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ISSUE ASSESSMENT:

IMPACTS OF

FERAL AND FREE-RANGING DOMESTIC CATS

ON WILDLIFE IN FLORIDA

PREPARED BY

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FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Revised from a February 2001 assessment prepared by George Wallace and Joni Ellis

EXECUTIVE SUMMARY

The domestic cat (*Felis catus*) is not native to Florida, but feral and free-ranging cats occur throughout the state and number several million. Together there are at least 5.3 million feral and owned (but free-ranging) cats that are outdoors and potentially preying on wildlife in Florida. Because there is not a strong link between hunger and hunting behavior in cats, even cats that are regularly fed can and do kill wildlife. Even by conservative estimate, cats kill millions of mammals and birds each year in Florida. The adverse impacts of cats in Florida are best documented for threatened and endangered species, especially endangered or already extinct subspecies of beach mice and cotton mice and the endangered Lower Keys marsh rabbit. However, predation by cats also has been documented for the Florida scrub-jay and for shorebirds, terns, and other ground-nesting species of birds, as well as for sea turtles. Disease spread by feral cats may impact the endangered Florida panther and other species. Although the cumulative impact of cats upon wildlife in Florida remains uncertain relative to other impacts, predation by cats adversely impacts and can even destroy wildlife populations that are small or restricted in their distribution.

The Florida Fish and Wildlife Conservation Commission (FWC) is mandated by the Florida Constitution to conserve and protect populations of native wildlife, and the FWC has authority to curtail adverse impacts that nonnative animals cause to native species. Educational programs and other methods of reducing the flow of cats into the wild, such as neutering and control laws, are essential components of a long-term solution to cat overpopulation and predation on wildlife and should be supported by FWC. Cats Indoors! is an existing and useful educational program aimed at reducing the toll taken on wildlife by owned, free-ranging cats. The practice of trapping, neutering, and then re-releasing cats into managed cat colonies does not effectively control cat populations and their adverse impacts on wildlife and should be opposed by FWC. The most effective and humane method of dealing with feral cats is to remove them through trapping followed by adoption or euthanasia.

INTRODUCTION

The domestic cat (*Felis catus*) is descended from the wild cat (*Felis silvestris*) of Africa and extreme southwestern Asia. Wild cats were domesticated approximately 4,000 years ago by the Egyptians and were introduced into Europe approximately 2,000 years ago (Nowak 1999). Domestic cats have been distributed worldwide by humans as companion animals and deliberately introduced into the wild in many countries, including the United States, with the intent of controlling rodent populations in agricultural areas. Deliberate introductions, escapes into the wild, and the predatory habits of pet cats in the vicinity of their homes together make the domestic cat the most widespread terrestrial carnivore on earth.

The objective of this issue paper is to provide an overview of the impacts of feral and free-ranging domestic cats on wildlife and to provide some insight into the magnitude of the problem in Florida. For the purposes of this paper, the term 'free-ranging cats' applies to owned cats that spend all or a portion of their time outdoors where they may prey on wildlife. 'Feral cats' are those cats that are not owned and exist in the wild. Feral cats can be born in the wild or may have only recently entered into the wild, but we make no attempt here to distinguish between these two groups. As will be discussed, feral animals can exist in the wild completely unaided by humans or they may be members of so-called "cat colonies" that receive varying levels of care and food from human caretakers.

It should be emphasized that the literature on domestic cats as predators of native wildlife is controversial and extensive. The goal of this issue paper is not to provide an exhaustive review, but rather to summarize information and make recommendations that will allow the Florida Fish and Wildlife Conservation Commission (FWC) to make an informed decision about setting policy to minimize the impact of domestic cats on native wildlife in Florida.

DIET, HUNGER, AND PREDATION IN DOMESTIC CATS

The domestic cat is a mesopredator that feeds primarily on small mammals and, to a slightly lesser extent, on birds, although this varies by location. For example, in Wisconsin, 70% of all prey were mammals, 20% birds, and 10% other animals, such as invertebrates, reptiles and amphibians (Coleman and Temple 1996). In England, 64% of all prey items taken by cats were small mammals, including shrews, voles, mice, and rabbits; songbirds made up 36% of all prey and were especially frequent in the diet during spring when young were fledging (Churcher and Lawton 1987). In Australia, Coman and Brunner (1972) found prey consisted of 88% mammals and 3.5 % birds by volume, with the balance being lizards and insects. Numerous diet studies confirm that cats can prey on a wide variety of animals, but that small mammals and birds make up the great majority of food items (see Jurek 1994, American Humane Association 1997).

An important characteristic of the domestic cat is the "decoupling" of hunger as a stimulus for hunting behavior. This is a critical point to consider when addressing the impacts of feral and free-ranging cats on wildlife because cat advocates often claim that well-fed cats pose little threat to wildlife. However, cats are extremely flexible in food habits and social organization (Jones and Coman 1981, Liberg 1984a, Konecny 1987) and hunt even when fed daily by humans (Warner 1985, Churcher and Lawton 1987, 1989). Laboratory studies of cats suggest that hunger and hunting are controlled by separate neurological centers in the brain (Polsky 1975, Adamec 1976). Davis (1957) alternated the presence or absence of domestic foods for cats on a farmstead at two-month intervals and found that cat predation rates were not affected by the availability of domestic foods. Actual consumption of prey may decrease with food supplementation by humans, but the cats continue to hunt and kill (e.g., Liberg 1984b).

THE MAGNITUDE OF CAT POPULATIONS AND THEIR IMPACTS ON WILDLIFE

Populations

Numbers of domestic cats have escalated in recent decades and the domestic cat is now the most numerous pet in the United States. Based on a survey by the American Pet Product Manufacturers Association, the Humane Society of the United States (HSUS) estimated that approximately 64.3 million owned cats existed in the United States in 2000, with 32.1 million households having at least one cat (HSUS 2000a). The Pet Food Institute (2003) reported that the number of pet cats increased from 44.6 million in 1981 to 75.6 million in 2001. Although exact numbers are uncertain, the number of owned cats in the United States clearly is enormous and growing (Nassar and Mosier 1991).

