

FLORIDA PANTHER (*Puma concolor coryi*)
RESEARCH AND MONITORING
IN BIG CYPRESS NATIONAL PRESERVE
2009-2010 ANNUAL REPORT



Photo of FP175 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 2009 to 30 June 2010. We hunted for 29 days between February 3 and March 5 in 2010 in 9 of the 12 survey blocks. We captured and collared 5 new panthers and changed the working collars on 2 panthers.

We monitored 12 panthers, 4 males and 8 females, for at least a portion of the reporting period. One collared panther was lost from the sample through mortality and 4 due to collar failure. When FP175 settled into the Bear Island Unit, we turned monitoring over to FWC. The average home range (95% MCP) of the 3 resident males and 7 resident females located more than 50 times in the reporting period was 604 km² and 124 km², respectively. The presence of a minimum of 3 uncollared adult males and 6 uncollared (or failed collar) adult females was verified in the study area. Five of the 7 monitored adult females denned during the reporting period and we marked 13 kittens, 6 males and 7 females, with transponders and sampled them for biomedical information. Three adult mortalities were documented in the study area, 2 from collisions with vehicles and 1 from blunt trauma, likely caused by a vehicle.

The efforts from the past 22 years of panther survey and monitoring work, 15 years of panther reproductive assessment, and 9 years of panther capture work conducted by National Park Service in Big Cypress have provided a significant amount of data with which management decisions have been influenced and panther ecology more thoroughly understood.

Report Background

This is the eighth 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 2009 and 30 June 2010 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 2004-2009 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 to 2009).

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 (2005-2009) average for hunter pressure was 13,985 man-days, with a mean harvest of 212 deer (bucks only) and 3 hogs (FWC 2005-2009 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.

2010 Capture Season Plans

In the SBICY 2010 Capture Season Plan presented at the 2 October 2009 Panther Capture Season Planning meeting in Naples, Florida, we identified 2 panthers, FP145 and 102

whose collars needed replacement. We planned to target blocks 2, 6, 10, and 12 which encompass the home ranges of 5 females, FP93, 124, 150, 151 and 153, 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. These collars now have pre-programmed breakaway devices in the event that we cannot handle the females because they are either denning or raising young. We planned to deploy 2 North Star satellite collars programmed to provide real-time locations 6 times per day. 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 panthers 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 2009 and 30 June 2010 (Figures 9-20) 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 determined these for panthers with 50 or more locations over at least a 4-month monitoring period. 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 (2010) lists all panther kittens handled at dens from 7 April 1992 through 30 June 2010 and Appendix III lists all known dens of radio-collared female panthers from June 1985 through 30 June 2010.

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 (2010) lists known panther injuries and mortalities through 30 June 2010.

Reporting

We used the reporting period of 1 July 2009 to 30 June 2010 to coincide with FWC reports completed in 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 male and female panthers as **adults**, although some may not have established a home range or 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 February 3 and March 5 in 2010 in 9 of the 12 survey blocks. We captured and collared 5 new panthers, FP175, 179, 180, 181, and 182. We changed the working collars on 2 panthers, FP133 and 171 (Table 1). We did not handle female FP145 because she was denning. We did not handle FP102 because she appeared to be pregnant or very full of food when we treed her. As it turned out, she was less than 1 month pregnant which would not have been noticeable from afar at that time.

2010 Capture Season Summary:

29	total hunt days
5	newly collared panthers (FP175, 179, 180, 181, 182)
0	failed collar replacement
2	working collar replacement (FP133 171)
1	not handled because was denning (FP145)
2	treed but not handled due to unsafe handling conditions (FP133, 102)
1	treed but not needing handling (FP169)

Following is a summary of this year's findings per block. Figure 4 shows our capture effort per block for the past 7 years.

Block 1: Hunted 7 days

- 21 Feb : collared FP180
- 28 Feb: collared FP181
- 1 March: collared FP182

Block 2: Hunted 11 days

- 7 Feb: collared FP175
- 12 Feb: cold-trailed an uncollared female
- 20 Feb: found sign of an uncollared male
- 23 Feb: cold-trailed an uncollared male
- 29 April: Roy/Caleb McBride treed FP93 (failed collar)
- 30 June: Roy/Cougar McBride treed an uncollared male

Block 3: Hunted 2 days

- 4 March: found tracks of an uncollared male and an uncollared female
- 5 March: found fresh tracks of an uncollared male

Block 4: No hunting in this area

Block 5: Hunted 1 day

Block 6: Hunted 4 days

- 18 Feb: verified report of an uncollared female sighting by tracks

Block 7: Hunted 1 day

Block 8: Hunted 2 days

- 27 Jan: R. Scott photographed tracks of a male. FP169 was 2 miles northwest of Popenhagers.
- 6 Feb: found tracks of an uncollared female
- 26 Feb: found tracks of an uncollared female
- 26 Feb: treed FP169 but did not need to handle him

Block 9: Hunted part of one day to recollar a panther

- 19 Feb: Recollared FP133 and found tracks of an uncollared female

Block 10: No hunting in this area

Block 11: No hunting in this area

Block 12: Hunted 1 day

- 14 Feb: found tracks of an uncollared female near Pinecrest and collared FP179 south of Monroe Station

Within the study area, 3 uncollared adult males and 6 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 of Monitored Panthers- Background, Home Range, and Reproductive Activity

We monitored 4 resident male and 8 resident female panthers between 1 July 2009 and 30 June 2010. Figure 6 shows the geographical distribution of this year's SBICY panthers in relation to the entire monitored population, and consists of 34% of the reporting period's locations. Locations obtained within Big Cypress boundaries (all units, including Bear Island and the Addition Lands) represent 52% of the monitoring efforts. Figures 7 and 8 depict the home ranges of the 4 resident males and 8 resident females inhabiting SBICY during the 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 programming error. It began functioning again, as programmed, on 23 June 2009. We treed FP102 on 3 March 2010, saw that she was either pregnant or full of food, and so did not handle her. Since it was toward the end of our capture work, we did not tree her again. Early in June, she started denning. Therefore, in early March she had fetuses less than 1 month of age, a condition not visually obvious. On 6 June, we marked 2 male kittens at her den. On 25 October, her collar emitted a mortality signal. The cause of her death was intraspecific aggression. We found kitten tracks in the vicinity and on 30 October her male kitten, K304, was captured and placed in captivity. FP102's home range during the 2009-10 reporting period was 242 km² (Figure 9).

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. On 19 Feb 2010, we fitted him with a Globalstar tracking collar which was programmed to potentially provide 6 locations per day. This collar ceased functioning on 5 October. His 598-km² home range during the 2009-10 reporting period based on 3 locations per week encompassed Bear Island, Deep Lake, and Turner River Units of Big Cypress (Figure 10).

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 2007, 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 programming error and she was not recaptured during the 2008 or 2009 panther capture work. Her collar began functioning again, as programmed, on 23 June 2009. She denned again in February 2010 and we marked 3 kittens, 2 females and 1 male, K291-293, on 25 February. Her home range during the 2009-10 reporting period was 89 km² (Figure 11).

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. We could not handle her during the 2009-10 capture work because her kittens were less than 12 months of age and her collar battery failed on August 22. Figure 12 shows her 23 locations prior to collar failure.

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. Female K279 was collared this year as FP182. One of her male siblings was documented with FP161 and FP182 on 22 March. In May 2010, FP161 denned again and on 26 May we handled 2 females and 1 male, K 300-302. Her home range during the reporting period was 58 km² (Figure 13).

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 May 2008, 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, K268 and 269. 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, K280, on 7 May. In March 2010, FP162 denned again and we marked 3 kittens, 2 females and 1 male, K 294-296, on 23 March. FP162's home range during the 2009-10 reporting period was 141 km² (Figure 14).

FP169

On 25 February 2009, we collared male FP169 in the Turner River Unit and estimated his age at 4 to 5 years. On 21 May 2010, he was struck and killed by a vehicle on Hwy. 41 just west of Monroe Station. His “lifetime” home range during the 15 months we monitored him was 812 km² and encompassed the Turner River and Corn Dance Units with a few brief excursions north of I-75 and south of Hwy. 41. We believe that he was the collared panther seen on several occasions at the Everglades Conservation Club on Loop Road, based on his movements and the sighting reports (Figure 15).

FP171

On 27 February 2009, we collared male FP171 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 inhabited the Bear Island Unit of Big Cypress and the Florida Panther National Wildlife Refuge. Because this panther was not slated for recollaring by FWC, we recollared him on 8 February 2010 to retrieve the GPS collar and attach a Televilt Tellus collar with which FWC could potentially obtain intensified information on him during the deer hunting season. He has been monitored by FWC this past reporting period (Florida Fish and Wildlife Conservation Commission 2010).

FP175

Female FP175 was collared for the first time on 7 February 2010 but was handled as a kitten, K254, at the den of FP150 in July 2007. She, therefore, was known to be 2.5 years of age when collared. She inhabits the northwestern Turner River Unit and the Bear Island Unit. She denned in July of 2010 and we marked 2 female kittens on 2 August. Since she has inhabited the Bear Island Unit almost exclusively, FWC monitored her. FP175’s home range during the 2009-10 reporting period was 131 km² (Figure 16).

FP179

Male FP179 was collared for the first time on 14 February 14 2010 and estimated to be 5 years of age. He was fitted with a Globalstar collar which could potentially obtain 6

locations per day. This collar ceased to relay locations on 5 May 2010. During the 10 weeks of monitoring, FP179 inhabited the Stairsteps and Loop Units of Big Cypress (Figure 17).

FP180

Female FP180 was collared for the first time on 21 February 2010 but was handled as a kitten, K264, at the den of FP151 in February 2008. She, therefore, was known to be 2 years of age when collared. At capture, we did not detect obvious signs of pregnancy or previous lactation. She inhabited a 100-km² home range in the Deep Lake Unit and has not denned during the 4 months she was monitored in the reporting period (Figure 18).

FP181

Male FP181 was collared for the first time on 28 February 2010, but was handled as a kitten, K93, in March 2001. He is an offspring of female TX106, one of the 8 female pumas brought from Texas in 1995. He, therefore, was known to be 9 years of age when collared. He inhabited a 403-km² home range in the Deep Lake Unit of Big Cypress and the Fakahatchee Strand Preserve State Park (FAKA) during the 4 months he was monitored in the reporting period (Figure 19).

FP182

FP182 (K279) is the offspring of FP161. We captured her as a yearling on 1 March 2010. She remained with FP161 until 24 March. She inhabited a 109-km² home range in the Deep Lake and Turner River Units of Big Cypress with occasional excursions into FAKA during the 4 months she was monitored in the reporting period (Figure 20).

The average home ranges (95% MCP) of the 3 resident males and the 7 resident females monitored 50 or more times in the reporting period were 604 km² and 124 km², respectively.

Reproduction

Seven adult female panthers were monitored during the reporting period and 5 of them denned. One had kittens at the onset of the reporting period and one was too young to breed. We checked the 5 dens and marked 13 kittens, 6 males and 7 females, with transponders.

FP	DOB	Male	Female	Unit
145	30 Jan. 2010	1	2	Deep Lake
162	9 March 2010	1	2	Turner River
161	10 May 2010	2	1	Turner River
102	17 May 2010	2	0	Turner River
175	16 July 2010	0	2	Bear Island

Mortality

Three adult panther deaths were documented in the study area during the reporting period (Figure 21). Two died of collisions with vehicles and 1 found floating in Turner River died of blunt trauma, probably due to a collision with a vehicle on Hwy 41.

- **UCFP127.** This 3 to 4-year-old uncollared female panther was found on 9 October 2009, floating in Turner River, about 600 meters south of Hwy 41. The necropsy concluded that she “*suffered blunt trauma, possibly due to vehicular collision, hours to days before death. A large hematoma over the left flank overlaid the stomach rupture, and a hematoma within the mediastinum gave further evidence for blunt trauma as a cause of death. The proximity of UCFP127 to US41 made vehicular collision a strong possibility; however, frayed claws and abrasions, usually seen with this type of trauma were not observed. UCFP127 was found in the Turner River but it was unknown if she drowned secondary to her injuries. It was also unknown where UCFP127 entered the water and how far south she may have drifted. Severe autolysis precluded a complete necropsy.*”
- **UCFP135.** This female, estimated to be 4 years of age, was killed on 29 December 2009 by a vehicle on SR 29, about 12 km north of Hwy. 41.

