predators are known to prey on common species, such as Northern cardinals (*Cardinalis cardinalis*), blue jays (*Cyanocitta cristata*) and house wrens (*Troglodytes aedon*) as well as some threatened and endangered species (National Geographic 2004). Winter and Wallace (2006) report that cats contribute to the endangerment of least terns (*Sterna antillarum*), piping plovers (*Charadrius melodus*) and loggerhead shrikes (*Lanius ludovicianus*). For over 10 years, feral cats have been a persistent problem in California, killing one or two colonies of least terns each year. The small white birds are part of an intense monitoring program with a tremendous number of volunteers who watch the colonies throughout the six-month nesting season. If a cat finds the colony, it can destroy the colony in a few days, if not overnight (National Geographic 2004). Feral cats have been specifically implicated in at least 33 bird extinctions, primarily on islands, making them one of the most important causes of bird extinctions worldwide (Danner et al. 2010).

Invasive species, including feral cats, are estimated to be the second most common cause of mortality in wild birds following habitat loss (American Bird Conservancy 2010). Habitat loss, furthermore, has depleted areas of cover and refuge for wild birds, therefore predisposing them further to feral cat predation. Studies show that the number and types of animals killed by free-roaming cats varies greatly, depending on the individual cats, the

time of year and availability of prey. Roughly 60–70% of the wildlife that cats kill are small mammals: 20–30% are birds, and up to 10% are amphibians, reptiles and insects (American Bird Conservancy 2010). The most vulnerable species of birds are ground-nesting and ground-feeding birds, and the most vulnerable life stage for the bird is the fledgling stage.

Free-roaming cats are extremely dangerous to wildlife, not only due to the internal and external trauma that can be caused by their bites and claws, but also from the bacteria present in their saliva. The bacteria *Pasteurella multocida* causes abscesses and septicemia that have proven fatal to birds and mammals (Jessup 2004). Cats can also transmit rabies to wild animals and humans via bite wounds (Centers for Disease Control and Prevention 2011). The Centers for Disease Control and Prevention identifies cats as the most frequently reported rabid domestic animal, and in 2009, three times more cats than dogs were reported to be rabid (Centers for Disease Control and Prevention 2011).

The transmission of Feline Leukemia Virus and Feline Panleukopenia Virus (feline distemper) has been documented in mountain lions and the endangered Florida panther (*Puma concolor coryi*), respectively (Coleman et al. 1997).

Furthermore, the transmission of a protozoal disease, toxoplasmosis, for which the cat acts as a dead-end host, has proven deadly to several species of wild animals including mice, songbirds and even marine mammals such as seals, dolphins and sea otters (Monmouth County Audubon Society 2009). Toxoplasmosis has zoonotic potential for humans and can have detrimental effects in pregnant women. Other zoonoses transmitted by cats include roundworms, hookworms, ringworm, plague, Lyme disease and cat scratch fever (Patronek 1998). More recently, it has been confirmed that cats are a high-risk species for spreading type A avian influenza virus (Rimmelzwaan et al. 2006).

Free-roaming cats compete with other wild animals such as raptors, fox and bobcat (*Lynx rufus*), for the same food source, which includes mice, shrews and other small mammals. Feral cats are usually not territorial and can live in large colonies, taking over another wild animal’s food supply very quickly (American Bird Conservancy 2010). This displacement can be extremely detrimental to the wild animal, as it may lead to starvation and death.

Free-roaming cats also usually have a readily available food source, such as a human, allowing their populations to increase and thrive in comparison to wild predators. Furthermore, the native wild species targeted by free-roaming cats have evolved alongside other native species and provide vital ecosystem services. “The loss

of these animals 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. Removal of cats from native and even degraded ecosystems has no negative and only positive ecologic consequences” (Jessup 2004).

Even though an animal is “domesticated,” meaning that it has evolved (due to humans) over thousands of years from a wild ancestor to a different, non-wild species, it does not mean that animal does not retain wild instincts such as stalking and hunting. There is a misconception that a well-fed cat will not hunt and kill wildlife and this is false. Well-fed cats kill birds and other wildlife because the hunting instinct is independent of the urge to eat. In one study, six cats were presented with a live small rat whilst eating their preferred food. All six cats stopped eating the food, killed the rat and then resumed eating the food (Adamec 1976).

### Consequences of a cat attack

Most injured wild animals presenting to a wildlife hospital due to a cat attack have obvious, visible injuries, including puncture wounds, skin tears, lacerations, fractures, head trauma and spinal trauma. Some cases may have extensive internal and external injuries and may need to be euthanized. Even if a wild animal was not observed to be in a cat’s mouth, the animal *may* have been exposed to a cat. The puncture wounds caused by a cat’s teeth can be extremely small and difficult to see, so it is advised to err on the side of caution, treat as a cat attack victim and start the animal on appropriate antibiotic therapy.

Table 1 shows the combined suspected and observed cat attack cases, separated by class, admitted to several larger wildlife hospitals for the year 2021. This data set also includes cases submitted from several wildlife rehabilitation centres through the WILD-ONE database system.

**Table 1** 2021 cat attack cases by class.

2021 cat attack cases by class					
Centre	Birds	Mammals	Reptiles	Amphibians	Total cases admitted
PAWS Wildlife Center	305	93	0	0	4657
Tri-State Bird Rescue & Research*	283	0	0	0	4384
Tufts Wildlife Clinic	65	137	4	0	3439
Wildlife Center of Virginia/WILD-ONE database	1665	2586	20	4	62 931
Willowbrook Wildlife Center	58	89	0	0	11 515
Wildlife Rehabilitation Center of Minnesota	239	785	1	0	19 300

\*Accepts only avian patients.

