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Feral Cats

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Integrated Pest Management for Home Gardeners and Landscape Professionals

Cats (*Felis catus*) are one of the most popular domestic pets in the United States. The American Veterinary Medicine Association estimated that over 11.6 million households in California own 23.3 million cats. These estimates, however, do not include the numbers of feral cats. In Los Angeles County alone, the feral cat population is believed to be more than half a million animals. Feral and free-roaming cats represent between 18–49% of all cats in the United States. They are fed by as many as one in five households. Research suggests that these cats are rarely neutered.

Feral cats are also known as unsocialized cats, wild cats, community cats, stray cats, and free-roaming cats (Figure 1). Feral cats are unowned and generally do not like to be handled by people. The California Department of Food and Agricultural (CDFA) define feral cats as a "cat without owner identification of any kind whose usual and consistent temperament is extreme fear and resistance to contact with people. A feral cat is totally unsocialized to people" (CDFA Code Section 31752.5 (b)).

Not all free-roaming cats are feral. House cats—often referred to as owned or pet cats—can be indoor or outdoor and can also be considered free-roaming, but they are not feral cats (Figure 2). Outdoor cats, whether feral or owned, are among the 100 worst invasive species in the world due to the extensive impact they can have on the environment and the difficulty of controlling population size and expansion.

Feral cats result from unregulated or unmanaged breeding, pet abandonment, limited or no human contact, and access to abundant food resources (from wild prey items as well as supplemental diets provided by humans). Often feral cats are sustained in feral cat colonies which can be a mix of feral cats and free-roaming cats (Figure 3). These colonies are frequently cared for by people, sometimes called "feeders," who provide food for feral cats living in these sites.

Figure 1. A feral cat, *Felis catus,* with a notched ear, showing that it has been neutered.

Figure 2. An indoor domesticated cat, *Felis catus*.

IDENTIFICATION AND BIOLOGY

Feral cats cannot be distinguished from owned cats by physical appearance such as coat color since they belong to the same species. The most effective method is to observe the behavior of the cat. Feral cats, as their name suggests, are generally much less tame than owned cats and will often avoid humans or, when approached, will have a fearful reaction and retreat quickly.

Generally, when feral cats are neutered the top of their ear is removed. This can help people discern between neutered feral cats and intact (unneutered) feral or owned cats.

Densities of feral cats vary depending on resource availability, but feral cats generally have larger home ranges than owned cats. Home ranges between 0.18 square miles and 8.05 square miles have been reported. On islands or other geographically isolated habitats, feral cats structure their home ranges to optimize access to prey resources; when prey availability is high, they tend to have smaller home ranges. High densities of feral cats have been reported in urban areas where feral cats have access to supplemental food sources and are not restricted to feeding on prey.

Female cats can bear their first litter as early as 6 months of age and litters can be as large as 9 kittens; however, an average litter contains about 5 kittens (Figure 4). When breeding is not limited by resources, feral cats can have multiple litters in a year. Breeding tends to peak between March and April. Reproductive success is dependent on available resources. Breeding can occur year-round, although feral cats don't tend to breed in winter months. One study found that feral cats not fed by people had smaller litters and lower kitten survival rate, while feral cats that were fed had larger litters and higher kitten survival rates. One adult female cat can give birth to as many as 100 kittens in a 7 year period. Under favorable conditions, a single intact female feral cat can add significantly to the cat population.

LEGAL STATUS

Cats are generally classified as pets under California state law. Feral cats are not classified under the California Department of Fish and Wildlife's (CDFW) Fish and Game Code. However, any cat (owned or unowned) found within the limits of any California Fish and Wildlife refuge is considered a nongame mammal and may be "taken" (killed) according to current nongame legislation.

The CDFA Code states that the owner of an intact (unneutered) cat that is impounded by a city or county animal control agency or shelter shall be fined in increasing dollar amounts for each impoundment. The maximum fine amount is reached after 3 impoundments, but subsequent impoundments continue to warrant the maximum fine. The fines are aimed at reducing the number and impacts of free-roaming and feral cats. Some cities in California have ordinances that make it illegal to feed feral cat colonies or establish new feral cat colonies.