- **FP169.** On 21 May 2010, this collared male panther was struck and killed by a vehicle on Hwy. 41 just west of Monroe Station.

Project Benefits

The efforts from the past 22 years of panther survey and monitoring work, 15 years of panther reproductive assessment, and 9 years of panther capture work conducted by National Park Service in Big Cypress have provided a significant amount of data with which management decisions have been influenced and panther ecology more thoroughly understood. Using this data, Big Cypress staff have coauthored several publications on panther genetics, survival, and habitat use (Hostetler et al. 2010, Johnson et al. 2010, Kautz et al. 2006) and authored a chapter on Interstate-75 as a case study on wildlife underpasses in the book *Safe Passages: Highways, Wildlife, and Habitat Connectivity* (Jansen et al. 2010).

Recommendations

Turner River Crossing

A recommendation was made 6 years ago 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 due to the fact that this is a known panther crossing site with a concentration of vehicle strikes. Defenders of Wildlife, along the USFWS, obtained funding for the planning stages of this project in 2006, however, public and tribal opposition resulted in project abandonment. Instead of a wildlife underpass, an experimental technology, a Roadside Animal Detection System (RADS), is slated for installation by the end of calendar year 2011.

With the death of UCFP127 in October of 2009, 7 panthers, 6 of which were females, have been struck by vehicles in this area. It is recommended, therefore, should the RADS prove not effective in preventing further panther mortality at this site, that construction of a wildlife underpass there be aggressively pursued by the agencies charged with panther recovery.

State Road 29

State Road 29 is a heavily traveled north-south road that bisects large public land areas in south Florida. Since 1979, 36 panther deaths have been verified on this road. Unlike the I-75 project, the inadequate number of underpasses and the absence of continuous fencing perpetuate the chronic problem of panther mortality on this road. 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 continue to 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. For more detailed recommendations on maintaining these underpasses for full wildlife benefit, see Jansen et al. 2010.

Acknowledgments

Our capture season success is in no small part due to the fact that all of us have worked together for many years with a spirit of unity and cooperation and the shared goal of safely catching panthers. The team members were Rocky McBride, our houndsman, and DVMs Jenny Powers, Kevin Castle, John Lanier, and Erik Madison. We welcomed one new NPS DVM this year, John Bryan, who melded into the team seamlessly. Annette Johnson readied the biomedical equipment, assisted with the biomedical sample collection, and monitored the radio-collared cats throughout the year. John Kellam and Dennis Giardina kept the vehicles and capture gear ready to go as well as retrieving the tranquilized panthers from tree limbs. Ralph Arwood assisted in all aspects of the field work and documented it through photography. His images continue to reinforce to the public that this animal is worth keeping as part of the south Florida ecosystem. Finally, thanks to the Big Cypress Management Team and all staff for sharing their equipment and providing much-appreciated encouragement.

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Table 1. Florida panthers captured and radio-collared in SBICY in 2010.

FP#	K#	Capture Date	Gender	Age (yrs)	Type	Capture Location	
						Easting	Northing
175	K254	February 7	F	2.5	resident	477439	2890533
171		February 8	M	3-4	resident	464003	2895807
179		February 14	M	~5	resident	488403	2857950
133		February 19	M	~10	resident	472839	2862679
180	K264	February 21	F	2	resident	467688	2888825
181	K93	February 28	M	9	resident	470704	2879266
182	K279	March 1	F	1	disperser	469695	2866919

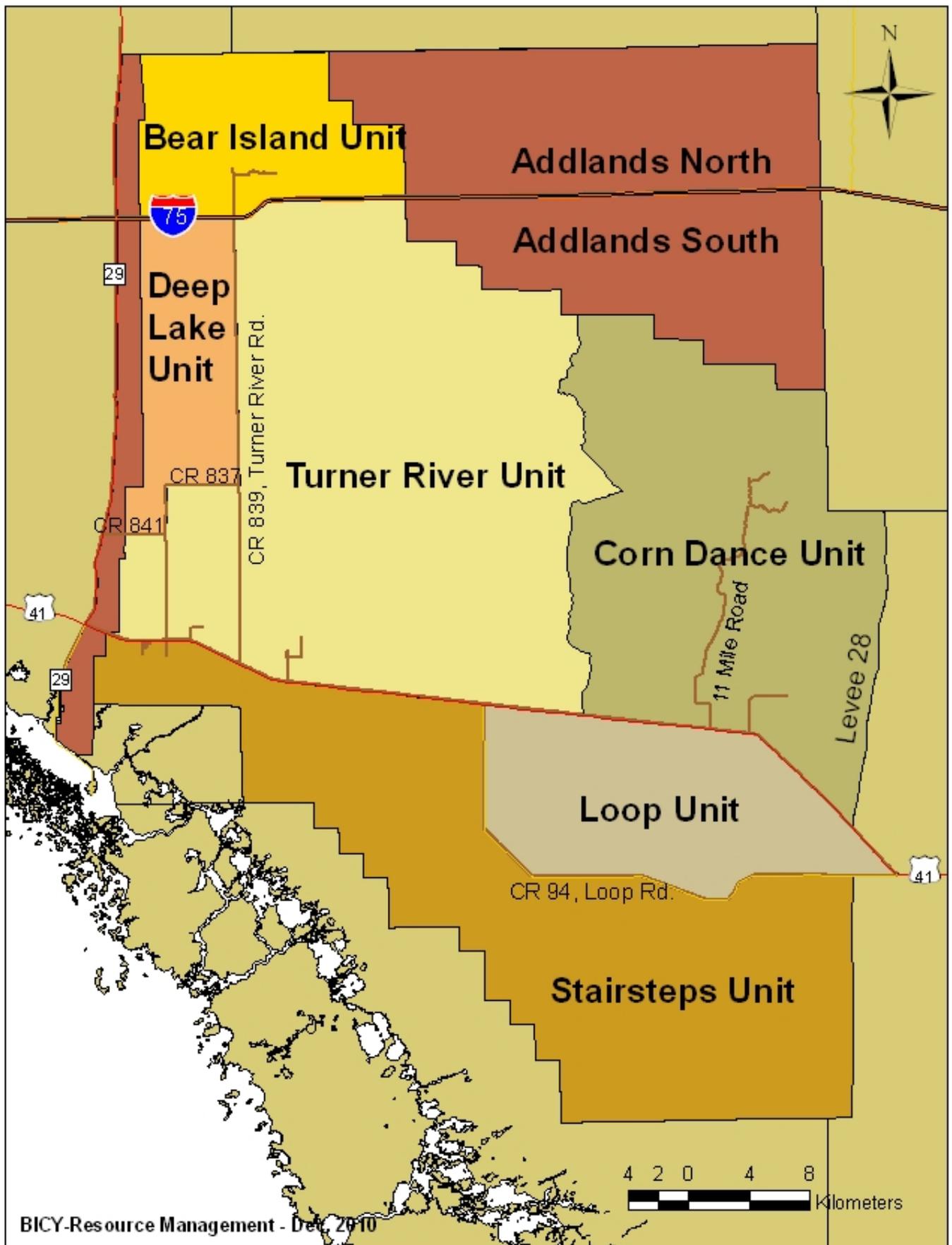


Figure 1. Management units and roads in Big Cypress National Preserve.

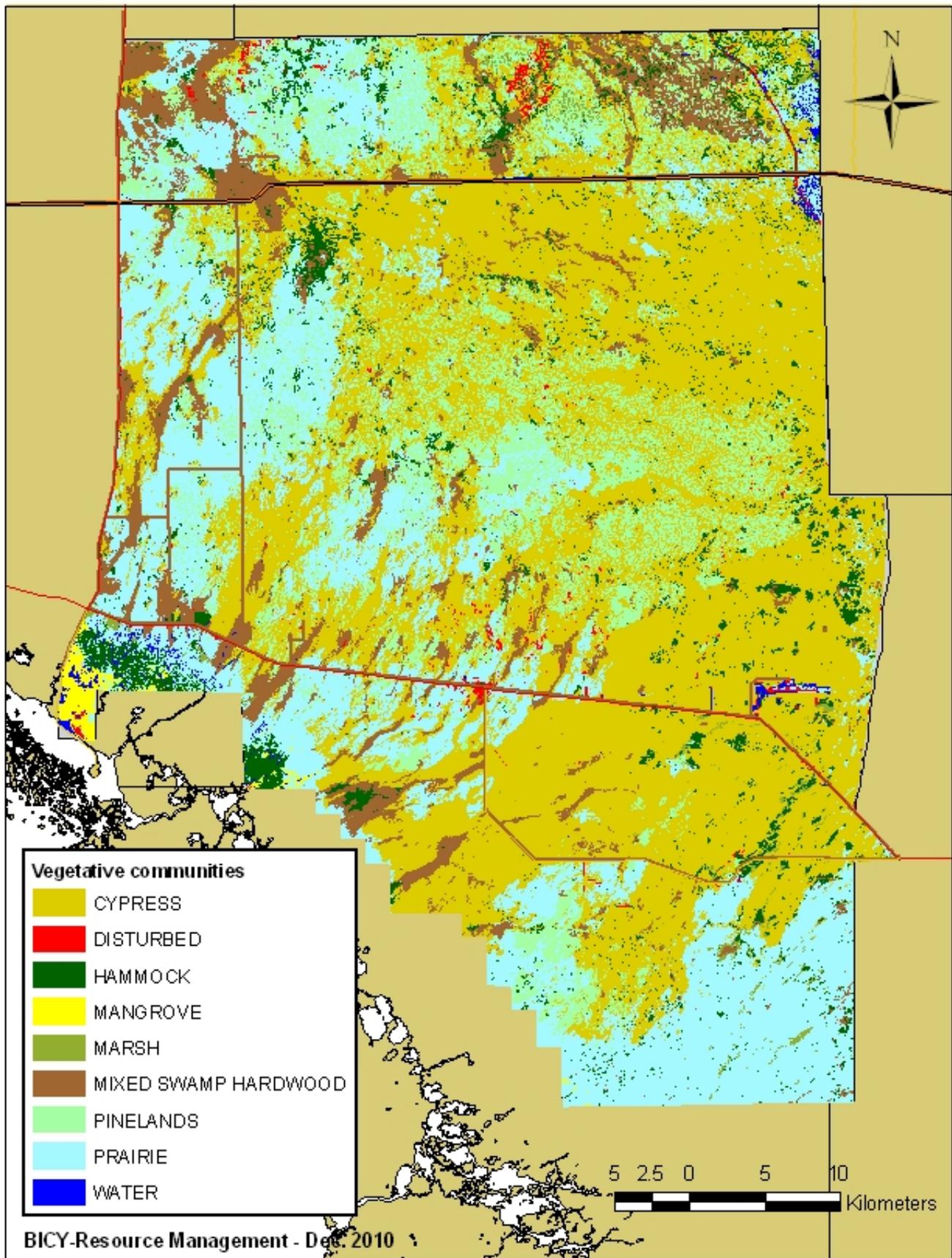


Figure 2. Vegetative communities in Big Cypress National Preserve.

