

**FLORIDA PANTHER**  
*(Puma concolor coryi)*  
**RESEARCH AND MONITORING**  
**IN**  
**BIG CYPRESS NATIONAL PRESERVE**  
**2010-2011 ANNUAL REPORT**



photo of FP190 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 2010 to 30 June 2011. We hunted for 30 days between February 3 and March 4 in 2011 in 9 of the 12 survey blocks. We captured and collared 4 new panthers, changed the working collars on 2 panthers, and recollared 1 panther with a failed collar.

We monitored 14 panthers, 3 males and 11 females, for at least a portion of the reporting period. One collared female panther (FP102) was lost from the sample through mortality, one female (FP175) shifted her home range into the Bear Island Unit, and one male (FP181) left our study area just prior to his collar failure.. The average home ranges (95% MCP) of the 2 resident males and 10 resident females located more than 50 times in the study area during the reporting period were 274 km<sup>2</sup> and 143 km<sup>2</sup>, respectively. The presence of a minimum of 3 uncollared adult males, 6 uncollared (or failed collar) adult females and 7 juveniles with their dams was verified in the study area. Six of the 10 monitored breeding-age females denned during the reporting period, including FP175 in the Bear Island Unit. At 5 dens we marked 15 kittens, 9 males and 6 females, with transponders and sampled them for biomedical information. Four adult mortalities were documented in the study area, 2 from collisions with vehicles and 2 from intraspecific aggression. Four 5-week-old kittens at a known panther den were killed in a wildfire.

The efforts from the past 23 years of panther survey and monitoring work, 16 years of panther reproductive assessment, and 10 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 ninth 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 2010 and 30 June 2011 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 infrequently such as the Miccosukee tribal lands south of I-75 and east of the L-28 canal and EVER northwest 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 2004-2010 annual reports covered capture and monitoring work in SBICY between 1 July to 30 June of those years and their citations can be found in the 2009-2010 report (Jansen et al. 2010).

## **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. This is especially relevant in providing insight into the panther population in Big Cypress in relation to the development of a Hunting Management Plan/EA for the entire Preserve.

**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 (2007-2011) average for hunter pressure was 14,561 man-days, with a mean harvest of 239 deer (bucks only) and 2 hogs (FWC 2007-2011 annual harvest reports). The agencies also monitor deer population trends through aerial surveys 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, however, Fletcher and McCarthy (2011) using an updated dataset on panther locations, found only limited indication that hunting affected panther distribution and movements. Nonetheless, 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 now in place throughout the Preserve.

## **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.

## 2011 Capture Season Plans

A post-2010 panther capture season meeting was held on 4 May 2010 at which time the goals for the Big Cypress 2011 capture season were presented. FP102 and FP169 had been targeted for handling, but died since the May meeting. The plan, therefore, was updated, submitted on 10 Jan 2011, and included the following:

- 1) the replacement of FP145's collar whose battery would soon fail, (*accomplished*)
- 2) the replacement of FP182's collar, (*accomplished*)
- 3) the retrieval of 6 failed satellite or GPS collars (on FP93, 124, 133, 150, 153, and 179),(*retrieved/replaced FP133's collar*)
- 4) the targeting of 3 areas for panther capture due to management concerns,
  - the Addlands south of I-75, under discussion for potential Wilderness designation and recreational use, (*spent only 1 day hunting there due to water levels*)
  - Raccoon Point, proposed to have an increase in oil extraction activity, (*hunted 2 days in this area and collared 1 new female*)
  - southeastern Stairsteps in which a significant deer die off had occurred (*no hunting done in this area*)

The capture work was planned for 30 days from early February to early March. GPS and VHF collars were deployed.

## 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. 2010 and 2011). We conducted our capture work following the protocols outlined in Endangered Species Permit TE146761-2 from USFWS. 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. 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 2010 and 30 June 2011 (Figures 9-22) 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 (2011) lists all panther kittens handled at dens from 7 April 1992 through 30 June 2011 and Appendix III lists all known dens of radio-collared female panthers from June 1985 through 30 June 2011.

## **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 (2011) lists known panther injuries and mortalities through 30 June 2011.

## **Reporting**

We used the reporting period of 1 July 2010 to 30 June 2011 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 30 days between February 3 and March 4 in 2011 in 9 of the 12 survey blocks. We captured and collared 4 new panthers, FP187, 190, 191, and 192. We changed the working collars on 2 panthers, FP145 and 182 (Table 1).

### **2011 Capture Season Summary:**

30	total hunt days
4	newly collared panthers (FP187, 190, 191, 192)
1	failed collar replacement (FP133)
2	working collar replacement (FP145, 182)
0	not handled because was denning
0	treed but not handled due to unsafe handling conditions
1	treed but not needing handling (FP162)

Following is a summary of this year's findings per block. Figure 4 shows our capture effort per block for the past 9 years.

**Block 1:** Hunted 1 day

- 12 Feb : recollared FP145; treed a yearling female with her

**Block 2:** Hunted 7 days

- 5 Feb: collared FP187
- 3 Mar: sign of uncollared adult male

**Block 3:** Hunted 2 days

- 23-24 Feb: found tracks of an uncollared male and an uncollared female with a kitten (female may be later collared as FP191)

**Block 4:** Hunted 3 days

- 26 Feb: collared new female FP191; treed 2 yearlings with her and tracks indicated possibly 3 yearlings.

**Block 5:** No hunting in this area

- 2 Mar: After hunting in Block 4, recollared FP182 in Block 5
- 6 Mar: on Rocky's morning of departure, the hounds treed an uncollared male at Bass Lake Road.

**Block 6:** Hunted 7 days

- 3 Feb: recollared FP133 who had a failed North Star satellite collar
- 17 Feb: team found male tracks on Skillet Trail.

**Block 7:** Hunted 6 days

- 9 Feb: tracks of uncollared male crossing Sandy Road
- 13 Feb: tracks of uncollared male; single female, and female with kitten (female may have been FP190 collared the next day)

- 14 Feb: collared new female FP190. Treed uncollared male with her. Determined later that FP190 had at least one kitten traveling with her.
- 21 Feb: old sign of a male and a female.
- 25 Feb: treed FP162 but she didn't have yearlings as expected with her. She appeared full or pregnant and was later confirmed pregnant.
- 28 Feb: collared new female FP192.

**Block 8:** Hunted 2 days

- 8 Feb: trailed an uncollared male

**Block 9:** Hunted 1 day

- 4 Feb: old sign of a female

**Block 10:** No hunting in this area

- Dec. 31, 2010: Roy McBride found female scrape and tracks in Pinecrest.

**Block 11:** Hunted 1 day

**Block 12:** No hunting in this area.

Within the study area, 3 uncollared adult males, 5 uncollared (or failed collar) adult females, and 7 juveniles with their dams were documented either during our capture season or by Rancher's Supply during their synoptic survey work (Rancher's Supply, Inc. 2010 and 2011) (Figure 5).

## **Synopsis of Monitored Panthers**

We monitored 2 resident male and 10 resident female panthers in our study area between 1 July 2010 and 30 June 2011. Figure 6 shows the geographical distribution of this year's SBICY panthers in relation to the entire monitored population which consists of 35% of the reporting period's locations. Locations obtained within Big Cypress boundaries (all units, including Bear Island and the Addition Lands) represent 58% of the reporting period's panther locations. Figures 7 and 8 depict the home ranges of the 2 resident

males and 10 resident females inhabiting SBICY and FP175 who transitioned her home range into Bear Island 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 2010, she started denning. Therefore, in early March she had fetuses less than 1 month of age, a condition not visually obvious. On 6 June 2010, 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. Trail camera photos of an adult male panther were taken at the site following her death. Even though her death occurred later than this document's reporting period, we are concluding our summary of FP102, therefore, Figure 9 depicts her lifetime home range of 254 km<sup>2</sup>.

## **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. He was recaptured on February 3, 2011 and fitted with a VHF collar. His 416-km<sup>2</sup> home range during the 2010-2011 reporting period 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. At her February 2010 den we marked 3 kittens, and at her June 2011 den we marked 3 kittens. Her home range during the 2010-2011 reporting period was 51 km<sup>2</sup> (Figure 11).

### **FP151**

On 10 February 2007 we collared FP151 in the Turner River Unit. Her transponder confirmed that she was the offspring of FP93, born in April of 2002. She weighed 41 kg and was in excellent condition. In April of 2007 she denned, and on 21 April we marked 3 kittens. They evidently did not survive because in August of 2007 she denned again. . We went to mark the kittens on 27 August and found the remains of a male and a kitten of unknown sex. The kittens had been killed and partially eaten within the past few hours. Fresh bear scat found within 5 meters of the den suggested that a bear had killed them. FP151 denned again in late February 2008. We marked 2 kittens on 4 March. FP151's collar failed on 7 June 2008. She was treed by Roy and Cougar McBride on October 28, 2010 and we recollared her. Her home range during the 8 months she was monitored during the reporting period was 122 km<sup>2</sup> (Figure 12).

## **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 in March 2010 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. She had been observed on several occasions with 3 juveniles. On June 6, she was observed by Annette with three 13-month-old juveniles. Her home range during the reporting period was 128 km<sup>2</sup> (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. In April 2011, FP162 denned again and we marked 4 kittens, K322-325. On May 2, these kittens were killed in the Jarhead Fire in spite of ongoing communications with the IC team regarding the location of the den and encouragement to take steps to protect it. We monitored FP162's response to the loss of her kittens and documented through location flights and remote collar signal monitoring

that she visited the den area for 23 days searching for her kittens. FP162's home range during the 2010-11 reporting period was 124 km<sup>2</sup> (Figure 14).

### **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. She denned again in January 2011 indicating that kittens from the previous den had died. We handled 2 kittens on January 27, 2011. She has inhabited the Bear Island Unit and the Addlands north of I-75, so FWC has monitored her during the 2010-2011 reporting period. Her home range was 73 km<sup>2</sup> (Figure 15).

### **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. In March 2011 she denned, however, she was located in one location for only a few weeks, so we thought the kittens had died. On July 6, a young panther was treed by Roy McBride with FP180 and another juvenile documented in the vicinity. Later that month, Annette observed FP180 walking with 2 kittens during a panther location flight. We, therefore, missed that den. FP180 inhabited a 83-km<sup>2</sup> home range in the Deep Lake Unit during the 2010-2011 reporting period (Figure 16).

### **FP181**

Male FP181 was collared for the first time on February 28, 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 Big Cypress until mid-July 2010 at which time he crossed SR29 and was located a few times in Copeland and then in the Fakahatchee Strand Preserve

State Park. His collar emitted the mortality mode, although when approached in the FAKA he moved off. The next day a visitor reported a panther on Janes Scenic Drive that appeared to be limping. FP181 then made a large movement to the western side of FAKA. FWC monitored him until his collar failed on August 2, 2010. Figure 17 shows his area of use during the month he was monitored in this reporting period.

### **FP182**

FP182 (K279) was born on February 10, 2009, to FP161. We captured her as a yearling on 1 March 2010. She remained with FP161 until 24 March. She denned for a first time in the Turner River Unit south of Lower Wagonwheel Road on April 15, 2011 when she was 26 months of age. We marked 4 kittens, 3 males and 1 female, on April 29. It is possible that she lost those kittens, based on her movements at the end of May and the presence of adult male tracks near the den. FP182 inhabited a 58-km<sup>2</sup> home range in the Turner River Unit and occasionally crossed Hwy. 41 near Turner River into the westernmost Stairsteps Unit during the reporting period (Figure 18).

### **FP187**

FP187 was a male collared on February 5, 2011 in the Turner River Unit. He weighed 50 kgs and was estimated at 7 years of age. He inhabited a 132-km<sup>2</sup> home range within the Turner River and Deep Lake Units during the reporting period (Figure 19).

### **FP190**

FP190 was a female collared for the first time on Feb. 14, 2011 in the Corn Dance Unit. She weighed 31 kgs and was estimated to be 5 years of age. An uncollared adult male was also treed nearby. FP190's examination at capture indicated that she had nursed but not recently. Annette saw her from the air with what appeared to be a yearling on 2 occasions, 7 and 8 months after her capture, so it is likely that she was traveling with kitten(s) when she was captured. FP190 has inhabited the Corn Dance Unit in a 66-km<sup>2</sup> home range during the reporting period (Figure 20).

## **FP191**

FP191 was a female collared for the first time on February 26, 2011 in the northeastern Turner River Unit. She weighed 36 kgs and was known to be 12 years of age. She was marked with a transponder as a kitten at the den of Texas female 107 in February 1999. Two offspring, one male and one female, estimated to be dispersal age were also treed on February 26 and tracks suggested that there might have been 3 offspring with her. FP191 has inhabited the Turner River, Corn Dance, and Addlands South Units in a 175-km<sup>2</sup> home range during the reporting period (Figure 21).

## **FP192**

FP192 was a female collared for the first time on February 28, 2011 in the Corn Dance Unit. She weighed 28 kgs and was known to be 1 year, 8 months of age. In July 2007, FWC had marked her with a transponder at the den of FP170 in the Picayune Strand State Preserve. Her capture site was a straight-line distance of 48 km from her birthplace. She has inhabited the Turner River and Corn Dance Units with brief excursions into Conservation Area 3A in a 235-km<sup>2</sup> home range during the reporting period (Figure 22).

The average home ranges (95% MCP) of the 2 resident males and the 10 resident females monitored 50 or more times in the study area in the reporting period were 274 and 143 km<sup>2</sup> respectively.

