



United States Department of the Interior

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July 14, 2000

John Donahue, Superintendent
Big Cypress National Preserve
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Ochopee, Florida 34141-9710

Log No.:	4-1-00-F-550
Project.:	ORV Management Plan for Big Cypress National Preserve
Dated:	July 8, 2000
Applicant:	National Park Service
Counties:	Collier, Monroe

Dear Mr. Donahue:

This document transmits the Fish and Wildlife Service's (Service) biological opinion for the *Final Recreational Off-Road Vehicle Management Plan Supplemental Environmental Impact Statement* (NPS 2000) (ORV Plan) for Big Cypress National Preserve (BICY) located in Collier and Monroe Counties, Florida, and the effects of the ORV Plan on the endangered Florida panther (*Puma concolor coryi*) (panther), endangered wood stork (*Mycteria americana*), endangered red-cockaded woodpecker (*Picoides borealis*), endangered Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*), endangered West Indian manatee (*Trichechus manatus*), the threatened bald eagle (*Haliaeetus leucocephalus*), and threatened eastern indigo snake (*Drymarchon corais couperi*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA).

This biological opinion is based on information provided in the draft and final ORV Plans for the BICY, field investigations, meetings, and phone conversations with the National Park Service (NPS); Service staff, and other sources of information. A complete administrative record of this consultation is on file at the Service's South Florida Field Office in Vero Beach, Florida.

Consultation History

On April 1, 1999, the Service received an advance copy of the draft ORV Plan from NPS. Since the Service was also named in the lawsuit that prompted the formation of the ORV Plan, we were given the opportunity to provide comments prior to the publication and comment period for

review of the ORV Plan. The Service provided comments to NPS in a letter dated May 20, 1999.

On August 31, 1999, NPS announced the dates for two public meetings to provide the public an opportunity to comment on the draft ORV Plan. One was to be held in Miami, the other in Naples.

On October 1, 1999, the Southwest Florida Regional Planning Council provided comments indicating the draft ORV Plan was "regionally significant and consistent" with the Southwest Florida Strategic Policy Plan.

In an October 26, 1999, letter to the Corps, the Florida Fish and Wildlife Conservation Commission (FWC) provided their comments on the revised draft ORV Plan to NPS. The Service provided additional comments on the revised draft ORV Plan in a letter dated November 12, 1999. The Service stated that the revised document appeared to be a planning tool and recommended a more action-oriented document be presented for additional review and comment.

The Environmental Protection Agency (EPA) also provided comments on November 12, 1999. They stated that they had "environmental objections" to the proposal and recommended additional information and specifics be included in the final document.

The firm of Meyer & Glitzenstein submitted comments to NPS on behalf of the Florida Biodiversity Project in a letter dated November 13, 1999.

From January 18 to January 20, 2000, the Service met with NPS staff to discuss the revisions necessary to improve the ORV Plan. The Service was present to provide technical assistance in the informal consultation process.

On March 3, 2000, a meeting of all stakeholders was held in Naples. The purpose of the meeting was for NPS to solicit additional input from interested parties. Service staff attended to meeting to further facilitate the informal consultation process.

Additional meetings were held at BICY from March 7 through March 9, 2000. Additional analysis of specific actions NPS intended to include in the final ORV Plan were discussed and informal consultation continued. Service staff attended and provided technical assistance to facilitate the formation of the plan and analysis of the effects of the proposed action on federally listed endangered and threatened species.

A final meeting to review the revised ORV Plan was held at BICY on June 7 and 8, 2000. This was to be the final meeting in the informal consultation process. Service staff attended and provided comments to NPS to facilitate the use of the final ORV Plan as NPS biological assessment for their initiation package as required in 50 CFR part 402.12.

A letter from Superintendent Donahue requesting formal consultation dated July 8, 2000, was received by the Service. In the letter, NPS determined that the proposed action would have no effect on the endangered West Indian manatee (*Trichechus manatus*), and threatened eastern indigo snake (*Drymarchon corais couperi*). They also determined that the proposed action may

affect, but is not likely to adversely affect the endangered red-cockaded woodpecker (*Picoides borealis*), endangered wood stork (*Mycteria americana*), endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*), and threatened bald eagle (*Haliaeetus leucocephalus*). A determination of may affect, likely to adversely affect was made for the proposed actions' effects on the Florida panther (*Puma concolor coryi*).

The Service concurs with these determinations and offers the following biological opinion for the Florida panther. The red-cockaded woodpecker, Cape Sable seaside sparrow, wood stork, Everglade snail kite, and bald eagle are also discussed in the effects of the action section of this biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

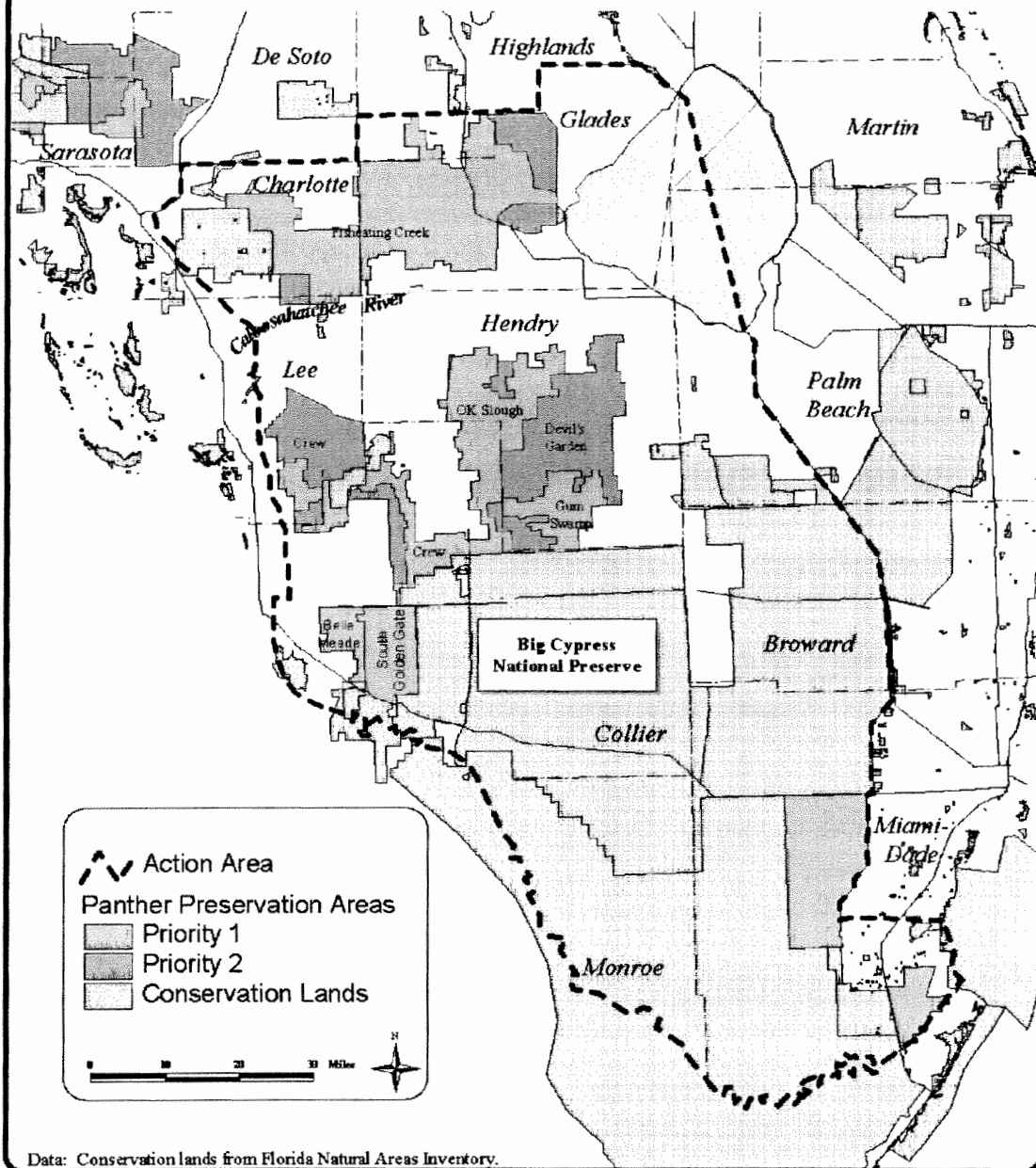
The applicant proposes to implement the preferred alternative as described in the *Final Recreational Off-Road Vehicle Management Plan Supplemental Environmental Impact Statement* (NPS 2000). The proposed action includes provisions to restrict ORV's to designated trails and access points; an integral research component to determine such things as the best areas through which to route ORV's and the most effective trail protection techniques; a restoration program to improve conditions of closed or impacted areas; application of the precautionary principal; use of adaptive management techniques to improve ORV management and visitor experience for both motorized and non-motorized users of BICY. A detailed description of the proposed action may be found in the ORV Plan referenced above. The proposed action addresses ORV use within the original boundaries of BICY, ORV activities on the addition lands will be addressed in future consultation on the addendum to the *General Management Plan and Final Environmental Impact Statement: Big Cypress National Preserve, Florida. Volume 1* (NPS 1991).

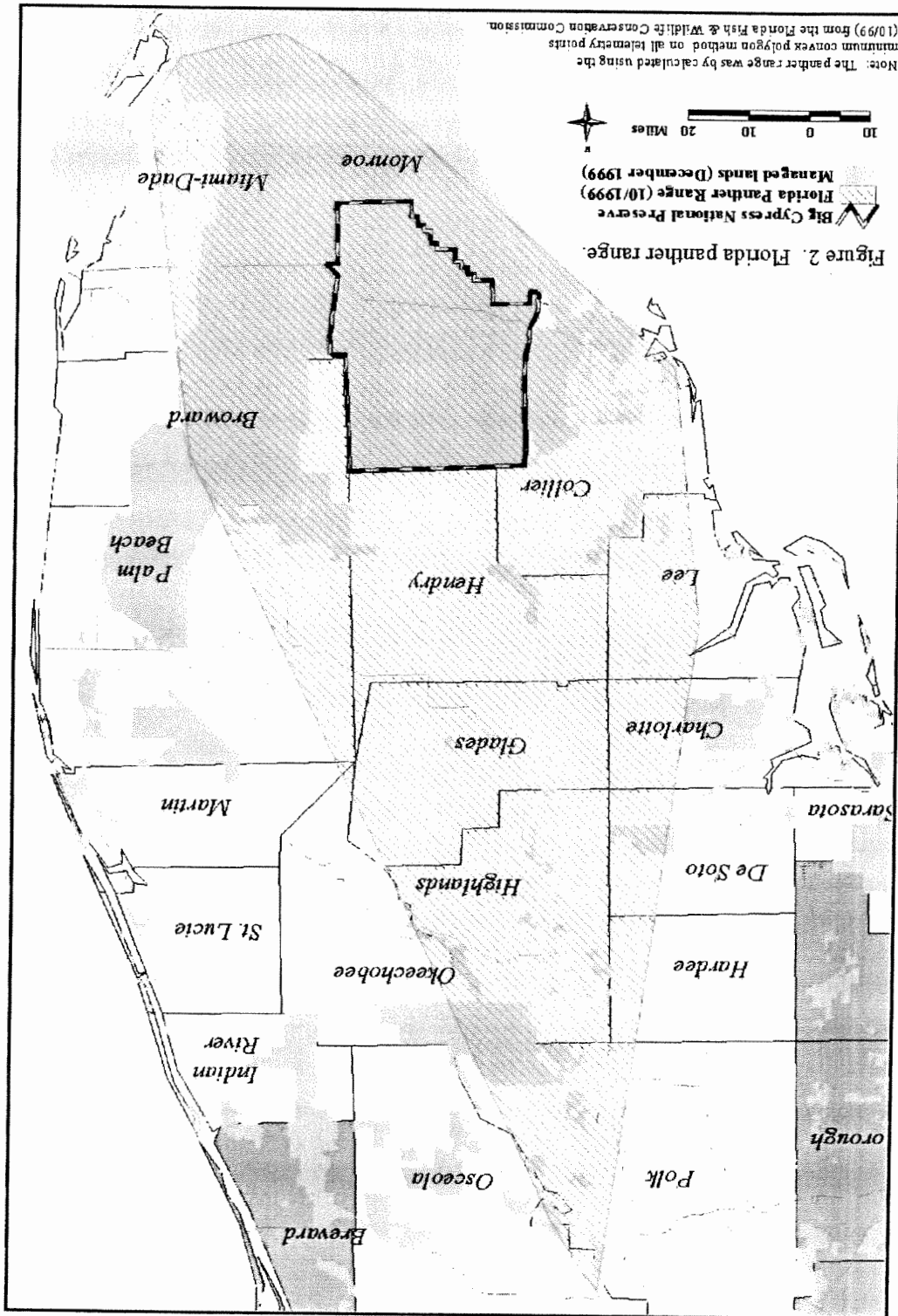
In the course of plan implementation, permits to place fill in wetlands may be required; the applicant will seek those permits when actual impacts have been quantified.

