

FLORIDA PANTHER (*Puma concolor coryi*)
RESEARCH AND MONITORING
IN BIG CYPRESS NATIONAL PRESERVE
2008-2009 ANNUAL REPORT



photo of FP171 by Ralph Arwood

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Abstract

The goals of this project are to provide demographic, biomedical, and genetic information on Florida panthers (*Puma concolor coryi*) in the 217,409-ha study area in Big Cypress National Preserve (SBICY) with which to guide management actions, assess responses to natural events and human-caused impacts, and enhance panther recovery. The reporting period is 1 July 2008 to 30 June 2009. During 29 hunting days between 31 January and 1 March, we captured and handled 5 panthers. Two were previously uncollared and 3 had their collars replaced. One female, slated for collar replacement, was not handled because she was raising kittens less than 12 months of age.

We monitored 10 panthers, 4 males and 6 females, for at least a portion of the reporting period. One collared panther was lost from the sample through mortality and one due to collar failure. Two previously collared panthers returned to the sample because their collars began functioning again. The average home range (95% MCP) of the 3 resident females and 1 resident male located more than 50 times in the reporting period was 130 km² and 787 km², respectively. The presence of a minimum of 4 uncollared adult males and 5 uncollared (or failed collar) adult females were verified in the study area.

Three of the 4 monitored females denned 4 times, and we marked 9 kittens, 6 males, 3 females, with transponders and sampled them for biomedical information.

Four adult mortalities were documented in the study area, 3 from collisions with vehicles and 1 from intraspecific aggression.

Report Background

This is the seventh annual report on National Park Service (NPS) panther work in Big Cypress National Preserve (Big Cypress). It covers capture and monitoring efforts between 1 July 2008 and 30 June 2009 in the study area (SBICY), which consists of all lands (217,410 ha) within the Preserve boundary south of Interstate 75 (I-75). The Florida Fish and Wildlife Conservation Commission (FWC) monitor panthers in the remaining 75,340 ha of Big Cypress north of I-75 as well as areas outside Big Cypress. The SBICY study area also includes lands used by our monitored panthers that are not in the FWC or Everglades National Park (EVER) study areas. Examples of these areas are the Miccosukee tribal lands south of I-75 and east of the L-28 canal and EVER north and west of Shark Valley Slough.

Information on all panthers known to inhabit SBICY between 1981 and 2003 can be found in the 2003 Big Cypress Annual Report (Jansen et al 2003). The 2004-2008 annual reports covered capture and monitoring work in SBICY between 1 July to 30 June of those years to coincide with the fiscal year reporting requirements of FWC (Jansen et al. 2004, Jansen et al. 2005, Jansen et al. 2006, Jansen et al. 2007, Jansen et al. 2008)

Statement of Purpose

The overall purpose of this ongoing project is to monitor the status of the panther population in Big Cypress, to provide information to management so their decisions will support and enhance panther recovery, and to determine the panthers' behavioral and/or demographic responses to natural events, management actions, and human impacts in south Florida.

Project Goals

The proposal to renew the Federal permit to capture and handle Florida panthers included the following goals (Jansen 2006):

Goal 1. To 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. To assess the potential of the habitat in Big Cypress to support panthers.

Goal 3. To assess the potential of the expanding population of panthers in Big Cypress to link with the subpopulation of panthers in EVER and to provide baseline information on panther use in areas that may be affected by the Comprehensive Everglades Restoration Plan (CERP).

Goal 4. 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.

Goal 5. To monitor the prevalence of feline leukemia and other potentially harmful diseases through biomedical sample collection.

Goal 6. To determine the nighttime movements and habitat use of panthers through GPS technology.

Goal 7. To identify crossing and mortality sites with which to recommend highway enhancements that lessen panther-vehicle collisions.

Goal 8. To provide timely response to panther-human interactions that occur within Big Cypress through monitoring of radio-collared panthers and, when warranted, through marking of panthers involved in these interactions.

Study Area

The study area, SBICY, represents 74% (217,409 ha) of Big Cypress, a 292,750-ha unit of the National Park Service (NPS), situated in south Florida in Collier, Monroe, and Miami-Dade Counties. The enabling legislation of Big Cypress allows for recreational and commercial uses, such as hunting, off-road vehicle operation, and oil extraction. Most of Big Cypress is also designated a state wildlife management area for recreational hunting, and, as such, has been divided into 6 “units” to allow flexibility in management and regulatory decision-making (Figure 1). 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% 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 (Figure 2). 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 run east-west through Big Cypress from State Road 29 (S R 29) to Conservation Area 3A. Four-lane Interstate 75, completed in 1993 and formerly named Alligator Alley, lies approximately 20 miles north of 2-lane Highway 41 (Hwy. 41), completed in 1928. Four unpaved county roads, Birdon (C R 841), Wagonwheel (C R 837), Turner River (C R 839), and Loop (C R 94) (now partially under NPS jurisdiction), cover 97 kms. State Road 29 is a paved road that borders Big Cypress on the west. The southern boundary of Big Cypress joins EVER and the eastern boundary is partially separated from Water Conservation Area 3A by a levee (L-28) (Figure 1). The northern boundary adjoins tribal and private lands, some of which have been converted into agricultural production.

A deer and hog hunting season takes place from September through December. The 5-year (2004-2008) average for hunter pressure was 13,444 man-days, with a mean harvest of 204 deer (bucks only) and 2 hogs (FWC 2004-2008 annual harvest reports). The

agencies also monitor deer population trends through aerial surveys, track counts, and spotlight counts since deer and hogs are the main prey species of the Florida panther.

Off-road vehicles (ORVs) are the only practical way to access the interior of Big Cypress for recreational purposes. The extent of ORV trails has increased since first quantified from 1953 maps (Duever et al. 1986). They 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. Aesthetic concerns and the probable impacts on soils, vegetation, and wildlife have 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 phase.

Methods

Study Area Sampling

We used the 6 designated “game management units” of Big Cypress, i.e., Bear Island, Deep Lake, Turner River, Corn Dance, Loop, and Stairsteps, to partition Big Cypress for descriptive purposes. We called the area added to Big Cypress in 1988 the Addlands North and Addlands South (Figure 1). We incorporated the 1-mile strip of acquired land along SR 29 into the existing management units for the purpose of this report. Because the Turner River, Corn Dance, and Stairsteps Units are so large, we further divided SBICY into 12 survey “blocks”, based on roads and recognizable geographic features, to aid in quantifying our survey and capture efforts (Figure 3). The size of the blocks ranges from 14,184 ha to 28,698 ha and averages 20,747 ha. Although our objective is to randomly sample all areas for the presence of panthers, targeted goals identified annually may take precedent.

2009 Capture Season Plans

In the SBICY 2009 Capture Season Plan presented at the 15 October 2008 Panther Capture Season Planning meeting in Naples, Florida, we identified 5 panthers, FP133, 152, 153, 161, 162 whose collars needed replacement. Three of these, however, were females that could not be handled if they were rearing young less than 12 months of age. We planned to target blocks 2, 6, 10, and 12 which encompass the home ranges of 4 females, FP93, 124, 150, and 151, with failed GPS store-on-board collars. We also planned to hunt in the southern Addition Lands if it dried down sufficiently for capture work. An ongoing goal is to have a sample of panthers in the Addition Lands as baseline information prior to opening the area to recreational use.

We planned to place Generation IV GPS collars (Telonics, Inc.), programmed to obtain 5 evening-to-morning locations on panthers in areas where this data has not yet been obtained. This information should complement the existing dataset of daytime locations and assess nighttime habitat use. For other panthers from which we already have a sample of nighttime data or that, due to their size or age, might be burdened by GPS collars, we planned to use MK9 collars (Telonics, Inc.). The VHF component of all collars is programmed to duty-cycle in order to extend their functioning life.

Survey and Capture Protocols

Documentation of panthers was recorded during the capture work and augmented by the annual synoptic survey efforts by Rancher's Supply, Inc. using the protocol they developed to determine the presence of uncollared panthers (McBride et al. 2008, Rancher's Supply, Inc. 2008). We conducted our capture work following the protocols outlined in Endangered Species Permit TE146761-1 from USFWS and the Special Purpose Permit WX08654 from FWC. Drug protocols and panther handling modifications were updated as new information became available. Biomedical procedures were similar to those outlined in Cunningham (2004). For consistency in our capture effort analysis, we defined a hunt day as one having suitable environmental conditions and the availability of all team members to conduct a capture.

Population Monitoring

We located each panther with a functioning collar 3 times a week usually between 0900-1200 hrs, using telemetry from a fixed-wing aircraft. Our methodology differed to some extent from the EVER and FWC monitoring protocol. We determined the general location of each panther at 150 m above the ground, and then made 1 or more passes at 60 m to further define the location. Flights conducted by other panther monitoring agencies do not descend below 150 m (Darrell Land and Sonny Bass, pers. comm.) We found, however, that low-level passes were necessary in most instances to confirm habitat use due to the complexity and intermingling of vegetative types in SBICY.

We recorded the date, time, Universal Transverse Mercator (UTM) coordinates, habitat type, and unique situations, such as 2 panthers in the same location or panther sightings. We mapped the general location by air, and in the office used a Geographic Information System with aerial photos geo-referenced in North American datum 83 to obtain accurate UTM's. We shared with FWC, on a flight-by-flight basis, the locations of several males that used both the FWC and SBICY study areas. The combined dataset on these individuals was incorporated into this report. We also incorporated location data from FWC to generate a map showing SBICY locations in relation to the entire monitored population.

We displayed the home ranges of resident radio-collared panthers located in SBICY between 1 July 2008 and 30 June 2009 (Figures 9-15) by 2 methods:

- 1) as minimum convex polygons (MCP) (Mohr 1947) with a 5% harmonic mean outlier removal for the entire time the individual was monitored via telemetry as an adult, and
- 2) as fixed kernels (Worton 1989), using the least squares cross validation (LSCV) "smoothing parameter" to show the home range during the reporting period (Seaman and Powell 1996). We generated home range maps using the ArcView 3.2 Spatial Analyst (Environmental Systems Research Institute, Inc.). For those panthers that died during the reporting period, we showed that year's locations as well as their lifetime home range as MCP and fixed kernels.

Reproduction

Inspection of Florida panther dens by FWC began in April 1992 and by Big Cypress in April 1995. When an adult female panther was found in the same location for more than 3 consecutive flights, we conducted a ground check to further delineate the site and install a remote monitoring device (Land et al 1998) if denning was suspected. We determined the female's routine of den attendance by 24-hour remote monitoring, and handled the kittens when she was away from the den during the daytime. We processed the kittens following the protocol established by FWC (Cunningham 2002). Appendix II in Florida Fish and Wildlife Conservation Commission (2009) lists all panther kittens handled at dens from 7 April 1992 through 30 June 2009 and Appendix III lists all known dens of radio-collared female panthers from June 1985 to 30 June 2009.

Mortality

If a panther's collar emitted a mortality signal, we notified FWC that we were in the process of confirming whether or not the panther was dead. On rare occasions, a panther may remain motionless for 2 hours, the time it takes to activate the mortality mode on the collar. Following the protocol established by FWC (Land 1999), a law enforcement officer accompanied us to inspect the site for sign of human involvement in the death. We submitted the carcass to FWC immediately and, within 24 hours, submitted the standardized form "*Panther Mortality Investigations and Carcass Retrieval*" to FWC and USFWS.