Based on a poll of cat owners, the American Bird Conservancy (ABC) estimates that 40 million owned cats spend some or all of their time outdoors and are free to prey on wildlife (ABC, undated, a). The number of un-owned cats is less well known but probably falls in the range of 40 - 60 million (HSUS 2000a). A survey in Wisconsin estimated a feral cat population of 1.7 million, or 10 -14 cats/km^2 (Coleman and Temple 1993). Locally, the free-roaming cat density may be as high as 44 cats/km^2, outnumbering all similarly-sized native predators (Coleman and Temple 1993, 1995).

In some areas, large numbers of feral cats congregate in "cat colonies" where un-owned cats gather at food sources provided by humans, such as garbage dumps or feeding stations where people deliberately leave food for them. Cat colonies vary greatly from simple aggregations of cats to large colonies managed by volunteers. At the heart of cat colony management is the practice of Trap-Neuter-Release (TNR), also known as Trap-Test-Vaccinate-Alter-Release (TTVAR). Using this management technique, cats are trapped and taken to a veterinarian or clinic where they may be tested for fatal feline diseases; if found positive, they are euthanized. The uninfected cats are vaccinated, spayed or neutered, and then released back to the site where they were originally trapped. To identify cats that have been vaccinated and

altered, the tip of an ear is surgically removed. Colony managers establish feeding stations where cats are fed. In theory, these colonies are managed to extinction by capturing, vaccinating, and altering all cats so that colony members cease reproducing. In practice, however, colonies are usually stable or increasing in size because of a steady influx of new cats.

Cats are extremely prolific and feral cat numbers can grow quickly in areas where deliberate introductions occur or where owned cats are not spayed or neutered and reproduce with other feral or free-ranging cats. Female domestic cats are polyestrous and normally produce 2 - 3 litters per year with 1 - 8 young per litter. Gestation is 65 days and kittens attain independence at approximately 6 months and reach sexual maturity at 7 - 12 months (Hemmer 1976, Nowak 1999). Based on 3 litters per year and 4 - 6 kittens per litter, a single pregnant female and her offspring can theoretically produce 420,000 cats in 7 years (HSUS 2000b). Obviously this theoretical maximum reproductive output is never achieved, but the implication is clear that cat populations can grow rapidly from small numbers of cats in a short period of time.

Predation

In many parts of the world, predation by cats is a significant cause of wildlife mortality. The impact of cat predation is probably most severe on oceanic islands, on barrier islands, and in "islands" of wildlife habitat in urbanized areas, but predation also occurs in rural areas. Although the long-term effect on the viability of populations is usually unclear, many studies have documented clearly that predation rates can be very high and a wide variety of wildlife can be killed (e.g., see Jurek 1994, American Humane Association 1997). A few examples of the magnitude and dimension of cat predation across the world follow (see Jurek 1994, American Humane Association 1997).

- In Wisconsin, evidence suggests that rural, free-ranging cats kill 7.8 - 38.7 million birds/year (Coleman and Temple 1995, 1996), although the numbers may be much higher depending on the parameters in the estimation formulae.

- In a Virginia study, 4 urban free-ranging cats killed an average of 35 animals/year and 1 rural cat killed an average of 111 animals/year. The rural cat killed 27 native species including 8 mammals, 8 birds, 9 reptiles, and 2 amphibians (Mitchell and Beck 1992).

- In a southern California study, cat owners in canyon forest fragments reported that their free-ranging cats killed an average of 24 rodents, 15 birds, and 17 lizards each year. Given the housing density and average number of 'outdoor' cats per household, cats were estimated to kill approximately 840 rodents, 525 birds, and 595 lizards per year in a typical, moderately sized canyon. This level of bird predation was deemed unsustainable (Crooks and Soulé 1999).

- Project FeederWatch, a continent-wide survey of 5,500 homes with bird feeders run by the Cornell Laboratory of Ornithology, has demonstrated that domestic cats are

significant predators of birds at feeders throughout North America (Dunn and Tessaglia 1994).

- In England, the average annual kill per owned cat is estimated to be 40 mammals and birds. The pet industry there estimates that there are 7.5 million cats which results in a total annual take by cats of approximately 300 million mammals and birds. These estimates do not account for kills consumed away from home or kills by England's estimated 800,000 feral cats (Mammal Society 1998).

- A study in rural Sweden found that domestic cats (feral and "house-based" combined) consumed approximately 30,000 field voles (*Microtus agrestis*), or 18% of the total estimated annual production. Annual consumption of wood mice (Apodemus silvaticus) corresponded to approximately 24% of annual production. Annual consumption of brown hares (*Lepus europeus*) corresponded to approximately 4% of annual production (Liberg 1984b).

- In Costa Rica, Aprill (1994) documented domestic cats raiding olive ridley sea turtle (*Lepidochelys olivacea*) nests.

- In the Galapagos, green turtle nests (*Chelonia mydas*) are preyed upon by feral cats (Stancyk 1995).

- In the Indian Ocean, cats are significant predators on seabirds and sea turtles. For example, on Marion Island, feral cats killed an estimated 450,000 seabirds annually prior to cat eradication efforts (Berruti 1981, Bloomer and Bester 1992). On Kerguelen Island, a pair of cats was introduced in 1956; the population had grown to 10,000 by 1994 and consumed an estimated 3 million seabirds per year (Chapuis et al. 1994). On the Seychelle Islands, green turtles were shown to be an important component of the diet of feral cats; turtle hatchling remains occurred in 90.4% of cat scats (Seabrook 1989).

Competition

Domestic cats have many advantages over native predators. For example, owned cats usually are protected from disease through vaccination, sheltered from the elements, and protected from starvation by regular feeding. Feral cats in colonies also may benefit from vaccination and feeding. Domestic cats are not strictly territorial (Nowak 1999, Liberg and Sandell 1988, Natoli and de Vito 1988) and so can occur at densities much higher than those of native predators such as bobcat (*Lynx rufus*) or fox (*Vulpes vulpes*, *Urocyon cinereoargenteus*). For example, Coleman and Temple (1993) found that densities of cats in rural Wisconsin were approximately 3 times higher than the combined densities of raccoon (Procyon lotor), striped skunk (*Mephitis mephitis*), and Virginia opossum (*Didelphis virginiana*).

At such densities, cats may compete with native predators for food. Locally, cats may reduce the prey base of small mammals, probably to the detriment of wintering hawks (George 1974).

Disease

According to The Centers for Disease Control and Prevention (CDC), cats are the most common carriers of rabies among domestic animals, with two times the number of cases nationally as reported in cattle or dogs (CDC 2000). Unvaccinated cats can transmit rabies to wildlife such as raccoons, skunks (e.g., striped and spotted [*Spilogale putorius*]) and foxes.