Action area

The BICY is located in Collier and Monroe Counties, Florida (Figure 1). For the purposes of this consultation, the action area includes the current occupied range of the panther in south Florida (Figure 2). The Service reviewed panther radio-telemetry data, known den sites, and other information to delineate an action area that includes lands in Charlotte, Glades, Hendry, Lee, Collier, Palm Beach, Broward, Miami-Dade, and Monroe Counties, as well as the southern portion of Highlands County. Developed urban coastal areas in eastern Palm Beach, Broward, and Miami-Dade Counties, and in western Charlotte, Lee, and Collier Counties were excluded because they contain little to no panther habitat and it is unlikely that panthers would use such areas. The Florida Keys, in Monroe County, were excluded for the same reason. Other species considered in this biological opinion would be adequately addressed by the use of this action area.

Figure 1. Big Cypress National Preserve and action area.





The action area is larger than the proposed action identified by the ORV Plan. The current range of the panther in south Florida is about one percent of a historic range which extended from eastern Texas eastward through Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, and parts of Tennessee and South Carolina. The current small panther population size has not precluded the ability of panthers to move over large distances in relatively short periods of time. Therefore, potential adverse effects to individual panthers in proximity to the proposed action may effect the remaining small panther population.

STATUS OF THE SPECIES

This section presents the biological and ecological information relevant to formulating the biological opinion. Appropriate information on the species' life history, habitat and distribution, and other factors necessary for survival are included. This analysis documents the effects of all past human and natural activities or events that have led to the current status of the species. When the Service's review focuses on the effects of the action on a discrete recovery unit or designated critical habitat unit, this section describes the status of that unit and its significance to the species as listed or to the designated critical habitat.

The Service has determined the following species may occur within the action area:

Cape Sable seaside sparrow - (E)(CH)	(<i>Ammodramus maritimus mirabilis</i>)
Snail kite - (E)(CH)	(<i>Rostrhamus sociabilis plumbeus</i>)
Wood stork - (E)	(<i>Mycteria americana</i>)
American crocodile - (E)(CH)	(<i>Crocodylus acutus</i>)
West Indian manatee - (E)(CH)	(<i>Trichechus manatus</i>)
Florida panther - (E)	(<i>Felis concolor coryi</i>)
Red-cockaded woodpecker - (E)	(<i>Picoides borealis</i>)
Bald eagle - (T)	(<i>Haliaeetus leucocephalus</i>)
Eastern indigo snake - (T)	(<i>Drymarchon corais couperi</i>)

(E) = federally listed as endangered

(T) = federally listed as threatened

(CH) = federally designated critical habitat

A summary of the status of the panther across its entire range, as well as the biological and ecological information relevant to our analysis of effects is provided below. The analysis of the species and critical habitat likely to be affected is also provided. This analysis will be presented in more detail later in the *Effects of the Action* section of this biological opinion. Detailed information regarding the status of the above-mentioned species along with the biological and ecological information utilized by the Service in evaluating potential adverse effects can be found in the *South Florida Multi-Species Recovery Plan* (MSRP) (Service 1999). That document is incorporated here by reference.

Florida panther

A complete panther life history discussion can be found in the MSRP. No critical habitat has been designated for the panther, therefore, none will be affected.

Species description

The panther is a medium-sized subspecies of puma or mountain lion, that is characterized as being relatively dark tawny in color, with short, stiff hair (Bangs 1899), and relatively longer legs and smaller feet (Cory 1896) than other subspecies. Skulls of the panther have been described as having a broad, flat, frontal region, and broad, high-arched or upward-expanded nasals (Young and Goldman 1946).

The coat of adult panthers is unspotted and typically rusty reddish-brown on the back, tawny on the sides, and pale gray underneath. The long cylindrical tail is relatively slender compared to some of the other subspecies (Belden 1988). Panther kittens are gray with dark brown or blackish spots and have five bands around the tail. The spots gradually fade as the kittens grow older and are almost unnoticeable by the time they are six months old. At this age, their bright blue eyes slowly turn to the light-brown straw color of the adult (Belden 1988).

Three external characters are often observed in panthers remaining in southwest Florida which are not found in combination in other subspecies of *P. concolor*. These characters are: (1) a right angle crook at the terminal end of the tail, (2) a whorl of hair or "cowlick" in the middle of the back, and (3) irregular, light flecking on the head, nape, and shoulders (Belden 1986). The light flecking may be a result of scarring from tick bites (Maehr 1992a).

Adult male panthers reach a length of around 2.15 meters (seven feet) from the nose to the tip of their tail and have reached or exceeded 68 kilograms (150 pounds) in weight, but typically average around 54.5 kilograms (120 pounds). They stand approximately 60 to 70 centimeters (23 to 27 inches) at the shoulder. Female panthers are considerably smaller with an average weight of around 34 kilograms (75 pounds) and average length of about 1.85 meters (six feet).

Habitat

Maehr (1990a) estimated the occupied range of the panther to be 2.2 million acres (880,000 hectares) in south Florida. Later estimates by Logan *et al.* (1993) indicated the occupied range to be at least 3.1 million acres (1.2 million hectares). Native landscapes within the Big Cypress Swamp region of south Florida, within occupied panther range, are dominated by slash pine (*Pinus elliottii*), cypress, and freshwater marshes, interspersed with mixed-swamp forests, hammock forests, and prairies (Duever *et al.* 1979). Private lands represent about 50 percent of occupied panther range in south Florida. The largest contiguous tract of panther habitat is the Big Cypress National Preserve/Everglades ecosystem in Collier, Monroe, and Miami-Dade

Counties. Suitable habitat extends into Lee, Hendry, Charlotte, Glades, Broward, Palm Beach, and southern Highlands Counties. Poorer-quality (low nutrient, frequently saturated) soils prevalent south of Interstate 75 (I-75) in south Florida do not produce the quality or quantity of forage required to support large herds of deer and other panther prey items. The influence of soils on primary productivity makes it unlikely that habitat in BICY and Everglades National Park is as productive as habitat on private lands in northern and western Collier County in terms of panther health, reproduction, and density. Better soils and drainage also make private lands north of I-75 more suitable for intensive agriculture and urban growth (Maehr 1992a).

Native upland forests are preferred by panthers in southwest Florida (Maehr 1990a). Highly preferred habitat types are relatively limited in availability but are sought by panthers as daytime resting cover (Maehr *et al.* 1991a). Understory thickets of saw palmetto have been identified as the most important resting and denning cover for panthers (Maehr 1990a). Early telemetry investigations (n=6) indicate that panther use of mixed swamp forests and hammock forests was greater than expected relative to their availability within the panthers' home range (Belden *et al.* 1988). As investigations expanded onto private lands between 1985 and 1990, it was determined that panthers preferred native upland forests, especially hardwood hammocks and pine flatwoods, over wetlands and disturbed habitats (n=26) (Maehr *et al.* 1991a). Hardwood hammocks were consistently preferred by panthers, followed by pine flatwoods (Maehr *et al.* 1991a). This may be related to the fact that, among major vegetation types in Florida, hardwood hammocks had the greatest potential for producing white-tailed deer, an important panther prey species (Harlow 1959, Belden *et al.* 1988, Maehr 1990a, Maehr 1992a, Maehr *et al.* 1991a).

Male panthers use more cover types and have larger home ranges than females. The home range size of male panthers is influenced by the percentage of hardwood hammock, hardwood swamp, water, grass, agricultural land, barren land, scrub, and brush in the landscape. Smaller male home ranges have greater percentages of hardwood hammocks and hardwood swamp, while larger home ranges have greater percentages of water, grass and agricultural land, barren land, shrub, and brush. Larger female home range size has been positively correlated with higher percentages of dry prairie, shrub swamp, and shrub and brush (Maehr 1992b). Similar to male home range size, female panther home range size is inversely related to habitat quality, which may also influence reproductive success (Maehr 1992b, Maehr *et al.* 1989b).

Dispersing males may wander widely through unforested and disturbed areas. Agricultural and other disturbed habitats, freshwater marsh, thicket swamp, and mixed swamp are not preferred, and are either used in proportion to their availability or are avoided (Maehr 1990a). Habitats avoided by panthers include agriculture, barren land, shrub and brush, and dry prairie. Panthers have not been found in pastures during daytime telemetry location flights but may travel through them at night (Maehr *et al.* 1991a, Maehr 1992a).

Telemetry research is biased toward heavily forested public lands where a majority of panthers have been captured and radio-collared. Telemetry data are collected just after sunrise and at a

time when panthers are bedding down for the day. Other panther activities must be interpreted from the location of the telemetry reading in the landscape and from field investigations. Consequently the value of habitats characterized as “not preferred” or “avoided” is understated. These habitats provide food and cover for panther prey, provide a buffer against more intensive land uses such as urban development, have a capacity to be restored to a native condition more conducive to panther use, and are part of the rural landscape matrix that has allowed the panther to persist in south Florida.

Reproduction and demography

Panthers are essentially solitary. Interactions between panthers were infrequent during a 1985-1990 study (Maehr *et al.* 1991a). Most interactions occurred between adult females and their kittens. Interactions between adult male and female panthers were second in frequency. Interactions between males and females lasted from one to seven days and usually resulted in pregnancy. Documented interactions between males were not uncommon and resulted in serious injury or death to some individuals. David Maehr (University of Kentucky, personal communication, 1998) indicates that intraspecific aggression is the number one cause of mortality in panthers. Aggressive encounters between females have not been documented (Maehr *et al.* 1991a).

The pattern of Florida panther distribution involves several males maintaining large, mutually exclusive home ranges containing several adult females and their dependent offspring. This spatial arrangement seems to be a prerequisite for successful reproduction (Maehr 1993).

Male panthers are polygamous. Breeding activity peaks in fall and winter (Maehr 1992a). Parturition is distributed throughout the year with 81 percent of births occurring between March and July. Litter sizes range from one to four kittens, with a mean of 2.2 kittens per successful litter¹ (Maehr *et al.* 1991a). Intervals between litters range from 16 to 37 months.

Den sites are usually located in dense, understory vegetation, typically saw palmetto (*Serenoa repens*) (Maehr 1990a). Den sites are used for up to two months by female panthers and their litters from parturition to weaning and are also used in subsequent years. Female panthers losing their litters generally produce replacement litters. Five of seven females whose kittens were brought into the captive breeding program successfully reproduced an average of 10.4 months after the removal of the litter (Land 1994).

Age at first reproduction has been documented at 18 months for females (Maehr *et al.* 1989a). The first sexual encounters for males has occurred at approximately three years of age (Maehr *et al.* 1991a). Dispersal of young typically occurs around 1.5 to two years of age, but may occur as early as one year of age (Maehr 1992a).

¹ A successful litter is one in which the kittens have survived to an age of at least six months.

Infant mortality is characterized as relatively high with fewer than half of all births resulting in offspring that survive beyond six months of age (Roelke *et al.* 1993). The kitten survival rate between age six months and one year has been estimated at 0.895, based on a sample of 15 radio-instrumented kittens monitored from six months to one year of age (Land 1994). Young panthers are considered recruited into the population when they have successfully reproduced (Dennis Jordan, Service, personal communication, 1997).

Females are readily recruited into the population as soon as they are capable of breeding (Maehr *et al.* 1991a). Males appear to have more difficulty being recruited. Sub-adult male recruitment is complicated by the lack of dispersal habitat and competition with adult male panthers for territories. Without large areas of suitable habitat to accommodate dispersal, young males have few opportunities for recruitment as residents. As a result, the panther's ability to increase and outbreed has been severely restricted. Successful male recruitment appears to depend on the death or home range shift of a resident adult male (Maehr *et al.* 1991a). Turnover in the breeding population is low; documented mortality in radio-collared Florida panthers is greatest in sub-adult and non-resident males (Maehr *et al.* 1991b).

Land and Taylor (1998) documented that panther mortality (n=67) averaged 3.5 deaths per year from 1978 through June 30, 1998. Male panthers accounted for 57.6 percent of mortality. Sub-adult panthers (up to three years of age) of both sexes accounted for 45.5 percent of mortality. Specific causes of documented panther mortality include road kill (37.9 percent), intraspecific aggression (21.2 percent), disease and old age (18.2 percent), causes unknown (12.1 percent), shootings (9.1 percent), and research-related (1.5 percent). These mortality figures only include panthers endemic to south Florida, not introduced Texas cougars.