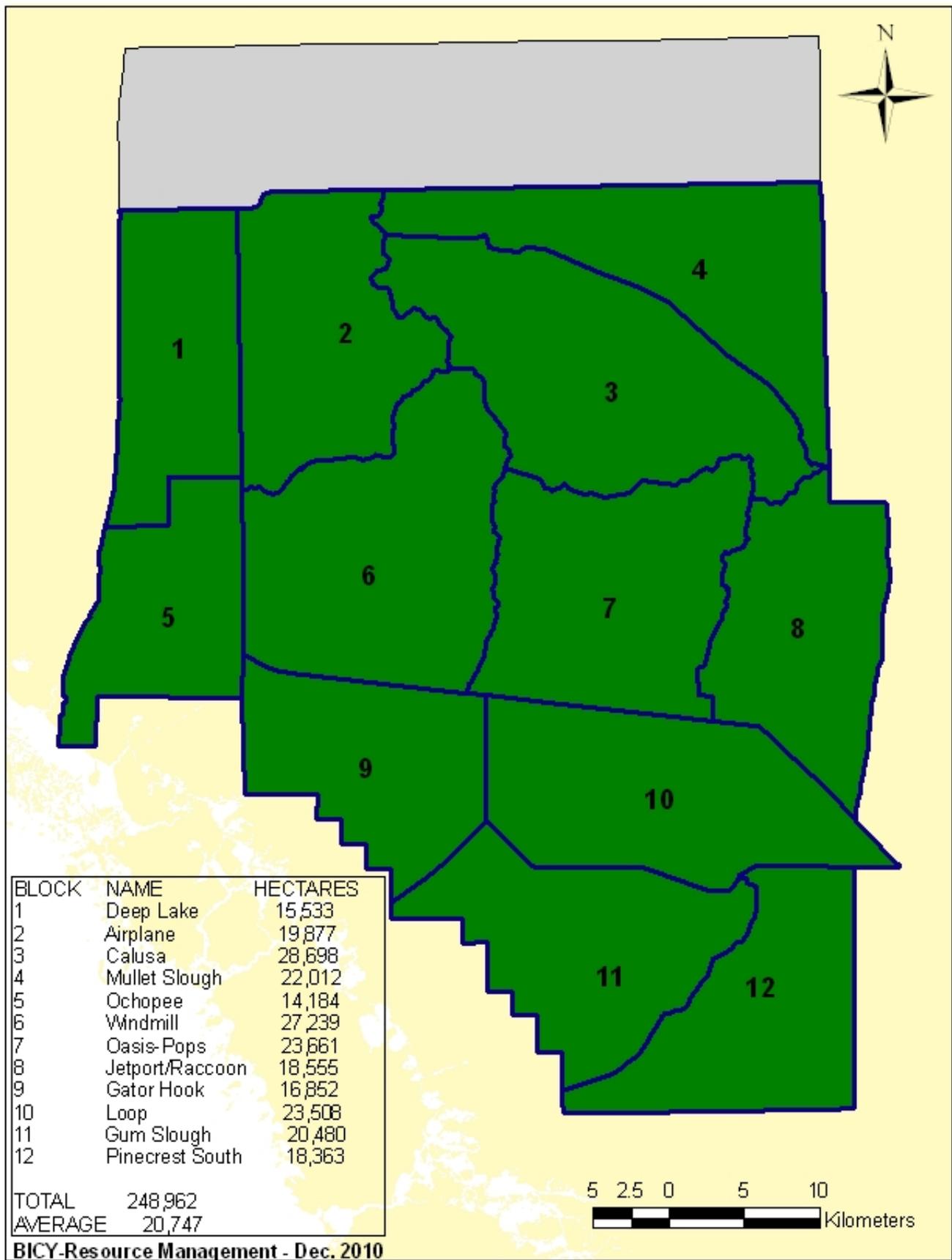


Figure 3. Panther survey blocks in SBICY.

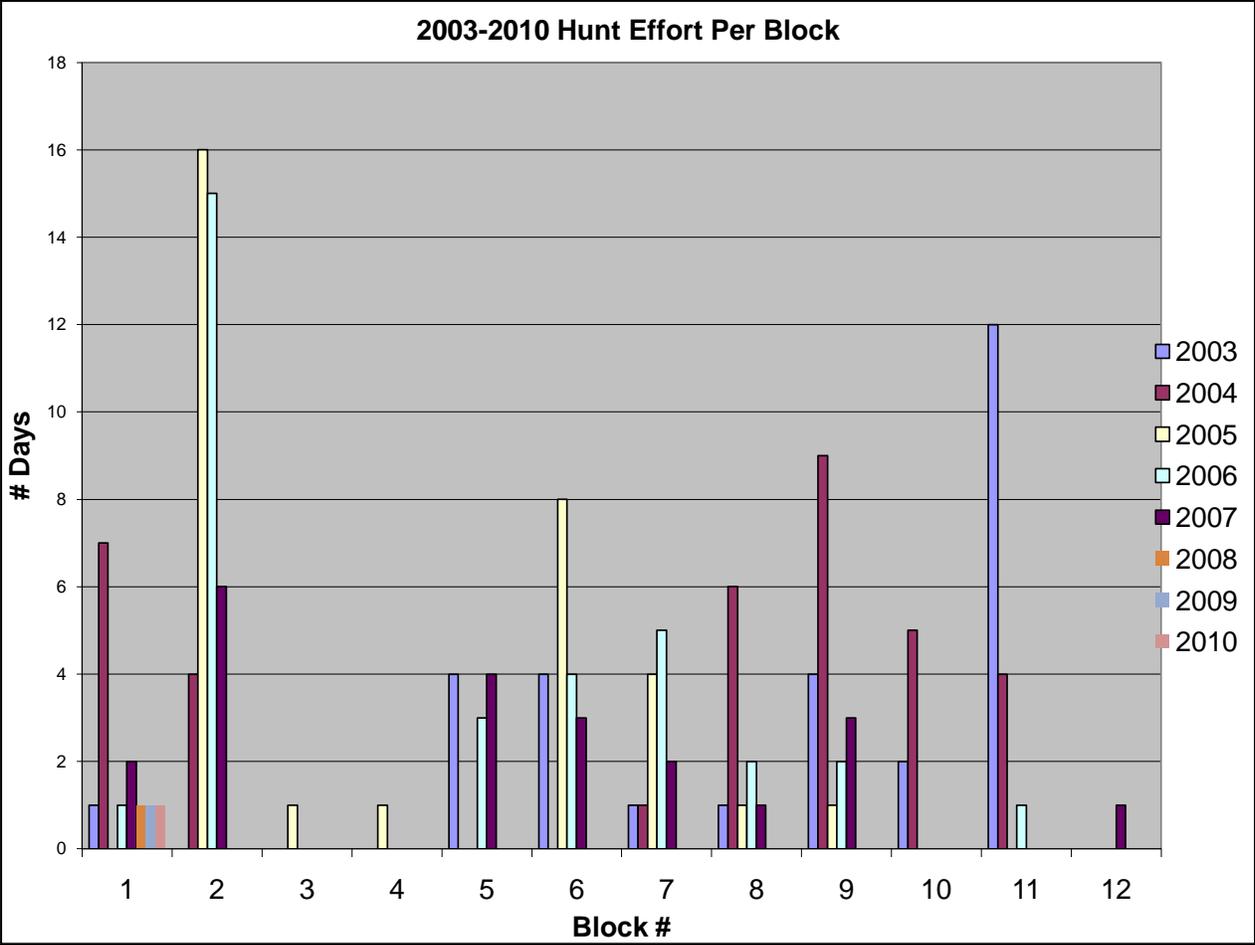


Figure 4. Panther capture effort per survey block, 2003 – 2010.

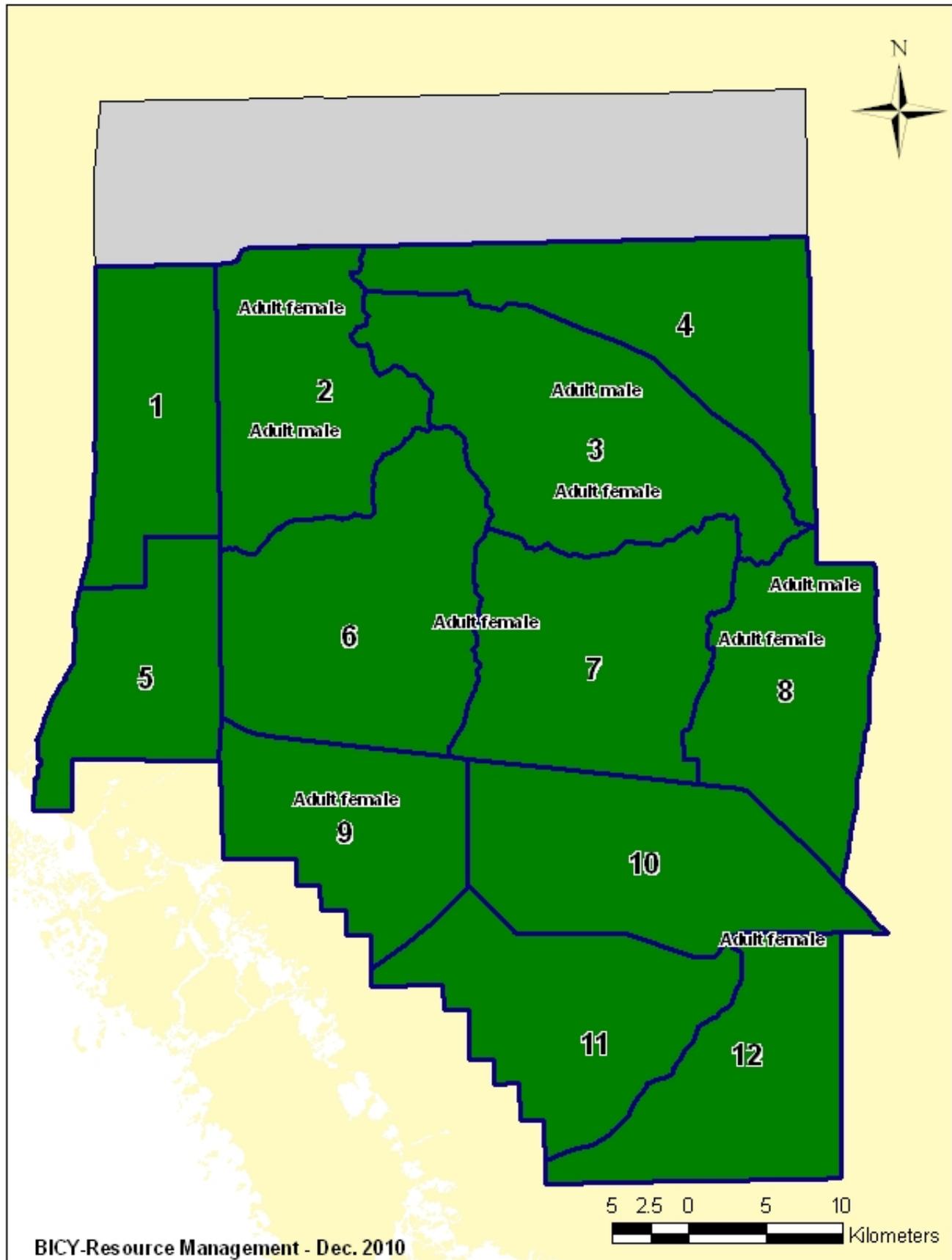


Figure 5. Documented presence of uncollared (or failed collar) panthers in SBICY from July 2009 - June 2010.

