Biology and Ecology of Feral, Free-Roaming, and Stray Cats

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TAXONOMY

Feral cats are the free-roaming offspring of the domestic cat, *Felis catus.* They generally fall into two categories: 1) domestic animals adapted to living on their own in rural and urban areas; or 2) homeless, lost, or abandoned pets that live on their own (Roberto 1995). The cat is a medium-sized carnivore of the family *Felidae* which usually weighs between 3.3 and 4.5 kg and measures between 73 to 79 cm in length (Nowak 1991). The ancestral wild species, the European and African wild cat, *Felis silvestris,* was domesticated around 7,000 years ago, most likely around the Middle East and eastern North Africa. As humans shifted from nomadic life to permanent settlements, agriculture increased and granaries were built, attracting rats and other rodents. Cats were most likely "tamed" to prey on the rats (Newman 1977). In Egypt cats were known to have been domesticated by 2000 B.C. Egyptians revered cats and built statues to commemorate them. Through breeding and isolation the domestic cat has evolved to the point that it is now accepted as a separate species, *Felis catus* (Serpell 1988). In Europe domestic cats still freely interbreed with the European wild cat.

DISTRIBUTION

Feral cats are widely distributed throughout the world, including populations in cold temperate or sub-polar oceanic islands (Jones 1977). They tend to be concentrated around populated areas where they are turned loose or left to run wild by their "owners", but are also widely distributed in remote locations. Cats probably arrived in North America with the first colonists several hundred years ago. Since that time cats have thrived as pets, unwanted strays, and semi-wild predators (Coleman et al. 1997).

REPR0DUCTIVE BIOLOGY

Domestic cats reach reproductive maturity between 7 to 12 months of age. A breeding female, called a queen, can be in estrus as many as five times per year, but usually produces two litters per year. The gestation period lasts 63 to 65 days. The average litter is four kittens (Nowak 1991). In a farm cat study in Illinois, the survival rate was 1.5 kittens per female per year (Warner 1985). Longevity of free-ranging cats is estimated at 4 - 5 years; domestic cats can live from 15 to 17 years as house pets.

HOME RANGE

Cats in rural areas tend to have larger home ranges than cats in urban areas (Dards 1978, Tabor 1981). At Bodega Bay, a study of radio-collared cats has shown that an individual feral cat may range more than one mile (1.4 km) in a single day (Stallcup 1991). Liberg (1980) found a population in rural southern Sweden of 2.5 to

3.3 cats per square kilometer with a home range of 30 to 40 ha. Feral male cats in the Swedish population had home ranges 2 to 4 km across. Home ranges of free-ranging cats in Brooklyn, New York, averaged between 1.7 and 2.6 hectares; where there is a feeding station, free-ranging cats do not keep out other cats (Haspel and Calhoon 1989).

FOOD HABITS

Cats are carnivorous. An adult cat may eat 5 - 8% of its body weight per day, and a female feeding kittens may consume 20% of its own weight (Scott 1976). Subadult cats may consume 9.5% of its weight (Howard 1957). Diet includes insects such as bumblebees and grasshoppers, rodents, amphibians, reptiles, and ground nesting and ground roosting birds which are particularly vulnerable. Cats have been reported to have killed and eaten animals up to 3500 grams, a weight equal to their own (Hill 1997).

Joe Mitchel, University of Virginia, kept a tally of the wildlife kills of his four family cats over 11 months. The total was 104 individuals of 21 species: 6 species of birds, 8 species of mammals, and 7 species of reptiles. Species taken included flying squirrels (*Glaucomys voIans),* chipmunks, wrens, and cardinals. Peter Stangel with the Fish and Wildlife Foundation in Washington, D.C. recorded 15 species of birds, mammals, and reptiles killed by his two cats in a four month period where he lived in South Carolina.

CONSERVATION STATUS

Feral cats are not protected or listed by state or federal agencies in California. Estimates based on 1970 U.S. Census data of households claiming cats as pets placed the population of eats "owned" as pets at 30 million (Pet Food Institute 1982). This did not include semi-wild or free ranging cats. Nationwide, approximately 30% of households have cats. In rural areas where free-ranging cats are not usually regarded as pets, approximately 60% of households have cats. In 1972 an estimated 31 million cats lived across the country (American Humane Assoc. 1972). Whit Gibbons, a senior biologist at the University of Georgia's Savannah River Ecology Laboratory (1996) and Nassar and Mosier (1991) estimated that there are 60 million cats in the United States. According to another estimate, 50 million feral cats live in alleys, lots, abandoned buildings, and parks in the United States (PAWS 1997). George (1974) estimates that one-third of the cats in the United States occur in our rural areas.

Locally, the Arcata Marsh and Wildlife Sanctuary is home to 12 to 15 free-roaming feral cats (Roberto 1995).

HABITAT REQUIREMENTS

Many of the cats are free-roaming domestic pets, returning to human habitation after foraging bouts. Others are wild-living, using abandoned buildings and farm outbuildings as resting areas. Feral cats are found on islands denning rock outcrops and burrows (Jones 1977). In urban parks cats use trees and shrubs as resting and hiding sites. In grassland areas, culverts and hedgerows provide cover for feral cats.