Foraging

Food habit studies of panthers in southwest Florida indicate that the feral hog (*Sus scrofa*) is the most commonly taken prey followed by white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), and nine-banded armadillo (*Dasypus novemcinctus*). Deer and hogs accounted for 85.7 percent of consumed biomass north of I-75 and 66.1 percent south of I-75 (Maehr 1990a). No seasonal variation in diet was detected; however, panthers inhabiting an area of better soils consumed more large prey. Differences in prey abundance and availability were indicated by an eight-fold greater deer abundance north of I-75 versus south of I-75, although the estimated number of deer consumed did not differ between the north and south portions of the study area. Hog numbers were lower south of I-75. Fewer large prey may, in part, explain the poorer physical condition, larger home ranges, and lower reproductive output of panthers south of I-75. Hogs dominated the diet of panthers in the north in terms of both estimated biomass and numbers. In the south, deer accounted for the greatest estimated biomass consumed, whereas raccoons were the highest estimated number of prey items consumed. Domestic livestock were found infrequently in scats or kills, although cattle were readily available north of I-75 (Maehr *et al.* 1990a).

Movements and dispersal

Adult panthers occupy available habitat in southwest Florida in a pattern similar to that of western cougars (Land 1994). Over 7,000 telemetry locations on 26 radio-collared panthers between 1985 and 1990 indicated that home-range size varied from 53 to 1,183 km², averaging 519 km² for resident males and 193 km² for resident females. Home ranges of resident adults were stable unless influenced by the death of other residents. Home-range overlap was extensive among resident females and limited among resident males (Maehr *et al.* 1991a).

There are no known differences in seasonal movements, wet and dry season habitat use, seasonal variation in diet, or effects of season on road crossings. There may be a response to fluctuations in water levels; however, the response is believed to be unmeasurable (Maehr 1989; Maehr *et al.* 1990b, 1991a).

Prior to, and during, the early construction converting State Road (SR) 84 (Alligator Alley) to I-75 and installation of wildlife crossings, only male panthers were detected successfully crossing this roadway. A female panther was killed on SR 84 in 1986. The highway may have been a deterrent to female movements (Maehr *et al.* 1991a). Since the completion of I-75 and the associated wildlife underpasses, male panthers and a female panther have regularly used the wildlife crossings (Lotz *et al.* 1996).

Dispersal distances average 58.7 km for sub-adult males and 16 km for an adult female. Mean dispersal age was 17.9 months. Dispersing males wander widely through unforested and disturbed areas (Maehr 1992a). The limited dispersal opportunities for sub-adult males may encourage fighting among males (Maehr *et al.* 1991a).

Activity levels for panthers peak around sunrise and sunset. The lowest activity levels occur during the middle of the day. Females at natal dens follow a similar pattern with less difference between high and low activity periods. Although some travel occurs during the day, panthers are mostly nocturnal (Maehr *et al.* 1990b).

Relationship to other species

The panther requires extensive, biotically diverse landscapes to survive. Large carnivores are considered critical in maintaining ecological integrity in many large forested systems (Terborgh 1988). Landscapes through which the panther ranges support a vast array of south Florida's faunal and floral diversity.

The panther's most important species association is with its prey species. Deer, hog, and raccoon are the most important prey species taken in term of biomass and numbers (Maehr *et al.* 1990a).

The panther is also influenced by man. Human activities, including road construction, residential/commercial development, and agricultural development have had impacts on the distribution, abundance, mortality, and dispersal and colonization opportunities for the panther.

Comparisons of food habits, habitat use, and movements revealed a low probability for competitive interactions among the panther, bobcat (*Lynx rufus*), and Florida black bear (*Ursus americanus floridanus*). All three species preferred upland forests but consumed different foods and utilized the landscape in ways that resulted in ecological separation (Maehr 1997).

Status and distribution

A small population of panthers in south Florida, estimated to number between 30 and 50 adults (30-to-80 total individuals) (Service 1999), represents the only known remaining wild population of an animal that once ranged throughout most of the southeastern United States from eastern Texas, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, and parts of South Carolina and Tennessee. The panther presently occupies a contiguous system of native forests, agricultural lands including rangeland, and rural areas totaling from two to three million acres (800,000-to-1,200,000 hectares) on public and private lands in Charlotte, Glades, Lee, Hendry, Collier, Miami-Dade, Broward, Palm Beach, Monroe, and Highlands Counties in south Florida.

Of the 27 recognized subspecies of *P. concolor* described in Hall (1981), the Florida panther is the sole remaining subspecies that occurs in the eastern United States. The population of this large cat may have numbered as many as 500 at the turn of the century (Seal *et al.* 1989). Historically, the panther was distributed from eastern Texas or western Louisiana and the lower Mississippi River valley east through the southeastern States in general, intergrading to the north with *P. c. cougar*, and to the west and northwest with *P. c. stanleyana* and *P. c. hipolestes* (Young and Goldman 1946) (Figure 3). Hunting, habitat loss from residential and agricultural development, and the loss of the panther's prey base have led to the decline of this species since that time (Belden *et al.* 1988, Maehr 1992a). In 1950, the panther was declared a game species in the State of Florida. This action resulted in the first regulation of panther harvest. By 1958 the panther was listed under Florida state law as an endangered species. The population was estimated at 100 to 300 statewide in 1966 (Smith 1970, Schemnitz 1972). The Federal government listed panthers as endangered in 1967. The Service cited heavy hunting and trapping pressures, the inability of the species to adapt to changes in the environment, and developmental pressures as the reasons for the decline of the panther (Service 1967).

In the 1970s, the FWC established a Florida Panther Record Clearinghouse to ascertain the status of the panther. The first field searches were made in 1972. Telemetry investigations began in 1981, primarily on public lands in southwest Florida. At the end of February 1997, 20 panthers are radio-instrumented in an area encompassing Everglades National Park, BICY, Florida Panther National Wildlife Refuge, Fakahatchee Strand State Preserve, and private lands in Collier, Lee, and Hendry Counties. Maehr *et al.* (1991a) estimated the density of panthers in southwest Florida between February and July 1990 to be one panther/110 km². When extrapolated over a 5,040 km² area thought to be occupied by radio-instrumented panthers in southwest Florida, the estimated population of the area was 46 adults (nine resident males, 28 resident females, and nine transient males) between December 1985 and October 1990. This population estimate assumed homogeneous density and similar age and sex composition over

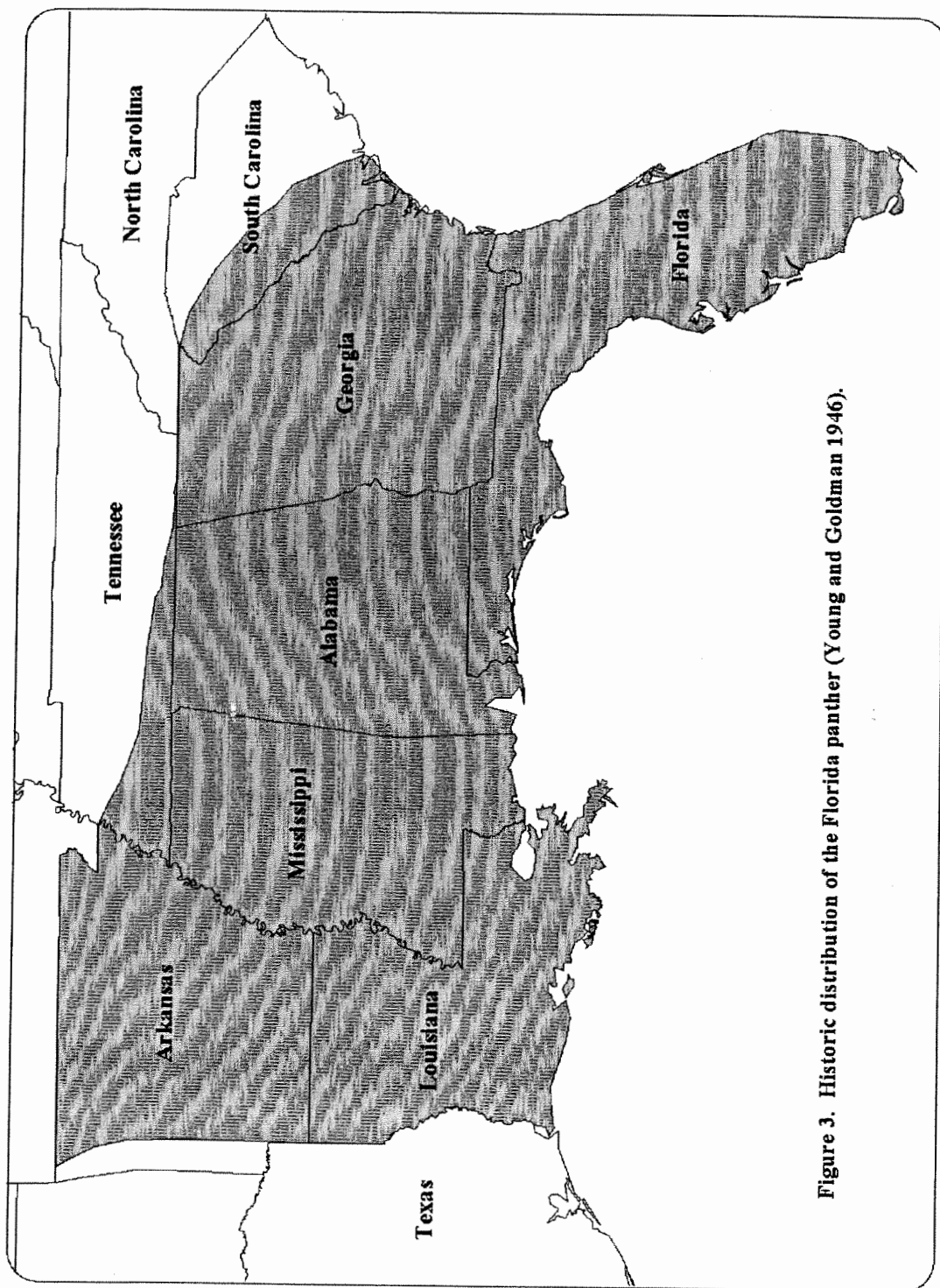


Figure 3. Historic distribution of the Florida panther (Young and Goldman 1946).

time and space. The total population in south Florida was likely higher, because the estimation technique excluded panthers in Everglades National Park, eastern BICY, and areas north of the Caloosahatchee River (Maehr *et al.* 1991a). Logan *et al.* (1993) reports that based on road kills, tracks, scat, and a decade of radio telemetry data, the only reproducing panther population occurs in Collier, Miami-Dade, Hendry, and Lee Counties in south Florida.

Natural gene exchange between the Florida panther and three other subspecies ceased when the panther became geographically isolated, probably over a century ago (Seal *et al.* 1994). Isolation from *P. c. cougar*, *P. c. stanleyana*, and *P. c. hipplestes*; habitat loss; reduced population size; and inbreeding have resulted in loss of genetic variability and diminished health (Service 1999). Data on polymorphism and heterozygosity, when combined with multiple physiological abnormalities, suggest that the panther is experiencing inbreeding depression (Roelke *et al.* 1993, Barone *et al.* 1994). Inbreeding depression has been related to decreased semen quality, lower fertility, lower neonatal survival, and congenital heart defects in a variety of domesticated and wild species (Lasley 1978, Rails and Ballou 1982, Wildt *et al.* 1982, O'Brien *et al.* 1985, Roelke 1991).

Population viability analysis data indicate that a minimum of 50 adult panthers are needed to ensure demographic and/or genetic health (Seal *et al.* 1989). The present population is estimated to be at or below this level. Maehr (1990a) indicates that there is no unoccupied habitat suitable for dispersal by sub-adult panthers. Inbreeding increases when dispersing individuals can no longer immigrate into the fragmented population, resulting in inbreeding depression, loss of genetic variation, declining health, reduced survivability, lower numbers, and eventual extinction. Continued loss of panther habitat results in less dispersal opportunity, thus adding to inbreeding problems.

Geographic isolation, habitat loss, small population size, and associated inbreeding have resulted in the loss of approximately half of the panther's genetic diversity (Roelke 1990). Natural gene exchange between the panther and other subspecies of *P. concolor* stopped when the panther became geographically isolated from other populations. Early population viability analyses projected extinction of the panther in 25 to 40 years under existing demographic and genetic conditions (Seal *et al.* 1989, 1992). To restore genetic health and genetic viability, a genetic management program was implemented with the release of eight female Texas cougars (*P. c. stanleyana*) into south Florida through the spring and summer of 1995. This program should restore the depressed panther genetic pool through the replacement of material from this formerly contiguous subspecies, without significant alteration in the basic genetic makeup of the panther or swamping the existing gene pool which may be adapted to local environmental conditions (Service 1994b).