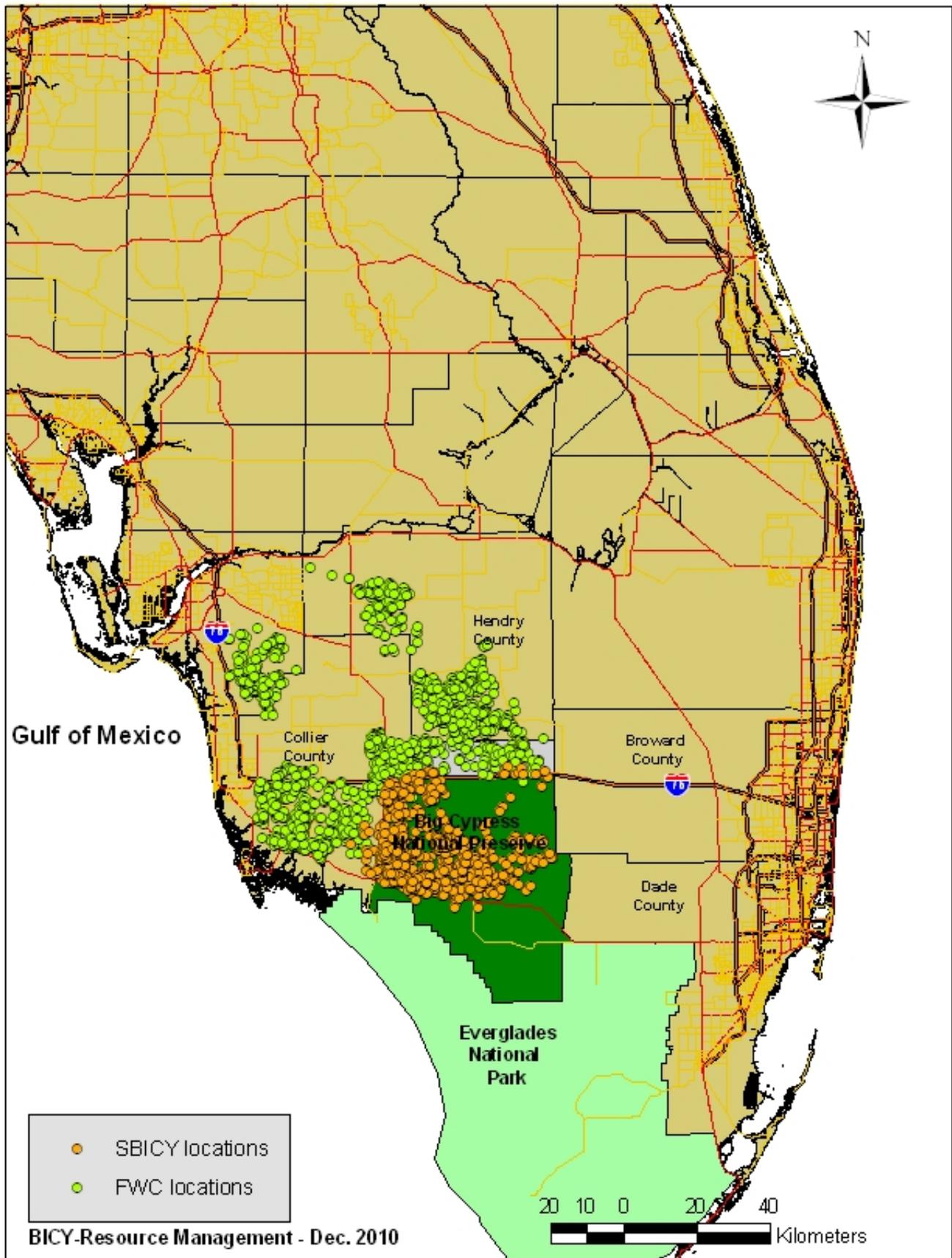


Figure 6. Geographical distribution of all Florida panther telemetry locations from July 2009 - June 2010.

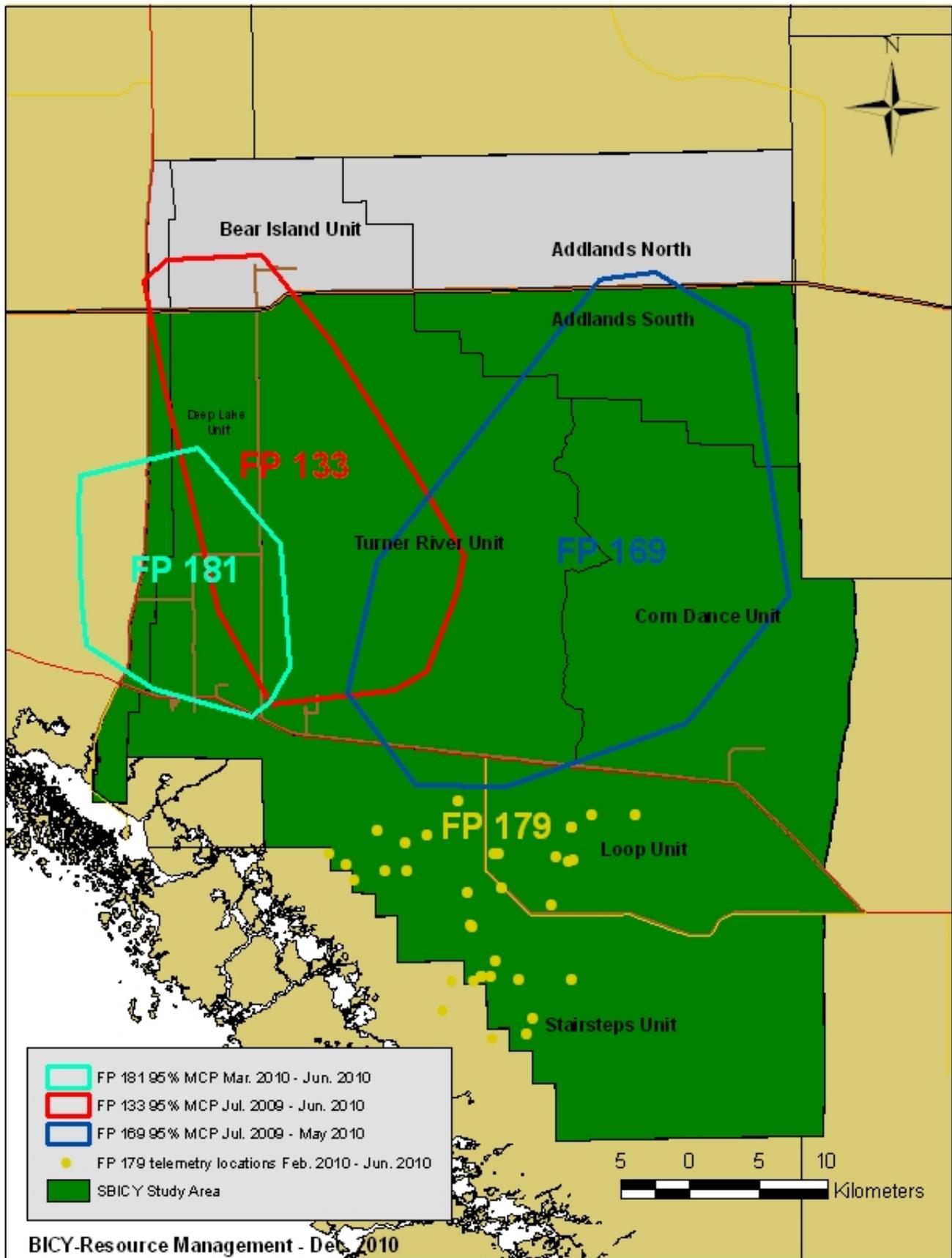


Figure 7. Home ranges of adult male Florida panthers monitored in SBICY from July 2009 - June 2010.

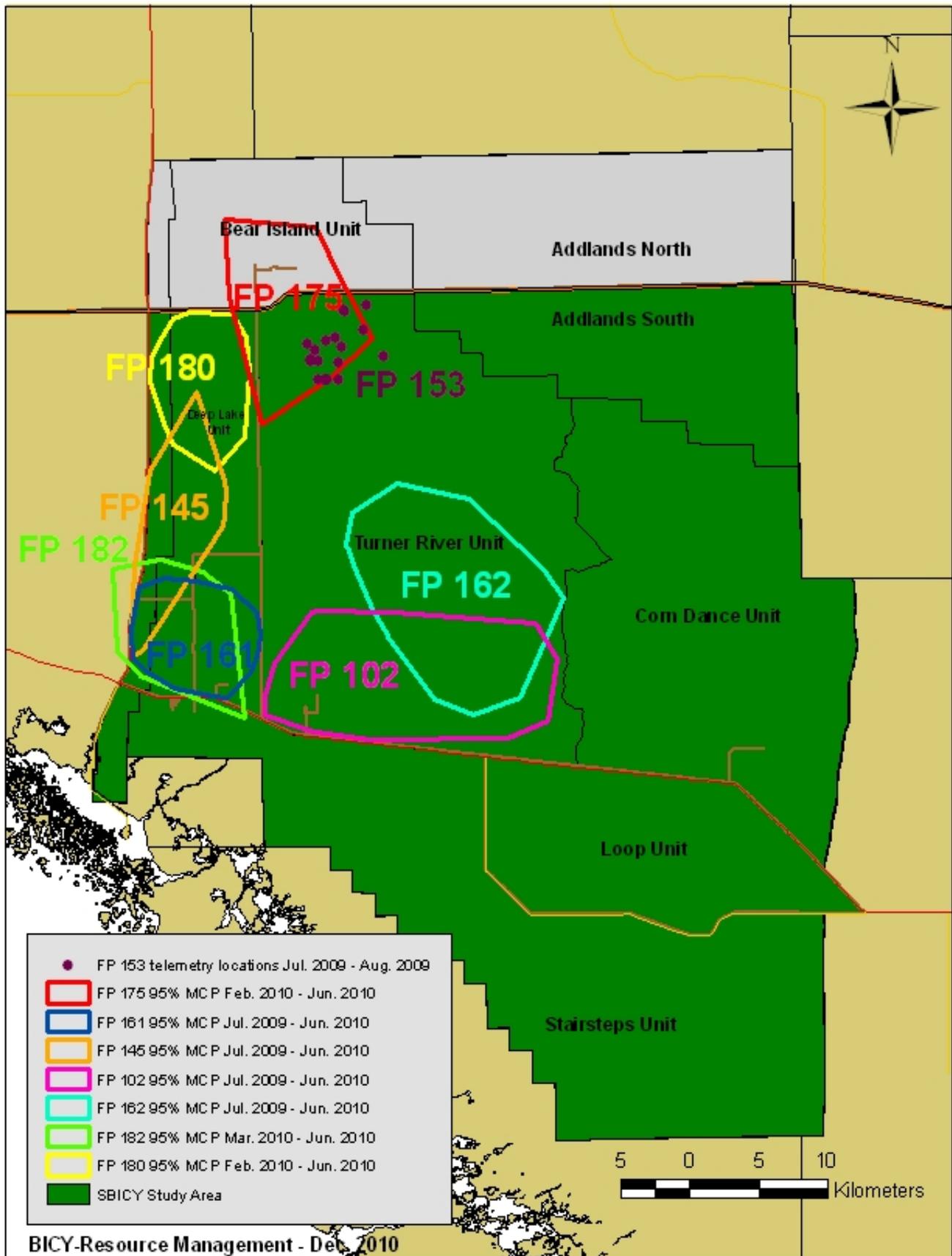


Figure 8. Home ranges of adult female Florida panthers monitored in SBICY from July 2009 - June 2010.

