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Feral Cats and Their Management

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Introduction

Feral cats are domestic cats that have gone wild *(Figure 1)*. They cause significant losses to populations of native birds, small mammals, reptiles, and amphibians; can transmit several diseases such as rabies and toxoplasmosis; and may be a general nuisance. However, many people are sympathetic to feral cats and provide food and care for them. Managing feral cat populations is controversial. Before choosing a management strategy, it is important to understand public interest and research-based information regarding management options. This Extension Circular provides research-based information on the management of feral cats.

Figure 1. Feral cats roam freely across urban and rural areas. (Photo Credit: Austen Hill)

What are Feral Cats?

Seven thousand years ago, the European and African wild cat (*Felis silvestris*) was domesticated in the Fertile Crescent region of the Middle East and Africa. Cats were used to reduce the number of rats and mice that resided around settlements. Over time, the process of domestication changed the wild cat into a separate species called the domestic or house cat (*Felis catus*).

Table I. Classification of the house or domestic cat.

Classification	*Owned*	*Tame*	*Allowed Outside*
Indoor	Yes	Yes	No
Limited-range	Yes	Yes	Yes, but confined to owner's or neighboring property
Free-range	Yes	Yes and No	Yes
Feral	No	No	Yes

Today, domestic cats can be classified into four categories (indoor, limited-range, free-range, or feral), based on whether they are owned, tame or acclimated to human contact, and allowed to roam extensively outside *(Table I)*.

Owned cats are under the direct care of an owner, likely to have access to residences, and receive medical care and vaccinations. Indoor cats are tame and confined to their owner's home or other buildings. Limited-range cats are tame and allowed outside but typically do not leave the owner's or neighboring properties. Free-range cats, such as barn cats, are not confined by their owner. Food and water are often provided daily, but the cats are allowed to roam freely on and off of the property. Some free-range cats are tame, while others are not acclimated to human contact. The term "stray cats" always applies to feral cats, but may also apply to limited- and free-range cats because it relates to a cat's freedom of

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mobility rather than to whether it is owned. Feral cats are not owned and therefore have reverted to a wild state. They frequently exhibit aggressive or avoidance behavior around people. For the most part, feral cats live outside but occasionally seek food and shelter inside barns, abandoned buildings, and other structures. While visually indistinguishable from owned cats, feral cats are more likely to have scratched faces and torn ears due to fighting.

Biology

Feral cats occur across Nebraska, as well as the United States, and have adapted to living in rural and urban areas where food, water, and habitat are available. They usually weigh 3 to 8 pounds and are 22 to 36 inches long. Life expectancy is 3 to 5 years, compared to 15 years for owned cats. Feral cats are adaptable and reside in a variety of conditions including barns, sheds, alleys, sewer systems, overgrown areas, under bridges, and along creeks. The average home range of feral cats is 1.5 square miles. Feral cats feed on human refuse and prey on birds, small mammals, reptiles, and amphibians, in addition to eating food provided by humans.

Most mating occurs during spring and summer as estrous is triggered by increasing daylight. Feral cats are prolific breeders and can produce up to five litters per year. Females give birth to 2 to 10 kittens about 65 days after mating. The Humane Society of the United States estimates that a pair of breeding cats and their offspring can produce over 400,000 cats in seven years under ideal conditions, assuming none die. Young are raised at a single den site, but are frequently moved to other locations. Family units break-up once the kittens reach 7 months of age. Males do not assist in the rearing of young and occasionally kill kittens.

Issues and Impacts

An estimated 60 to 88 million cats are owned in the U.S. and 60 million more are feral. As instinctive hunters, feral cats pose a serious threat to native wildlife *(Figure 2)*, particularly birds. Proponents of feral cats argue that predation by feral cats on wildlife is negligible. While loss of habitat is the primary cause of species extinctions, cats are responsible for the extinction of at least 33 species of birds around the world. Cats kill an estimated 480 million birds per year (assuming eight birds killed per feral cat per year). 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). A wildlife rehabilitation facility in California reported that one-third of all birds (36 species) requiring treatment had sustained cat-related injuries.