## **Reproduction**

Ten breeding age female panthers were monitored during the reporting period and 6 of them denned. We checked the 5 dens, including one in Bear Island and marked 15 kittens, 9 males and 6 females, with transponders. We missed the den of FP180, thinking that it had failed until McBride treed a kitten in the area and Annette saw FP180 walking with 2 kittens in July.

<b>FP</b>	<b>Birthdate</b>	<b>Male</b>	<b>Female</b>	<b>Unit</b>
175	6 Jan 2011	1	1	Bear Island
180	16 March 2011	?	?	Deep Lake
162	28 March 2011	3	1	Turner River
182	15 April 2011	3	1	Turner River
145	29 May 2011	1	2	Deep Lake
151	21 May 2011	1	1	Turner River

### **Mortality**

Four adult panthers and four 5-week-old kittens were known to have died in the study area during the reporting period (Figure 23). Two adults died of collisions with vehicles and 2 of intraspecific aggression. The 4 kittens were killed in the Jarhead wildfire.

#### **UCFP147**

On October 1, 2010, an uncollared female Florida panther 147 was killed by a vehicle collision on Hwy. 41, 1.7 miles east of Monroe Station. She was estimated to have been 3 years of age.

#### **FP102**

On October 25, 2010, the remains of FP102 were retrieved from the Turner River Unit. She was a 12.5-year-old female who died of intraspecific aggression.

#### **UCFP157**

On March 12, 2011, the skeletal remains of a panther in the Loop Unit were found by hikers. Big Cypress staff inspected and retrieved the remains on March 15. An osteological examination done by the University of Florida C. A. Pound Human Identification Lab determined that this was a female panther between the ages of 4 and 8 years that died of intraspecific aggression.

## **UCFP160**

On April 30, 2011, an uncollared male Florida panther was struck and killed by a vehicle on Hwy 41 near 50-mile Bend. He was estimated to be 12 to 14 months of age.

## **K322, 323, 324, 325**

On May 2, 2011, 4 kittens in the den of FP162 were killed when a wildfire swept through the palmetto island in which the den was located. They had previously been marked with transponders. Their remains were retrieved on May 3. FP162 remained in the vicinity of the den for the next 23 days.

## **Project Benefits**

The efforts from the past 23 years of panther survey and monitoring work, 16 years of panther reproductive assessment, and 10 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.

## **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 corridor 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), was installed in the area. We continue to document the crossing of 2 collared adult female panthers in addition to reports of other panthers crossing 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 vigorously pursued by the agencies as a solution to this site of chronic panther mortality.

### **State Road 29**

State Road 29 is a heavily traveled north-south road that bisects large public land areas in south Florida. Since 1979, 38 panther deaths have been verified on this road, including 2 which occurred during this reporting period. 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**

We continue to recommend that panther-proof fencing be installed along the 14- km stretch of the interstate between the toll booth in Naples and Everglades Blvd along which 9 panthers have been killed, 2 within this reporting period (Jansen et al 2010)

### **Protection of Known Panther Dens from Fire**

As part of the After Action Review of the Jarhead Fire in which 4 kittens in a known panther den were killed, the following steps were recommended by the wildlife staff at Big Cypress:

- Rank endangered species and other sensitive resources at a higher level of protection in the Incident Plan. In the Jarhead Fire Plan, the protection of the panther den was ranked lower than the protection of hunting camps. At a minimum, they should have equal protection and receive the same protection techniques.
- Involve local park staff with expertise in the area's resources, fuel loads, and fire behavior in daily decision-making and strategy sessions done by the ICS.
- Develop a Sensitive Resource Protection Plan that is used by local fire staff during non-incident fires and becomes part of the Delegation of Authority during incident fires.

## **Acknowledgments**

We once again had a successful panther capture season due to team effort and support of NPS and local DVMs. We continue to place team member and panther safety above all other goals. Our efforts to cross-train all team members have resulted in a smooth operation that provides for our personal and career growth as well as ever-increasing understanding of panthers and how they live in Big Cypress.

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**Table 1. Florida panthers captured and radio-collared in SBICY in 2011.**

<b>FP#</b>	<b>K#</b>	<b>Capture Date</b>	<b>Gender</b>	<b>Age (yrs)</b>	<b>Type</b>	<b>Capture Location</b>	
						<b>Easting</b>	<b>Northing</b>
133		February 3	M	~11	resident	480480	2876670
187		February 5	M	~7	resident	475341	2881889
145		February 12	F	~7	resident	469756	4880163
190		February 14	F	~5	resident	504610	2870026
191	K56	February 26	F	12	resident	492773	2886923
192	K287	February 28	F	1.7	resident	499238	2867372
182	K279	March 2	F	2	resident	468418	2867116

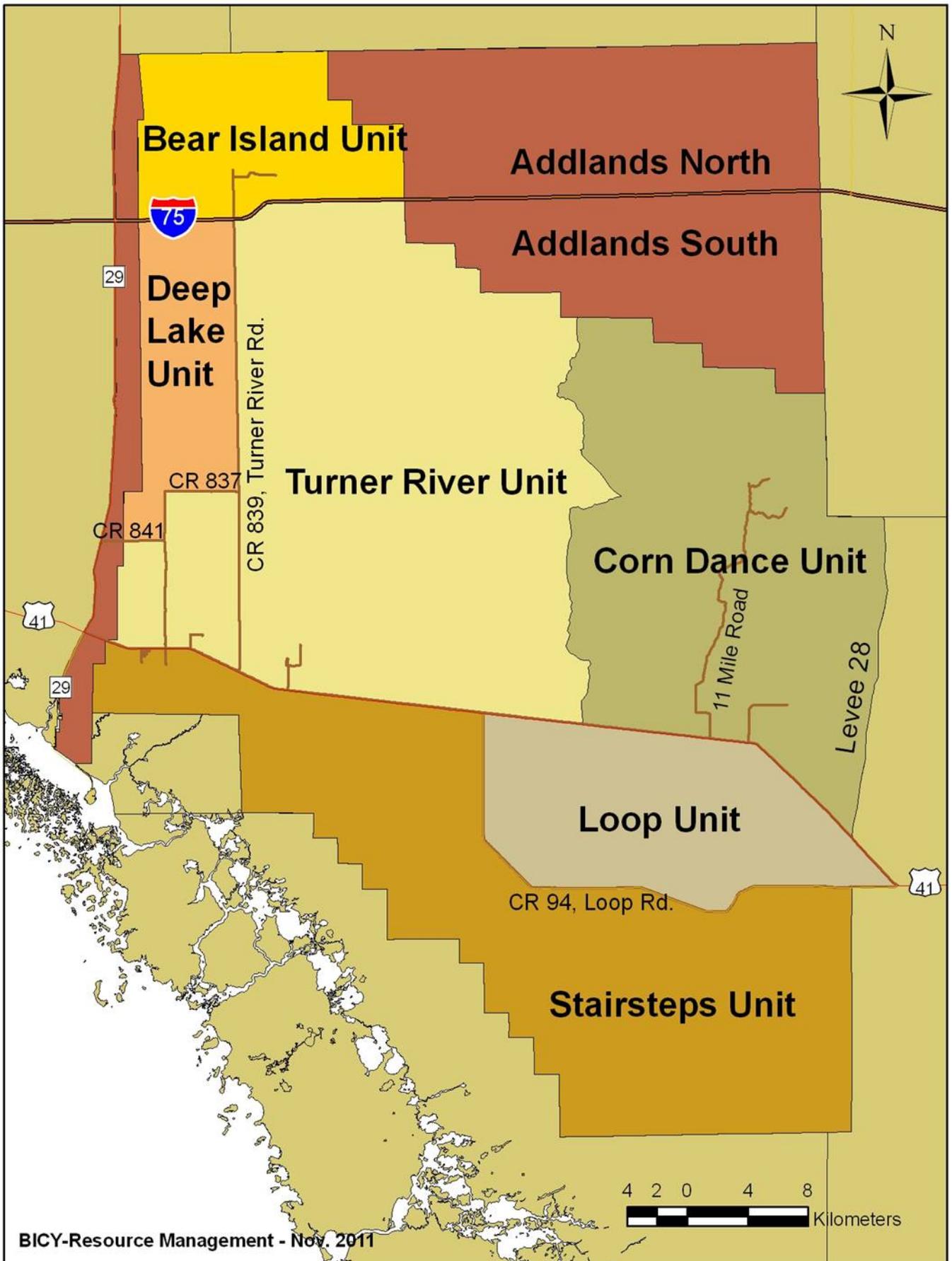


Figure 1. Management units and roads in Big Cypress National Preserve.

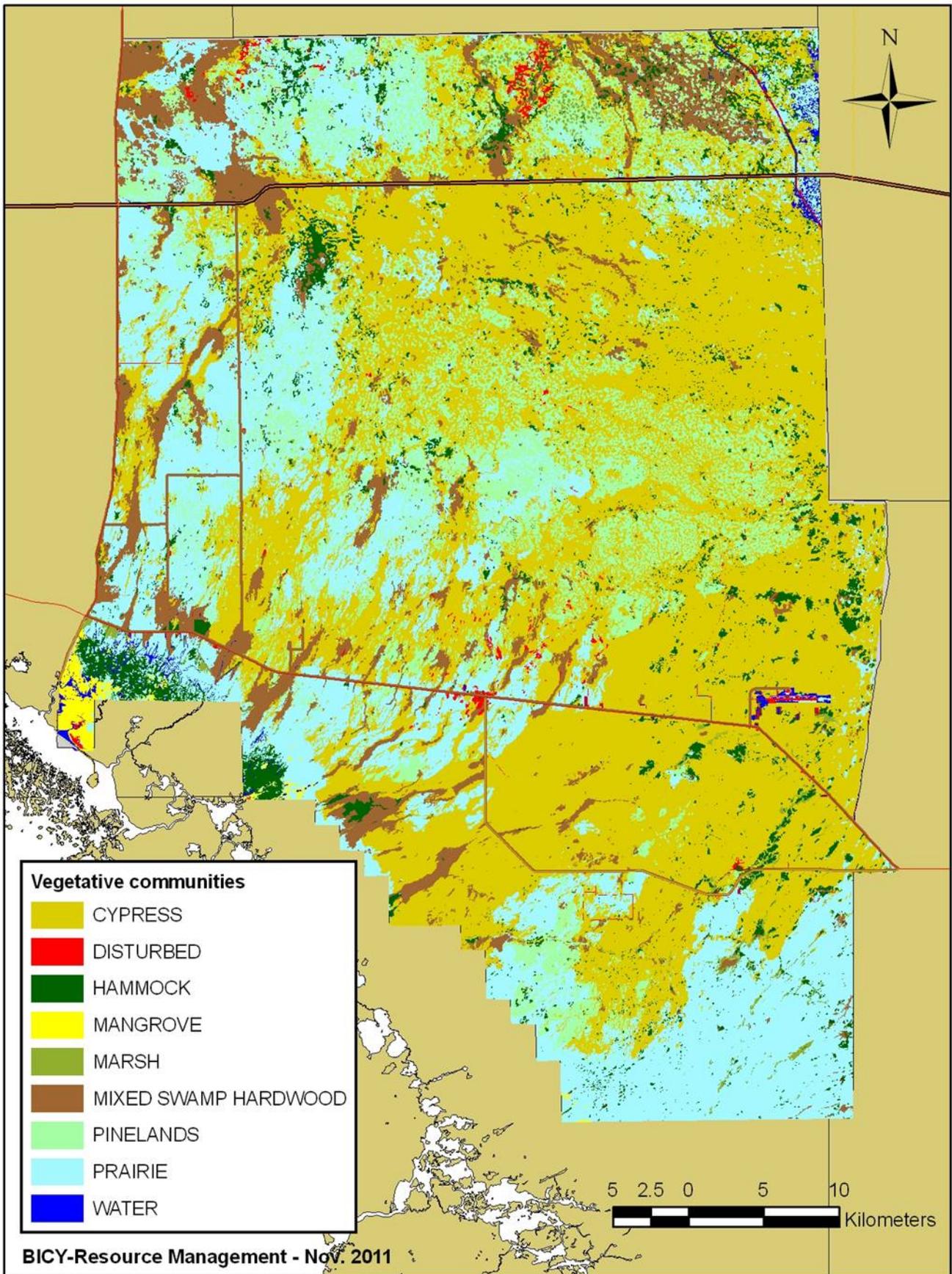


Figure 2. Vegetative communities in Big Cypress National Preserve.

