

**Florida Panther
Current Verified Population, Distribution and Highlights
of Field Work: Fall 2001 – Winter 2002**

by
Roy McBride
Contract Panther Hunter
FWC Contract #01055
Livestock Protection Company
Alpine, Texas

Prepared for
Florida Panther SubTeam of MERIT
US Fish and Wildlife Service
South Florida Ecosystem Office
Vero Beach, Florida

September 2002



The views expressed in this report do not necessarily reflect those of the FWC, nor does the contractor represent the FWC either officially or unofficially.

Table of Contents

	page
Introduction	1
Results from the Field	1
Capture Efforts	1
Noteworthy Events	4
Current Verified Population and Distribution	4
Across the Caloosahatchee	10
Recent Panther History in Central Florida	10
Habitat in Central Florida	12
Habitat Protection in South Florida	15
Conclusion	16
Highlights of Field Work	17
Acknowledgments	22
References	22

Introduction

The 22nd year of capturing and monitoring the Florida panther began on November 1, 2001. New, less-intrusive methods to monitor the population are being evaluated, including trail cameras and scat identification of individual panthers by means of DNA. GPS collars were deployed for the first time to broaden the scope of data collection by providing as many as 8 locations around the clock compared to the current 3 daytime locations per week.

Panther field work encompasses year-round activities, such as surveying for new panthers, marking kittens at the den, evaluating Central Florida habitat, trail camera studies and panther telemetry flights. This year a new task was added to the field work: ground-truthing the new GPS collars by getting visual and UTM locations of panthers at times when the collar transmitters were set to record locations via satellite.

Results from the Field

Capture Efforts

Routine capture efforts are scheduled during the winter months when cooler temperatures and lower water levels provide safer conditions for capture. These conditions can occur as early as October and continue as late as May. This season the capture team of the Florida Fish and Wildlife Conservation Commission (FWC) worked 33 hunting days, recollaring 8 panthers and capturing 6 new ones (see Tables 1 and 2, p. 3). Hunting days are capture season field days on which the full team, including the veterinarian, is present and the houndsman casts the dogs to find new panthers or to recollar panthers whose transmitter batteries are scheduled for replacement (Figure 1). Eight panthers were treed but not radio-



Figure 1. Hounds hunting for panther trails.

collared, including 4 that were treed during survey work and 3 that were treed incidentally while capturing targeted panthers. An additional uncollared male was treed at the site where a female panther (#FP49) was killed and cannibalized. This male was also left uncollared. The selection of certain panthers for monitoring is a departure from past years, when all panthers that were treed were collared unless conditions for capture were unsafe.

Four of the 6 new panthers captured were fitted with GPS collars to evaluate this new technology. This year's 33 hunting days contrasts with 75 hunting days last season and 85 hunting days 2 seasons ago, reflecting a change in telemetry monitoring goals, but not a decrease in other types of data collection.

While capture seasons are not always comparable due to duration and location of effort, there is no doubt that we have experienced a remarkable increase in the rate of capture success since the early years of monitoring (1981-1995) (see Figure 2). During the first decade of capture efforts, a month would sometimes pass without encountering a new panther, even though I hunted 7 days per week. Despite long capture seasons and the practice of collaring every panther we treed, it was difficult to achieve and maintain a radiocollared sample of over 20 animals, approximately half the current sample. During this year's capture season, uncollared panthers were treed at a rate of 1 every 3.3 days, while average capture times for the years prior to 1995 ranged from 14 to 21 days. This season, 9 panthers were treed during the first 3 days of the capture season (Nov. 1, 3, and 6, see Highlights p. 17). Some of these panthers were already radiocollared, while others were not collared because of age, but just seeing 9 panthers in 3 days of effort is a welcome contrast to early capture efforts.

