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Big Cypress National Preserve
Ochopee, FL

BIG CYPRESS NATIONAL PRESERVE
FLORIDA PANTHER (*Puma concolor coryi*)
RESEARCH AND MONITORING
2003-2004 ANNUAL REPORT



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IN BIG CYPRESS NATIONAL PRESERVE

2003-2004 ANNUAL REPORT

submitted to the U. S. Fish and Wildlife Service

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Abstract: Seventeen Florida panthers (*Puma concolor coryi*) were monitored in the 217,410 ha study area in Big Cypress National Preserve during the July 1, 2003 and June 30, 2004 reporting period. During 39 hunting days, 5 new panthers were captured and radio-collared, 2 had their failed collars replaced, and 1 had its working collar replaced. Nine panthers were lost from the sample: 2 died from intraspecific aggression, 2 were struck by vehicles and placed in captivity, 1 was euthanized due to irreparable injuries, 1 was translocated from the study area, 1 dispersed from the study area, and the collars on 2 panthers failed. Two additional uncollared panthers were killed by vehicles. Three monitored females denned, producing 8 kittens, 4 males and 4 females. Transponders were implanted and tissue samples were obtained. Two of these 8 subsequently died when their mother was struck by a vehicle and removed from the study area. The average home range of the 9 resident females was 163 km² and that of the 3 resident males was 574 km². Recommendations include the construction of a wildlife underpass at Turner River on Highway 41, the biomedical examination of male #104 to determine his semen quality, and the continuation of capture work in Big Cypress given the high rate of loss (53%) from the monitored sample.

Introduction

This report covers the work conducted by Big Cypress National Preserve (Big Cypress) on Florida panthers (*Puma concolor coryi*) between July 1, 2003 and June 30, 2004. This time frame is in keeping with our permit reporting requirements. The previous Big Cypress annual report, dated September 15, 2003, provided a review of all Florida panthers monitored by telemetry between 1981 and 2003 in the Big Cypress study area (SBICY) which consists of all lands (217,410 ha) within the Preserve boundary south of Interstate 75 (I-75). FWC has monitored panthers in the remaining 75,340 ha of Big Cypress north of I-75 since 1981.

Statement of Purpose

The purpose of this project is to determine the status of the panther population in Big Cypress National Preserve and to determine the panthers' behavioral and/or demographic responses to existing or proposed management actions to ensure that they will not be detrimental, and preferably will enhance, the recovery of the Florida panther in south Florida.

Goals

Goal 1. Provide the necessary information to make sound management decisions, evaluate the effects of restoration projects and management strategies, and meet the recommendations and stipulations of the Environmental Impact Assessments and Biological Opinions related to the management of Big Cypress.

Goal 2. Assess the potential of the habitat in Big Cypress to support panthers.

Goal 3. Assess the potential for the expanding population of panthers in Big Cypress to link with the relatively disconnected population of panthers in Everglades National Park.

Goal 4. Continue to provide the samples necessary to assess of the impacts of the Genetic Restoration Project on the panthers in Big Cypress south of Interstate-75 to determine whether it will remain predominately *stanleyana* intercrosses.

Study Area

The study area, SBICY, represents 74% (217,409 ha) of Big Cypress, a 295,142-ha unit of the National Park Service (NPS), situated in south Florida in Collier, Monroe, and Dade Counties. The enabling legislation of Big Cypress allowed for continued recreational and commercial uses, such as hunting, off-road vehicle operation, and oil extraction. Big Cypress was also designated a state wildlife management area for recreational hunting, and, as such, has been divided into “units” to allow flexibility in management and regulatory decision-making (Figure 1). These units are used in this document to identify specific areas. The area has further been divided into “blocks” to quantify panther survey and capture efforts (Figure 1 in Appendix A).

Big Cypress encompasses almost half of a unique water-dependent ecosystem called Big Cypress Swamp. Unlike the Everglades, it is still a relatively pristine wetland system. Nearly 80 percent of the rain normally falls during the 6-month wet season of May through October and averages 135 cm per year (Schneider et al. 1996). The vegetative types described by Welch et al (1999) have been consolidated into 7 general categories. Using these, the study area consists of 50% cypress, 16% prairie,

13% marsh, 13% pineland, 4% mixed hardwood swamp, 3% hardwood hammock, and 1% mangroves. Disturbed habitat, including exotic plants and areas of human influence such as roads, is found in 0.4% of SBICY.

Only 285 km of roads exist in SBICY. Two paved roads, I-75 (formerly Alligator Alley) and Highway 41 (Hwy. 41), run east-west through the northern and southern portions respectively from State Road 29 (S R 29) to Conservation Area 3A. Four unpaved county roads, Birdon (841), Wagonwheel (837), Turner River (839), and Loop (94) (now partially under NPS jurisdiction), account for 97 kms. State Road 29 is a paved road that borders BICY on the west. The southern boundary of BICY joins Everglades National Park (EVER) and the eastern boundary is partially separated from Water Conservation Area 3A by a levee (L-28) (Figure 2). The northern boundary adjoins private and tribal lands, some of which has been converted into agricultural production.

A deer and hog hunting season takes place from September through December. The 5-year (1999-2003) average for hunter pressure is 14,166 man-days, with a mean harvest of 226 deer (bucks only) and 74 hogs (FWC 2003 weekly harvest reports). These represent a sample of the actual harvest.

The operation of off-road vehicles (ORVs) has created a system of trails that has increased in recent times. Duever et al. (1986) mapped 250 km of ORV trails from 1953 maps and over 1,100 km from 1973 maps. Welch et al (1999) delineated over 46,774 km of trails or trail remnants that were visible on aerial photos. Janis and Clark (2002) determined that panthers showed some avoidance of these trails during periods of increased vehicle activity. The obvious aesthetic concerns and the probable impacts on soils, vegetation, and wildlife prompted the development of an ORV management plan that restricts ORV travel to designated trails (National Park Service 2000). This designated trail system is still in the development and construction process.

Methods

Capture and Monitoring

The capture of panthers in SBICY followed the protocols outlined in the Endangered Species Permit

TE051015-0 from the US Fish and Wildlife Service (USFWS) and the Special Purpose Permit #WX02384 from the Florida Fish and Wildlife Conservation Commission (FWC), with drug and handling modifications agreed upon between the Big Cypress and the FWC veterinarians. Biomedical procedures were similar to those outlined in Land et al (2004).

The daytime resting sites of the monitored panthers were determined 3 times per week using telemetry from a fixed-wing aircraft. This regimen increased to daily monitoring, either aerially or from the ground, for situations that arose this year in which some panthers were repeatedly observed near residential areas. The fixed-wing methodology used by SBICY to determine each location deviated from the EVER and FWC monitoring protocol. Big Cypress staff determined the general location of each panther at 150 m above the ground, but then made several passes at 60 m to further refine it. Flights conducted by other panther monitoring agencies did not descend below 150 m. Low-level passes have been necessary, however, in SBICY to obtain accurate locations and habitat use because of the complexity and intermingling of vegetative types. Universal Transverse Mercator (UTM) coordinates of each location were then determined using a geo-referenced coverage of the study area.

Handling Kittens at Dens

When routine monitoring of adult female panthers indicated that one was remaining in the same location for more than a week, the den location was further defined by ground checks. A monitoring device was then installed near the site (Land et al 1998). The presence or absence of the female was determined by both daytime and nighttime remote checks until the absence of a signal indicated that she had left the den. Once the den was located, the kittens were processed following the *Florida Panther Kitten Biomedical Protocol* developed by Mark Cunningham, DVM, dated April 17, 2002.

Data Analysis

The dataset used in this report consists of all telemetry locations of radio-collared panthers located in SBICY between July 1, 2003 and June 30, 2004. Several locations on radio-collared panthers that temporarily left the study area were obtained by FWC. Maps were generated using the ArcView 3.2 Animal Movement program extension (Hooge and Eichenlaub 1997). Home ranges are shown as

minimum convex polygons with a 5% outlier removal. The home range maps delineate the locations obtained during dispersal and those that comprise a MCP home range when the panthers were adults. The maps of previously monitored panthers show the home range from this reporting period compared to that of earlier years.

Definitions

Home range, i.e., the area where a panther restricts the majority of its movements, was determined for panthers that had more than 5% of their locations in SBICY, had more than 50 datapoints, and were considered to be adults. Those not meeting these criteria had **areas of use**. Females were considered to be **adults** at 18 months and males at 24 months, based on known ages when panthers in SBICY first bred. **Residents** were defined as adults that had continuous use of the area for greater than 6 months. **Dispersers** made large random movements and typically inhabited SBICY for less than 6 months before they either left the study area or settled into a home range. **Immigrants** dispersed from some other locality. **Emigrants** were panthers that were born in SBICY but dispersed completely outside the study area.

Results

2004 Capture Season

Eight juvenile or adult panthers, 4 females and 4 males, were captured and handled by the NPS capture team in 2004 (Table 1). One had a functioning collar nearing the end of its battery life, 2 had collars that failed prematurely, and 5 panthers had not been previously handled. Capture and biomedical data were submitted to FWC post-capture. Appendix A, *Big Cypress National Preserve 2004 Florida Panther Capture Season Report*, summarizes this past year's survey and captures efforts by NPS. Biomedical data obtained during captures were submitted to FWC and incorporated into their annual report (Land et al 2004).

Background and 2003-2004 Activity of Juvenile and Adult Panthers

Seventeen juvenile and adult panthers, the majority of which were residents, were monitored in SBICY during this reporting period (Table 2). Following is a summary of the background and information obtained through monitoring these 17 panthers during the past year.

FP #55

This female is the only known offspring of FP #23 to survive in the wild. She was born on December 12, 1992 in the Corn Dance Unit and first captured on January 25, 1994 at 2 years of age. She dispersed at 14 months of age and, between 1994 and 2003, established a 490-km² home range in the Turner River Unit. Her 196-km² home range during this reporting period was within her previously established home range (Figure 3).

FP #55 was last collared on April 4, 2003 at the age of 10 years. She was in excellent physical condition, weighing 80 lbs, more than on any previous handling. The possible presence of chronic hepatic insufficiency observed during #55's handling in 2000 (K.G. Charlton, FWC veterinarian) was not apparent in 2003. Her alkaline phosphatase and gamma glutamine transferase were within range, although her albumin was still slightly low.

FP 55 was first bred at 19 months of age and had denned 8 times of which 3 dens have failed. i.e., the kittens died prior to leaving the den. She last gave birth in August of 2003 at the age of 10.5 years. A kitten was briefly seen during the den search, however, it eluded capture. On the July 12, 2004 monitoring flight, #55's collar emitted a mortality signal. Site inspection and the subsequent necropsy indicated that she probably died from intraspecific aggression, although results were not conclusive due to the degree of scavenging. It was estimated that she had been dead for up to 4 days, although the collar had not emitted the mortality signal during previous flights. No sign of kittens was found where she died, however, #55's movements between October and July suggest that she was rearing a kitten.

FP #60

This male was first captured in the Big Cypress on March 6, 1996 at an estimated 6 months of age. He established his home range in the Florida Panther National Wildlife Refuge and Fakahatchee Strand State Preserve (FAKA) with only brief excursions into SBICY. He was last handled for collar replacement on March 6, 2002. Since December of 2002, he had remained in SBICY, and during this reporting period inhabited a 698-km² home range which was significantly smaller than the 1695-km² combined home range from previous years (Figure 4). He is likely the sire of 3 kittens from 1 known den in SBICY.

In mid-May of 2004, #60's movements notably decreased. He was located for 9 consecutive days within a small area on the north side of Hwy. 41 in Ochopee. He evaded observation when approached by Big Cypress staff to assess his condition. He left the area and moved approximately 2 miles northeast of Ochopee for a few days. He then returned to the same area in Ochopee. A week later #60 was located on the south side of Hwy. 41 adjacent to a private campground that housed a "petting zoo" consisting of goats, emus, peacocks, chickens, ducks, and turkeys that ran free on the property. The same day that #60 was first located south of the highway and adjacent to the campground, the campground owner sent an email to NPS complaining of the loss of some livestock.

Big Cypress and FWC staff confirmed that the livestock had been killed by a panther and made recommendations to the campground owner on housing specifications needed to protect his remaining livestock. The agencies located the panther daily and monitored the panther's nighttime movements in the vicinity of the campground. Sirens, signal horns, lights, and tapes of baying hounds were used to frighten #60 from the area, but had limited success. Because he persisted in approaching the livestock at night, #60 was caught in a live trap on June 29th. Although initial plans were to relocate him to another area, his poor condition at capture warranted removal from the wild for further evaluation.

Examination revealed that #60 weighed 90 lbs, 30 lbs less than when he was last handled in March of 2002. He had muscle wasting, little subcutaneous fat, severe anemia, bacterial infection, severe hookworm infection, and pneumonia. More significantly, he had fractures of the left cheekbones and mandible as well as skin abrasions and muscle injuries on his left side, suggesting that he may have been struck by a vehicle in mid-May when he first showed restricted movements in the Ochopee area. Although magnetic resonance imaging showed no evidence of brain injury, an electromyography indicated that there was nerve damage on the left side of his face that might preclude his ability to kill prey. This, along with his continued abnormal behavior, i.e., a lack of fear of humans, may prevent his return to the wild (Land et al 2004).

FP #70

This female was born on May 7, 1997 in the Turner River Unit. She and her sibling were the first offspring of TX 107, one of the 2 Texas cougars released into SBICY in 1995. FP #70 was first captured on February 25, 1998 at the age of 10 months and dispersed at the age of 16 months to the western

Turner River Unit. Her first litter, sired by FP #79, was born June 14, 1999. Two females and 1 male were marked at the den and radio-collared while still with her. She successfully raised them to dispersal age. FP#70's collar malfunctioned on January 24, 2000.

FP#70 was recollared on March 10, 2003. She weighed 97 lbs. and was in good condition. During subsequent tracking, it was found that she was raising 2 kittens, estimated at 6 months of age. She dened again on May 26, 2004 and, on June 6, 3 kittens, 2 females and 1 male, were marked. FP#70's home range during this reporting period was 154 km², significantly less than the 377-km² area she has used since she was first collared (Figure 5). Home range shifts could not be detected since there was a 3-year period between collar failure and recollaring.

FP #71

This female, the sibling of FP #70, was born on May 7, 1997 in the Turner River Unit. She was first captured on March 5, 1998 at the age of 10 months, left her mother at the age of 16 months, and dispersed to the Addition Lands south of I-75. She established a 300-km² home range that bordered I-75. Her first litter, sired by #79, was born June 18, 1999. Two males and 2 females were marked at the den. Two were subsequently radio-collared; one likely died early based on observations of the family, and the status of the fourth is unknown. FP#71's collar malfunctioned on July 10, 2000. On February 17, 2004, the FWC team captured #71 in the Addition Lands north of I-75 and, since then, she has not returned to SBICY.

FP #79

This male was born to an introduced Texas cougar, Tx101, on the Seminole Indian Reservation in September of 1995. He was first captured on March 3, 1999 at 3.5 years of age in the Turner River Unit, over 47 km from his birth site. Since then, he has been monitored until his collar failed on October 4, 2003. He was captured on March 17, 2004 and fitted with a Generation III GPS collar (Telonics, Inc.) programmed to obtain 5 diurnal fixes on a daily basis. At 8.5 years of age, he weighed 147 lbs, was in excellent condition, and surprisingly had no bite wounds or scars from intraspecific fights.

FP#79 has been the dominant breeder in SBICY, having bred at least 7 individual females who produced 32 kittens in 12 litters since 1998, based on field monitoring information. He may also have sired an additional 11 kittens in 5 litters, however, this has not yet been confirmed through genetics. His home range during the 5.5 months of this past year that he had a functioning collar was 643 km². This is half the size of his 1,304-km² home range from all previous years (Figure 6).

FP #86

This female was born in the Addition lands south of I-75 to FP #71 on June 18, 1999. She was first captured on February 21, 2000 at 8 months of age. She dispersed at 12 months and established a home range in the Corn Dance Unit. When handled on February 27, 2001, it was noted that she had a healed left distal tibial fracture. During the April 1, 2003 workup, a bony calcification of the left proximal metatarsal and a grade II (out of VI) protosystolic heart murmur were noted. Although she was assessed to be in very good physical condition, #86 weighed only 64 lbs at the age of 3.5 years. Employees of an oil extraction company within the home range of #86 had reported several observations of a panther that limped. These sightings coincided with her locations during monitoring flights within the same timeframe.