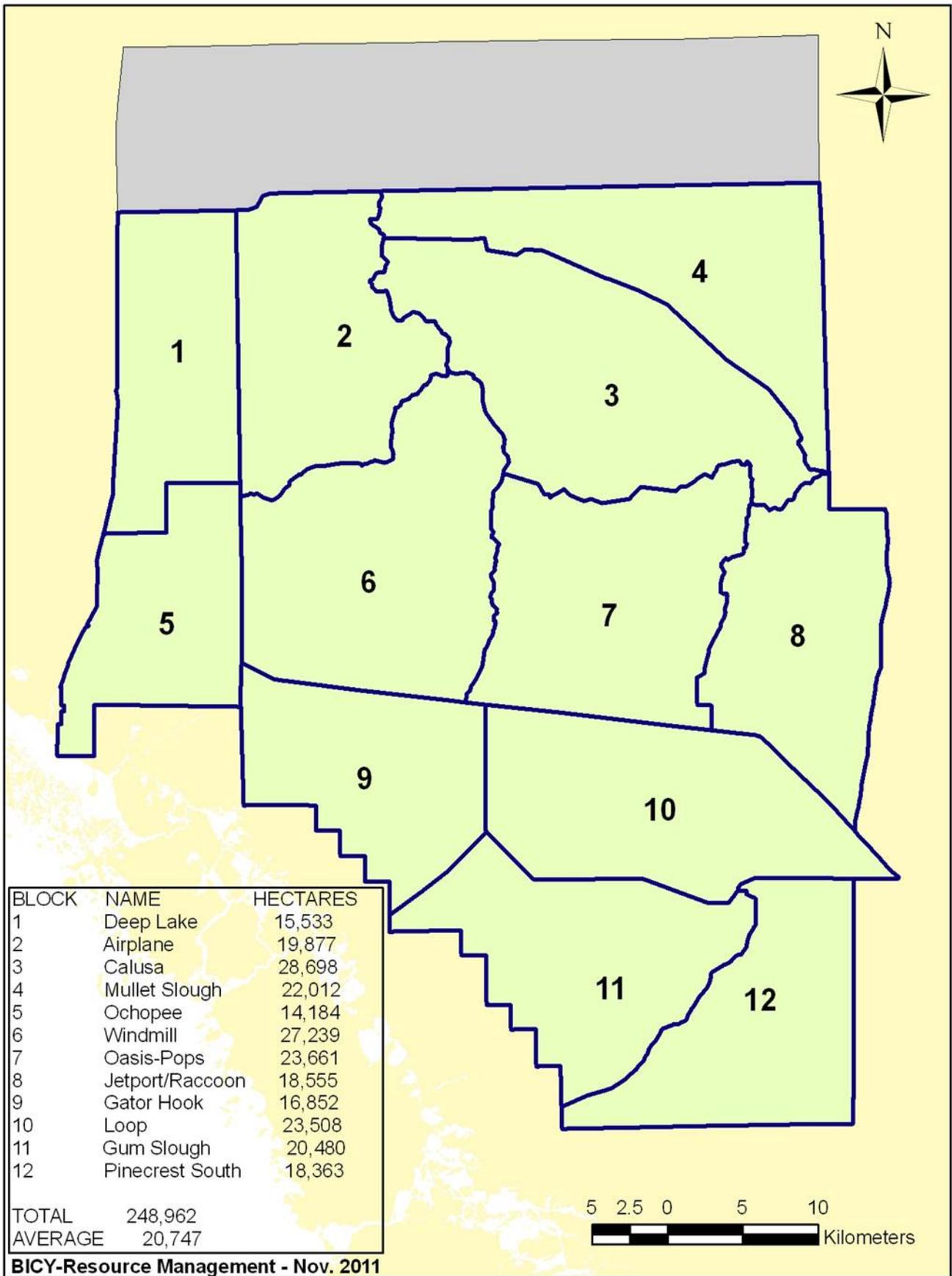


Figure 3. Panther survey blocks in SBICY.

### 2003-2011 Hunt Effort Per Block

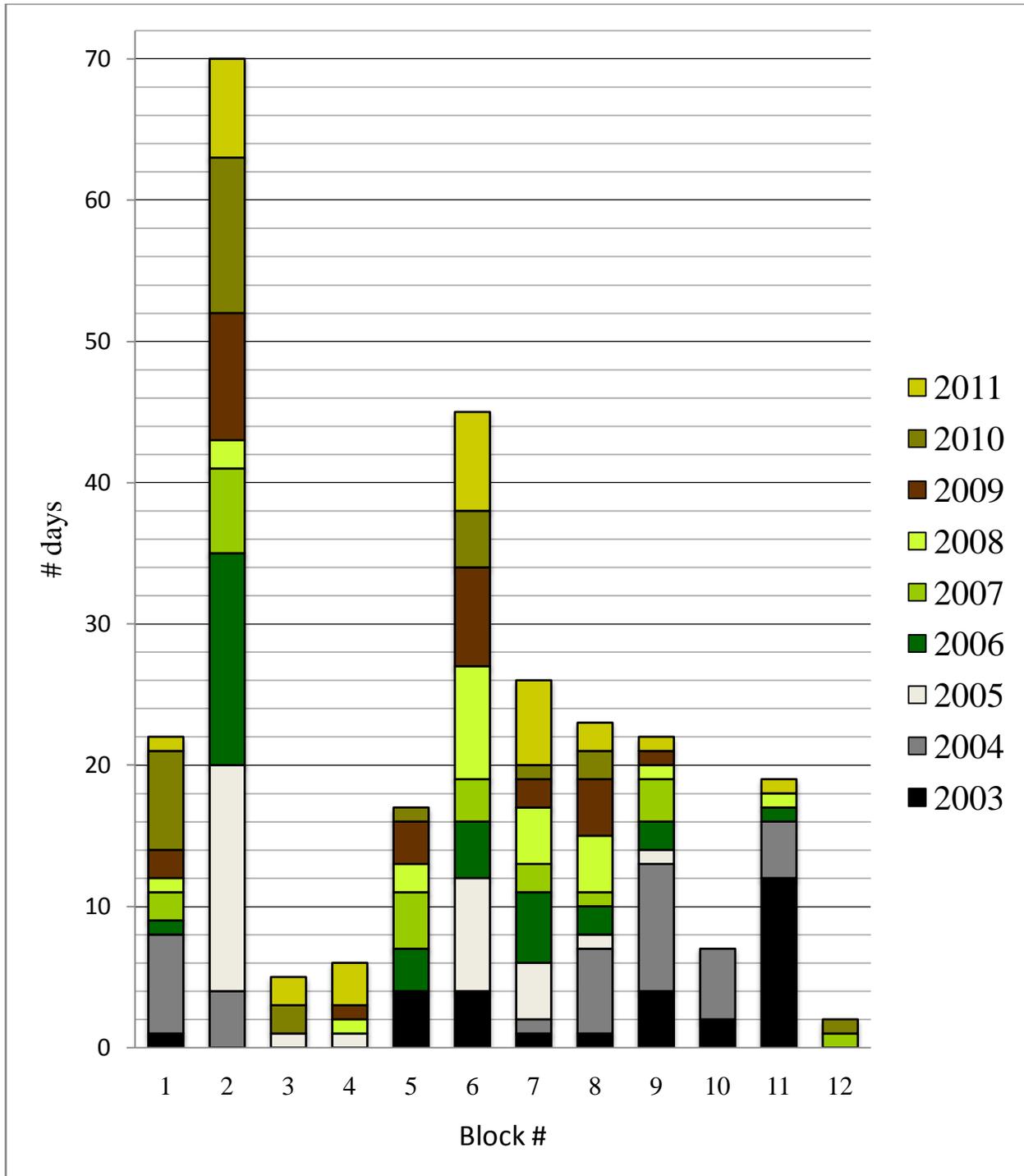


Figure 4. Panther capture effort per survey block: 2003 – 2011.

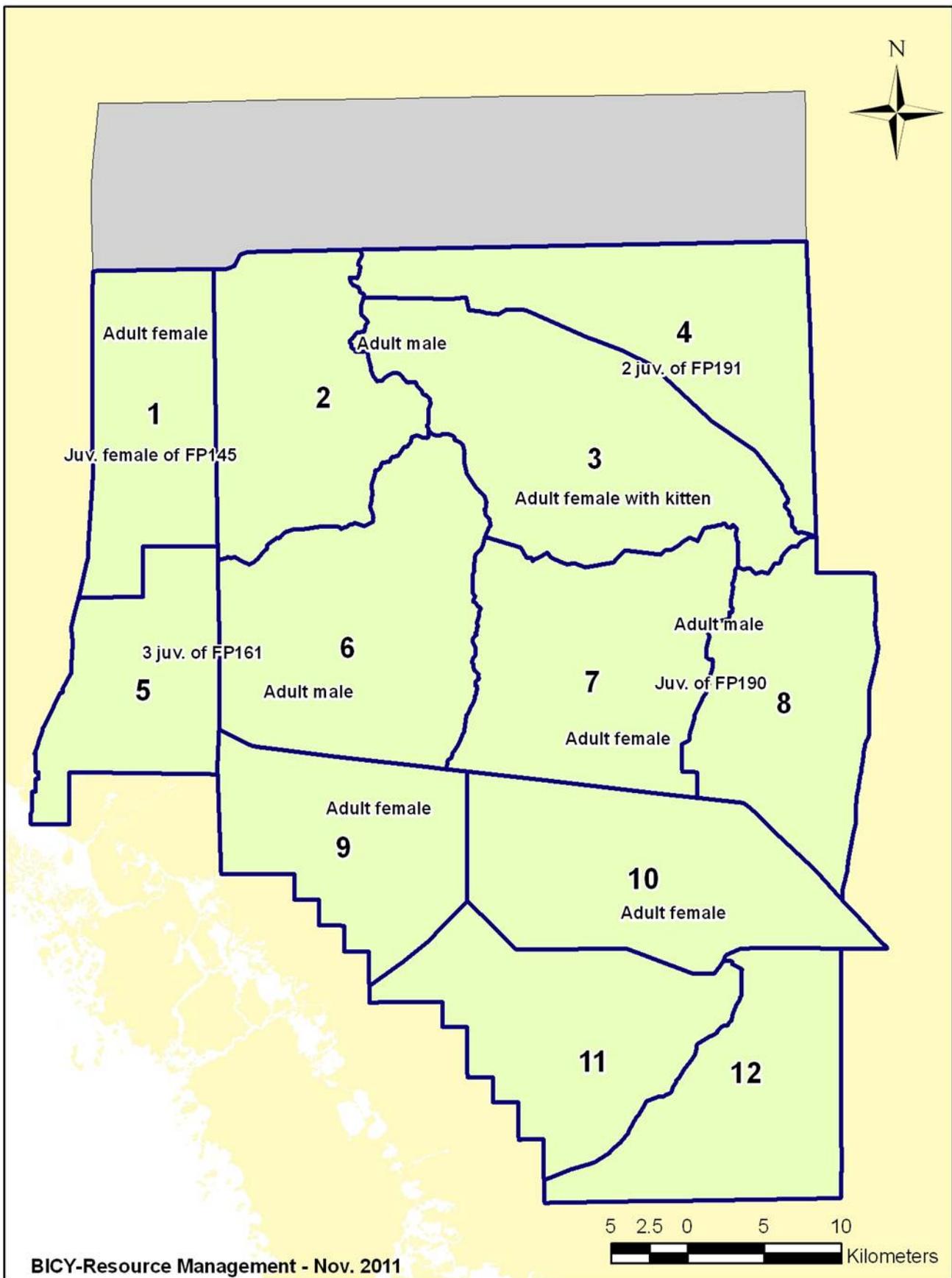


Figure 5. Documented presence of uncollared (or failed collar) panthers in SBICY from July 2010 - June 2011.