If Big Cypress personnel received a report that a panther had been injured or killed on a road in SBICY, we notified FWC and responded to the site to secure the evidence and obtain detailed information. We submitted the carcass to FWC. Some aspects of necropsy results are incorporated into this report. Appendix IV in Florida Fish and Wildlife Conservation Commission (2009) lists known panther injuries and mortalities through 30 June 2009.

Reporting

We used the reporting period of 1 July 2008 to 30 June 2009 to correspond with FWC reports that coincide with their fiscal year. The compiled telemetry flight dataset was submitted to FWC at the end of the reporting period. We submitted all data obtained on panther dens and mortality as well as biomedical samples from kittens and adults to FWC and designated labs within 24 hours of collection.

Definitions

We defined **Home range** as the area where a panther restricts the majority of its movements. We determined home range for **resident** panthers, i.e., those that had more than 5% of their locations in SBICY, had more than 50 locations during the reporting period (approximately one-third of all flight locations), and were considered to be adults. Those not meeting these criteria had **areas of use**. We chose 2 years as the average age to classify female panthers as **adults**, based on a sample of 7 known age females in SBICY who had their first litter at an average of 23 months. We also chose 2 years as the average age to classify male panthers as adults, although some may be still dispersing or have not had a breeding opportunity until older, whereas others, such as FP79, had successfully bred at 15 months (Warren Johnson, pers. comm.) We described **Dispersers** as those panthers that made large random movements and typically inhabited SBICY for less than 6 months before they either left or settled into a home range. **Immigrants** dispersed into SBICY from some other locality. **Emigrants** were panthers born in SBICY but dispersed completely outside the study area.

Results

Survey and Capture Efforts

We hunted for 29 days between 31 January and 1 March 2009 in 8 of the 12 survey blocks. We captured and collared 2 new panthers, FP169 and 171. We changed the working collars on 3 panthers, FP133, 161, and 162 (Table 1). We did not handle females FP153 because she was raising kittens less than 12 months-of-age. FP124's

collar failed prematurely during the reporting period. Figure 4 shows our capture effort per block for the past 7 years.

2009 Capture Season Summary:

- 29 total hunt days
- 2 newly collared panthers (FP169, FP171)
- 0 failed collar replacement
- 3 working collar replacement (FP133, FP161, FP162)
- 1 not handled because had kittens less than 12 months-of-age (FP153)
- 3 treed but not handled due to environmental conditions (FP133, FP162)
- 1 treed but not needing handling (FP133)

Synopsis of our hunt effort and findings during the capture season:

Block 1: Hunted 2 days.

- 27 Feb: collared FP171.

Block 2: Hunted 9 days.

- 2 Feb: treed FP133 but too high in cypress tree.
- 8 Feb: found sign of uncollared female
- 10 Feb: found sign of uncollared female and juvenile male

Block 3: No hunting in this area.

Block 4: Hunted 1 day.

- 17 Feb: Found old sign of an uncollared male south of I-75 rest area (FP169 has been located there since collared.)

Block 5: Hunted 3 days.

- 31 Jan: recollared FP161
- 14 Feb: found sign of uncollared male
- 22-23 Feb: confirmed sighting and sign of uncollared female

Block 6: Hunted 7 days.

- 2-4 Feb: treed but did not handle FP162.
- 3 Feb: found sign of an uncollared male
- 11 Feb: recollared FP133 and 162
- 14 Feb: treed FP133 who did not need handling
- 20 Feb: found fresh male sign at Austins and fresh female sign east of Austins
- 21 Feb: sign of uncollared female and male near the Bamboos
- 25 Feb: collared new panther FP169

Block 7: Hunted 2 days. Sign observed may be collared panthers

Block 8: Hunted 4 days.

- 6 Feb: trailed uncollared female
- 13 Feb: found uncollared male sign, but FP169 has been there since 25 Feb collaring
- 23 Feb: sighting of 2 panthers reported by oil workers
- 24 Feb: trailed uncollared female
- 1 March: fresh male tracks south of Pad 1 (not FP169)

Block 9: Hunted 1 day.

- 15 Feb: found sign of uncollared female south of Monroe Station and off Paces Dike
- Rancher's Supply documented adult male in this block

Block 10: No hunting in this area.

Block 11: No hunting in this area.

Block 12: No hunting in this area.

Documentation of Uncollared Panthers

Within the study area, 4 uncollared adult males and 5 uncollared (or failed collar) adult females were documented either during our capture season or by Rancher's Supply during their synoptic survey work (Figure 5).

Synopsis on Monitored Panthers- Background, Home Range, and Reproductive Activity

We monitored 10 resident adult panthers between 1 July 2008 and 30 June 2009. Figure 6 shows the geographical distribution of this year's SBICY panthers in relation to the entire monitored population, and consists of 36% of the reporting period's locations. Locations obtained within Big Cypress boundaries (all units, including Bear Island and the Addition Lands) represent 45% of the monitoring efforts. Figures 7 and 8 show the home ranges of the 3 resident females and 1 resident male inhabiting SBICY during the entire reporting period.

FP102

This female was born to FP55 on 8 February 1998 in the Turner River Unit. She was first captured on 20 February 2001 at 3 years of age. At least 2 kittens were with her, one of which, FP103, was captured a month later at an estimated 10 months of age. FP102 denned again on 25 June 2001 and 2 males were marked 3 weeks later. FP102 next denned on 5 July 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 11 April 2003. FP102 was recollared on 24 March 2004. She weighed 39 kg and was in late-term pregnancy. She apparently lost the fetuses but was bred a month later and gave birth on 22 July 2004. We marked 3 kittens, 2 females and 1 male, at her den on 4 August. She denned again 2 years later, in June 2006, and we marked 2 male kittens on 12 July. On 15 February 2007 we recollared her. This collar failed on 23 June 2007 due to a Telonics programming error. It began functioning again, as programmed, on 23 June 2009. Her home range during the 2007 reporting period was 250 km² (Jansen et al 2007). FP102 is now 11.5 years of age.

FP124

On 13 February 2004, we captured and collared female FP124 and her 2 juvenile males, FP125 and FP126 in the Loop Unit. FP124 weighed 32 kg and was estimated to be 3 to 4

years old. FP126 was removed from Big Cypress on 28 May 2004 and died from intraspecific aggression on 1 January 2005. FP125 dispersed naturally in July 2004 and his collar was found on a road in Miami-Dade County 2 months later on 27 September. FP124 next denned in the Stairsteps Unit and, on 29 September 2004, we marked 1 male kitten. It survived to only 3 to 4 weeks of age. FP124 denned again in February 2005 in the Stairsteps Unit. On 10 February, we marked 3 kittens, 2 males and 1 female. Subsequent sightings up to 26 December 2005 indicated that she successfully raised 2 of the 3 offspring to 11 months of age. She was seen with 1 juvenile during the 19 April 2006 routine monitoring flight. She was recollared on 17 February 2007 and two 9-day-old male kittens were found and marked at the site. On 27 February, FP124 was recollared. One of her 2 male offspring was also treed but not collared. Several observations of FP124 with 1 offspring were made during routine flights during the reporting year. FP124's collar failed prematurely on 25 August 2008. Although there have been several reported sightings of panthers within FP124's home range, none have reported a collared panther. Her home range during the 2008 reporting period was 270 km² (Jansen et al. 2008).

FP133

The FWC capture team caught this male panther, estimated at 4 to 5 years-of-age, on 18 November 2004 in the Bear Island Unit. We recollared him on 19 Feb 2008 and again on 11 February 2009. His 787-km² home range during the reporting period encompassed Bear Island, Deep Lake, and Turner River Units of Big Cypress, with 73% of the locations in SBICY (Figure 9).

FP145

The female was captured on 16 February 2006 in the Deep Lake Unit. She was in good condition, weighed 29 kg, and was estimated at 1.5 to 2 years of age. She had not been handled as a kitten at a den, so her lineage was unknown. On 23 June 2006, we marked 3 female kittens at her den. This was the first panther den documented in the Deep Lake Unit. We recollared her on 25 February 2007. She was in excellent condition, weighing

32 kg. She denned in April of 2006, indicating that the kittens from her June 2006 den did not survive. We marked 3 kittens on 26 April 2007. Her collar failed on 23 June 2007 due to a Telonics programming error, and she was not recaptured during the 2008 hunt season. Her collar began functioning again, as programmed, on 23 June 2009. Her home range during the 2007 reporting period was 93 km² (Jansen et al 2007). FP145 is now an estimated 5 years of age.

FP152

On 16 February 2007 we collared FP152 in the Stairsteps Unit. He did not have a transponder, so was estimated to be between 4 and 5 years of age. He was assessed to be in good condition and weighed 61 kg. He was recollared on 28 February 2008, in excellent condition at 60 kg. FP152 was located in the same hammock on 3 consecutive flights in October 2008. We flew to the site on 22 October to check on him given the fact that the mortality mode on several previous collars did not function during the routine flight locations. We found him alive, however, he expired soon after our arrival. We noted a swollen forepaw and a few wounds on his face. The subsequent necropsy confirmed that he died of infection associated with intraspecific aggression. FP152's lifetime home range was 810 km². In the last months of his life, he made a few brief excursions outside the northern edge of his home range and ultimately was killed by another male when he ventured even further north (Figure 10).

FP153

On 19 February 2007, we collared FP153 in the Deep Lake Unit. She did not have a transponder, so was estimated to be 6 years of age. She weighed 40 kg. We also treed 2 kittens estimated at 10 to 11 months of age, but did not handle them. On 3 March 2008, we recollared FP153. She was in good condition at 39 kg. In early July, she started denning and on 20 July 2008 we handled 2 male and 1 female kittens, K274-276. She denned again in June of 2009, indicating that the kittens from the July 2008 den did not survive. We handled 2 male kittens, K281 and 282, on 8 July 2009. Her home range during the reporting period was 123 km² (Figure 11).

FP161

On 10 February 2008, we first collared female FP161. Her transponder confirmed that she was K169, born on 25 May 2004 to female FP70 in a den only 1 km from this capture site. Although her progesterone and relaxin levels indicated pregnancy, she did not den that year. She was recollared on 31 January 2009, weighing 40 kg. She started denning 9 days later and on 25 February, we handled 1 female and 2 male kittens, K277-279. Her home range during the reporting period was 92 km² (Figure 12).

FP162

On 18 February 2008, the hounds began trailing male panther FP138 in the Turner River Unit. He was with an uncollared female that the hounds treed and we collared as FP162. She did not have a transponder, so we estimated her age at 3 years. She was assessed to be in good condition, weighing 33 kg. Her mammary glands indicated that she had not previously lactated and, although her progesterone levels were high, her relaxin was negative. She gave birth in early May, 83 days post-capture, indicating that she was in the early stages of pregnancy when captured. We checked the den on 23 May and found the partially-eaten remains of 2 kittens, a male and a female. Two collared males had recently been documented in the vicinity of the den. We recollared FP162 on 11 Feb 2009. She weighed 34 kg. She denned in April of 2009 and we handled 1 female kitten on 7 May. FP162's home range during the reporting period was 175 km² (Figure 13).

FP169

On 25 February 2009, we collared male FP169 in the Turner River Unit and estimated his age at 4 to 5 years. His home range during the 4 months of the reporting period was 389 km² and encompassed the Turner River and Corn Dance Units (Figure 14).