Figure 3. A feral cat colony in an urban alleyway.

Figure 4. Two feral kittens in vegetation.

IMPACTS

Diseases and Parasites

Cats can carry several diseases and parasites capable of infecting humans, wildlife, domestic pets, and livestock. The presence of feral cats can result in fecal accumulation in areas where the cats congregate. Some diseases and parasites are specifically associated with cat feces, including toxoplasmosis, cryptosporidiosis, giardiasis, roundworm, and hookworm. Bacteria associated with cat feces include *Salmonella* and *Campylobacter*. Diseases and parasites from cat feces may be acquired as a result of direct contact with the animal, its feces or contaminated surfaces, or from ingestion of food, dirt, or sand contaminated with feces. In a study, cats and dogs were found to contribute more to fecal coliform bacteria contamination in an urban watershed than any other source. Cats were twice as likely to be the source of the bacteria than the dogs.

Some people are at a higher risk of serious disease or complications from these diseases and parasites. These include very young children, elderly persons, and persons with compromised immune systems. Feral cat colonies fed by people on or near school properties, hospitals, and other areas where such groups are found, put these people at a higher risk of exposure.

Felids (including cats) are the only known hosts for the reproduction of the parasite *Toxoplasma gondii*. Humans can be infected by *T. gondii* through contact with contaminated cat feces and through contact with contaminated soil. It is important to be aware of the risks of contracting *T. gondii*, particularly during pregnancy, when the disease can be transmitted to the fetus with potentially very

serious consequences. *T. gondii* has also been implicated in a substantial number of deaths of California sea otters and is known to infect other species of wildlife, including the endangered island fox on the California Channel Islands.

Cats can also carry diseases that affect other animals, including humans. These include rabies, SARS-CoV-2, feline leukemia virus (FelV), and feline immunodeficiency virus (feline aids; FIV). Cats can also contract the avian flu (H5N1) and shed the virus extensively. This is of particular concern to backyard and commercial poultry producers.

The cat flea (*Ctenocephalides felis*) (Figure 5) regularly infests domestic cats and dogs, and backyard wildlife such as coyotes, opossums, skunks, and raccoons. The cat flea can transmit infectious agents that cause the disease flea-borne typhus. Up to 80% or more of feral cats are infested with flea eggs or adult fleas.

Between 2001 and 2021, Los Angeles and Orange Counties had over 1,300 instances of human flea-borne typhus cases. Although the prevalence of flea-borne typhus in Southern California is increasing, human cases of the disease have not been locally acquired in other parts of California. Data from the California Department of Public Health shows that 80% of reported flea-borne typhus cases required hospitalization. Flea-borne typhus is only contracted through fleas (not person to person) and can be prevented by treating cats for fleas and ceasing feral cat feeding (which also attracts other wildlife with fleas that vector flea-borne typhus). Fleas are also known to transmit other diseases and parasites including tapeworm, *Bartonella*, *Rickettsia*, and *Coxiella*.

If you are bitten or scratched by a feral cat, immediately wash the wound and seek medical attention. Rabies is rarely identified in cats but can occur if they are bitten by a wild animal and survive. Rabies can be prevented by avoiding contact with unfamiliar cats.

Predation

Cats are known predators of many species of birds, small mammals, and reptiles. In areas with high feral cat densities, the cats have a significant impact on local wildlife. The belief that well-fed cats will not hunt because they are not motivated by hunger is incorrect. Some cats are more motivated to hunt than others, but all cats will hunt, regardless of available food resources. This includes barn cats, which can also harbor diseases and be destructive to wildlife.

Feral cats do not control invasive rodent populations. In urban areas, rodent populations are more often limited by the availability of food resources than by cat populations. In areas where feral cat colonies are located, the abundance of supplemental food available to the cat colony can actually increase populations of rodents and other backyard wildlife, including opossums and raccoons as these species will readily consume pet food. While they may hunt, barn cats, or any other cats, do not provide effective rodent control, especially for rats (which are usually the intended targets).