Predation by cats on birds has an economic impact of more than $17 billion dollars per year in the U.S. The estimated cost per bird is $30, based on literature citing that bird watchers spend $.40 per bird observed, hunters spend $216 per bird shot, and bird rearers spend $800 per bird

Figure 2. Feral cats prey on native wildlife. (Photo Credit: Stephen M. Vantassel)

released. The estimated economic impact of cat damage to birds does not include losses to small mammals, reptiles, and amphibians.

Proponents of feral cats also suggest that well-fed cats do not prey on wildlife. Research shows that cats maintain their predatory instincts, no matter how well fed they are. The diets of well-fed house-based cats in Sweden consisted of 15 percent to 90 percent native prey, depending on availability.

Some proponents contend that feral cats provide societal benefits by controlling invasive species such as pigeons (*Columba livia*), house mice (*Mus musculus*), Norway rats (*Rattus norvegicus*), and European starlings (*Stumus vulgaris*). Feral cats do kill some of these animals, but they are not effective in controlling populations because pigeons, house mice, and Norway rats have adapted to living in close association with humans and human-related disturbance. In California, 67 percent of rodents, 95 percent of birds, and 100 percent of lizards brought home by cats were native species, and native birds were twice as likely to be seen in areas without cats. House mice (an invasive species) were more abundant and native rodents less abundant in areas with cats.

Feral cats are opportunistic hunters, taking any small animal available, such as pheasants, native quail, grouse, turkeys, waterfowl, and endangered piping plovers (*Charadrius melodus*). Feral cats also impact poultry producers by preying on free-ranging chickens and other domestic fowl. Cat owners should be aware that feral cats have killed limited- and free-range cats.

Feral cats pose risks to public health and safety. Unlike owned cats that are required by state law to be vaccinated for diseases, few feral cats are vaccinated, so the probability of them carrying and transmitting diseases is much higher than owned cats. Feral cats can transmit several diseases to humans and other cats, including cat scratch fever, plague, rabies, ringworm, salmonellosis, and toxoplasmosis. In fact, cats are the most important species in the life cycle of the parasite responsible for toxoplasmosis, and in 3 separate studies, most feral cats (62 percent to 80 percent) tested positive for toxoplasmosis. Feral cats are hosts of fleas and ticks that are known carriers of diseases that can be transmitted to humans.

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Since some feral cats appear tame, people may think that all feral cats can make suitable companions. Less aggressive cats can be fed and tamed; however, doing so can lead to problems. Feeding encourages cats to congregate, which increases the chance of diseases being transmitted between cats.

Owned cats are the responsibility of their owners, but who is responsible for feral cats? People in 9 percent to 15 percent of all households in America feed feral cats, but only a few consider themselves to be the owners of these cats. Many people who feed strays do not spay or neuter their own outdoor cats, which can lead to problems with city ordinances, upset neighbors, and increased numbers of feral cats. Landowners, pet owners, and professionals should work together to manage feral cats.

Social-Legal Controversy

Cats are the most popular pet in the U.S. According to the American Pet Products Manufacturers Association, 88 million cats provide companionship and entertainment in 38.4 million American households.

Some people believe cats have the right to live unowned and wild, and therefore, they believe that people do not have the right to manage cats. Others believe the methods used to capture, handle, kill, and otherwise manage feral cats are inhumane. We recognize the concerns of those who believe feral cats should not be killed for simply trying to survive. Nevertheless, most scientists, wildlife managers, and public health officials believe the impact of predation by feral cats on native wildlife, coupled with the risks of disease transmission, justifies the management of feral cats.

Status of Cats

The lack of clear-cut responsibility and jurisdiction complicates the management of feral cats. They are not regulated by city or state agencies in Nebraska *(Figure 3)*, and Animal Control regulations do not include a category for cats that are not owned. The Nebraska Game and Parks Commission does not consider feral cats to be a wild mammal or wildlife species as defined in Chapter 37 of the Nebraska statutes (37-246, 37-247). Consequently, feral cats do not fall under any authority or jurisdiction within our public institutions. Landowners' rights and responsibilities regarding the management of feral cats will continue to be unclear until laws and regulations are established in Nebraska.