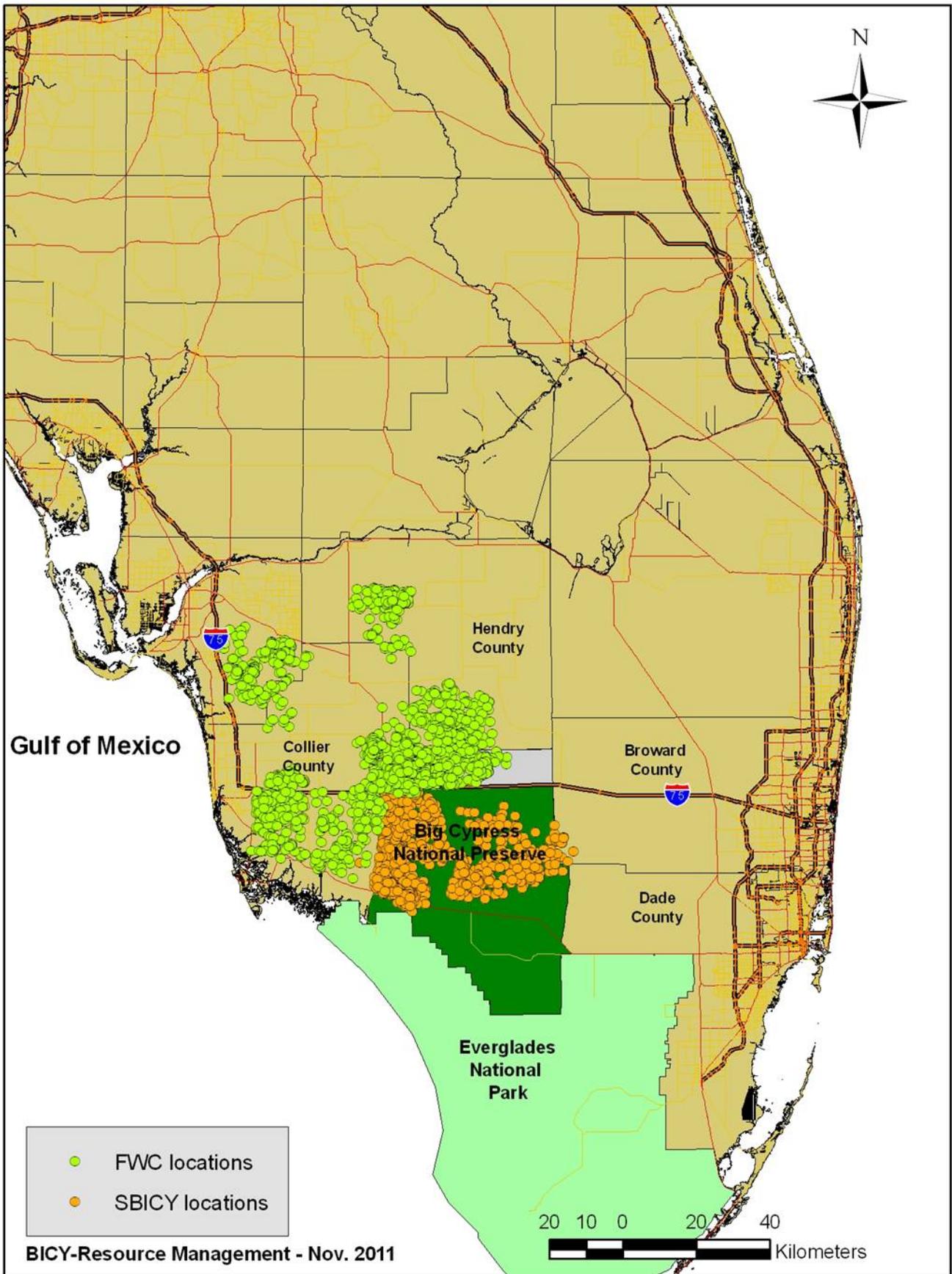
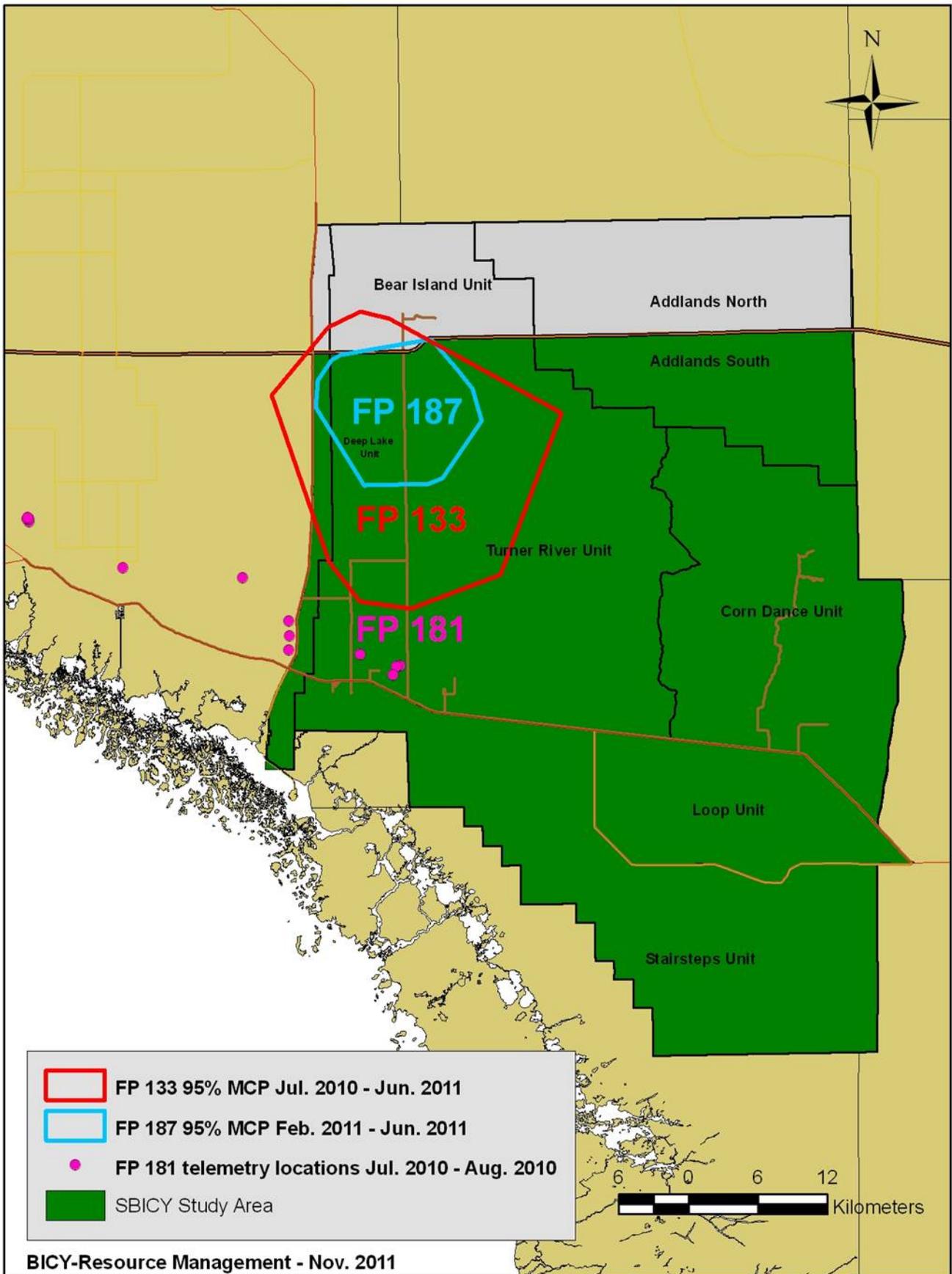


Figure 6. Geographical distribution of all Florida panther telemetry locations from July 2010 -June 2011.



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Figure 7. Home ranges of adult male Florida panthers monitored in SBICY from July 2010 - June 2011. FP181 has a failed collar.

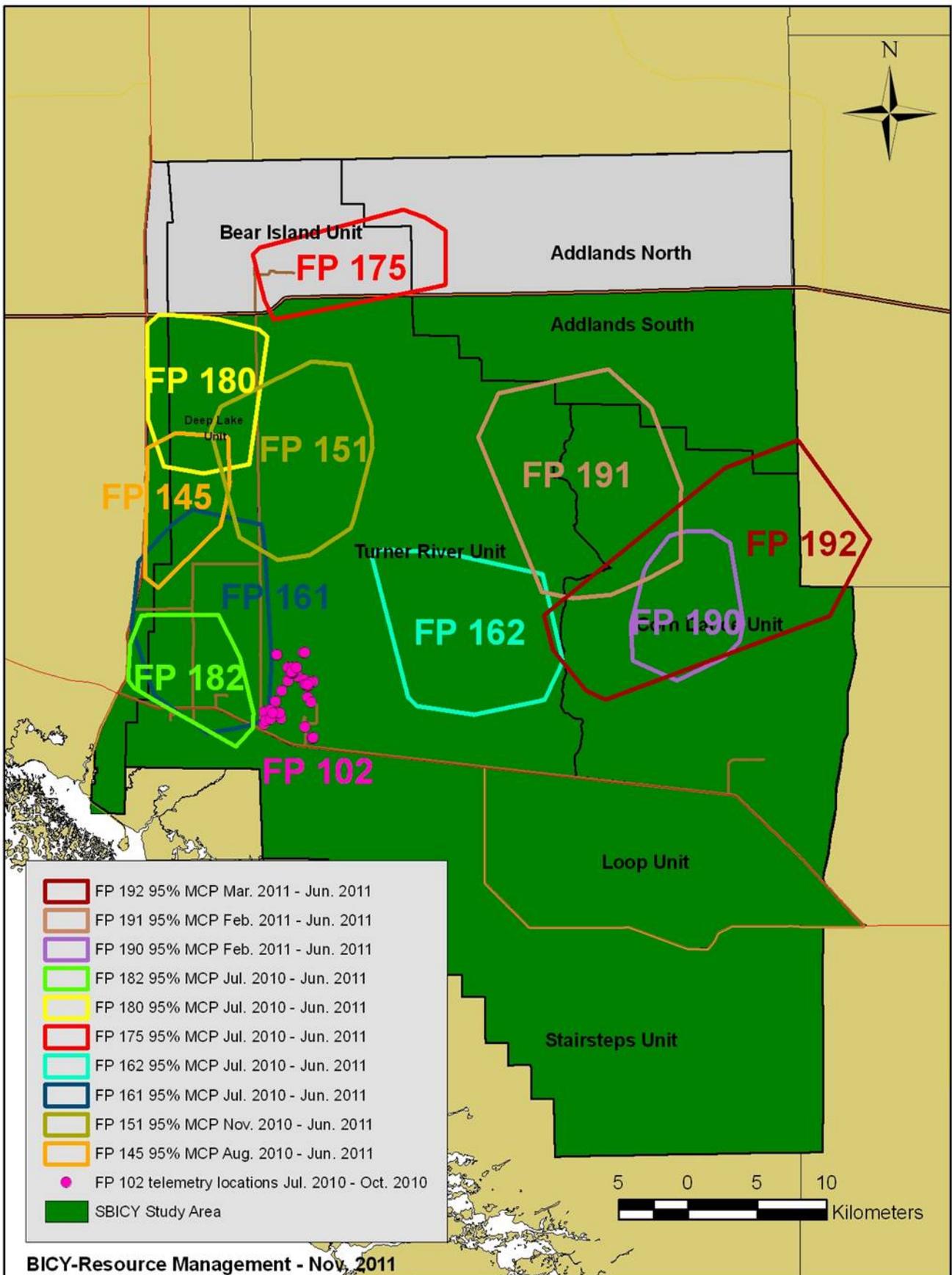


Figure 8. Home ranges of adult female Florida panthers monitored in SBICY from July 2010 - June 2011.

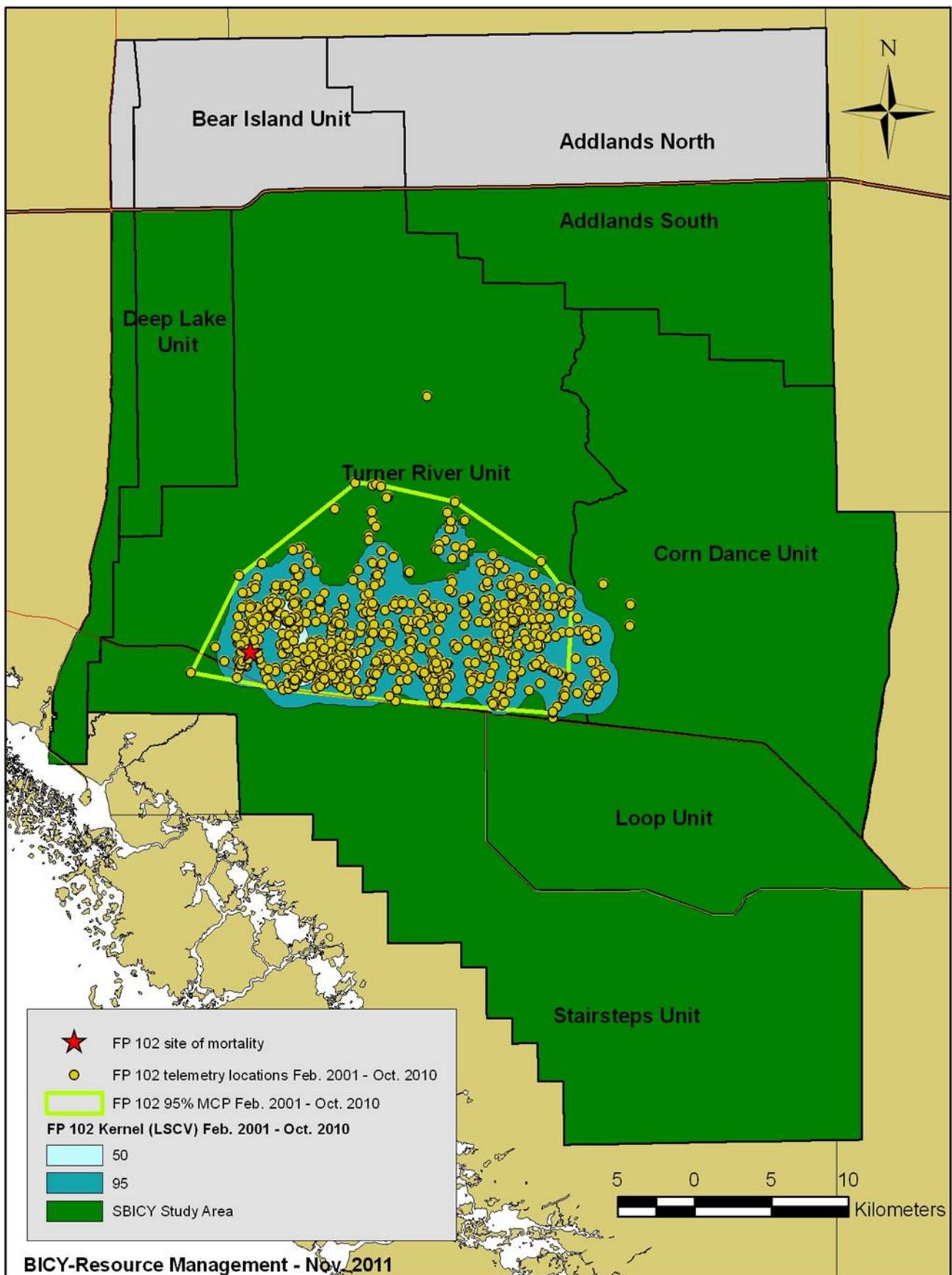


Figure 9. Lifetime home range of female Florida panther #102.