FP #86's limited movements in October 2003 suggested that she might be denning, therefore, Big Cypress staff set up the remote monitoring device (Land et al 1998). The more intensive monitoring indicated that she had not left the hammock for 4 days. On November 3, when Big Cypress staff approached her on the ground, she eluded observation. On November 5, she was observed dragging her right hind leg. On November 6, Big Cypress and FWC staff tranquilized her on the ground without the use of hounds. She was severely emaciated and dehydrated. She also had a large tumor at the base of the tail and exhibited hind end paralysis. She was removed from the wild for further evaluation. FP86 was euthanized on November 7 after it was found that she had permanent damage to her spinal cord, possibly due to an injury. Prior to being euthanized, her gametes were removed for oocyte cryopreservation (Land et al 2004). Her metatarsal injury may have contributed to the fact that she never denned in spite of having been with a collared male panther on 4 known occasions.

FP86's home range during the 4 months she was monitored during this reporting period encompassed 50 km² and was within the 141-km² home range from all previous years (Figure 7).

FP #91

This female was born to FP #70 on June 14, 1999 in the Turner River Unit. She was first captured on March 17, 2000 at 9 months of age. The tranquilizer dart tip imbedded in her knee, so she was removed from the wild to determine whether the foreign object would be life threatening. She was transported to Lowry Park Zoo where veterinary staff concurred that the needle was solidly imbedded in the patella with no impact to surrounding tissues or ligaments. She was returned to Big Cypress that night and successfully reunited with her family the next morning. When recaptured for routine collaring on March 21, 2001, no evidence of arthritis, osteomyelitis or other inflammation was found.

FP #91 dispersed at 13 months and made extensive movements both north and south of I-75. She was recollared on March 18, 2003. Although no physical abnormalities were noted, she was a small animal with thin muscling, weighing 66 lbs, 7 lbs less than she had 2 years prior. The affected knee joint palpated normally and exhibited the full range of motion.

During the routine flight on December 12, 2003, the collar of #91 was emitting the mortality signal. She was found dead laying on a swamp buggy trail with no obvious indication of a struggle. There were, however, bite marks on the back of her head and neck, signifying that she had been killed by another animal. Fresh male tracks were found on the trail. The necropsy confirmed that she had died of intraspecific aggression. Although she had been documented with a collared male panther on 2 occasions, she never denned and the necropsy confirmed that she had never nursed.

During the 5.5 months of this reporting period, #91 had a 156-km² home range that was within the 495-km² home range from all previous years (Figure 8).

FP #93

This female was born to Tx #107 on February 22, 1999 in the Turner River Unit. She was first captured on April 10, 2000 at 14 months of age. She did not reunite with her mother post-capture, but was seen on May 1 with an uncollared panther, likely one of her 2 siblings. She remained in SBICY, establishing a 197-km² home range in the Turner River Unit (Figure 9).

When #93's malfunctioning collar was replaced on February 28, 2002, her progesterone levels indicated she was pregnant. She gave birth to her first litter on April 6, 2002, consisting of 3 females and 1 male. She was observed from the monitoring plane with 3 kittens on October 11, 2002 and the tracks of 3 offspring, 2 females and 1 male, were observed with hers on March 31, 2003. Her male offspring, K115, was captured on April 2, 2003. The status of the 2 females is unknown. FP#93 next denned on July 16, 2003 and, on August 5, 3 kittens, 2 males and 1 female, were marked. Her collar failed on August 30, therefore, she was monitored only 2 months during this reporting period and her locations centered on the den site (Figure 9).

FP #102

This female was born to #55 on February 8, 1998 in the Turner River Unit. She was first captured on February 20, 2001 at 3 years of age. At least 2 kittens were with her, one of which (FP #103) was captured a month later at an estimated 10 months of age. FP #102 denned again on June 25, 2001 and 2 males were marked 3 weeks later. Neither has been collared. FP #102 next denned on July 5, 2002, only a year after her previous den. One male and 1 female were marked at this den and their tracks were documented with hers on April 11, 2003. FP #102 was recollared on March 24, 2004. She weighed 85 lbs and was in late term pregnancy. She apparently lost the fetuses but was bred a month later and denned in August. FP #102 inhabited a 188-km² home range during this reporting period, with little shift from her 174-km² home range compiled from previous monitoring (Figure 10).

FP #103

This female, an offspring of FP#102, was first captured in the Turner River Unit on March 13, 2001 at an estimated 10 months of age. She was with #102 through April, except for several days when #102 was bred by #79, the territorial male. When #103 dispersed at an estimated 11 months of age, she moved east into the Corn Dance Unit. Her collar failed prematurely on December 23, 2003, however, she was recollared on February 27, 2004. She weighed 70 lbs, was in very good condition, and was not pregnant. Her 238-km² home range shifted slightly from her 234-km² home range compiled from all previous monitoring (Figure 11). FP#103 is currently 4 years of age, and, although she has been documented with a male on 4 occasions, has not denned.

FP #104

This male was first captured on April 2, 2001 at the estimated age of 6 to 7 months. His parentage is unknown, however, it is suspected that he is the offspring of FP #70 because he was captured within her home range. During capture, he sustained a capture-related mid-shaft fracture of the right radius and ulna and was removed from the wild. He was treated and housed at the Lowry Park Zoo for 8 weeks and, on June 4, 2001, was taken to White Oak Conservation Center for further rehabilitation. He was released in the Turner River Unit on November 28, 2001.

FP #104 ranged widely post-release, traveling west to FAKA, southeast into the Loop and Stairsteps Units, and north under I-75 into the Addition Lands and Tribal Lands. He settled into a 474-km² home range in the Corn Dance Unit. His 381-km² home range during this reporting period shifted further south in the Corn Dance Unit (Figure 12). Since 2 years of age, he has been documented with 4 adult females on 11 occasions. To date, none have denned.

FP #119

This male was born to #93 on April 12, 2002 in the Turner River Unit. He was collared at 12 months of age on April 2, 2003, weighed 76 lbs and was in excellent physical condition. He did not reunite with his mother, but remained within a 1.6-km radius from the capture site for about 2 weeks. During this time, his mother was bred so his natural dispersal was imminent. When he left his natal range, he inhabited the Deep Lake and Turner River Units (Figure 13) until the breakaway device on his collar separated on August 12, 2003.

FP #120

This female was first collared on April 8, 2003 in the Turner River Unit at an estimated 3 years of age. Her parentage is unknown. She weighed 82 lbs and was in excellent physical condition. Her 42-km² home range was bisected by Hwy. 41 (Figure 14). In January 2004, #120 denned south of Hwy. 41. On February 7, 2 kittens, 1 male and 1 female, were marked at the den. In mid-March, her movements indicated that she had left the den with the kittens, but remained south of Hwy. 41. Given her proximity to the road and the likelihood that she would eventually attempt to cross with her kittens, Big Cypress

asked the FWC Division of Law Enforcement in early May to increase monitoring of nighttime traffic in the Panther Speed Zone that had been established in the Ochopee area. FWC complied by conducting almost nightly enforcement of the posted 45-per-hour speed limit.

In spite of this effort, at 6:45 on the evening of July 11, #120 was struck by a vehicle. FWC officers witnessed the collision. The panther lay momentarily on the side of the road, but when approached, swam the canal on the north side and retreated into the woods. The next morning, she was tranquilized on the ground and removed for examination. She had a compound fracture of the right femur and significant blood loss. As of October 2004, she is still in captivity. She has gained weight and her leg is healing, although slowly. Her lower right canine, damaged in the collision, has been extracted, and she has damaged her lower left canine while in captivity (Mark Cunningham, pers. comm.).

At the time #120 was removed from Big Cypress, her kittens were 5.5 months old, too young to survive in the wild. Based on #120's restricted movements and sign at one of her kill sites, it was believed that at least one of her kittens was still with her. Therefore, on July 13, NPS, FWC, and the Collier County Sheriff's office slowed traffic in the Ochopee Panther Speed Zone while the houndsman used his dogs to search for the kittens. No kittens were found. Also that week, several venison bait piles surrounded by tracking medium were set up in the woods near the collision site and inspected daily. No sign of the kittens was found. On August 2, the male kitten of #120 (K156) was struck by a vehicle and killed in the same location as #120's collision. He was severely undernourished, weighing only 20 pounds at 6 months of age, but had survived 23 days without the care of his mother.

FP124 and Kittens 125 and 126

This family was first reported in September of 2003 as a group of 4 panthers, 3 of which were reported as smaller, on Loop Road near Pinecrest. This community in eastern Big Cypress consists of approximately a dozen private residences and weekend retreats. For the next 4 months, Big Cypress staff received occasional reports of sightings of both individual panthers and a female with 2 kittens in the Pinecrest area. Since some of these reports included evidence of habituated behavior on the part of these panthers, they were the focus of capture work when the Big Cypress team convened in early February.

On February 13, 2004, 3 panthers were treed at 1 location in Pinecrest. The adult female, #124, weighed 70 lbs and was estimated to be 3 to 4 years old. One of the 2 kittens, #125, was a male also weighing 70 lbs. He was examined for testicle development and had 2 descended testicles. The other kitten, #126, weighed 60 lbs and was recorded as a female. This error likely occurred because sedation and thus the workup time for the 3 panthers were kept to a minimum to facilitate the reunion of the family. FP#126 was correctly sexed as a male when recaptured on May 28th. Both kittens were treed on March 22 and given a booster for feline leukemia via the dart gun. The family inhabited a 199-km² home range in the Loop and Stairsteps Units (Figures 15, 16, and 17). At times #124 was with the kittens; at other times she left 1 or both behind.

The kittens were estimated at 10 months when captured on February 13. This aging was based on their size and weights (60 and 70 lbs), and by tooth eruption and wear examined by the houndsman. Photos of the family group taken since September 2003 also supported the 10-month-old age estimate. When #126 was handled on May 28, it was aged, however, by FWC at 11-12 months rather than 14 months (Land et al 2004; email from FWC expressing concern about #126's chances of survival on his own). The revised age was based on the kitten's size and weight (although the same as 3.5 months previously). If #125 and #126 were 11 months on May 28, they would have been 7-8 months when first captured in early February. Tracing their age back further, the mother with a kitten were seen and photographed on September 2, 2003 and the kitten was described as "half the size of the mother". If #126 was only 11 months of age on May 28, it would have been only 2 months old in September. The photos suggest otherwise.

In addition, #125 was last with his mother on June 22 and began dispersal movements on July 6. Had he been 11 months old on May 28, he would have dispersed at 12 months. If he was 14 months, his age at dispersal would have been 15 months, which is more consistent with known dispersal ages. It is, therefore, recommended that the estimated age of FP #125 and #126 remain at 10 months when first handled on February 13, 2004.

This “Pinecrest panther family” has become the center of concern by some Pinecrest residents and the Miccosukee Tribe of Indians, who believe that the panthers are a threat to their family members and to the children who attend programs at the Everglades National Park Environmental Education Center on Loop Road. As a result, #126 was removed from Big Cypress on May 28, 2004 and relocated to Okaloacoochee Slough State Forest. FP #125 dispersed naturally into Everglades National Park, at which time Park staff took over monitoring. He was last located on September 24 in the eastern Everglades adjacent to Krome Avenue, a heavily traveled road on the western edge of Miami. During the next monitoring flight on September 27, his collar emitted the mortality signal. On September 28, his collar was retrieved on the east side of Krome Avenue. The “break-away” leather piece, used as a safety device should the collar malfunction, had separated and the collar was misshapen, likely due to an impact with a vehicle. The status of the panther itself as of this writing is unknown, however, given the extent of distortion of the collar, it is unlikely that he survived the impact.

FP#127

This male, estimated at 2 years of age, was captured in the Turner River Unit on February 16, 2004. He had not been marked with a transponder at his den, so his parentage is unknown. He weighed 100 lbs and was in very good physical condition. He received the feline leukemia booster via dart gun on March 12. He initially inhabited the Turner River Unit, but then moved to the eastern side of Big Cypress where he has used both private lands and the Addition Lands north and south of I-75 (Figure 18).

FP #129

This female was captured in the Corn Dance Unit on February 20, 2004. Her transponder chip verified that she is kitten #89, born to panther #87 on January 23, 2001. Her father was likely #79. This 3-year-old female was in excellent physical condition, weighed 81 lbs., and was not pregnant. Her 243-km² home range is in the Corn Dance Unit (Figure 19).

UCFP62

This female kitten, estimated to be 7–8 months of age, was struck and killed on Hwy 41 in the Dade County portion of Big Cypress on January 11, 2004. She weighed 32 lbs and no transponder was detected.

Summary

The report summarizes the status of the 17 panthers monitored by the National Park Service in Big Cypress National Preserve between July 1, 2003 and June 30, 2004. It includes the death of #55 on July 8, the removal of #120 on July 12 due to injuries from a collision with a vehicle, and the subsequent loss of her dependent kitten (K156) that was hit by a vehicle on August 2. It also includes the dispersal of #125 out of the study area on July 6 and the loss of his collar on September 26.

At the onset of the reporting period, Big Cypress was monitoring 12 panthers, 8 females and 4 males. Five new panthers were caught and radio-collared. Nine (53%) were lost from the sample by mid-July: 2 (#55 and #91) were killed by other panthers, 1 (#86) was euthanized due to injuries from natural causes, 2 (#60 and #120) were placed in captivity due to injuries from collisions with vehicles, 1 (#126) was removed from the study area to honor a request from the Miccosukee Tribe of Indians, 1 (#125) dispersed from the study area and his collar came off likely due to an impact from a vehicle, and 2 (#93 and #119) had collars that failed. Two uncollared panthers (UCFP62 and K156) were struck and killed on Hwy. 41 in SBICY during the reporting period.

All 10 females monitored during this reporting period were of breeding age. Six are confirmed breeders. Two, #86 and #91, failed to breed during their 4-year lifespan. FP #103, at 4 years of age, has been with a collared male on 4 occasions yet has not denned. FP #129, at 3 years of age, has been with a collared male on 4 occasions during the reporting period, but has not yet denned.

The average home range (95% MCP) of the 3 resident males was 574 km² (Table 20). The average home range of the 9 resident females with a minimum of 50 locations during the reporting period was 163 km² (Table 21).

Recommendations:

1) Initiate interagency discussions on the construction of a wildlife underpass on Hwy. 41 near Turner River.

This area has the highest level of known panther crossings, injuries, and deaths. With the planned resurfacing of Hwy. 41 to make it a safer road for human travel, something needs to be done to also increase the safety of the road for wildlife. Discussions should be initiated to build an underpass at Turner River similar to those built on S R 29 in high panther use and mortality areas.

2) Determine the reproductive capability of #104 when he is recollared in 2005.

For the past year and a half, #104 has been documented with 4 adult female panthers and none of them have denned. If neither female #103 nor #129 dens this fall, a semen analysis should be conducted when he is handled in the spring during routine collar replacement.

3) Maintain the level of capture effort in the Big Cypress study area in order to maintain an adequate sample of monitored panthers with which to meet the project objectives.

This past year 53% of the panthers monitored in the study area were lost from the sample. It is essential to continue or increase the 2004 level of capture effort to meet the project's goals.

Acknowledgments

The success of our work this past year is once again due to staff support at Big Cypress, whether it be those in administration, maintenance, interpretation, law enforcement, or resource management. They are always willing to handle equipment orders, repair swamp buggies, ready team housing, examine mortality sites, and encourage the visitor to drive slowly and watch for wildlife crossing the roads.

Carol Clark, Acting Superintendent of Big Cypress, is commended for her dedication to doing what is right for the resource. Ron Clark, Resource Management Division Chief, is recognized and appreciated for his unwavering support of panther recovery and his efforts to secure funding. In addition to base funding that supports this project, special funds from the NPS Southeast Regional Office were acquired this year to provide increased monitoring of the Pinecrest panthers.

Special thanks to volunteer Annette Johnson, who participated in captures and den work, conducted the majority of the fixed-wing flights, and never gave up until she got the locations precise. Helicopter pilot Bill Evans not only got us to where we needed to be quickly, but he became an integral part of the team once there. Big Cypress rangers John Bowie and Derek Dalrymple and USFWS technician Dennis Giardina provided their overall field skills and tree climbing expertise to the team.

Table 1. Florida panthers captured and radio-collared in SBICY in 2004.

ID#	K#	Capture Date	Gender	Age (yrs)	Type	Capture Location	
						Easting	Northing
124	none	February 13	F	~3-4 yrs	new	507500	2849267
125	none	February 13	M	~10 mo.	new	507500	2849267
126	none	February 13	M	~10 mo.	new	507500	2849267
127	none	February 16	M	~2 yrs.	new	474246	2877949
129	K89	February 20	F	3 yrs.	new	510657	2872210
103	none	February 27	F	~4 yrs.	failed collar	507216	2870947
79	K19	March 17	M	8.5 yrs.	failed collar	482903	2875015
102	K48	March 24	F	~ 6 yrs.	recollar	489957	2864214

Table 2. Panther status and extent of use of SBICY between July 1, 2003 and June 30, 2004.