The most common cat attack victims were Eastern cottontail rabbits (*Sylvilagus floridanus*), Eastern grey squirrels (*Sciurus carolinensis*), American robins (*Turdus migratorius*) and mourning doves (*Zenaida macroura*). These numbers are just a small fraction of affected wildlife and only represent the animals that are fortunate enough to be found by someone and brought to a rehabilitation clinic. Further studies to determine the magnitude of feline predation on wildlife in relation to population dynamics and size are still needed (Griffin 2006) and even that may not be feasible considering the number of free-roaming cats present in the United States.

### Risks to cats living in the outdoors

The life of a free-roaming cat is not a glamorous one. The outdoor cat’s lifespan is one-third of that of indoor cats due to the high potential for predation, starvation, disease, exposure and being hit by a vehicle. Therefore, allowing a cat to remain feral or live a free-roaming lifestyle has ethical concerns due to the increased chances of mortality. Some will argue that keeping a cat indoors is prohibiting them from expressing natural behaviours and instincts. However, there are several alternative options to keep an indoor cat stimulated and allow for natural behaviour expression, including interactive toys, cat-specific furniture and scratching posts, videos and aromatherapies to calm anxious cats. If a cat must have outdoor time, he can easily be tethered with a leash or placed into a secure, outdoor enclosure (e.g., catio) to prevent exposure to wildlife and feral cats.

### Proposed solutions

#### Trap-Neuter-Release

Many animal welfare organizations, animal rights organizations and humane societies have been involved in and supportive of a specific method called “Trap-Neuter-Release”, in which feral cats are humanely captured,

spayed or neutered by a veterinarian and then released back to where they were originally found. The colony is usually offered food and water by humans. The ultimate goal of TNR or “colony management” is colony size reduction by alteration and eventual elimination by attrition. In 2009, the AVMA stated that they neither endorse nor oppose appropriately managed cat colony programs. The likelihood that the creation of managed colonies will diminish the numbers of free-roaming cats is minimal but is the first step towards attrition. The AVMA has an extensive list of minimum requirements for “managed colonies” in the interest of the health and welfare of the cats and the public. Notably, these requirements include “restriction of the colony to a well defined area, not on lands managed for wildlife or other natural resources” (Tate 2003). TNR may seem like a viable solution; however, it does not prevent those cats from preying upon wildlife, and it does not prevent a person from dumping unwanted cats into these colonies, which only exacerbates the problem. It also does not prevent disease transmission to other animals and to humans. The National Association of State Public Health Veterinarians, American Association of Wildlife Veterinarians, American Bird Conservancy, American Ornithologists’ Union and Cooper Ornithological Society oppose TNR practices.

The results of a TNR study conducted in Catalina, California in 2010 concluded that sterilization likely would not reduce the impact of feral cats on native prey species, and sterilization had no effect on the degree of home-range overlap amongst individuals (Guttilla & Stapp 2010). This study further supports those opposed to TNR programs.

Some have argued that persons participating in TNR are actually in violation of the ESA and MBTA. The ESA states that it is unlawful to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” any protected native wild species. Because cats can and do kill, harass, harm, pursue and wound endangered species, people who reabandon cats, maintain feral cats or both and the veterinarians who knowingly provide services for these animals appear to be in potential violation of the ESA (Jessup 2004). The MBTA states that it is a misdemeanor or felony to kill or take “any migratory bird.” The act states that “any person, association, partnership or corporation who shall violate any provision...shall be deemed guilty of a misdemeanor...fined not more than \$15,000 or be imprisoned not more than 6 months, or both” (Jessup 2004). Furthermore, many states have their own laws regarding endangered species, and in all states, the taking of native species is illegal with the exception of those with hunting regulations or “game laws.” A list of several position statements on TNR practices may be viewed at TNR Reality Check.

### **Public education**

The best solution to the problem of free-roaming cats is public education. Veterinarians can and should play a major role in this by encouraging clients to keep their cats indoors or use a leash or enclosed cage if they must be placed outdoors. Owners should be advised of the dangers of keeping their cat(s) outdoors, not only to the wildlife but also to the cats themselves. All pet cats should be spayed or neutered, vaccinated and cared for regularly by a veterinarian. Unwanted cats should be taken to a humane society rather than released into the wild, and farm cat populations should be kept at a low level if at all (The Wildlife Society 2011). Pamphlets or handouts can be created discussing the risks of keeping cats outdoors and supplied to each cat owner on their initial exam, or by request. Upon graduation, each veterinarian takes an oath by stating: “I solemnly swear to use my scientific knowledge and skills for the benefit of society through the protection of animal health and welfare, the prevention and relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge” (AVMA 2012). By supporting TNR practices and/or not encouraging owners to keep cats indoors, veterinarians are going against the oath of protecting animal health and welfare, preventing animal suffering, conserving animal resources and promoting public health. It is critical for individuals to take a stand on this issue to prevent further wildlife detriment, disease spread to humans and other animals and to prevent a poor quality of life for cats.

### **Conclusion**

Free-roaming cats pose a challenge not only for wildlife but also for humans. They prey upon billions of wild birds and mammals annually and are responsible for the extinction of 33 documented species of birds. They compete with native wildlife for food and transmit diseases to other cats, wildlife and humans. If their populations are not controlled, the negative effects they have on wildlife will become even more considerable and could lead to further extinctions of already threatened and endangered species.

Disease will continue to be spread, and more cats will be born to contribute to the population, subsequently contributing to the problem. Veterinarians must take a stand on the issue and be proactive in educating their clients of the dangers and negative consequences of keeping cats outdoors.

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