National Park Service
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Big Cypress National Preserve

FLORIDA PANTHER (Puma concolor coryi) RESEARCH AND MONITORING IN BIG CYPRESS NATIONAL PRESERVE 2012-2013 ANNUAL REPORT

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Female Florida Panther 220, granddaughter of TX107 from Texas

Prepared by National Park Service staff
Deborah Jansen, Project Leader
John Kellam, Biological Technician
Annette Johnson, Biological Technician

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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 2012 to 30 June 2013. We hunted for 28 days between February 2 and March 9 in 7 of the 12 survey blocks. We spent an additional day in the Addlands recollaring FP216. We captured and collared 2 new panthers, FP220 and 221, and changed the failing collar on FP216.

We monitored 14 panthers, 1 resident male, 1 dispersing male, 11 resident females and 1 dependent female for at least a portion of the reporting period. The average home range (95% MCP) of the 1 resident male was 418 km^2 and that of the 10 resident females located more than 50 times was 84 km^2. The presence of 3 uncollared adult males, 11 uncollared (or failed collar) adult females and 9 juveniles was verified in the study area. Four of the 11 monitored breeding-age females denned during the reporting period. At 4 of 5 dens checked, we marked 9 kittens, 6 males and 3 females, with transponders and sampled them for biomedical information. One other den failed, possibly due to predation by a bear. Three adult mortalities were documented in the study area, all from collisions with vehicles.

The efforts from the past 25 years of panther survey and monitoring work, 18 years of panther reproductive assessment, and 12 years of panther capture work conducted by the 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 include sufficient funding for effective and productive panther capture and monitoring and thereby sound management, reconsideration of an underpass at Turner River on Hwy. 41, and steps to lessen panther-vehicle collisions, especially on SR29, where they occur chronically.

Report Background

This is the eleventh 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 2012 and 30 June 2013 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) monitors 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 2004-2012 annual reports cover capture and monitoring work in SBICY between July 1 and June 30 of those years.

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.

Goal 9. To evaluate satellite collar technology as a means of effectively monitoring panthers in lieu of aerial location flights.

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 (Sobczak et al. 2011). From 1994 to 1997, the University of Georgia used remote sensing techniques to create vegetation classification maps of Big Cypress (Welch et al 1999). Burch (2011) further refined this work into 7 general habitat types comprised of 50% cypress, 24% prairie, 2% marsh, 15% pineland, 3% mixed hardwood swamp, 5% hardwood hammock, and 0.4% mangroves (Figure 2). Disturbed habitat, including exotic plants and areas of human influence such as roads, is found in 0.7% 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 (I-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 years that cover the 2008-2012 deer and hog hunting seasons averaged 14,285 man-days

of hunter pressure, with a mean harvest of 226 deer (bucks only) and 3 hogs harvested in the past 5 years (FWC 2009-2013 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. Duever et al. (1986) examined 1953 and 1973 maps to obtain an estimate of trails in Big Cypress. They found that the extent of trails had increased from 250 km to over 1,100 km in that 20-year period. Welch et al (1999) used remote sensing techniques to identify linear features and found over 46,774 km of trails or trail remnants that were visible on aerial photos. The National Park Service (2000) developed a plan for off-road vehicle recreational use which limited vehicles to a designated trail system. Janis and Clark (2002) determined that panthers showed some avoidance of 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.

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.

2013 Capture Season Plans

An interagency panther capture planning meeting was held on October 4, 2012. The SBICY capture plan was submitted with the following goals:

1. Recollar FP151, 161, 187, 190, and 216 with working collars that may fail (*Accomplishments: FP216 was recollared) FP190's collar failed in December 2012 prior to the capture season, and the other collars remain functioning as of January 25, 2014.*
2. Find and replace failed collars of FP88, 93, 124, 145, 150, and 179. (*not accomplished but did document that FP93 was still alive)*
3. Deploy satellite collars on 2 male panthers (*not accomplished).*
4. Target two areas for panther capture that have been the least hunted areas in the 11 years of NPS capture work and have relevant management concerns in each area,
    - the Addlands south of I-75, under discussion for potential Wilderness designation and recreational use. (*did not hunt there due to equipment problems and funding limitations*)
    - southeastern Stairsteps in which a significant deer die-off had occurred (*did not hunt there due to equipment problems and funding limitations*)

Survey and Capture Protocols

Documentation of panthers was recorded during the capture work and augmented by other confirmed sightings and the annual synoptic survey 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. 2012 and 2013). 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 (2008). 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

For the first 6 months of the reporting period, we located the panthers during 70 flights, at a schedule of 3 times per week. Then several situations arose that lessened the amount of monitoring of the collared panthers: 1) The management staff at Big Cypress sought to lessen costs by reducing the number of monitoring flights, 2) The National Park Service ended its contract with Speed Aviation and endeavored to meet our flying needs through a government-owned aircraft and NPS pilot, and 3) the Federal government sequestration further reduced funding. The NPS plane proved not airworthy and a government pilot was not hired. Therefore, for the last 6 months of the reporting period we contracted flights when funding was available. We now pay for one flight what we had paid for 2 flights under the previous contract with the same vendor. In addition, our ability to fly on a 7-day interim has been unreliable due to unavailability of a plane. During the last 6 months of the reporting period, we located the panthers a total of 23 times. The protocol established as of July 1 is one flight per week.

# of panther location flights during the reporting period

July 2012	12
August	14
September	11
October	11
November	11
December	11
January 2013	9
February	5
March	4
April	3 (not all panthers)
May	1
June	1

During each flight, 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 and/or Google Earth to obtain accurate UTMs. 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 used the FWC data to generate a map showing SBICY locations in relation to the entire monitored population (Figure 6).

We displayed the home ranges of resident radio-collared panthers located in SBICY between 1 July 2012 and 30 June 2013 (Figures 9-21) 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. Since the 2 panthers we radio-collared in February have fewer than 50 locations, we did not conduct a home range analysis on them. 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 their reporting period home range as well as their lifetime home range as MCP and fixed kernels.

Reproduction

Inspection of Florida panther dens began in April 1992 by FWC and in April 1995 by Big Cypress. 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. Since the number of flights decreased in the last 6 months of the reporting period, it is not known whether or not we "missed" a den during that period. For those we confirmed, 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 (2013) lists all panther kittens handled at dens from 7

April 1992 through 30 June 2013 and Appendix III lists all known dens of radio-collared female panthers from June 1985 through 30 June 2013.

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. Appendix IV in Florida Fish and Wildlife Conservation Commission (2013) lists known panther injuries and mortalities through 30 June 2013.

Reporting

We used the reporting period of 1 July 2012 to 30 June 2013 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. We submitted 33% fewer panther locations this year compared to previous years.

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 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 when less than 2 years of age (Benson et al. 2011). 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. Intraspecific aggression is abbreviated as **ISA**.

Results

Survey and Capture Efforts

2013 Capture Season Summary (February 2 – March 9; March 25):

29	total hunt days
2	newly collared panthers (FP220 and 221)
0	failed collar replacement
1	working collar replacement (FP216)
0	not handled because was denning
9	treed but not handled due to unsafe handling conditions (FP187 5 times, FP93, uncollared male and female in Block 1, uncollared female in Block 7)
1	treed but not needing handling (FP214)

Following is a summary of this year's findings per block. Figure 4 shows our capture effort per block for the past 12 years.

Block 1: Hunted 4 days

- 25 Feb: treed uncollared female
- 2 Mar: trailed an uncollared female
- 9 Mar: treed an uncollared young male (too high and warm)

Block 2: Hunted 11 days

- 12 Feb: freshly eaten raccoon, possibly by FP220
- 13 Feb: sign of small female, possibly later collared as FP221
- 21 Feb: sign of uncollared male
- 22 Feb: collared FP221 (new); treed FP187 14 km from his previous day's location

Block 3: No hunting

Block 4: No hunting

Block 5: Hunted 4 days

- 9 and 10 Feb: sign of uncollared female
- 10 and 16 Feb: sign of uncollared family group

Block 6: Hunted 4 days

- 6 Feb: treed FP214 (not needed), then treed FP93 and FP187 (both too high)
- 15 Feb: treed FP187 (too high)

Block 7: Hunted 3 days

- 8 Feb: found male sign, possibly FP187
- 24 Feb: sign of an uncollared male, an uncollared female, and an uncollared female with a yearling
- 27 Feb: treed an uncollared female (too high)

Block 8: Hunted 1 day

- 20 Feb: team found sign of an uncollared male and uncollared female

- 7 Mar: team found sign of an uncollared male, an uncollared female, and Rocky found sign of a female with one yearling

Block 9: Hunted 1 day

- 2 Feb: sign of uncollared female found by team
- 6 Mar: sign of uncollared female found by Rocky McBride

Block 10: No hunting

Block 11: No hunting

Block 12: No hunting

Addition Lands: 1 day

- 25 Mar: Roy McBride and BICY team recollared FP216

Within the study area, we documented the presence of 3 uncollared adult males, 11 uncollared (or failed collar) adult females, and 9 juveniles during our capture season and from confirmed reports throughout the year (Figure 5).

Synopsis of Monitored Panthers

We monitored 1 resident male, 1 juvenile male, 1 juvenile female, and 11 resident female panthers in our study area between 1 July 2012 and 30 June 2013. Figure 6 shows the geographical distribution of this year's SBICY panthers in relation to the entire monitored population. The SBICY study area accounts for 32**%** of both agency's reporting period locations. Those obtained within Big Cypress boundaries (all units, including Bear Island and the Addition Lands) represent 50**%** of both agencies' reporting period panther locations. Figures 7 and 8 depict the portions of Big Cypress inhabited by the monitored males and females respectively during the reporting period.

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. 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. We marked 2 kittens at her May 2011 den and 2 kittens at her December 2012 den. Her home range during the reporting period was 77 km^2 in the Deep Lake and Turner River Units (Figure 9).

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. In early July, she started denning and on 20 July 2008 we handled 3 kittens. She denned again in June of 2009, indicating that the kittens from the July 2008 den did not survive. We marked 2 kittens. We could not handle her during the 2009-10 capture work because her kittens were less than 12 months of age and her collar failed due to normal battery failure on 22 August 2010. On 19 February 2012, Rocky treed her and found her den nearby. We recollared her and marked her 4 male kittens. We returned to the original den after she relocated her den 200 meters away and found the remains of one of the kittens. We also found a living kitten and placed him near the den site FP153 was attending. FP153 has not shown signs of denning since her February 2012 den. Her home range in this reporting period was 78 km^2 in the Turner River Unit (Figure 10).

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. She started denning 9 days later and, on 25 February, we handled 3 kittens. One of them, 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 3 kittens. She had been observed on several occasions with 3 juveniles, the last date of which was June 6, therefore, she had successfully raised them to at least 13 months of age. In April 2012 she denned and we marked 4 kittens. She denned again in November, indicating that the kittens from the April den had died. We marked a male and a female at her November den. Her home range during the reporting period was 54 km^2 in the Turner River with occasional crossing of Hwy. 41 into the Stairsteps Unit (Figure 11).

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. Her mammary glands indicated that she had not previously lactated and, although her progesterone levels were high, her relaxin was negative. She gave birth that May, 83 day's 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 denned in April of 2009 and we handled 1 female kitten. In March 2010, FP162 denned again and we marked 3 kittens. In April 2011, FP162 denned again and we marked 4 kittens. On May 2, these kittens were killed in the Jarhead Fire. 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. We attempted on 2 occasions to collar her, however, she was too high in the trees for a safe capture. In June 2012, she denned and we marked 2 kittens. FP162's home range during the reporting period was 99 km^2 in the Turner River Unit (Figure 12).

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. He also documented FP180 and another juvenile in the vicinity. Later that month, Annette observed FP180 walking with 2 kittens during a panther location flight. We, therefore, missed that den. FP180 denned in July 2012 and we marked 3 male kittens at that den. Her home range during the reporting period was 57 km^2 in the Deep Lake Unit (Figure 13).

FP182

FP182 (K279) was born on 10 February 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 in April 2011 when she was 26 months of age. We marked 4 kittens on April 29. She likely lost those kittens, based on the presence of adult male tracks near the den and her movements at the end of May. FP182 denned again in April 2012 but we were unsuccessful in marking the kittens since she rarely left the vicinity during the day and she apparently moved the kittens among the small islands of the area. (On 12 September 2012, Roy McBride documented her sign with 2 kittens.) FP182 was in the same location south of Hwy. 41 on the December 7 and 10 flights but not in mortality. On December 11, she was found dead 60 meters south of Hwy. 41 within the Roadside Animal Detection System (RADS) Zone. Efforts to document, through trail cameras, the presence of the kittens, then 9 months of age, were unsuccessful. Her necropsy indicated collision with a vehicle. Her lifetime home range was 65 km^2 in the Turner River Unit with occasional Hwy. 41 crossings into the Stairsteps Unit (Figure 14).

FP187

Male panther FP187 was first collared on 5 February 2011 in the Turner River Unit. He was estimated at 7 years of age. He was treed on 5 occasions this past capture season but was too high for handling. His home range during the reporting period was 418 km^2 in the Turner River Unit (Figure 15).

FP190

Female panther FP190 was first collared on 14 February 2011 in the Corn Dance Unit. She 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. She denned in April 2012 and 3 kittens were marked at the den. Her collar failed in the third week of December 2012. Her home range during the first 6 months of the reporting period was 113 km^2 in the Corn Dance Unit (Figure 16).