ID#	Gender	# Locations	%	Home Range (km²)	Origin	Class	Status (30 June 04)
55	F	154	100	196	SBICY	resident	dead (July 8)
60	M	146	93	698	immigrant	resident	removed June 29; in captivity
70	F	153	100	154	SBICY	resident	alive
79	M	85	100	643	immigrant	resident	alive
86	F	52	100	50	SBICY	resident	dead (euthanized Nov. 7)
91	F	62	100	156	SBICY	resident	dead (Dec. 12)
93	F	22	100	-	SBICY	resident	unknown; failed collar (Aug. 30)
102	F	156	100	188	SBICY	resident	alive
103	F	123	100	238	SBICY	resident	alive
104	M	155	97	381	SBICY	resident	alive
119	M	17	100	-	unknown	unknown	unknown; failed collar (Aug. 12)
120	F	153	100	42	unknown	resident	in captivity (July 12)
124	F	91	100	199	unknown	resident	alive
125	M	92	100	-	SBICY	disperser	likely dead (Sept. 26)
126	M	63	100	-	SBICY	-	translocated (May 28)
127	M	58	60	-	unknown	disperser	alive
129	F	55	100	243	SBICY	resident	alive

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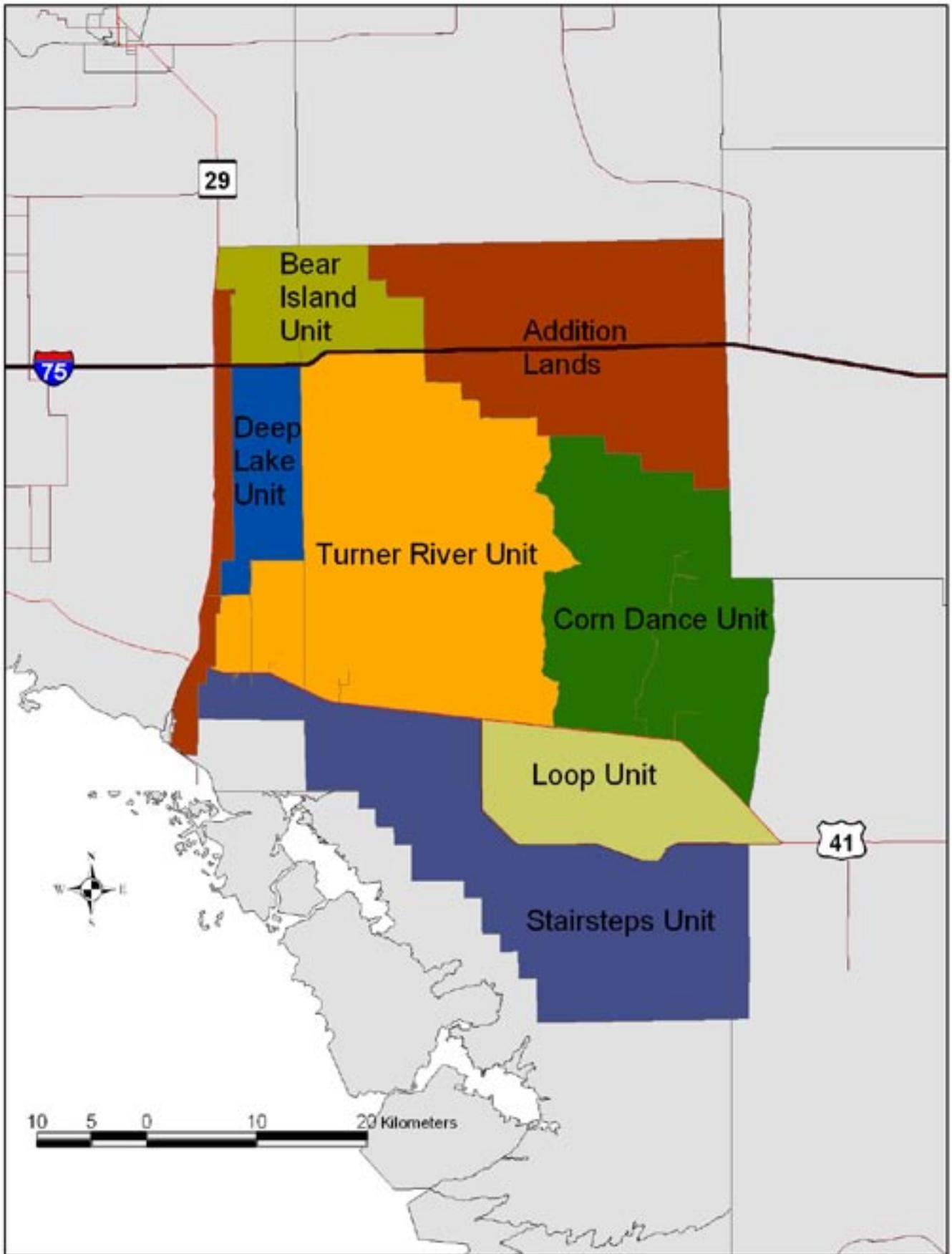


Figure 1. Management Units

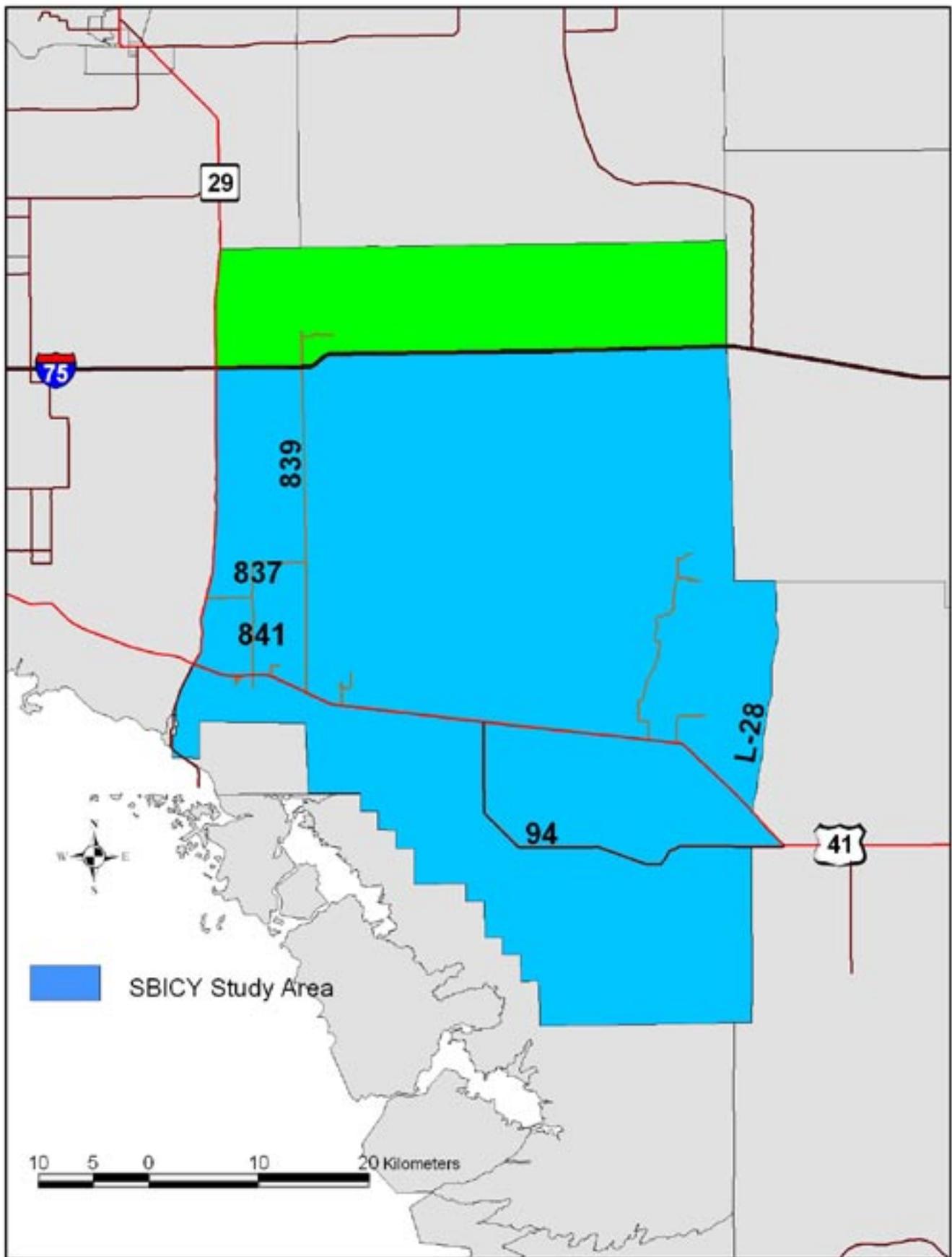


Figure 2. Roads of Big Cypress National Preserve.

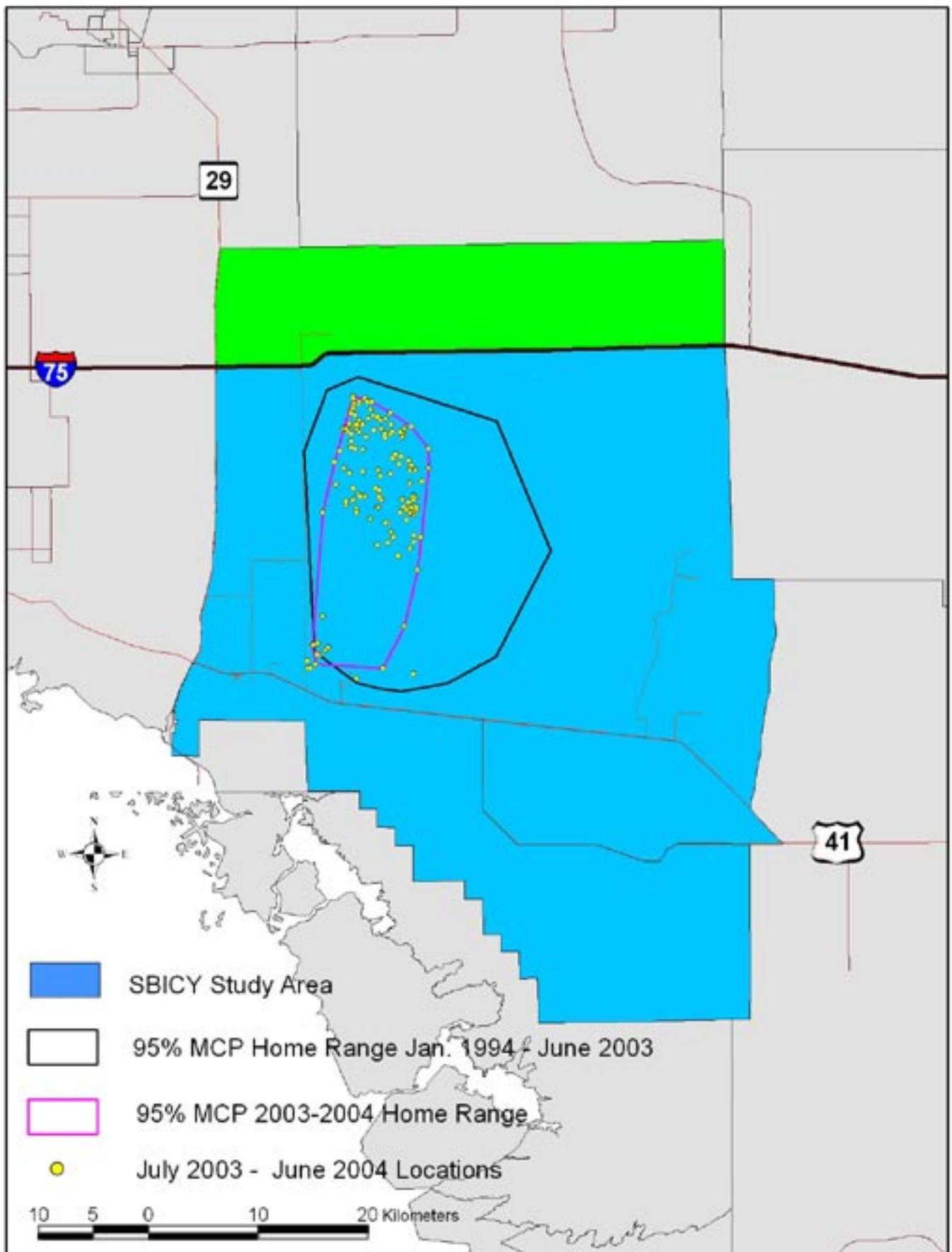


Figure 3. Home range of female Florida panther #55.

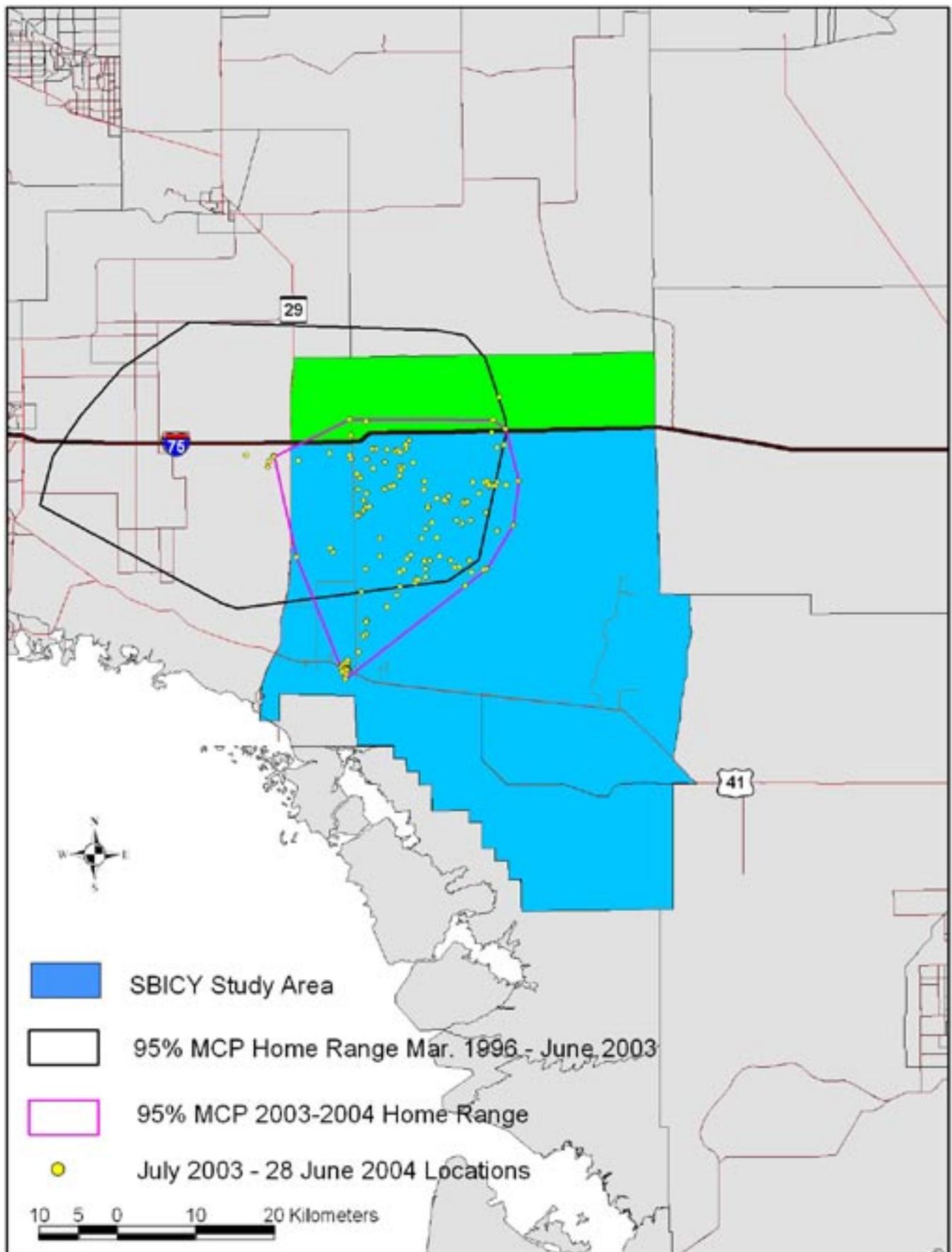


Figure 4. Home range of male Florida panther #60.