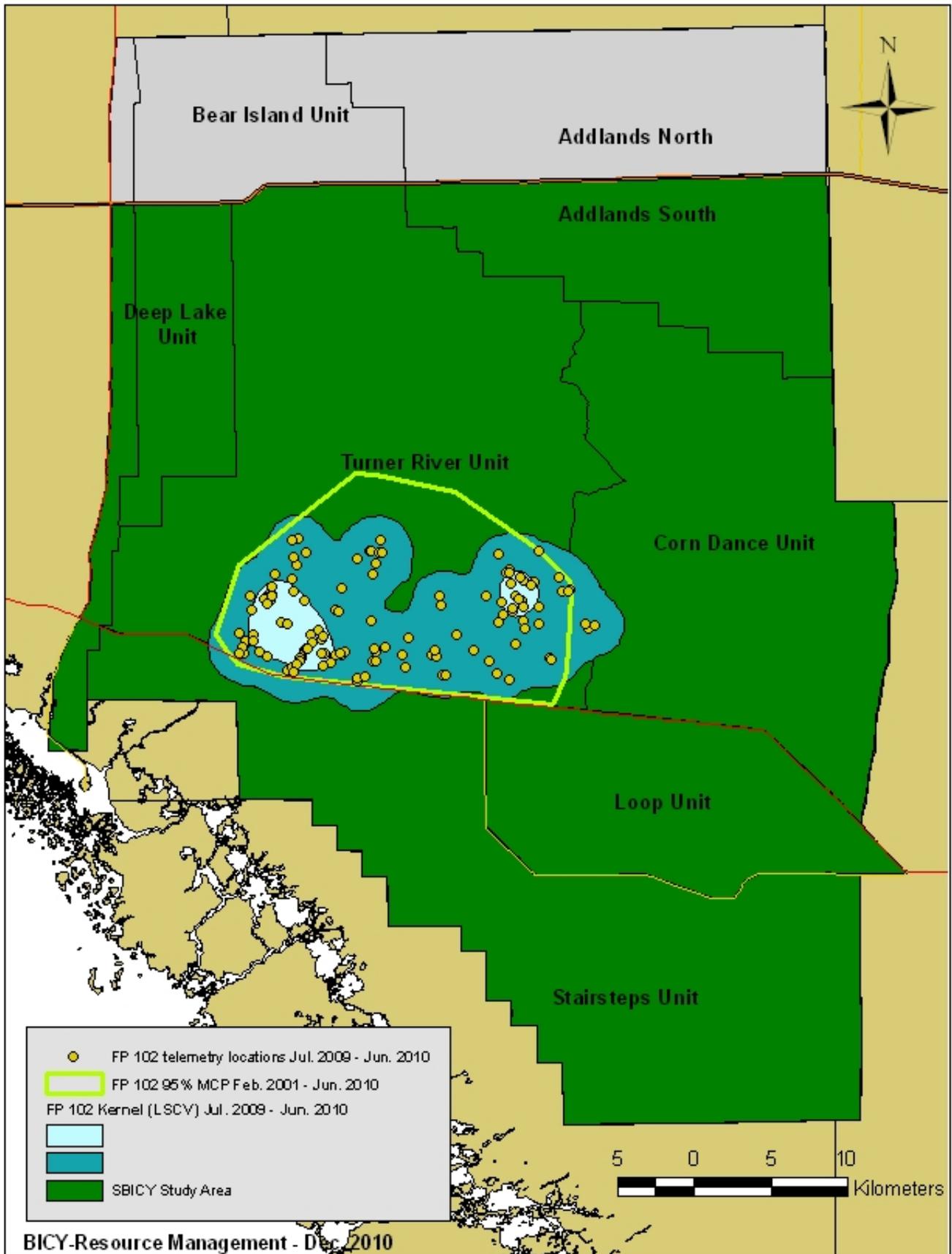


Figure 9. Home range of female Florida panther #102.

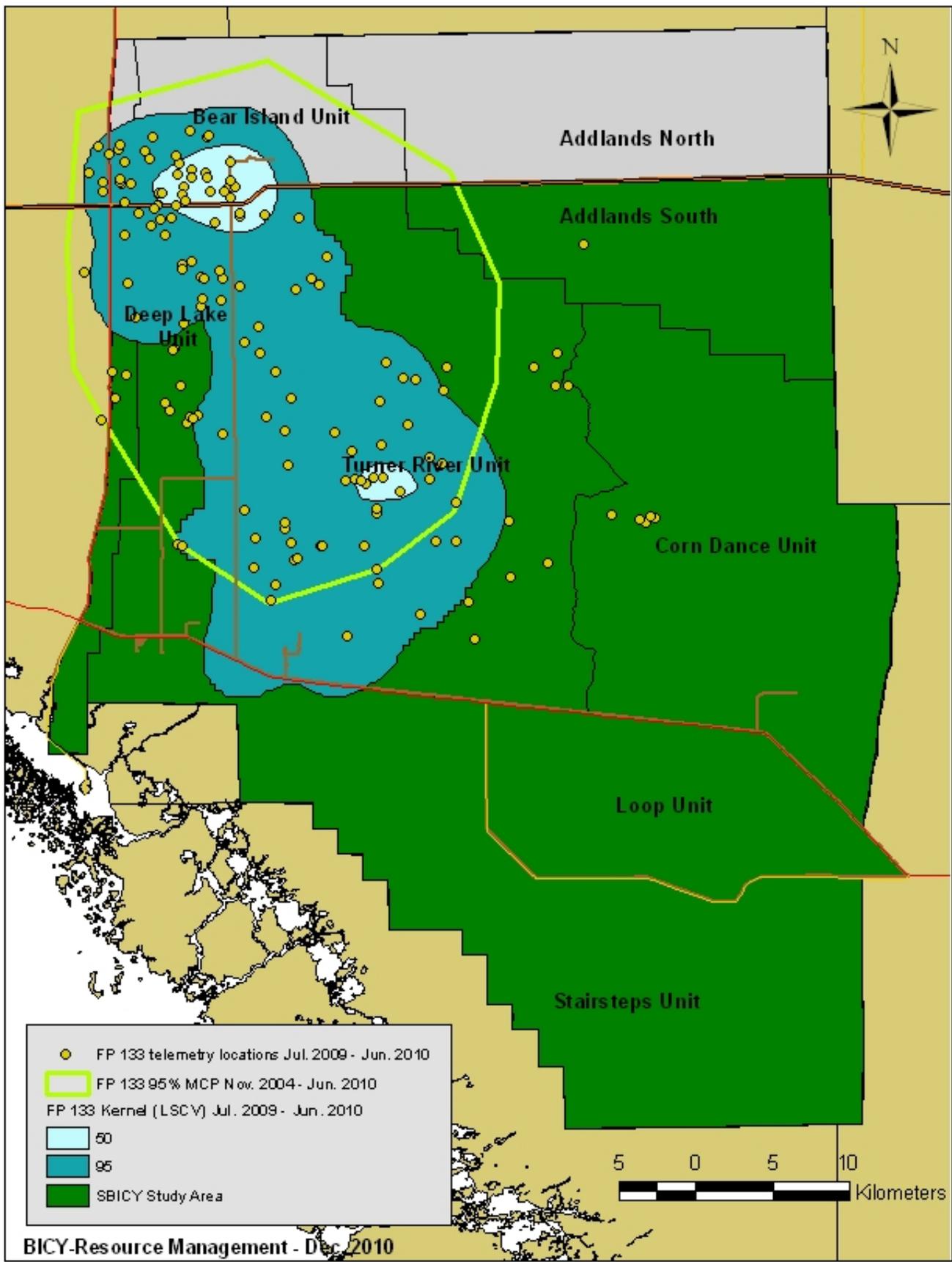


Figure 10. Home range of male Florida panther #133.

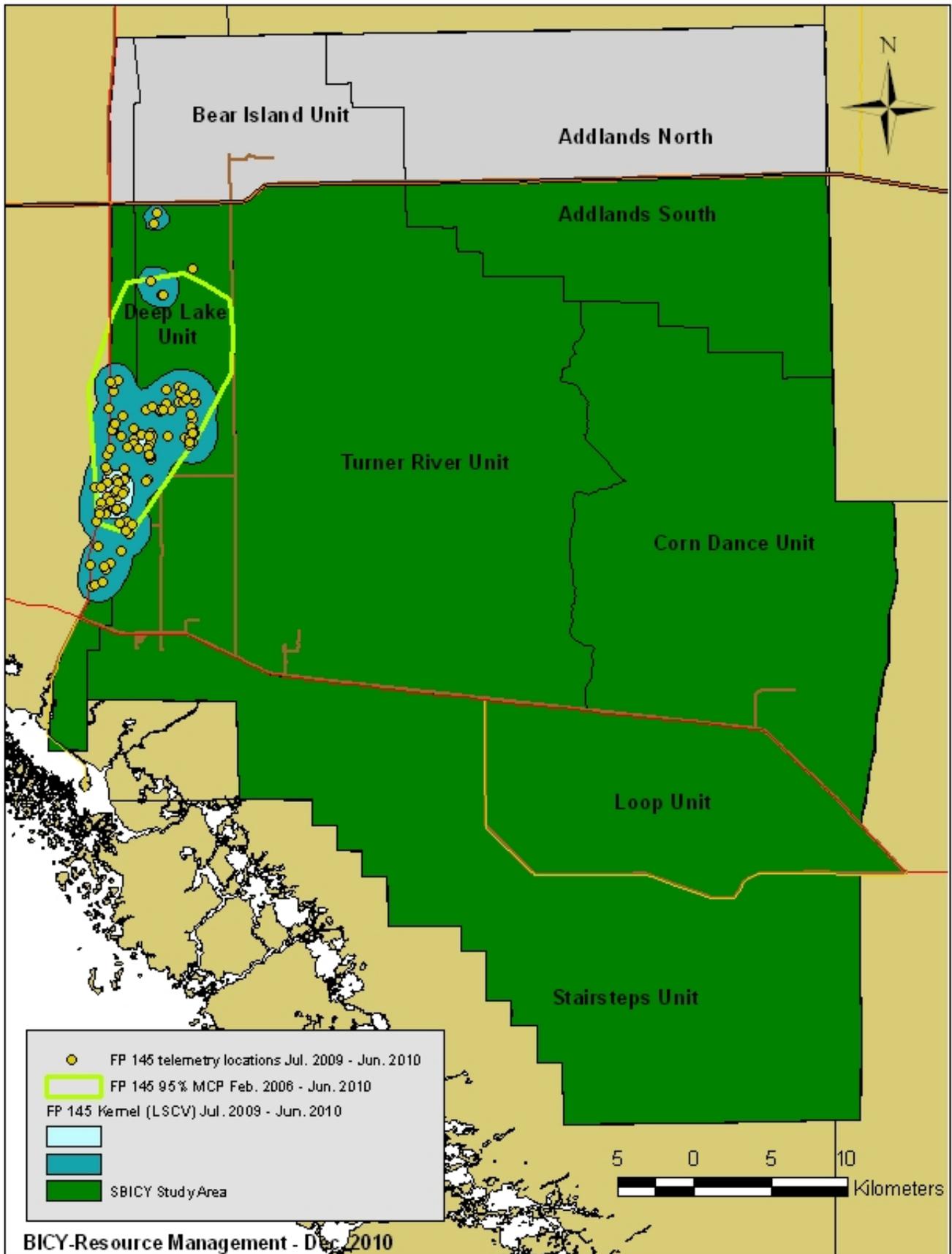


Figure 11. Home range of female Florida panther #145.

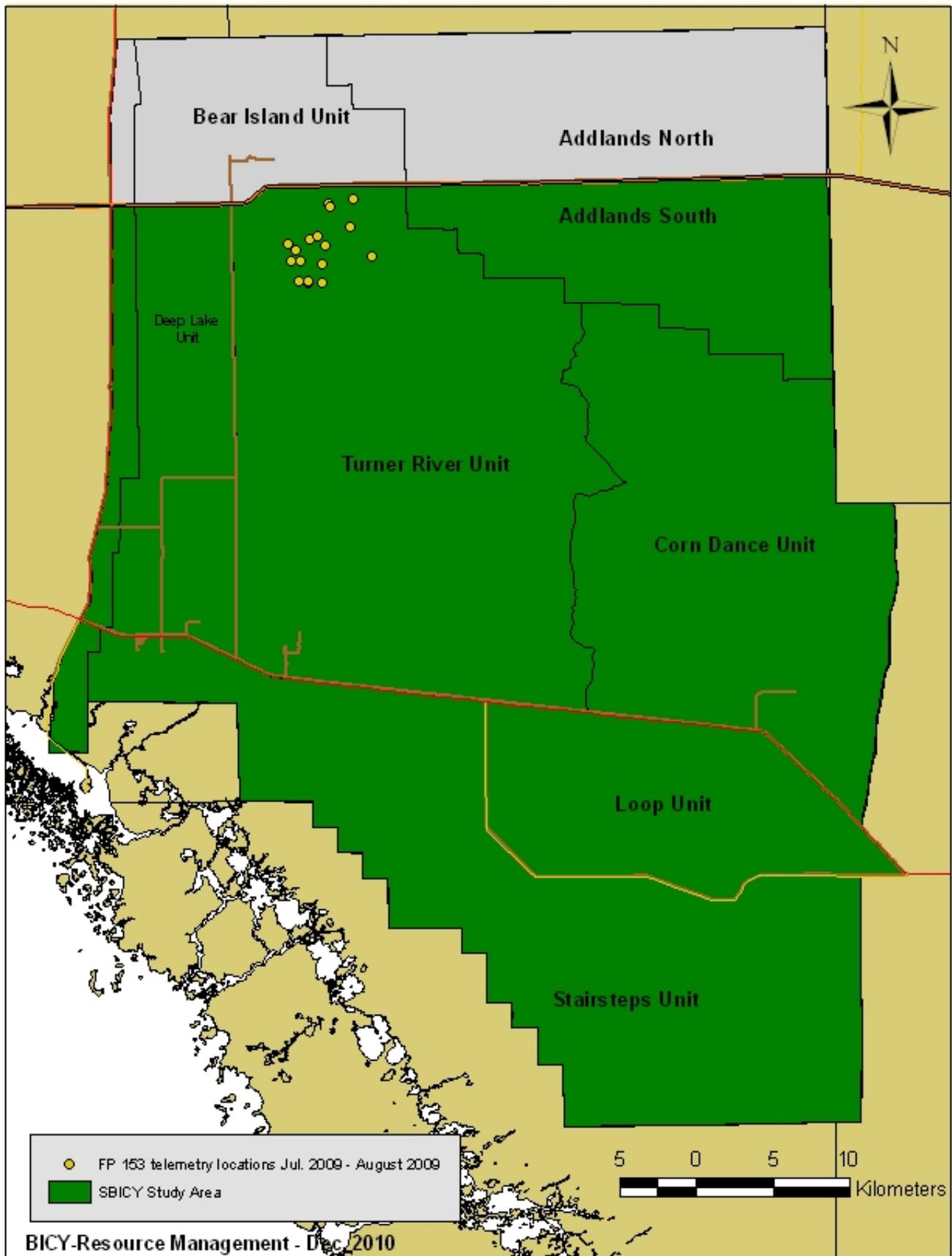


Figure 12. Home range of female Florida panther #153.