FP191

Female panther FP191 was first collared on 26 February 2011 in the northeastern Turner River Unit. She was known to be 12 years of age because she had been 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. She denned in March 2012 and we marked one male kitten. She returned to the den but lack of den attendance indicated that the kitten had died. She denned again in June 2012 and we marked 1 female kitten. Her home range during the reporting period was 117 km^2 in the Turner River Unit (Figure 17).

FP192

Female panther FP192 was first collared on 28 February 2011 in the Corn Dance Unit. She was known to be 1 year, 8 months of age because 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 denned in March 2012 and we marked 3 kittens. Between September 10 and 19, she showed signs of denning, however, we found no kittens when we checked the site on September 21. We did find fresh bear scat at the site. FP192 denned again in February 2013 and we marked 2 male kittens. Her home range during the reporting period was 140 km^2 in the Corn Dance Unit (Figure 18).

FP214

This female panther, estimated between 3 and 4 years of age, was collared on 22 February 2012 in the Turner River Unit. We have not documented her denning in the 2 years we have monitored her. Her home range during the reporting period was 77 km^2 in the Turner River Unit (Figure 19)

FP216

This male panther, estimated at 1 to 1.5 years of age, was collared on 11 March 2012 with a GlobalStar satellite collar. He inhabited the Turner River Unit until mid-February at which time he began dispersing. His collar was only sending occasional locations and an unknown signal within his collar's range was mistakenly thought to be his collar failing, so his whereabouts were unknown until he was photographed by a trail camera under an underpass on S R 29. He was then located in the Bear Island Unit and recollared on March 25 by the BICY team. He did not return to the SBICY study area, so FWC initiated monitoring in April. During the 7 months of the reporting period, his area of use encompassed 313 km^2 in the Turner River and Deep Lake Units, followed by dispersal into the Bear Island and Addition Land Units (Figure 20).

FP220 and FP221

FP220 was first collared on 4 February2013 in the Turner River Unit. She had first been handled as FP93's kitten in February 2007 so was known to be 6 years of age. Two weeks later on February 22, we collared FP220 and soon learned via monitoring that she

was the daughter of FP220. We estimated FP221's age at 9 to 10 months of age based on tooth eruption. They were located together through the remainder of the reporting period. FP220 and FP221 were located separately starting in November when FP221 was estimated to be 18 months of age. Their area of use during the reporting period is shown in Figure 21.

The average home range (95% MCP) of the 1 resident male was 418 km^2 and that of the 10 resident females was 84 km^2.

Reproduction

Eleven breeding age female panthers were monitored during the reporting period and 4 of them denned. We checked 5 dens and marked 9 kittens, 6 males and 3 females, with transponders. It is possible that some dens were missed between January and July since we located the panthers only 23 days during that time period.

FP	Birthdate	Male	Female	Unit
180	20 July 2012	3	0	Deep Lake
192	Sept 2012	0	0	Corn Dance
161	26 Nov 2012	1	1	Turner River
151	17 Dec 2012	0	2	Turner River
192	26 Feb 2012	2	0	Corn Dance

Mortality/Injuries

Three adult panthers were killed by vehicles in the study area during the reporting period (Figure 20). Two uncollared yearling panthers were killed on S R 29. On 8 October 2012, a male (UCFP 175) was killed 2.7 km north of Hwy .41 and on 14 November 2012, a female (UCFP178) was killed 2.4 km south of I-75. On 11 December 2012, radio-collared adult female FP182 was retrieved south of Hwy 41 within the Roadside Animal Detection Zone in Ochopee. She had been located there 3 days earlier but not in mortality, so she likely initially survived the collision, but eventually died. She was raising two 9-month-old young who would not have been able to survive on their own.

Their presence was not documented at the site. This is the 11th documented vehicle collision with a panther within the recommended 2-mile wildlife underpass project area that was abandoned due to public and tribal opposition.

Project Benefits

The efforts from the past 25 years of panther survey and monitoring work, 18 years of panther reproductive assessment, and 12 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

Reinstate Funding for Logistical Support of Capture Work

In the fall of 2012, management staff at Big Cypress sought to lessen costs by reducing the number of panther monitoring flights. Early in 2013, the National Park Service ended its contract with Speed Aviation and endeavored to meet our monitoring needs through acquisition of a government-owned aircraft and pilot. The NPS plane, however, proved not airworthy and a government pilot was not hired. Federal "sequestration" further impacted our ability to conduct a productive capture season. Because we could not fly to locate the resident male, we were unable to cast the hounds where they didn't cross his previous night's travels. We inadvertently treed him 5 times, thus wasting 5 hunting days. We were not able to monitor panthers immediately post-capture to assess their recovery. We also did not have the funding to make off-road vehicle repairs, necessary to provide transportation for the capture team and gear. The result was an unproductive capture season and frustrated team members, including NPS veterinarians and volunteers who devote their time each year to the capture effort. We recommend that panther capture work receive the funding and support it needs to be as efficient and productive as possible. A reduction in the number of panthers monitored annually will lessen agency staff's ability to make science-based management decisions and detect impacts to the population.

Turner River Crossing

A recommendation was made 8 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 and site of chronic panther mortality. Defenders of Wildlife, along the USFWS, obtained funding for the planning stages of the crossing project in 2006, however, public and tribal opposition resulted in project abandonment. So far, 9 panthers have been injured or killed in the past 18 years at this site. Every radio-collared female, except for FP161, that has had this site within her home range, has been killed there. This year FP182 was killed there on December 11 and it is likely that her 9-month-old offspring did not survive on their own. The experimental technology, a Roadside Animal Detection System (RADS), was installed in the area 2 years ago and is still in the refinement phase. It is recommended that, if further panther mortality occurs in this area, construction of a wildlife underpass be vigorously pursued by the agencies as a solution to this site of chronic panther mortality.

State Road 29: Another Site of Chronic Panther Mortality

State Road 29 is a heavily traveled north-south road that bisects large public land areas in south Florida. Since 1979, 45 panther deaths have been verified on this road, including 13 which occurred in the 20-mile section between Big Cypress and Fakahatchee Strand Preserve State Park. Two of these deaths occurred this year (Figure 22). 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 (Jansen et al 2010). 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.

Acknowledgments

Although this report is authored by Big Cypress staff Deborah Jansen, John Kellam, and Annette Johnson who conduct panther research and monitoring throughout the year, this work would not have been accomplished without the other team members, namely Ralph Arwood, Dennis Giardina, Kevin Castle, Jenny Powers, and Rocky McBride. We also acknowledge Reg Reisenbichler, volunteer-in-the-park, who provided valued assistance in all aspects of the project this year. Thanks every year go to Big Cypress staff who support us in many ways, especially Dave Adams and Dave Putnam, who would have kept our buggy wheels turning had we had the funding for vehicle repairs.

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Table 1. Florida panthers captured and radio-collared in BICY in 2013.

FP#	K#	Capture Date	Gender	Age (yrs)	Type	Capture Location	
						Easting	Northing
220		February 4	F	6	resident	472616	2871801
221		February 22	F	~10 mos.	juvenile	479929	2880325
216		March 25	M	~2	disperser	483311	2898173

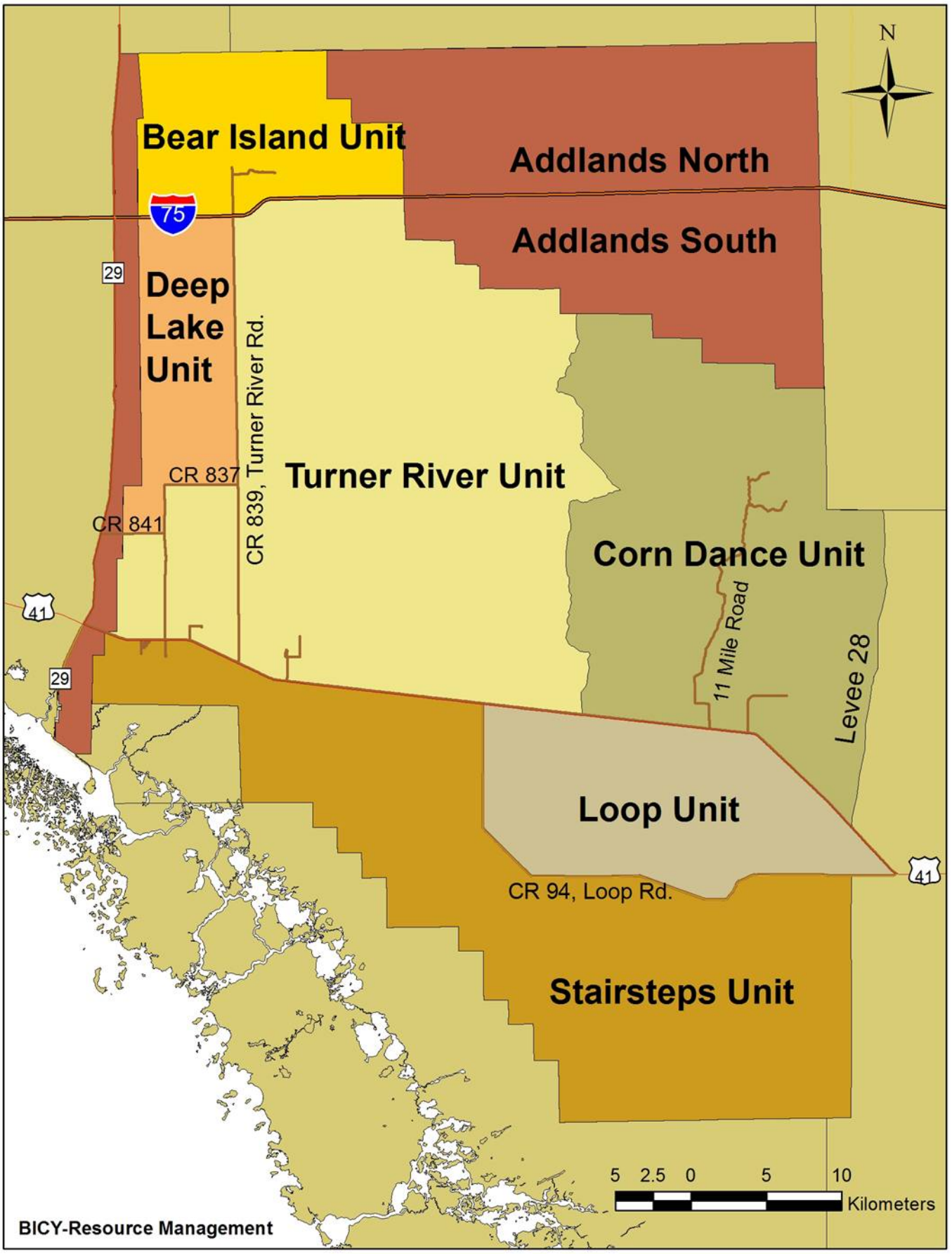

Figure 1. Management units and roads in Big Cypress National Preserve.

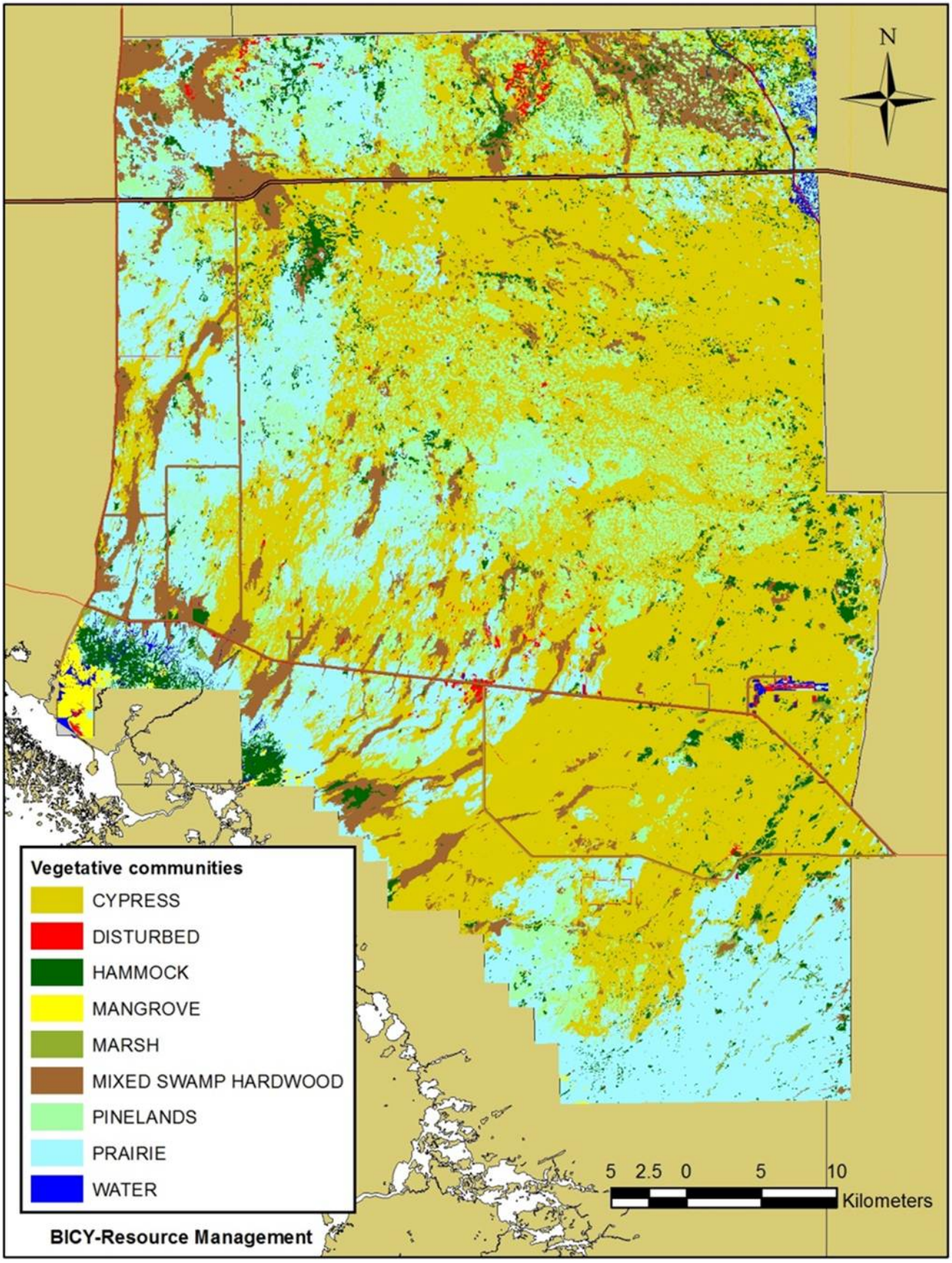

Figure 2. Vegetative communities in Big Cypress National Preserve.