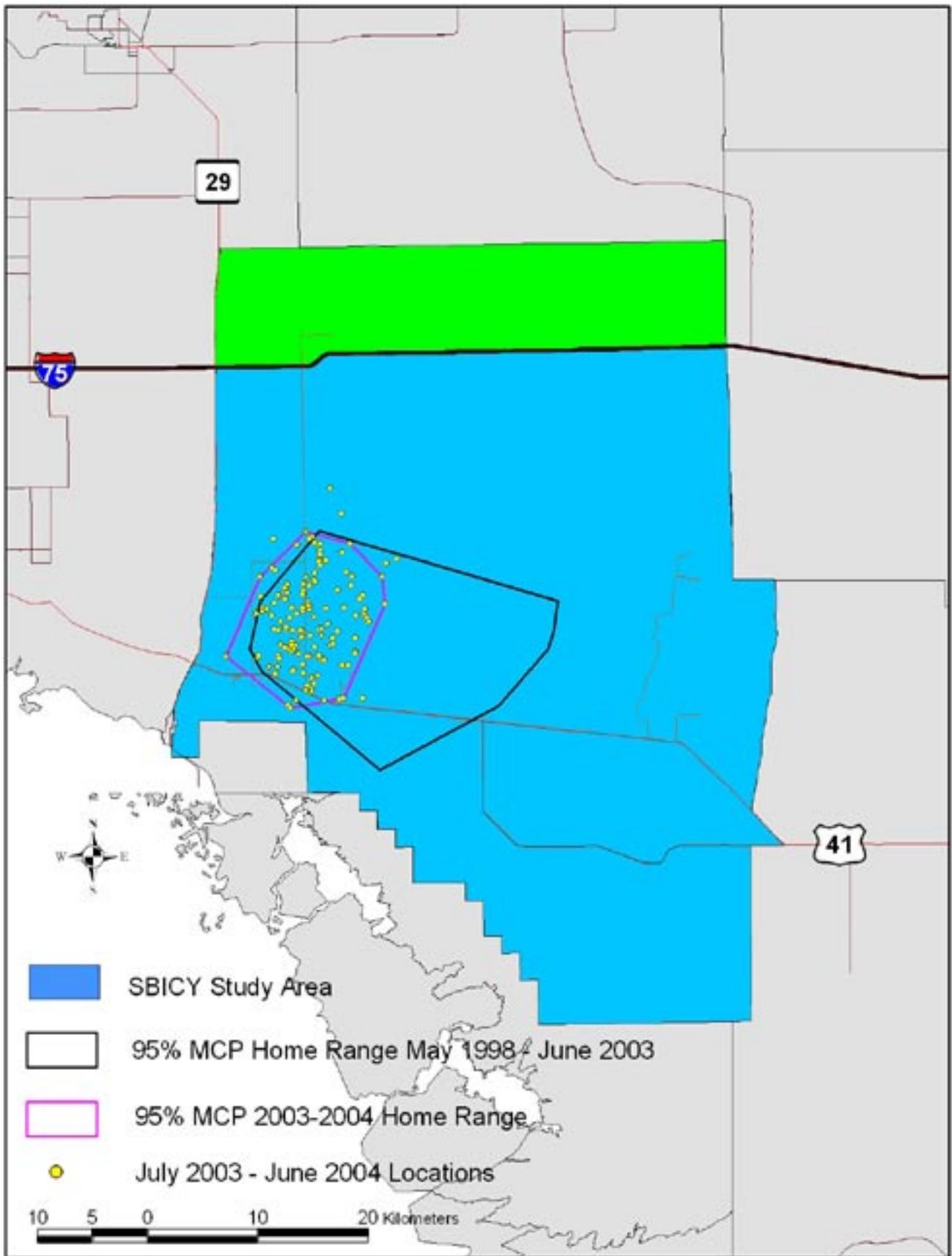


Figure 5. Home range of female Florida panther #70.

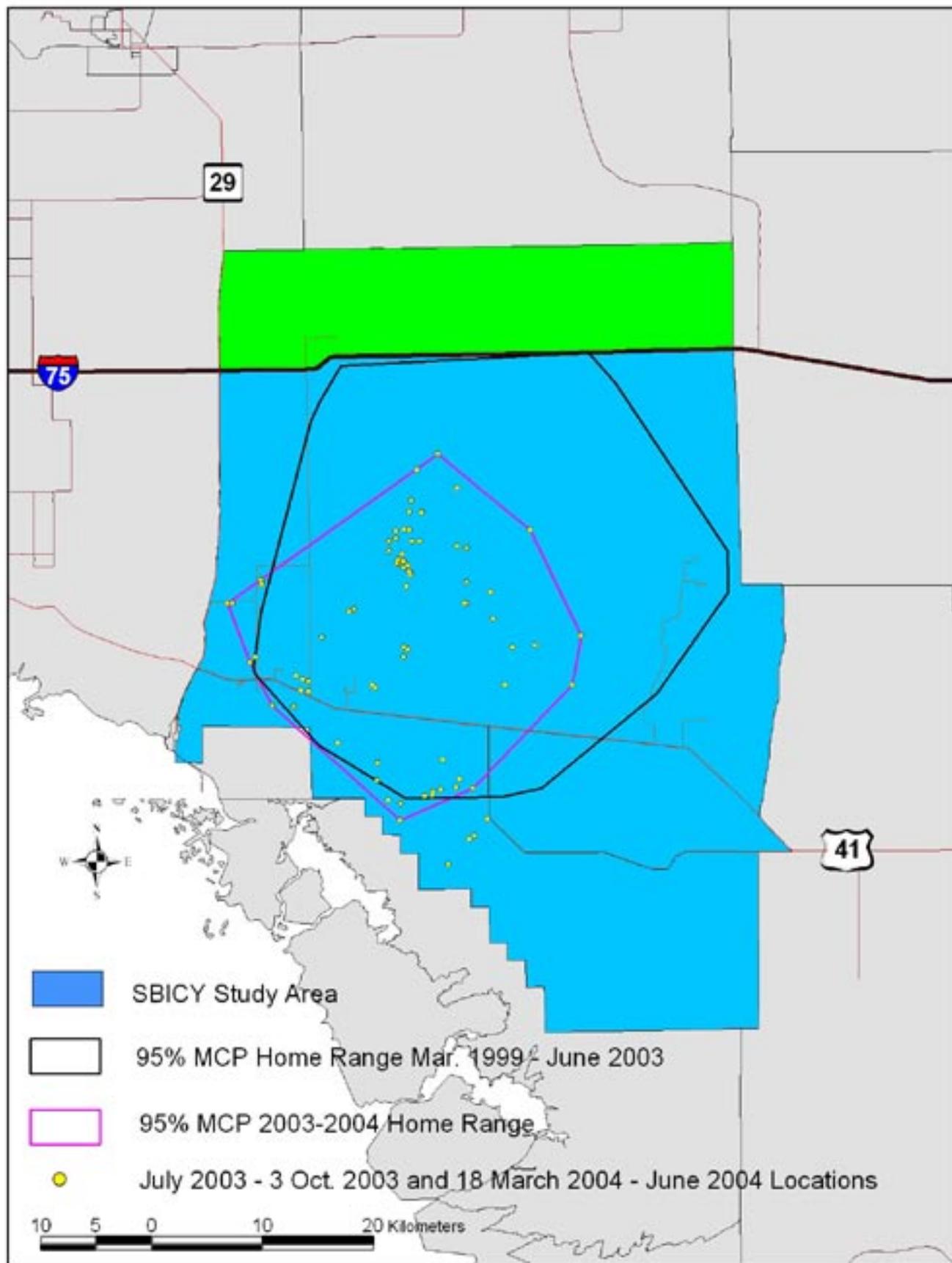


Figure 6. Home range of male Florida panther #79.

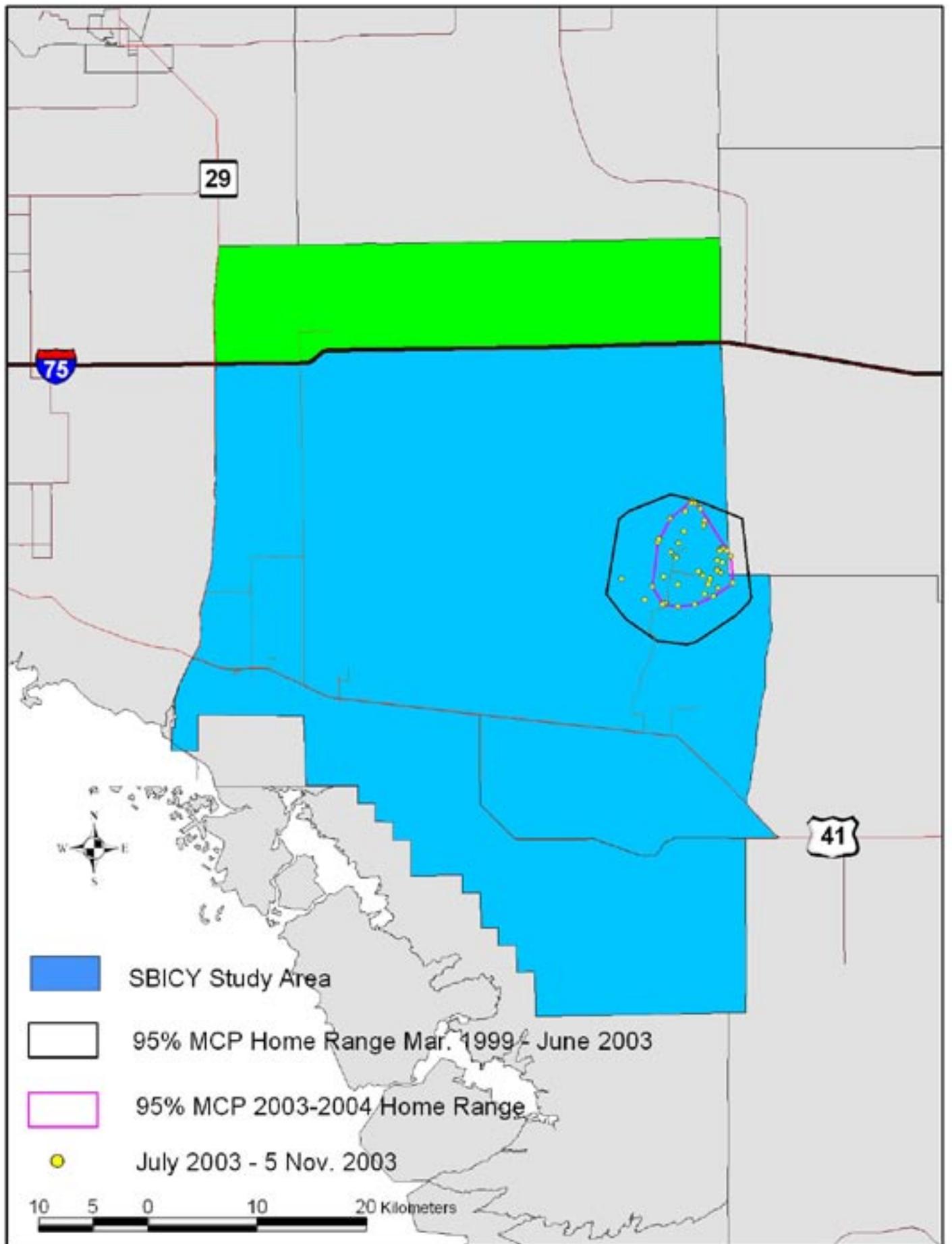


Figure 7. Home range of female Florida panther #86.

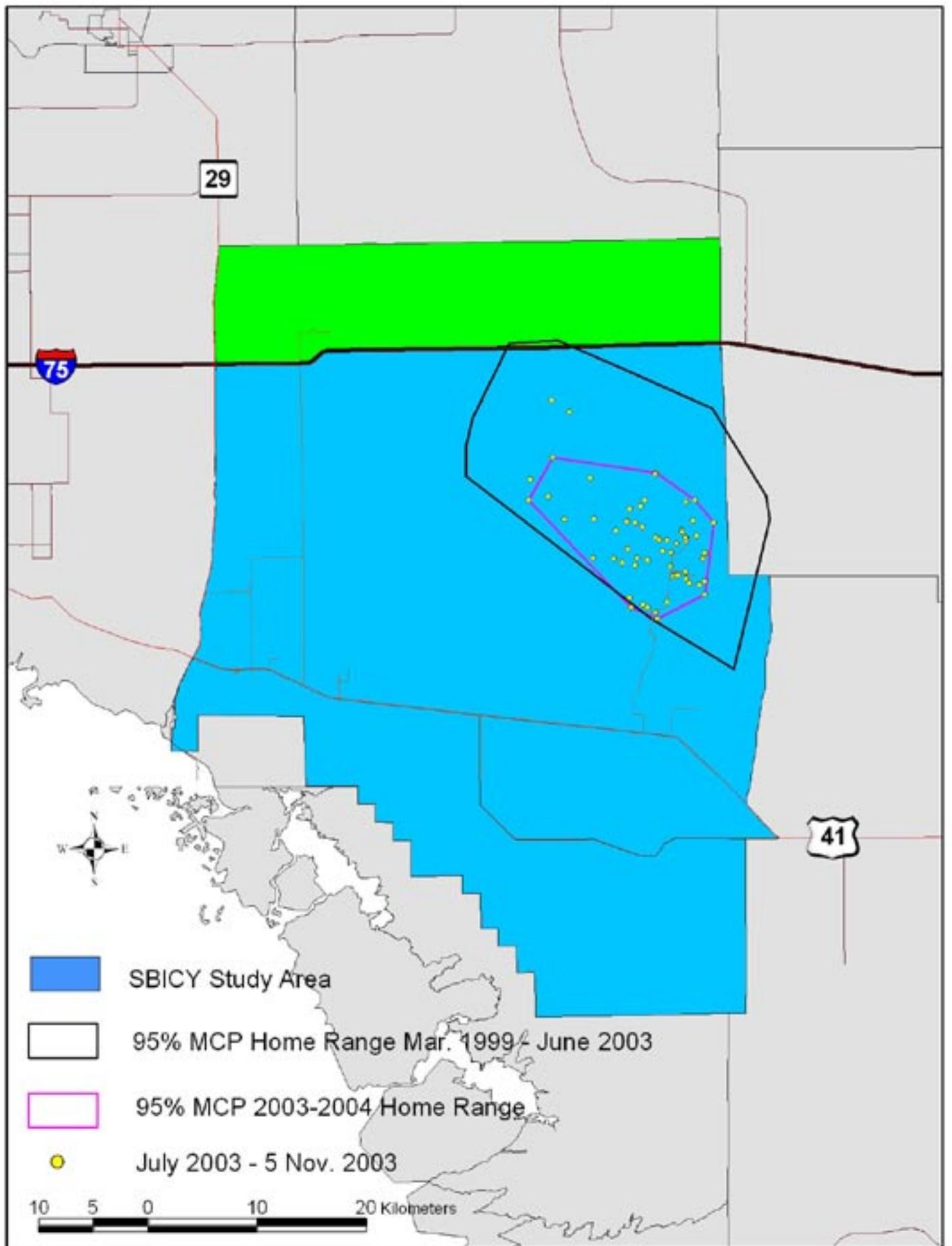


Figure 8. Home range of female Florida panther #91.

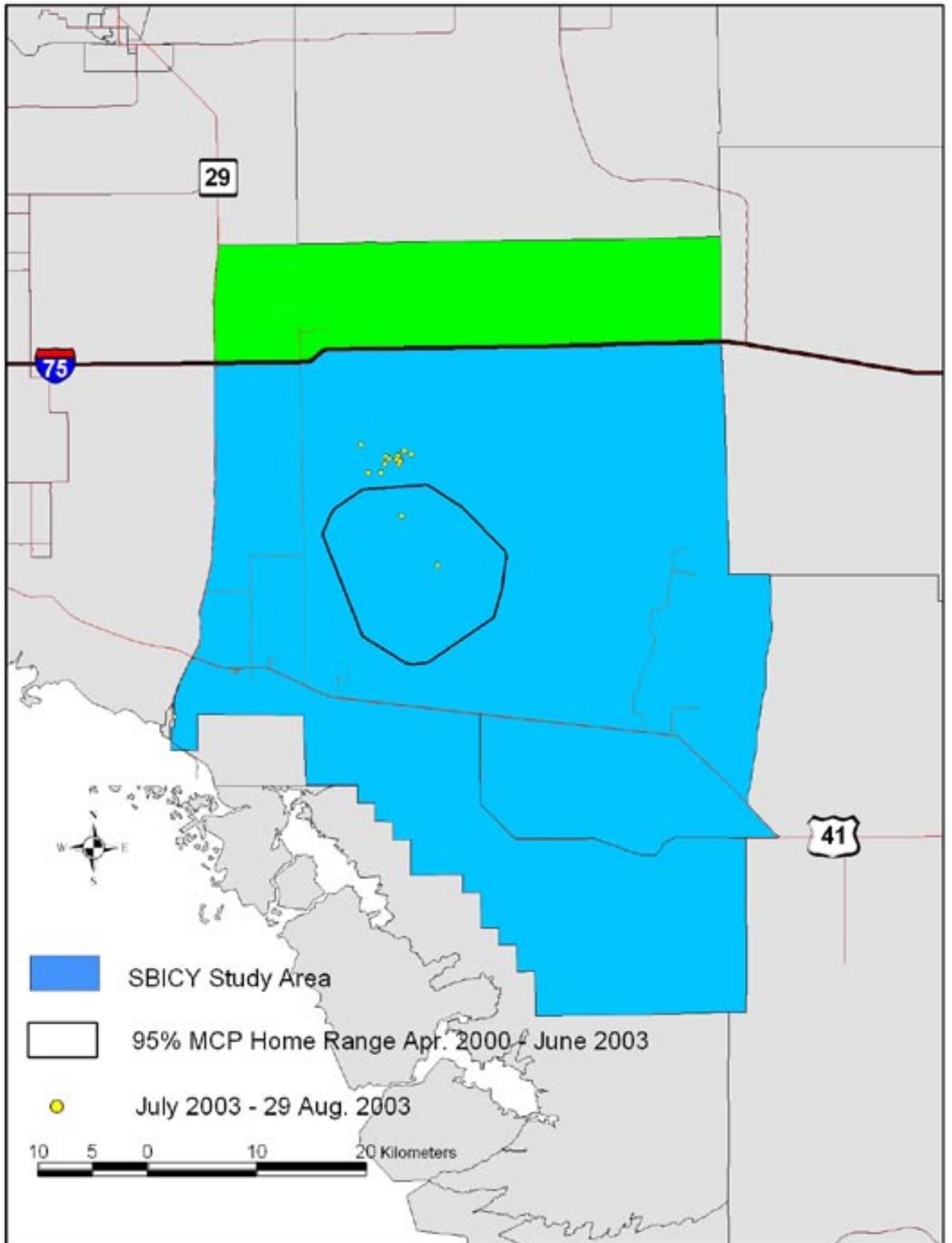


Figure 9. Area of use by female Florida panther #93.