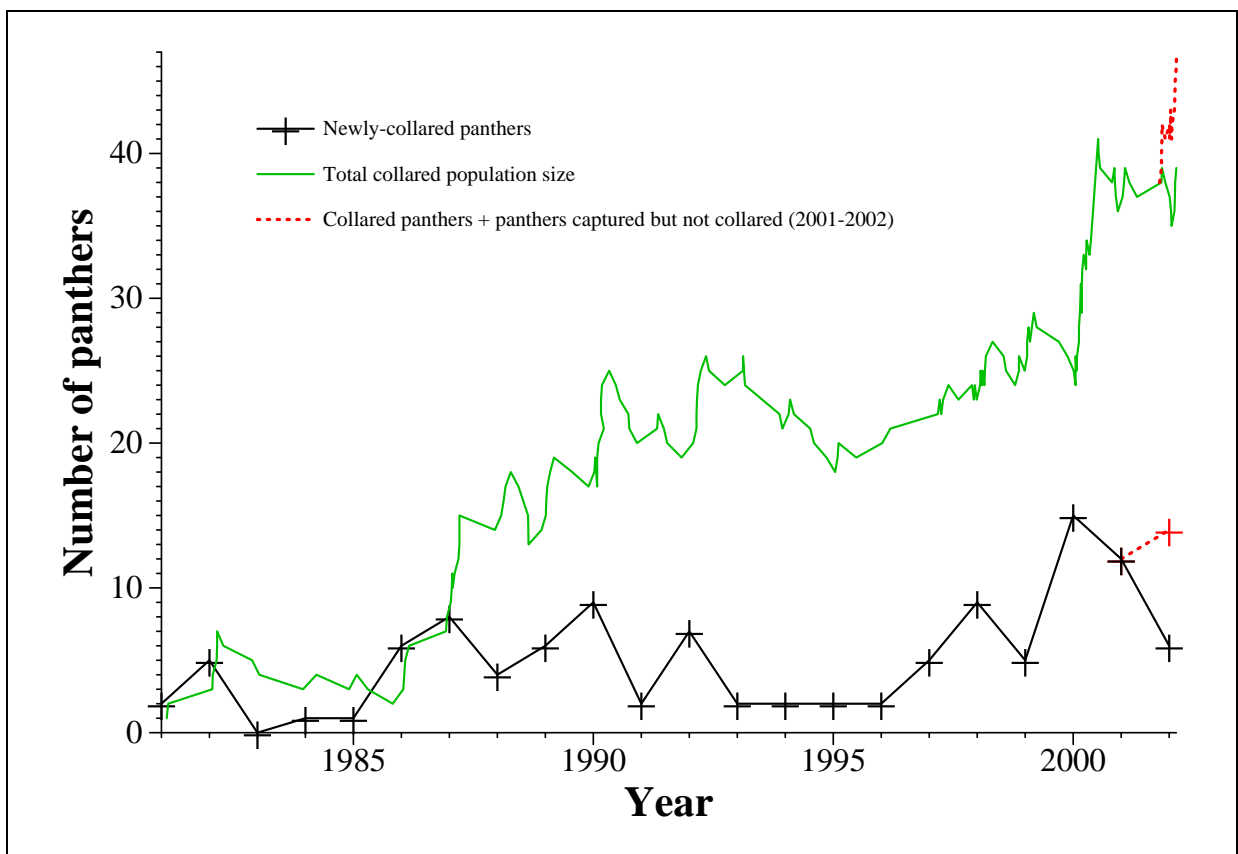


Figure 2. Total number of panthers in the radiocollared sample over the monitoring period 1981-2002 (excluding translocated Texas panthers and panthers whose radiocollars have failed) and yearly counts of first-time captures. The 2002 decline in the number of newly-collared panthers does not reflect a decrease in capture success, as indicated by the red lines denoting the number of panthers that would have been included in the monitored sample if all panthers captured had been radiocollared (collared panthers + panthers that were captured but not collared).

Table 1. Newly radiocollared panthers.

Panther	Sex	Capture Date	Age	Parents	Location	Weight (lbs.)
FP107	F	11/01/00	1 yr 7 mos	uk	FPNWR	72
108 _{FX}	M	11/03/01	10 mos	87 _{FX} , 79 _{F1}	BCNP	74
FP109	M	02/10/01	10 yrs	uk,FP	OK Slough	143
110 _{FX}	F	02/13/01	1 yr 2 mos	FP82, 65 _{F1}	OK Slough	71
FP111	M	02/14/01	8 yrs	FP,FP	OK Slough	130
FP112	F	02/25/01	3 yrs 6 mos	uk,FP	BCNP	84

Note: *FP* denotes Florida panther; *F1* denotes *FPxTX*; *F2* denotes *F1xF1*; *FX* denotes other crosses; uk = unknown.

Table 2. Allocation of capture season days by task / by region.

Region	Total days spent	Tasks completed	
		scheduled recollars	marking new cats
ENP	0	0	0
BCNP1	0	0	0
BCNP2	3	3	1
BCNP3	3	0	1
FPNWR	4	3	1
FSSP	1	1	0
Private land	2	1	0
OK Slough	20	1	3
TOTAL	33	9	6

BCNP1 = BCNP south of US 41

BCNP2 = BCNP south of I-75 and north of US 41

BCNP3 = BCNP north of I-75

Noteworthy Events

- The most significant event recorded this year was the rearing of 2 female kittens by #88_{F2} south of US 41 in BCNP. This is the first reproduction documented in BCNP south of US 41 since the project began in 1981. If panthers can continue to raise young there, proximity and connectivity to the ENP population via Shark River Slough would be greatly enhanced.
- Another significant event this year was the marking of a record number of 30 kittens at the den (FWC 2002).
- On January 11, I treed and photographed a male Florida panther who had no visible testicles (bilaterally cryptorchid). This is the fourth Florida panther we have encountered with this genetic defect, an indicator that genetic restoration has not reached the entire population. None of the introgressed males have been found to be cryptorchid thus far.
- On February 10 at OK Slough State Forest, the hounds trailed a panther south across State Road 832 and into a saw palmetto scrub, where the dogs overtook the panther. During the chase, I saw the panther climb a low oak tree that was covered with vines which partially obscured my view. On approaching the tree, I was surprised to see that this panther had a short tail, less than half the normal length. This abnormality may have been the result of injury or may have been present at birth. We attached little significance to this event, but it was the first bobtail panther I have seen in over 45 years of hunting them (see photo, p. 20). This panther, #FP109, was the first Florida panther to be fitted with a GPS collar.

Current Verified Population and Distribution

The current verified population (CVP) represents the number of panthers documented during the past year and includes adult and subadult panthers, but does not include kittens at the den. The CVP is not an estimate, nor does it represent an extrapolation from the known population or a guess about the total population size. The CVP is the number of panthers whose existence has been confirmed by:

1. treeing with hounds and radiocollaring,
2. treeing with hounds but not radiocollaring,
3. physical evidence (e.g. tracks in areas where radiocollared panthers are absent),
4. documentation by trail camera photos,
5. sighting of an uncollared panther accompanying a radiocollared panther by a biologist from the monitoring plane.

Geographic coordinates were recorded for most of the observations and photographs taken when possible. Some of these observations were part of systematic surveys; others were collected opportunistically during other field activities. Small fluctuations in the yearly count may reflect the intensity of effort and survey coverage rather than a change in the population.

It is important to note that many of these cats are not breeders. Some are past breeding age; some are too young to breed; some have reproductive deficiencies that preclude breeding or

diminish breeding potential; some are geographically isolated from mates. Caution must, therefore, be exercised when comparing the CVP to suggested minimum viable population sizes (MVPs). Most MVP estimates make assumptions that are inconsistent with known demographic attributes and habitat conditions of the South Florida population. For example, MVPs generally assume that half the population is made up of regularly-breeding females, that no habitat loss will occur, that there is equal random access to mates, no genetic effects of inbreeding, and no man-made or geographic impediments to movement (e.g. highways, Shark River Slough). Recent FWS biological opinions have suggested that last year's CVP of 78 panthers (McBride 2001) provides a surplus of 28 cats when compared to an MVP of 50 panthers. Such a comparison is inaccurate.

The difference between the verified population and the actual population size is dependent on the level of survey effort and is further enhanced by field work associated with panther captures. In addition to telemetry data derived from radiocollars, thousands of acres are surveyed on the ground by capture team members in the course of panther captures, contributing invaluable information about panther presence and activities. Increasing the intensity of field efforts narrows the gap between the confirmed and the actual population, while a decrease in efforts widens the gap of uncertainty. Systematic and comprehensive survey work is necessary to provide a verified count that closely approximates the actual population. Such a count is clearly valuable and attainable in the small, closely monitored South Florida panther population. The absence of such a count has opened the door to unsupported speculation in the past. The lack of scientific rigor in methodology has resulted in exaggerated estimates of early population size and growth parameters.