A recent population viability analysis using a non-spatially explicit model known as VORTEX indicates a high probability of persistence for 100 years (Maehr *et al.* 1999). The Service has convened a panel of scientists tasked with completing a population viability analysis using a spatially-explicit model known as RAMAS and updated demographic parameters. The results will then be used to better guide recovery decisions. The panther persists as a small, isolated

population and a catastrophic natural event, such as disease, could accelerate extinction significantly.

Disease is a threat to small inbred populations (Roelke 1991, Barone *et al.* 1994, Seal *et al.* 1989). Panthers have tested positive for feline immunodeficiency virus (FIV) (Barr *et al.* 1989, Roelke and Glass 1992, Taylor 1997). FIV has a long incubation period but leads to non-specific immunosuppression and death in domestic cats (Roelke 1991). Its significance to the panther is unknown. Other diseases, such as feline infectious peritonitis (FIP), feline leukemia virus (FeLV), *Cytauxzoon felis*, and *Bartonella henselae*, are present in varying degrees (Roelke 1991, Roelke and Glass 1992, Dunbar 1993). Parasites found on 12 panthers examined between 1978 and 1983 included one protozoan, two trematodes, three cestodes, seven nematodes, six ticks, and one flea. The trematode *Alaria marcianae* and a hookworm *Ancylostom pluridentatum* were the most prevalent and abundant (Forrester *et al.* 1985).

Other recovery efforts include the establishment of two additional populations within the historic range of the panther (Service 1987a, 1995). Between 1988 and 1995, twenty-six Texas cougars were released near Okefenokee National Wildlife Refuge and Osceola National Forest. Studies have concluded that Florida panther reintroduction is biologically feasible (Belden and Hagedorn 1993, Belden and McCown 1996) based on available habitat in north Florida and south Georgia. However, complex social issues must be addressed prior to population reestablishment (Belden and McCown 1996).

Twenty years of radio-telemetry data suggest that the south Florida population may be at or near carrying capacity for existing habitat conditions. Demographic and genetic health depend on maintaining suitable habitat to support a viable population. Therefore maintaining sufficient habitat for resident adults and recruitment of dispersing sub-adults is essential to facilitate gene exchange and to prevent problems associated with inbreeding. Continued deterioration, fragmentation, loss of habitat, and further reductions in the current extent of the occupied range will likely reduce the south Florida population below the level necessary for demographic and genetic health.

Analysis of the species likely to be affected

The endangered panther occupies two to three million acres (800,000-to-1,200,000 million hectares) of land in south Florida, six to nine percent of Florida's total land area, and about one percent of a historic range that included all of six, and part of two, southeastern states. Geographic isolation, small population size, and associated inbreeding have compromised the genetic health and viability of the panther. The panther is a wide-ranging species that requires extensive, biotically-diverse landscapes to survive. Sub-adult males wander widely through unforested and disturbed habitat and limitations on recruitment into the breeding population result in intraspecific aggression and mortality. Approximately 50 percent of occupied panther range in south Florida is on private lands: these lands include preferred panther habitat such as native upland forests. The habitat productivity on some public lands may be reduced as a result of low nutrient, frequently saturated soils which limit the quality and quantity of forage required

to support panther prey species. Private lands in south Florida are subject to increasing and intensifying agricultural and urban development, including associated infrastructure such as drainage canals and roads.

Road mortality

Florida panther road mortality (n=24) between 1978 and June 30, 1998, averaged 1.2 panthers per year and was almost evenly divided between males (n=13) and females (n=11). Although the relative significance of highway deaths to other sources of mortality is not entirely known, it has been the most often documented source of mortality (Maehr 1989, Maehr *et al.* 1991b). Vehicle collisions resulting in the death of sub-adult panthers of both sexes exceeds sub-adult mortality due to intraspecific aggression (23.4 versus 10.9 percent) and equals all other forms of sub-adult mortality combined (Land and Taylor 1998). Total mortality figures may be biased toward road mortality because the only documented deaths of non-instrumented panthers are the results of vehicle collision.

Habitat loss and fragmentation

Although road mortality is a concern, habitat loss, habitat fragmentation, and increased human access resulting from agricultural and residential development in south Florida are greater threats to the panther. Between 1936 and 1987, statewide cropland and rangeland increased 1.72 million hectares (4.23 million acres) or 30 percent, urban areas increased by 1.60 million hectares (3.95 million acres) or 538 percent, while herbaceous wetlands declined by 1.57 million hectares (3.88 million acres) or 56 percent and forests declined by 1.74 million hectares (4.30 million acres) or 21 percent (Kautz 1993, Kautz 1994). Continued development associated with the expansion of Florida's urbanized east coast, increasing growth on the west coast, and the spread of agricultural development in the south Florida interior have placed increasing pressure on panthers and panther habitat (Maehr 1990b, Maehr *et al.* 1991a, Maehr 1992b). Rapid development in southwest Florida is compromising the ability of natural habitats to support a self-sustaining panther population (Maehr 1990b, 1992b). Maehr (1990a) reports that there are approximately 2.2 million acres (880,000 hectares) of occupied panther range in south Florida and that approximately 50 percent of the known breeding distribution is comprised of landscapes under private ownership. Agricultural and urban development continues to replace and fragment panther habitat. Over 83 percent of the 648,000 hectares (1.6 million acres) of agricultural land in southwest Florida; (Charlotte, Collier, Glades, Hendry, Lee and Sarasota Counties) is categorized as rangeland. Between 1986 and 1990, row crop acreage increased by 3,640 hectares (8,990 acres) or 21 percent, sugarcane increased by 6,475 hectares (16,000 acres) or 21 percent, citrus increased by 21,850 hectares (54,000 acres) or 75 percent, and rangeland, much of it suitable for panther occupation, decreased by 64,750 hectares (160,000 acres) or ten percent. Rangeland losses were about evenly divided between agricultural and urban development (Townsend 1991). Maehr (1990a) indicates that unchecked development of private lands will limit panther habitat to landscapes under public stewardship and result in extinction of the panther. Maehr (1990b) also reports a lack of unoccupied, suitable habitat for sub-adult

dispersal. This suggests that available landscapes are at or near carrying capacity under existing habitat conditions.

Panthers consistently use large areas with few major highways (Maehr and Cox 1995). Belden and Hagedorn (1993) observed that Texas cougars used in a population reintroduction study established home ranges in an area with one-half the road density of the region in which the study was conducted. In particular, the study animals tended to avoid crossing more heavily traveled roads in favor of more lightly traveled roads. Female panthers rarely establish home ranges bisected by highways and maternal dens are located at distances one kilometer or greater away from highways (Maehr 1997).

Because of their wide-ranging movements and extensive spatial requirements, panthers are particularly sensitive to habitat fragmentation (Harris 1985). Past land use activity, hydrologic alterations, road construction, invasion of exotic plants, and lack of fire management have affected the quality and quantity of panther habitat. The effect of invasive plants on panther habitat utilization, particularly such species as melaleuca (*Melaleuca quinquenervia*) is unknown. Panthers may have increased their use of suboptimal wetland habitat, because forested uplands have been developed. As the remaining forested uplands are lost, sloughs containing cypress, marsh, and shrub wetlands comprise a greater percentage of the remaining habitat available to panthers, relative to habitat historically available to the species.

Panther/human interactions

Florida panthers were hunted for bounty during the 1800s and for sport up until the 1950s. Three studies of western puma indicate that there are short- and long-term responses to habitat alteration, road density, and human population density. Two recent studies have attempted to quantify the response of Florida panthers to hunting and prescribed fire. Prescribed fire is probably the single-most important habitat management tool available to public land stewards. Current information on panther and human interactions is summarized below.

Seven panther shootings, six fatal and one non-fatal, occurred between 1978 and 1986. A female Texas puma introduced for genetic restoration was shot twelve years later in 1998 (Land *et al.* 1999). Education, self-policing among hunters, and regulation are the tools by which shootings are minimized. All free-ranging puma in the southeastern U.S. are protected by a "similarity of appearance" provision in the ESA.

Reactions of *P. concolor* to logging and other human activities were studied in northern Arizona from 1976 to 1980 and in south-central Utah from 1979 to 1982. Resident puma were rarely found within one km of sites logged within the past six years. Puma two to three years old were found in logged areas more often than older puma, but four of five young puma that visited logged areas did not maintain residence there (Van Dyke *et al.* 1986). Puma in undisturbed areas tend to be inactive at mid-day, more active at mid-evening and sunset, and most active at sunrise (Ackerman 1982, Van Dyke 1983). Puma in areas disturbed by humans shifted activity peaks to after sunset, concentrated other activity during evening hours, and were inactive rather

than active at sunrise. Dispersing juvenile puma encountered human disturbances more frequently than resident puma. Residents, and transients that became residents, selected home ranges with road densities lower than the study area average, no recent timber sales, and few or no sites of human residence (Van Dyke *et al.* 1986).

Janis and Clark (1999) compared the behavior of panthers before, during, and after the recreational deer and hog hunting season (October through December) on areas open (BICY) and closed (Florida Panther National Wildlife Refuge, Fakahatchee Strand State Preserve) to hunting. The variables examined were; (1) morning activity rates, (2) movement rates, (3) predation success, (4) home range size, (5) home range shifts, (6) habitat selection, (7) distance from panther locations to trails, and (8) frequency of panther use in the Bear Island Unit of Big Cypress National Preserve. The authors failed to detect any relationship between ORV use and the first six variables. Of the last two variables they determined that the distance of panther locations from trails increased an average of 180 meters (0.31 mile) and that the frequency of panther use in the Bear Island Unit decreased from 30 up to 40 percent during the hunting season. An analysis of movement rates, a measure of energy expenditure, and predation success, a measure of energy intake, do not indicate any direct, negative energetic responses to increased human activity during the hunting season. However, the increase in average distance from trails and decrease in panther use of the Bear Island Unit are indicative of a behavioral change.

Janis and Clark (1999) surmise that the increase in the distance of panther locations from trails is "biologically minor" and probably related to prey behavior; *i.e.* white-tailed deer moving deeper into the forest to avoid ORV users. The decrease in panther use of the Bear Island Unit is balanced by an increase in use of private lands north of BICY as "refugia." The authors assert that this pattern would be of serious concern if panther habitat on private lands were lost.

Dees *et al.* (1999) examined panther use of habitat in response to prescribed fire at Florida Panther National Wildlife Refuge and BICY between 1989 and 1998. A positive temporal response to prescribed fire occurred in the year following the burn and is likely due to the rapid regrowth of vegetation which in turn attracted white-tailed deer. Panther use of the burn area gradually declined after the first year and ended after four years. Prescribed fire rotations on both study sites is four years but unfavorable weather conditions and logistics may sometimes extend the rotation.

Spatial responses to fire depended on scale. Panthers positioned their home ranges in areas more likely to be burned, whereas use of burned areas within the home range was less than non-burned areas. Although burnable habitats (pine) were not preferred within panther home ranges, they were used, with about 36 percent of the locations occurring in previously burned areas. Dees *et al.* (1999) concluded that resource managers could improve panther habitat by reducing the proportion of area comprised of burns older than four years but cautioned that shorter burn rotations could alter vegetative patterns and have a negative impact at the landscape level.

ENVIRONMENTAL BASELINE

The first bounty on Florida panthers was passed in 1832. Another Florida law passed in 1887 authorized a payment of \$5.00 for panther scalps (Tinsley 1970). Agricultural land clearing in the southeast between 1850 and 1909 totaled 12.8 million hectares. Lumbering reduced the original southern forest nearly 40 percent from 121.4 million hectares to 72.0 million hectares (300.0 million to 177.8 million acres) by 1919. Some 36.4 million hectares (89.9 million acres) of pine forests were considered cut-over by 1920 with one-third classified as restocked with saw timber, one-third restocked with cordwood only, while one-third remained barren (Williams 1990). Meanwhile the white-tailed deer, primary prey of the panther, was reduced from a range-wide population of about 13 million in 1850, to under one million by 1900 (Halls 1984). Over a 100-year period, bounty hunting, land clearing, lumbering, and market hunting of deer contributed to the range-wide decline of the panther leaving only a remnant population in the impenetrable Everglades and Big Cypress swamps of south Florida.