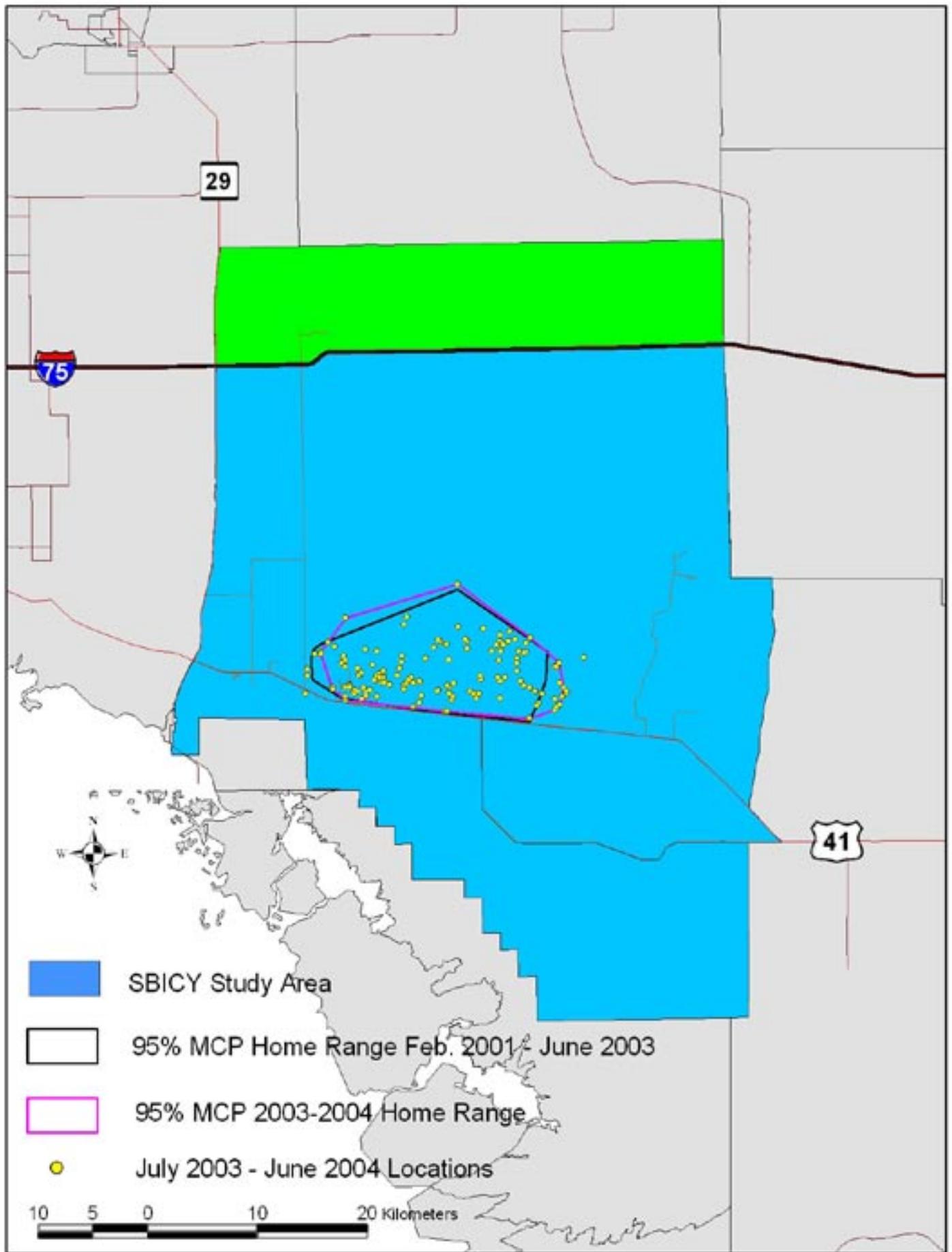


Figure 10. Home range of female Florida panther #102.

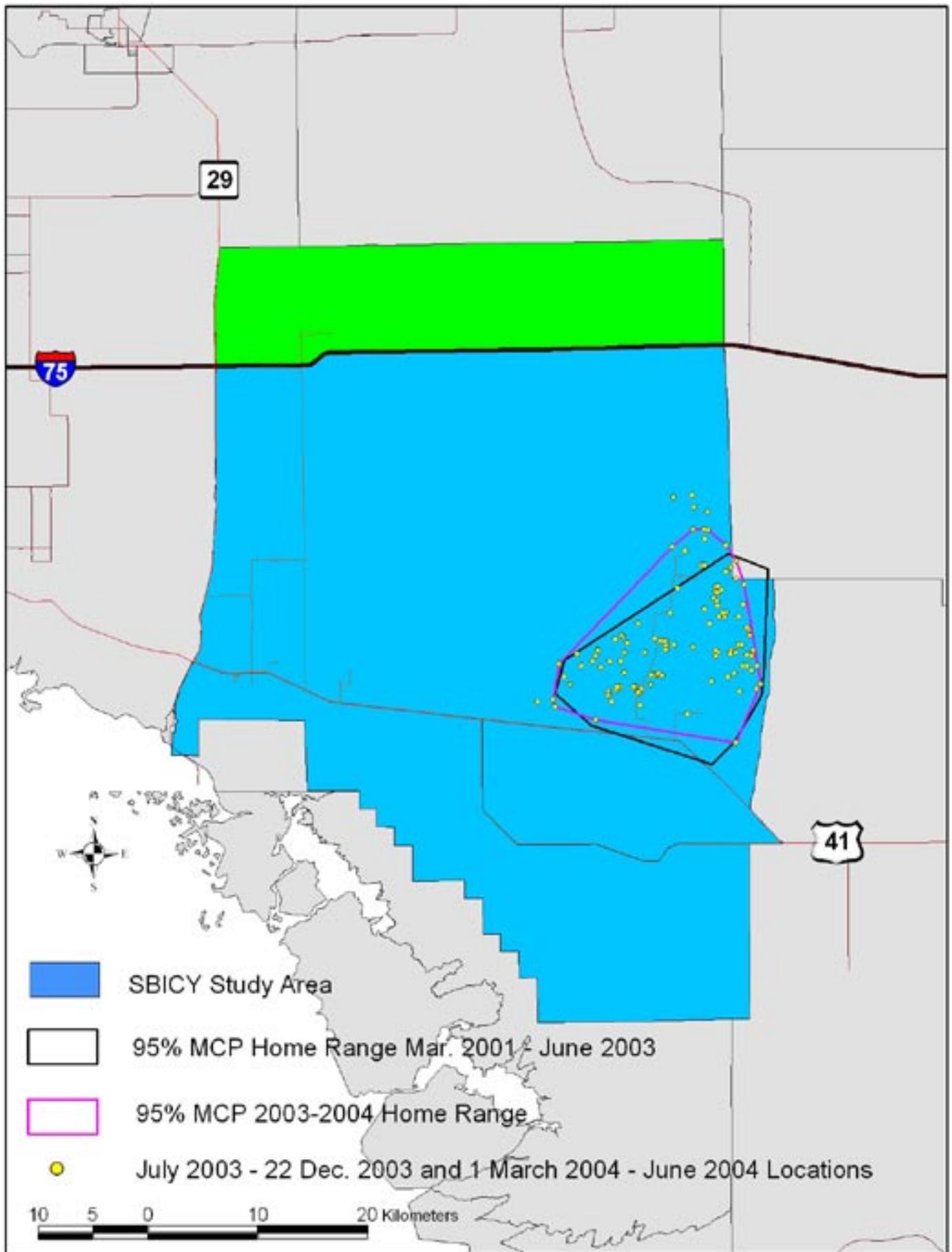


Figure 11. Home range of female Florida panther #103.

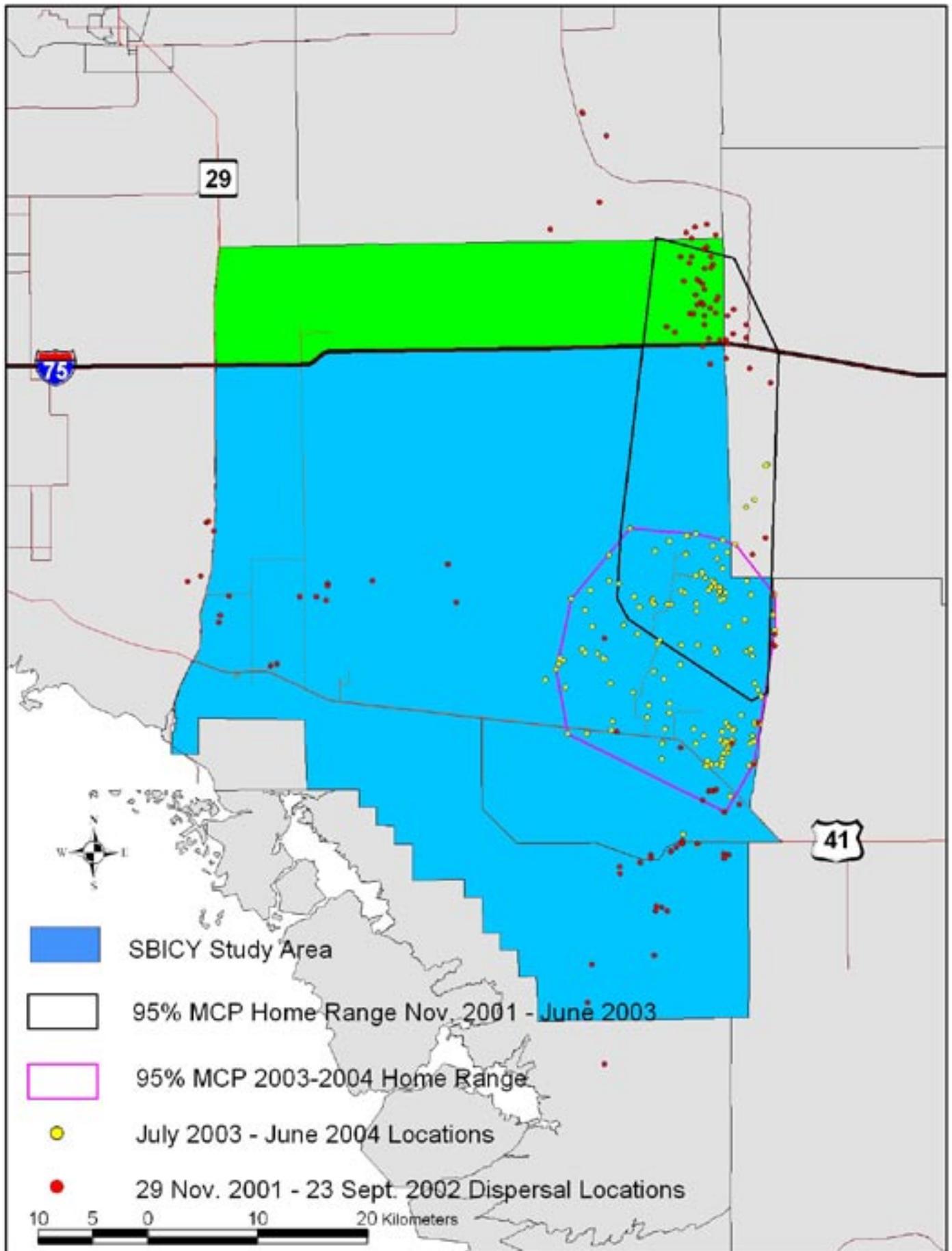


Figure 12. Home range of male Florida panther #104.

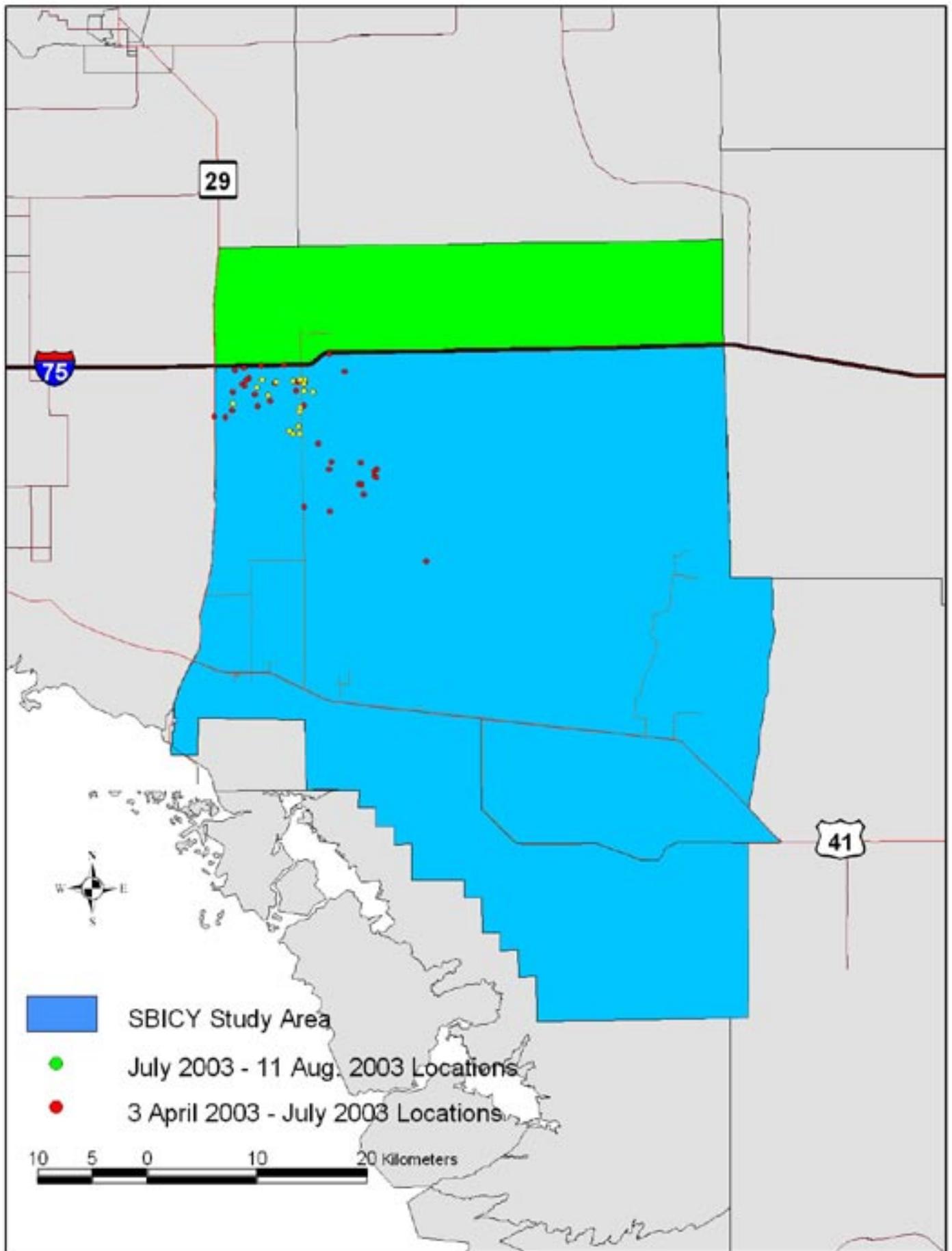


Figure 13. Area of use by male Florida panther #119.