For example, the estimate of pre-introgression population size offered in Maehr (1997) was based on extrapolation. He estimated that 74 panthers were producing 28 kittens per year in the area north of I-75 in 1990. Although this extrapolation was unsupported by field surveys or by physical evidence and represented a doubling of the known population, it was later used as if it were empirically-based in a PVA analysis to evaluate pre-introgression population viability (Maehr et al. 1999, 2001). This PVA analysis has subsequently been cited as evidence of the demographic health of the Florida panther in questioning the need for the FWC's genetic restoration program (Maehr 2001). Because of the important role PVA models play in assessing population status and guiding management decisions, better science is needed in parameter estimation. Given the extensive scope of panther field and telemetry monitoring efforts, data were certainly available to achieve more accurate estimates.

1. Everglades National Park

Number of panthers: 7

Six radiocollared and 1 uncollared panthers

#61_{F1}

#85_{FX}

#94_{F1}

#95_{F1}

#TX105

#TX108

Observations from monitoring plane on 2 separate occasions of an uncollared panther with #61_{F1} (Mario Alvarado (ENP); David Shindle (FWC) provided additional confirmation of the presence of an uncollared panther in ENP with a trail camera photo.

2. Big Cypress National Preserve south of US 41

Number of panthers: 3

One radiocollared and 2 uncollared panthers

#88_{F2}

Tracks of 2 uncollared dispersal-aged juvenile females with #88_{F2} (Roy McBride, FWC, and BCNP biologist Deborah Jansen, documented and photographed January 12, 2002, and again on March 19, 2002).

Note: The uncollared male treed at Gum Slough in February of 2001 has not been confirmed by recent track surveys and was therefore dropped from this year's count.

3. Big Cypress National Preserve north of US 41, south of I-75

Number of panthers: 19

Eleven radiocollared and 8 uncollared panthers

#FP55

#70*_{F1}

#79_{F1}

#86_{F2}

#87_{FX}

#91_{F2}

#93_{FX(75)}

#FP102

#103_{FX}

#104_{F2} (recently moved north of I-75, returned once, currently north of I-75 again)

#108_{FX}

Treed 2 uncollared dispersal-aged kittens of #87_{FX} on November 3, 2001; left uncollared

Treed and photographed 1 uncollared female, January 21, 2002; left uncollared.

Tracks of 2 uncollared females in the home range of #70*_{F1}; only 1 added to the count

Tracks and scrapes of 1 uncollared female north of Monument Lake on March 11, 2002

Tracks of uncollared male in Baxter Island on August 31, 2002

Tracks of uncollared female in Baxter Island on August 31, 2002

Observation of an uncollared male during the recollaring of #93_{FX(75)}

The decrease in the verified population in this area from last year's total of 22 to the current 19 does not necessarily represent a decline in the population, but does reflect the absence of recent surveys in Deep Lake, Raccoon Point, Jetport or Mullet Slough. Panthers previously documented in these areas may very well still be alive but have been dropped from the verified count (e.g., #71*_{F1}).

4. Big Cypress National Preserve north of I-75 and Big Cypress Seminole Indian Reservation (BCSIR)

Number of panthers: 19

Eleven radiocollared and 8 uncollared panthers:

#FP48* (Bear Island)

#FP56* (treed and photographed, but not recollared, October 20, 2001, in the Addition Lands)

#FP67 (private lands)

#FP69* (treed and photographed, but not recollared, November 8, 2001, in the Addition Lands)

#73_{F1} (BCSIR, accompanied by 2 juveniles, August 26, 2002)

#FP75 (private land)

#77_{FX}* tracks and scrapes found recently in her home range (nursery to Jeep Tram)

#FP81 (BCSIR)

#FP100 (Doctor's Hammock, Bear Island, Addition Lands)

#FP101 (Addition Lands)

#FP112 (Bear Island)

Uncollared male treed at site of cannibalized carcass of #FP49

Uncollared male treed in company with #FP112 and making urine markers showing signs characteristic of a breeding male; left uncollared

Uncollared male treed and photographed January 11, 2002, at Bear Island. Because this panther was bilaterally cryptorchid, it is unlikely he was the breeder listed above.

Tracks of family group, consisting of 1 female and a minimum of 2 subadults at Baker's Grade, photographed.

5. Fakahatchee Strand State Park (FSSP) and Picayune Strand State Forest (PSSP)

Number of panthers: 7

Four radiocollared and 3 uncollared panthers:

#FP54*

#FP57*

#FP60

#83_{FX}

Photo of uncollared female in FSSP (taken by FSSP biologist Mike Owens)

Photo of female tracks in PSSP (taken by PSSP biologist Sonya Durrwachter)

Tracks of small uncollared female on East Main tram (Mark Lotz, FWC)

Tracks of uncollared female on Pennington Post Rd. (Mark Lotz, FWC)

Note: One of the last two could be #FP57 whose radiocollar has failed, so only 1 was added to the count.

6. Florida Panther National Wildlife Refuge and Catherine Island

Number of panthers: 8

Seven radiocollared and 1 uncollared panther

#FP32

#FP59
#66*_{F1} (north of Refuge)
#FP78
#FP106
#TX106
#FP107
Tracks of juvenile with #FP78

7. OK Slough and adjacent private lands

Number of panthers: 10

Five radiocollared and 5 uncollared panthers

#65_{F1}
#FP82
#FP109*
#110_{FX}
#FP111

Tracks of uncollared female northwest of SR 832 (OK Slough)

Tracks of uncollared young male (OK Slough)

Tracks of uncollared female south of SR 832 (OK Slough)

Tracks of uncollared male and uncollared female seen at the site of the carcass of #FP97 (David Shindle and Mark Lotz, FWC).

8. Outliers

Number of panthers: 7

One radiocollared and 6 uncollared panthers

#FP99 (Crew, Ft. Myers Airport, and FGCU)

Tracks and trail camera photos of uncollared panther (D. Blanco, Sarasota County)

Tracks of uncollared male (Crew Lands and Corkscrew area)

Photo of an uncollared female (taken by trail camera by Audubon Society biologist Jason Lauritsen)

Tracks of an uncollared female and juvenile on Corkscrew Island (Mark Lotz, FWC)

Tracks of uncollared male at Platt Branch Mitigation Park, found by Steve Shattler (FWC) and confirmed by R. McBride on August 4, 2002

Note: #FP62* (male whose radiocollar has failed 2 years ago; status currently unknown; dropped from this year's count)

Total CVP = 80 panthers (see Figure 3).