Currently, rural residents are allowed to trap and shoot feral cats on their property year-round, provided they are following state trapping and firearm regulations. Urban residents can only use cage traps to capture feral cats. Captured cats should be taken to a local animal control or humane society.

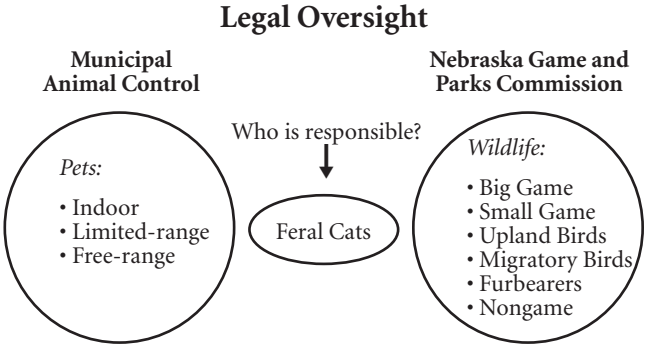

Figure 3. Pets and wildlife are controlled by agencies in Nebraska, but feral cats are in limbo with no agencies or laws regulating them.

Proposed Solution

People who oppose the management of feral cats often contend that control activities risk harming someone's pet by mistake. Animal control agencies and humane society offices have occasionally, and regrettably, euthanized owned cats because they were unable to identify or locate the cats' owners. Since cats frequently break free of their collars that hold identity tags, another method should be used to help identify owned cats.

One solution is to use passive integrated transponder (PIT) tags. A PIT tag is a small microchip that is injected under the skin. When an animal with a PIT tag is found, the unique microchip is read and the animal and owner are identified easily. Omaha and Lincoln require annual licensing of owned cats, and state law requires all pets to have a current rabies vaccination. The PIT tags can be inserted easily, with little discomfort when cats are licensed or vaccinated. Cats found that are lacking PIT tags could then be assumed to be unowned, placed up for adoption if suitable, or humanely euthanized.

Proper Pet Ownership

One of the most important ways that problems with feral cats can be avoided is for individuals to practice proper pet ownership. This involves keeping only as many cats as can be fed and provided care, and keeping all cats indoors where they will be safe and can't harm wildlife. If cats must be left outside, limit the amount of time and space, and supervise their activities if possible. Use collars with tags, along with PIT tags to ensure the cats can be identified. Keep cats vaccinated as required by law. Spay or neuter cats to prevent unwanted breeding, and encourage others to do the same.

If cats are unwanted, use legal, humane, and ethical actions for control. Contact the local humane society or animal control office for information and assistance. Do not release unwanted cats in rural areas, vacant lots, alleys, or other sites — this only perpetuates the problem.

On farms, keep only the minimum number of cats necessary for control of rodents in and around structures, and consider other methods of pest control — remember, cats are far less effective at controlling rodents than many people believe. More effective rodent control can be achieved through proper sanitation, rodent-proof construction, trapping, and toxicants. See the resources listed in "Habitat Modification" for additional detailed information.

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Integrated Pest Management

The most effective approach to dealing with feral cats is through integrated pest management (IPM), which is the timely use of a variety of control methods to reduce impacts to tolerable levels.

Nonlethal methods include habitat modification, exclusion, frightening devices, repellents, trapping and live-capture with removal, and fertility control. These methods should be considered first because most are broadly accepted by the public and help reduce the "biological carrying capacity" — the number of feral cats in the area that can be sustained without negative impacts to the environment. By reducing the biological carrying capacity, the number of feral cats that will move into the area also will be reduced. The so-called "vacuum effect" is not an issue when an IPM approach is used to manage feral cats.

Lethal methods, such as trapping with euthanasia, kill-trapping, and shooting should also be considered in IPM. These methods provide an immediate reduction in the population and may be necessary when feral cats are overabundant and causing significant negative impacts.