A number of other diseases are known to occur in domestic cats and may pose a risk to other wildlife. Feline leukemia virus (FeLV) is the leading cause of death due to infectious disease in cats. There is one recorded instance of FeLV in the mountain lion (*Felis concolor*) (Jessup et al. 1993). Domestic cats also were identified as one of several possible reservoir hosts for feline panleukopenia (FPV), which has been discovered in the Florida panther (*F. c. coryi*).

CAT POPULATIONS AND THEIR IMPACTS ON WILDLIFE IN FLORIDA

Population Size

The southern region of the United States has the highest number of cats per household of any region in the country (HSUS 2000a). Thus, it is reasonable to infer that Florida, by virtue of its southern position and high human population, has a large population of owned cats and by extension a large population of feral cats. If we assume that 34% of all households have at least one cat (American Pet Product Manufacturer's Association 2002), that those with cats have on average 2.1 animals (HSUS 2003), and that there are 5.9 million households in Florida (U.S. Census Bureau 1999), then the estimated population of owned cats in Florida is approximately 4.2 million. Typically, the density of feral cats approaches the density of owned cats (American Pet Product Manufacturer's Association 2002); if we conservatively estimate feral cat numbers to be 2/3 of the number of owned cats, then the feral cat population of Florida may be 2.8 million. Based on a national average of approximately 60% of all owned cats spending some or all of their time outdoors (ABC undated, a), an estimated 2.5 million owned cats in Florida are outside at least some of the time. Combined, these owned and feral animals represent at least 5.3 million cats in Florida that are outdoors and potentially preying on wildlife. Although precise estimates of cat populations in Florida are not available, there are obviously several million cats potentially preying on wildlife in Florida.

In Wisconsin, Coleman and Temple (1995, 1996) estimated a statewide population of 1.7-2.0 million free-ranging rural cats. They estimated these cats each killed between 28 and 365 animals per year; based on their data and previous studies, the typical kill ratio is 80% mammals and 20% birds. Extrapolating the minimum predation rate of 28 kills annually to the

minimum estimate of 5.3 million feral and free-ranging cats in Florida, we calculate that cats in Florida annually kill nearly 120 million small mammals and 30 million birds. We believe these estimates are conservative and, if the highest predation rates from Wisconsin are more accurate, cats might well kill many millions more mammals and birds in Florida. No data are available to estimate the number of reptiles and amphibians killed. The precision and accuracy of these Florida estimates is unknown. Furthermore, we do not know what portion of the animals killed are themselves exotic species, such as the house mouse (*Mus musculus*) or house sparrow (*Passer domesticus*). Thus, it is not productive to enter arguments about the exact number of wildlife killed in Florida. Rather these coarse calculations should be used only to indicate the magnitude of the problem: cats kill several million wild animals in Florida each year.

Data are not available to accurately assess the long-term impact of cat predation on wildlife populations in Florida. As indicated above, the precision and accuracy of cat population data are unknown. In addition, we do not know current population levels or rates of mortality and productivity for most wildlife species. Thus it is seldom possible to know whether predation by cats significantly affects population levels. Cats undoubtedly kill millions of animals and potentially this predation is additive to other sources of mortality, such as disease, and thus represents a significant impact to wildlife populations. Conversely, for some prey species, it is also possible that predation by cats is largely compensatory, such that most animals killed by cats would likely be killed by other sources. Because the impact of cat predation varies among species and local areas and because local data is typically lacking, the conservative assumption regarding any local population should be that cat predation is a significant mortality factor that should be minimized.

Predation Impacts

Species with restricted geographic distributions and small population sizes are most likely to show demonstrable impacts from predation. These rare species usually are formally listed as Threatened or Endangered wildlife species and are among the most thoroughly studied in Florida. Thus, studies of some of these animals provide the most concrete information on the impact of cats on wildlife in the state.

Many of the best examples involve beach mice (*Peromyscus polionotus*), which are endemic to the dune ecosystems of barrier islands in the southeastern United States. Populations of beach mice already are imperiled due to loss of suitable habitat and loss of genetic diversity (see Holler 1992). Domestic cat predation applies additional pressure to already fragile populations. Six of the eight beach mouse subspecies are federal and state listed as endangered or threatened, and one is extinct. Predation is the single most important factor affecting beach mouse survival (Blair 1951), and thus several authors consider house cats to be a serious threat to beach mouse populations (Bowen 1968, Humphrey and Barbour 1981, Holliman 1983).

The pallid beach mouse (*P. p. decoloratus*) is extinct (Humphrey and Barbour 1981), and extensive sampling in 1989 at the type locality for the subspecies revealed high densities of feral

cats. Although Humphrey (1992a) stated that extinction was probably a result of the combined effects of competition with house mice and cat predation, competitive exclusion by house mice has not been documented and the impact of house mice on beach mouse populations now seems insignificant relative to impacts of predation by cats (J. A. Gore, FWC, pers. commun.).

Domestic cats have colonized the dune habitat preferred by the Anastasia Island beach mouse (*P. p. phasma*) in St. Johns County, and may pose a serious threat to remaining populations there (Blair 1951, Bowen 1968, Humphrey and Barbour 1981, Frank 1992). Frank (1996) stated that, "Management of domestic cats in beach mouse habitat may be the single most effective management technique available to reduce the vulnerability of populations to extinction. Domestic cats were found to use habitats well removed from development, and they pose a threat throughout the range of the Anastasia Island beach mouse."

To track the abundance of domestic cats on Anastasia Island, Frank (1996) counted cat tracks on mouse trapping grids at Anastasia State Recreation Area throughout the entire two-year study. Cat removal occurred during fall 1989 - January 1991, with 25 cats removed during fall 1989 alone. Cat control resulted in a decrease in the number of cat tracks and an abrupt increase of beach mice, which were previously at very low numbers. This pattern suggests an inverse relationship between cat abundance and beach mouse population levels. Supplemental feeding of cats is believed to have artificially increased cat densities in dune habitats. Removal of cats at Anastasia State Recreation Area appears to have allowed beach mouse populations to increase to levels comparable with Fort Matanzas National Monument, where cats were absent.