*Collar has quit. Panthers whose radios have failed are generally retained on the inventory if panther sign is still found in their home ranges.

Ranges of some resident males overlap Fakahatchee Strand, Panther Refuge and Bear Island. These males were assigned to a single area to avoid counting them twice.

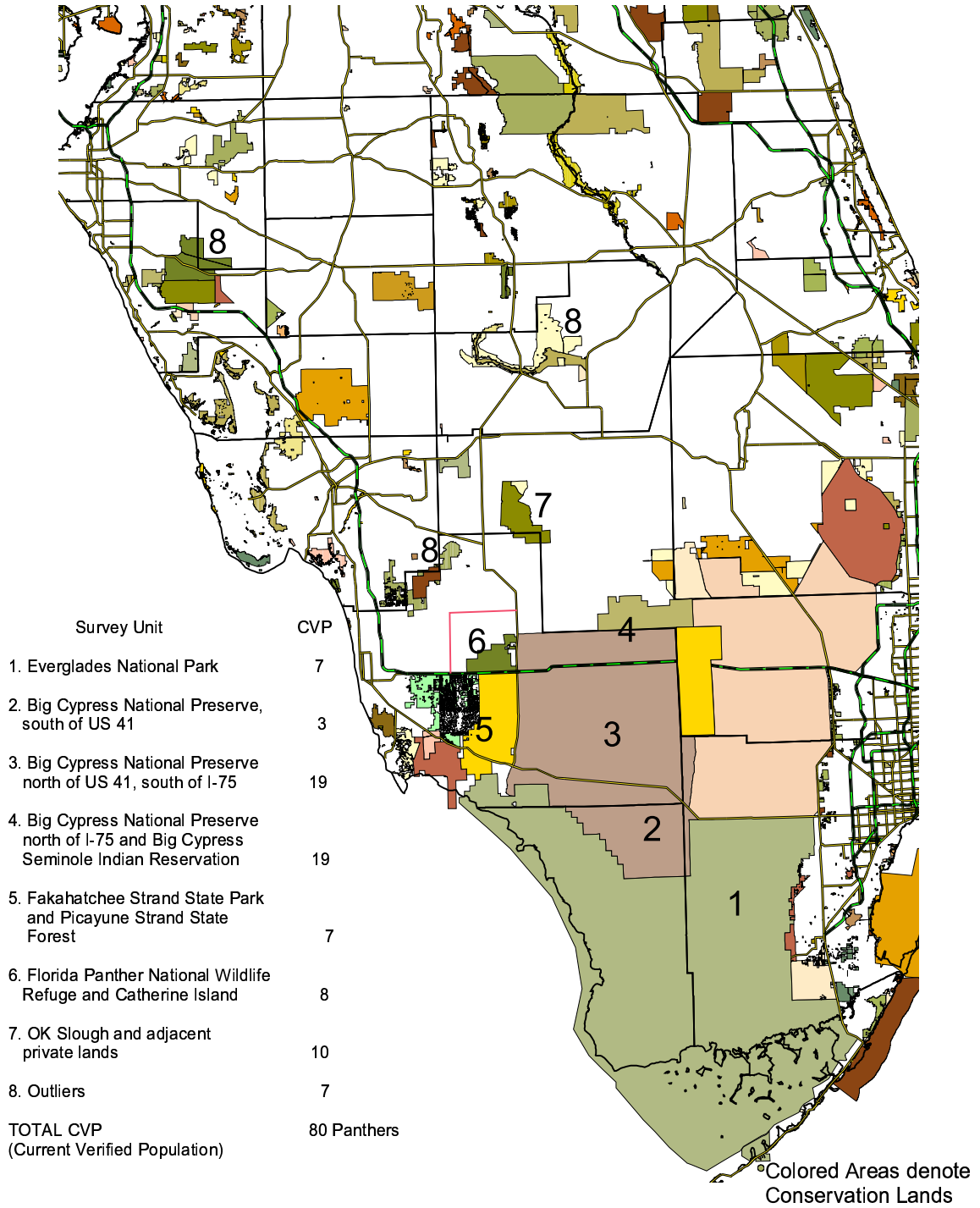


Figure 3. Florida panther survey units.

Across the Caloosahatchee

Panther field work includes responding to reports of panthers outside the known range of South Florida and evaluating prospects for panthers in other parts of the state. Information gathered in the course of these efforts is relevant to making decisions about reintroduction of panthers into other parts of their historic range, one of the stated goals of panther recovery.

Recent Panther History in Central Florida

South Florida supports the only reproducing panther population in the eastern U. S. (Brocke and van Dyke 1985; Downing 1984, Cardoza and Langlois 2002; McBride et al. 1993). Over the past 30 years, the presence of 18 panthers (17 males and 1 female) has been documented north of the Caloosahatchee River, outside the known breeding range. With the exception of 3 radiocollared males who dispersed from the South Florida population, the origin of the Central Florida panthers is unknown. However, various investigations, beginning with the establishment of the Florida Panther Clearinghouse in 1976 (Belden et al. 1991), have found no evidence of reproduction in Central Florida. Therefore, it is likely that these isolated individuals originated from the breeding population to the south. It is interesting to note that only one female has been recorded in Central Florida in over 30 years, possibly reflecting the tendency of most Florida panther females to disperse near the natal range.

The following list of panthers that have been confirmed in Central Florida includes records compiled by Chris Belden for the period 1972 to 1989.

- Male UFP28*, highway mortality, 13 Feb 1972, US 27 south of Moore Haven, Glades Co. (A. Olson).
- Barren female, treed and handled, 10 Feb 1972, Glades Co. (Nowak and McBride 1973).
- Tracks of male, 14 Mar 1982, Charles Scott Ranch, Okeechobee Co. (plaster cast, J. Earman).
- -Tracks of male, 24 Feb 1983, Fisheating Creak WMA, Glades Co., (photographs of tracks, D. Jansen).
-Male UFP09*, highway mortality, 1 Mar 1983, US 27 near Palmdale, Glades Co. (D. Austin, FWC).
- Tracks of male, 31 Mar 1984, Lighter Knot Hunt Club, Volusia Co. (photographs and plaster cast of tracks, R. Stevens).
- Tracks of male, 15 Apr 1984, Fisheating Creek WMA, Glades Co., (Roof and Maehr 1988).