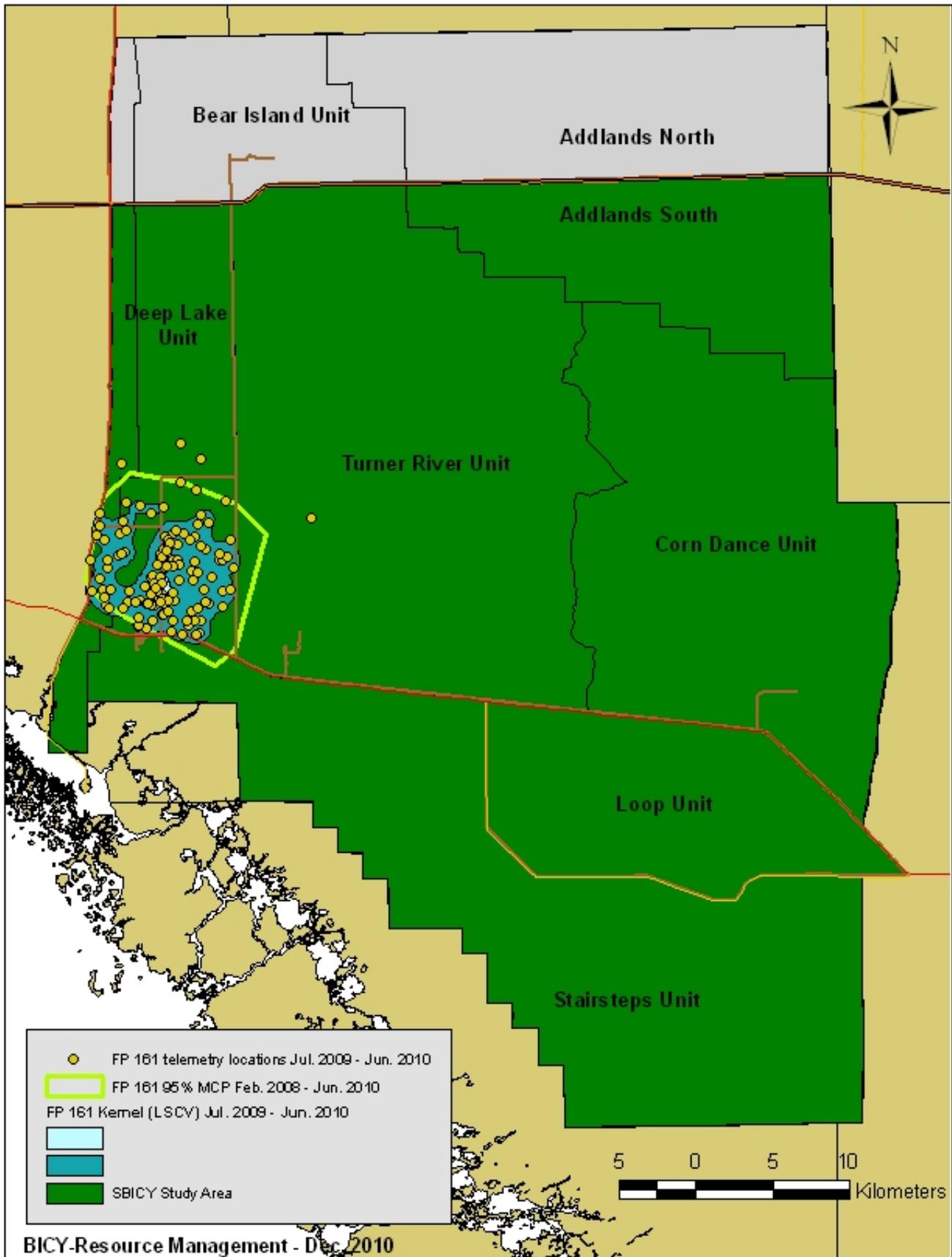


Figure 13. Home range of female Florida panther #161.

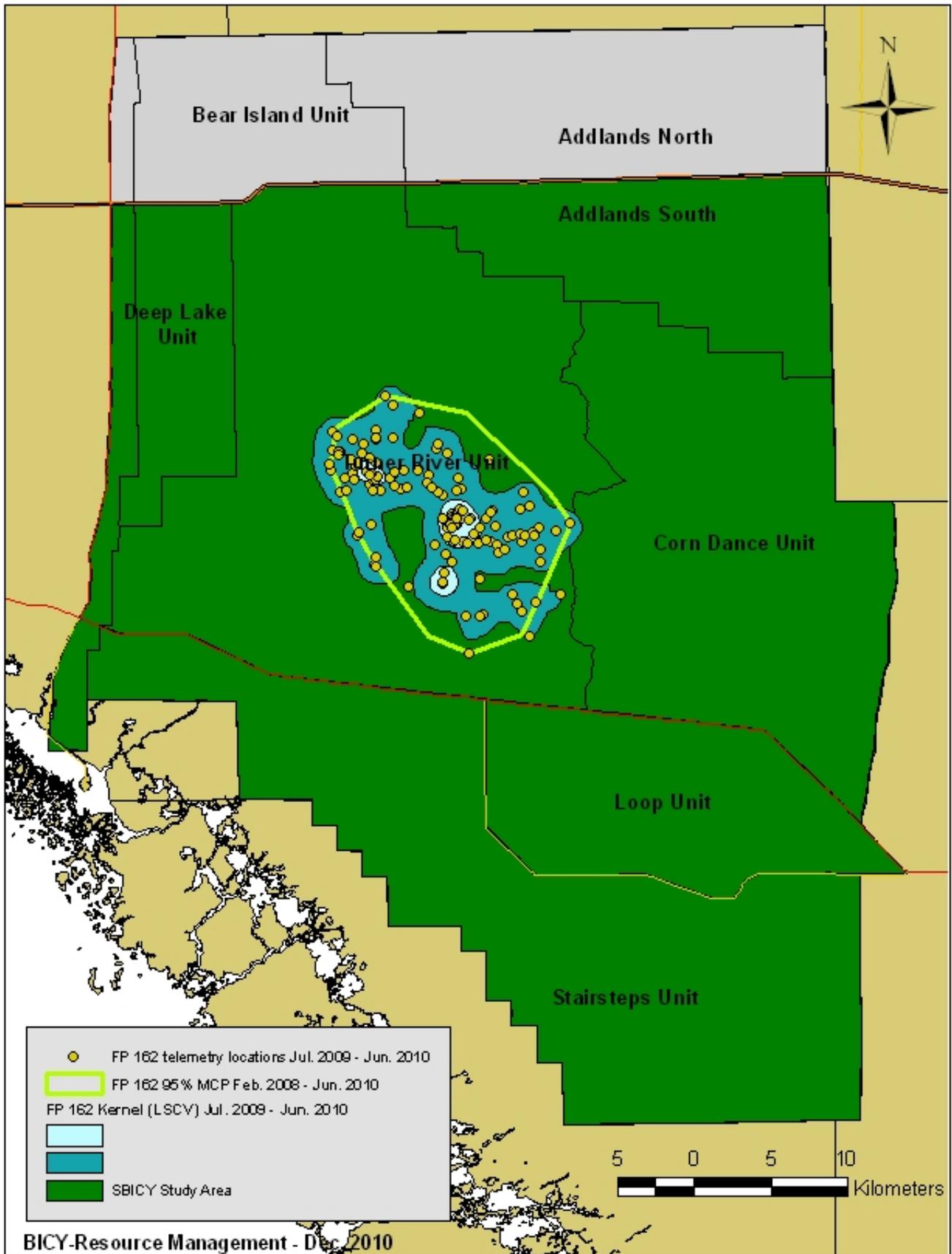


Figure 14. Home range of female Florida panther #162.

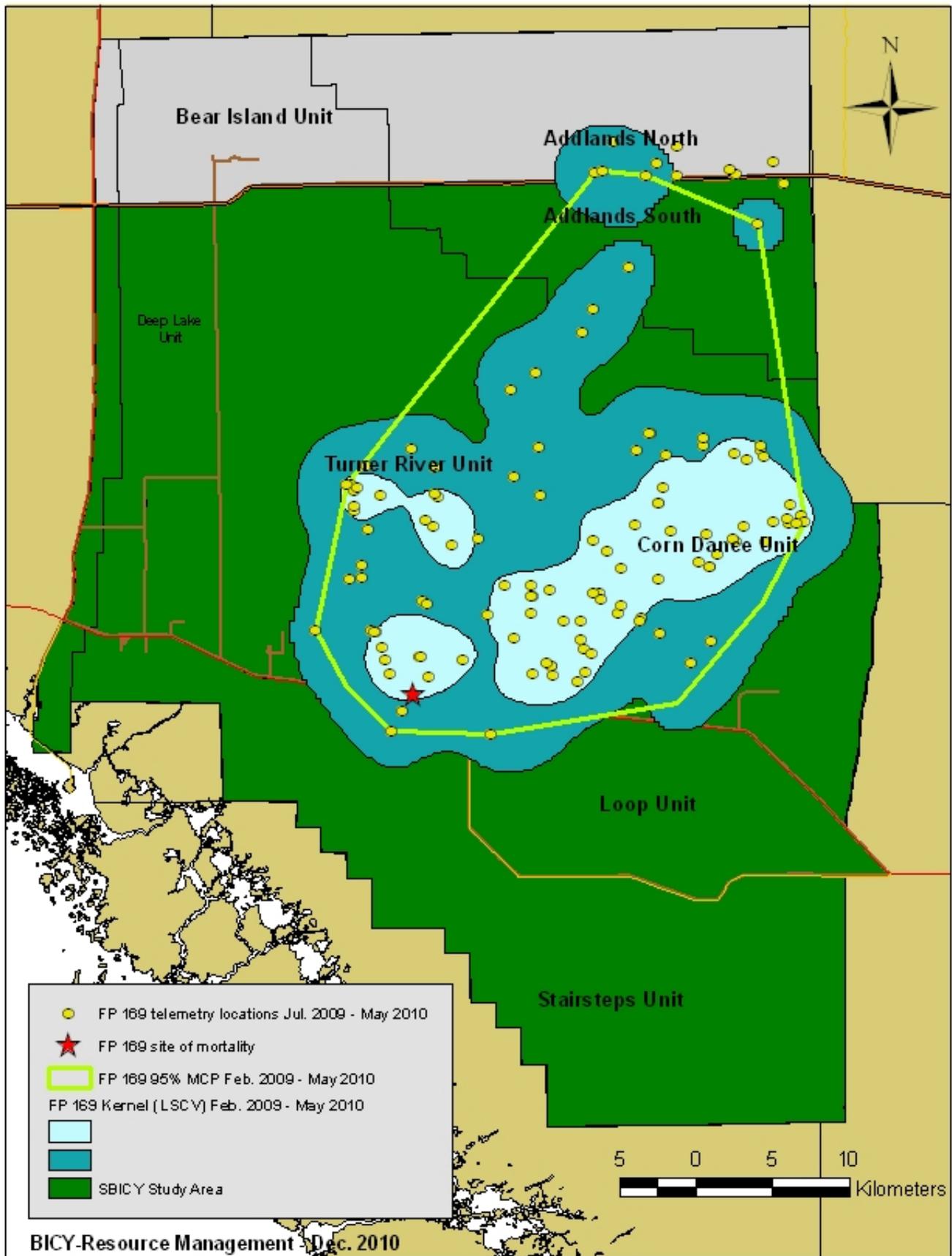


Figure 15. Lifetime home range of male Florida panther #169.