Feral cats have been documented to have a significant negative impact on native rodent populations, as well as native and migratory bird populations. In one California study, a site with a colony of feral cats had fewer birds than a comparable site without cats. Native rodent density was also much lower at the feral cat colony site, when compared with the study site that did not have cats. In contrast, the introduced house mouse was more common at the site with feral cats, than the site without feral cats. Other studies have considered cat densities and associated bird mortality and found that cats were responsible for the estimated deaths of 8–217 million birds per year.

Feral cats are among the most successful and damaging invaders on islands. In these ecosystems, they can be important drivers of extinctions,

Figure 5. The cat flea, *Ctenocephalides felis.*

endangerment, or both as they feed on several species of mammals, birds, reptiles, amphibians, and fish. In California, feral cats were eradicated from San Nicolas Island at a cost of more than $2.5 million (U.S.) to protect several endemic species.

Higher densities of cats in a managed cat colony can significantly affect the ecosystem through accumulation of feces and associated pathogens, predation on local wildlife, sharing of diseases and fleas between wildlife and feral cats, and risk of flea infestations surrounding the feeding site. The CDFW considers the impact of feral cats on wildlife to be significant and an issue that must be better managed to protect California's unique wildlife biodiversity. According to the Department, since cats were introduced into North America by humans, humans are responsible for the management and removal of cats that prey on wildlife.

MANAGEMENT

Do not feed feral cats!

Feeding feral cats is not recommended. Providing food to feral cats provides additional resources to these animals and allows them to congregate. Feral cat feeding stations, or colonies, are known to attract additional wildlife. Research has shown that coyotes that eat feral cats occupy the same type of landscape where feral colonies are most frequently found.

Sanitation

Proper disposal of cat feces is important to reduce exposure to pathogens. Since many diseases can be contracted from cat urine and feces, sanitation is extremely important. Young children who play in sand boxes used by cats as latrines may be at risk of contracting several diseases and parasitic infections. Cover sandboxes when they are not in use to limit cat access.

It is important to wear gloves when working the landscape or garden soil where feral or free-roaming cats may visit. Wash gloves often when working in areas where cats are known to defecate. Wash fruits and vegetables before consuming.

Habitat Modification

Keep vegetation trimmed and grass mowed to reduce sheltering areas for cats. Reduce vegetation available to shelter feral cats and there will be fewer resources (such as wood piles, under decking) for cats, fleas, and other wildlife attracted to the overgrowth.

Do not feed domestic pets outside or if you must, remove food once the pet has finished eating. Removing pet food from the outdoor environment will limit the attractiveness to feral cats and other free-roaming wildlife. Cats feeding on prey resources do not need to drink water. Cats feeding on pet food will require some water. However, reducing the amount of water that a cat has access to will probably not alter its behavior.

Exclusion

Fencing and netting can be used to exclude cats (Figure 6). Exclusion of cats will prevent a flea infestation from occurring on the property. Cats can jump to a height of approximately six feet. Therefore, an exclusion fence should be at least six feet tall and include a two-foot curved floppy overhang. This overhang should be facing outward, away from the yard. The addition of an electric wire to this installation should ensure the exclusion of cats from your yard. It is important to check your municipal codes for regulations concerning fencing heights. Charged electrical wire can be dangerous to children and pets and can be a fire hazard if not installed appropriately. Cats can also dig under fences. Research has shown that a 30 cm horizontal foot apron is appropriate in keeping cats from digging under. Coyote Rollers may also be effective in keeping cats out of backyards.