Domestic cats are known to prey upon Choctawhatchee beach mice (*P. p. allophrys*) near Grayton Beach State Park, Walton County. During a recent radio telemetry study on beach mice at Grayton Beach, one radio collar from a beach mouse was tracked and located in the digestive tract of a live cat (Van Zant and Wooten, In Press). Another radio collar was found in cat feces in the campground. Cat feeding stations along the eastern boundary of the park may attract and support cats that feed on mice in the park (H. Mitchell, DEP, pers. commun.).

Perdido Key beach mice were re-introduced to Perdido Key State Park, Escambia County from the sole remaining population at Gulf Islands National Seashore in February 2000. The mouse was previously extirpated from Perdido Key State Park because of predation by feral and free-ranging cats and habitat alteration from hurricanes and development. A program to remove non-native predators was implemented at the time of the re-introduction, and 59 cats have been removed from Perdido Key State Park since February 2000. The other recent former location for Perdido Key beach mice is nearby at Florida Point, Alabama. The Florida Point population also was extirpated and an actively managed cat colony on the western end of the key is considered the primary reason (H. Mitchell, DEP, pers.commun.).

Although the Santa Rosa Island beach mouse (*P. p. leucocephalus*) is not a listed species, cats apparently adversely impact its populations. Bowen (1968) proposed that stretches of beach with unusually high levels of cat predation may serve as barriers to gene flow. He found that cats

on Santa Rosa Island were such an important factor in the reduction of beach mouse populations that he avoided trapping in areas with cat sign. Gore and Schaefer (1993) found a significant inverse relationship between the incidence of cat tracks and beach mouse tracks on track count surveys on Santa Rosa Island. Areas near human habitation have higher numbers of cat tracks and few beach mouse tracks, whereas the reverse is true in more remote areas of the island.

The Chadwick Beach cotton mouse (*Peromyscus gossypinus restrictus*), formerly found in Englewood Beach, Sarasota County, is extinct. Predation by the large numbers of cats associated with the high density of residences in that area may have been an important factor in its disappearance (Humphrey 1992b).

The last remaining populations of the federal and state listed endangered Key Largo woodrat (*Neotoma floridana smalli*) and the Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*) occur on approximately 3000 acres of upland tropical hammock on the northern quarter of Key Largo, Monroe County. The Key Largo woodrat has undergone a precipitous decline in numbers in recent years and the number of remaining animals may be well below 100. No disease or habitat issues have been identified, and predation by cats is likely a significant factor in the species decline. The north edge of the species' remaining range is bordered by the Ocean Reef Club, a housing development that maintains a cat colony with an estimated 500-1,000 cats. The south end of the species' range is bordered by another colony of approximately 30 cats. Cats are regularly observed throughout the uplands of Key Largo Hammocks Botanical Park and Crocodile Lake National Wildlife Refuge. Cats undoubtedly prey on the two native rodent species and the impact is suspected to be significant, but predation has not been directly observed (S. Klett, USFWS; J. Duquesnel, DEP; pers. commun.).

Deterministic causes of extinction for the endangered Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*) include invasion by introduced predators, habitat destruction, disease, and climate change (Nunney and Campbell 1993). Forys (1995) determined that the main source of juvenile and adult mortality (and probably nestling mortality) in the Lower Keys marsh rabbit is the domestic cat. If current mortality rates persist, it is likely that the Lower Keys marsh rabbit will go extinct during the next 20 - 30 years. The single most effective strategy for reducing the risk of extinction of the Lower Keys marsh rabbit is to eliminate predation by domestic cats (Forys and Humphrey 1999).

In most regions, mammals make up a greater proportion of the cat diet than birds, and this almost surely holds true in Florida. However, the impact on birds should not be ignored. Many species that may be affected by cat predation in Florida are native resident and migratory songbirds whose populations are already stressed by a host of factors including habitat degradation, destruction, and fragmentation, and pesticide pollution. Neotropical migrants that rely on small, forest remnants for migration stop-over habitat may be especially vulnerable to the unnaturally high densities of predators that greet them in some south Florida parks, such as Greynolds Park in Miami-Dade County. This problem was the topic of a segment in the National Geographic Society's 1998 video The Secret Life of Cats, filmed at Greynolds Park. A survey

conducted by the Everglades Research Group, Inc. (1998) concluded that the decline of upland bird populations during the period 1988 - 1998 was due to cats in a managed cat colony in the park. It is not uncommon to observe 30-50 cats during a typical visit to the park. A graduate student conducting a study of feral cat colonies in these parks witnessed cats stalk and kill a common yellowthroat (*Geothlypis trichas*) and a blue jay (*Cyanocitta cristata*) (Castillo 2001).

Generally, ground-nesting birds face the greatest risk of predation by cats. Cats are known to prey on shorebirds, terns, and gulls in Florida, including several threatened and endangered species such as the least tern (*Sterna antillarum*) and American oystercatcher (*Haematopus palliatus*) (Gore and Kinnison 1991, Below 1996, Gore 1996). Many other species of ground-nesting birds in Florida are probably preyed upon by cats, including northern bobwhites (*Colinus virginianus*), goatsuckers, brown thrashers (*Toxostoma rufum*), eastern towhees (*Pipilo erythrophthalmus*), and several wood warblers.

The domestic cat is known to prey on young and adult Florida scrub-jays (*Aphelacoma coerulescens*), a federal and state listed threatened species (Woolfenden and Fitzpatrick 1996). At least one fledgling scrub-jay has been observed killed by a cat and other mauled jay carcasses were probably jays killed by cats. Post-fledging jay survival is lower in suburban areas than in undeveloped native scrub habitat at Archbold Biological Station (ABS), in part because of predation by cats and collisions with automobiles (R. Bowman, ABS, pers. commun.).

Cats have been implicated as predators of colonially nesting seabirds in numerous locations around the world and Gore and Kinnison (1991) suspected cats preyed upon least tern nests in north Florida. They found cat tracks leading among failed nests and suspected cats and other mammalian predators were largely responsible for nest failures when human activity was limited. However, habitat loss, human disturbance, and storms have more an impact on seabird productivity in Florida than predation by cats (J. A. Gore, FWC, pers. comm.).

Domestic cats are known to prey upon loggerhead sea turtle and green turtle nestlings in Florida. FWC surveys indicate that during 1999-2002, feral cats depredated sea turtle nests in Monroe, Charlotte, Sarasota, Palm Beach, and Okaloosa counties (FWC, unpubl. data). However, depredation by foxes and raccoons has a more significant impact in Florida and depredation by cats should be viewed as occasional, with little consequences for sea turtle populations (B. Witherington, FWC, pers. commun.).