FP171

On 27 February 2009, we collared male #171 in the Deep Lake Unit and estimated his age at 2 to 3 years. Soon after, he crossed I-75 into the Bear Island Unit and has occupied a 63-km² home range during the 4 months of the reporting period (Figure 15)

The average home range (95% MCP) of the 3 resident females, FP153, 161, 162, and only resident male, FP133 monitored during the entire reporting period was 130 km² and 787 km², respectively.

Reproduction

Four adult female panthers were monitored during the reporting period, 1 of which had a collar failure (FP124). Two additional females, FP102 and 145, had collars incorrectly programmed to shut off for 2 years beginning in June of 2007. They began functioning on 24 June 2009 as scheduled. Three females were raising young during the reporting period (FP153, 161, and 162). We checked 4 dens and marked 9 kittens, 6 males and 3 females, with transponders.

- FP124: On 17 Feb 2007, we marked 2 male kittens at 9 days of age in the Stairsteps Unit. We treed her and 1 juvenile male on 27 February 2008 and recollared her. Because her collar failed on 25 August 2008, we do not know of her reproductive status.
- FP153: FP153 denned in July of 2008 and we marked 3 kittens, 2 males and 1 female. She denned again in June of 2009 and we marked 2 male kittens. Since there was only a year between these dens, it is probable that the 2008 den failed.
- FP161: FP161 denned in February of 2009 and we marked 3 kittens, 2 males and 1 female.
- FP162: FP162 denned in April of 2009 and we marked 1 female kitten.

Mortality

Four adult mortalities were documented in the study area during the reporting period (Figure 16). Three adults died of collisions with vehicles and 1 of intraspecific

aggression. Up to 3 dependent kittens of FP153 are presumed dead, based on the fact that she denned a year after these were born.

- **FP152:** FP152 was located in the same hammock on 3 consecutive flights in October 2008. We flew to the site on 22 October to check on him given the fact that the mortality mode on several previous collars did not function during the routine flights. We found him alive but immobile, and he expired soon after our arrival. We noted a swollen forepaw and a few wounds on his face. The subsequent necropsy confirmed that he died of infection associated with intraspecific aggression.
- **K253:** On 17 January 2009, this 45-kg uncollared male panther was struck and killed on the eastbound exit ramp of I-75 and SR29. He had been handled and marked with a transponder when a kitten at the den of FP150 on 20 July 2007 in the Turner River Unit of Big Cypress.
- **UCFP119:** On 9 April 2009, this 29-kg uncollared female panther was struck and killed on Hwy. 41 at Turner River. This is the fourth known adult female panther killed at this site. She was estimated to be 2 to 3 years-of-age.
- **UCFP121:** On 14 May 2009, this 34-kg uncollared male panther was struck and killed on SR 29, 9 km south of I-75, on the western boundary of Big Cypress in an area without protective fencing to keep wildlife off the road. He was estimated at 2 years-of-age and did not have a transponder.
- **FP153's kittens:** As stated in the Reproduction section, FP153 denned in July of 2008 and we marked 3 kittens, 2 males and 1 female. She denned again in June of 2009 and we marked 2 male kittens. Since there was only a year between these dens, it is probable that the 2008 den failed.

Recommendations

Turner River Crossing

A recommendation was made in the 2004-2005 Big Cypress Annual Panther Report to initiate discussions regarding the need for a wildlife underpass on Hwy. 41 at Turner River. Defenders of Wildlife, along the USFWS, obtained funding for the planning stages of this project, however, public and tribal opposition have hindered progress. With the death of UCFP119 in April of 2009, 6 panthers, 5 of which were females, have been struck by vehicles in this area. It is recommended, therefore, that agencies tasked with panther recovery continue to pursue and support effective methods to eliminate panther mortality at this crossing site.

State Road 29

State Road 29 is a heavily traveled north-south road that bisects large public land areas in south Florida. Since 1979, 31 panther deaths have been verified on this road. Unlike I-75, the construction of sections versus continuous fencing adjacent to wildlife underpasses was implemented on SR 29 on an experimental basis as a cost-saving measure and to provide access to adjacent canals for fishing. Panthers and other wildlife, however, continue to be struck by vehicles along portions that are not fenced. We continue to recommend the development of a SR 29 Panther Protection Plan so that, as funds become available, this road is secured against further panther and other wildlife road mortality.

Interstate 75

Since I-75's completion in 1993, 2 panthers have been struck and killed in the 40-km fenced segment of this road. A breach was found in the fencing near the site of the first death in 2007 and in January of 2009 a panther was killed on the entrance ramp from SR 29 to I-75. We recommend routine inspection of the fencing installed on I-75 and assessment of the entrance ramps at SR 29 to determine if a modification to the fencing might prevent wildlife from accessing the interstate.

Acknowledgments from the project leader

The Big Cypress capture team consisted of a diverse group of experts in their fields who worked together to accomplish this year's intensive and successful capture effort. Two NPS DVMs, Jenny Powers and Kevin Castle, shared the team veterinarian role and improved the biomedical aspect of our work through their skills and insight. We thank Margaret Wild and Elaine Leslie of the NPS Biological Resource Management Division's Wildlife Health Program for providing this technical support. The many years of clinical experience of local DVMs John Lanier and Erik Madison further complemented the biomedical work.

Annette Johnson oversaw the biomedical aspects of our work as vets came and went. Her skill in locating the collared panthers by fixed-wing aircraft was always thorough and precise. Mark Cunningham, FWC DVM, generously provided his support and advice on biomedical aspects of panther work. Naples Community Hospital donated biomedical supplies and services and Naples Oxygen, Inc. donated oxygen supplies. Big Cypress volunteer, Charlie Wilson, enthusiastically ran our errands, delivering biomedical samples and picking up needed supplies in Naples. Speed Aviation continues to provide professional and reliable pilots that ensure safe and accurate determination of panther whereabouts.

John Kellam and Dennis Giardina kept equipment running and organized, retrieved sedated panthers from treetops and provided welcome input into situation assessment and decision-making. We thank Dennis' employer, the Department of Environmental Regulation, for allowing him to dedicate a month of his time to our work. Ralph Arwood continued to share his photographic knowledge, equipment and images with, not only the National Park Service, but also with the Friends of the Florida Panther Refuge and all the recipients of their monthly Panther Update.

The McBrides, Roy, Rocky, and Cougar, continue to be the key element in all aspects of panther capture and population tally in Florida. We especially thank Rocky for his tireless efforts to find and tree panthers in our study area.

The success of our work is due to Big Cypress staff support of the wildlife program, especially that of Ron Clark and Pedro Ramos. This project was funded by the National Park Service at Big Cypress and the NPS Biological Resource Management Division's Wildlife Health Program.

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Table 1. Florida panthers captured and radio-collared in SBICY in 2009.

| FP# | K# | Capture Date | Gender | Age (yrs) | Type | Capture Location | |
|-----|------|--------------|--------|-----------|-----------|------------------|----------|
| | | | | | | Easting | Northing |
| 161 | K169 | January 31 | F | 5 | resident | 473346 | 2865205 |
| 133 | | February 11 | M | ~9 | resident | 481604 | 2875252 |
| 162 | | February 11 | F | ~4 | resident | 485312 | 2876955 |
| 169 | | February 25 | M | ~4-5 | resident | 480960 | 2863918 |
| 171 | | February 27 | M | ~2-3 | disperser | 472774 | 2890572 |

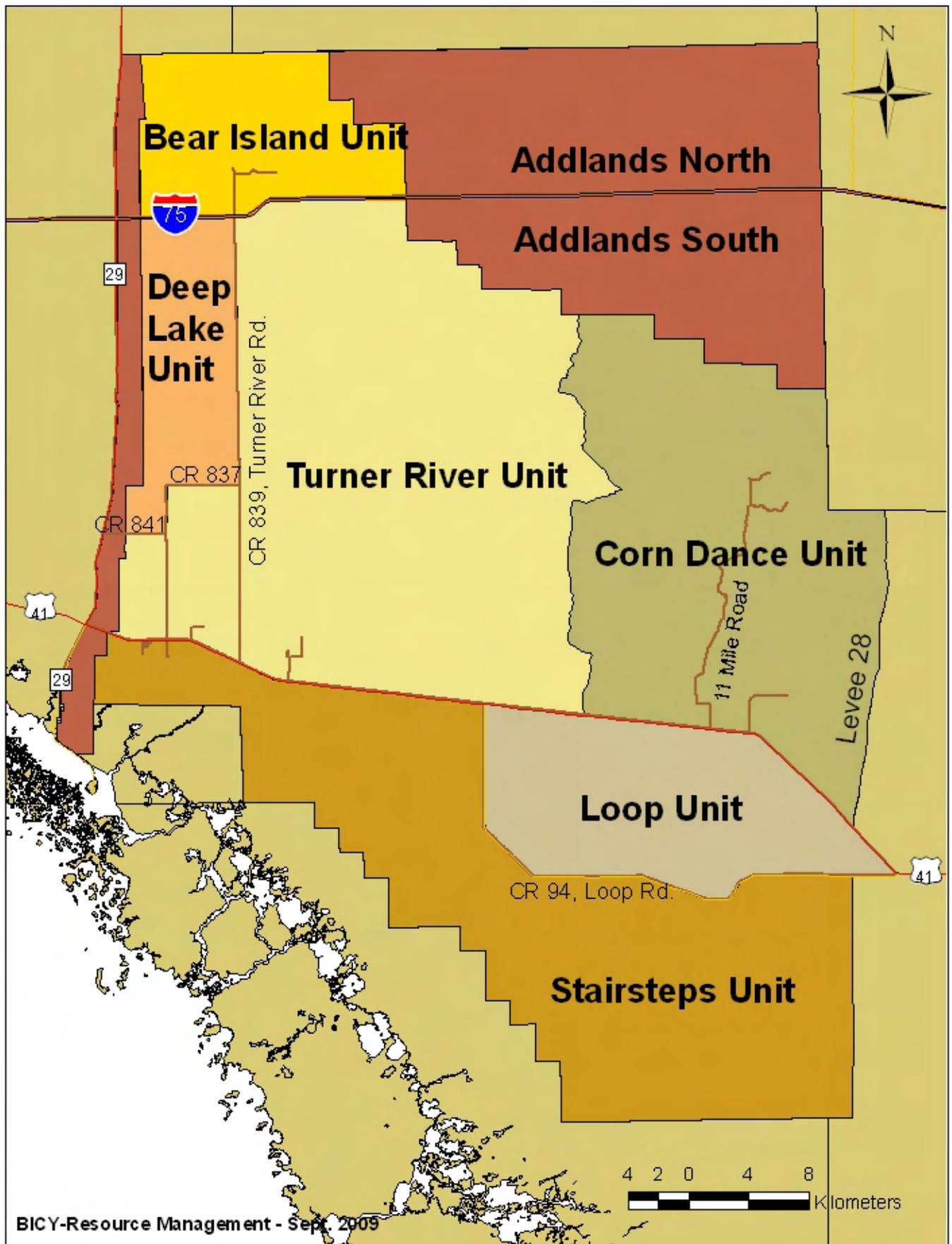


Figure 1. Management units and roads in Big Cypress National Preserve.