Of the 27 *P. concolor* subspecies described in Hall (1981), the Florida panther is the only one remaining in the eastern U.S. The population in Florida numbered about 500 at the turn of the century (Seal et al. 1989). Kautz (1994) estimated that a loss of 1.74 million hectares (4.3 million acres) of forests in Florida between 1936 and 1987 was the equivalent of 35 to 70 male panther home ranges and 100 to 200 female panther home ranges. The Big Cypress population was estimated at 125 in 1969 (DOI 1969) and a south Florida population at 92 in 1972 (Schemnitz 1972). The State of Florida declared the panther a game species in 1950 and an endangered species in 1958. The Florida Panther Act, a State law enacted in 1978, made killing the panther a felony.

The Service listed the panther as endangered in 1967 (32 FR 4001). Although there were prior consultations, the records on file in the Naples Suboffice contain only those consultations completed after 1980. Between June 3, 1980, and December 21, 1999, the Service has provided technical assistance on 32 projects; concluded informal consultation on 23 projects and concluded formal consultation on 40 projects affecting the panther and panther habitat in the action area. Thirteen percent of these actions occurred between 1980 and 1989 (average 1.3 per year) while 87 percent occurred between 1990 and 1999 (average 8.7 per year). The highest number of actions reviewed was 22 in 1999. Several important consultations are summarized below.

On March 29, 1984, the Service provided a biological opinion to the Corps of Engineers on the proposed construction of an automobile test track, maintenance and office buildings on a 530-acre tract located 11.0 miles northeast of the proposed action in sections 22, 27, and 34, T49S, R28E, Collier County, Florida. A ten-foot high chain-link fence resulted in a loss of 530 acres of habitat. Habitat loss from the project footprint included three acres of hammock, 87 acres of pine flatwoods, and 40 acres of wetlands. Indirect impacts from disturbance and cumulative habitat losses were discussed but not quantified. The Service noted that "the loss of habitat has been and continues to be the greatest threat to the Florida panther" and concluded that the proposed action would not jeopardize the panther.

On February 21, 1985, the Service provided a biological opinion to the Federal Highway Administration on the conversion of two-lane SR 84 to four-lane I-75. The opinion covered I-75 from County Road 951 in Collier County to US 27 in Broward County, through 40 miles of known panther habitat, for a total distance of 76 miles. Habitat lost to the project footprint was not addressed. The opinion focused instead on a 1,000 percent increased risk of panther mortality from vehicle collisions. Proposals to construct an interchange at State Road 29 and recreational access points in BICY were tabled for future consultation. The Service noted that the Broward County segment would not adversely affect the panther and that construction could proceed immediately but that the Collier County segment, without the recommended 25 crossings, 13 bridge extensions, and proper fencing, would jeopardize the panther.

On February 10, 1989, the Service provided a biological opinion to the Federal Highway Administration on the proposed interchange at SR 29 and I-75 in Collier County, Florida about 20 miles northeast of the proposed action. The project footprint would impact 85 acres of habitat. Indirect impacts included an increased potential for development of 25,600 acres of panther habitat along SR 29 and an increased potential for injury and mortality of panthers from vehicle collisions (as of the date of consultation 38 percent of the road kills had occurred on SR 29). The threat of development was reduced when the Collier County Board of Commissioners passed a resolution giving State and Federal agencies 60 days to review zoning variances requested of the board. The Florida Department of Transportation (FDOT) committed to provide wide, grassy shoulders on SR 29 that would allow motorists a better chance to avoid collisions with panthers and they committed to posting panther warning signs with reduced nighttime speed limits. As a conservation recommendation the Service suggested that FDOT turn management authority of four square miles, the intersection lands, over to the appropriate State or Federal agency. The Service concluded that the project would not jeopardize the panther.

On December 31, 1991, the Service provided a draft jeopardy biological opinion to the Corps on the proposed improvement of Miller Boulevard Extension in sections 25 and 36, T51S, R27E in Collier County, Florida. Improvement of the one mile long dirt road would not result in direct impacts to the panther or panther habitat. Improvement of the extension, connecting Miller Blvd. proper with Highway 41, would have indirectly increased the potential for development of 50,000 acres in South Golden Gate Estates by reducing travel time from Naples about 55 percent. The proposed action would also have increased the potential for injury and mortality of panthers from vehicle collisions. The Service was unable to provide any Reasonable and Prudent Alternatives. The County eventually withdrew the permit but continues to make, and table, improvement proposals.

On January 14, 1992, the Service provided a biological opinion to the Corps for a 32-acre citrus grove (Dooner Gulf Coast Citrus) and a water retention area on 40 acres within an 80-acre parcel located south of Immokalee Road (section 36) in Collier County, Florida about 12 miles north of the proposed action. The opinion stated that the project would "fall just short of the jeopardy threshold for the panther," noting the potential cumulative impact of conversion of native habitat to citrus and other agricultural land. The Service recommended that the applicant acquire and

place under conservation easement and perpetual management, approximately 40 acres of land identified as high priority for panther protection. The Service also recommended that the grove detention pond not discharge into pine habitat on the remaining undeveloped 40 acres of the tract to avoid upland habitat impacts from flooding.

On February 23, 1993, the Service issued a jeopardy biological opinion on panther impacts associated with a permit application by Lee County Department of Transportation to upgrade Corkscrew Road in southern Lee County, located 26.0 miles north of the proposed action. The Service in issuing its jeopardy opinion identified a wildlife crossing as reasonable and prudent alternative (RPA) to allow the applicant to proceed with the project while avoiding jeopardy to the panther. On June 18, 1993, the applicant agreed to implement the RPA and the Service determined that the modified action was not likely to jeopardize the panther. The dirt road was then paved by the county. No known vehicle/panther collisions have been reported.

On October 5, 1993, a jeopardy opinion was drafted for a proposed 1,000-acre housing development (The Habitat DRI), located 26.0 miles northwest of the proposed action, because of traffic and cumulative development impacts to the panther. As a result of modifications to the project proposal, including reduction in habitat impacts, site design changes, and proposed applicant funding of panther habitat acquisition, a jeopardy opinion for the panther was avoided.

On October 27, 1994, the Service provided biological opinions for the 760-acre Florida Gulf Coast University, the 787-acre Timberland & Tiburon DRI, and 60-acre Treeline Boulevard. The opinions determined that the projects would adversely affect but not jeopardize the panther and recommended speed zones on Corkscrew and Alico Roads, traffic management strategies to encourage speed zone compliance, posting wildlife crossing signs in panther habitat on Alico Road, Corkscrew Road, and Treeline Boulevard, day and night speed zones on Treeline Boulevard, initiation of a traffic compliance study, a local educational program under the leadership of the University, and a region-wide analysis of the cumulative impacts of growth on the environment and the panther. The Corps permit subsequently provided 560 acres of habitat purchase, habitat restoration, and management for the University and Treeline Boulevard (a \$2 million commitment from Lee County). Approximately 400 acres of habitat acquisition to minimize adverse effects to the panther was provided by the Corps permit issued for the Timberland & Tiburon DRI.

On August 7, 1995, the Service provided a biological opinion to the Corps for a proposed 36-hole golf course (Bonita Bay East Golf Course) on 1,000 acres located in sections 18, 19, and 20, T48S, R27E, Collier County, Florida. The project footprint would impact about 129 acres of native habitat and 380 acres of improved pasture. The proposed action included preservation of 464 acres of native habitat (78 percent of 593 acres) and restrictions on night-time golf. The proposed action did not include housing. Based on this information the Service concluded that the proposed action was not likely to adversely affect the panther.

On March 27, 1998, the Service provided a biological opinion to the Corps on the proposed expansion of Willow Run quarry in sections 11 through 14, T50S, R26E, Collier County,

Florida. The site of the proposed action, 549 acres, included 162 acres of existing mine, 288 acres of jurisdictional wetlands, and 99 acres of uplands. The proposed action would involve temporary impacts to 17 acres of wetlands and excavation of 104 acres of wetlands, including 36 acres of Priority 1 panther habitat. Wetland mitigation included restoration, enhancement, and preservation of 136 acres of wetlands and 54 acres of uplands. This land, about 190 acres of Priority 1 panther habitat, would be placed under easement to FDEP. The Service concluded that the proposed action would not jeopardize the panther. Suggested conservation recommendations included a panther education program for truck drivers at the quarry and reduced speed limits on the entrance road.

On November 9, 1998, the Service issued a biological opinion for the Daniels Parkway extension which would connect existing Daniels Parkway at Southwest Florida International Airport to Gunnery Road in southern Lehigh Acres. On September 3, 1999, the Service reinitiated consultation with the Corps in response to the Corp's July 30, 1999, request to amend the original biological opinion based on further project analysis by the applicant, Lee County DOT. The amended biological opinion, dated September 17, 1999, indicated that the effects to the panther resulting from the roadway would be minimized by a final plan to purchase and manage 94.4 acres of habitat in the CREW Ecological Unit to satisfy the 50.5 functional units of minimizing credits set forth in the November 1998 opinion.

On December 8, 1999, the Service issued a non-jeopardy biological opinion to the Corps for the proposed development, by Kaufmann Holdings, Inc., of a 47-lot rural subdivision on 239 acres in section 32, T48S, R27E, Collier County, Florida. Effects to the panther were minimized by a plan to purchase, preserve, and manage at least 24 acres of forested land in, or adjacent to, the Corkscrew Regional Ecosystem Watershed project.

On April 17, 2000, the Service issued a non-jeopardy biological opinion to the Corps for the proposed development of a 1,323-acre mixed use residential golf course community by Miromar Development, Inc. in sections 11 through 14, 23, and 24, T46S, R25E, and sections 18 and 19, T46S, R26E, Lee County, Florida. Effects to the panther were minimized by a plan to purchase, preserve, and manage, in perpetuity, the functional equivalent of 194 acres of Priority 1 panther habitat adjacent to existing public lands.

Status of the species within the action area

Florida panther

The uncertain status of the panther led to the establishment of a GFC Florida Panther Record Clearinghouse in the 1970s. Records were compiled prior to extensive field surveys and radiotelemetry research of remaining animals (Belden 1977). The first field surveys began in 1972. Radiotelemetry research began in 1981 and through 1983 was limited to Fakahatchee Strand State Preserve and BICY (Belden et al. 1988). The research program gradually expanded to include Everglades National Park, Florida Panther National Wildlife Refuge, Picayune Strand State Forest, Okaloacoochee Slough State Forest, the Corkscrew Regional Ecosystem Watershed, and private lands in Collier, Hendry, and Lee Counties. A total of 79 panthers (44

male, 35 female) have been radio-collared since telemetry research began in 1981. As of June 30, 1999 there were 27 panthers (14 male, 13 female) being monitored (Land *et al.* 1999).

Ten Florida panther kittens, five male and five female, were removed from the wild between February 1991 and August 1992 for captive breeding purposes. The kittens ranged in age from ten days to eight months and represented progeny of 11 different adult panthers. Two females died in captivity in 1992. One died after heart surgery in an attempt to correct an atrial septal heart defect and one died of unknown causes. Two captive males died of severe respiratory distress after being released to the wild in southern BICY in 1997. Six panthers remain in permanent captivity, one male and one female each, at White Oak Conservation Center in Yulee, Florida, Lowry Park Zoo in Tampa, and at the Jacksonville Zoo (Land and Taylor 1998).

The Picayune Strand State Forest, Fakahatchee Strand State Preserve, Florida Panther National Wildlife Refuge, BICY, Big Cypress Seminole Indian Reservation, and ranches located in southern Hendry County and northeastern Collier County provide a contiguous landscape that supports the only extant breeding puma population east of the Mississippi River.