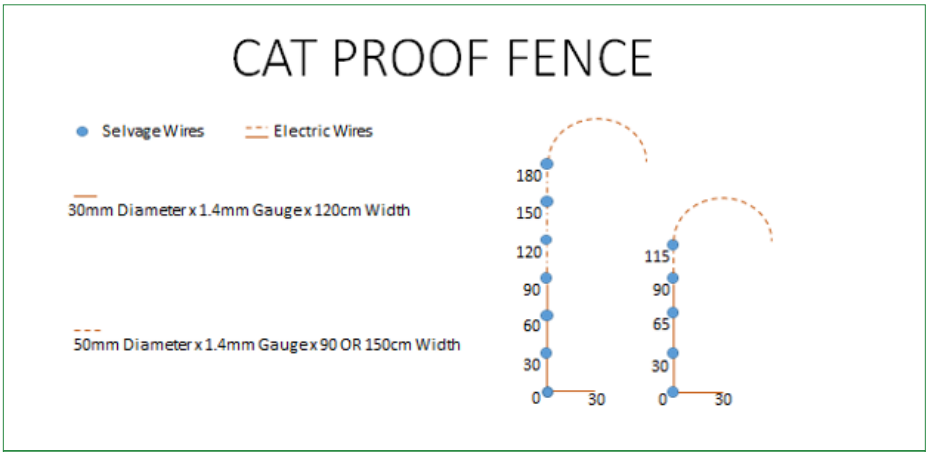

Figure 6. Diagram of a cat proof fence.

Repellents

There are several repellents commercially available for cat management. These products generally have a range of active ingredients including, but not limited to oil of black pepper, capsaicin, and other related capsaicinoids, and piperine. However, these products have not been shown to be effective for feral cat management. Motion activated sprinklers do not have any known efficacy, but they may be useful to deter cats and other predators from yards.

Trapping

Trapping followed by euthanasia is considered a humane and good practice for feral cat management. Feral cats can be difficult to handle, and care should be taken to thoroughly understand how to safely trap and transport a feral cat.

Use a wire mesh cage trap that is at least 30 inches long with a mesh size of no greater than ½ inch (Figure 7). Set traps along cat tracks or trails and behind bushes. Ensure that no vegetation is hampering the mechanisms in the trap from functioning correctly. The cat should be able to walk around the trap to investigate it, so make sure that no vegetation is blocking the cat's pathway around the trap. Traps should be secure and can be staked to the ground if needed; cats may thrash when captured and a secure trap will limit potential injuries. Ensure that the trap is weighted or anchored in a way that will ensure the cat does not thrash around. Make sure any trap modifications will not injure the cat. If the cage is being placed in soil, push the trap into the soil and then move it forward a few inches so that the soil is covering the mesh bottom but not blocking the trigger panel of the trap. If there are multiple cats in the area, multiple traps will need to be set.

Figure 7. A wire mesh cage trap for feral cat capture.

Use fish in cans to ensure that the trap stays as clean as possible during the trapping process. It may be necessary to prebait the trap. This means that you bait the trap for a few days with the door propped and secured open. The cat should be able to enter and exit the trap unimpeded for 2 or 3 days before the trap is set.

It is better to set traps in the evening and check them early in the morning. This will limit the time that the feral cat spends in the trap and reduce the risks of trapping many nontarget animals.

Once a cat is captured, drape a cover over the trap to minimize stress to the animal. You can take the cat to your local veterinarian or animal shelter for euthanasia. Sometimes this service is offered free of change; in other cases, a considerable fee maybe be charged. Be aware that many shelters are "no-kill" shelters and feral cats may be neutered and rereleased into your community. Although this ensures that the cat will not produce any more litters, this does not negate the public health risks or the conservation issues that surround feral cats' existence in communities.

Although it is legal to do so, it is not recommended to relocate feral cats. This can directly impact the feral cats' health, the health of other wildlife and pets, and other communities. The movement of feral cats could potentially expose humans, pets, and wildlife to diseases and fleas carried by the feral cats and disrupt native wildlife populations.

Once a management program has been implemented, it is important to monitor the effectiveness of the program. Keep track of direct observation of cat feces or cats during the day. Since cats may be active at night, spotlighting, using a 100-watt handheld spotlight, may be necessary. Track counts can be used to help measure changes in populations of feral cats if recorded before, during and after a management program. Track counts do not offer an absolute estimate of density, but they can be used to determine fluctuations within populations.