SURVEY TECHNIQUES

Sooted trackplates easily detect cats. Cat tracks can easily be confused with small canids such as kit foxes *(Vulpes macrotis),* grey foxes *(Urocyon cinereoargenteus),* and red foxes *(VuIpes wipes).* The cat track is more rounded than canid tracks (Taylor and Raphael 1988). The small canids may not show the claws. According to Orloff et al. (1993) cat tracks on sooted trackplates can be distinguished by the three lobes on the posterior border of the palm pad and one or two lobes on the anterior border. Since the foot is not as well furred, the palm and toe pads are usually distinct. The anterior portion of the palm pad usually extends to a point halfway through the posterior toe pads, and the posterior toe pads often extend almost halfway through the anterior toe pads. Cats apparently have no hesitation about stepping on trackplates, placing their full weight on the soot, creating clear prints. In contract, many canids may be hesitant, producing indistinct or blurred prints (Orloff et al. 1993).

MANAGEMENT CONSIDERATIONS

The issues regarding free-ranging cats are really social ones. Cats can be a major factor in the killing of native wildlife including threatened or endangered species, reducing the prey needed for native predators to survive, and spreading diseases. For further discussion of these issues the authors recommend reading Coleman et al. (1997) and Luoma (1977).

Coleman et al. (1997) states that cats, worldwide, may be the second-most leading reason behind habitat destruction for bird species extinction. Nationwide cats are contributing to the endangerment of such species as least terns *(Sterna antillarum),* piping plover *(Choradrius melodus),* and loggerhead shrike *(Lanius ludovicianus).* Marsh rabbits *(Sylvilagus palustris)* in Key West, Florida, have been threatened by predation from domestic cats.

On Anacapa Island, cats have caught and eaten young brown pelicans *(Pelecanus occidentalis)* (Anderson et al. 1989). Along with non-native red foxes, free-roaming feral cats are a major threat to the endangered California clapper rail *(Rallus longirostris obsoletus)* (Frederick 1996, Roberto 1995). In Hawaii feral cats were responsible for the reduction of the Hawaiian dark-rumped petrel *(Pteroderma phaeopygia sandwichensis)* (van Riper 1978).

According to U.S. Fish and Wildlife Service biologist Don Edwards of the San Francisco Bay National Wildlife Refuge, feral cats forage along the tidal sloughs and levees ravaging burrowing owls *(Athene cunicularia),* snowy plovers *(Charadrius alexandrinus),* and salt-marsh harvest mouse *(Reithrodontomys raviventris)* populations - all species at risk.

Recent research (Coleman and Temple 1994) indicates that rural free-ranging cats in Wisconsin may kill between 8 and 217 million birds each year. Reasonable estimates indicate that over 39 million birds are killed annually in that state each year. Nationwide, rural cats probably kill over a billion small mammals and millions of birds each year.

Studies in England and Wisconsin have documented that well-fed domestic cats kill as many prey as feral cats (Churcher and Lawton 1987, Coleman and Temple 1994). Free-roaming cats fed at feeding stations continue to hunt natural prey, according to Scott Craven in Luoma's 1997 Audubon article,

Cat feeding habits may be detrimental to the survival of natural predators. George (1974) studied three cats responsible for eating 18 species of mammalian prey in raptor home-range territories. In a study in rural Illinois between January 1968 and December 1971, rodents accounted for between 82 and 95% of free-ranging cats prey. This area was also hunted by red-tailed hawks *(Buteo jamaicensis),* American kestrels *(Falco sparverius),* and northern harriers *(Circus cyaneus).* Pearson (1964) recorded the removal of 4200 mice from a 35 acre study plot by six cats. According to Scott Craven, "Anything a cat consumes is one less bit of prey for a native predator."

Cats may transmit diseases to wild animals and humans. Dr. Stan Deresinski *(in* Roberto 1995) listed 21 cat associated infections which can be transmitted to humans. Some free-ranging domestic cats carry rabies and toxoplasmosis which can be easily transmitted to humans (Warfield and Gay 1986). According to Ron Lapham of the Humboldt County Humane Society, cats may be responsible in Humboldt County for an increase in raccoon distemper. Feline distemper (panleukopenia) and an immune deficiency disease may have been spread to the endangered Florida panther *(Felis concolor coryi)* (Roelke, et al. 1993). Feline leukemia virus was documented in a mountain lion *(Felis concolor)* which staggered onto the Sacramento State College campus in 1993 (Jessup et al. 1993). Native wild cats may have an antibody against the feline immuno-deficiency virus (FIV).

MITIGATIONS

Controlling cats in urban areas will require the education of cat lovers from the general public as well as from such groups as Stray Cats and TTVAR (Trapped, Tested, Vaccinated, Altered,

and Released) who advocate feeding stations. Controlling the number of free-ranging rural cats primarily will depend on enlisting the help of rural residents who maintain them.

At Stanford University a habitat conservation plan was rewritten to consider the impacts of free-ranging cats on listed species around the campus. Nationally, cat-loving groups are attempting to set up free-roaming cat sanctuaries on public and corporate lands. Conversely, National Park Service's George Washington Memorial Parkway in Virginia implemented a trapping policy to remove feral cats and feeding stations. The National Park Service now has a lawsuit pending by cat-lovers over its trapping policy.

What can we do? The following suggestions are from Coleman et al. (1997).

- Keep only as many pets as you can adequately care for.
- If you have a cat, keep it indoors.
- Declaw your cat
- Neuter your cat and encourage other to do the same.
- Locate bird feeders in sites that do not provide cover for cats to wait in ambush.
- Eliminate sources of food that attract stray cats.
- Don't feed stray cats. Feeding maintains high densities of cats that competes with native wildlife populations.

In addition;

- Trap stray cats and take them to your animal shelter. (Humboldt County Humane Society euthanizes over 200 cats a month.)
- Enforce current laws prohibiting the feeding of wildlife.

The city of Novato in Marin County, California now requires cats to be licensed and implanted with an identifying microchip. Communities can set heavy fines for failure to spay or neuter cats, abandonment of domestic animals, and feeding in public places.

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