Disease

As noted above, domestic cats are the most common carriers of rabies among domestic animals (CDC 2000) and unvaccinated cats can transmit rabies to wildlife such as raccoons, skunks and foxes. This is particularly likely at cat colonies where cats and native mammal species often feed from the same bowl, which has been documented in Florida. Because so little

is known about diseases in wild animals, much less the pathways for disease transmission, it is difficult to determine the health threat that cats pose to wildlife populations.

One species whose health has been closely monitored is the endangered Florida panther and several diseases that are common in domestic cats have been documented panthers. Domestic cats may be one of several possible reservoir hosts for the feline panleukopenia (FPV) that has been discovered in the Florida panther (Roelke et al. 1993), and have the potential of introducing FPV to bobcats as well (Wassmer et al. 1988, Layne 1994). Veterinarians suspect that one of the ways in which Feline immunodeficiency virus (FIV) may have infected Florida panthers is through panthers' consumption of infected domestic cats (Roelke et al. 1993). Feline leukemia virus (FeLV) is the leading cause of death due to infectious disease in cats and could also be spread to Florida panthers through feral domestic cats. There is one recorded instance of FeLV in the mountain lion (Jessup et al. 1993).

STRATEGIES FOR DEALING WITH FERAL AND FREE-RANGING CATS

The cat problem in Florida is complex because cats are spread over the entire state in virtually all terrestrial habitats and on private, state, and federally owned properties. Cats are highly efficient predators of mammals, birds, and other animals regardless of whether they are fed regularly by humans. People are emotionally and philosophically divided in their opinions of cats, and views range from the pragmatic to the passionately obsessive. A variety of techniques will have to be employed to reduce the toll cats take on wildlife.

Eradication

Complete eradication of cats requires considerable time, personnel, and equipment to have lasting results. The best results have been achieved on relatively small islands where immigration can be completely limited and control measures can be applied to an entire area (Bell 1989). The most effective control regimes have employed aerial application of poison baits, sometimes in combination with trapping and euthanasia, but poisoning is not an option in Florida for numerous reasons. However, cats can be eradicated through shooting or trapping and euthanasia.

Complete eradication could be employed on smaller islands in Florida in situations where the arrival of new cats could be prevented. However, on developed islands and on the mainland, eradication techniques have to be continuously applied because of the constant stream of new cats that can arrive into control areas. Current predator control measures in the Florida panhandle are a good example of this situation. While this control project has achieved dramatic results, especially in the form of increased nesting success of sea turtles, the immigration of new predators (cats, foxes, coyotes, raccoons) has been slowed but not stopped.

Intensive eradication efforts are important for emergency actions, such as in the case of the Perdido Key beach mouse population translocations, wherein an immediate response is required to prevent the extinction of a small population of native wildlife. Control measures on Perdido Key have attracted negative public response and traps have been vandalized and stolen. Despite problems such as these, routine trapping and removal of nuisance feral cats will remain an essential part of feral cat control.

Cat Colonies and TNR

Cats sometimes congregate at food sources provided by humans. In some cases, as with garbage dumps, the food is provided unintentionally, but some colonies of cats form because people deliberately feed and otherwise support the cats. These cat colonies may be simple aggregations of cats or managed cat colonies with an actual program of feeding and TNR. They can range in size from a few animals to hundreds.

Deleted: ¶

TNR-based colony maintenance is often proposed as an effective method of reducing cat numbers. A key assumption of TNR is that all cats in the colony are trapped, altered and released. The colony then slowly shrinks as colony members live out their lives, die, and are not replaced. Colony demise is supposedly further enhanced by the territorial behavior of male cats which prevents immigration by new cats. Another assumption is that feeding and vaccination renders the cats harmless to the wildlife in the vicinity of the colony. Unfortunately, these assumptions are seldom met and thus little or no quantitative data exist to support neutering as a method for controlling cat populations (see Clarke and Pacin 2002; Levy et al. 2003).

Zaunbrecher and Smith (1993) suggested that TNR programs might be an alternative to eradication, but Zaunbrecher, in a subsequent letter to the Journal of the American Veterinary Medical Association, later stated that "…that eradication is the only real answer, however unpleasant" (in litt.) and that subsequent studies and practical experience with cat colonies have shown that they are the wrong solution to cat overpopulation. More recently, Levy et al. (2003) found that a managed cat colony declined in size over several years, but only when more than half of the trapped cats were adopted and not returned to the colony.

In theory, TNR works because no new cats enter the colony. In practice, cat colonies are open systems in which new cats freely enter the colony and replace any that die. Food placed by colony managers lures in new feral cats and irresponsible pet owners abandon unwanted cats at cat colonies. A study of two managed cat colonies in Miami-Dade County parks found no support for the hypothesis that TNR reduces or eliminates cat colonies (Castillo 2001). In this study, the size of one cat colony, at Crandon Marina, did not change significantly over time ($P = 0.82$) and the other cat colony, at A. D. Barnes Park, increased in size ($P = 0.03$). Castillo (2001) documented illegal dumping of unwanted cats, including numerous kittens and females with litters, at these and other cat colonies in Miami-Dade County parks. Domestic cats are not strictly territorial (Nowak 1999) and, therefore, resident cats do not exclude immigrants from

colonies. Thus, a certain level of immigration and reproduction is inevitable, and in practice TNR colonies remain stable or increase in size over time.

The effects of cat colonies on wildlife health and human health have not been adequately quantified. Given the unusually high densities of cats and other wildlife (e.g., raccoons, opossums, foxes, skunks) that may be attracted to the food at managed colonies, the spread of disease is a serious potential concern. Large numbers of cats become vulnerable to diseases like feline panleukopenia. The health hazards are not restricted to cats, but also extend to humans. As a result the National Association of State Public Health Veterinarian, Inc. (1996) found no evidence that cat colony management programs reduce diseases such as bartonellosis, larval migrans, toxoplasmosis, and vector-born zoonotic diseases and that rabies will always be a risk because colonies are not closed. They support cat control through eradication and responsible ownership, including keeping owned cats indoors. Similarly, the Florida Rabies Advisory Committee of the Florida Department of Health has stated that the concept of managing free-roaming and feral cats is not tenable on public health grounds and also advocates removal of feral cats (Brooks 1999). When cats in a colony cease to be fed, the colony disbands. Cat densities in the vicinity of the colony return to a level more easily tolerated by wildlife, and health hazards to wildlife and humans are diminished.