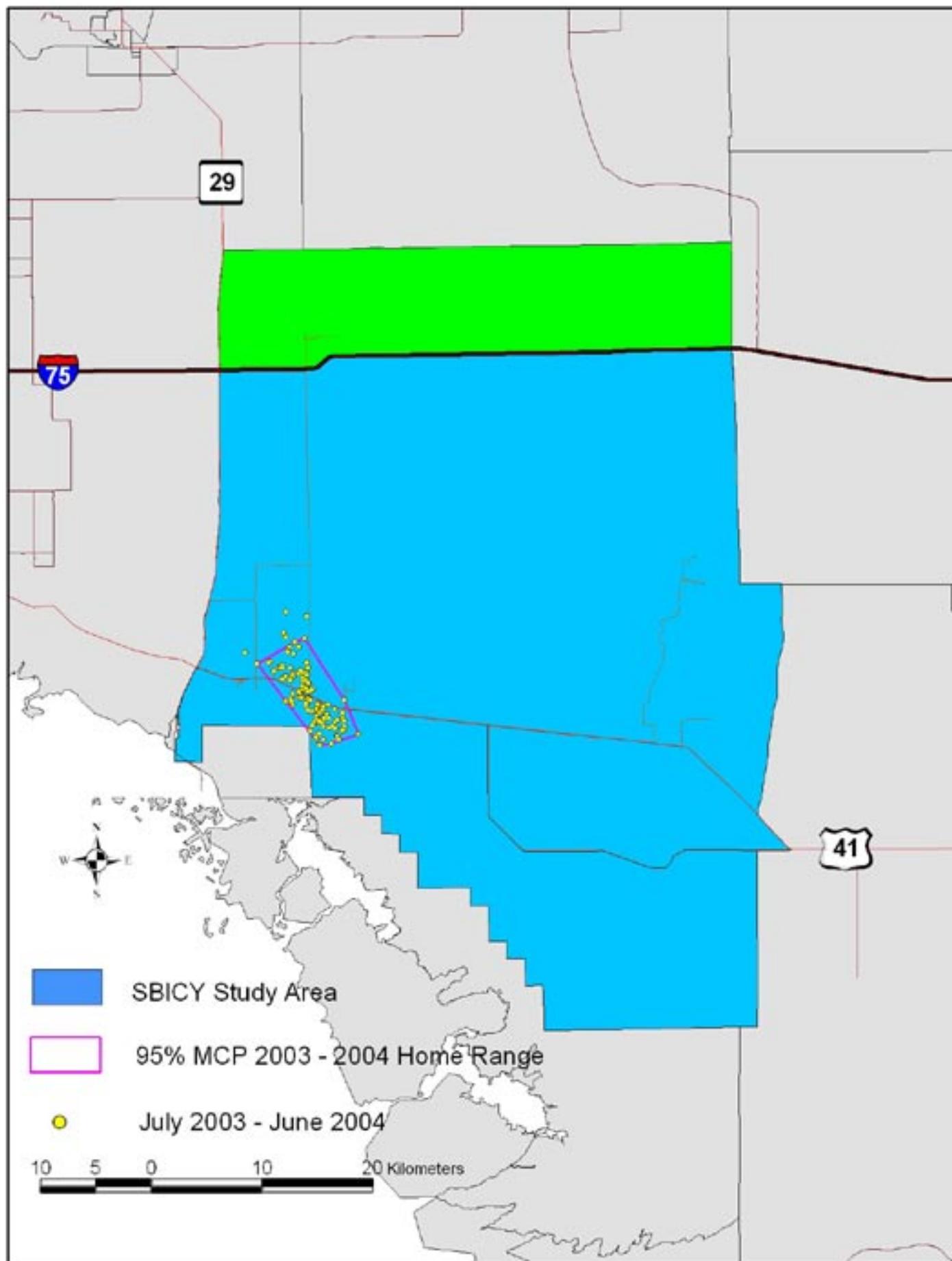


Figure 14. Home range of female Florida panther #120.

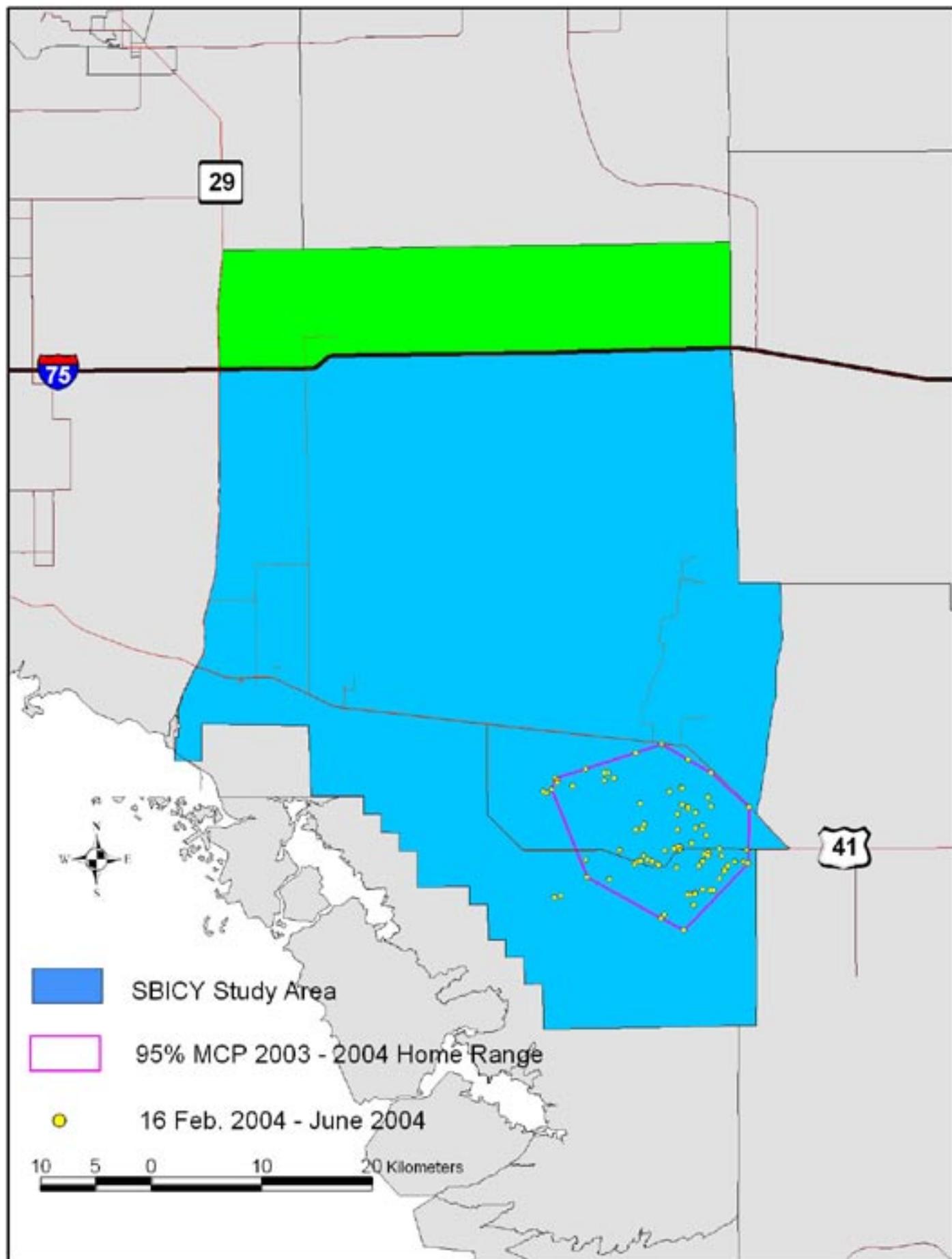


Figure 15. Home range of female Florida panther #124.

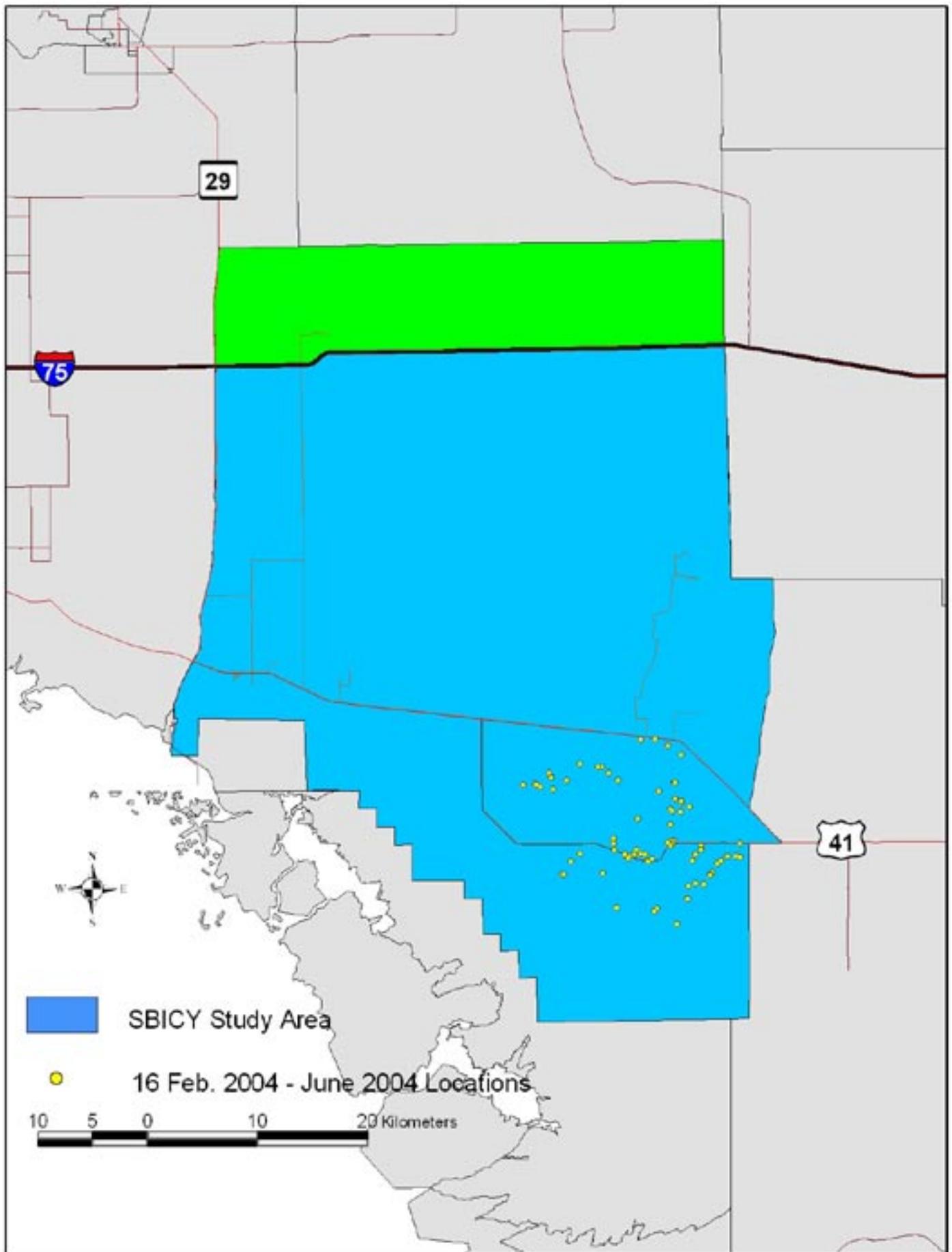


Figure 16. Area of use by male Florida panther #125.

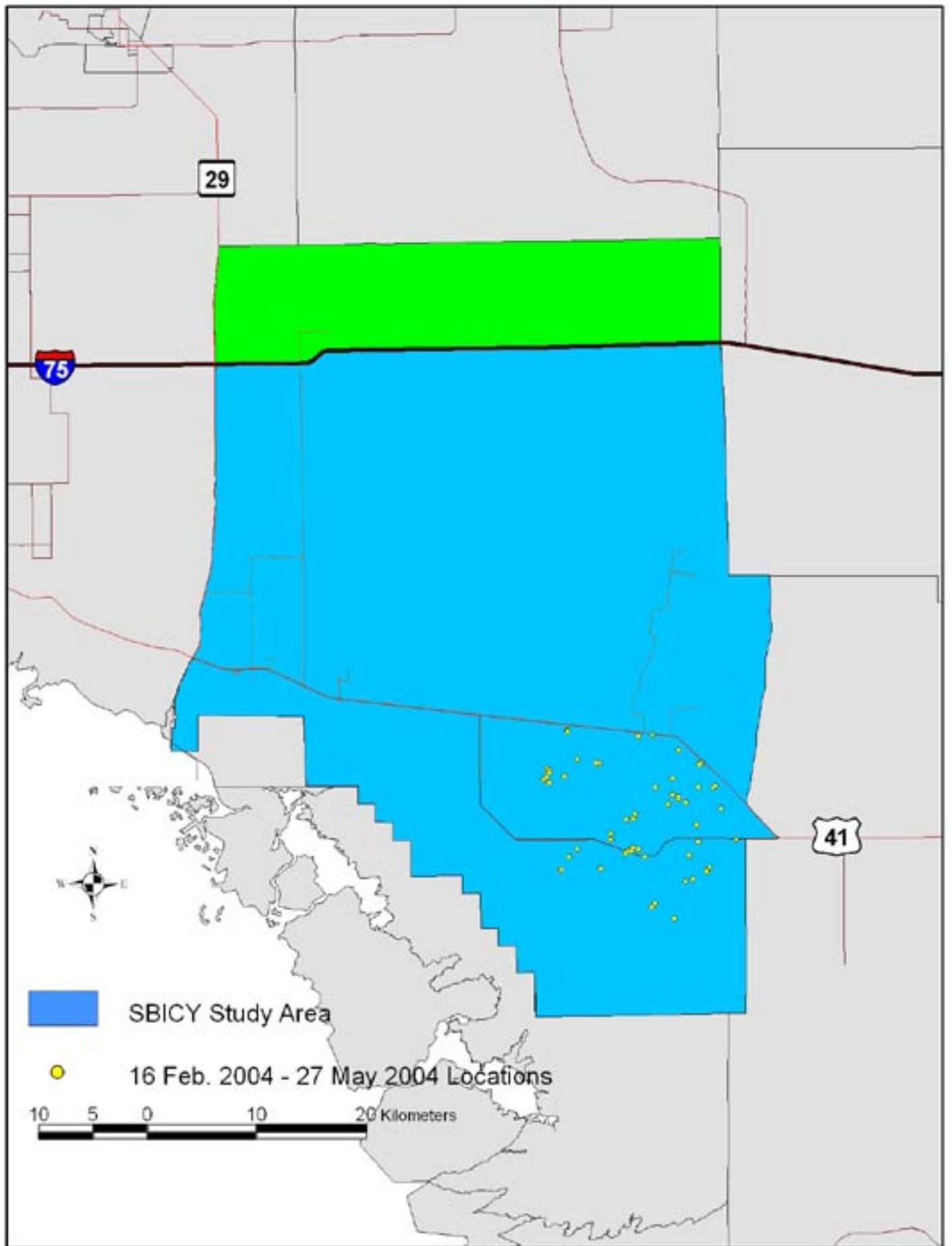


Figure 17. Area of use by male Florida panther #126.