- Tracks of male, 10 Aug 1984, Relay WMA, Flagler Co. (B. Williams, FWC; confirmed by C. Belden, FWC).
- -Tracks of male, 3 Jan 1986, Mud Lake Canal, Tosohatchee WMA, Orange Co. (K. Krantz, FWC).
-Tracks of male, 9 Mar 1986 Deseret Ranch, Orange Co., (C. Tucker, FWC).
-Tracks of male, 2 Nov 1986 Tosohatchee WMA, Orange Co., (B. Frankenberger, FWC).
- Male skeleton found by deer hunter, 19 Dec 1987, Farmton WMA, Volusia Co. (B. Strickland, C. Belden FWC).
- Male FP24, captured and radiocollared, 30 Jan 1988, died of unknown causes at Venus near Palmdale, Glades Co., 22 Aug 1988 (R. McBride).
- Tracks of male and a deer kill, 25 Feb 1988, near Fort Drum WMA, Indian River Co. (J. McGrady, FWC; confirmed by B. Frankenberger, FWC).
- -Tracks of male, 3 Jul 1989, Relay WMA, Flagler Co. (B. Williams, FWC).
-Hair sample from vehicle grill, 25 Sep 1989, Korona, Flagler Co. (S. Kendrick).
- Male FP62, dispersed from South Florida Apr 1998, radio expired July 2001, current fate unknown.
- Male 74FX, dispersed from South Florida May 1999, highway mortality, 8 Sep 1999, US 27 north of Palmdale,
- Tracks of male first found Jul 1999, Sarasota Co. wellfield. Tracks have been observed over the past 3 years, also supported by trail camera photo (tracks first reported by D. Blanco, Sarasota Co. Resource Management; confirmed by R. McBride, C. Belden, FWC).
- Male 84FX, dispersed from South Florida April 2000, found dead several weeks later near Fisheating Creek, Glades Co., cause of mortality unknown (D. Shindle, FWC).
- Male UFP45, highway mortality, 5 Apr 2002, US 27 near Palmdale, Glades Co. (M. Lotz, FWC).
- Tracks of male, 4 Sep 2002, near boundary of Glades and Highlands counties (S. Shattler, FWC; confirmed by R. McBride).

* UFP = uncollared Florida Panther

- denotes multiple records that likely document the same panther

All of the information above was confirmed by FWC panther team personnel. During the first 26 years (1972–1997), 12 confirmed records, including 4 mortalities, were documented in Central Florida. However, the frequency of confirmations has recently increased, as indicated by the documentation of 6 records during the past 4 years, 3 of which were mortalities. This increase in the rate of documentation corresponds to the post-1995 increase in the size of the verified population in South Florida. It is interesting to note that

there was a 9 year hiatus (1989–1998) during which no highway mortalities or new tracks were reported in Central Florida, although methods of reporting and investigation were unchanged. This hiatus corresponds to a period when other evidence also indicates that the population in South Florida was static or declining, and is in contradiction to estimates that there were 74 panthers north of I-75, possibly extending into Glades and Highlands County, in 1990 (Maehr 1997). As Maehr explained, his estimate of population size was based on extrapolation rather than field surveys.

At the very least, the above records of isolated panthers found in Central Florida suggest that the Caloosahatchee River has never constituted a barrier. Instead, the frequency of crossings appears to reflect the availability of dispersing animals. If a canal the size of the Caloosahatchee cannot be crossed by panthers, then the larger rivers in Florida and in the eastern and western U.S. would also have segregated and isolated panther populations. This has not been reported thus far in the literature. During the North Florida reintroduction study, a panther from the desert of West Texas crossed the Altamaha River in Georgia while it was in flood (Belden and McCown 1996). The subspecies of panther described in Young and Goldman (1946) as *coryi* was reported on both sides of the Mississippi River. *Puma concolor* have been reported to swim swift-flowing rivers (Seidensticker et al. 1973), crossing rivers 1 mile wide (1.6 km) and swimming 0.8 to 1.6 km from island to island along the coast of Vancouver Island, B.C. (Young and Goldman 1946) and in Puget Sound, Washington (Cowan 1956).

Although the Caloosahatchee River is described as the northern boundary of South Florida, the northernmost extent of occupied panther range lies 10 miles south of the river at its closest point. From here it is necessary for dispersing panthers to cross abandoned agricultural fields and several paved roads to reach the banks of the river. Urban development on both sides of the Caloosahatchee, from its mouth to within several miles west of the Ortona Locks, makes it difficult for panthers to approach the river or proceed along its banks in search of a place to cross. The area identified as the approximate crossing site for the 3 radiocollared males is accessible from the south, but there are several subdivisions on the northern bank. These subdivisions are not fully developed at this time, leaving some wooded lots panthers can use to avoid detection as they thread their way north. After passing through the subdivisions, panthers would encounter citrus groves and open cow pastures with scattered oak hammocks as they move northward. The current configuration of these landscape features would tend to make dispersals easier to accomplish for panthers going north than for panthers attempting a north-to-south crossing.

Habitat in Central Florida

Although individual panthers have been found north of the Caloosahatchee River in Central Florida, the question of whether or not reproduction and recruitment can succeed there is still unanswered. Central Florida is currently being resurveyed by the FWC for the presence of panthers and to evaluate suitability and accessibility of habitat (Peripheral Area Survey, Chris Belden PI). The blueprint for this survey is the GIS map based on satellite imagery drawn up by the MERIT Panther Subteam. The ongoing FWC Central Florida survey is ground-truthing this map (see Figure 4, A and B).



(A)



(B)

Figure 4. Central Florida habitat. (A) This forest in Central Florida illustrates the need for ground-truthing GIS imagery. Forest with no understory is of little value to panthers. (B) Excellent Central Florida panther habitat: dense understory for panthers in the background and natural openings for prey in the foreground.

Upon completion, the FWC survey will provide a realistic and science-based assessment of Central Florida habitat. This ground-truthing effort is an essential accompaniment to GIS maps, which do not identify understory, prey base, intensity of land use, or the type of connectivity between patches of cover. For example, remnant 5-hectare hammocks left

to furnish shade for cattle that are connected by improved pasture with absolutely no cover do not have the same value for panthers as 5-hectare hammocks in a natural prairie that provides abundant cover between hammocks, as in the natural landscape where panthers are found.