People who are very sensitive about cats will be opposed to capture and removal and lethal methods of control. Management of feral cats should be discussed in community meetings and decisions should be made based on public sentiment and sound research-based information.

The following sections provide detailed information on both nonlethal and lethal methods that should be considered in an IPM approach to managing feral cats.

Habitat Modification

Habitat modification involves changing the landscape to reduce the availability of food, water, and shelter available to feral cats inhabiting an area. If pets must be outdoors, the amount of food and water provided should be limited to an amount that will be consumed at one time. Leaky pipes and downspouts provide a source of water and should be repaired, and depressions in the ground should be filled so water cannot pool. Good sanitation practices, such as securing lids on dumpsters and placing trash in enclosed areas, will discourage scrounging. Removing piles of boxes, lumber, unused equipment, and other debris will reduce shelter options. Placing bird feeders and birdbaths in open areas at least 10 feet from foliage or objects where cats can hide will help decrease hunting success. Mow grass and other vegetation to reduce habitat for rodents, and control rodents, especially rats and mice, through good sanitation, rodent-proof construction, trapping, and rodenticides. For more information on rodent control and rodent-proof construction, refer to NebGuides G1005, *Controlling House Mice* (*www.ianrpubs.unl.edu/epublic/live/g1105/ build/g1105.pdf*), G1737, *Controlling Rats* (*www.ianrpubs.unl.edu/epublic/live/g1737/build/g1737.pdf*), and G1530, *Rodent Proof Construction—Structural* (*www.ianrpubs.unl.edu/epublic/live/g1530/build/g1530.pdf*).

Exclusion

Use fencing and netting to exclude cats from gardens and flowerbeds. Fences should be at least 6 feet tall with 2- by 2-inch square mesh with a curved overhang at least 2 feet in circumference outside of the enclosure. Install ¼-inch mesh screen on porches, sheds, vents, and other structures to block entry points. Wire mesh can be installed perpendicular to rooftops, walls, depressions, and gutters to preclude cats from moving from one place to another. Keep doors and windows closed, and install 2-inch mesh if ventilation is needed. Place ¼-inch cat spikes along ledges to restrict access. If cats are using an area in your garden as a latrine, place cat spikes around the area or create an alternative such as a catnip garden that is located at least 30 feet from flowers and vegetables.

Frightening Devices

Frightening devices keep cats away through fear. Most commercially available frightening devices have been ineffective at consistently keeping cats away. Two effective devices are motion-activated sprinklers, which spray cats when they walk in front of the sensor, and dogs that are aggressive toward cats and can chase them away from residences. Dogs should only be used to frighten cats in confined areas such as backyards and fenced lots. Other methods of frightening, such as tennis balls, garden hose, clapping, and yelling, require constant human presence to be effective.

Repellents

The U.S. Environmental Protection Agency (EPA) has registered the following chemicals individually and in combination for repelling house cats: anise oil, methyl nonyl ketone, thymol, and benzyldiethyl (2-6 xylyl carbamoyl) methyl ammonium saccharide (BMAS). The first three are applied on the ground and emit a foul smelling odor to cats. The BMAS is applied to garbage bags and other objects that cats are biting or chewing and deters them with a bitter taste. Do not apply BMAS indoors or to edible plants during the fruit-bearing season as it may alter the taste of produce. Repellents can be used around gardens, flower beds, and landscaped areas. Product labels must be followed closely for proper and safe application. Repellents have not been proven to be effective against feral cats.

Trapping

Cats can be removed from a specific area by trapping. Feral cats should be handled by trained individuals or professionals such as those who work with private pest control companies, the humane society, USDA-Wildlife Services, and municipal animal control agencies. For additional information, refer to the NebGuide G1828, *Wildlife Encounters and Conflicts: A Nebraska Guide to Finding Assistance* (*www.ianrpubs.unl.edu/epublic/live/g1828/build/g1828.pdf*). Before implementing a control method, carefully determine whether the cats are owned.