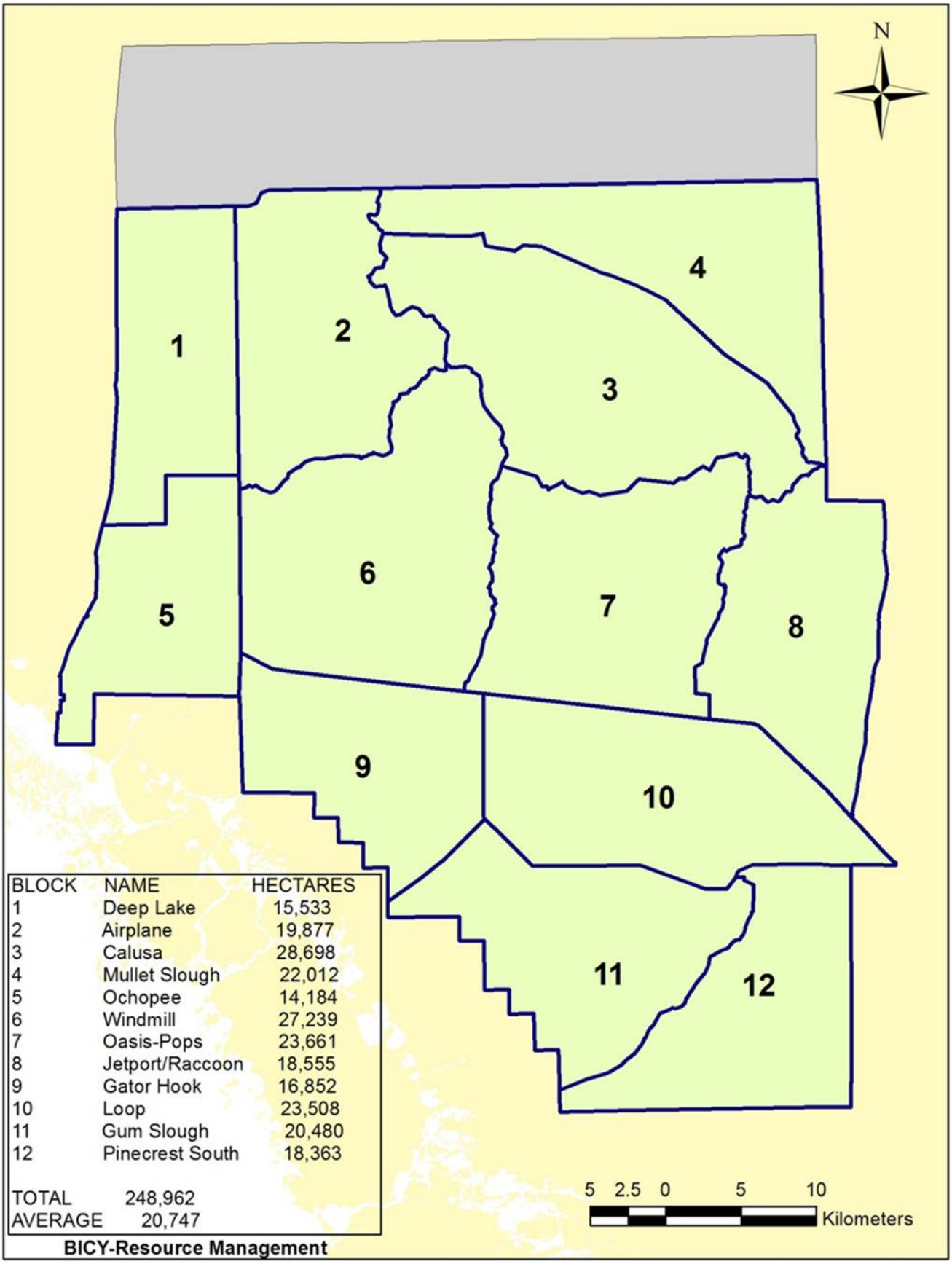

Figure 3. Panther survey blocks in SBICY.

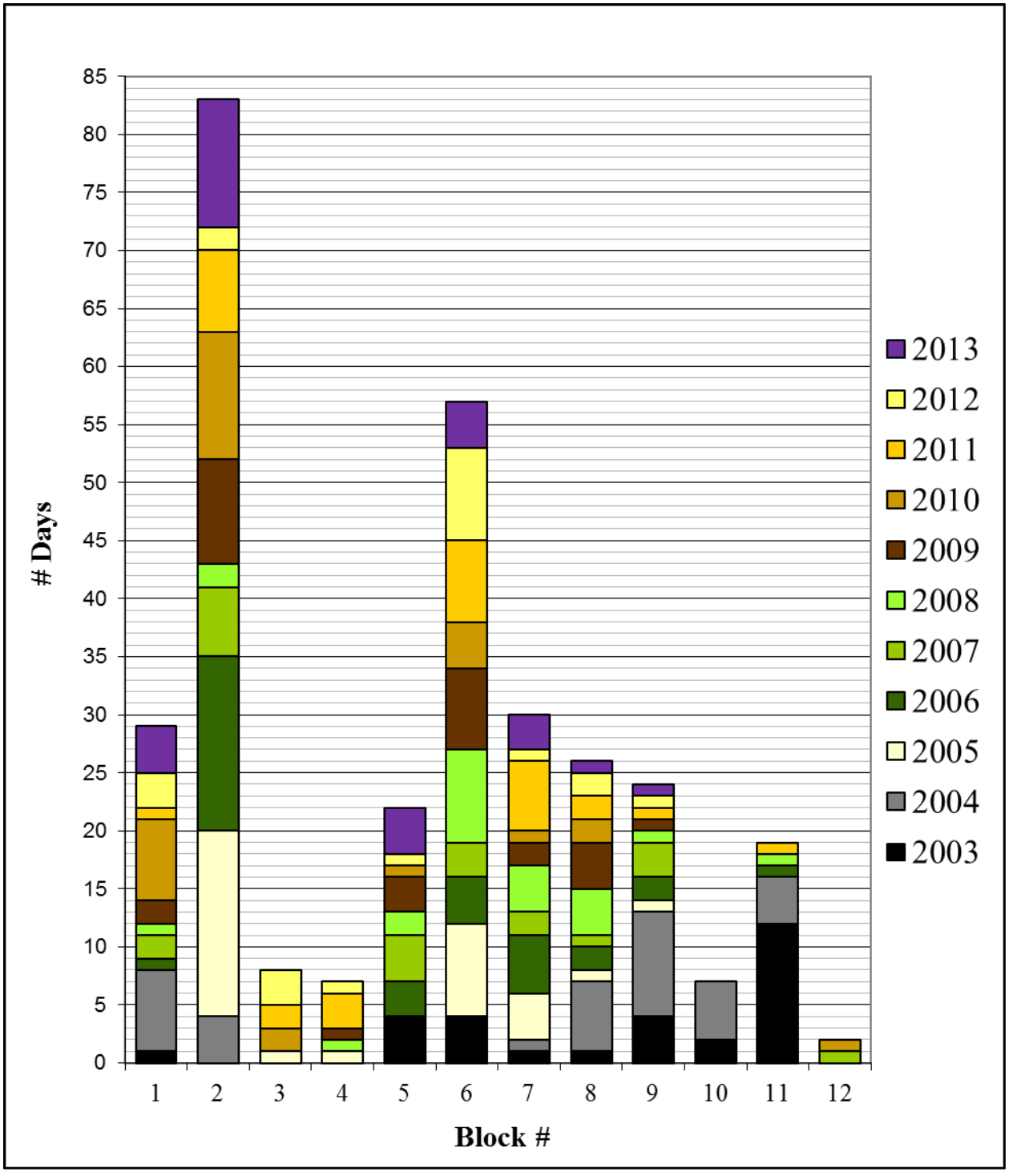

Figure 4. Panther capture effort per survey block: 2003 – 2013.

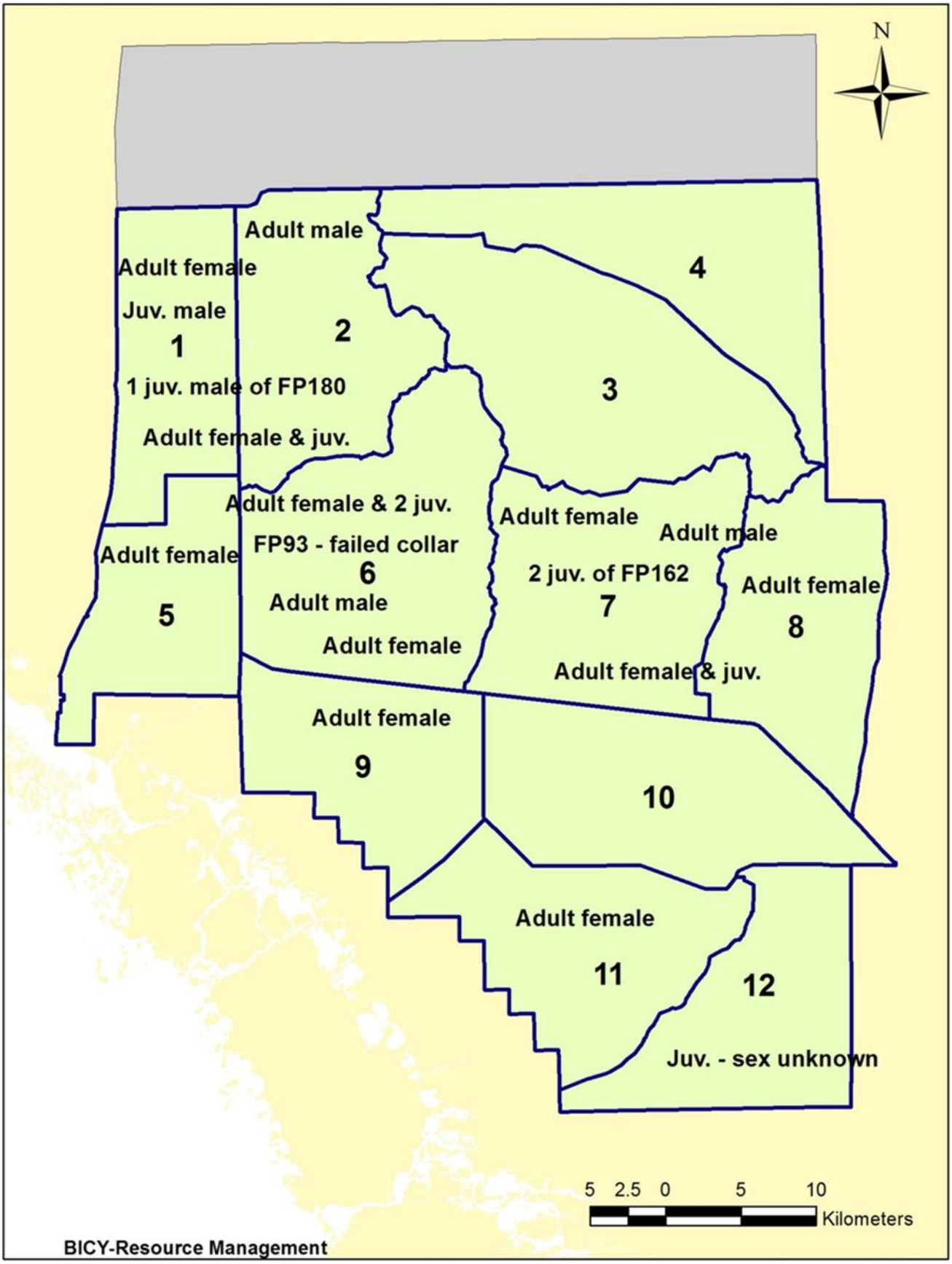

Figure 5. Documented presence of uncollared (or failed collar) panthers in SBICY from July 2012 - June 2013.