Each tract of potential habitat is being evaluated and scored for the following criteria:

- **Tract size.** The number one problem for panthers we have identified in the early stages of the survey is small tract size. Panthers in South Florida use a relatively unfragmented and undisturbed tract of landscape that includes a mosaic of habitats meeting the life-cycle needs of panthers, including cover, prey, and sufficient spatial extent to support overlapping home ranges of a number of breeding adults. From an historical perspective, when the panther population in South Florida numbered between 30 and 40 individuals, they were struggling with problems inherent in small populations, including the deleterious effects of inbreeding. Preliminary survey results have failed to locate an area of natural landscape, combining public and private land, that would support a population of even one-fifth this size. Not one of the public lands that we have surveyed thus far is large enough to encompass the typical home range of one reproductive male.
- **Proximity:** In lieu of availability of large tracts, an alternative configuration would be medium-sized tracts in reasonable proximity to one another to facilitate movement between tracts. Movement between the two best tracts we have identified thus far would necessitate navigating a bewildering 60-mile maze with any number of dead-ends. Even this route may soon be severed by the slated development of 30,000+ acres of intervening ranch land.
- **Connectivity.** A third alternative could consist of small tracts connected by corridors that would allow movement from one tract to another. However, the small tracts we have surveyed to date are badly fragmented, widely-scattered, and criss-crossed by busy highways, lacking connectivity both between and within tracts.
- **Prey base:** The two areas surveyed thus far in Central Florida that offer the best prospects for supporting a few panthers score high in the prey base category. A feral hog trapping program in one of these area (60,000+ acres) netted 1865 hogs in 2001 (D. Blanco, Sarasota Co. Resource Management, pers. comm.) To put this statistic in perspective, this harvest far exceeds last year's take of 84 hogs on the 729,000-acre BCNP (B. Adams, FWC, pers. comm.).
- **Human activity.** Preliminary results of our survey have discovered human activities in Central Florida ranging from those that cause little measureable disturbance (e.g. hiking, bird-watching) to those that would preclude panther habitation (e.g. off-road vehicle rallies).
- **Highway density.** Highways present a major problem in panther recovery, impeding movement and resulting in vehicle-related mortalities. In South Florida, female panthers often live on unfragmented tracts large enough that they are able to live out their lives without finding it necessary to cross roads. This is not the case in Central Florida, where small tract size could necessitate both male and female panthers

crossing roads regularly in order to maintain home ranges. In Central Florida, US 27 has already claimed the lives of 4 of the 18 panthers that have been documented there (see list above). The Fisheating Creek WMA is bisected north to south by this highway. If Central Florida is seriously considered for panther reintroduction, it may be necessary to retrofit existing highways with fencing and underpasses in strategic locations.

In the event that recolonization of Central Florida does not occur by dispersal from the South Florida population, the alternative of translocation has been suggested (Maehr et al. 2002). Before reintroduction is undertaken, close attention should be paid to the lessons learned from two prior reintroduction efforts in North Florida, an area with much larger tracts of suitable habitat, fewer highways, lower human populations, and better connectivity between tracts than are found anywhere in Central Florida (Belden and McCown 1996, Belden and Hagedorn 1993, Cramer 1995, FCRC 1998).

Habitat Protection in South Florida

As the focus draws tighter on a handful of landowners who own most of the remaining occupied panther habitat, small tracts are offered for sale at market prices and sometimes go for years without selling. Examples include (1) a 1,600-acre tract that adjoins the Seminole Indian Reservation on the west, (2) a 900-acre tract 1 mile north of Big Cypress, (3) a 2500-acre tract west of the L-28 feeder, and (4) a 2000-acre tract north of BCSIR. These tracts of land were offered by willing sellers and were listed and advertised by local real estate agents. These parcels, some of which sold for less than \$1500/acre, were virtually undisturbed and had a long history of panther use, including denning. Attention to these smaller tracts may be a role for the NGOs. It would require no additional personnel on the part of recovery agencies to establish a mechanism for identifying these properties and alerting NGOs and federal and state land acquisition programs of their availability. The state of Florida has recently purchased some large tracts in both Central and South Florida and has plans for further acquisitions.

The value of occupied panther habitat that is intact, requires no restoration, and is strategically connected to adjoining occupied range is not reflected in current land appraisals. Improvements that increase the market value of land often decrease its value for panthers. From the standpoint of endangered species protection, natural landscapes should be considered the “highest best use,” and command a far better price than improved pasture. Recent bids indicate that complete restoration of degraded habitat, utilizing a selection of the 600 plant species endemic to South Florida, could cost as much as \$12,000/acre (Jean McCollom, FWC, pers. comm.) The intensive effort needed to control exotic vegetation on cleared land could easily exceed the original purchase price and may turn out to be the proverbial “tiger by the tail.”

In addition to outright purchase, compensation is assessed for certain public and private activities that impact panther survival and recovery. For example, Shark River is the only known travelway for panthers to enter or leave ENP. The additional water that the Comprehensive Everglades Restoration Plan (CERP) has scheduled for Shark River may increase the width and depth of the Slough and lengthen the hydroperiod, which could further isolate

panthers in ENP. Another area that should be carefully monitored for excessive flooding is eastern BCNP, which has a long history of panther use.

If compensation for panther habitat loss continues to focus solely on forest, as it has in the past, it will fail to capture the essence of how panthers use the landscape they occupy. Field work continues to document by the supporting evidence of tracks and the trailing behavior of hounds that panthers use the mosaic of habitats available to them. Both panthers and their prey use or benefit from a variety of forested and non-forested habitats throughout their home ranges. Therefore, the loss of prairies, marshes and other open spaces diminishes habitat quality. The value of spatial extent and of all habitats within panther ranges must be considered in the compensation process.

Conclusion

As the 22nd year of panther monitoring in South Florida draws to a close, capture success rates are up from last year and a record 30 kittens were marked at the den. By all measurable standards, the panther population has increased significantly since 1995. Panther recovery continues to benefit from the FWC's ground-breaking approach to genetic restoration, which offers a practical solution to the deleterious effects of inbreeding in a small population. Another bright spot for the panther's future is the state of Florida's aggressive land acquisition program to the north of BCNP. Still another is the prospect that #88_{F2} and her 2 female offspring could provide linkage to the panther population in Everglades National Park.