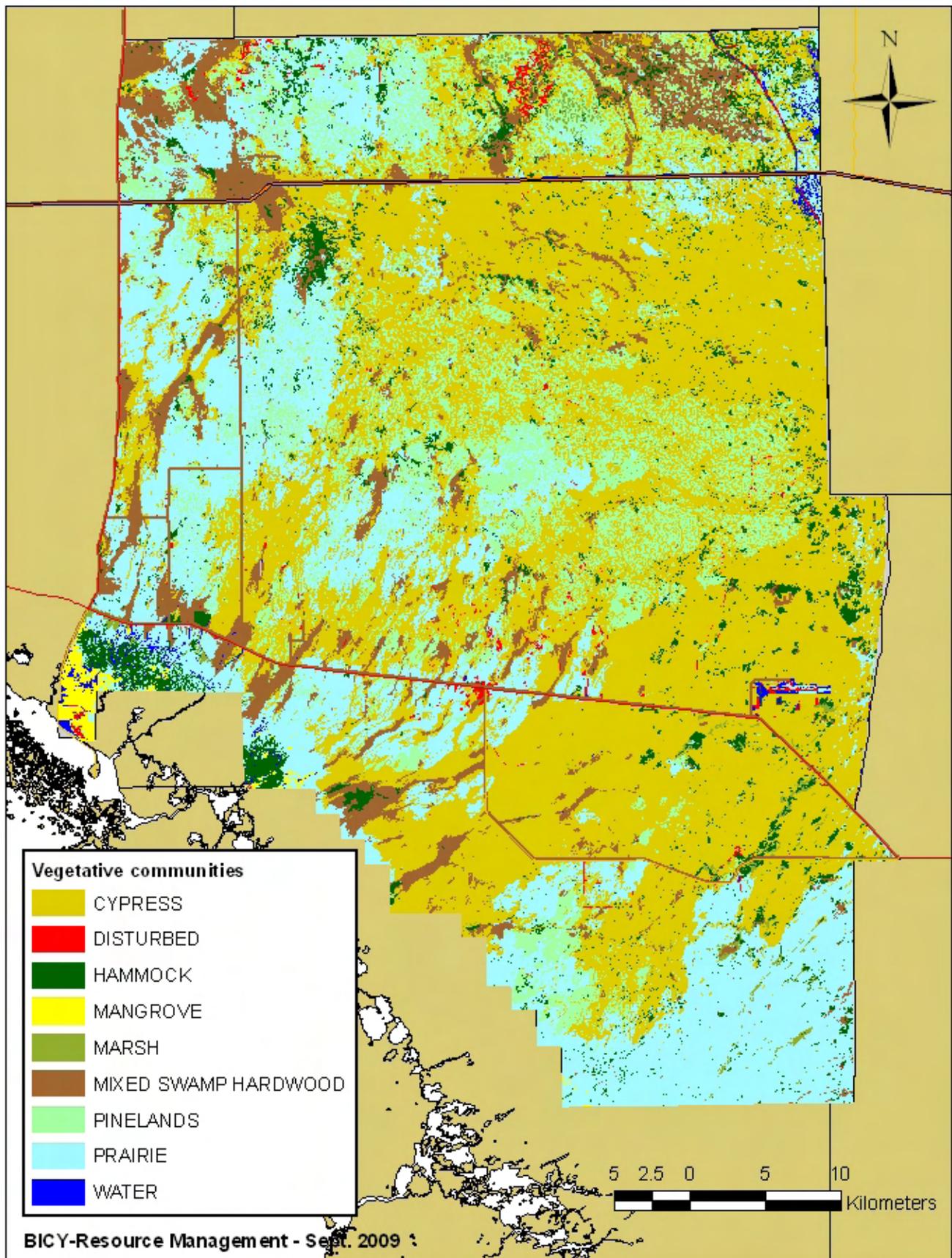


Figure 2. Vegetative communities in Big Cypress National Preserve.

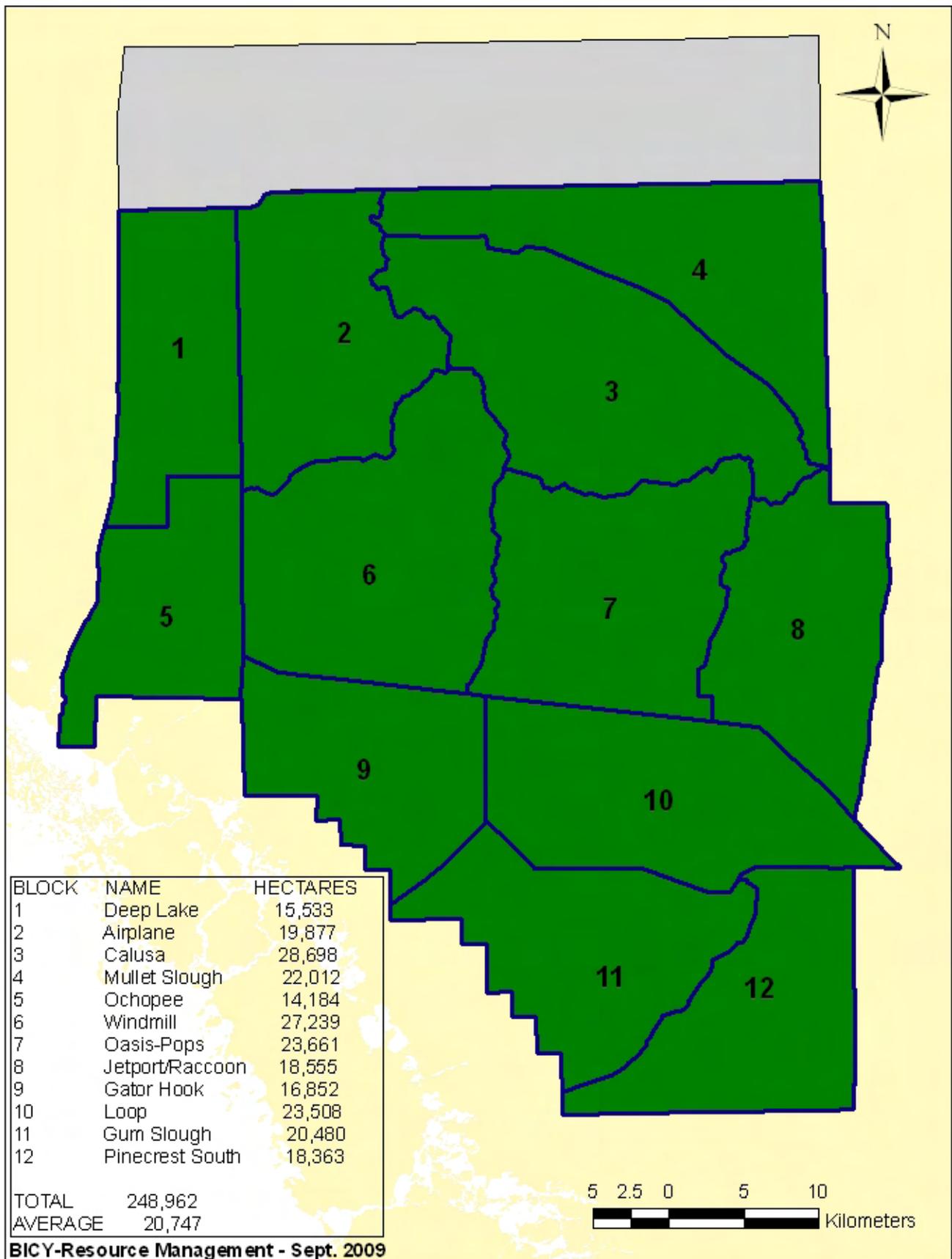


Figure 3. Panther survey blocks in SBICY.

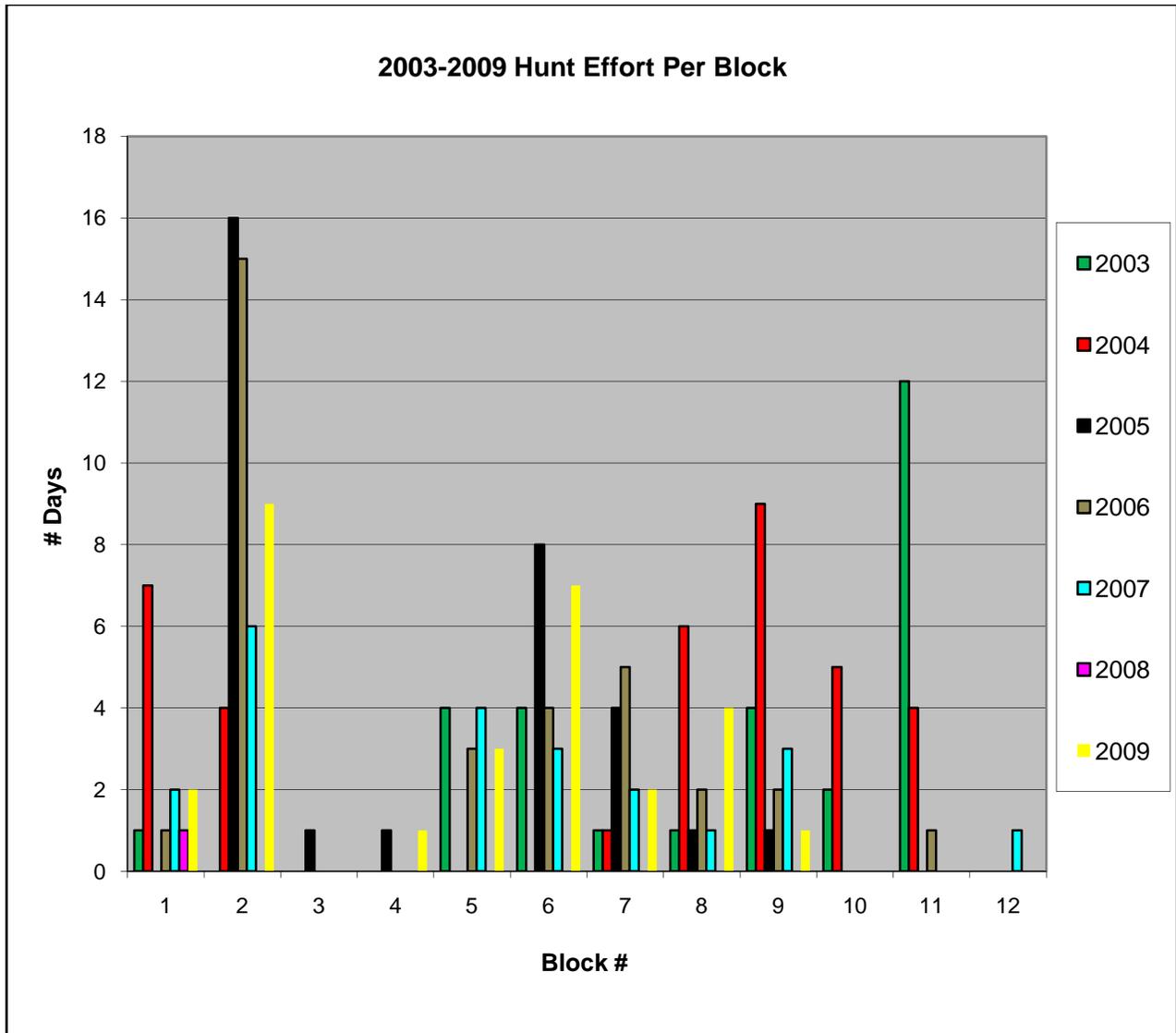


Figure 4. Panther capture effort per survey block, 2003 – 2009.