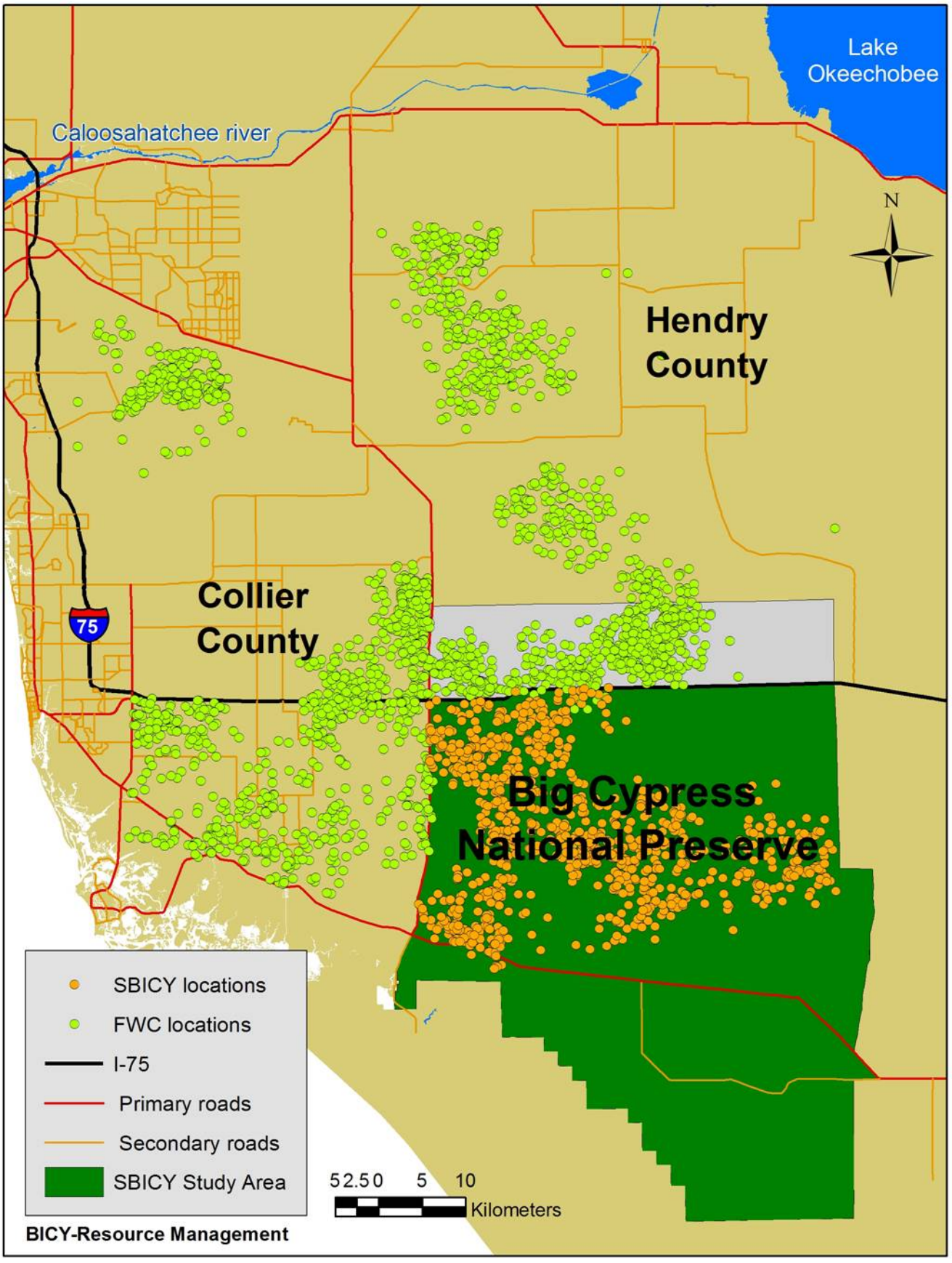

Figure 6. Geographical distribution of all Florida panther telemetry locations from July 2012 -June 2013.

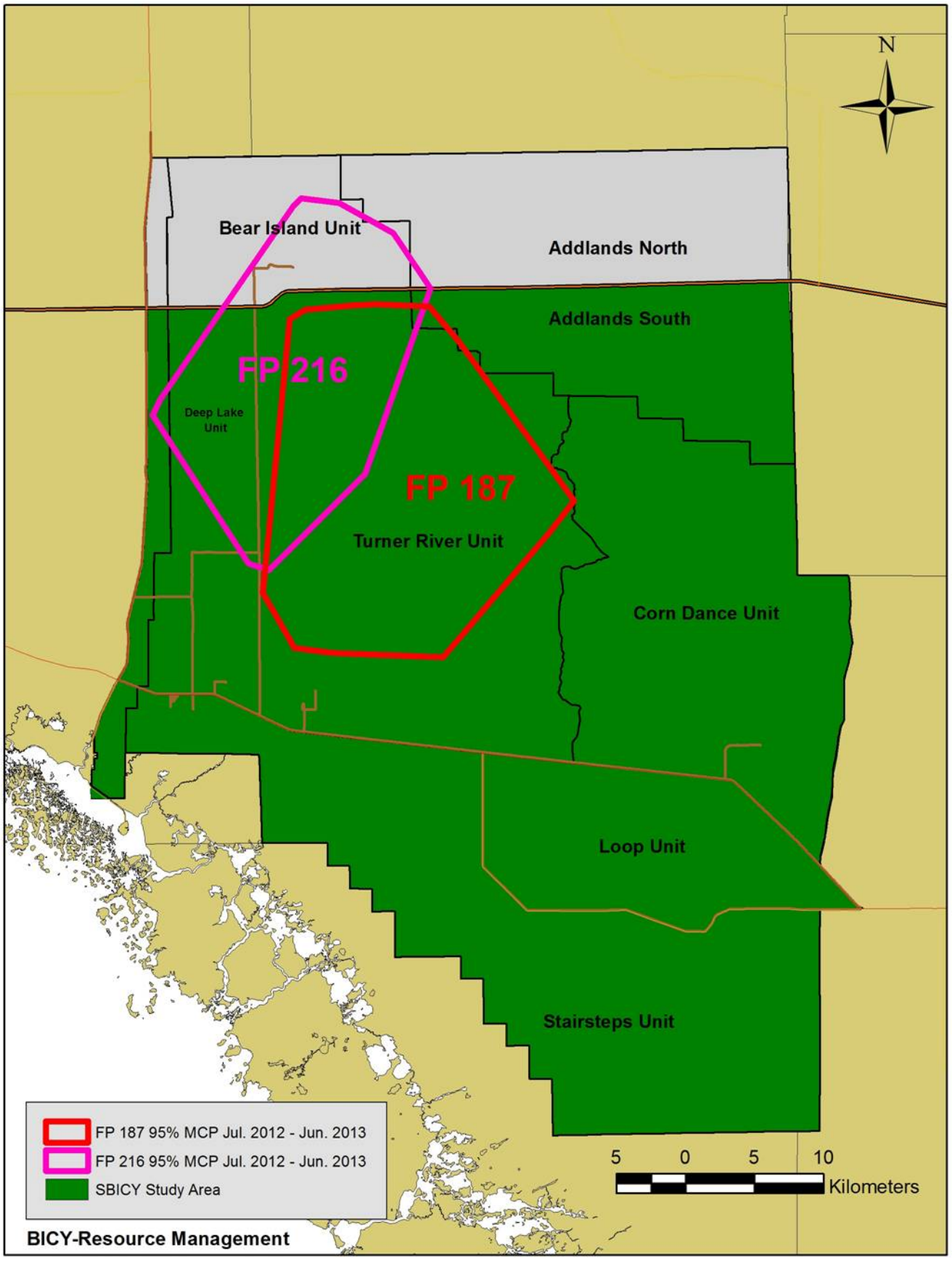

Figure 7. Home ranges and areas of use of adult male Florida panthers monitored in SBICY from July 2012 - June 2013.

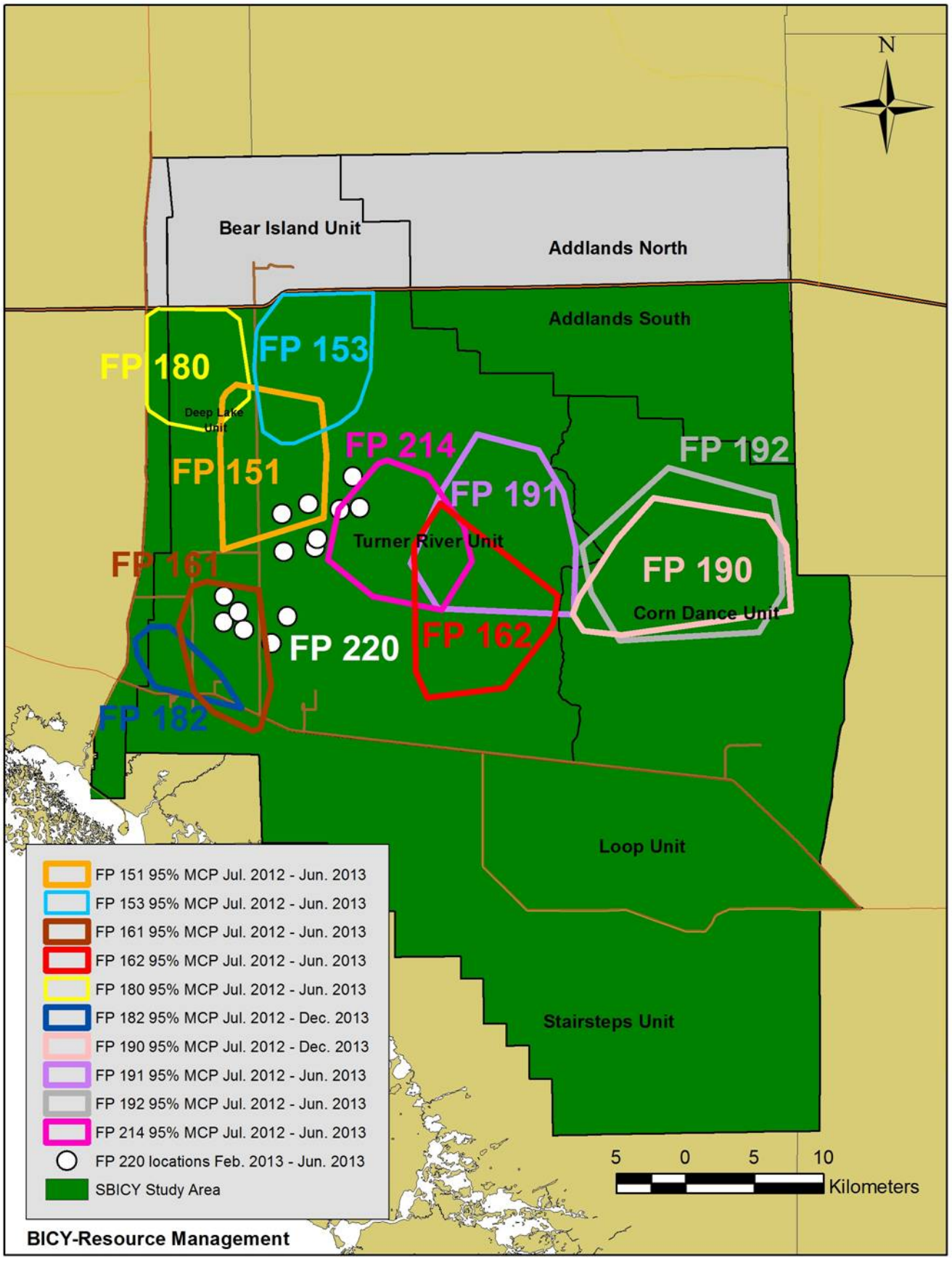

Figure 8. Home ranges and locations of adult female Florida panthers monitored in SBICY from July 2012 - June 2013.