Cat colonies and TNR are opposed by many groups including: American Bird Conservancy, American Association of Wildlife Veterinarians, American Ornithologists' Union, Cooper Ornithological Society, National Association of State Public Health Veterinarians (ABC, undated, b). Association of Avian Veterinarians, and the Florida Department of Health. The Wildlife Society adopted a position statement on feral and free-ranging cats that includes support for the humane elimination of cat colonies (The Wildlife Society 2000; see Appendix 2).

Enforcement of Existing Laws

The mission of FWC is to manage the state's fish and wildlife resources for their long-term well-being and the benefit of all people, and the agency has clear authority (Article IV, section 9 of the Florida Constitution) to regulate impacts upon wildlife. These impacts would include those caused by domestic animals, such as cats. However, FWC does not typically regulate domestic animals and it would not be in FWC's interest or responsibility to establish and enforce laws regulating domestic cats, such as laws governing the leashing (controlling) of cats, neutering and spaying, and licensing. Local governments have the responsibility to regulate domesticated species, including cats, but the actions of local governments must not adversely impact native wildlife. Thus, controlling impacts of cats requires efforts from multiple regulatory levels. The FWC will strive to minimize or eliminate the impacts of cats where they pose a threat to local wildlife populations, but will otherwise leave control of nuisance or feral cats and issues of local public safety and welfare to local governments. Several Florida state laws and codes may apply to the control of feral and free-ranging cats (Appendix 3) and potentially could be invoked to support eradication, oppose cat colonies and TNR, and to support

education efforts.

Reducing the Flow of New Cats into the Wild

Any effort to control the cat problem should include measures to reduce the flow of new cats into the wild. As outlined above, eradication through trapping and euthanasia is unfortunate, but necessary, as well as an effective and humane way of reducing numbers of feral cats and controlling cats in situations where they pose an imminent threat to wildlife, although it is may be unpopular with some of the public. TNR and cat colonies are unsatisfactory solutions to cat overpopulation and do nothing to reduce the impact of cats on wildlife. It is imperative that cats not be put in either situation; they should never be there in the first place.

Several steps could be taken by a municipality or county, the level at which laws are typically implemented, to control companion animals such as cats and dogs. These steps include:

1. Provide incentives for spaying and neutering of cats.

2. Enact and enforce animal control laws (so-called "leash laws," or "running at large laws") that require owners to be accountable for their pets at all times.

4. Enact and enforce local ordinances that prohibit abandonment of cats. Warning signs could be posted in public areas that are set aside for wildlife announcing that this is an illegal activity.

5. Prohibit feeding of stray cats, including colony cats in public parks.

6. Limit the number of cats that may be owned or cared for at any one time

Education

Education is a critical component of a successful, long-term approach to cat control. A simple first step is to teach and encourage pet owners to keep their cats indoors. FWC supports the Cats Indoors! program of the American Bird Conservancy. Over 2,000 organizations have voiced their support for this program including the Humane Society of the United States, the American Humane Association, United Activists for Animal Rights, and the International Wildlife Rehabilitation Council. At the core of this program is the simple message that indoor cats do not kill wildlife and live healthier and longer lives than outdoor cats. Of course other by-products of having an indoor cat include a reduced risk of it becoming a stray or breeding with other cat.

To date, FWC education strategies have included:

- Sending Cats Indoors! brochures and posters to animal shelters, health departments, veterinary offices, and wildlife rehabilitation centers. The brochure explains why it is beneficial to cats and wildlife to keep cats indoors.
- Distribution of Cats Indoors! 15 second or 30 second public service announcement in VHS or Beta format. Print versions are also available.
- Placing a domestic cat page at FWC's Critter Questions web site, a source for information on nuisance wildlife.
- Providing staff time and resources for public speaking and education programs utilizing Cats Indoors! materials including distribution of a teacher's guide available from American Bird Conservancy's web site.
- Raising awareness among county governments and the public that releasing cats into the state may be a violation of Florida Statutes (see above).

Recommended educational steps include:

- Identifying hot spots where cats have an impact on listed species and distribute Cats Indoors literature to people who own cats in the area through veterinary clinics, place Florida specific Cats Indoors ad in local weekly or daily newspapers, and give presentations to appropriate homeowner associations.
- Initiate a statewide media campaign (newspaper, television, organizational newsletters) to encourage people to keep their cats indoors utilizing the Florida specific Cats Indoors print and electronic media ads.
- Work with humane groups, shelter personnel, wildlife conservation groups, animal control groups, and veterinarians to improve methods for educating people to sterilize their pet cats.
- Create and implement a strategy for preparing the public and humane groups to accept, tolerate or work together with FWC when feral cat colony removal is necessary to protect a listed species or the natural integrity of public lands for wildlife.
- Provide information on statute and fines associated with violating Florida's animal cruelty laws, 828.12 (1) and 828.13(3) as they pertain to abandonment of domestic animals to veterinary clinics, animal control authorities, humane, rescue and wildlife groups.

CONCLUSION

Domestic cats are not native to Florida, but they occur throughout the state. The number of cats in Florida, both owned and unowned (feral), that are sometimes outdoors is not certain but estimated to be about 5.3 million. Cats are known to prey upon native wildlife species,

particularly small mammals and birds. Although the precise number and species of wildlife taken annually by cats in Florida is not known, it undoubtedly numbers in the millions. Thus, the potential impact to native wildlife populations is great. Impacts are best documented and have greatest potential for adverse impacts among endangered species or others that occur in limited numbers or across small areas.

The FWC has the authority and responsibility to curtail the adverse impacts of cats upon native wildlife, but local governments have primary responsibility for controlling nuisance cats and issues of public health or safety. Maintenance of cats in TNR programs or other managed colonies is not an effective means of controlling cat populations. Cats should not be protected on public lands and should be removed where they pose a threat to local wildlife populations. Educating people, particularly cat owners, about the adverse effects of cats on wildlife is a vital element of any program for protecting native wildlife from cats.

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Appendix 1. Examples of groups that support or conduct Trap-Neuter-Release programs to control cat populations in Florida.

1. Adopt A Cat Foundation - Lake Park

Adopt A Cat Foundation, Inc. is a 501-C-3 non-profit organization, committed to finding loving homes for rescued cats and kittens. Adopt A Cat Foundation & their foster-care guardians provide shelter for over 200 homeless, abandoned, ill and injured cats/kittens everyday.

