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Period Covered: July 2003 – June 2004

Study Duration: July 1995 – June 2004

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Abstract: Telemetry data were collected on 37 radiocollared Florida panthers (*Puma concolor coryi*) in southern Florida during the reporting period; none of the original 8 Texas puma that were released into south Florida in 1995 remain in the wild. Seven new panthers were added to the radiocollared population monitored by FWC this past capture season. We documented 6 panther dens during the study period producing a total of 18 neonate kittens (9♀, 9♂). All of these kittens were handled successfully at their dens, permanently marked with subcutaneous transponder chips, and skin biopsies taken. We have radiocollared a total of 132 panthers since 1981 and handled 169 neonate kittens at dens since 1992. Seven radiocollared panthers and 7 uncollared panthers died during the reporting period. Seven panthers died from vehicular trauma and three panthers, including 1 female, died from intraspecific aggression. Three dependent-aged kittens orphaned by the deaths of their mothers were captured and placed into temporary captivity last fiscal year. In August 2003, these 3 cats were released back into their mothers' former home ranges. One of these panthers, FP114 was killed by an uncollared male 6 weeks after the release. One radiocollared panther died of pneumonia and other infections that were likely secondary to concurrent feline leukemia virus infection. A 4 year-old radiocollared female panther was removed from the wild due to hind limb paralysis and was later euthanized because there was no chance of recovery. Three panthers died of unknown causes. Apparently, genetic introgression is reducing the occurrence of kinked tails, cowlicks, and cryptorchidism. Preliminary analyses indicate that the likely representation of Texas puma genes is on target with the originally proposed introgression level of 20%.

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INTRODUCTION

Florida panthers are endangered by a combination of population and habitat factors (USFWS 1987). Loss and fragmentation of habitat and unregulated killing over the past two centuries have reduced and isolated populations in the southeastern United States to the point where only one population, estimated in the late 1980's at 30-50 adults, exists on approximately 8,810 km² (2.2 million acres) of habitat in south Florida (Machr 1990). Small population size and geographic isolation increase the chance for extinction of Florida panthers due to demographic instability inherent in small numbers and erosion of genetic diversity from restricted gene flow and inbreeding. Genetic diversity is the basis for production of fit individuals as well as providing population elasticity in order to respond to changing environmental and habitat conditions. Demographic variation has been considered important in regulating populations for many years, but the role of social and genetic factors has only recently begun to be examined as modern techniques from field biology and molecular genetics have become available. Recovery of the Florida panther is complex, but not an uncommon situation as many species face similar circumstances. A unique opportunity exists to implement conservation and management strategies for Florida panthers and evaluate results that will benefit Florida panthers as well as other imperiled species.

Natural exchange of genetic material occurred historically among the Florida panther population in the southeastern United States and contiguous populations of *P. c. cougar* to the north, *P. c. hipplestes* the northwest and *P. c. stanleyana* to the west (Young and Goldman 1946). Genetic exchange between populations ceased as the coastal plain was gradually cleared and settled. Florida panthers steadily declined in abundance and distribution as a result. Gene flow occurs as individuals disperse and breed, but habitat fragmentation disrupts dispersal and natural population processes. Dispersal is not only the natural mechanism for mixing the gene pool but also minimizes inbreeding within populations. Inbreeding increases when dispersing potential breeders can no longer move among fragmented populations, and declining population size compounds demographic and genetic factors. Implications include inbreeding depression, loss of genetic variation, declining health, reduced survivability, lower numbers, and eventual extinction. The compounding effects of these interrelated factors, perceived as an

inward spiral or vortex (Gilpin and Soule 1986), have become a cornerstone of conservation biology. A computer program (VORTEX) has been developed and widely used to predict extinction for numerous species under similar situations (see Grier 1980, Lacy and Clark 1990, and Seal and Lacy 1989).

Genetic diversity and health of the Florida panther population needs to be restored to ensure survival, even with adequate habitat conservation and other enhancement measures. The complex interplay of social, demographic, genetic, and health factors dictates that a timely and aggressive program be implemented to address the many problems faced by Florida panthers. A plan for genetic restoration and management of the Florida panther was developed in September 1994 (Seal 1994). Genetic restoration is a direct and immediate action that will restore genetic variability and vitality for a healthier, more resilient population. Results from genetic restoration will enable implementation and refinement of management strategies to maintain levels of genetic diversity historically present in the North American population.

Our objectives are to continue monitoring of released individuals and resident panthers to evaluate translocations, to compare reproductive performance and kitten health among Texas and Florida females, and to assess phenotypical and genotypical responses of genetic restoration. The final product will be the development of a long-term management plan based on study results to maintain genetic diversity, health, and long-term survival of the south Florida panther population.

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STUDY AREA

The study area encompassed most of interior southern Florida south of Orlando and extending to southern ENP. The area includes large blocks of low-lying public lands such as ENP, BCNP, FSSP, and the FPNWR. Significant private lands, primarily used for cattle and crop production, lie on higher and more productive ground to the north of the public lands and constitute some of the most important habitat for Florida panthers.