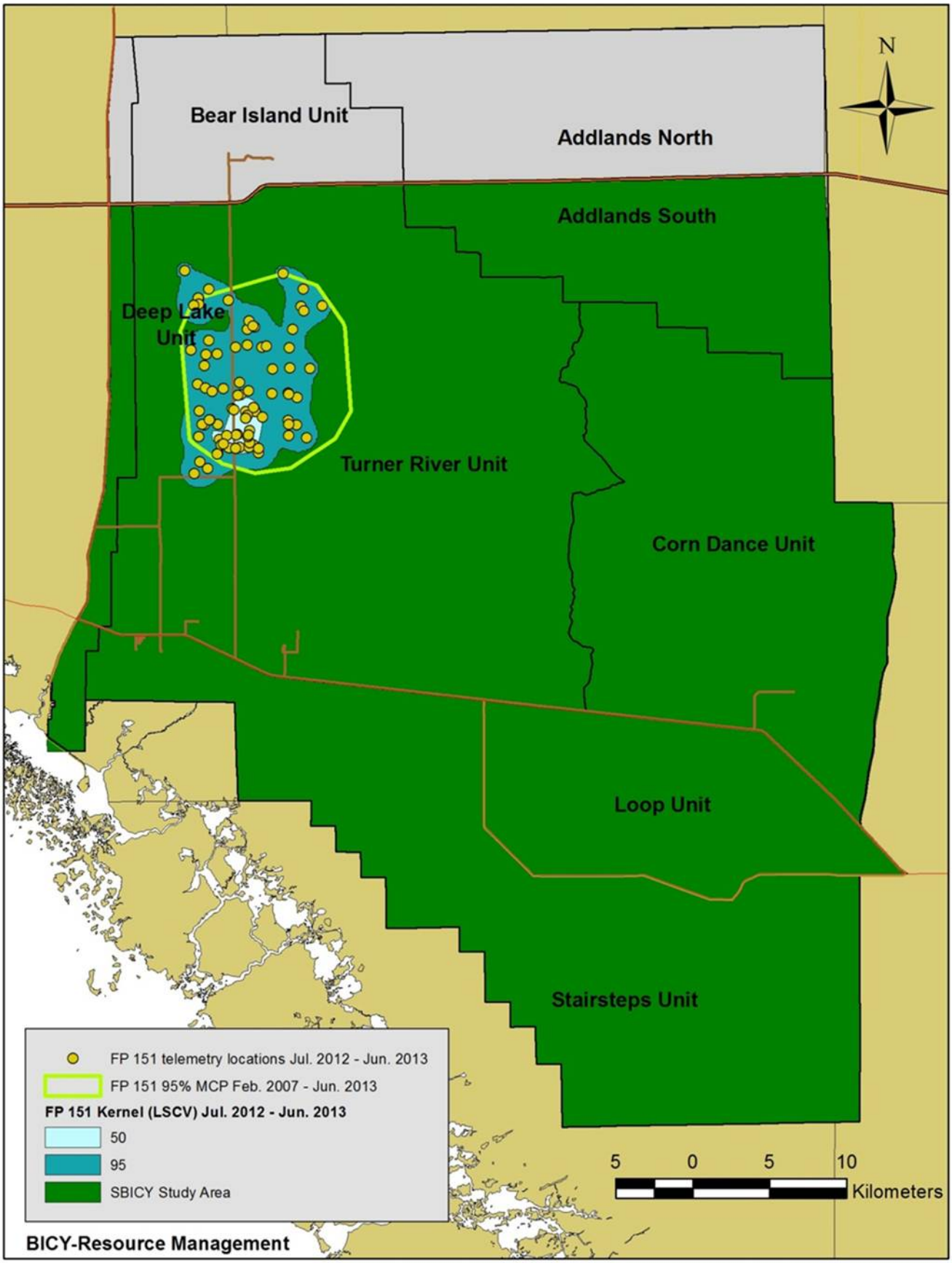

Figure 9. Home range of female Florida panther #151.

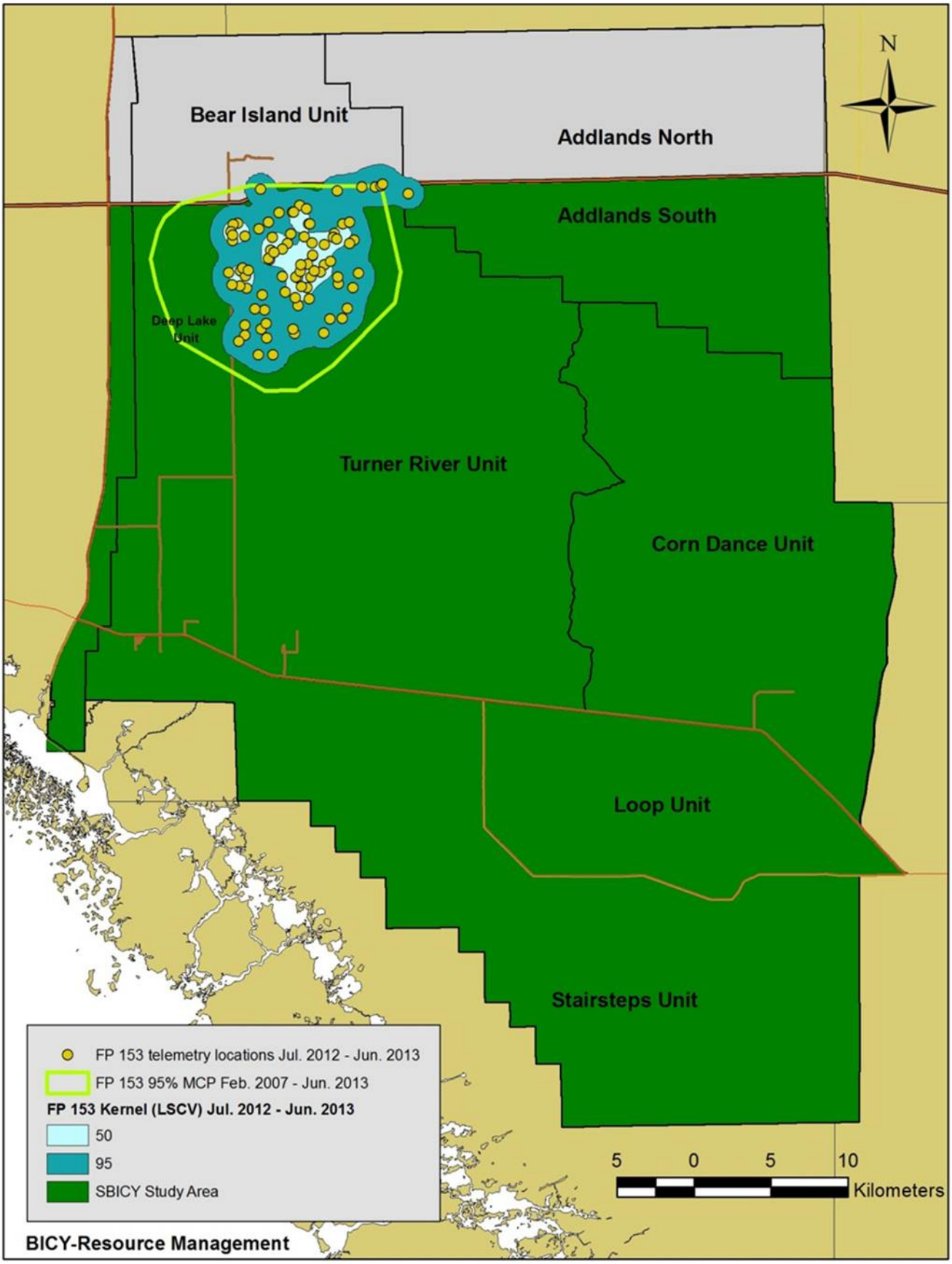

Figure 10. Home range of female Florida panther #153.

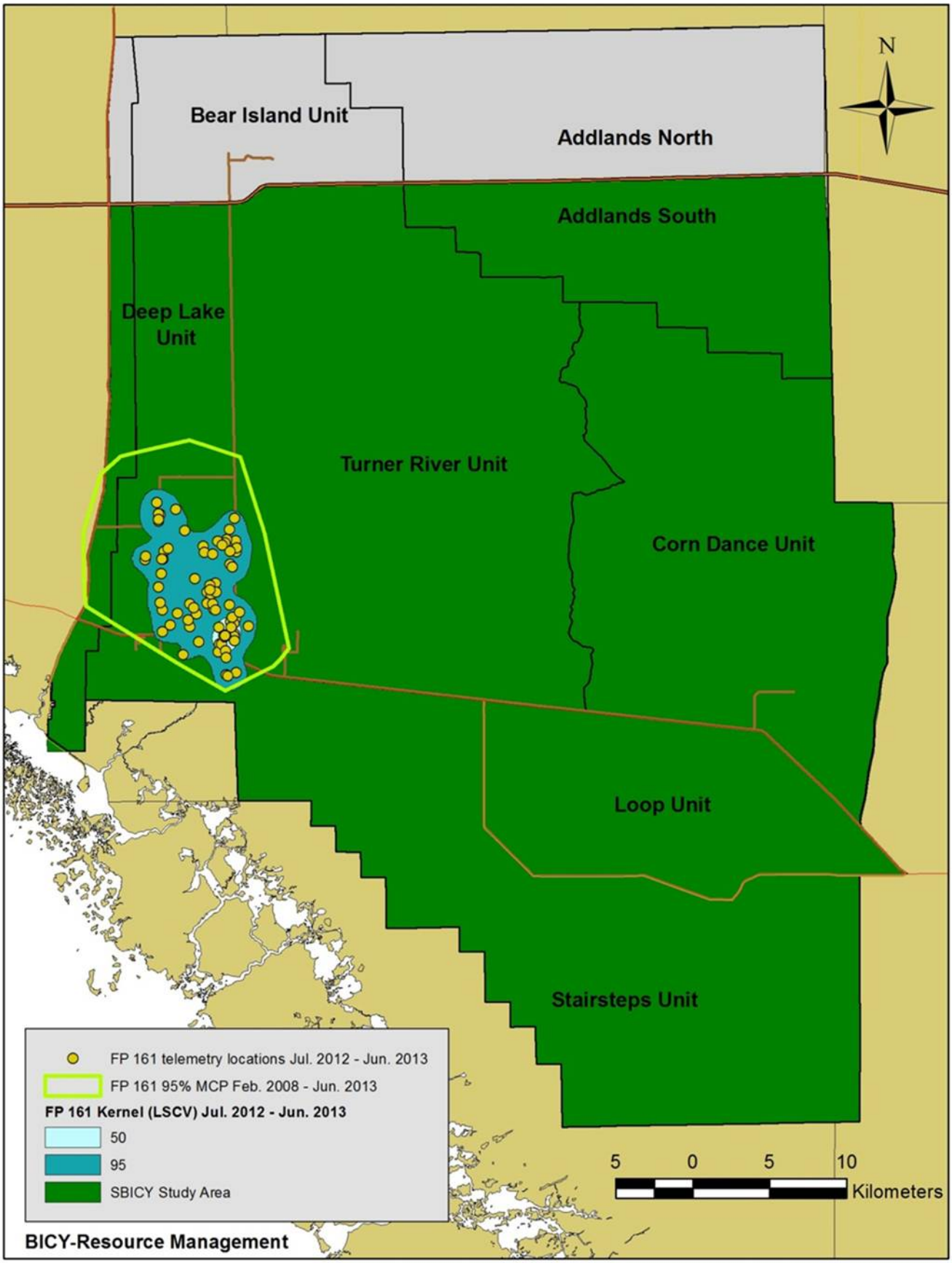

Figure 11. Home range of female Florida panther #161.

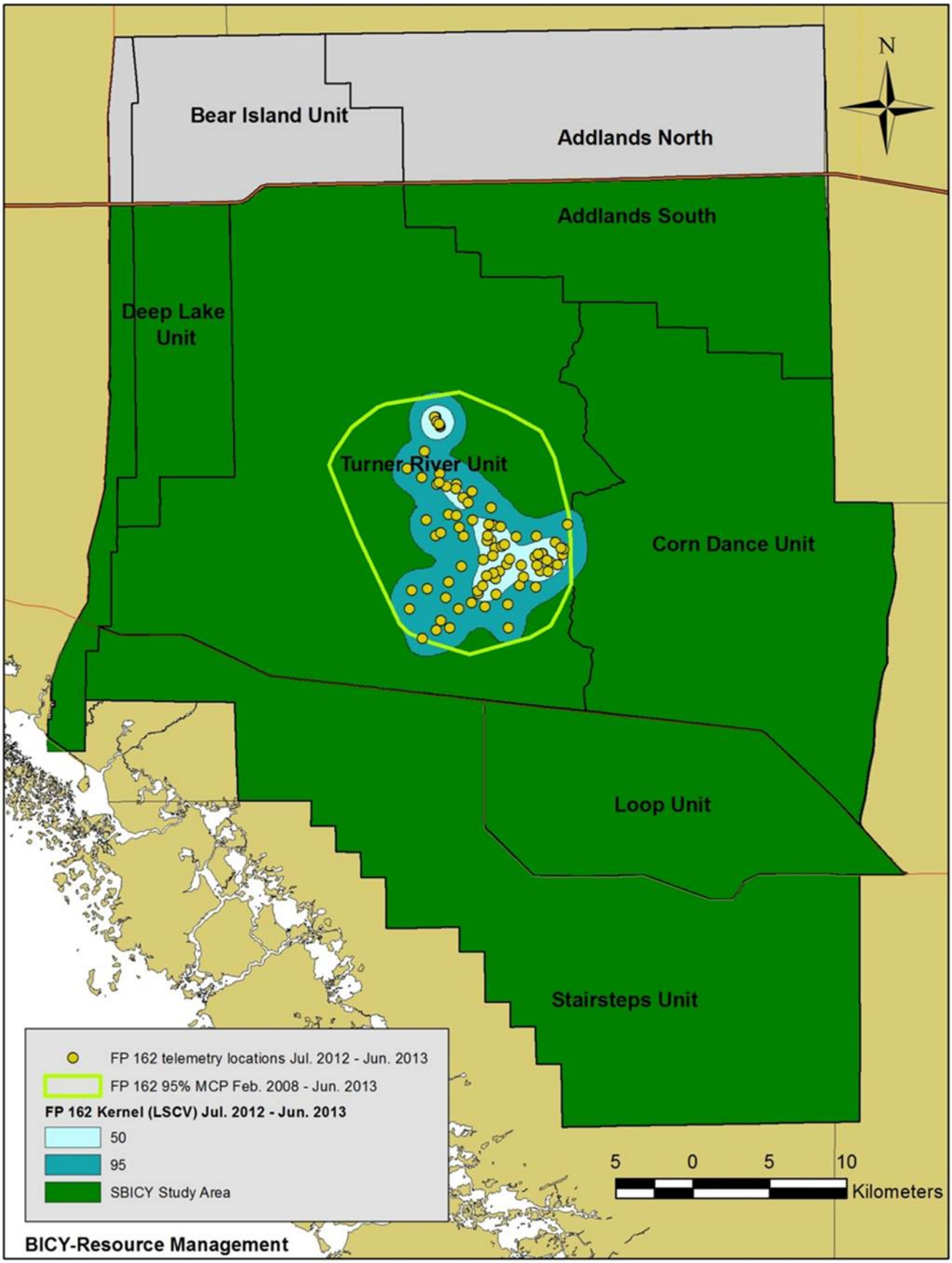

Figure 12. Home range of female Florida panther #162.