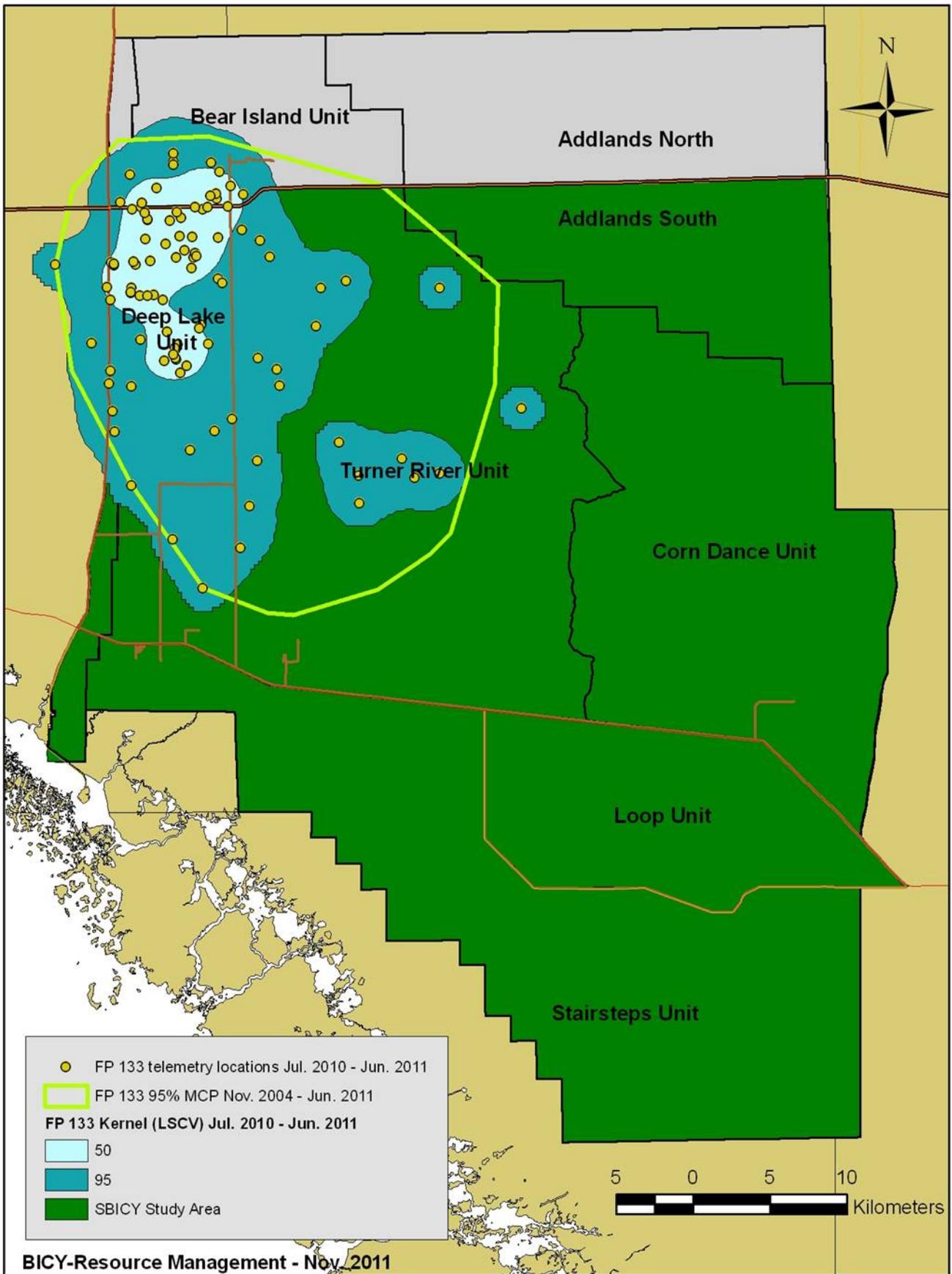


Figure 10. Home range of male Florida panther #133.

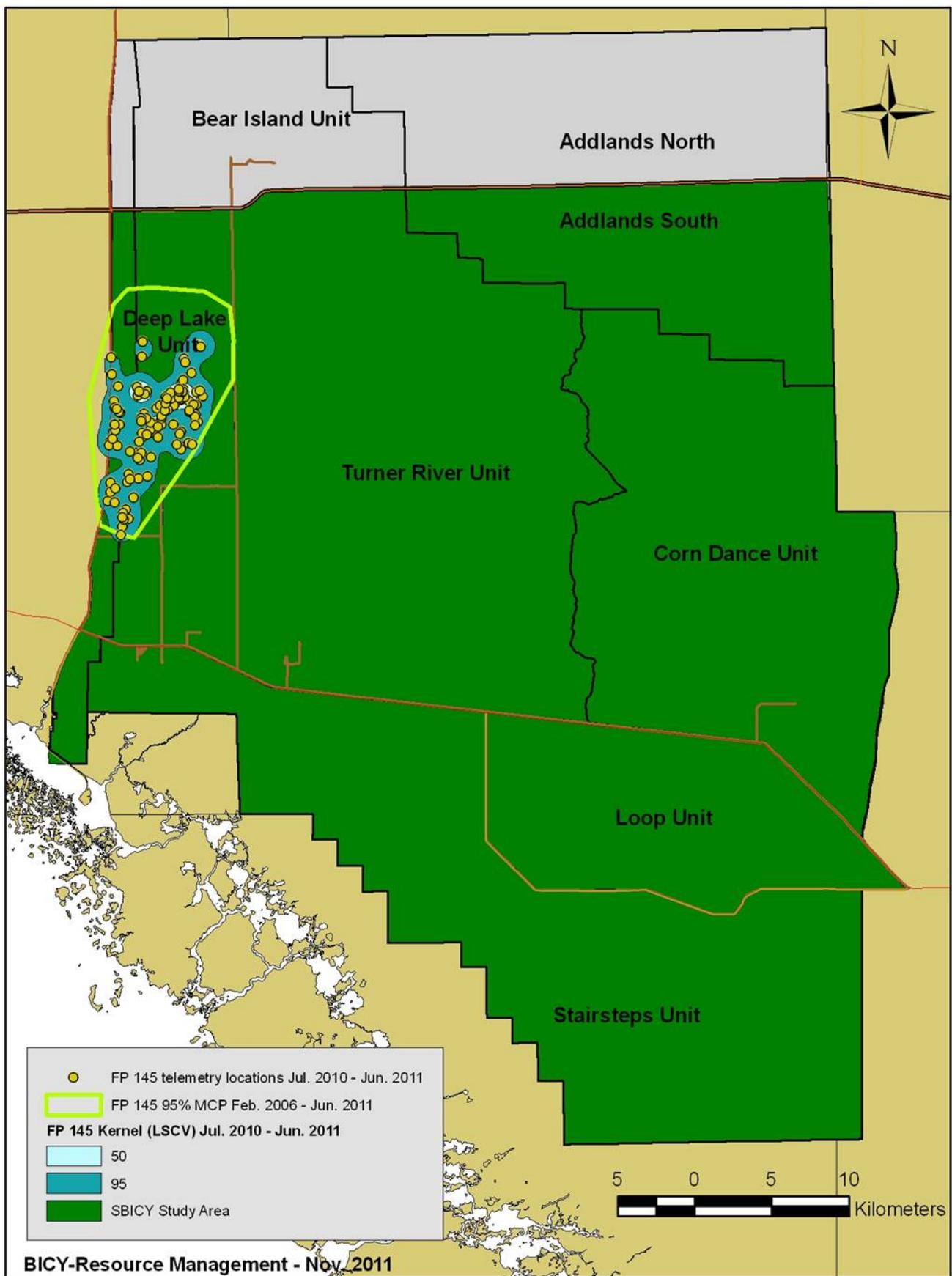


Figure 11. Home range of female Florida panther #145.

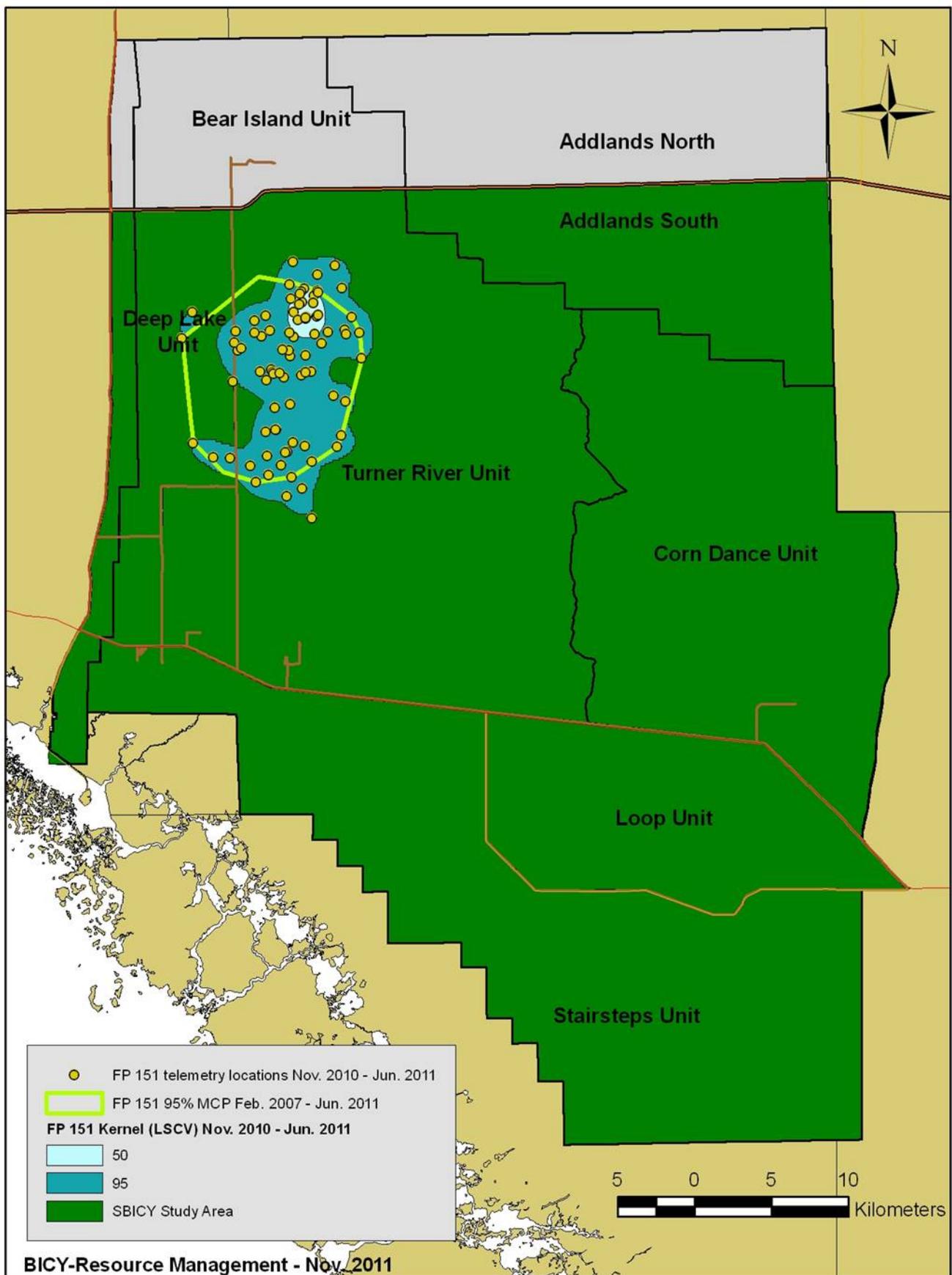
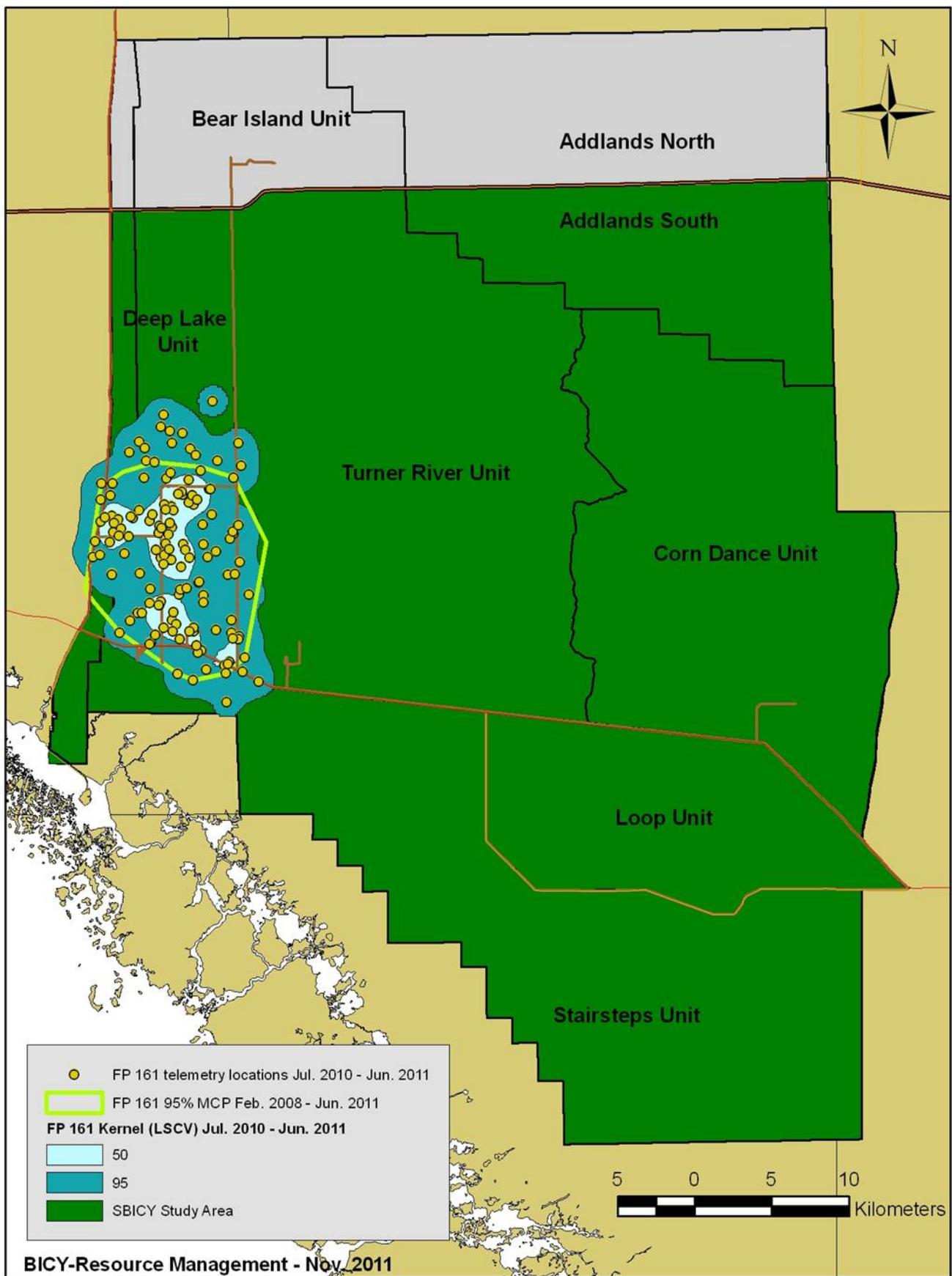


Figure 12. Home range of female Florida panther #151.