Trap Neuter Return

Trap Neuter Return (TNR) is a process where feral cats are captured, typically by cat advocacy programs and shelter volunteers, brought to a veterinarian for sterilization and then returned to the area where they were living. The premise of this practice is to reduce the population to a point where it disappears through attrition.

For population reduction or attrition to successfully occur as a result of TNR, more than 75% of the population must be sterilized annually, with no new additions to the colony. Currently, the maximum spay/neuter rate achieved at county level is approximately 2–5%. One study of a TNR program in San Diego County showed no decline in feral cat populations after 10 years. Similar results for TNR programs worldwide have been reported.

In many cases TNR programs are touted as a 'humane' alternative to euthanasia but Trap Neuter Return does not include disease or parasite control. After cats are sterilized and returned to the environment, they become susceptible to flea infestations. Most TNR programs also do not include testing for FelV and FIV or a rabies vaccination, leaving the entire colony, as well as surrounding pets and wildlife at risk. Even if optimum sterilization efforts were achieved, this does not negate the effects that feral cats have on native wildlife or the serious public health impacts they can pose.

Research has shown that feral and free-roaming cat populations have a very high growth rate. Euthanasia is estimated to be more effective at reducing cat populations than Trap Neuter Return programs.

Predation and Natural Attrition

Studies have shown that in fragments of natural areas around cities, coyotes appear to inhibit cat populations through a combination of predation and predator avoidance. Several studies have shown that feral cats occur in less than 2% of areas where coyotes also occur. Published studies from southern California, however, state that the frequency of co-occurrence of cats and coyotes is closer to 20% in urban areas. Additionally, several studies suggest that the feeding of feral cats may attract coyotes to new areas.

Responsible Pet Ownership

The American Veterinary Medicine Association (AVMA) and many other organizations strongly encourage owners of domestic cats in urban and suburban areas keep cats solely indoors. Cats kept indoors are healthier and live longer lives and their negative impacts on the natural environment, as well as public health, are prevented. All cats should be spayed or neutered, whether they are kept indoors or let out.

Under the California Penal Code, anyone who willfully abandons an animal is committing a misdemeanor. This includes the abandonment of owned and feral cats. If you are no longer able to care for your pet cat, take them to a nearby animal shelter or animal rescue organization.

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WARNING ON THE USE OF PESTICIDES

Pesticides are poisonous. Some pesticides are more toxic than others and present higher risks to people, nontarget organisms, and the environment. A pesticide is any material (natural, organic, or synthetic) used to control, prevent, kill, suppress, or repel pests. "Pesticide" is a broad term that includes insecticides, herbicides (weed or plant killers), fungicides, rodenticides, miticides (mite control), molluscicides (for snails and slugs), and other materials like growth regulators or antimicrobial products such as bleach and sanitary wipes that kill bacteria.

Always read and carefully follow all precautions and directions provided on the container label. The label is the law and failure to follow label instructions is an illegal use of the pesticide. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, and animals. Never place pesticides in food or drink containers. Consult the pesticide label to determine active ingredients, correct locations for use, signal words, and personal protective equipment you should wear to protect yourself from exposure when applying the material.

Pesticides applied in your garden and landscape can move through water or with soil away from where they were applied, resulting in contamination of creeks, lakes, rivers, and the ocean. Confine pesticides to the property being treated and never allow them to get into drains or creeks. Avoid getting pesticide onto neighboring properties (called drift), especially onto gardens containing fruits or vegetables ready to be picked.

Do not place containers with pesticide in the trash or pour pesticides down the sink, toilet, or outside drains. Either use all the pesticide according to the label until the container is empty or take unwanted pesticides to your local Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Follow label directions for disposal of empty containers. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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University of California scientists and other qualified professionals have anonymously peer reviewed this publication for technical accuracy. The ANR Associate Editor for Urban Pest Management managed this process.

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