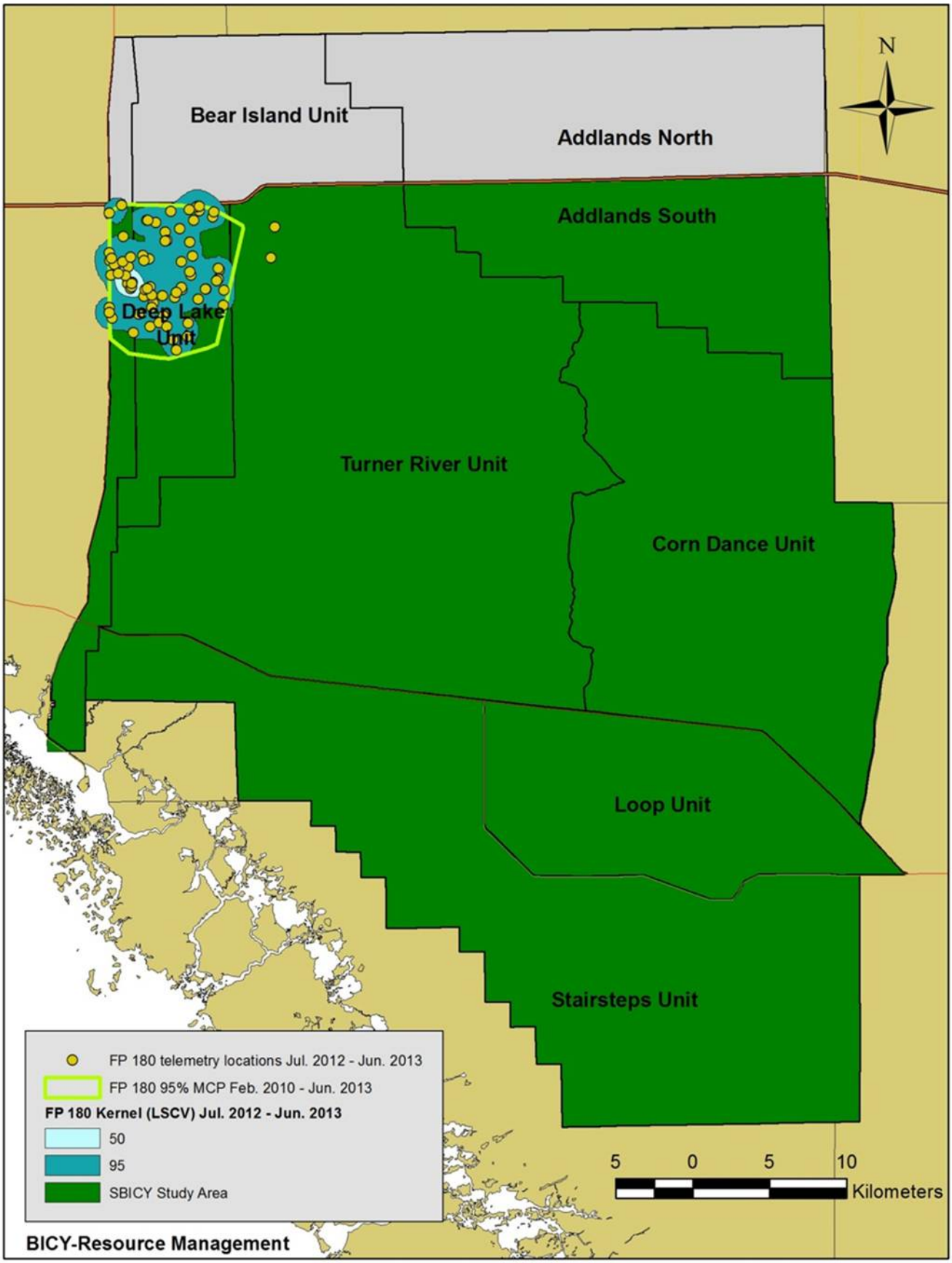

Figure 13. Home range of female Florida panther #180.

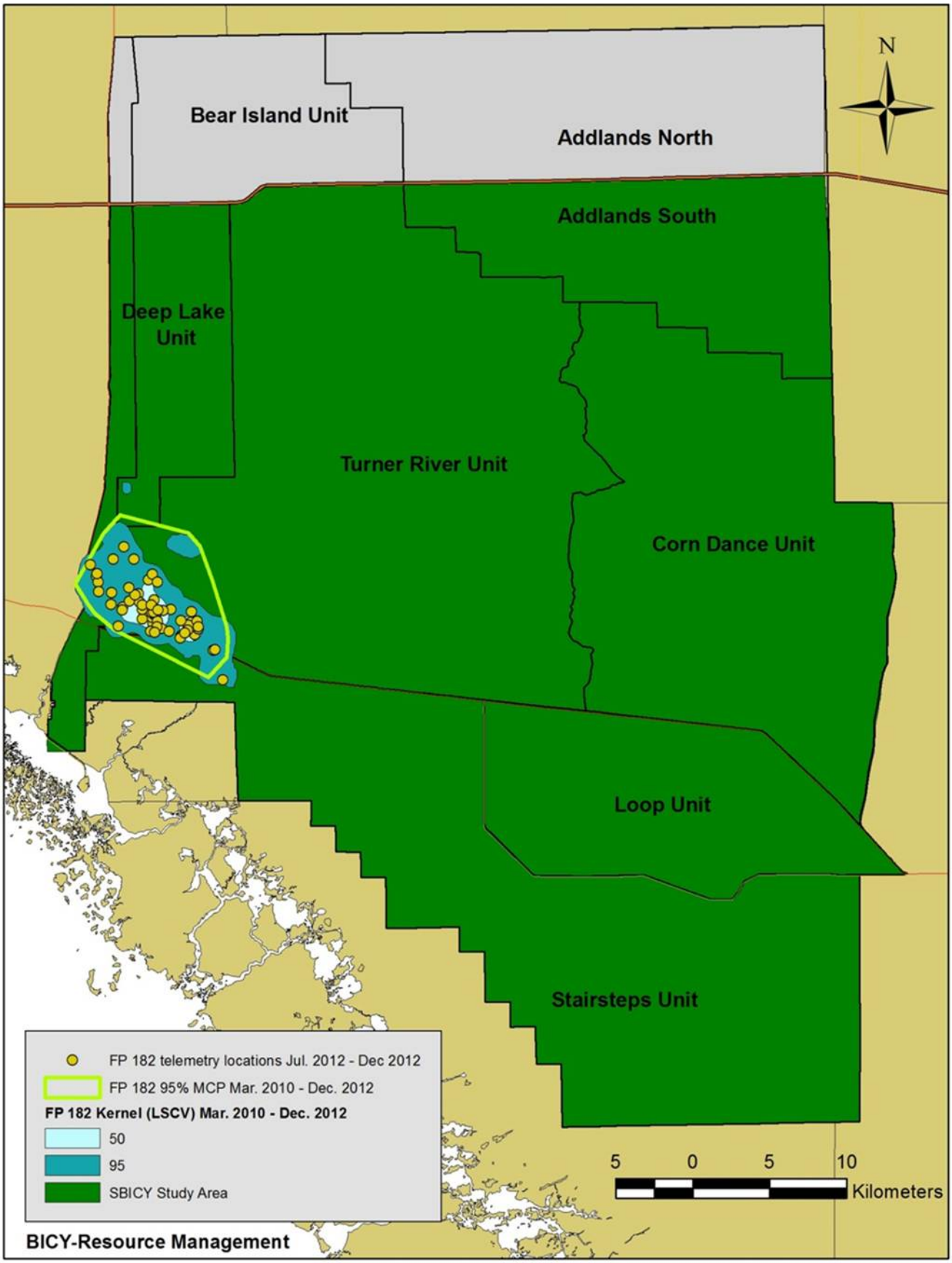

Figure 14. Lifetime home range of female Florida panther #182.

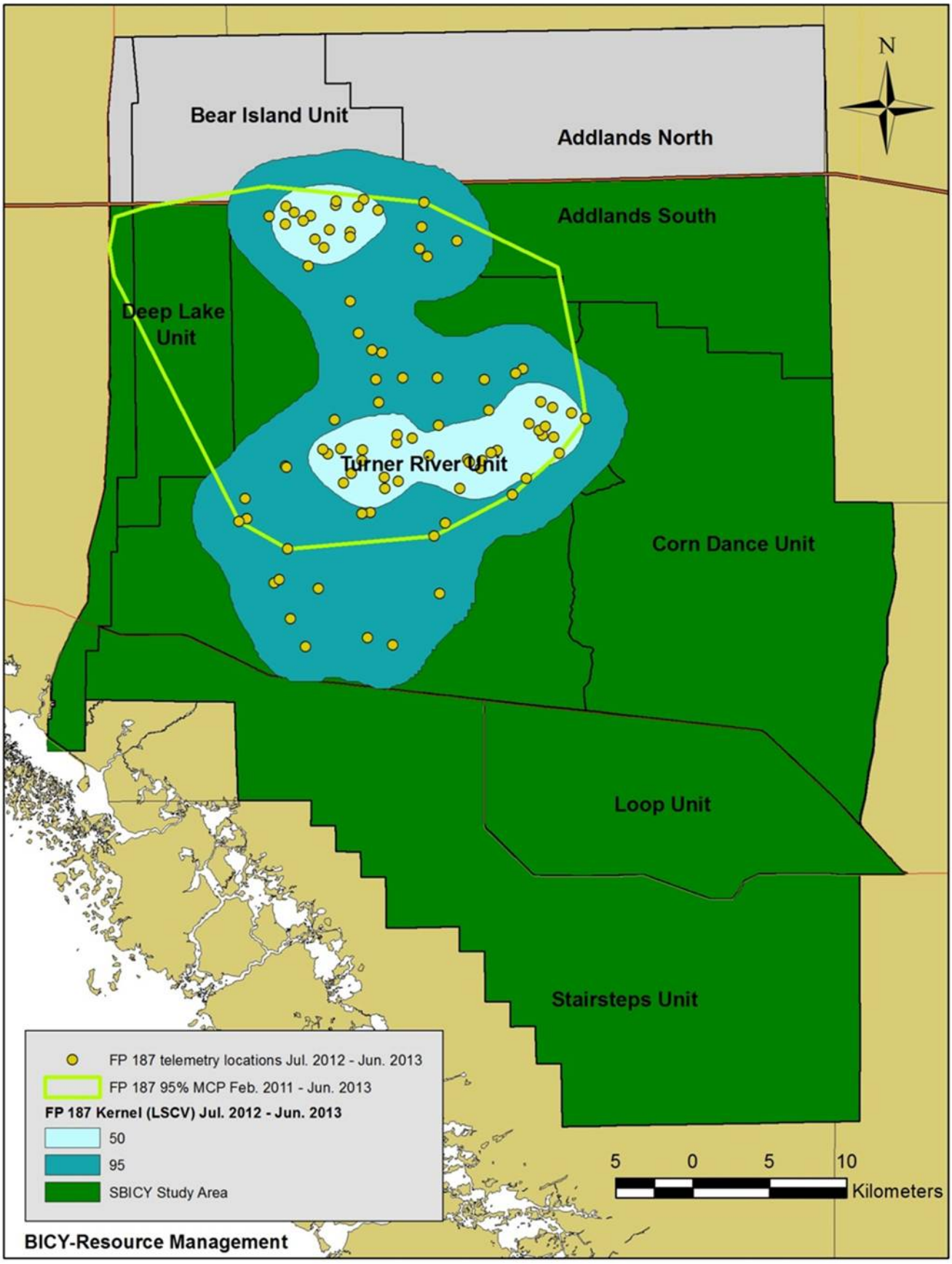

Figure 15. Home range of male Florida panther #187.