2. Alley Cat Rescue - Sarasota

Alley Cat Rescue, Inc.
5830 Hagerman Road
Sarasota, Florida 34232

Email: Info@AlleyCatRescue.org or Catnip4241@aol.com

3. Animal Coalition of Tampa - Tampa

The Animal Coalition of Tampa is a 501(c)3 non-profit organization. This organization seeks to serve as an umbrella for several local animal groups and individuals that share resources, ideas, and the common goal of reducing animal overpopulation in Hillsborough County.

Animal Coalition of Tampa
8490 W. Hillsborough Avenue, #156
Tampa, FL 33615813.818.9381

linda@actampa.net

4. The Bear Foundation - Ponte Vedra Beach

100 Lamplighter Lane
Ponte Vedra Beach, FL 32082
Telephone: 904-285-4687
Fax: 904-280-1152
Email: bearfoundation@att.net

5. The Cat Network - Miami

The Cat Network, Inc. is a 501(c)3, Florida not-for-profit corporation that is dedicated to reducing the overpopulation of stray and feral cats in South Florida through the humane practice of sterilization, vaccination, and release.

THE CAT NETWORK, INC.
P.O. Box 593026
Miami, Florida 33159-3026
(305) 255-3482

6. Feline Rescue Adoption Program - Jacksonville

The Feline Rescue Adoption Program is located at 818 Margaret Street, Jacksonville, Florida 32204. This is in the Riverside/5 Points area just south of downtown.
Call 904-354-4451 or e-mail: staff@straycathouse.org

7. Fix and Feed Feline Feral - Tampa

Fix & Feed Feline Feral, Inc., a Tampa based non-profit organization which provides information, humane alternatives and assistance to individuals who act as caregivers to stray and feral cats. Our mailing address is:

Fix and Feed Feline Feral Inc.P.O. Box 270035Tampa,FL 33688-0035

8. Operation Catnip - Gainesville

A non-profit organization dedicated to humanely reducing the stray and feral cat population through a no cost Trap-Neuter-Return program. Founded in 1998, Operation Catnip-Gainesville is the second Operation Catnip chapter to join the national effort to reduce feral cat populations through free TNR programs for unowned, feral cats.

P.O. Box 141023
Gainesville, FL 32614-1023
(352) 380-0940

9. Space Coast Feline Network

The Space Coast Feline Network is a nonprofit organization, incorporated as a not-for-profit in Florida, operated solely by volunteers and funded entirely through donations.

Space Coast Feline Network
PO Box 624
Cocoa, Florida 32923
321-799-4379

http://www.spacecoastfelinenetwork.com/Welcome.html

10. National Alley Cat Allies

Founded in 1990, Alley Cat Allies is part of an international effort working to promote, foster, and develop humane nonlethal control programs for feral and stray cats through sterilization programs that effectively reduce their numbers over a period of time. Alley Cat Allies respects the sanctity of life and the rights of individual animals and embraces proactive preventative control methods, i.e. trap-neuter-return.

1801 Belmont Road NW, Suite 201 ▪ Washington ▪ DC ▪ USA
Phone: 202.667.3630 ▪ Fax: 202.667.3640
http://www.alleycat.org/

11. Alley Cat Rescue Inc

Rescuing stray cats, helping feral cat colonies, running national programs. Advocates the sterilization of feral colony cats Provides information to colony caretakers on all aspects of Trap-Neuter-Return, including rabies control and issues surrounding wildlife and predation.

3702 Webster Street ▪ Brentwood ▪ MD ▪ USA
Phone: 301-699-3946 ▪ Fax: 301-6993946 ▪ email: laholton@aol.com
http://saveacat.org

12. Animal Outreach Society

AOS has numerous programs, including cat rescue and a feral cat program. AOS believes that the most humane and also the most effective way to deal with the problem of feral cat over-population is a combination of feral colony caretakers and a procedure called Trap-Neuter-Return (TNR).

PO Box 396 ▪ McHenry ▪ IL ▪ USA
Phone: 815-385-0005 ▪ email: info@animaloutreachsociety.org
http://www.animaloutreachsociety.org

13. Stray Pet Advocacy

A consolidated display of information essential to the welfare of strays and TNR
USA The goal of this website will be to consolidate sources of stray pet animal control information, to publish and provide links to related research; and to provide spay/ neuter and

TNR advocacy materials.

email: admin@straypetadvocacy.org
http://www.straypetadvocacy.org/stray_pet_advocacy1_001.htm

14. Feral Cat Coalition

The FCC is an organization that traps and spays/neuters feral cats, then returns them to their caretakers.

FERAL CAT COALITION
9528 MIRAMAR ROAD
PMB 160
SAN DIEGO, CA 92126
rsavage@feralcat.com

Appendix 2. Text of Policy Position Adopted by The Wildlife Society

Wildlife Policy Statement - Feral and Free-Ranging Domestic Cats

Reviewed and Re-adopted 24 September 2002

Feral and free-ranging domestic cats are exotic species to North America. Exotic species are recognized as one of the most widespread and serious threats to the integrity of native wildlife populations and natural ecosystems. Exotic species present special challenges for wildlife managers because their negative impacts are poorly understood by the general public, many exotic species have become such an accepted component of the environment that many people regard them as "natural," some exotic species have advocacy groups that promote their continued presence, and few policies and laws deal directly with their control. Perhaps no issue has captured more of the challenges for contemporary wildlife management than the impacts of feral or free-ranging human companion or domestic animals. The domestic cat is the companion animal that recently has attracted the most attention for its impact on wildlife species.

Domestic cats originated from an ancestral wild species, the European and African wild cat (*Felis silvestris*). The domestic cat (*Felis catus*) is now considered a separate species. The estimated numbers of pet cats in urban and rural regions of the United States have grown from 30 million in 1970 to nearly 65 million in 2000. Reliable estimates of the present total cat population are not available. Nationwide, approximately 30% of households have cats. In rural areas, approximately 60% of households have cats.