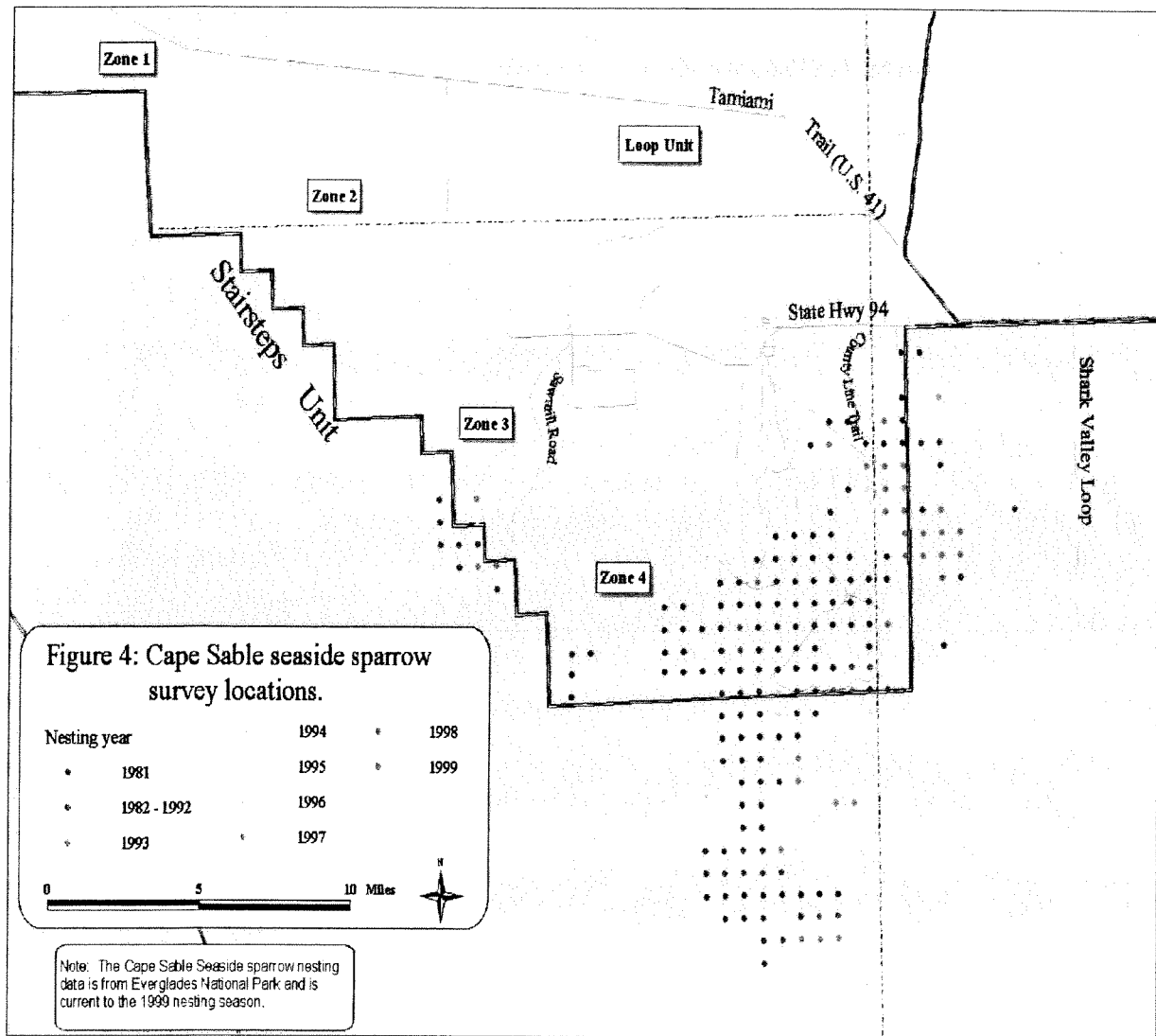
Cape Sable seaside sparrow

Presently, the known distribution of the Cape Sable seaside sparrow is restricted to localized areas on the east and west sides of Shark River Slough which is entirely contained within the action area (Figure 4). The status of the Cape Sable seaside sparrow after the breeding season in 1995 is provided below.

By 1995, subpopulation A, located in the western marl prairies, on the west side of Shark River Slough, and representing approximately 50 percent of the total population in 1992, had disappeared from all but a few locations. It was noted in the Service's October 1995 biological opinion on Test 7 of the Experimental Program, that the Cape Sable seaside sparrow was now represented by a single viable subpopulation (subpopulation B) and two subpopulations (subpopulations A and C-F) too small to persist over the long term. Subpopulation A increased slightly to 272 birds in 1996 and 1997, and declined again in 1998 to 192 birds.

The smaller subpopulations located in the eastern marl prairies are struggling to persist. For example, subpopulations C, D, and F appear to have been extirpated in 1995, but the 1996 and 1997 surveys located a small number of birds at each of these sites. The 1998 survey results in subpopulations C, D, and F estimated 80, 48, and 16 birds, respectively, or approximately five percent of the total 1998 rangewide estimate. The 1995 estimate for subpopulation B, considered the most stable of all the sparrow subpopulations, was 2,128 birds. This subpopulation declined to 1,888 birds in 1996, increased to 2,832 in 1997, and declined again in 1998 to 1,808 birds. Subpopulation E, the remaining eastern prairie subpopulation, had a 1995 estimate of 352 birds, declined in 1996 to 208, increased in 1997 to 832, and again increased in 1998 to 912.

Over 100 birds were present in Zone 4 of the Stairsteps Unit of BICY in 1999. Although the number of birds present in 1998 was similar, they were more widely distributed within Zone 4.



Wood stork

Historically, South Florida supported greater than 70 percent of the total nesting effort in the southeast U.S. In 1996, nesting effort in South Florida improved from the previous three years, most likely in response to improved foraging conditions as a result of a rapid dry-down following three high water years. In Everglades National Park, BICY, Corkscrew National Sanctuary, and Florida Panther National Wildlife Refuge, there were a total of approximately 1,600 nesting pairs. Numbers of nesting storks in the action area have declined since 1996, averaging about 142 nesting pairs (Ogden, personal communication 1998).

Nesting in BICY has been rare, however, 45 colonies were identified in 1996 (Jansen and Brooks 1996). Sporadic nesting has been documented since that time.

Bald eagle

In the action area, bald eagle use varies, perhaps in relation to available nesting habitat. Three active nest sites are present in BICY. Bald eagles in Florida have increased since 1973, when population monitoring began. Over 1,000 active territories are present state-wide. Implementation of the *Habitat Management Guidelines for the Bald Eagle in the Southeast Region* (Service 1987b) has been instrumental in providing protection for nesting sites for this species. The bald eagle was proposed for delisting in July of 1999. A final rule on the delisting has not been published.

Red-cockaded woodpecker

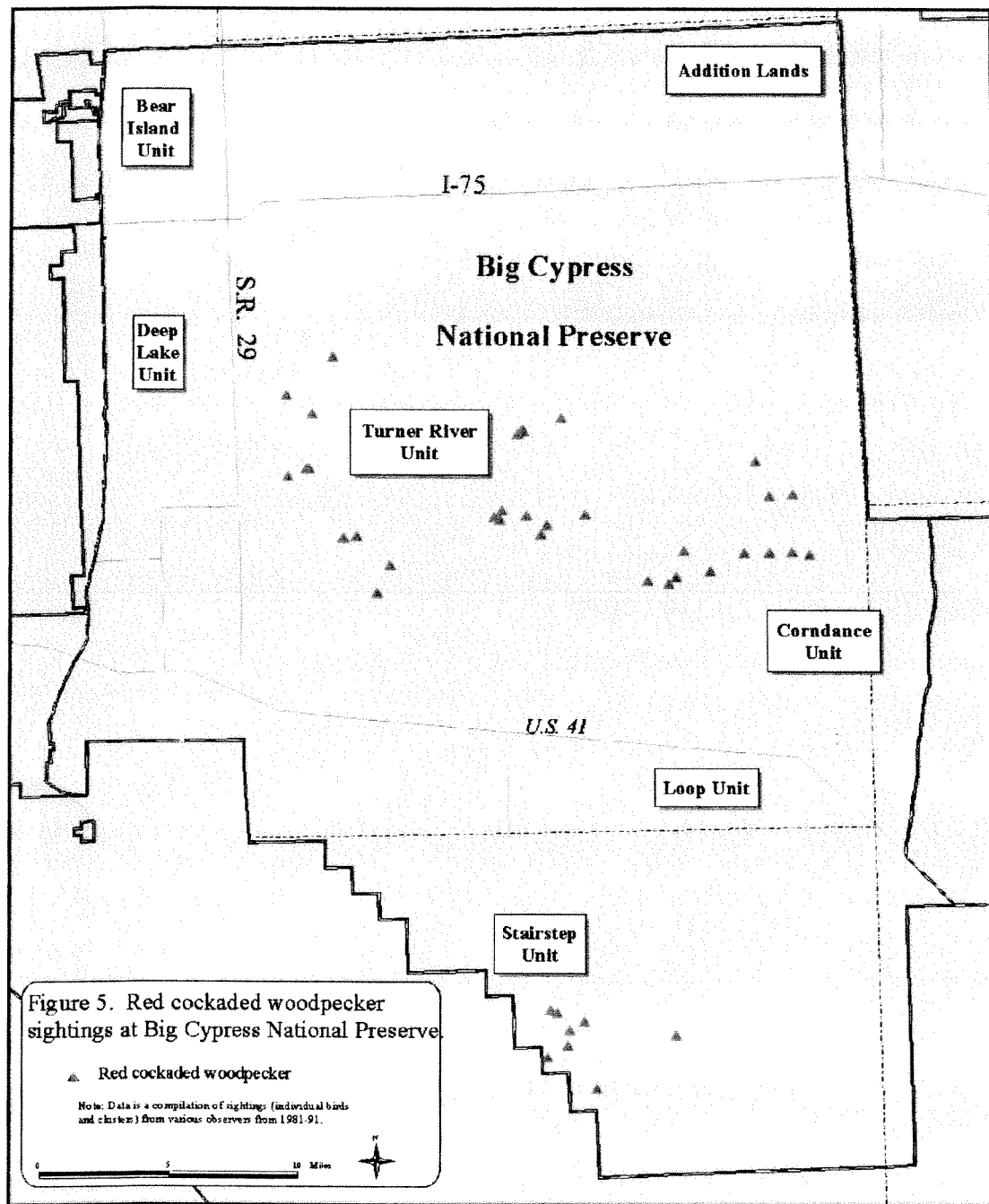
Use of the action area by the red-cockaded woodpecker also varies. There are 53 clusters (44 active, and 9 inactive) located within the boundaries of BICY (Figure 5). Currently, no red-cockaded woodpeckers are found on Florida Panther National Wildlife Refuge or the addition lands. Approximately 729,000 acres of habitat for red-cockaded woodpeckers is present on BICY.

Red-cockaded woodpeckers are also found sporadically throughout Collier County. The distribution of red-cockaded woodpeckers follows the distribution of available, suitable habitat throughout south Florida. Clusters have been located in Lee, Charlotte, and Glades Counties; but are absent from Hendry and Sarasota Counties. Extensive logging in south Florida in the late 1800s and early 1900s resulted in loss of habitat for this species. Many areas are now recovering and trees are approaching a suitable age to provide cavity excavation opportunities for red-cockaded woodpeckers. Logging does not occur at BICY nor are there any plans to implement such a program.

Residential and commercial developments as well as conversion of native forested communities to agriculture has continued to affect the distribution and abundance of available habitat for red-cockaded woodpeckers.

Snail kite

Snail kite use of the action area fluctuates greatly, with low use during drought years, such as 1991, and high use in wet years, such as 1994. Although sharp declines have occurred in the



counts since 1969 (for example, 1981, 1985, 1987), it is unknown whether decreases in snail kite numbers in the annual count are due to mortality, dispersal (into areas not counted), decreased productivity, or a combination of these factors. Despite these problems in interpreting the annual counts, the data since 1969 have indicated a generally increasing trend (Bennetts *et al.* 1994). The annual counts since 1995 confirm a continued increasing trend, however, the degree of this apparent increase in the snail kite's population needs to be confirmed with alternative methods of estimating population size.

In BICY, Zone 4 of the Stairsteps Unit is of particular importance. Nesting and foraging occur there to varying degrees.

Factors affecting species environment within the action area

Factors that affect the species environment within the action area include but are not limited to highway, urban, agriculture, resource extraction, recreation, and land management (prescribed fire, water) projects. These activities often result in habitat loss, habitat fragmentation, and habitat degradation.

Individual management actions not related to the ORV Plan will be addressed in subsequent consultations. Management actions related to the ORV Plan may or may not be addressed through this consultation. The placement of designated trails and the implementation of restoration projects may require further consultation once more specific details are developed for the activity. NPS will continue to coordinate these activities with the Service to ensure consultation, if necessary, is completed for these activities.

EFFECTS OF THE ACTION

This analysis was conducted for all species identified in the July 8, 2000, letter from NPS requesting consultation on the proposed action.

Factors to be considered

The factors identified below would apply to the analysis for all listed species discussed in this biological opinion. ORV use on the addition lands will be addressed in an addendum to the *General Management Plan and Final Environmental Impact Statement: Big Cypress National Preserve, Florida. Volume 1* (NPS 1991).

The duration of the effects of the proposed action would be long-term. The change to and reduction in extent of designated trails is proposed to take effect between year 1 and year 5. New area closures would begin in year 1. These actions would continue until changes in the management of BICY were deemed warranted.