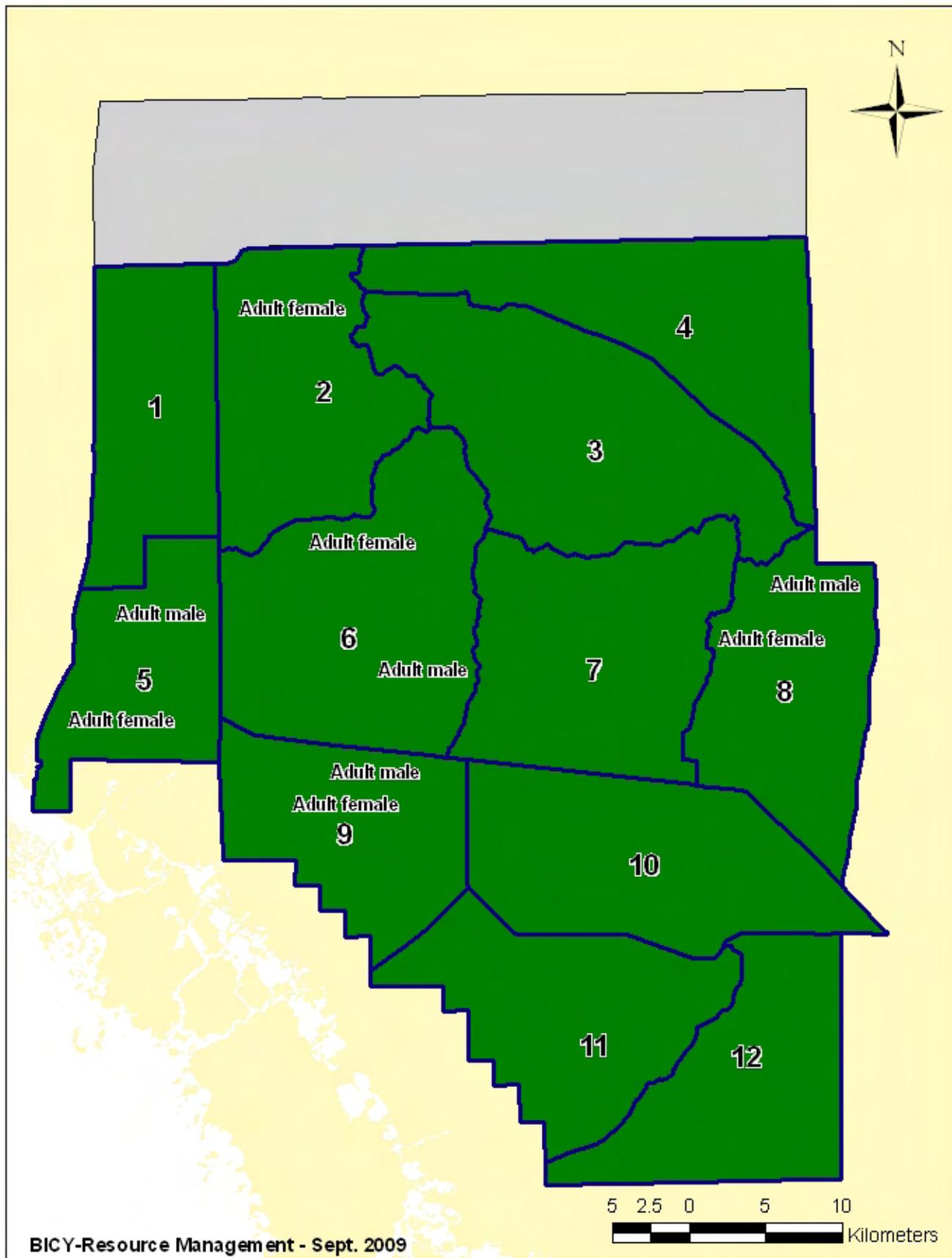


Figure 5. Documented presence of uncollared (or failed collar) panthers in SBICY from July 2008-June 2009.

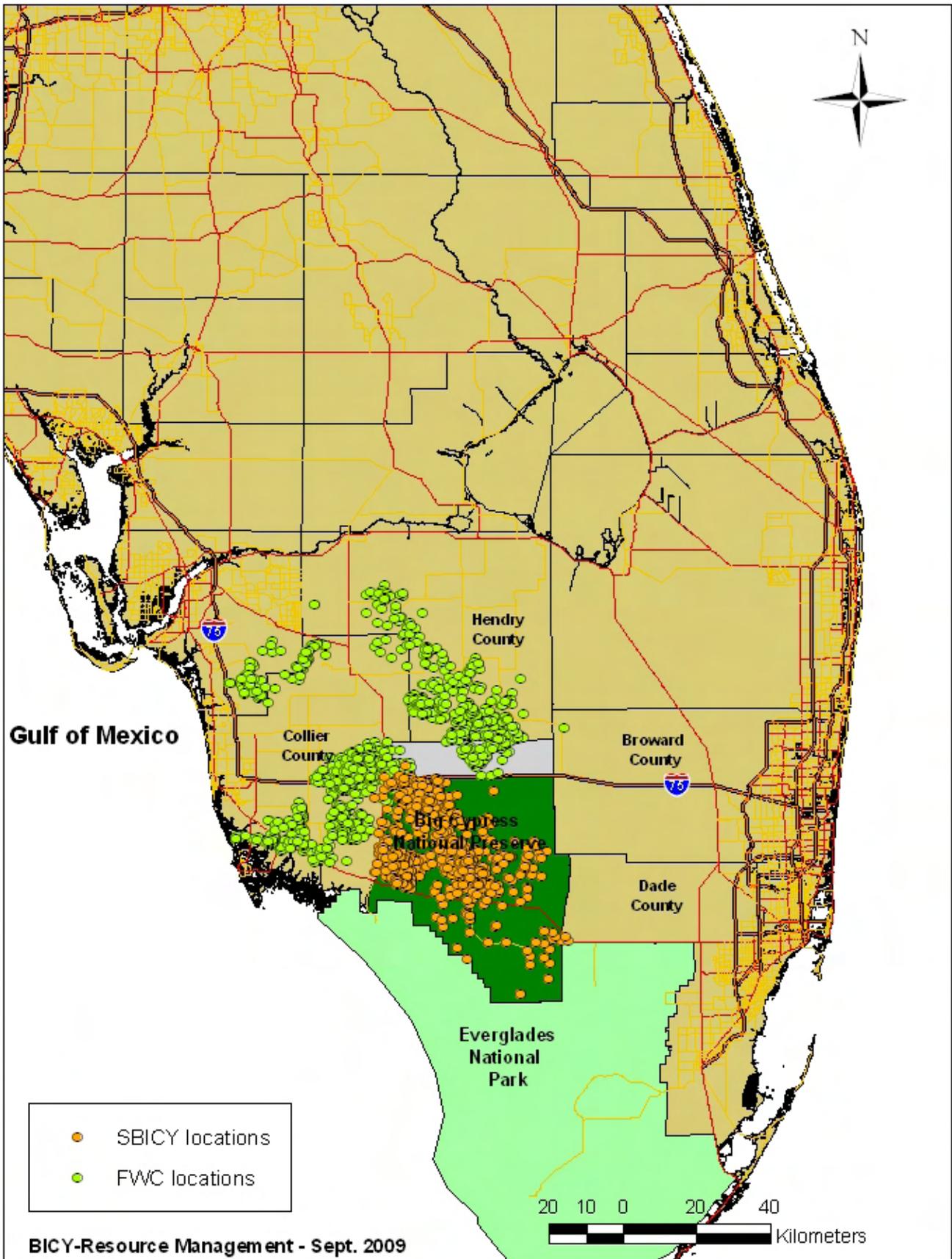


Figure 6. Geographical distribution of all Florida panther telemetry locations from July 2008-June 2009.

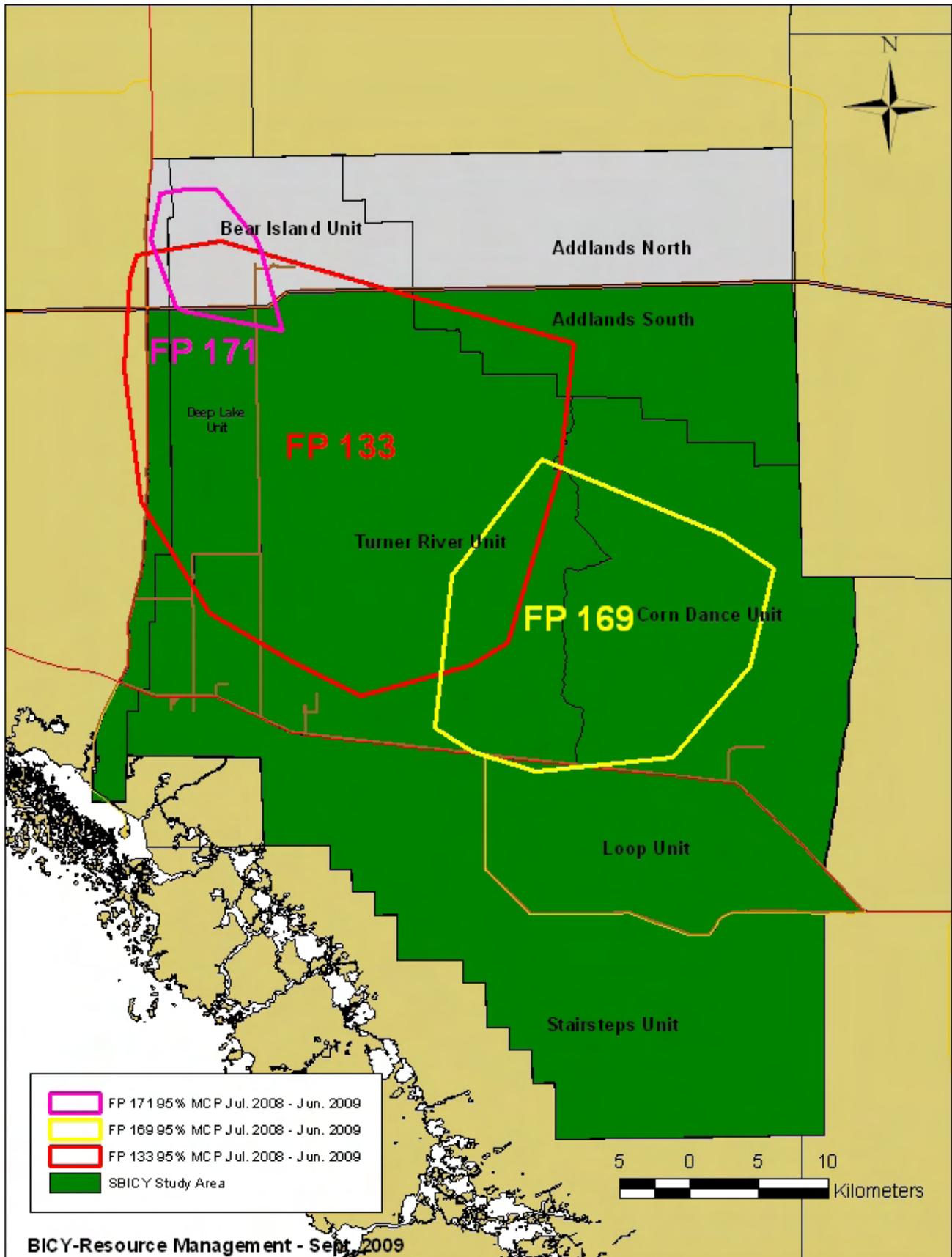


Figure 7. Home ranges of adult male Florida panthers monitored in SBICY from July 2008-June 2009.