Cage traps used for feral cats may include a single or double door and should be 30 inches or longer and have an

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Figure 4. Cage trapping can be an easy and inexpensive way to capture feral cats. Once caught, they can be transferred to a veterinary clinic to be spayed, neutered, vaccinated, put up for adoption, or humanely euthanized. (Photo Credit: Chad Tetherow)

opening about 10 by 12 inches *(Figure 4)*. Traps should have ½- by ½-inch mesh and a wide handle guard to protect the handler and cat during transport. Solid-wall traps can be used instead of ½-inch mesh to protect the handler and provide cats with a sense of security. Ideally, one trap should be set for every cat on the site. Failure to use enough traps will lead to a longer capture period, and cats may learn to avoid traps.

Place traps out of the view of the public and in areas where feral cats feel secure. Cover cage traps with a blanket or cloth to protect captured cats from the elements and to reduce the risk of getting sprayed should a striped skunk (*Mephitis mephitis*) be captured accidentally. Ensure that traps rest squarely on the ground or flat surface. Unstable traps are susceptible to misfires. Some trappers recommend covering the floor of a cage trap with newsprint, soil, or grass to encourage cats unwilling to step on hard metal surfaces to enter. Food-based baits, including dry cat food, tuna, mackerel, and sardines packed in oil, are excellent. Prebait traps to condition cats to the traps, especially when trap-shyness is a problem. Simply place traps with their doors wired or tied in the open position, in the area where you intend to trap the cats, and place food-based baits inside. When cats are used to the traps and are readily taking the bait, remove the wire or ties from the door(s), bait, and set the traps. Check them several times per day for the humane treatment of trapped cats and to reduce trap-shyness of other cats.

Curiosity lures appeal to the excellent senses of smell, hearing, and sight of cats. Fresh catnip, hanging strips of aluminum foil, and battery-operated squeaker lures can be placed back in the darkened end of the trap to capture cats. This type of lure should not be used during prebaiting.

Unfortunately, opossums (*Didelphis virginianus*), raccoons (*Procyon lotor*), and striped skunks are also attracted to food-based baits and curiosity lures. Place cage traps on an elevated surface like a ledge or picnic table to minimize the chance of catching skunks. Learn how to handle nontarget species before initiating a trapping program by visiting the Internet Center for Wildlife Damage Management (ICWDM) (*icwdm.org*) or contacting a trained professional.

When a cat is captured, drape an old blanket or towel over the trap to help keep it calm, and transport it to a local veterinarian for spaying, neutering, vaccination, adoption, or euthanasia. Be aware that these options may cost over $100 per cat.

Proper euthanasia involves a gunshot to the head, chemical injection, or carbon dioxide asphyxiation. The American Veterinary Medical Association (AVMA) approves of the use of barbiturates, inhaled anesthetics, carbon dioxide, carbon monoxide, and potassium chloride in conjunction with general anesthesia, nitrogen gas, and argon gas for the euthanasia of cats. The AVMA guidelines are most applicable in lab settings and may not be practical in the field. The American Society of Mammalogists (ASM) accepts shooting and other "traumatic" physical means of euthanasia as long as the result is instantaneous death. Place shots between the eyes and angled down so the bullet travels toward the spinal column after passing through the brain. When this is not possible, a shot through the heart/lung area is acceptable. For more details, see the ICWDM Web site on euthanasia: *icwdm.org/wildlife/euthanasia/Carbondioxide.aspx, icwdm.org/wildlife/euthanasia/shooting.aspx*, and *icwdm.org/wildlife/euthanasia/sodiumbarbitol.aspx*.

Padded jaw foothold traps can also be used to capture feral cats, especially in rural areas or where feral cats are trap shy and reluctant to enter cage traps. Use No. 1 and 1.5 sized traps with double swivels to minimize risk of injury to the animal. Secure the traps so that they can withstand at least 50 lbs of pull force. Blind sets (trapping without bait) can be made on known travel areas and near cat toilets. Baited sets can be used in open areas or where paths of cats are uncertain. Check traps several times per day for the humane treatment of trapped cats. Euthanize trapped cats by methods mentioned earlier or use a catchpole or blanket to restrain the cat. Carefully remove the cat's foot from the trap to avoid injuring you and the cat. Place the cat in a carrier and transport it to a local veterinarian. Avoid placing the catchpole loop directly on the neck. Instead, secure the cat around the thorax or shoulder and neck.