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

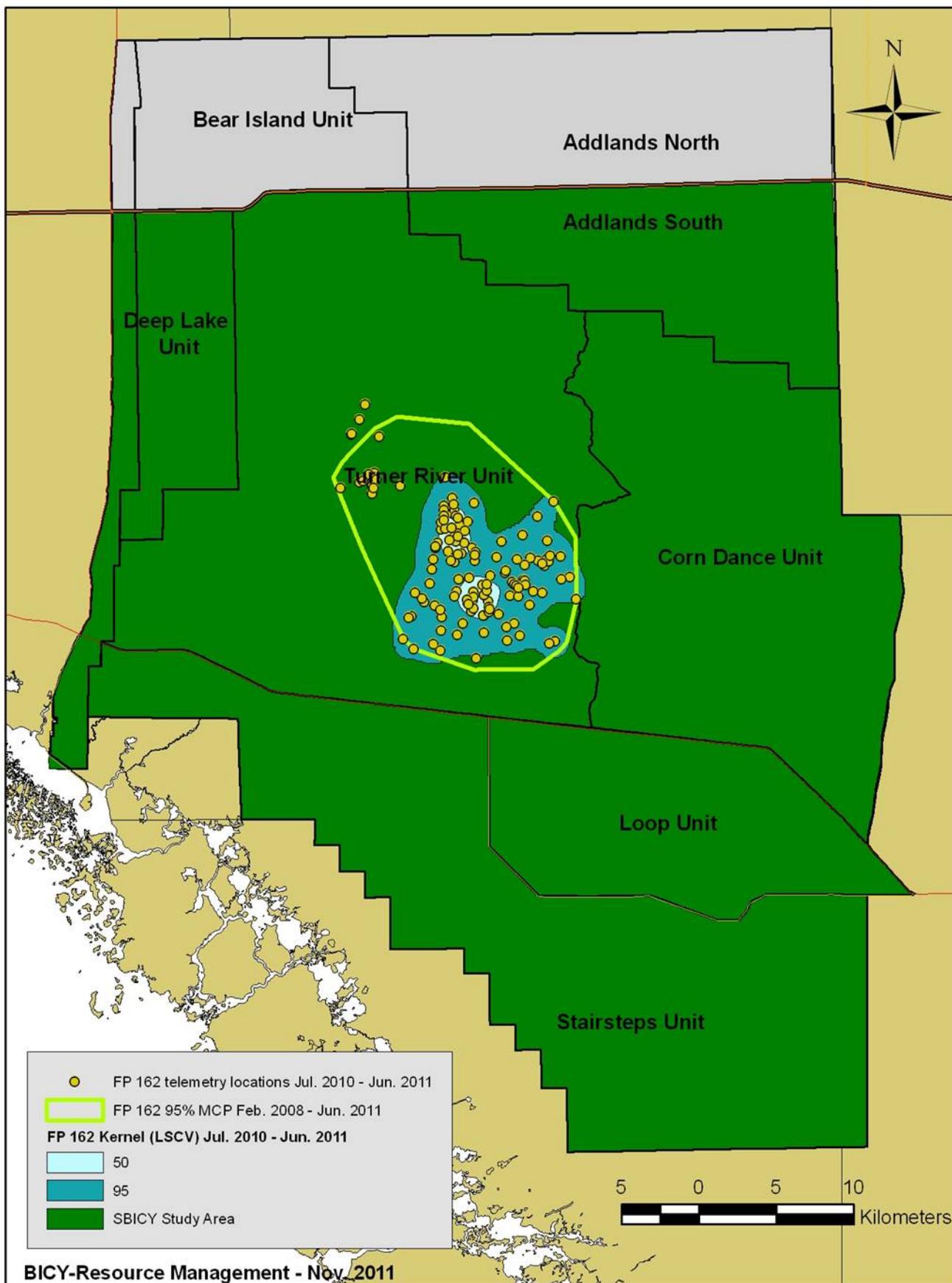


Figure 14. Home range of female Florida panther #162.

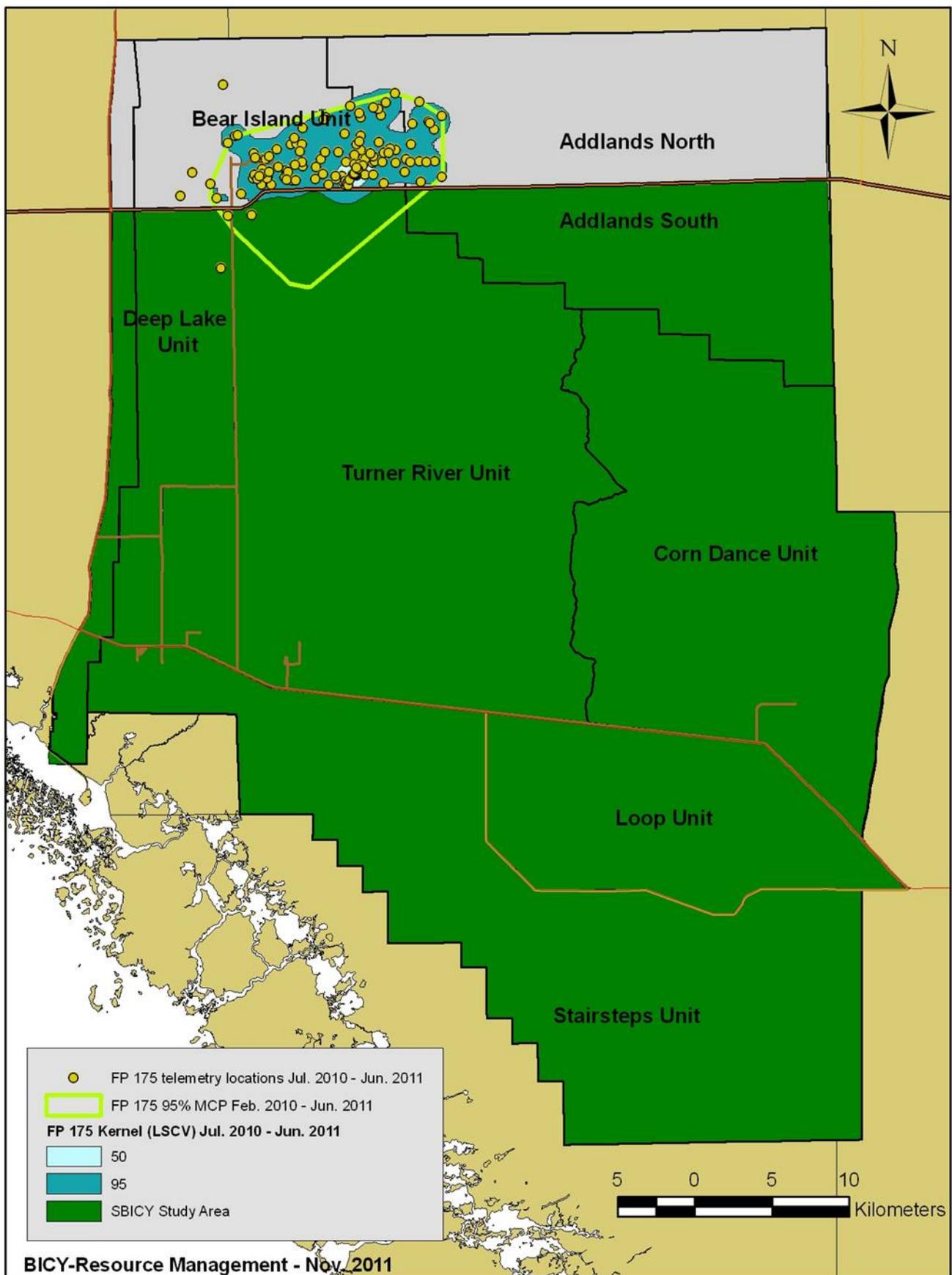


Figure 15. Home range of female Florida panther #175.

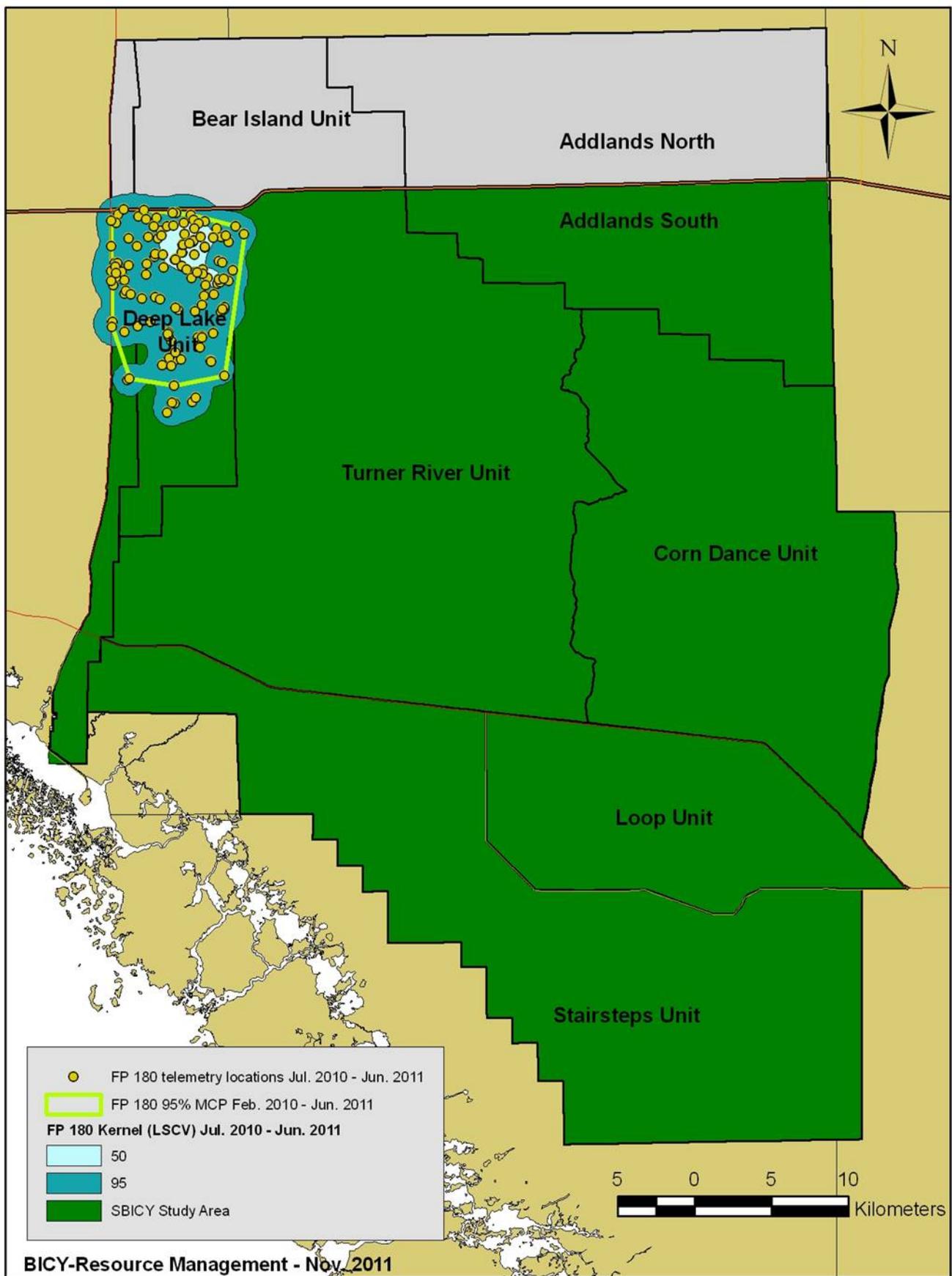


Figure 16. Home range of female Florida panther #180.