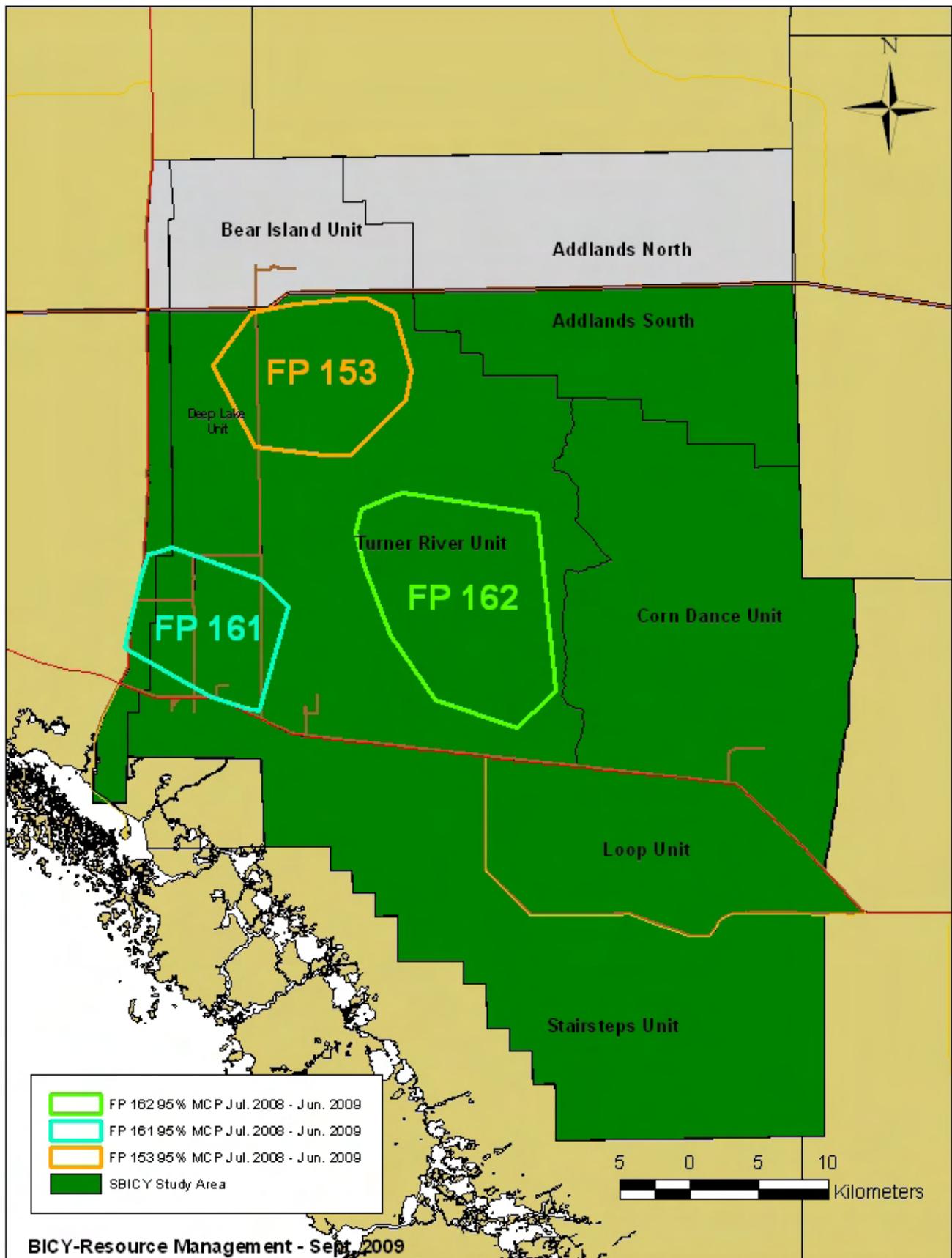


Figure 8. Home ranges of adult female Florida panthers monitored in SBICY from July 2008-June 2009.

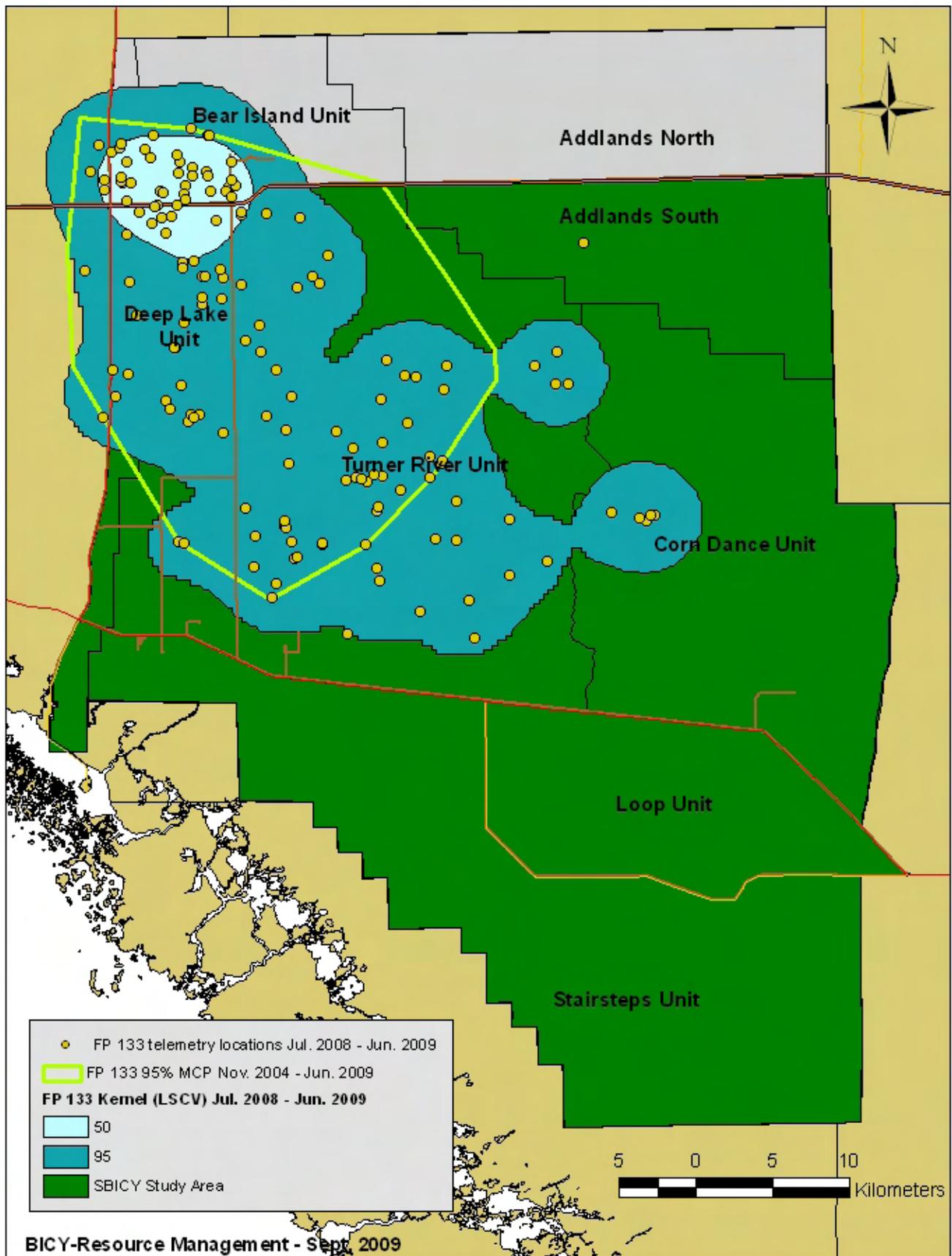


Figure 9. Home range of male Florida panther #133.

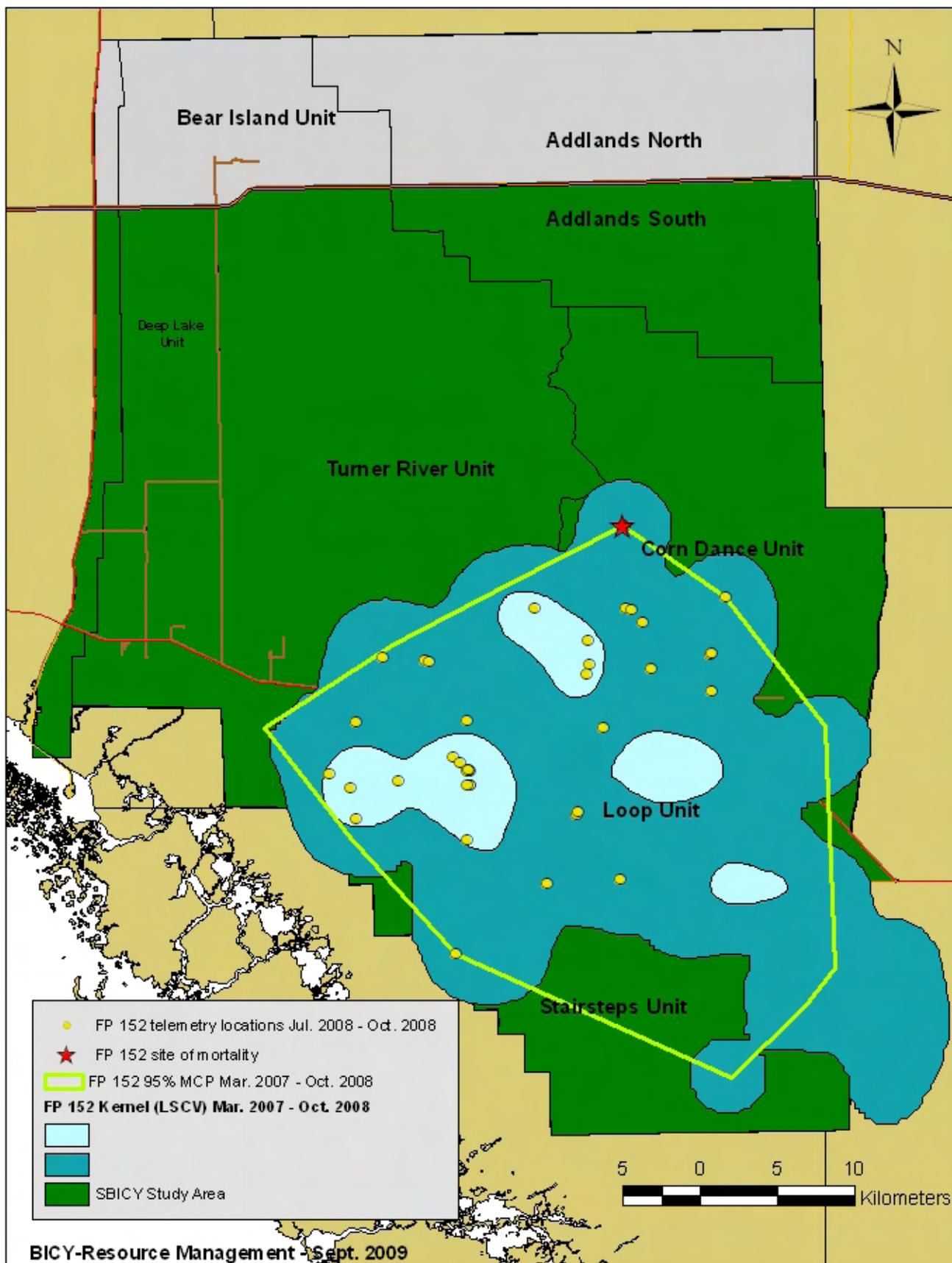


Figure 10. Lifetime home range of male Florida panther #152.