The impact of domestic cats on wildlife is difficult to quantify. However, a growing body of literature strongly suggests that domestic cats are a significant factor in the mortality of small mammals, birds, reptiles, and amphibians. Because free-ranging cats often receive food from humans, they can reach population levels that may create areas of abnormally high predation rates on wildlife. When the wildlife prey is a threatened or endangered species, the result may be extirpation or extinction. Effects of cat predation are most pronounced in island settings (both actual islands and island of habitat), where prey populations are already low or stressed by other factors, or in natural areas where cat colonies are established. Competition with native predators, disease implications for wildlife populations, and pet owners' attitudes toward wildlife and wildlife management also are important issues.

Extensive popular debate over absolute numbers or types of prey taken is not productive. The number of cats is undeniably large. Even if conservative estimates of prey taken are considered, the number of prey animals killed is immense. Feeding cats does not deter them from killing wildlife as they do not always eat what they kill. Humans introduced cats to North America and they must be responsible for the control and removal of cats that prey on wildlife.

The policy of The Wildlife Society in regard to feral and free-ranging domestic cats is to:

1. Strongly support and encourage the humane elimination of feral cat colonies.

2. Support the passage and enforcement of local and state ordinances prohibiting the public feeding of feral cats, especially on public lands, and releasing of unwanted pet or feral cats into the wild.

3. Strongly support educational programs and materials that call for all pet cats to be kept indoors, in outdoor enclosures, or on a leash.

4. Support programs to educate and encourage pet owners to neuter or spay their cats, and encourage all pet adoption programs to require potential owners to spay or neuter their pet.

5. Support the development and dissemination of sound, helpful information on what individual cat owners can do to minimize predation by free-ranging cats.

6. Pledge to work with the conservation and animal welfare communities to educate the public about the negative impact of free-ranging and feral cats on native wildlife, including birds, small mammals, reptiles, amphibians, and endangered species.

7. Support educational efforts to encourage the agricultural community to keep farm cat numbers at low, manageable levels and use alternative, environmentally safe rodent control methods.

8. Encourage researchers to develop better information on the impacts of feral and free-ranging cats on native wildlife populations.

9. Recognize that cats as pets have a long association with humans, and that responsible cat owners are to be encouraged to continue caring for the animals under their control.

10. Oppose the passage of any local or state ordinances that legalize the maintenance of "managed" (trap/neuter/release) free-ranging cat colonies.

Appendix 3. Text of Statutes and Rules Potentially Applicable to the Problem of Feral and Free-ranging Domestic Cats in Florida.

372.265 F.S. Regulation of foreign animals.--
(1) It is unlawful to import for sale or use, or to release within this state, any species of the animal kingdom not indigenous to Florida without having obtained a permit to do so from the Fish and Wildlife Conservation Commission.

(2) The Fish and Wildlife Conservation Commission is authorized to issue or deny such a permit upon the completion of studies of the species made by it to determine any detrimental effect the species might have on the ecology of the state.

(3) Persons in violation of this section shall be guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082 or s. 775.083.

Note: According to the FWC General Counsel, section 372.265, F.S. is not intended for FWC to impose statewide control over domestic cats and does not limit local government's authority to regulate cats.

828.12 F.S. Cruelty to animals.--
(1) A person who unnecessarily overloads, overdrives, torments, deprives of necessary sustenance or shelter, or unnecessarily mutilates, or kills any animal, or causes the same to be done, or carries in or upon any vehicle, or otherwise, any animal in a cruel or inhumane manner, is guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082 or by a fine of not more than $5,000, or both.

(2) A person who intentionally commits an act to any animal which results in the cruel death, or excessive or repeated infliction of unnecessary pain or suffering, or causes the same to be done, is guilty of a felony of the third degree, punishable as provided in s. 775.082 or by a fine of not more than $10,000, or both.

(3) A veterinarian licensed to practice in the state shall be held harmless from either criminal or civil liability for any decisions made or services rendered under the provisions of this section. Such a veterinarian is, therefore, under this subsection, immune from a lawsuit for his or her part in an investigation of cruelty to animals.

(4) A person who intentionally trips, fells, ropes, or lassos the legs of a horse by any means for the purpose of entertainment or sport shall be guilty of a third degree felony, punishable as provided in s. 775.082, s. 775.083, or s. 775.084. As used in this subsection, "trip" means any act that consists of the use of any wire, pole, stick, rope, or other apparatus to cause a horse to fall or lose its balance, and "horse" means any animal of any registered breed of the genus Equus, or

any recognized hybrid thereof. The provisions of this subsection shall not apply when tripping is used:
(a) To control a horse that is posing an immediate threat to other livestock or human beings;
(b) For the purpose of identifying ownership of the horse when its ownership is unknown; or
(c) For the purpose of administering veterinary care to the horse.

828.13 Confinement of animals without sufficient food, water, or exercise; abandonment of animals.--
(1) As used in this section:
(a) "Abandon" means to forsake an animal entirely or to neglect or refuse to provide or perform the legal obligations for care and support of an animal by its owner.
(b) "Owner" includes any owner, custodian, or other person in charge of an animal.

(2) Whoever:
(a) Impounds or confines any animal in any place and fails to supply the animal during such confinement with a sufficient quantity of good and wholesome food and water,
(b) Keeps any animals in any enclosure without wholesome exercise and change of air, or
(c) Abandons to die any animal that is maimed, sick, infirm, or diseased, is guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082 or by a fine of not more than $5,000, or by both imprisonment and a fine.

(3) Any person who is the owner or possessor, or has charge or custody, of any animal who abandons such animal to suffer injury or malnutrition or abandons any animal in a street, road, or public place without providing for the care, sustenance, protection, and shelter of such animal is guilty of a misdemeanor of the first degree, punishable as provided in s. 775.082 or by a fine of not more than $5,000, or by both imprisonment and a fine.

68A-4.005 F.A.C. Introduction of Foreign Wildlife or Freshwater Fish or Carriers of Disease.--
(1) It shall be unlawful for any person to possess, transport or otherwise bring into the state or to release or introduce in the state any wildlife or freshwater fish that is not native to the state unless such person shall first secure a permit from the commission. Such permit shall be granted only after duly authorized agents have made such investigation and inspection of the wildlife or freshwater fish as may be deemed necessary, provided that this rule shall not apply to ring-necked or Mongolian pheasants or coturnix quail.

(2) Nothing in this rule shall prohibit the commission or its duly authorized agents from bringing into the state or releasing or introducing any wildlife or freshwater fish.

(3) No person shall release or introduce in the state any wildlife or freshwater fish or any other organism that might reasonably be expected to transmit any disease to wildlife or freshwater fish.