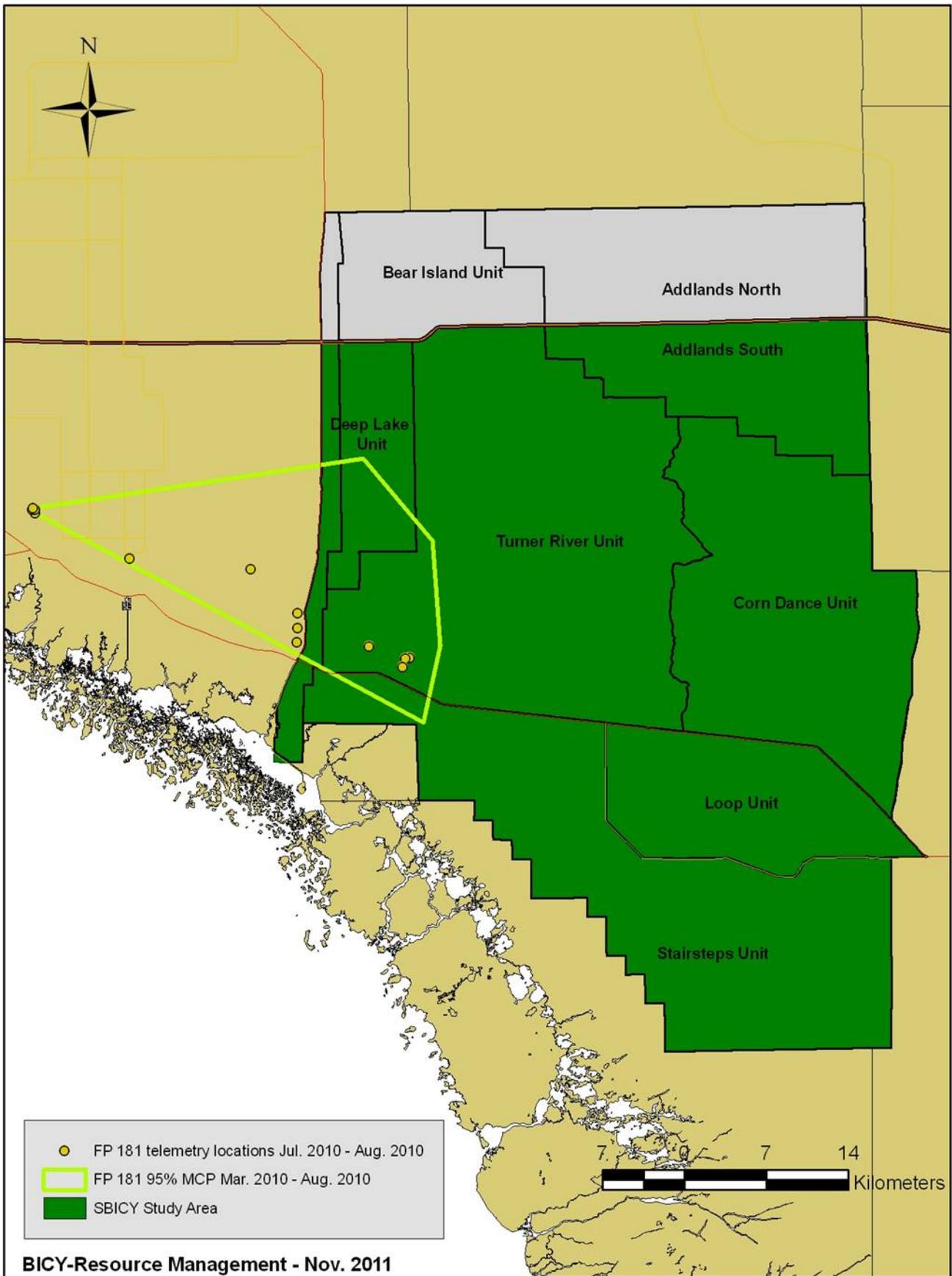


Figure 17. Home range of male Florida panther #181. FP 181's radio-collar failed on 08/02/10.

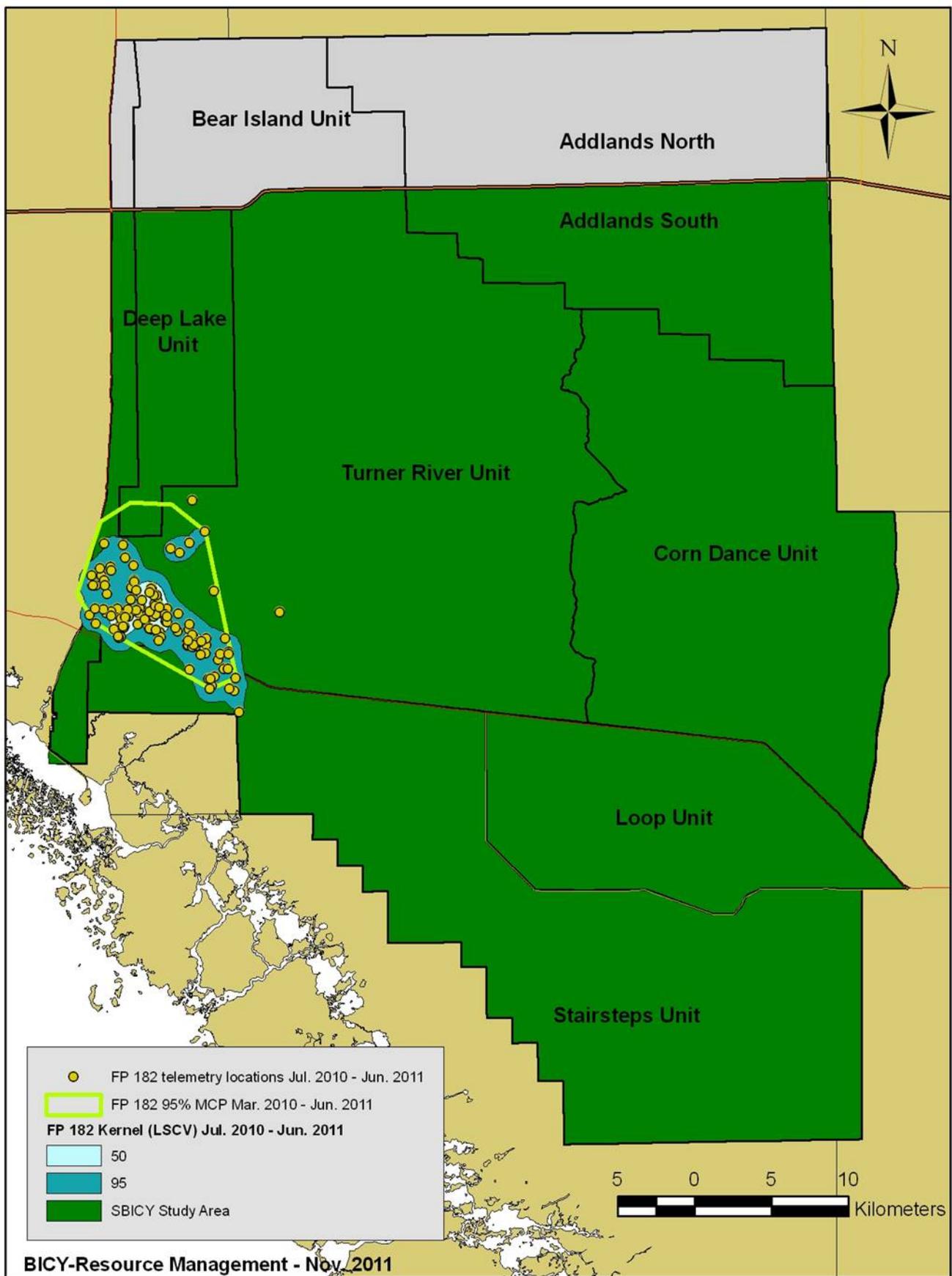


Figure 18. Home range of female Florida panther #182.

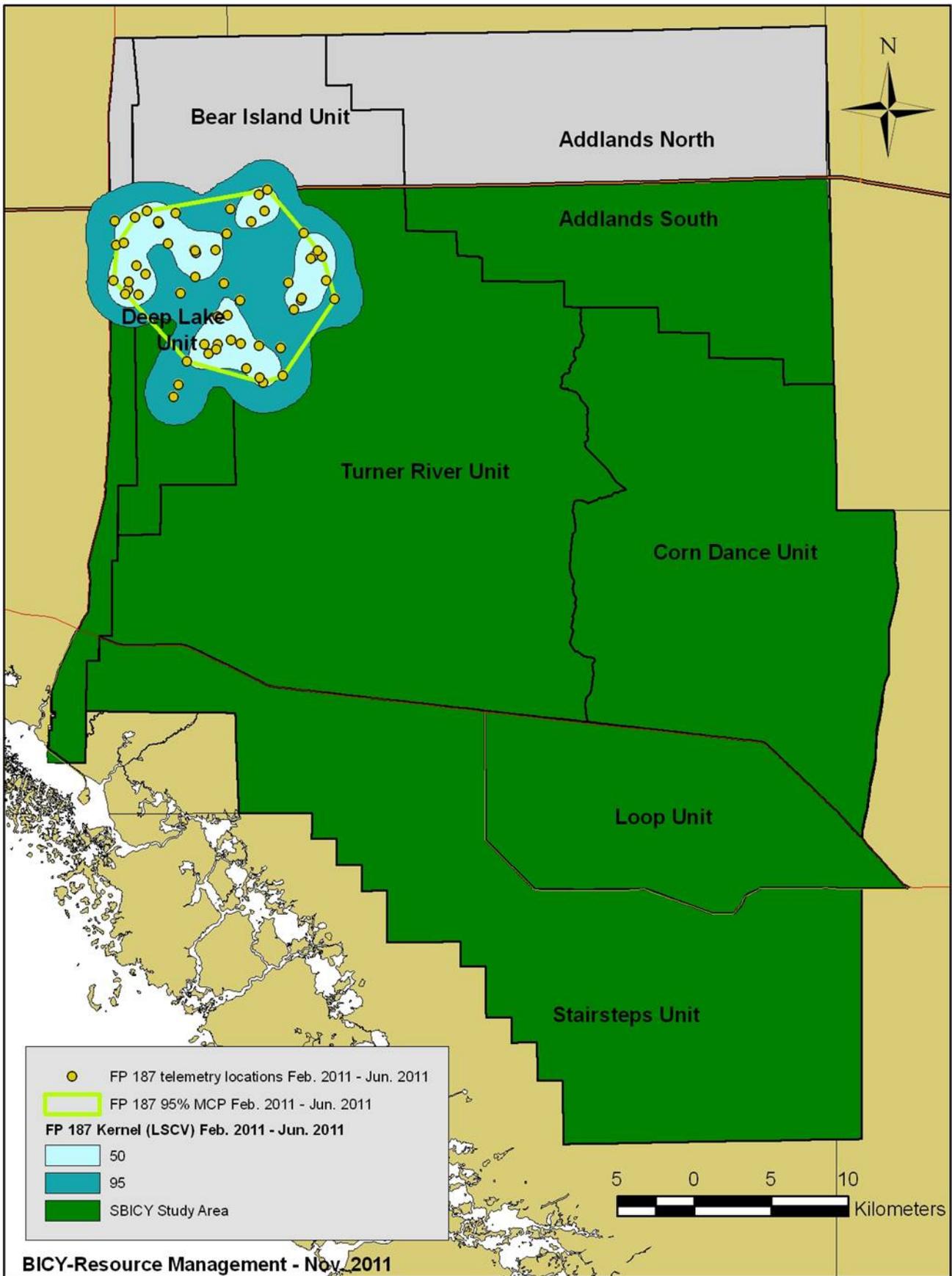


Figure 19. Home range of male Florida panther #187.

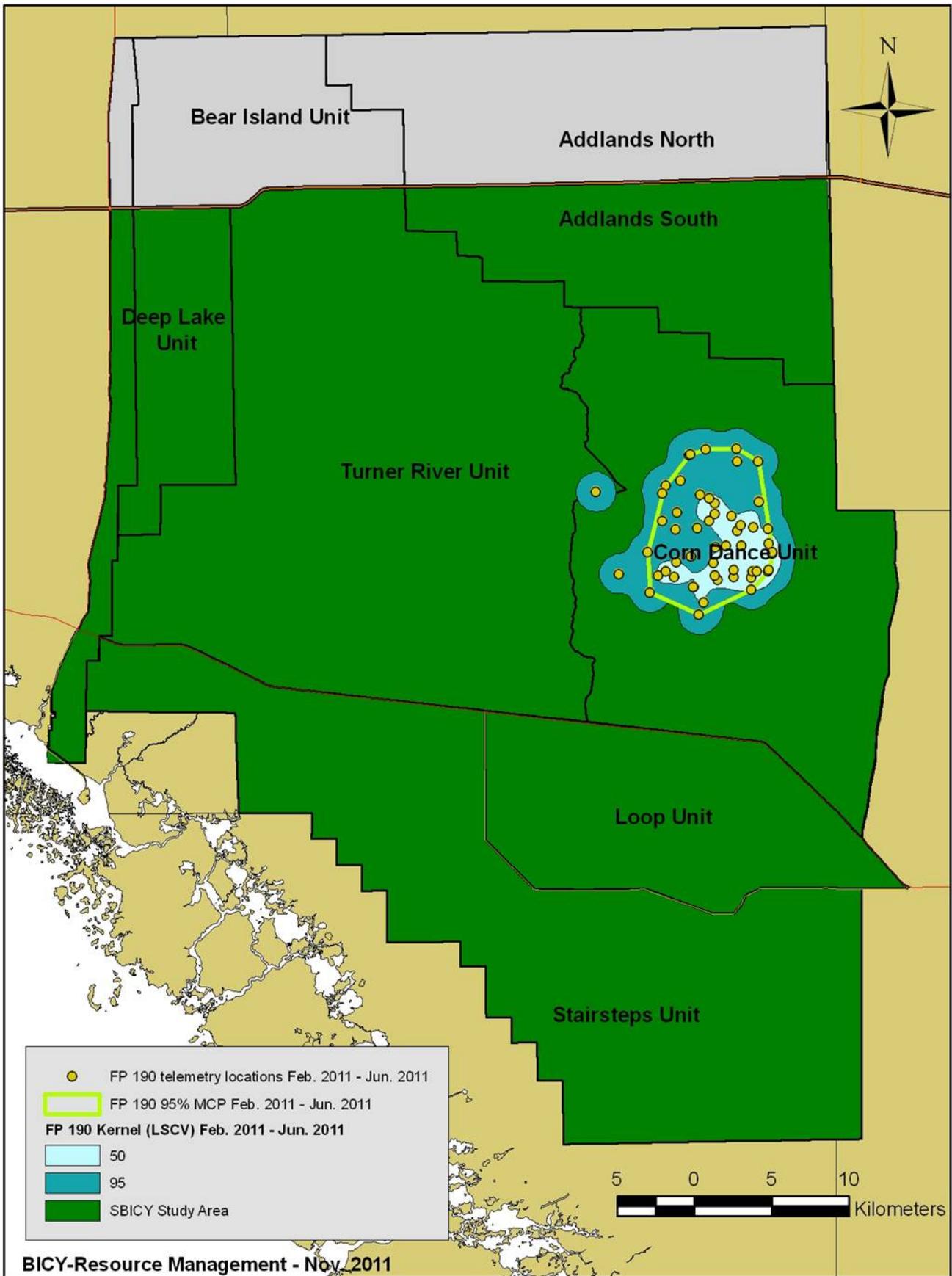


Figure 20. Home range of female Florida panther #190.