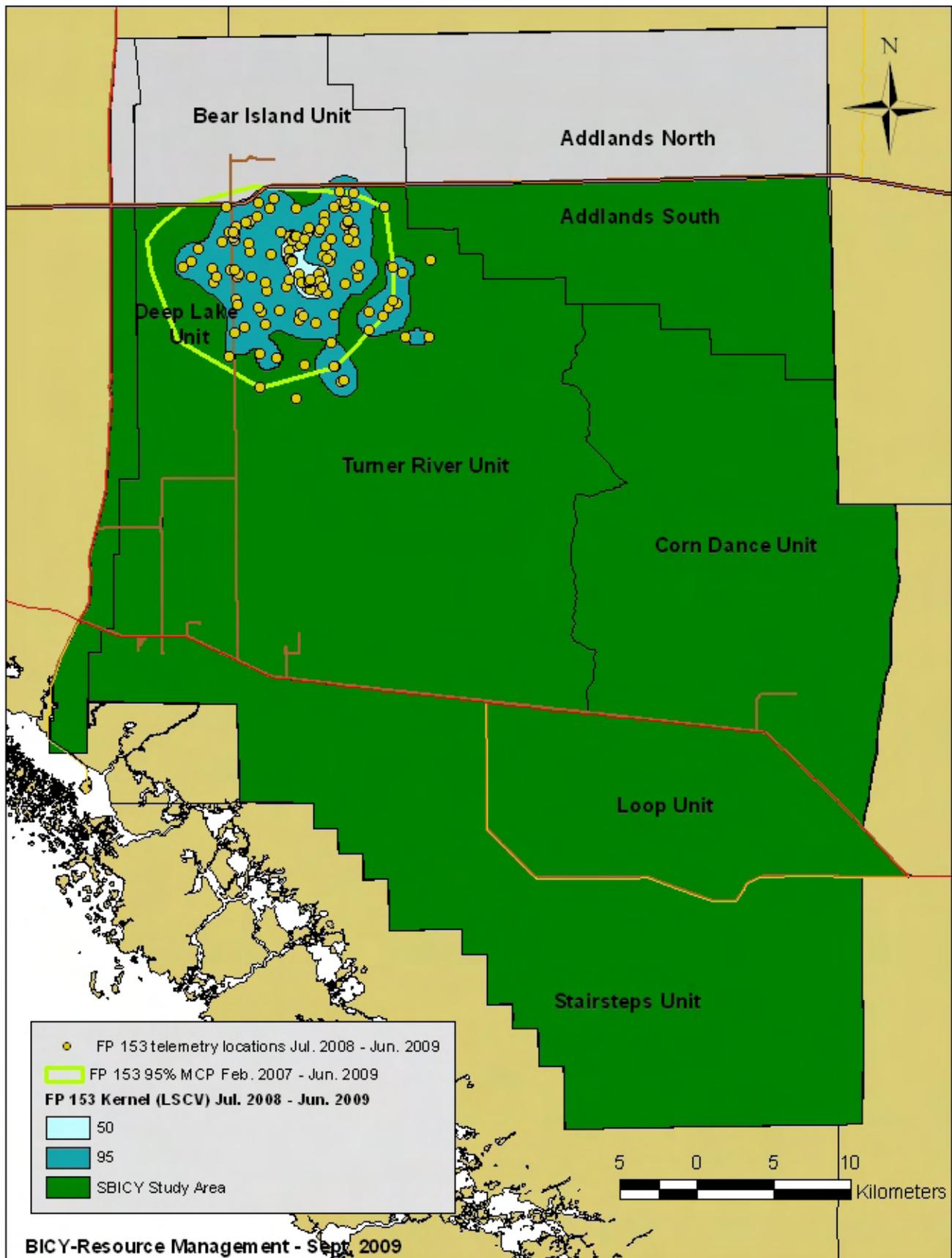


Figure 11. Home range of female Florida panther #153.

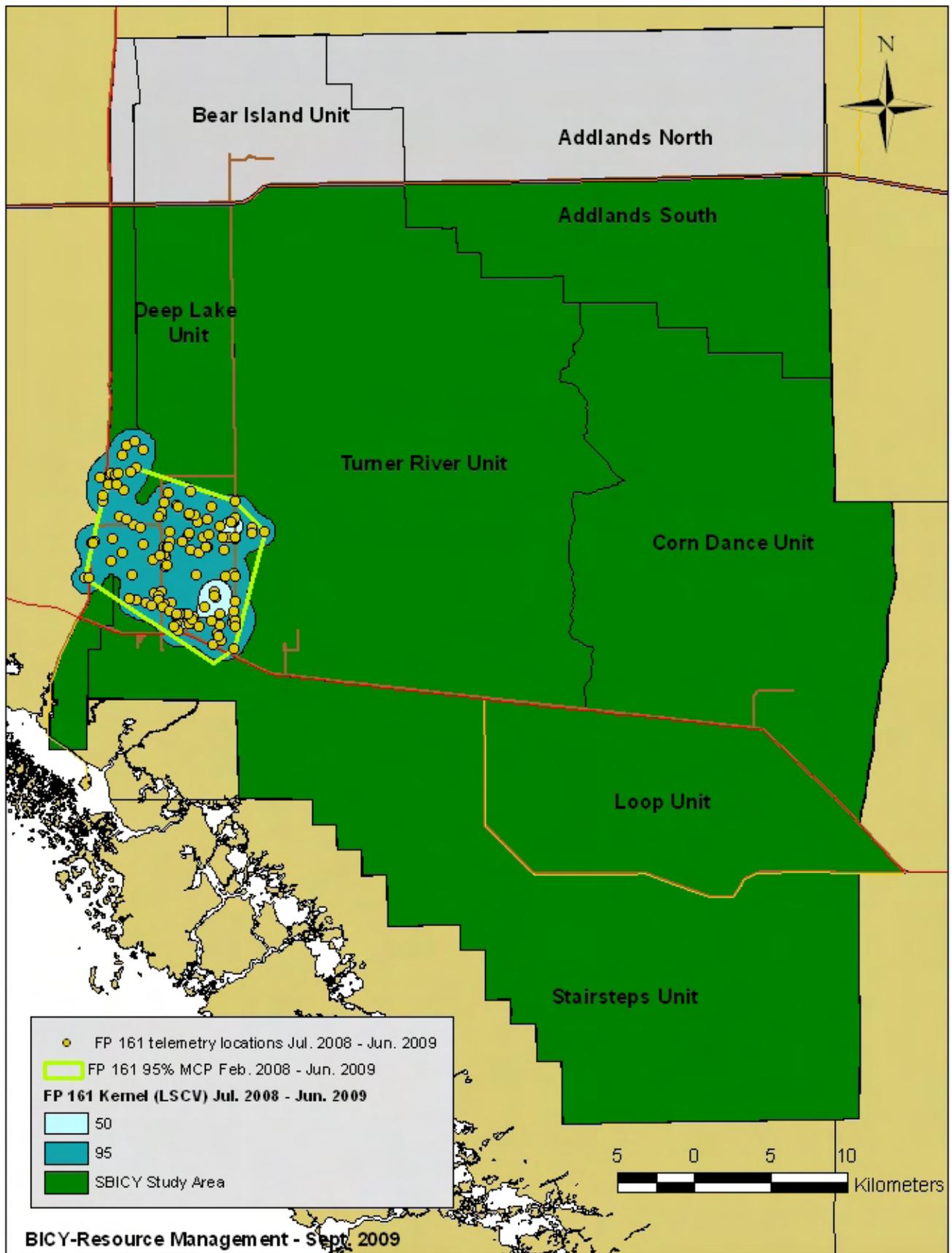


Figure 12. Home range of female Florida panther #161.

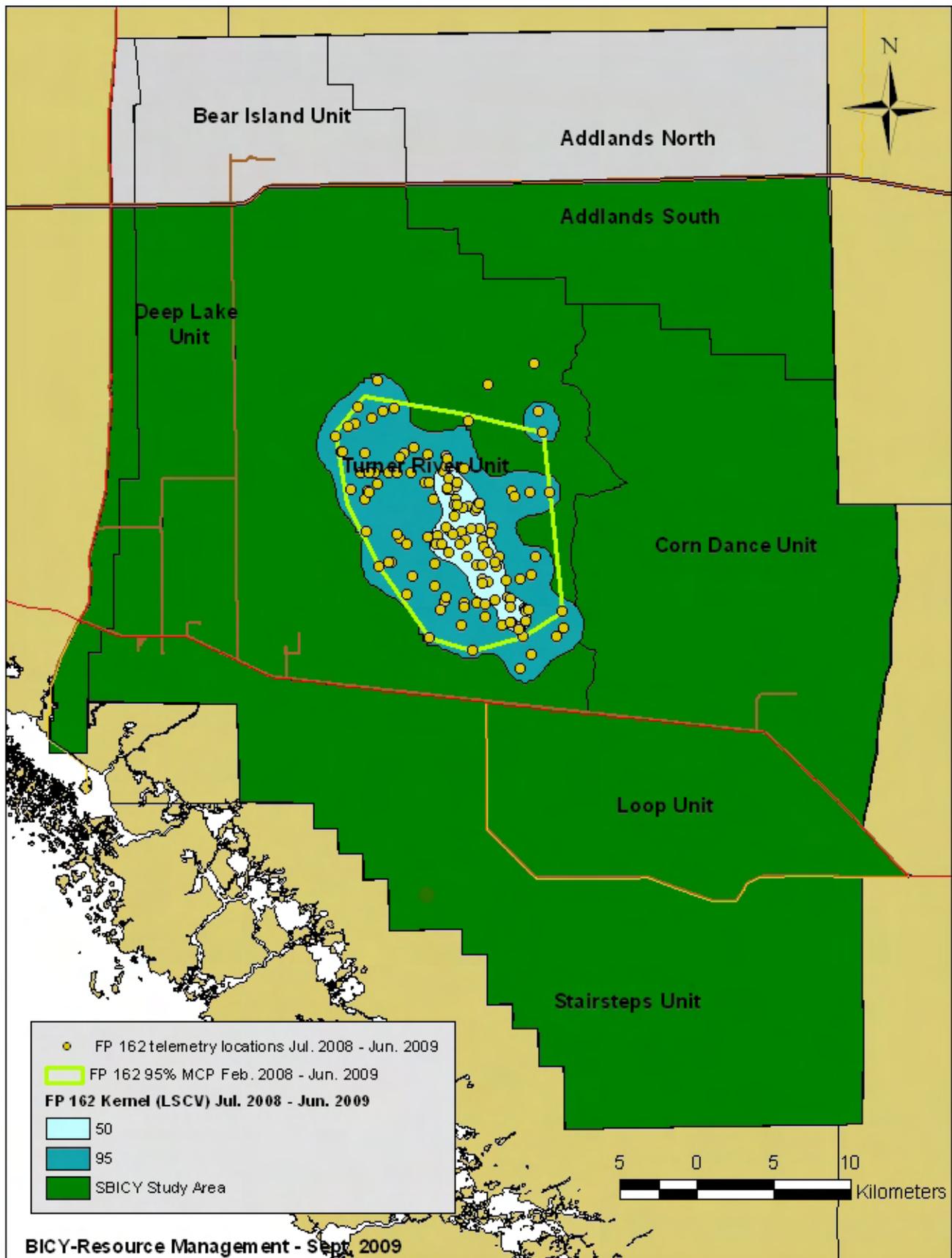


Figure 13. Home range of female Florida panther #162.