However, available habitat is shrinking, and not just in South Florida. The FWS is again studying the historic range of the panther for reintroduction sites, and the FWC is resurveying Central Florida for the same purpose. Preliminary results from Central Florida indicate that several tracts score high for prey availability and habitat quality. However, these choice pieces of habitat are small when compared to the typical home range size of a panther in South Florida, and pose their own set of problems if reintroduction is considered there. In the end, whether or not we are able to save the panther and the wild lands they need will say a lot about the legacy we leave to those who come after us.

Highlights of Field Work

October 20 – #FP56 treed and photographed during survey work in Addition Lands. She was wearing a failed radiocollar, but was not recollared or handled (see Figure 5).



Figure 5. #FP56

November 1 – #FP96 was captured in FPNWR for a radiocollar change; #FP107, a new female panther, was treed on same day and added to the radiocollared sample.

November 3 – 4 panthers were treed in BCNP north of US 41 on the same day: #87_{FX} and her 3 yearlings near dispersal age. One of these yearlings was radiocollared as new panther #108_{FX}; the 2 other siblings were treed but not radiocollared.

November 6 – 3 panthers were treed in FPNWR the same day. #FP99 was captured for a radiocollar change (see Figure 6); #FP96 and #FP107 were treed incidental to the capture of #FP99.



Figure 6. #FP99

November 8 – #FP69 was treed in the Addition Lands. Although she was wearing a failed radiocollar, she was not recollared or handled (see Figure 7).



Figure 7. #FP69

December 14 – #FP78 was recollared in FPNWR.

January 4 – An uncollared male was treed near the cannibalized body of #FP49 in the Addition Lands. He was not handled or radiocollared. His appearance was somewhat bedraggled, including a rough coat of hair.

January 10 – An uncollared female was treed and photographed during survey work in Bear Island, but was not radiocollared or handled (see Figure 8).

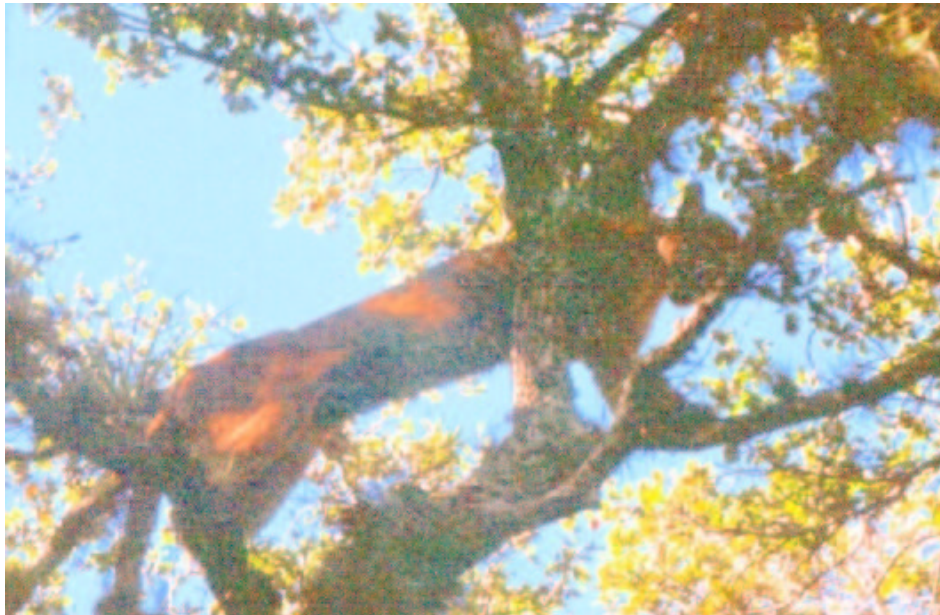


Figure 8. Uncollared female in Bear Island, BCNP

January 11 – An uncollared male with no visible testicles was treed and photographed during survey work in Bear Island, but was not radiocollared or handled (see Figure 9). The rear portion of this panther’s anatomy was also photographed and is on record.



Figure 9. This uncollared male showed no evidence of descended testicles.

January 21 – An uncollared female was treed and photographed during survey work in Airplane Prairie, but was not radiocollared or handled (see Figure 10).



Figure 10. Uncollared female panther.

February 10 – #FP109, a new male panther with a bobtail was radiocollared in OK Slough. This panther received the first GPS radiocollar (see Figure 11 and Noteworthy Events, p. 4).



Figure 11. Bobtail panther #FP109 gets the first GPS collar.

February 13 – #110_{FX}, a new female panther radiocollared in OK Slough, was also instrumented with a GPS collar (see Figure 12).

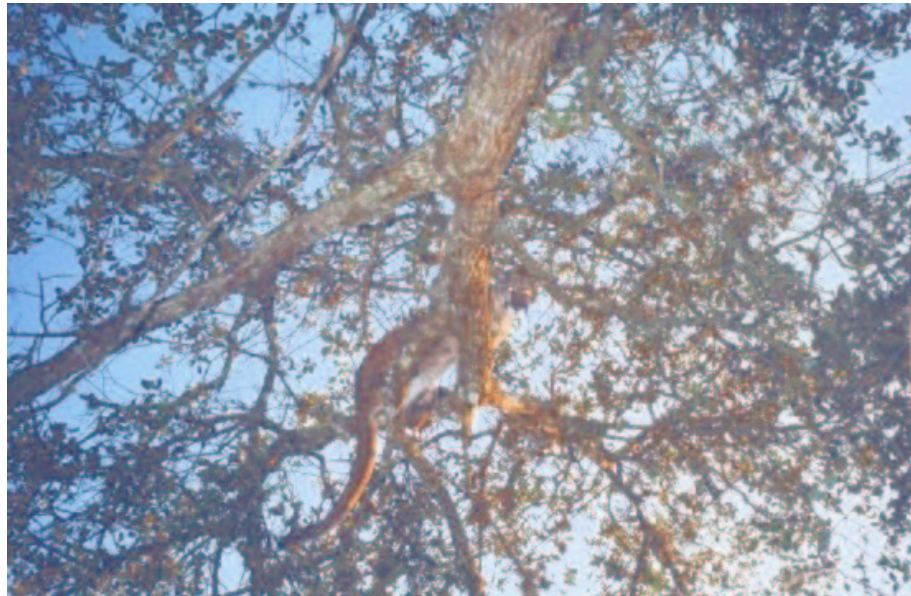


Figure 12. #110_{FX}, second GPS collar.