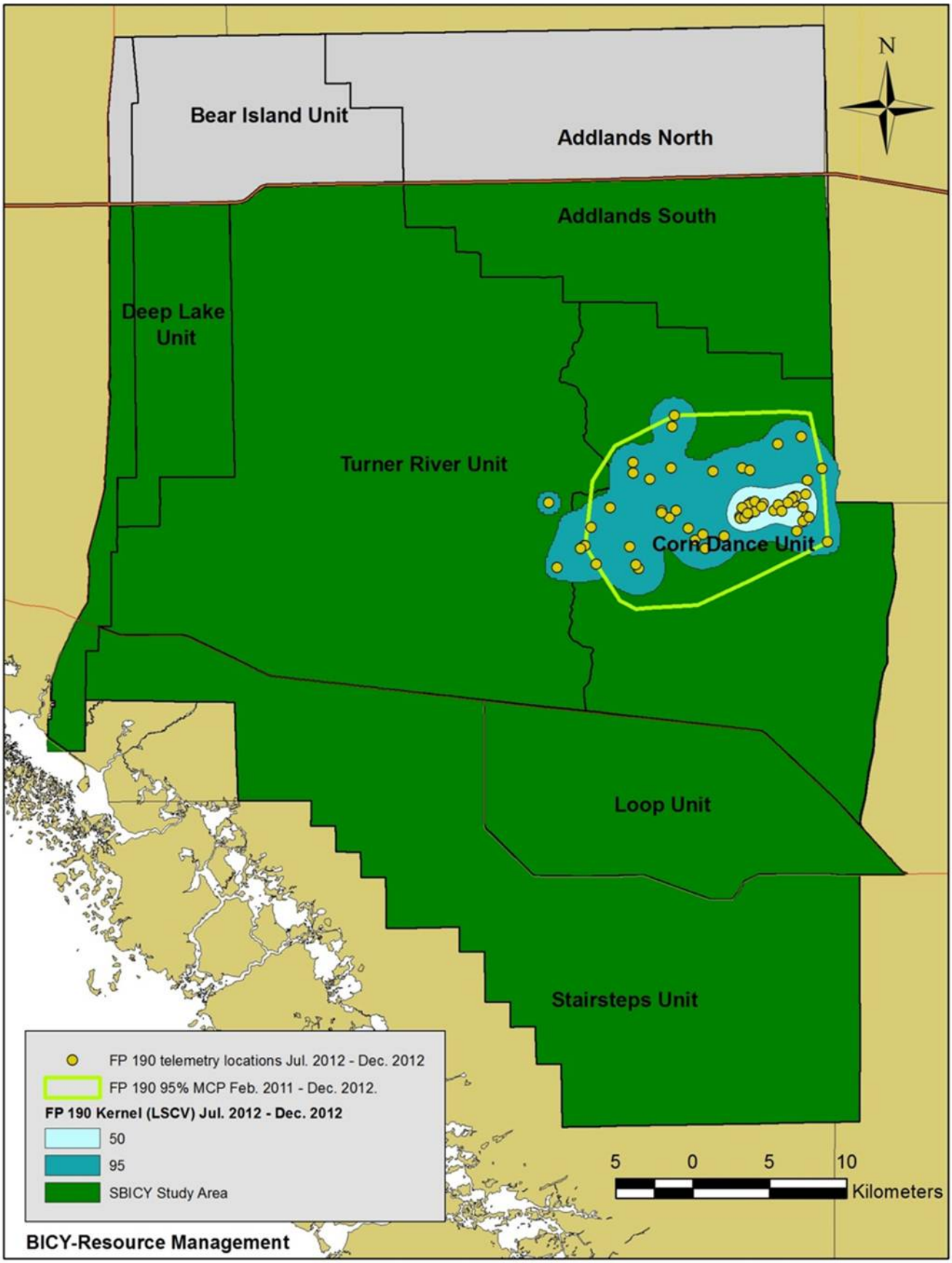

Figure 16. Home range of female Florida panther #190.

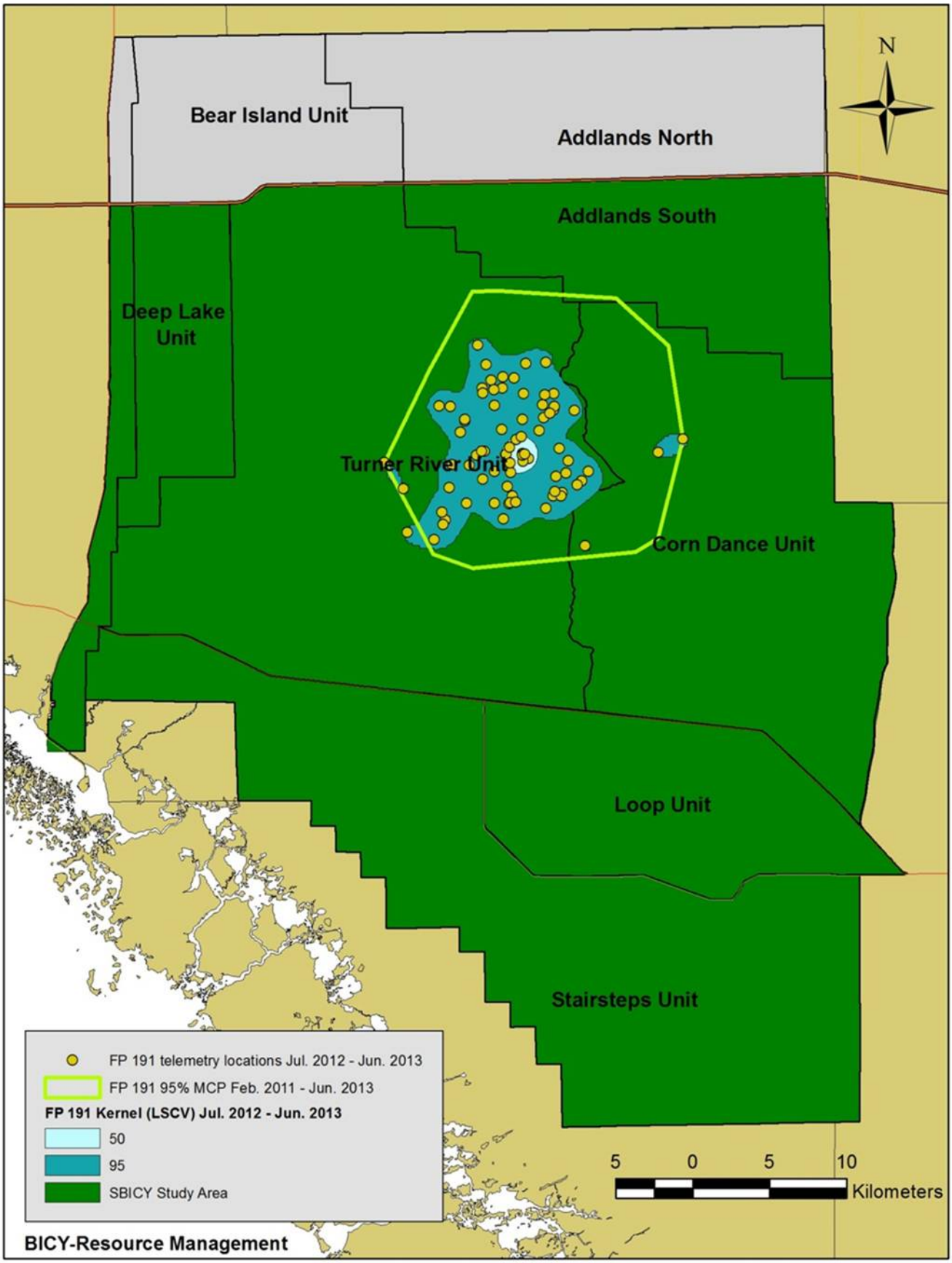

Figure 17. Home range of female Florida panther #191.

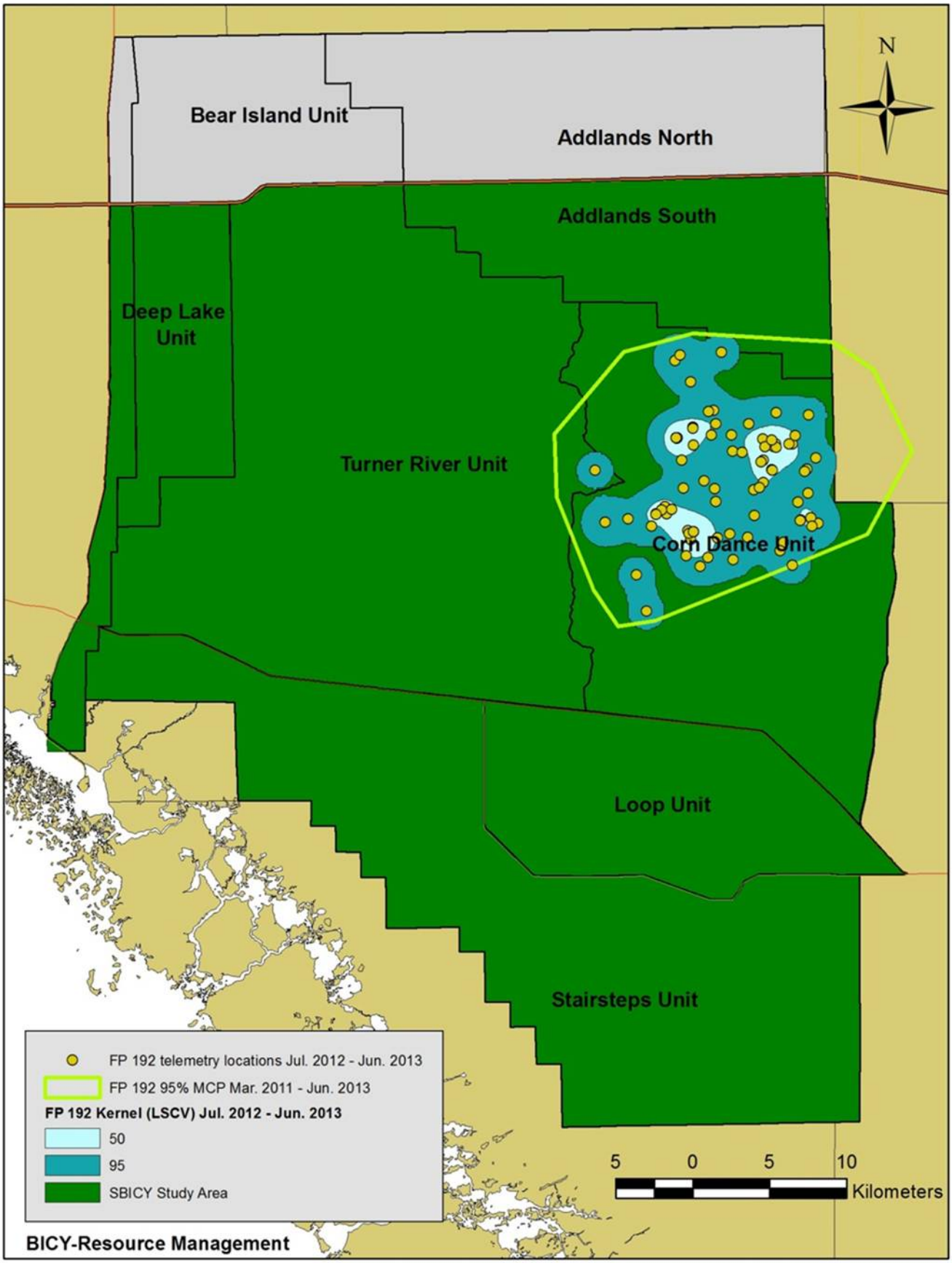

Figure 18. Home range of female Florida panther #192.

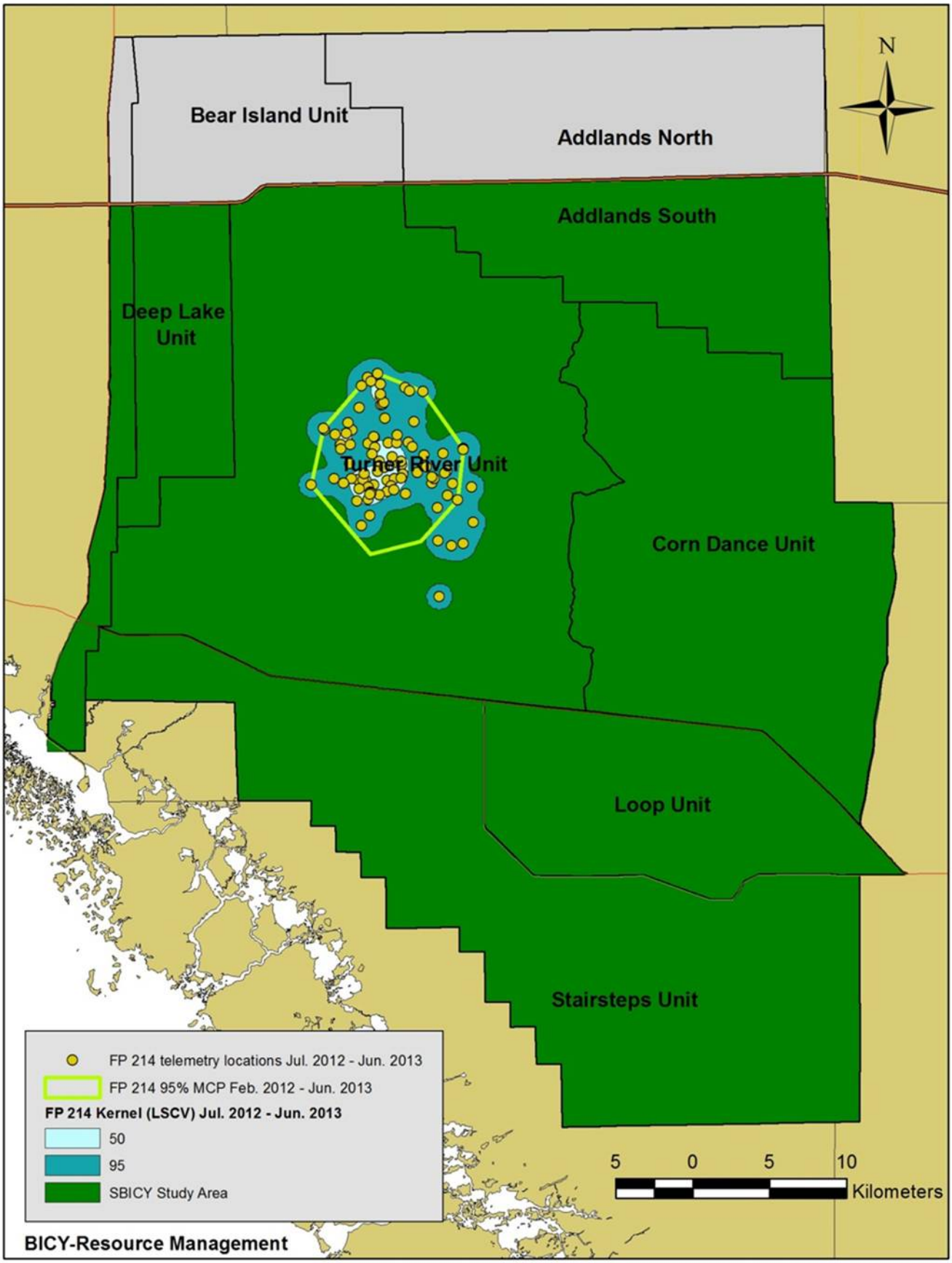

Figure 19. Home range of female Florida panther #214.