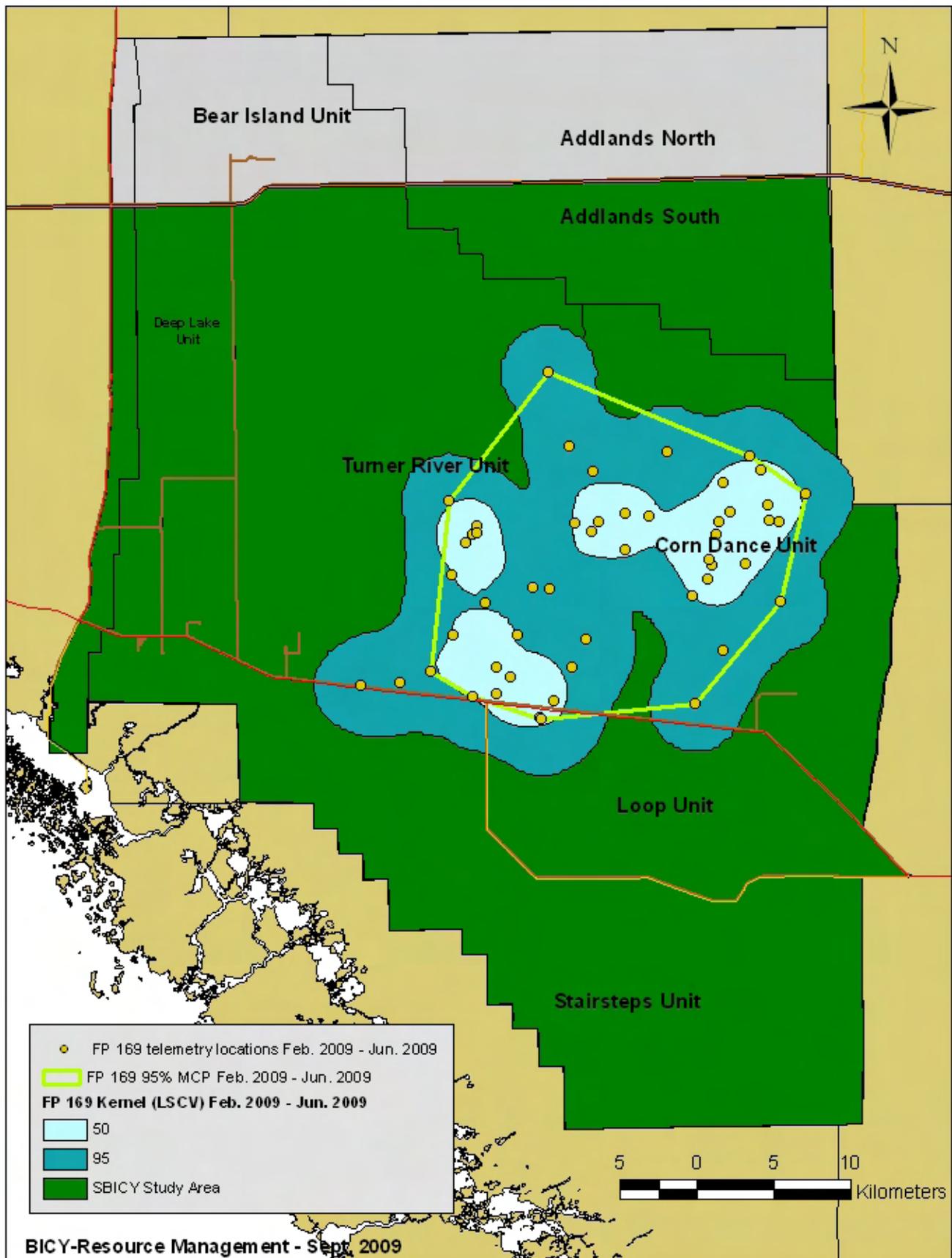


Figure 14. Home range of male Florida panther #169.

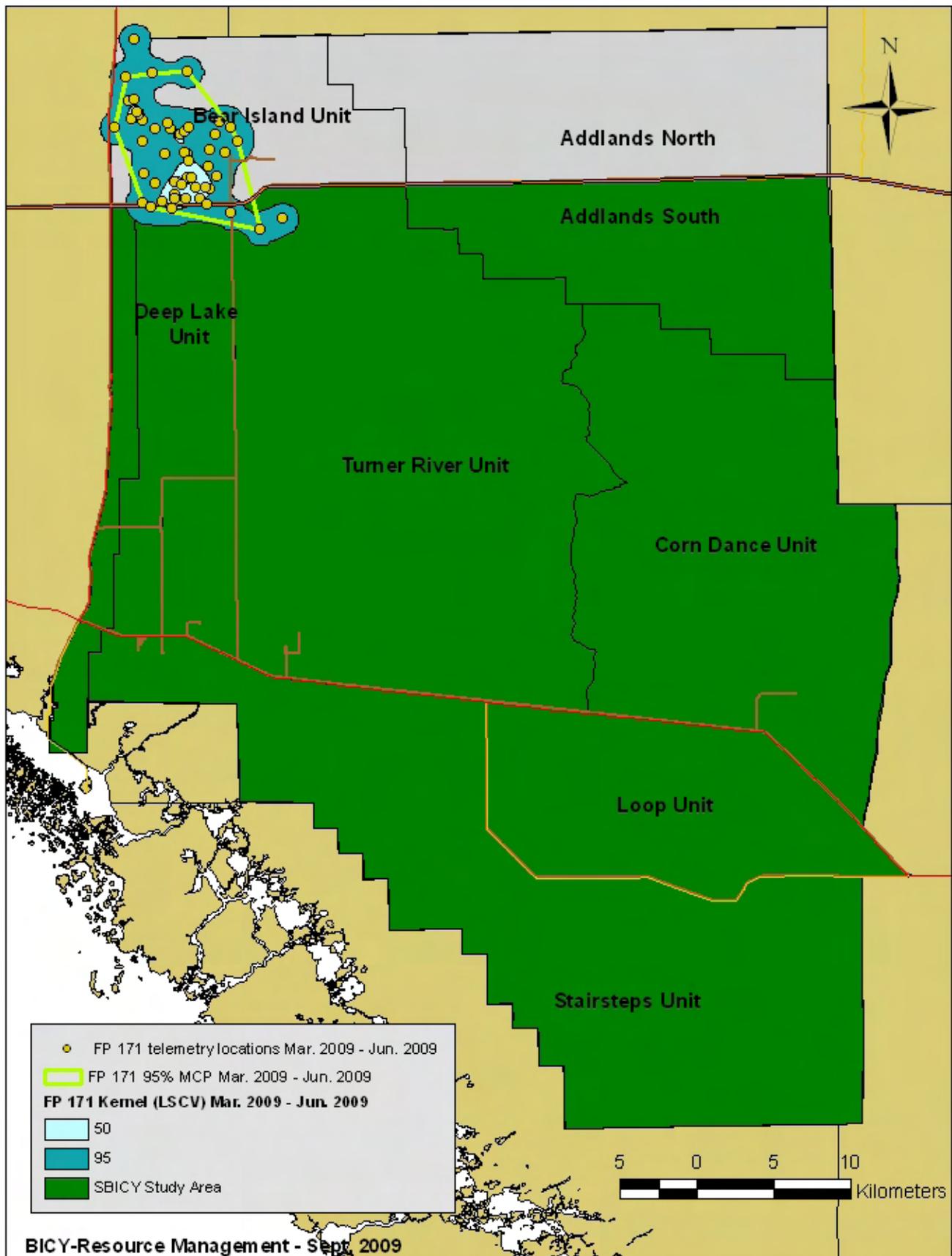


Figure 15. Home range of male Florida panther # 171.

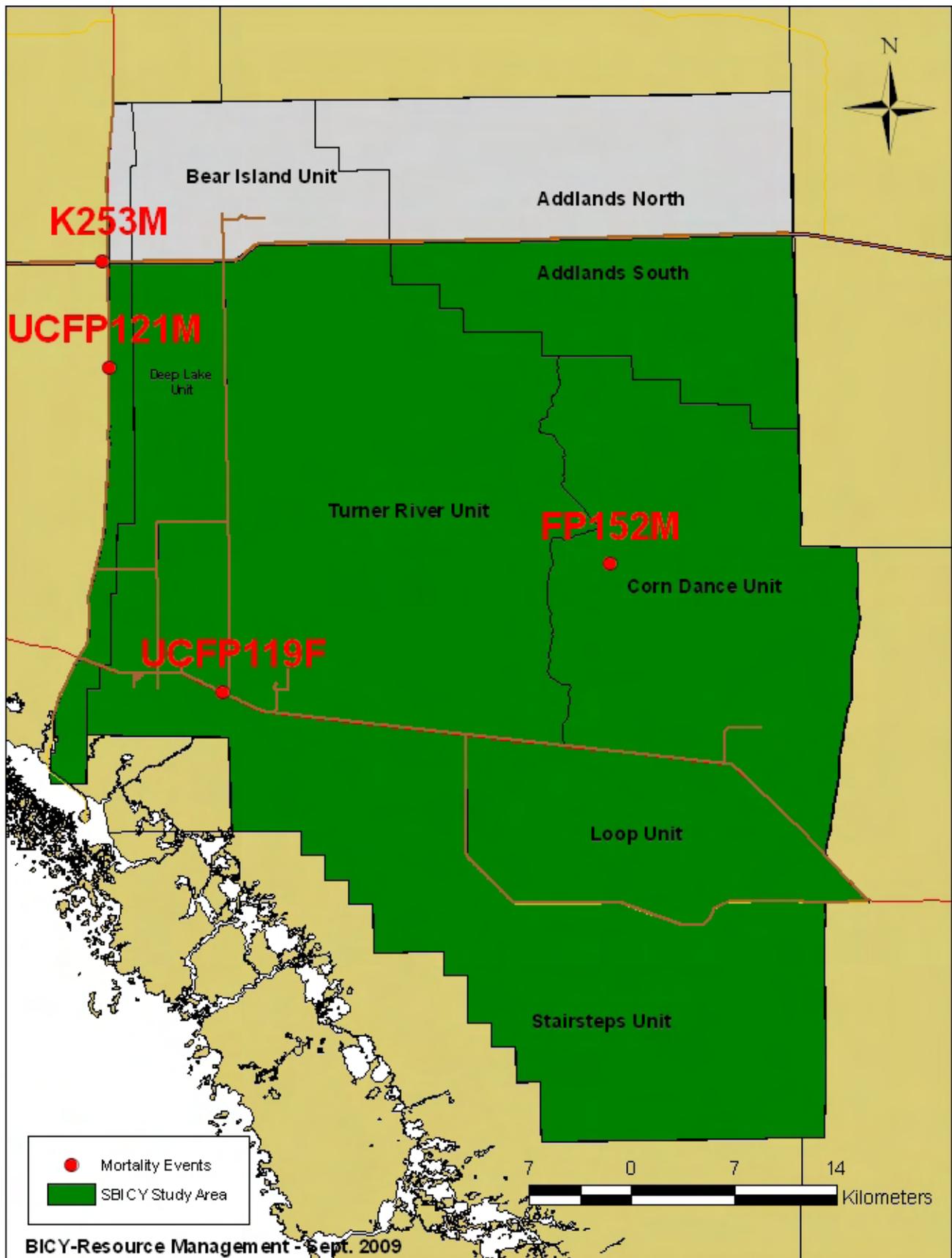


Figure 16. Distribution of known Florida panther deaths in SBICY from July 2008 - June 2009.