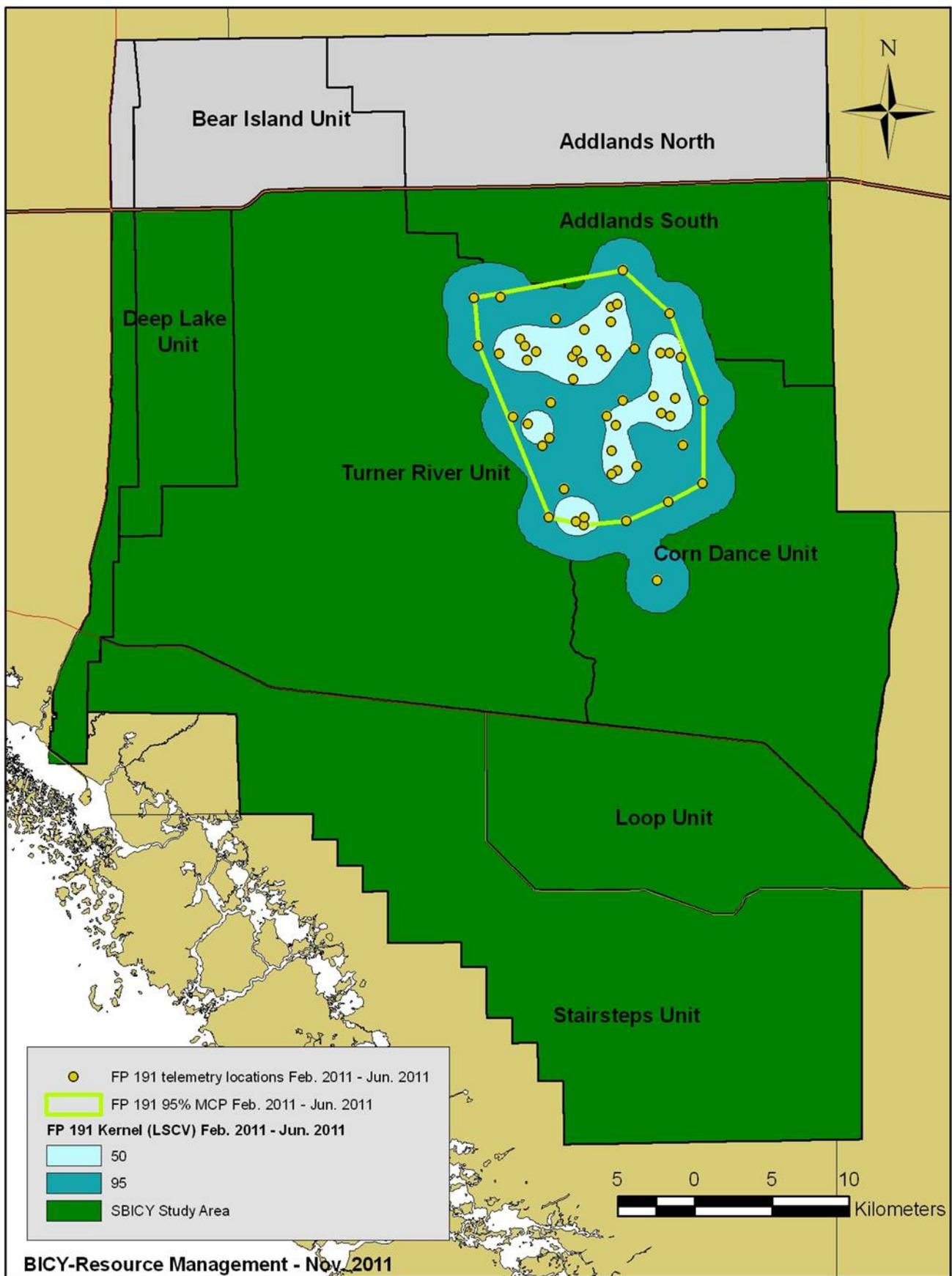


Figure 21. Home range of female Florida panther #191.

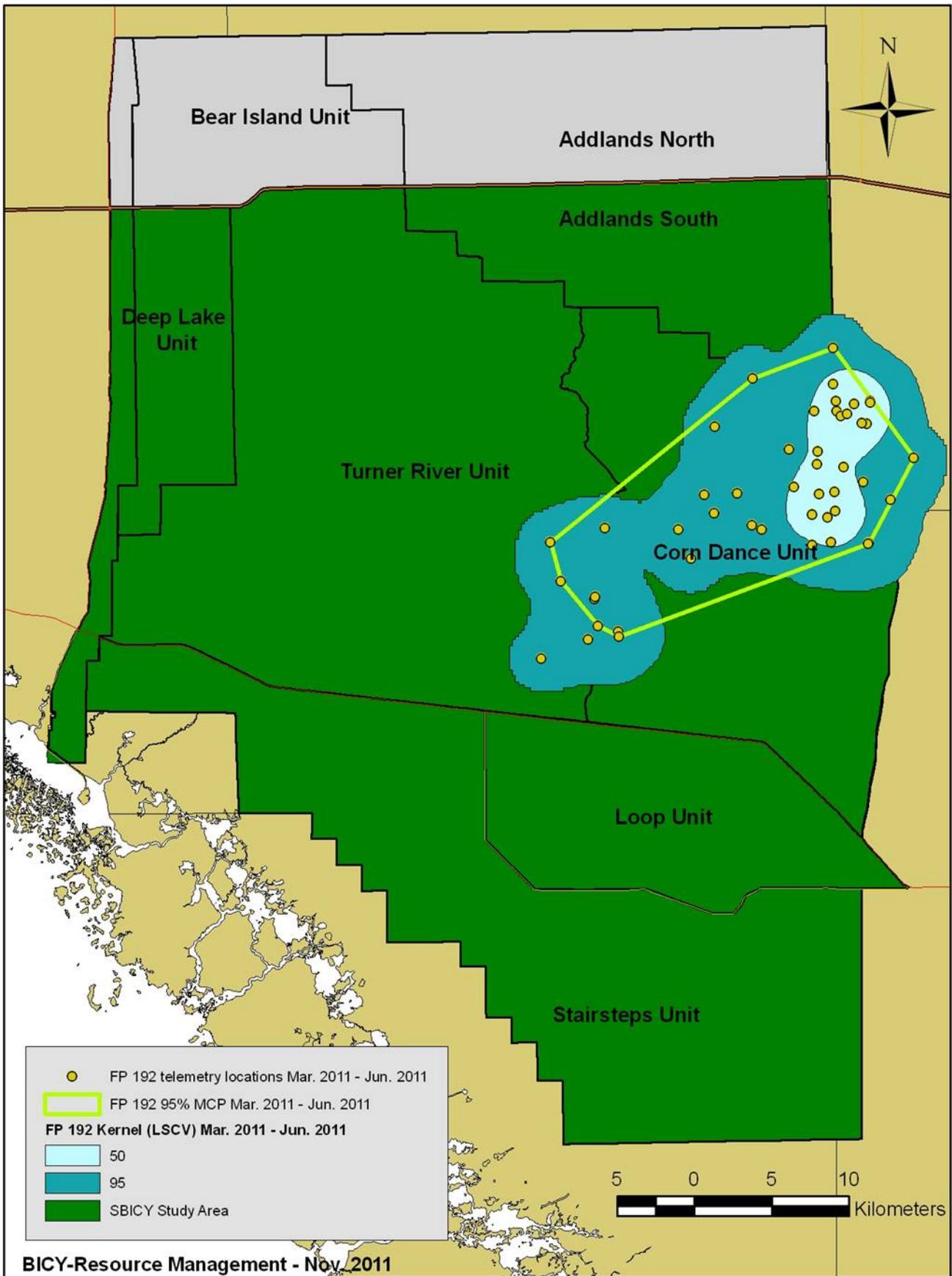


Figure 22. Home range of female Florida panther #192.

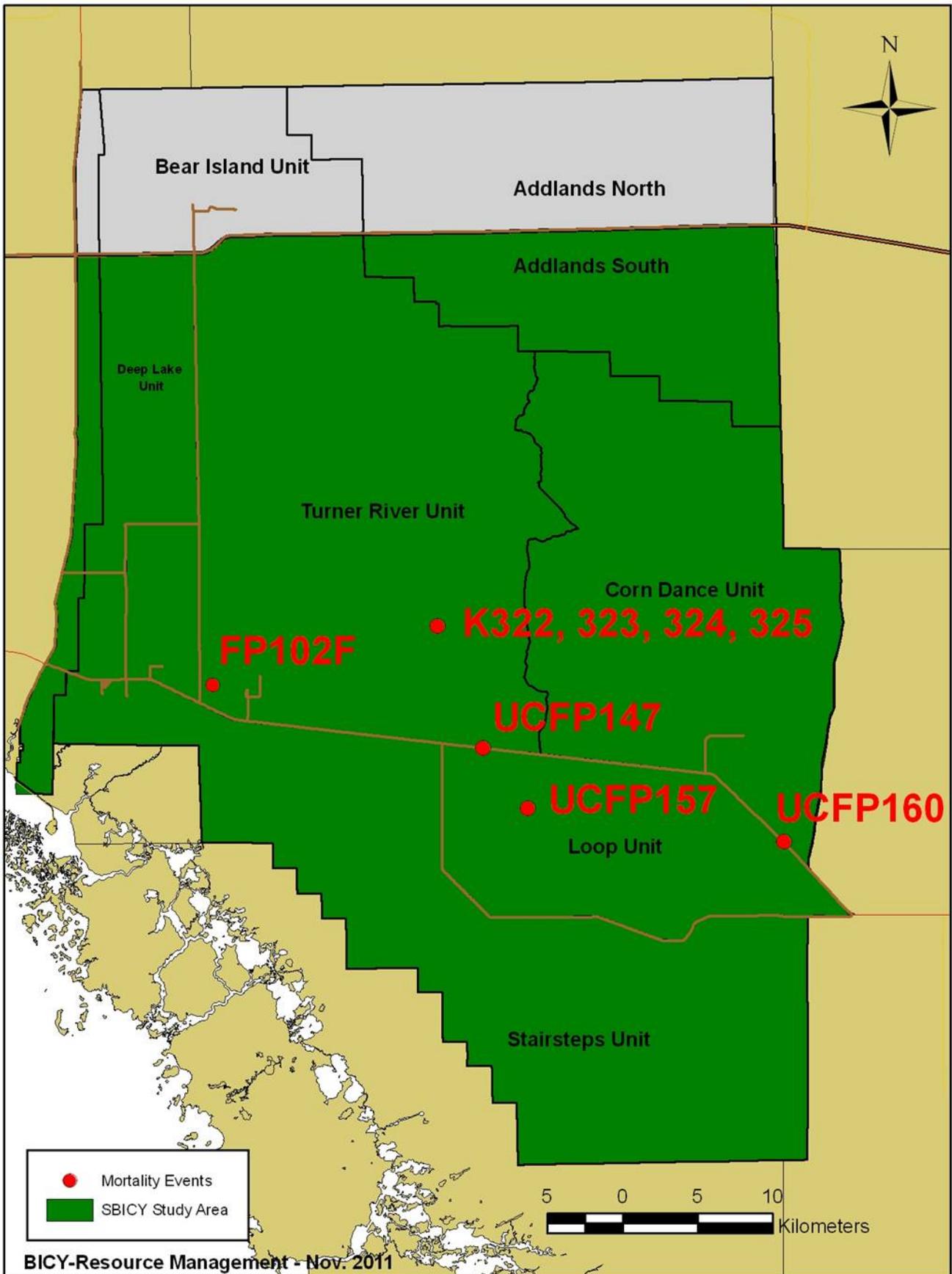


Figure 23. Distribution of known Florida panther deaths in SBICY from July 2010 - June 2011.