The proposed action is located in part of a contiguous system of south Florida public lands that includes Fakahatchee Strand State Preserve, Florida Panther National Wildlife Refuge, Picayune Strand State Forest, and Everglades National Park.

Human activity currently occurs year-round at BICY. ORV use is greatest during the hunting season. Late summer usually sees the smallest number of visitor days each year. High water and high temperatures at this time of the year undoubtedly contribute to the low level of visitation during this time. During years of extreme high water, human activity is greatly reduced to non-existent in some portions of BICY.

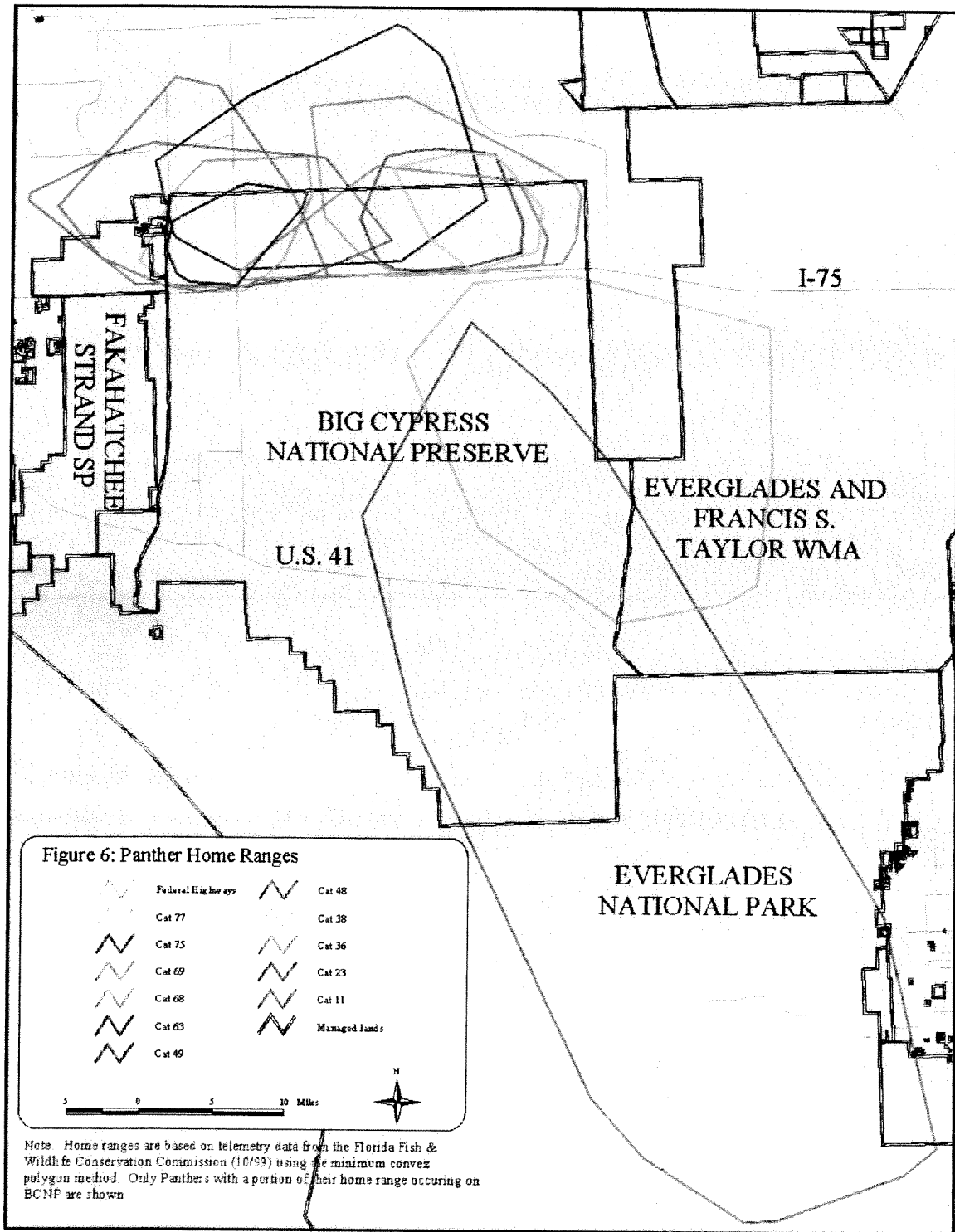
Florida panther

The disturbance intensity, or amount of panther habitat affected by the proposed action, at the population level is approximately 581,617 acres, an additional 147,249 acres is found in the BICY addition lands. ORV use on the addition lands will be addressed in an addendum to the *General Management Plan and Final Environmental Impact Statement: Big Cypress National Preserve, Florida. Volume 1* (NPS 1991). Not all of the 581,617 acres is habitat for the panther, however, a large portion of BICY is used by this species. In total, BICY, excluding the addition lands encompasses approximately 23 percent of an estimated 2.2 million acres occupied by the panther (Land *et al.* 1999). The disturbance severity, or effect of the project as a function of the rate of recovery, is negligible. Multiple actions of lesser, equal, or greater disturbance intensity and severity in the vicinity of the proposed action, and throughout the action area, may result in adverse effects to the panther population.

BICY and surrounding lands, including the site of the proposed action, are located on the rapidly developing urban fringe of Collier County about 25 miles from the geographic center of the panther population.

A total of 30 panthers currently use portions of BICY (Figure 6). This includes 4 adult males, 16 adult females, 3 subadult males, 5 subadult females, and 2 unknown sex. Of these 19 have been radio-instrumented. In total, the panthers that have a portion or all of their home range on BICY represents approximately 38 percent of the known population. Telemetry data represent the annual range and movements of radio-collared panthers and not that of uncollared panthers which may have been, or could be, present in the vicinity of the proposed action. Telemetry data are gathered three times per week, or on 43 percent of the days during which the animal may be wearing a functional radio-collar. Telemetry data are collected between sunrise and mid-day and primarily reflect a panther's choice of day rest sites, or maternal den sites. Mating and denning behavior, aggressive encounters between males, movements and home range shifts, dispersal, survival, recruitment, displacements and replacements of individuals, and other social and ecological interactions are interpreted from telemetry data and field investigations (Land *et al.* 1999).

The Bear Island Unit is of great importance to panthers. It has the highest proportion of preferred panther habitat within the original BICY boundaries. Its location north of I-75



provides additional prey resources and upland plant communities not available in the southern portion of BICY.

The proposed action will reduce the amount of designated trails in Bear Island by approximately 40 percent to approximately 55 miles. Sixteen miles of these trails are above-grade roads constructed prior to establishment of BICY. The effect of the proposed action will be to reduce the extent of trails that panthers may move away from during periods of high use.

Cape Sable seaside sparrow

The disturbance intensity, or amount of Cape Sable seaside sparrow habitat affected by the proposed action, at the population level is approximately 40,000 acres in the Stairsteps Unit of BICY or approximately 25 percent of the total habitat available. The disturbance severity, or effect of the project as a function of the rate of recovery, is negligible since the area used by majority of western subpopulation A that occurs on BICY will be closed to airboat use. In addition, one of the most important factors affecting Cape Sable seaside sparrows is related to water levels. Water levels and delivery in the Stairsteps Unit have no relation to the ORV Plan and will not be considered further. BICY is developing hydrologic criteria for closure of other areas of potential habitat. This hydrologic closure criteria will avoid impact such as soil subsidence in these areas, and address the issue of water levels.

The Stairsteps Unit, Zone 4 in particular, is the most important area of the preserve for the Cape Sable seaside sparrow. Sparrows were found in the Ochopee Prairie, but have not been located there since the early to mid 1980s. The lack of occurrence is likely due to hydrologic changes in the area that have reduced the suitability of the habitat for nesting.

The proposed action will reduce airboat use in the vicinity of Cape Sable seaside sparrow nesting areas. Researchers and private landowners may access the closed area in Zone 4 on occasion, however, the volume of airboat traffic will be, in essence, eliminated from the majority of available nesting habitat.

Wood stork

The disturbance intensity, or amount of wood stork habitat affected by implementation of this plan should be reduced or remain unchanged. Wood stork nesting in BICY is sporadic and related to hydrologic conditions in the action area. NPS plans to use the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service undated) to ensure that setbacks for ORV trails from colony sites are consistent with the recommendations in the referenced document.

Bald eagle

Disturbance intensity and duration should remain unchanged with respect to bald eagle nest sites. NPS is implementing the recommendations in the *Habitat Management Guidelines for the Bald Eagle in the Southeast Region* (Service 1987a) and plans to route ORV trails no closer than 1,500 feet from known nest locations. Minimization of effects to nesting adult bald eagles is the

primary focus of eagle management activities. The implementation of the proposed action should maintain or improve conditions for nesting bald eagles at BICY

Red-cockaded woodpecker

The disturbance intensity should remain unchanged for the red-cockaded woodpecker. ORV trails near active clusters will be designed to either avoid the cluster, or be placed at least 200 feet from the aggregate of cavity trees that comprise the cluster site. This setback is consistent with recommendations found in Henry (1989).

Snail kite

The disturbance intensity for this species should be reduced through additional closures presented in the proposed action. Information on appropriate set-back distances from nesting sites is available and will be used to determine the placement of designated trails in sensitive areas (Rodgers 1991). Additional research has been conducted specific to airboats to determine recommended set-back distances to colonial waterbirds; this information should be published and available soon. Revisions to trail placement may be considered upon review of the recommendations contained in the follow-up study.

Analyses for effects of the action

Florida panther

The proposed action will: (1) continue to allow a reduced amount of trails to alter panther movements during the hunting season in the Bear Island Unit; (2) continue to allow human use of areas important to the Florida panther; and (3) reduce the fragmentation of habitat that supports panther prey by restoring heavily impacted or sensitive vegetative communities.

The continuation of ORV activities in areas occupied by panthers, particularly Bear Island, will result in a continuation of the avoidance behavior observed by Janis and Clark (1999). The reduction in the extent of designated trails could reduce the extent of trail avoidance observed. In addition, continued use of BICY by ORV users and other visitors would maintain the risk of human/panther interaction at existing levels. The reduction in the extent of designated trails and the implementation of designated trails could reduce ORV use by the general public should they believe designated trails to be too restrictive. The limit of permit issuance to 2,000 permits ensures that levels of permitted ORV users does not increase.

Restoration activities included in the plan should increase the amount and quality of habitat for both panther and prey species. This increase could contribute to population recovery by providing additional, higher quality prey items. The change in the extent of designated trails in Bear Island could provide additional buffer in popular denning areas.

Cape Sable seaside sparrow

The proposed action will: (1) reduce human use of Zone 4 of the Stairsteps Unit; (2) ensure that airboats do not operate in potential habitat during periods of low water; and (3) provide additional security for nesting Cape Sable seaside sparrows.

The closure of portions of Zone 4 is a positive conservation program that should further the purpose of the ESA by eliminating recreational use of the area by airboaters. While there is no evidence to suggest airboat activity has been detrimental to Cape Sable seaside sparrow habitat, closure of the area will reduce the possibility of airboat use exacerbating the impacts from unplanned or inappropriate water deliveries outside the control of NPS.

The closure of portions of Zone 4 will ensure that probability of human interaction with breeding Cape Sable seaside sparrows is low. Researchers will have to access the area both inside and outside the nesting season to conduct investigations on the sparrow and its habitat.

The hydrologic triggers developed by NPS will ensure that airboats do not operate at times when low water levels create the likelihood of soil subsidence or erosion from wave action associated with airboat use. This measure is also a positive conservation effort to promote recover of the Cape Sable seaside sparrow.

Wood stork

The proposed action will: (1) continue to provide buffers around colony sites should nesting occur and (2) promote the development of additional prey resources through restoration efforts.

Utilization of the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service undated) will ensure that nesting storks are protected from human disturbance. Restoration activities undertaken as a result of implementation of this plan should increase the amount and quality of habitat for fish species important to the wood stork. As chicks approach fledging, their food intake increases making nearby foraging habitat more important to the adult storks.

Bald eagle

The proposed action will: (1) continue to provide buffers around bald eagle nesting sites and (2) promote the development of additional prey resources through restoration efforts.

The proposed action should continue to provide bald eagles with adequate protection of their nest sites in BICY. No change is anticipated from the current management to the proposed action. Restoration activities should improve the quality of habitat for prey species, thus providing a slight benefit to the bald eagle.

Red-cockaded woodpecker

The proposed action will: (1) continue to provide buffers around clusters and (2) promote the development of additional foraging resources through restoration efforts.