Body-gripping traps (160 and 220 Conibear®) and snares can be used to quickly kill feral cats. Only experienced trappers should use snares and body-gripping traps due to the risk of capturing nontarget species. The NGPC prohibits the use of sight-exposed bait within 30 feet of foothold traps to protect nongame birds (Title 163 Chapter 4 001.03A4). Lincoln and Omaha prohibit the use of foothold traps, snares, and body-gripping traps inside city limits (Lincoln: Section 6.04.340 Ord. 15515 §34, Omaha: Section 6-78 Ord. 36463, §2). Check all local laws and city ordinances regarding the use of traps and snares before using one.

Shooting

Shooting is an efficient method to reduce populations of cats in specific areas. Use shotguns with No. 6 shot or larger, .22-caliber rifles, or air rifles capable of shooting 700 feet per second or faster (inside 20 yards and with pointed

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pellets). Aim shots between the eyes or in the heart/lung area to ensure a humane death. Shooting in urban areas is a very sensitive matter as many safety factors need to be considered. Consult local officials to determine if shooting is legal in your area. It is not legal to discharge a firearm, including air rifles, inside the city limits of Lincoln and Omaha (Lincoln: Section 9.36.010 Ord. 15625 §1, Omaha: Section. 20-196 and 20-197 Ord. 38295 § 1). In most cases, shooting is avoided inside city limits unless an animal poses an imminent threat to public health and safety.

Fertility Control

Trap-Neuter-Vaccinate-Release (TNVR) practices are suggested as a humane and nonlethal solution to reduce populations of feral cats. Cats are captured, spayed or neutered, vaccinated, and released at the capture site. Feral cats should only be released at the original capture site. Cats should not be released in an unfamiliar area; they are territorial and cats already in the area will likely be very aggressive toward released cats. A thorough step-by-step explanation of TNVR can be found at *www.alleycat.org/NetCommunity/Page.aspx?pid=285*.

Studies indicate TNVR can help to reduce the expansion of feral-cat colonies and may be effective in controlling their numbers. In one study, a population included about 920 cats before TNVR and 678 after. The estimate rose to 983 cats after including immigration and births into the colony. Models have estimated that more than 70 percent of a population of feral cats must be spayed or neutered before the population will decline. No real-world example of eliminating a colony through TNVR exists, and evidence of large-scale colony reduction is anecdotal. One study indicated that eliminating a colony would require 4 to 10 years. Furthermore, 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. For these reasons, we do not recommend the TNVR method to eliminate colonies of feral cats. The Wildlife Society (TWS) opposes local and state ordinances that legalize managed (TNVR) colonies of free-range and feral cats, and both TWS and the American Society of Mammalogists support the humane elimination of feral cat colonies and restricted movements of free-range cats.

Toxicants

No toxicants are currently registered for feral cats.

Summary

Feral cats are invasive and pose a threat to native fauna and public health. Using an integrated approach to control populations of feral cats is best, but determining which cats are feral and which are someone's pet may be difficult. Developing new city ordinances and state regulations and statutes regarding the legal status of cats should be a priority as current laws are vague or silent on the issue. Owners must be responsible by keeping their cats on their property and having them spayed or neutered. The supplemental feeding of feral cats should be discouraged and prohibited. Nonlethal options are important and may help limit problems associated with feral cats. Lethal methods are also important in resolving problems posed by feral cats. The public's participation will play a pivotal role in the effective management of feral cats.

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Special Note

We understand this is a difficult and controversial topic, and some will disagree with some of the methods of control discussed in this publication. We are advocates for research-based information, integrated pest management, native wildlife, public health, and the right to protect personal property, and have presented both nonlethal and lethal options for control to help individuals make informed decisions. — The authors

Additional Resources

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