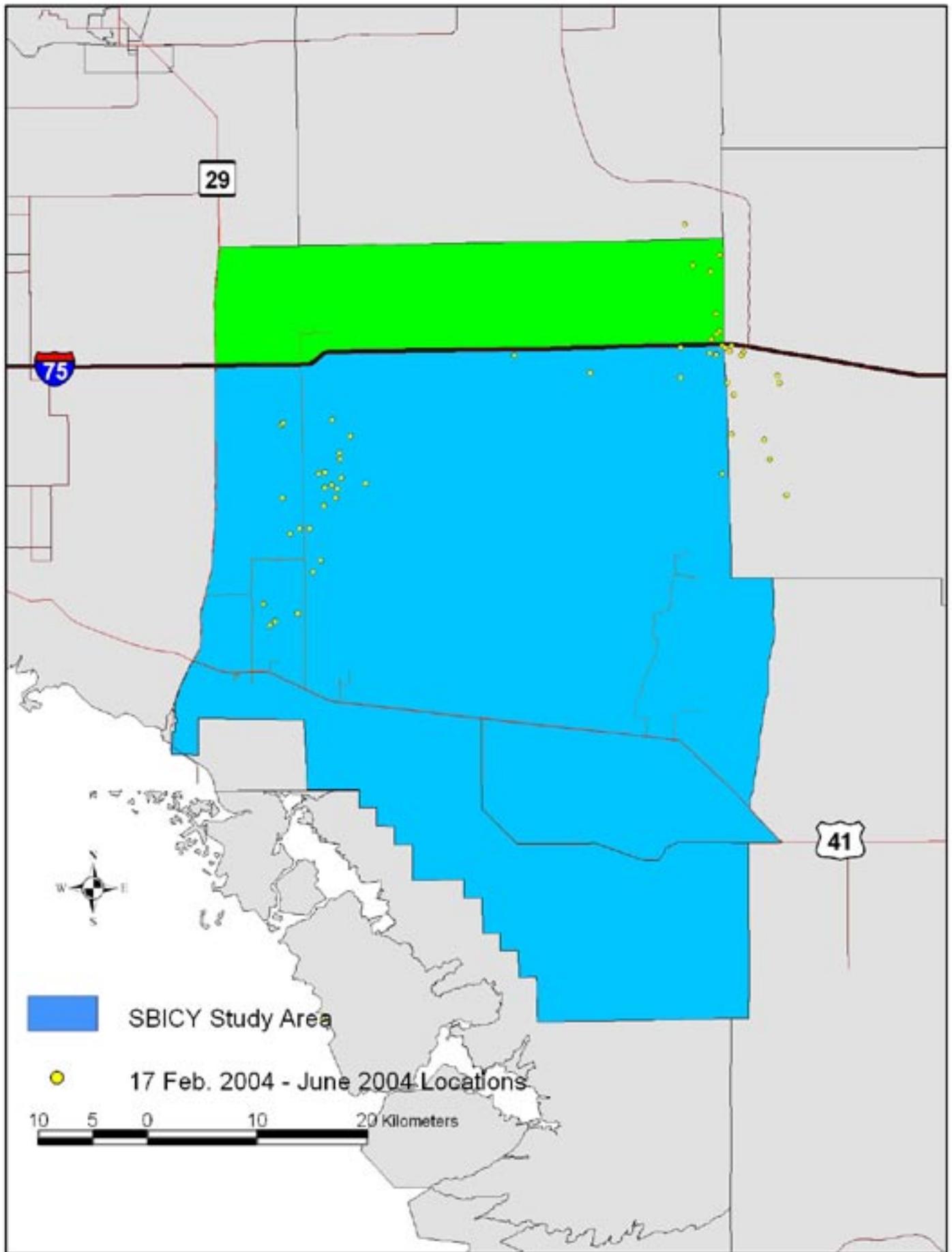


Figure 18. Area of use by male Florida panther #127.

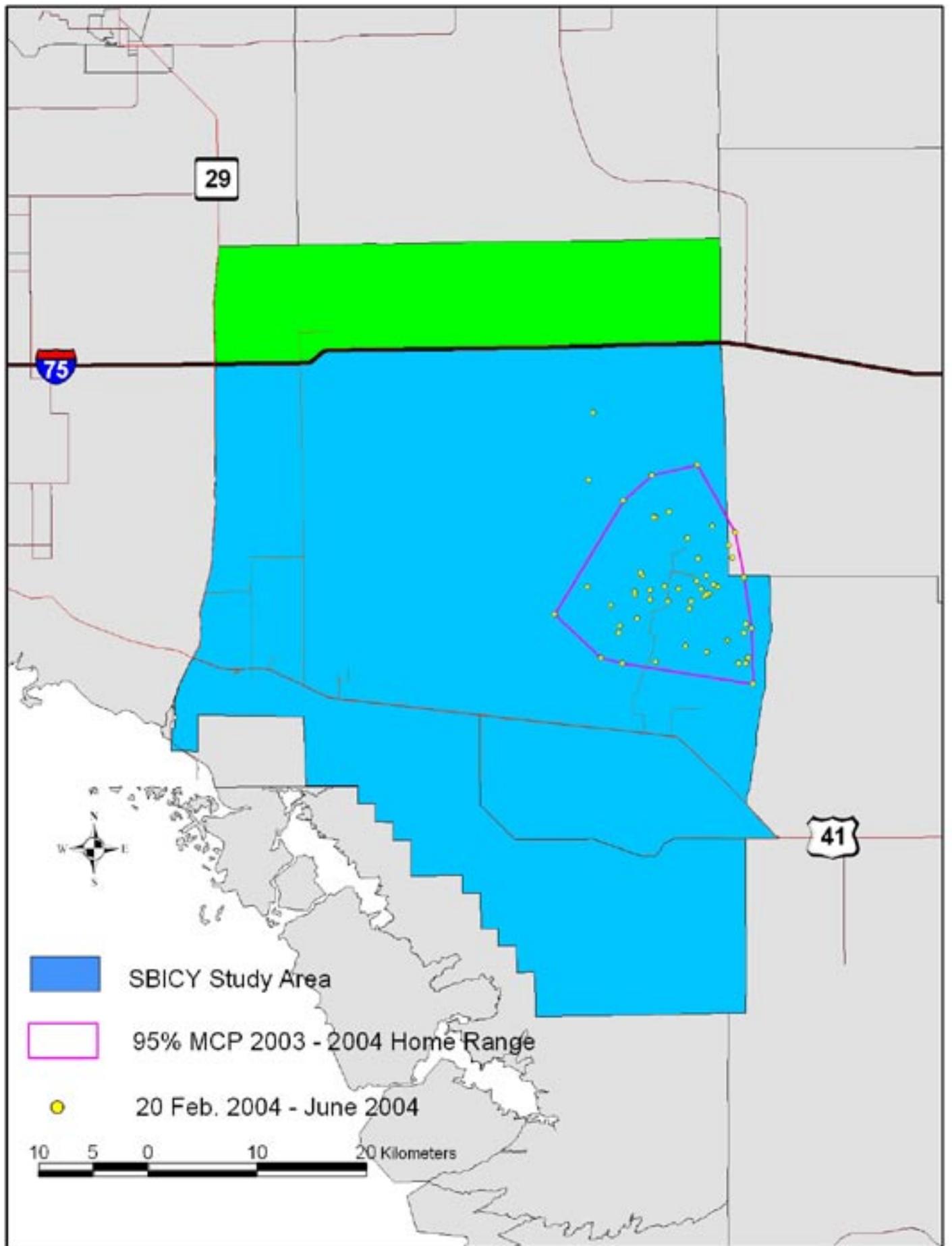


Figure 19. Home range of female Florida panther #129.

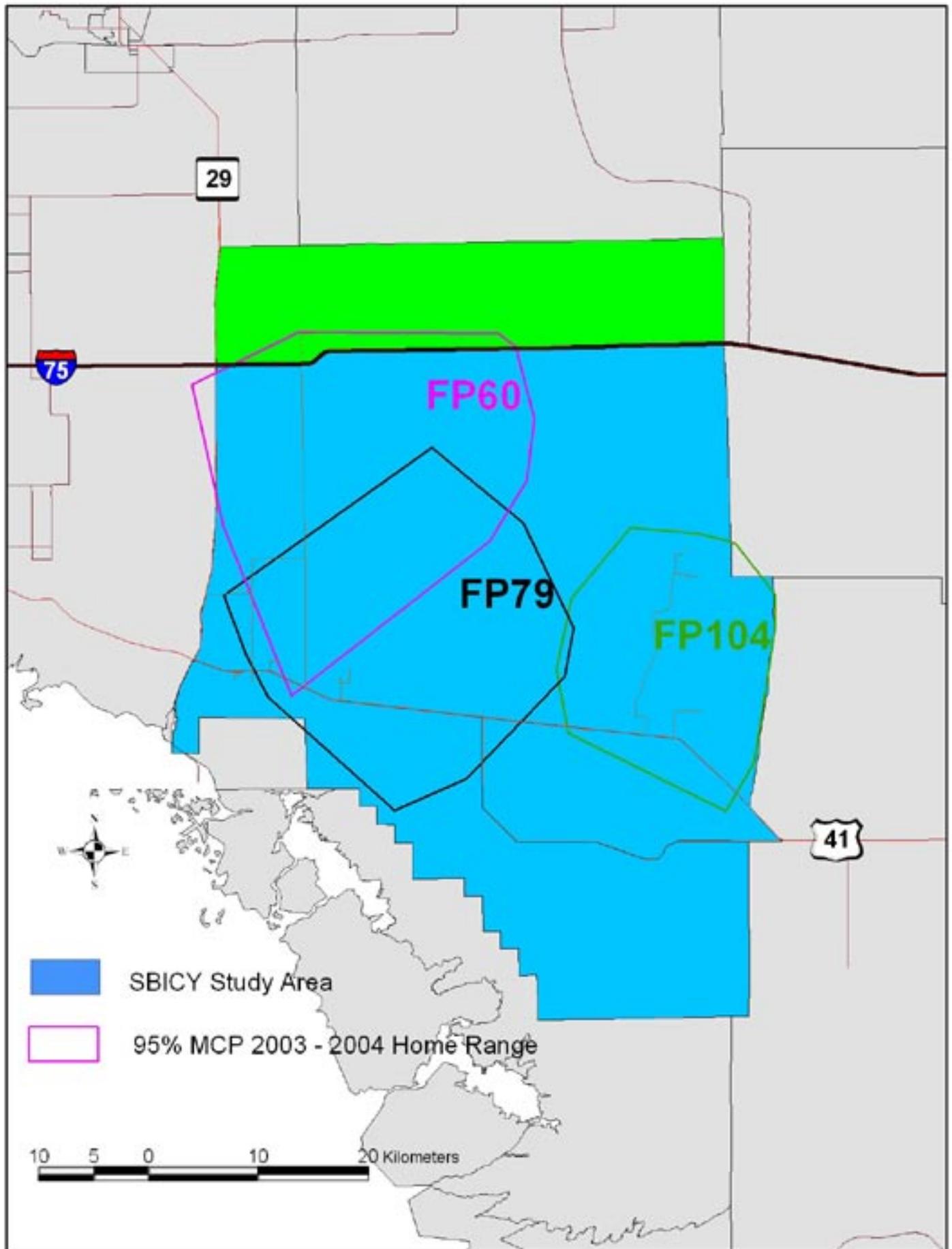


Figure 20. 2003 - 2004 home range of radio-collared adult male Florida panthers in SBICY.

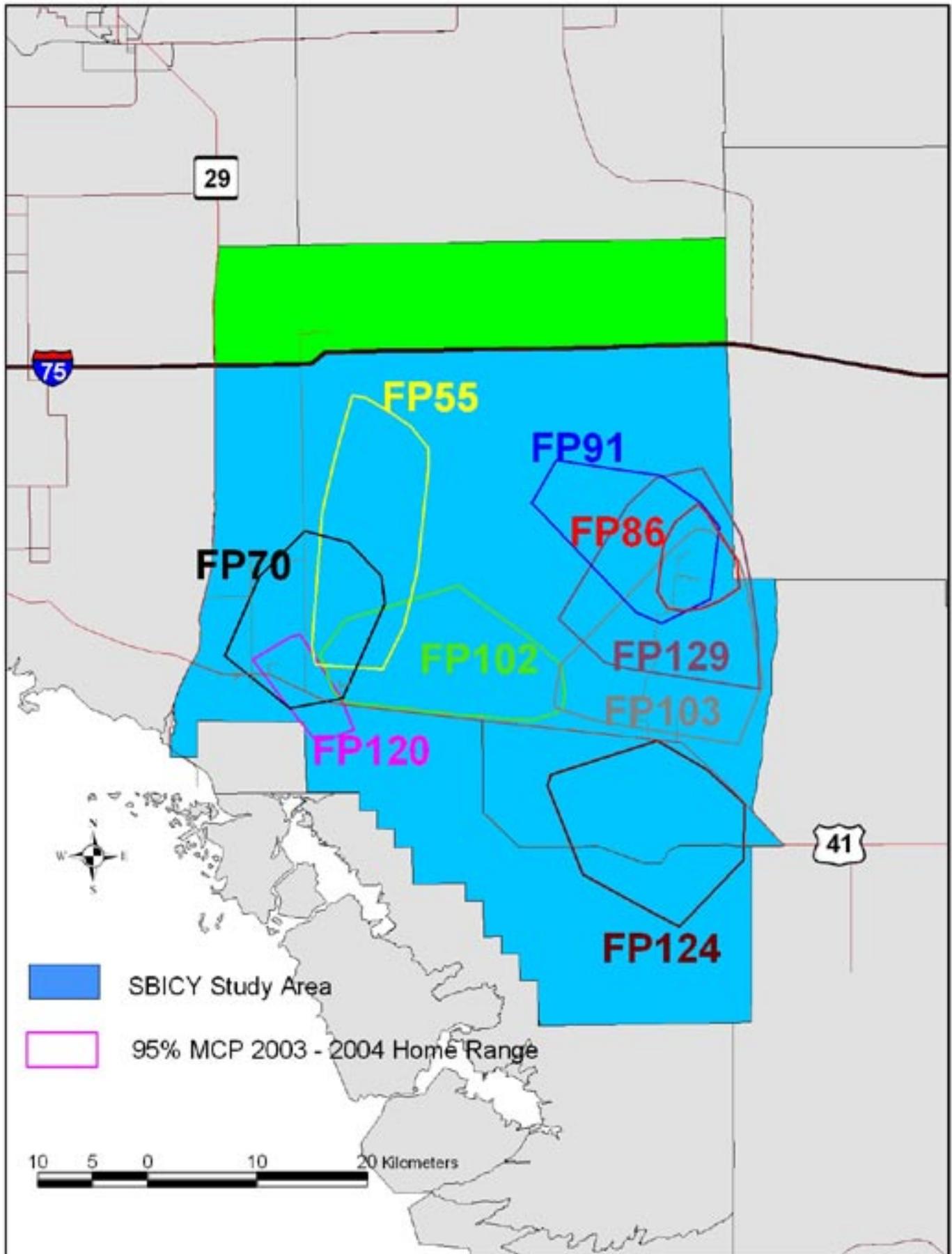


Figure 21. 2003 - 2004 home ranges of radio-collared adult female Florida panthers in SBICY.

APPENDIX 1:

Big Cypress National Preserve 2004 Florida Panther Capture Season Report

submitted September 9, 2004

Introduction

This project, conducted by the National Park Service (NPS) in Big Cypress National Preserve south of Interstate-75 (SBICY) in Collier, Dade, and Monroe Counties was authorized under USFWS Endangered Species Permit #TE051015-0 and the Florida Fish and Wildlife Conservation Commission (FWC) Special Purpose Permit #WX02384. This report covers the capture and survey work conducted between June 30, 2003 and July 1, 2004. All biomedical and capture data have been submitted to Darrell Land, FWC Project Section Leader. Details on other aspects of panther activities in the study area will be covered in the annual report submitted under the USFWS permit.

Project Goals

As stated in the February 19, 2002 NPS proposal "*Florida Panther Research and Monitoring in Big Cypress National Preserve*", the goals of this project are to obtain an adequate sample of panthers:

- 1) to make sound management decisions and evaluate management actions taken;
- 2) to assess the potential of this area to support panthers;
- 3) to assess the potential of panthers in this area to augment the sub-population in Everglades National Park; and
- 4) to evaluate the impacts of the genetic restoration efforts.

Capture Season Goals

The NPS 2004 Capture Season Plan (attached), presented at the 30 September 2003 meeting in Naples, identified three panthers, #79, 102, and 103 in need of recollaring. It also slated five survey blocks, #1, 9, 10, 11, and 12, i.e., the Deep Lake, Loop, and Stairsteps Management Units as priorities for capture work. The Deep Lake Unit has had occasional use by collared males, but has not had a resident female monitored there since panther collaring began 24 years ago. No resident panthers with working collars

were being monitored in the Loop and Stairsteps Units since the collar of panther #88 failed prematurely in August of 2002. Last year's survey efforts indicated that at least two females and one male still resided in that area.

Time permitting, the team planned to hunt within the home ranges of two other females, #71 and #93, (Survey Blocks 2 and 4) whose collars had also failed prematurely. GPS collars would be placed on adult males in order to determine movements and habitat use other than daytime resting sites. The priorities for the capture season changed in January when apparently habituated panthers were repeatedly seen in the small community of Pinecrest in the Loop and Stairsteps Units. They were targeted for capture as soon as the team assembled in February.

Methods

A hunt day is defined as one having suitable environmental conditions and the availability of all team members to conduct a capture. The study area was divided into 12 blocks based on roads and recognizable geographic features (Figure 1). The size of the blocks ranged from 14,184 ha to 28,698 ha and averaged 20,747 ha. Although a random sampling scheme was desirable to ensure equal representation of panthers throughout the area, the overriding goals addressed above took precedent. Capture work was conducted following the protocol as outlined in our FWS and FWC capture permits with the exception of handling and collaring the kittens of the Pinecrest family group at only ten months of age.

Results

We hunted for 36 days between February 10 and April 2, 2004 for uncollared panthers. Two additional days were spent in recollaring attempts and one in giving the booster for feline leukemia (FeLV). Our highest priority, i.e., to collar the panthers at Pinecrest was achieved in four hunt days when, on February 13th we collared an adult female and her two male offspring, #s 124, 125, and 126.

We collared an additional two new panthers, #127 and 129, and two whose collars had failed, #79 and 103. We recollared one panther, #102, in three attempts. On one attempt, storms came in and on the

second, the water levels were too high for a safe capture. We treed one panther, #60, which we did not handle because he was not slated for recollaring (Table 1).