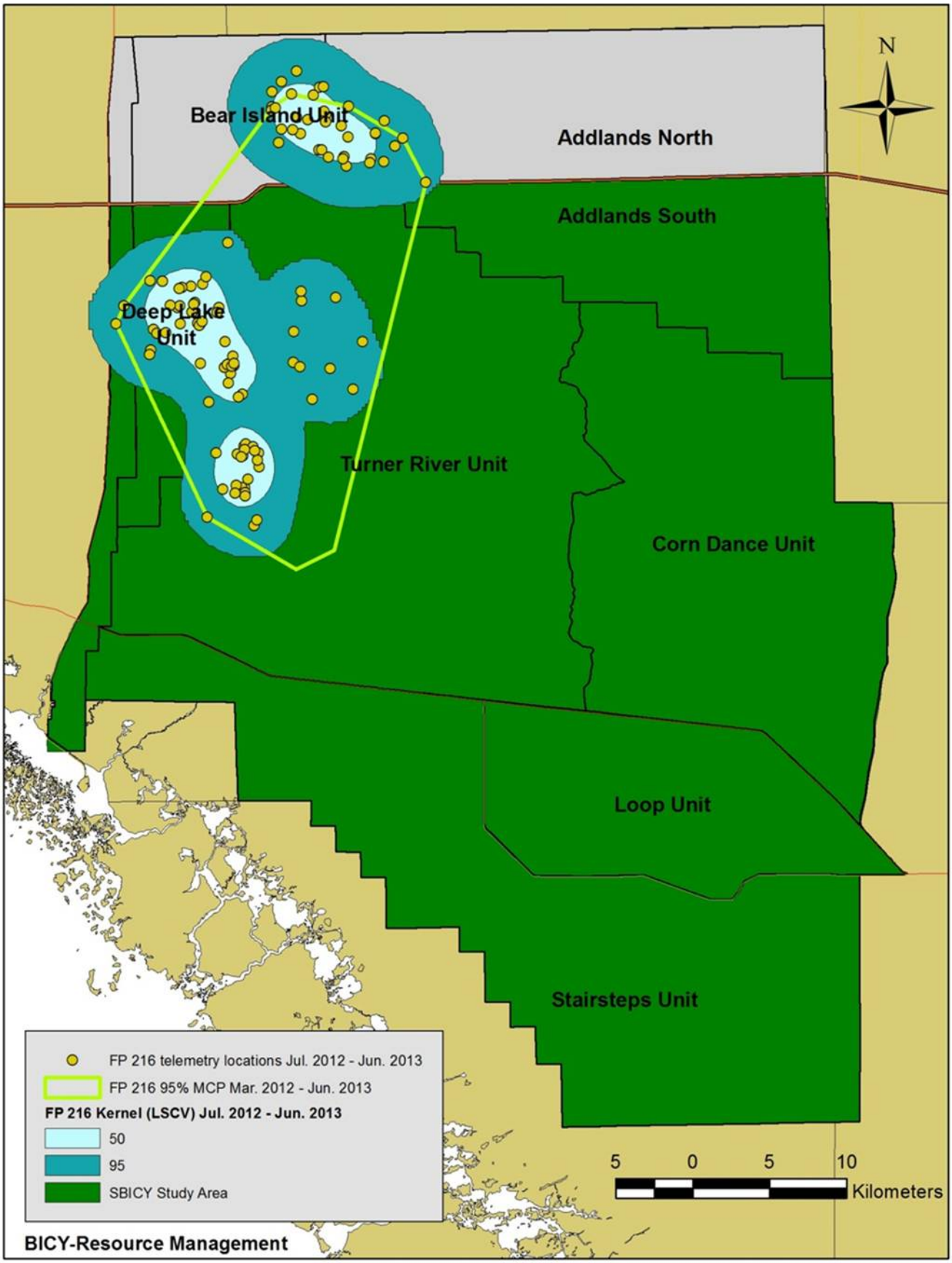

Figure 20. Area of use of male Florida panther #216.

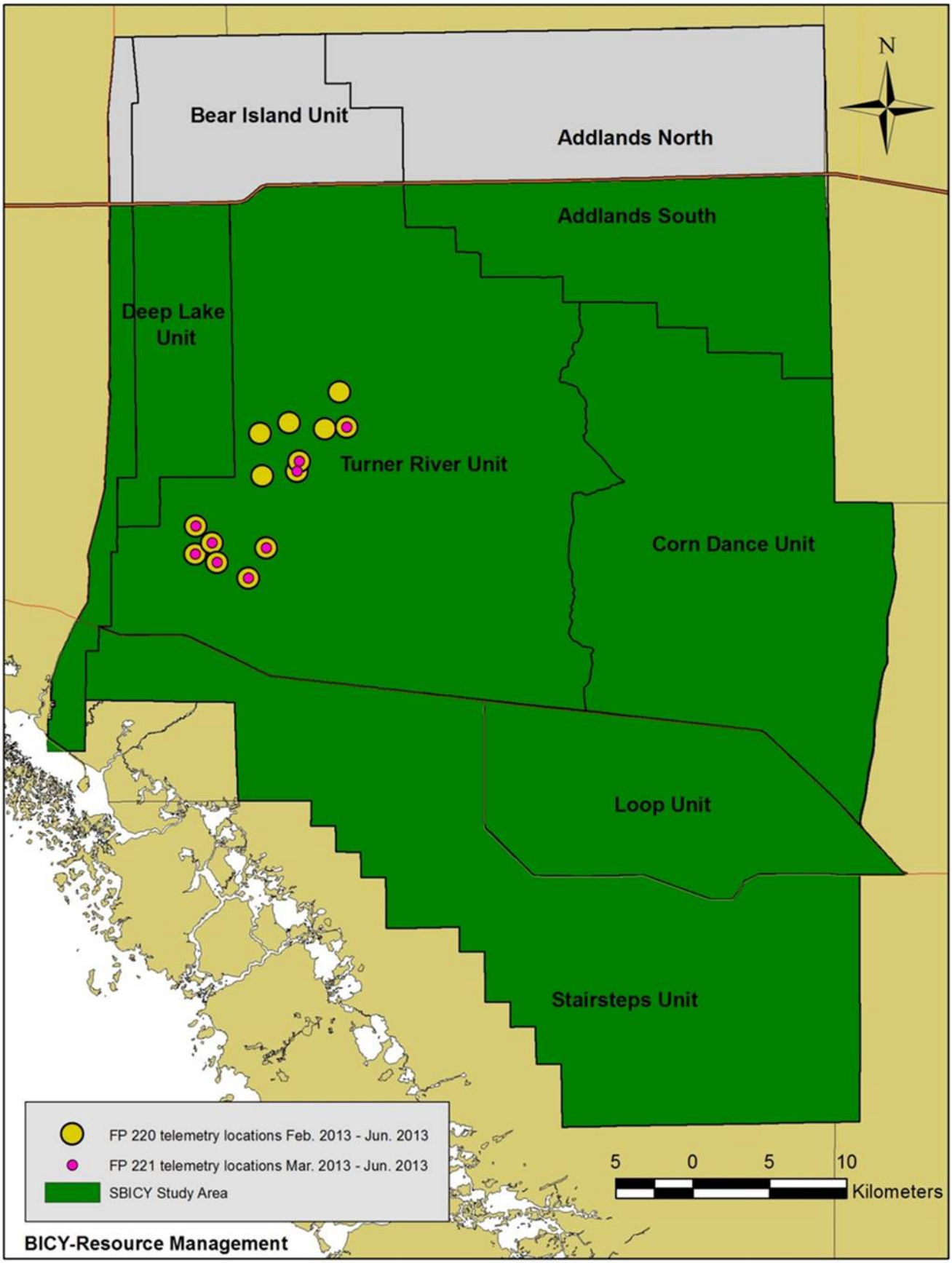

Figure 21. Area of use of female Florida panther #220 and her juvenile #221.

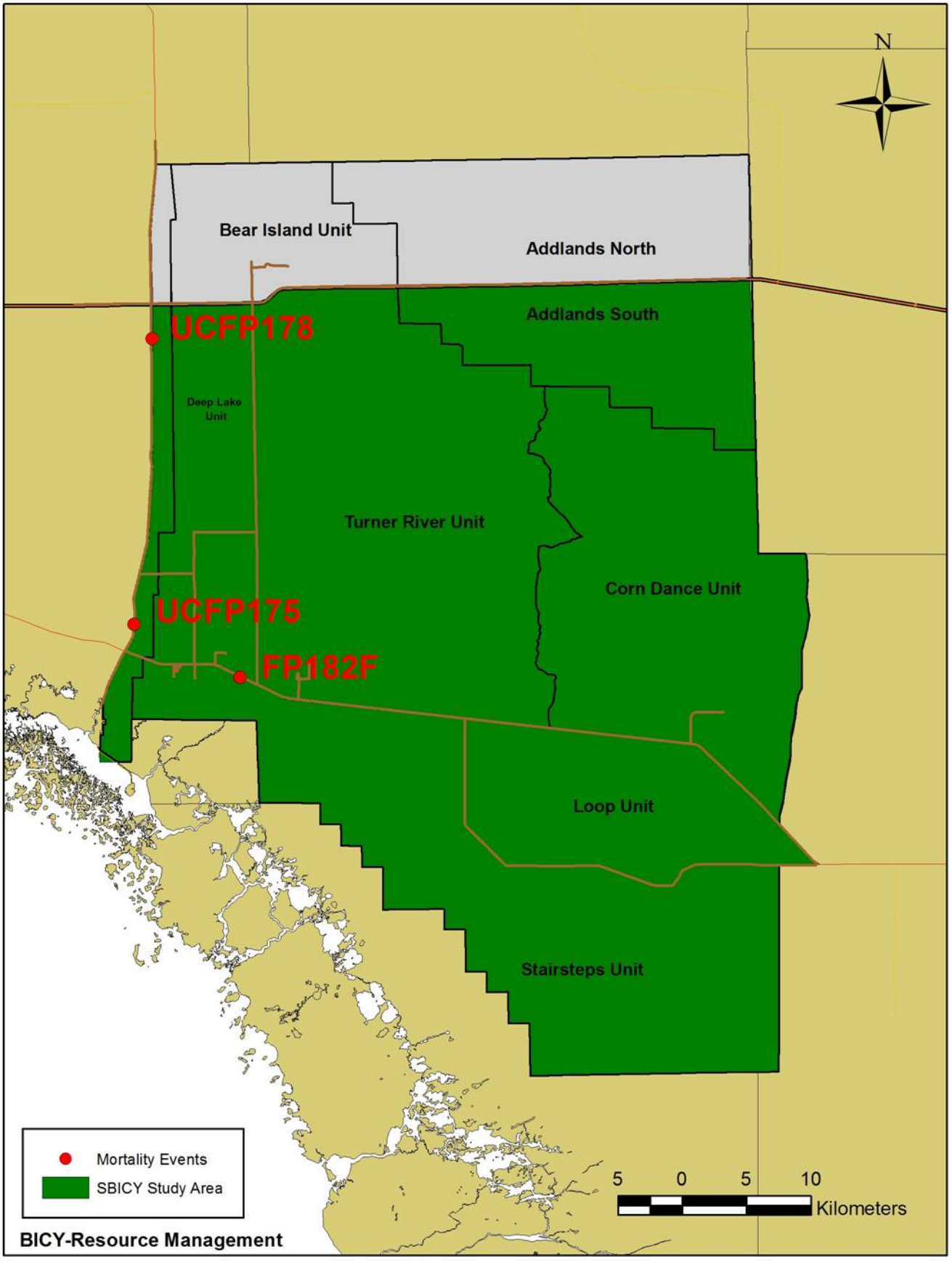

Figure 22. Distribution of known Florida panther deaths in SBICY from July 2012 - June 2013.