Buffers around clusters should provide adequate protection from disturbance by ORV's. There have been no documented detrimental effects of ORV use on this species. Avon Park Air Force Range has approximately 29 active clusters and is regularly used for military training and bombing practice. Buffers exist around the clusters and reproductive success is equal to that in other areas. While the available information indicates that red-cockaded woodpeckers are not

affected by human disturbance and ORV use, the implementation of buffers around clusters is a positive conservation program designed to assist in recovery of this species.

Snail kite

The proposed action will: (1) continue to allow airboat use in areas used by snail kites and (2) promote the development of additional prey resources through restoration efforts.

Airboat use will continue to occur in some areas used by snail kites. Snail kites appear to be more tolerant of this activity than most colonial nesters. The closure of portions of Zone 4 and all of Zone 1 in the Stairsteps Unit should increase the amount of undisturbed habitat for this species. This action would also be considered a positive conservation program that will promote recovery. Restoration efforts should improve hydrology and sheet flow in some areas, possibly improving water quality and habitat for apple snails (*Pomacea paludosus*), the snail kites' primary food source.

Species response to the proposed action

Florida panther

The panther will continue to move away from designated trails in Bear Island, and possibly elsewhere as a result of the proposed action. This could alter normal breeding, feeding, and sheltering behavior.

Adverse effects to the panther will be minimized by reducing the extent of designated trails in Bear Island, providing opportunities for recovery-oriented research and management activities on BICY, and improvements in habitat quality through restoration efforts.

Cape Sable seaside sparrow

The breeding areas for the Cape Sable seaside sparrow will be further buffered by the closure of a portion of Zone 4 in the proposed action. It is anticipated that this closure would be benign or beneficial to the Cape Sable. Opportunities for recovery-oriented research and management activities should improve habitat conditions for this species. NPS cannot control water deliveries, therefore, adverse conditions resulting from water levels cannot be minimized or ameliorated.

Wood stork

The proposed action includes set-backs from wood stork colonies. This should provide benefit to wood storks when hydrologic conditions are appropriate for nesting in BICY. Restoration activities that improve habitat for wood stork prey species should improve foraging opportunities for this species in the long-term.

Bald eagle

It is anticipated that the proposed action would be benign or beneficial to the bald eagle. BICY currently protects nesting sites, therefore, any benefits from the proposed action would come from habitat quality improvements. Since eagles nest in the Stairsteps Unit, it is possible that

the proposed closures could further minimize the risk of human interactions with nesting eagles. Designated trails will ensure that ORV users do not approach nests during the nesting season.

Red-cockaded woodpecker

Since there is little evidence to suggest that ORV's have adverse effects on red-cockaded woodpeckers, the proposed action should be benign or beneficial to this species. Restoration activities should provide additional, higher quality foraging habitat over the long-term for this species. Ensuring designated trails are set back from active clusters will assure long-term impacts from ORV use, such as soil compaction resulting in tree death, will not occur.

Snail kite

Snail kites will, likely, continue to use BICY in the manner they use it now. Proposed closures in the Stairsteps Unit could provide additional benefit to this species through improvements in habitat quality. It is the Service's opinion that the proposed action would be benign or beneficial to this species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Cumulative effects considered in this section affect all the listed species identified in the ORV Plan. The extent to which these cumulative effects impact each species may vary. Anticipated future actions in the action area that will degrade, fragment, or directly eliminate habitat include:

1. **Population Growth.** The human population of Florida has doubled every 20 years since 1830 and has now reached 13 million, with over 50 percent residing in south Florida. Florida's population, fourth largest in the United States, is expected to reach 17.8 million (127 persons per km²) by 2010 (Floyd 1997). The population of south Florida exceeded one million (130 persons per km²) in 1950, three million (391 persons per km²) in 1970, and six million (780 persons per km²) in 1990. The population growth rate of south Florida has exceeded the statewide average since 1960. South Florida's population is projected to reach 8.2 million (1,070 persons per km²) by 2010 (Floyd 1997). One example illustrating the connection between human population growth, habitat loss, fragmentation, and degradation can be seen in a 5,986 square mile area of southwest Florida, *i.e.*, Charlotte, Collier, Glades, Hendry, Lee and Sarasota Counties. Between 1975 and 1993, the amount of urban land and transitional land cleared and prepared for development increased from 641 square miles or 11 percent to 1,372 square miles or 23 percent (SWFRPC 1995).
2. **Land Clearing.** Clearing or timbering of upland habitat for grazing, vegetable crop production (primarily tomatoes, peppers, squash, watermelon), citrus production, and nurseries is common in the action area. These uses require only a Notice of Clearing or

clearing permit from Collier County and may be exempt from stringent wetland regulation or only require a surface water management or water use permit from the SFWMD. Lands on, and adjacent, to the site of the proposed action include uplands that have been cleared for agricultural uses. Panther activity is lower on agricultural lands than native lands however agricultural lands can, and may need to, be restored to a native condition to achieve panther recovery goals. Conversion of agricultural lands to urban uses precludes this opportunity.

3. SFWMD Permits. The SFWMD is responsible for permitting the construction, alteration, operation, maintenance, removal and abandonment of surface water management systems within its jurisdictional boundaries (SFWMD 1996). The SFWMD has issued 382 surface water management permits or ground water use permits covering 384,000 hectares (948,480 acres) or 64 percent of the Immokalee Rise Physiographic Region (Mazzotti *et al.* 1992), *i.e.*, approximately 64 percent of the occupied panther range in private ownership.
4. Subsequent intensification of uses on lands where initial habitat clearing occurred under agricultural uses. Most single-family home construction and some low-density “ranchette” style subdivisions do not trigger rezoning thresholds or more intensive local development regulation instituted under local growth management provisions. Other than local building permits, no additional permits from, or notification to, State or Federal permitting agencies is required.
5. Mining. Eighty-five percent of 17,500 acres zoned and approved, as of December 1992, for commercial excavation in eastern Lee County is Priority 2 panther habitat. Similar figures are not available for Collier County, but commercial excavation is permitted as a conditional use in the rural agriculture district (Land Development Code 2.2.2.3.1). Small mines proposed on previously cleared land with no wetlands are a harbinger of future urban development in the rural agriculture district.
6. Golf Courses. Lee County Commissioners approved a county growth plan amendment in June 1999 that would allow golf course development on 22,000 acres of Priority 2 panther habitat in the CREW ecological unit. In Collier County golf course development is permitted in the rural agriculture district (Land Development Code 2.2.2.2.10). Growth management critics see this as a loophole that permits urban development outside the designated urban boundary. Three of twenty golf courses constructed in Collier County since 1995 are located in the rural agriculture district; Bonita Bay East, 36 holes, 1,000 acres; Forest Glen, 18 holes, 640 acres; and Twin Eagles, 36 holes, 1,115 acres. As the number of vacant tracts 300 acres or larger within the urban boundary diminishes the likelihood of golf course development on rural lands inhabited by the panther increases. A strong local and regional housing market and low land prices favor development in the rural agriculture district. Land already converted to agricultural uses, and with minimal or no wetlands, is a prime candidate for development.

7. State and County Road Projects. New roads and road extensions create development opportunities. Road improvements, from dirt to pavement and from 2-lanes to 4-lanes, may increase the potential profit and, therefore, the likelihood of roadside development. A 33-meter (108-foot) and 100-meter (328-foot) cleared right-of-way would consume, respectively, 1.9 and 5.7 percent of each section of land through which it passes (Ruediger 1998). Highways stimulate more land development than is generally recognized. Change occurs as far away as 3.2 km on either side of the highway. Thus, for each kilometer a highway is extended, 644 hectares (1,590 acres) are opened to new development (Wolf 1981). Concurrent with road and land development, motor vehicle registrations have increased 374, 267, and 371 percent in Collier, Hendry, and Lee Counties, respectively, between 1974 and 1992 (SWFRPC 1995). Proposed road projects of concern include the proposed improvement of Miller Boulevard Extension and Sabal Palm Road from dirt to pavement in the Belle Meade Ecological Unit and the proposed extension of County Road 951 from its terminus at Immokalee Road in Collier County to Corkscrew Road in Lee County. State Road 80 in Hendry County will eventually require the addition of two lanes to handle increased cross-state traffic. Increased development along an improved State Road 80 could restrict panther dispersal into central Florida.
8. An increase in disturbances related to increased human presence and development in the action area. Noise, lighting, pollution, pet and human disturbance may contribute to behavioral changes, such as habitat avoidance, for the panther in the action area.

CONCLUSION

The disturbance intensity, or amount of panther habitat affected by the proposed action, at the population level is approximately 581,617 acres; an additional 147,249 acres is found in the BICY addition lands. ORV use on the addition lands will be addressed in an addendum to the *General Management Plan and Final Environmental Impact Statement: Big Cypress National Preserve, Florida. Volume 1* (NPS 1991). Not all of the 581,617 acres is habitat for the panther, however, a large portion of BICY is used by this species. In total, BICY, excluding the addition lands encompasses approximately 23 percent of an estimated 2.2 million acres occupied by the panther (Land *et al.* 1999). The disturbance severity, or effect of the project as a function of the rate of recovery, is negligible. Multiple actions of lesser, equal, or greater disturbance intensity and severity in the vicinity of the proposed action, and throughout the action area, may result in adverse effects to the panther population.

After reviewing the current status of the panther, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the implementation of the *Recreational Off-Road Vehicle Management Plan/Supplemental Environmental Impact Statement* (NPS 2000) is not likely to jeopardize the Florida panther. No critical habitat has been designated for this species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NPS for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If NPS (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NPS must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

Amount or extent of take anticipated

The Service anticipates panthers could be taken by implementation of the proposed action. Incidental take is not a substitute for reasonable and prudent measures as a means of minimizing the impacts of incidental take. The incidental take is expected to be in the form of harassment.

The Service anticipates incidental take of Florida panthers will be difficult to detect for the following reasons: losses may be masked by seasonal fluctuations in numbers or movements; the panthers large home range and use of its habitat make incidental take difficult to quantify; data collection on radio-instrumented panthers provides limited knowledge on actual daily movement patterns. However, the following level of take for the panther may be anticipated as movement away from designated trails for a period of at least 3 years.

Effect of take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the panther.

Reasonable and prudent measure

The Service believes the NPS has incorporated many of the reasonable and prudent measures necessary and appropriate to minimize impacts of incidental take of panthers into the design of the proposed action. The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take to the Florida panther.

1. NPS will reduce the extent of trails in BICY.
2. Appropriate levels of use compatible with the Florida panther need to be determined for all areas of BICY.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the ESA, NPS must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. NPS will reduce the extent of trails in Bear Island and employ designated trails in the balance of BICY. This will minimize the spatial extent of ORV use in BICY.
2. NPS will study the level of ORV use in Bear Island to determine the level that is acceptable and compatible with panther use of this management unit.
3. NPS will continue panther monitoring and initiate a study similar to the Janis and Clark study concurrent with the ORV carrying capacity and level of use study. This will provide data on panther behavior associated with known levels of human activity.
4. NPS will provide the Service with copies of studies performed on panther use and related ORV investigations.
5. NPS will implement studies described in Table 3 of the proposed action to preserve panthers and determine the ORV carrying capacity for management units within BICY.
6. Upon locating a dead, injured, or sick panther specimen, initial notification must be made to the nearest Service Law Enforcement Office (Mr. Vance M. Eaddy; Fish and Wildlife Service; 9549 Koger Blvd., Suite 111; St. Petersburg, Florida 33702; 727-570-5398). Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission. Care should be taken in handling sick or injured specimens to ensure effective treatment and care, or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured panthers or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions

provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Entry into the Stairsteps Unit will be coordinated with the Superintendent's Office. The Superintendent's Office may then decide if further coordination or consultation with the Service is necessary.
2. Studies pertinent to listed species or habitat restoration should be initiated and completed as soon as possible.
3. Coordination with the Service should continue. Since restoration activities may further the recovery of several listed species in BICY, coordination with the Service may ensure the maximum benefit of proposed activities associated with the proposed action to these species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects of benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or

extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions regarding this biological opinion, please contact Jane Tutton at (561) 562-3909 extension 235.

Sincerely,



James J. Slack
Project Leader
South Florida Field Office

cc:

Service, Ecological Services-Naples
Service, Florida Panther National Wildlife Refuge
Service, Ecological Services-Atlanta, GA
Service, Florida State Supervisor-Vero Beach
EPA, Atlanta, Georgia
NPS, Ochopee, FL (Susan Kaynor, Deborah Jansen, Ron Clark)
NPS, Denver, Colorado (Pat Kenney)
FWC, Tallahassee, FL
FWC, Punta Gorda, FL (Jim Beever)
FWC, Naples, FL (Darrell Land)

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