We failed to locate and recollar #88 or the resident adult male south of Highway 41 in spite of expending an additional 13 hunt days (38%) toward that goal. We spent seven days (19%) in the Deep Lake block and documented sign of an uncollared adult female but failed to capture her. We hunted in Block 2 of the Turner River Unit for four days (11%) and caught #79 and 127 there but failed to locate #93. We spent six hunt days (17%) in Raccoon Point (Block 8) and caught #103 whose collar had failed and a new panther, #129. We only hunted one day (3%) in Block 7 north of Oasis Visitor Center and we did not hunt at all in five blocks due to time constraints and water levels. Table 1 compares the distribution of our hunting efforts with the previous year.

Although time and water levels precluded us from hunting for #71 in her original home range in Block 4, the FWC team caught her north of Interstate 75 (I-75) in the northwest portion of Big Cypress. To date, she has not returned to her original home range south of I-75.

Capture Season Summary:

- 39 total hunt days
- 5 newly collared panthers (#s 124, 125, 126, 127, 129)
- 2 failed collar replacement (#s 79, 103)
- 2 attempted but failed recollars (#s 102)
- 1 successful recollars (#s 102)
- 2 treed but not collared (#60, #125 and 126 FeLV booster)

Uncollared panthers

We documented sign of uncollared panthers in seven blocks (Table 2). Based on track size and the locations of collared panthers, we confirmed the following uncollared panthers:

- 1) South of Hwy. 41 (Blocks 9, 10, 11, 12) - one adult male, two adult females, one with two kittens
- 2) Deep Lake Unit (Block 1) – one adult female and one small male
- 3) Concho Billie Trail (Block 2) – one adult female with at least one kitten

Reproduction

Three collared panthers denned during the past reporting year. On August 5, 2003, we handled three kittens, two males and one female, at the den of #93 in Block 2. On February 7, 2004, we handled two kittens, one of each sex, at the den of #120 in Block 9. On June 6, 2004, we handled three kittens, one male and two females, at the den of #70 in Block 5. Transponder chips were implanted and biomedical samples were obtained and submitted to FWC.

Mortality

Four panthers either died or were removed from the study area during the reporting period. On November 6, 2003, female #86 was removed due to injuries from natural causes that prevented her from obtaining food. She was euthanized once it was determined that her neurological injuries could not be remedied. On December 12, 2003, female #91 was found in mortality. Field and physical signs indicated that she had been killed by another panther. On January 12, 2004, an unmarked female kitten was struck and killed by a vehicle on Highway 41. On June 29, 2004, male #60 was live-trapped and removed from the wild. He had been killing domestic livestock and, when caught and examined, it was found to be in poor condition. He had sustained serious injuries, likely by recently being struck by a vehicle on Highway 41. To date, he is still in captivity.

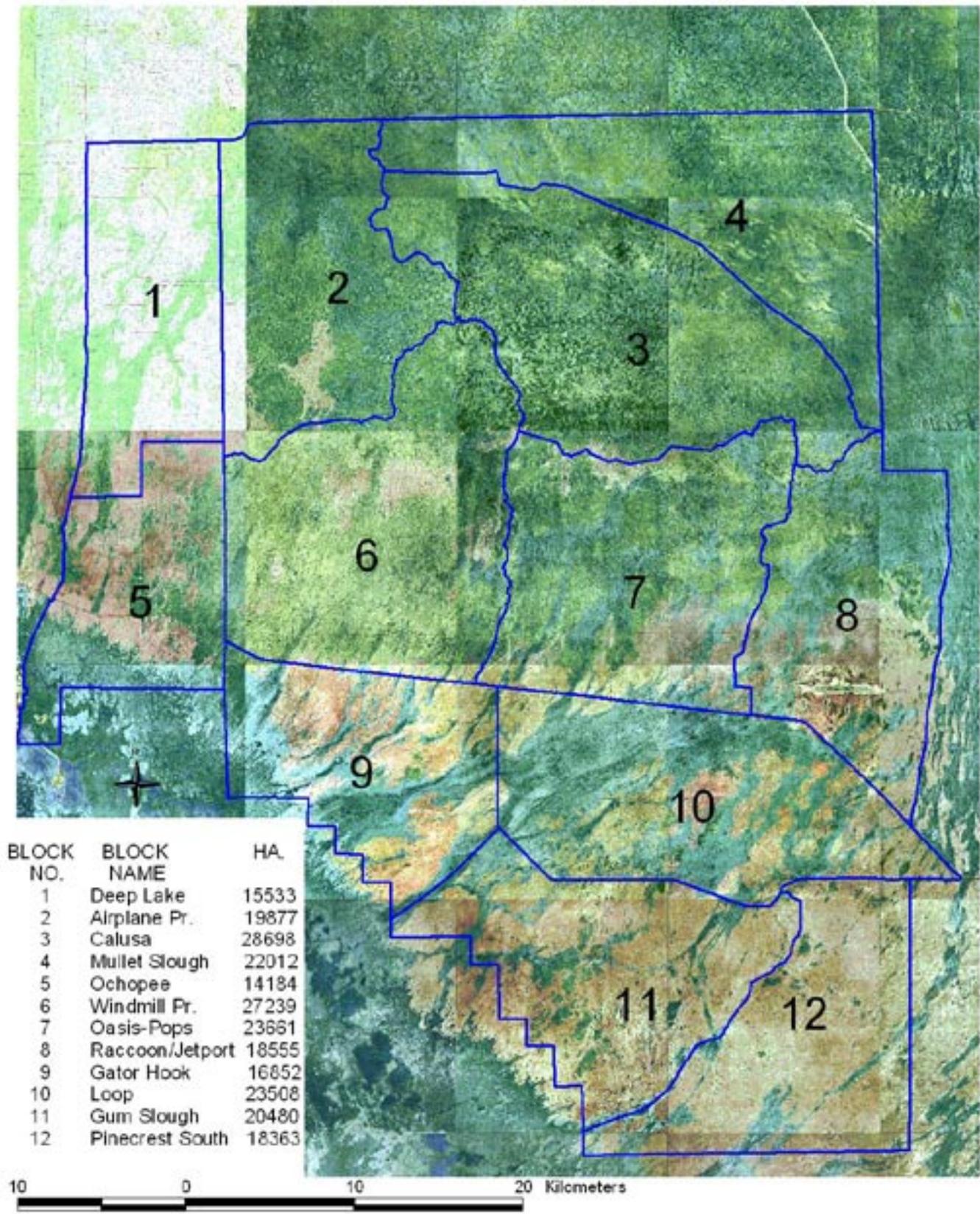


Figure 1. Panther Survey Blocks in the NPS Study Area.

Table 1 2004 Panther Hunt Days in Big Cypress

Date	Block	Results/Comments
10-Feb	10	
11-Feb	10	
12-Feb	10	
13-Feb	10	collared #124, 125, 126
16-Feb	2	collared #127
17-Feb	8	
18-Feb	8	
19-Feb	8	
20-Feb	8	collared #129
23-Feb	7	
24-Feb	9	
25-Feb	0	attempt to recollar #102 but storms came in
26-Feb	0	no hunt but McBride treed #60
27-Feb	8	recollared #103 (failed collar)
1-Mar	8	
2-Mar	9	
3-Mar	9	
4-Mar	2	
5-Mar	0	attempt to recollar #102 but water level at site too high
8-Mar	1	
9-Mar	1	
10-Mar	1	
11-Mar	9	
12-Mar	1	treed and gave FeLV booster to #127
15-Mar	9	
16-Mar	2	
17-Mar	2	recollared #79 (failed collar)
18-Mar	1	
19-Mar	9	
21-Mar	10	
22-Mar	0	gave FeLV booster and aversive conditioning to #125 and 126
23-Mar	11	
24-Mar	11	recollared #102
25-Mar	9	
26-Mar	1	
29-Mar	11	
30-Mar	1	attempt to recollar #60 but had he had left Big Cypress
31-Mar	9	
1-Apr	9	
2-Apr	11	

Table 2 2004 Panther Hunt Effort per Survey Block in Big Cypress

Block #	2003	2004	2004 Ef/BI
1	1	7	19%
2	0	4	11%
3	0	0	0%
4	0	0	0%
5	4	0	0%
6	4	0	0%
7	1	1	3%
8	1	6	17%
9	4	9	25%
10	2	5	14%
11	12	4	11%
12	0	0	0%
	29	36	100%

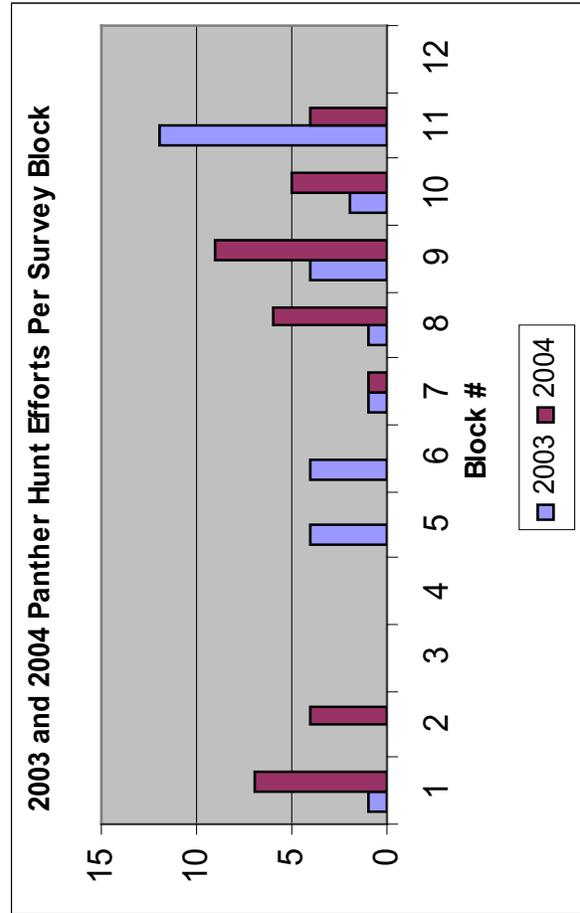
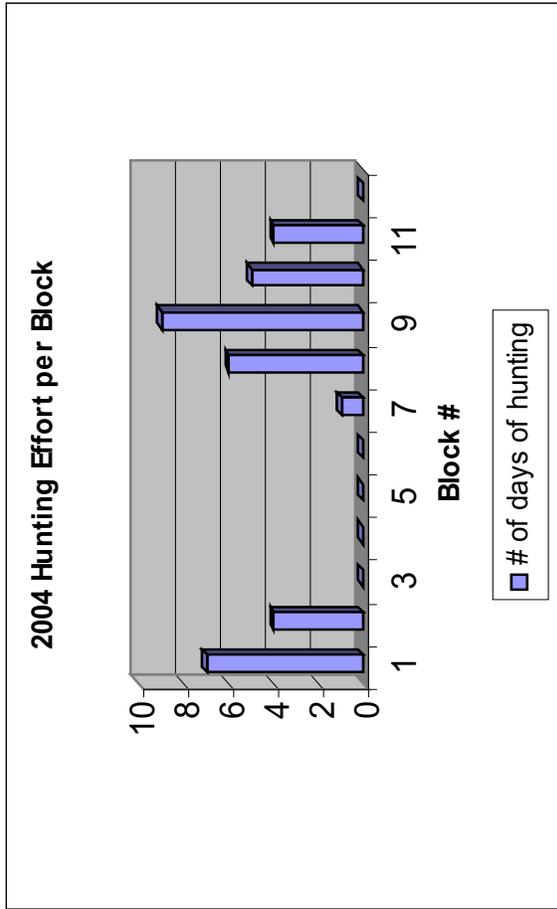


Table 3 Sign of Uncollared Panthers Documented during the 2004 Panther Capture Season in Big Cypress

Date	Block #	Locus	Sign of unknown panthers	Comments
11-Feb	10	Pinecrest	female	
16-Feb	1	Deep Lake	female	
17-Feb	8	Raccoon Point	2 females	
18-Feb	8	Raccoon Point	male; female	
19-Feb	8	Raccoon Point	female	
1-Mar	7	W of Raccoon Point	male	
2-Mar	9	Gator Hook	male & female together	
4-Mar	2	Concho Billie Trail	female w kittens; lone female; male	likely not #70
11-Mar	9	Gator Hook	male; lone female; female w 2 kittens	
15-Mar	9	Gator Hook	male	
21-Mar	10	Gum Slough	male	sighting by C. Little on 20 Mar
23-Mar	11	Gum Slough	male	possibly #79
25-Mar	11	Gum Slough	male	possibly #79
26-Mar	1	Deep Lake	female; male	possibly #60
30-Mar	1	Deep Lake	female	
31-Mar	9	Gator Hook	male	
3-Apr	2	Airplane Prairie	female	

Capture Season Plan for Big Cypress National Preserve—2005

Prepared by Deborah Jansen, Wildlife Biologist, NPS

1 November 2004

Goals

To achieve and maintain a sample of 20 radio-collared panthers distributed throughout the 295,142-ha study area of Big Cypress south of I-75 with which to determine the status of the panther population and their behavioral and demographic responses to existing or proposed management actions.

Individuals targeted for capture

Two panthers, **#79 and #104**, are due for recollaring. They will be handled when aerial monitoring indicates that they are in an area favorable for an efficient and safe capture. GPS collars, programmed to obtain nighttime locations, will be deployed on males #79 and #104. It is recommended that #104 be electro-ejaculated when handled, based on the fact that he has been documented with 4 collared females on 11 occasions and none of them have denned.

Male panther #127 will be treed to evaluate his collar sizing. He will be recollared with a GPS collar if he is handled.

These radio-collared males are also a priority for vaccination against feline leukemia virus (FeLV) (Mark Cunningham, DVM, in *Feline leukemia virus in Florida panthers: management recommendations*).

This document also recommends that all panthers handled this year be vaccinated against feline leukemia virus and given a booster within 4 weeks.

Survey and capture efforts

The southern Big Cypress study area has been divided into 12 survey blocks (Figure 1). As described in the project's proposal, we are using a random sampling approach in our capture efforts to ensure geographic representation by monitored panthers.

Capture efforts over the past 2 years have targeted blocks 1, 8, 9, 10, and 11 (Figure 2). This year we will target the areas in which little or no capture effort occurred the previous 2 years, i.e., blocks 3, 4, 7, and 12. These are also areas in which no resident females are being monitored (Figure 3). The 2 female panthers, #88 and #93, with failed collars will also be targeted for recollaring. Their last known home ranges encompassed blocks 2 and 9.

Block 4 will be targeted for several additional reasons. The preparation of a General Management Plan for the Addition lands was initiated in 2001 and is currently nearing completion. The USFWS biological opinion on the I-75 Recreational Access Plan addressed the necessity of monitoring panther response when the Addition lands are opened to recreational use, therefore, a sample of monitored panthers living in the Addition Lands is necessary to meet the terms of the USFWS document. This area has also been identified as a priority in which to establish a buffer zone against FeLV (Mark Cunningham, DVM, in *Feline leukemia virus in Florida panthers: management recommendations*).

Timeframe

The timeframe for capture work has not been finalized and will depend on when environmental conditions are favorable for tracking, travel by ORV, and safe handling of panthers. Capture efforts will not begin until after January 2, the end of the General Gun season in Big Cypress WMA. Any malfunctioning collars, however, will be replaced as soon as possible. The season will last approximately 8 weeks.

Team Members

The team will consist of Deborah Jansen, project leader, Cougar McBride, houndsman, Emmett Blankenship, veterinarian, Steve Schulze, tree climber, with additional support from other NPS personnel as needed.

Capture Season Plan for Big Cypress National Preserve—2004

Prepared by Deborah Jansen, Wildlife Biologist, NPS

September 30, 2003

Goals

Achieve and maintain a sample of 20 radio-collared panthers distributed throughout the 295,142-ha area of Big Cypress south of I-75.

Recollars

Three panthers, #79, 102, and 103 are due for recollaring. They will be handled when aerial monitoring indicates that they are in an area conducive for an efficient and safe capture.

Sampling

Capture efforts will target 5 of the 12 survey blocks, #1, 9, 10, 11, and 12, where no panthers are currently monitored. Three female panthers with established home ranges, #71, 88, and 93 have failed collars; they will also be targeted for recollaring. Survey work for the presence of panthers will be done in the 12 survey blocks when soil conditions provide good tracking medium.

Timeframe

The Big Cypress capture season is slated for an 8-week period between February and April of 2004. However, any malfunctioning collars will be replaced as soon as possible.

Team Members

The team will consist of the same personnel as in 2003 with the exception of NPS employee Guy Almerico who has replaced Bob Thomas as biological technician.

Collar Specifications

Three GPS collars will be deployed in order to determine movements and habitat use other than daytime resting sites. The specifications and configurations of the units have not yet been determined. Two males, #79 and the uncollared male south of Hwy 41, are potential candidates for GPS collar attachment.