February 14 – #FP111, a new male captured in OK Slough, also received a GPS collar.

February 20 – #FP109 was recaptured in OK Slough to reprogram his GPS collar.

February 25 – #FP112, a new female panther captured in Bear Island, was fitted with a GPS collar. An uncollared male was also treed, but was not radiocollared or handled.

February 28 – #93_{FX(75)}, a female, was recollared in BCNP north of US 41. While the hounds were chasing her, an uncollared male came crashing out of the palmettos and passed within several feet of me, affording a close look. #93_{FX(75)} was pregnant at the time, and gave birth to 4 healthy kittens on April 23rd.

March 6 – #FP60, an older male, was recollared in the Fakahatchee Strand.

March 13 – #103_{FX}, a female, was recollared in BCNP north of US 41. #93_{FX(75)} was treed accidentally in the same area (see Figure 13).



Figure 13. #93_{FX(75)}: pregnancy is obvious, even in a poor picture.

April 22 – #FP67, a female, was recollared on private land, ending the capture season.



Figure 14. Capture season ends.

Acknowledgments

The monitoring of panthers involves a large group of dedicated people, including ENP project leader Sonny Bass, and his staff Mario Alvarado and Lori Oberhofer; BCNP project leader Deborah Jansen and her staff Steve Schulze and Bob Thomas; FWC South Florida project leader Darrell Land and his staff David Shindle, Mark Lotz, veterinarian Mark Cunningham; FWC Central Florida project leader Chris Belden; Debbie Blanco, Sarasota Co. Resource Management; Steve Shattler (FWC); and Jason Lauritsen, Audubon Society biologist. Jane Comiskey, an FWS MERIT Panther Subteam member and ATLSS panther modeler, was invaluable in the preparation and review of this report.

References

Belden, R.C. and J. W. McCown. 1996. Florida panther reintroduction feasibility study. Final Report 7507. Florida Game and Fresh Water Fish Commission, Tallahassee. 72pp.

Belden, R. C. and B. W. Hagedorn. 1993. Feasibility of translocating panthers into northern Florida. *Journal of Wildlife Management* 57(2): 388-397.

Belden, R. C., W. B. Frankenberger, and J. C. Roof. 1991. Florida panther distribution. Final Report. Study No. 7501, Fed. No. E-1 II-E-1. Florida Game and Fresh Water Fish Commission, Tallahassee. 26pp.

Brocke, R. H., and F. G. Van Dyke. 1985. Eastern cougars: the verifiability of the presence of isolated individuals versus populations. *Cryptozoology*, 4:102-105.

Cardoza, J. E. and S.A. Langlois. 2002. The eastern cougar; a management failure? *The Wildlife Society Bulletin* 30(1): Pages 265-273.

Cowan, I. M. 1956. Life and times of the coast black-tailed deer. Pages 523-617 In W. P. Taylor, ed. *The deer of North America: their history and management*. Stackpole Co., Harrisburg Pa. and Wildlife Management Institute, Washington, D.C.

Cramer, Patricia. 1995. The northeast Florida panther education program. Final Report to Florida Advisory Council on Environmental Education.

Downing, Robert L. 1984. The search for cougars in the eastern United States. *Cryptozoology* 3: 31-49.

Florida Conflict Resolution Consortium (FCRC). 1998. Public acceptability of Florida panther reintroduction. Prepared for the Florida Game and Fresh Water Fish Commission.

Florida Fish and Wildlife Conservation Commission (FWC). Florida Panther Field Note: Panther Dens Keep Biologists Busy, July 2002. <http://www.panther.state.fl.us/news/pdf/capt7-19-02.pdf>.

McBride, R. T. 2001. Current panther distribution, population trends, and habitat use: report of field work: fall 2000 – winter 2001. Report to Florida Panther SubTeam of MERIT,

US Fish and Wildlife Service, South Florida Ecosystem Office, Vero Beach, Florida.
<http://www.panther.state.fl.us/news/pdf/rtm2001.pdf>.

McBride, R. T. 2000. Current panther distribution and habitat use: a review of field notes, fall 1999 - winter 2000. Report to Florida Panther SubTeam of MERIT, US Fish and Wildlife Service, South Florida Ecosystem Office, Vero Beach, Florida. May 2, 2000.
<http://www.panther.state.fl.us/news/pdf/report.pdf>.

McBride, R. T., McBride, R. M., Cashman, J. L., and Maehr, D. S. 1993. Do mountain lions exist in Arkansas? Proc. Annu. Conf. Southeast. Fish and Wildl. Agencies. 47, 394-402.

Maehr, D. S. June 13, 2001. Declaration of opinions relevant to Florida panther litigation. Re:Landon Companies/Agripartners-National Wildlife Federation et al. v. Caldera et al. Case No 1:00CV01031 (D.D.C. Judge Robertson).

Maehr, D. S. 1997. The Florida panther: life and death of a vanishing carnivore. Island Press, Covelo, California.

Maehr, D. S., E. D. Land, D. B. Shindle, O. L. Bass, and T. S. Hctor. 2002. Florida panther dispersal and conservation. *Biological Conservation* 106:187-197.

Maehr, D.S., Lacy, R.C., Land, E.D., Bass, O.L., Hctor, T.S., 2001. Population viability of the Florida panther: a multi-perspective approach. In: Beissinger, S., McCullough, D., (Eds.), *Population Viability Analysis*. University of Chicago Press, Chicago.

Maehr, D.S., Lacy, R.C., Land, E.D., Bass, O.L., Hctor, T.S., 1999. A reassessment of Florida panther population viability analysis and recovery efforts from multiple perspectives. *Population Viability Analysis Conference*. March 15-16, 1999. San Diego, California.

Nowak, R. M., and R. McBride. 1973. Feasibility of a study on the Florida panther. Report to World Wildlife Fund. 13pp.

Roof, J. C., and D. S. Maehr. 1988. Sign surveys for Florida panthers on the peripheral areas of their known range. *Florida Field Naturalist* 16(4): 81-104.

Seidensticker, J. C., IV, M. G. Hornocker, W. V. Wiles and J. P. Messick. 1973. Mountain lion social organization in the Idaho Primitive Area. *Wildlife Monographs* 35:1-60.

Young, S. P. and E. A. Goldman. 1946. *The puma, mysterious American cat*. Dover Pub., Inc. N.Y. 358 pp.