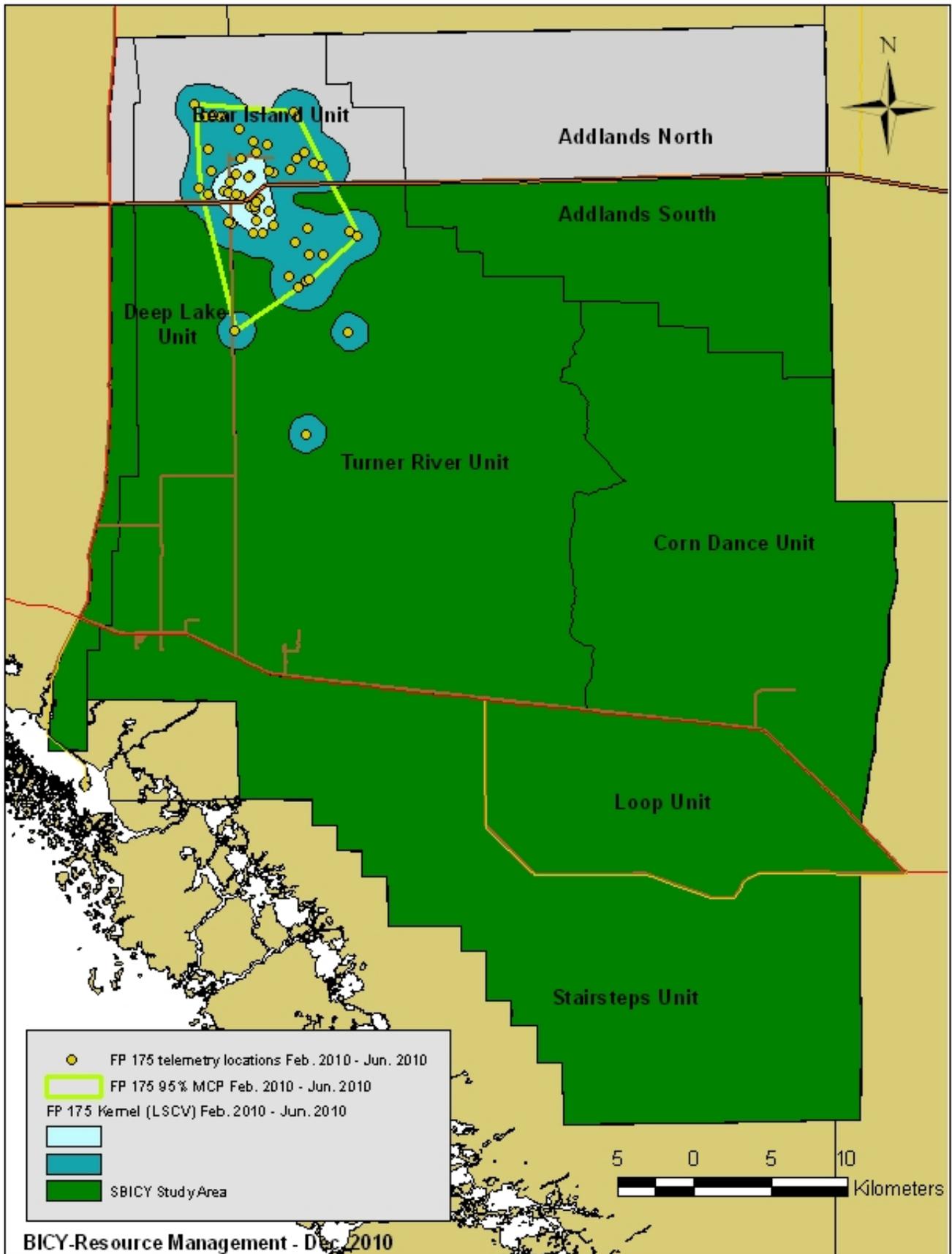


Figure 16. Home range of female Florida panther #175.

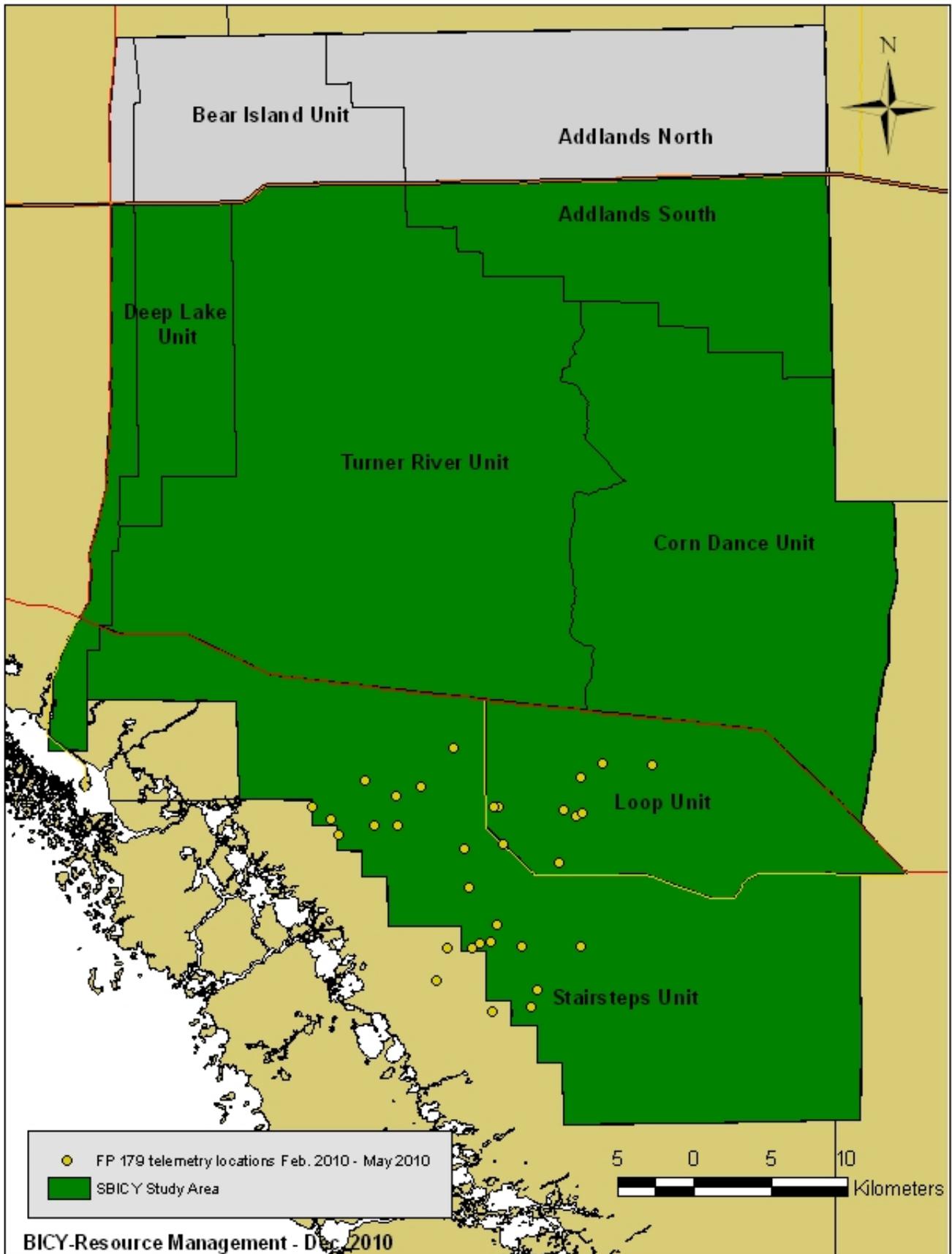


Figure 17. Home range of male Florida panther #179.

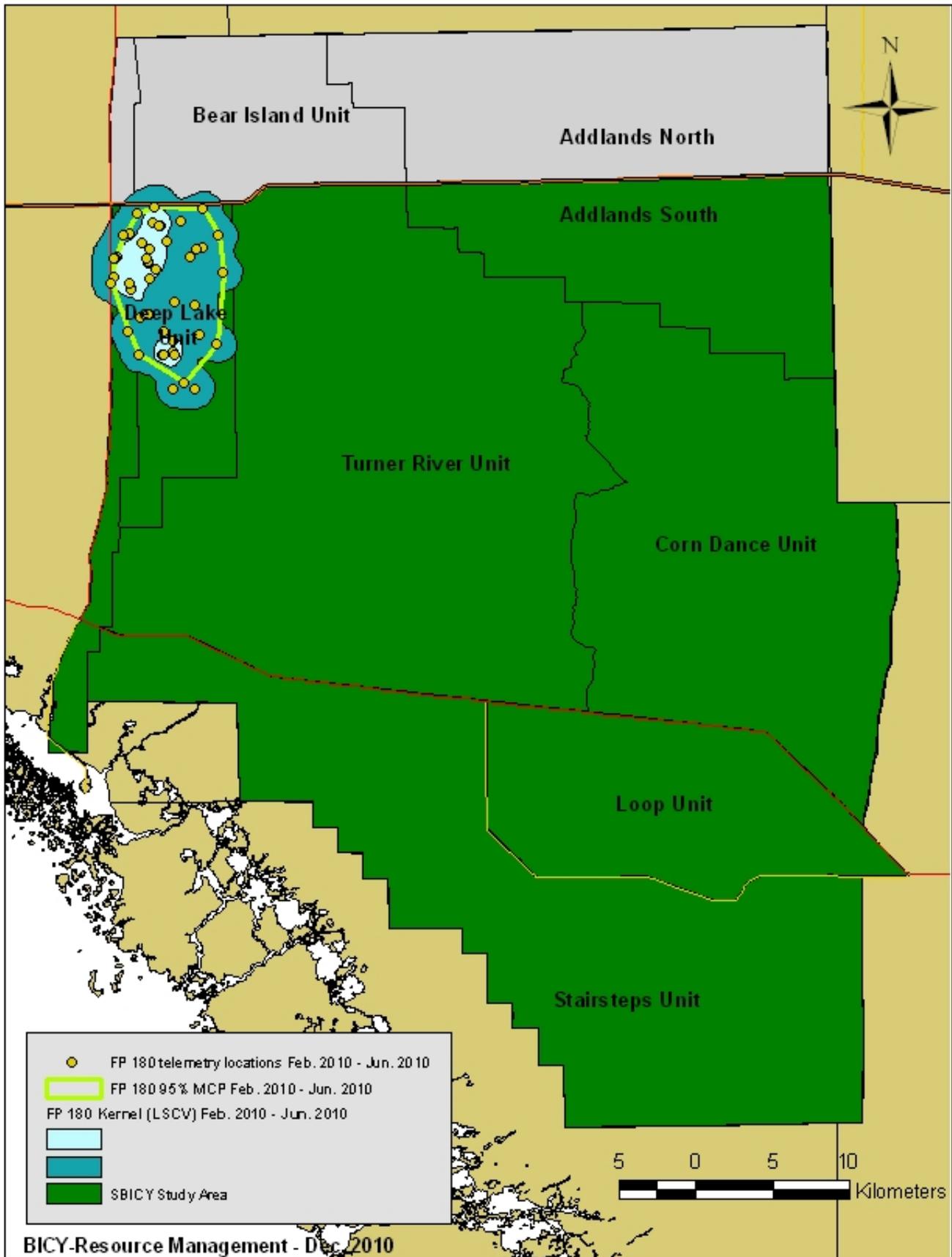


Figure 18. Home range of female Florida panther #180.

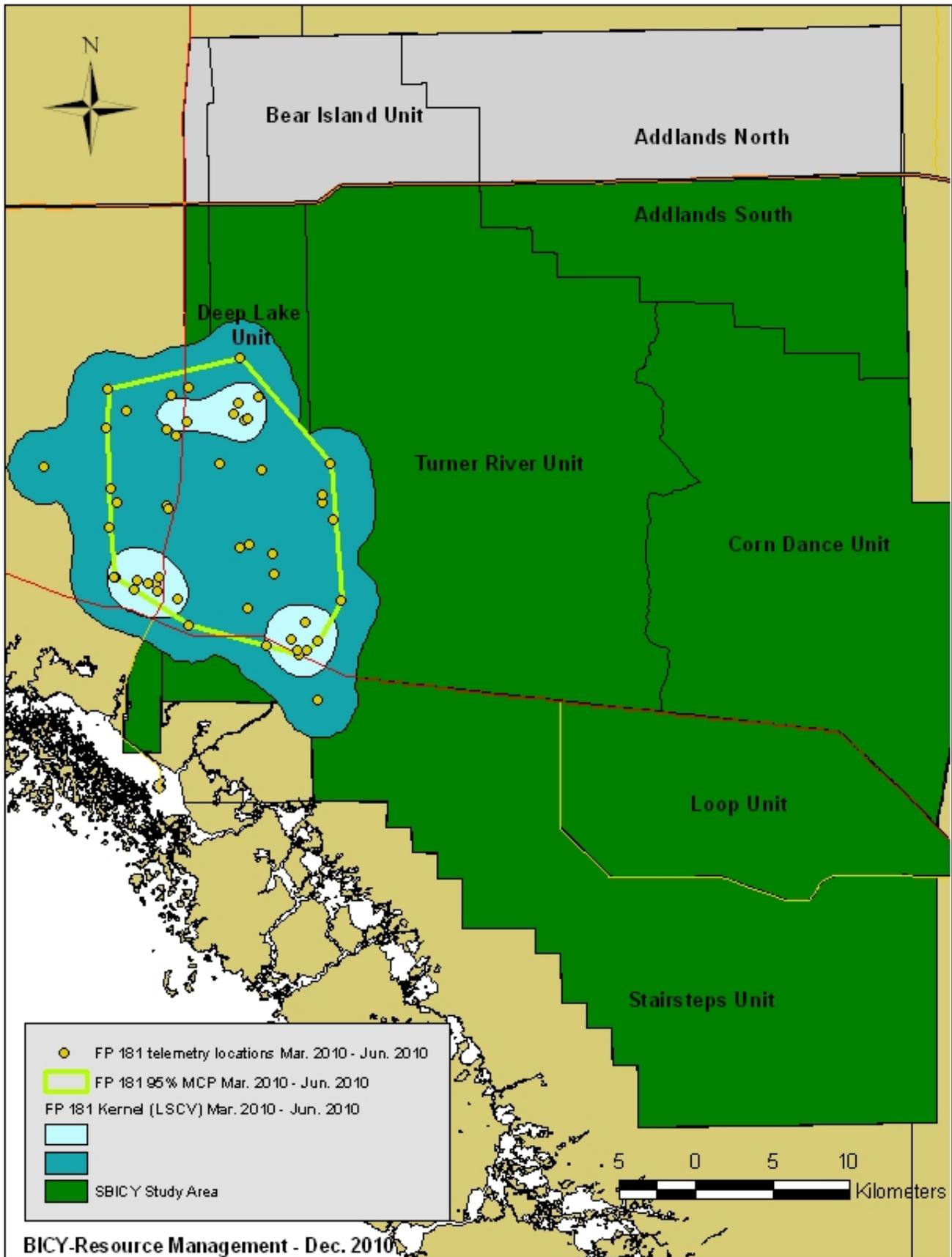


Figure 19. Home range of male Florida panther #181.

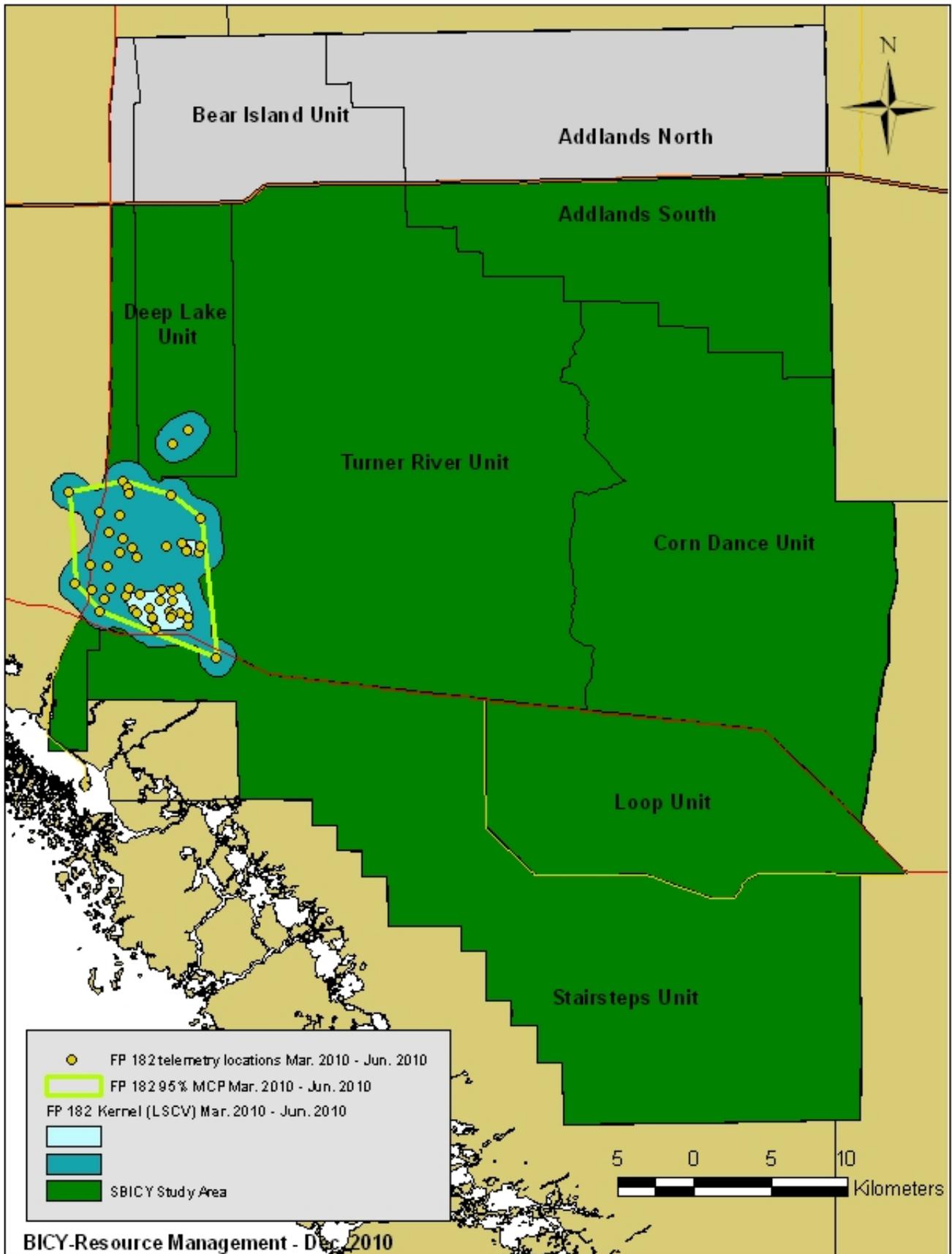


Figure 20. Home range of female Florida panther #182.

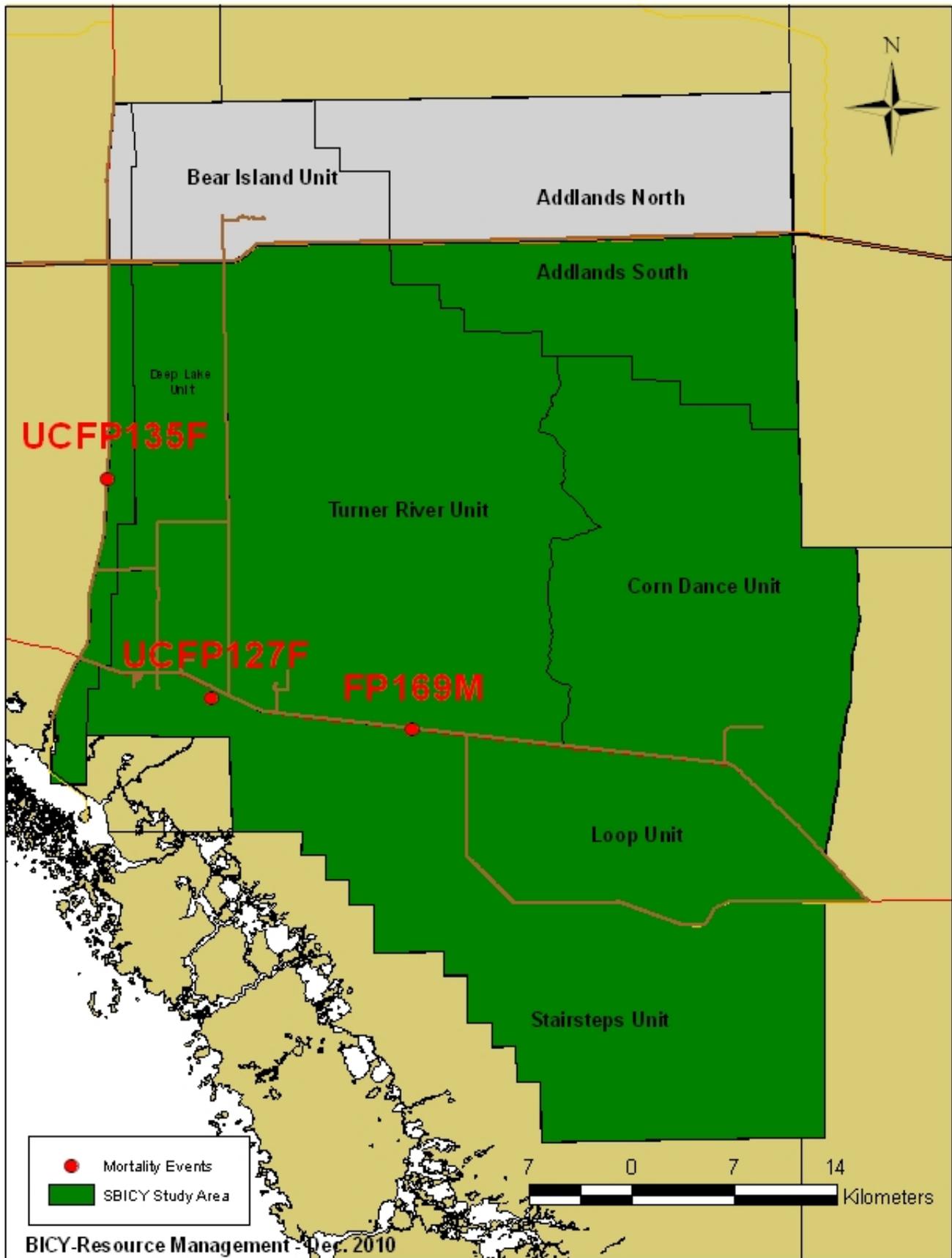


Figure 21. Distribution of known Florida panther deaths in SBICY from July 2009 - June 2010.