METHODS

Adult and juvenile Florida panthers were captured using trained hounds, chemically immobilized, and fitted with radio-collars, or, if severely injured, were immobilized by hand injection. A combination of ketamine HCl (10 mg/kg) and xylazine HCl (1 or 1.7 mg/kg, Congaree Veterinary Pharmacy, Cayce, South Carolina) was used for immobilization. Propofol (PropoFlo™, Abbott Laboratories, North Chicago, Illinois) was administered intravenously (IV) either as a bolus or continuous drip to maintain anesthesia. Butorphanol tartrate (0.1-0.4 mg/kg, Fort Dodge Animal Health, Fort Dodge, Iowa [FDAH]) was administered intramuscularly (IM) to smooth recovery in some panthers. Xylazine HCl was reversed with yohimbine HCl (Yobine®, Lloyd, Inc., Shenandoah, Iowa).

Vital signs (temperature, heart rate, respiration rate, and capillary refill time) and depth of anesthesia were monitored and recorded. A sterile petrolatum ophthalmic ointment (Puralube®, Pharmaderm, Melville, New York) was applied to the eyes for lubrication. All animals underwent a physical examination to assess general health and physical condition. For each panther handled, the skin over the medial saphenous vein was clipped, prepped, and an IV catheter (Abbocath®-T, Abbott Park, Illinois) aseptically placed. Sterile isotonic fluids were administered either subcutaneously (SQ) or IV to counteract hyperthermia, maintain blood pressure, and expedite clearance of drug metabolites (Shindle et al. 2001). Panthers >4 months old were vaccinated SQ against feline viral rhinotracheitis (FVR), feline calicivirus (FCV), feline panleukopenia (FPV) (Fel-O-Vax® [FDAH], 3 ml, lower left leg), feline leukemia virus (FeLV, Fel-O-Vax® [FDAH], Lv-K 2 ml, lower left leg) and rabies (Rabvac™ 3 [FDAH],

1 ml, lower right leg). Some panthers were given a FeLV booster (2 ml) IM remotely by darting 3-16 weeks post initial inoculation. Captured panthers were dewormed with ivermectin (0.1 mg/kg, Ivomec®, Merial Limited, Iselin, New Jersey) and praziquantel (3.75 mg/kg, CestaJect™, Phoenix Pharmaceutical, Inc., St. Joseph, Missouri) administered SQ in the lateral aspect of the thigh. Penicillin G procaine/benzathine (USVet®, Hanford Pharmaceuticals, Syracuse, New York) was administered IM at 22,000 to 44,000 U/kg. Panthers were implanted with a SQ transponder identification chip (Trovan®, Douglas, United Kingdom), ear-tattooed, measured, and weighed.

Approximately 70-140 ml of blood (depending on body weight) was collected from the medial saphenous or cephalic veins using a butterfly catheter (19 or 21 ga), luer adapter/hub, and Vacutainer® tubes (Becton Dickinson, Franklin Lakes, New Jersey) (approximately 50 ml in serum separator, 40 ml in EDTA, 9 ml in Na Heparin, and 9 ml in ACD tubes). From uncollared panthers, eight skin biopsies (4 mm) were aseptically collected from the medial aspect of the hindlimbs and saved in biopsy transport media. Defects were closed with surgical glue (Vetbond™, 3M Animal Care Products, St. Paul, Minnesota). Hair clipped from blood collection and biopsy sites and pulled hair were saved in sample collection bags; clipped hair was also collected from the ventral abdomen. Other samples such as bacterial cultures, skin scrapings, and diagnostic biopsies were taken as indicated. Panthers were left to recover from anesthesia in a dry, shaded area away from open water and were visually monitored until they attained a sufficient state of consciousness.

Whole blood in EDTA, serum, and diagnostic samples were shipped overnight to Antech Diagnostics (Farmingdale, New York) for a complete blood count (CBC), serum chemistry profile, and appropriate diagnostic procedures (culture, histopathology). Skin biopsies were shipped overnight to the Laboratory of Viral Carcinogenesis (National Cancer Institute [NCI], Frederick, Maryland) for tissue culture and genetic analyses (O'Brien et al. 1990). Reciprocal antibody titers and/or presence of antigen in serum were determined for feline leukemia virus (FeLV, ELISA antigen), feline immunodeficiency virus/puma lentivirus (FIV/PLV; Western Blot, Kinetics ELISA, and peptide ELISA), feline rhinotracheitis virus (FVR, serum neutralization [SN]), feline calicivirus (FCV, SN), West Nile Virus

(WNV, SN) and feline panleukopenia virus (FPL, SN) at the New York State Diagnostic Laboratory (Cornell University, Ithaca, New York). EDTA whole blood from panthers was tested for FeLV and FIV in the field using a rapid immunoassay (SNAP Combo, IDEXX Laboratories, Westbrook, Maine). Reciprocal serum antibody titers to FeLV were performed at Hansen Veterinary Immunology (Dixon, California). EDTA blood smears from FeLV antigen positive panthers were sent to the National Veterinary Diagnostic Laboratory (Franklin Lakes, New Jersey) for immunofluorescent antibody (IFA) testing. Polymerase chain reaction (PCR) for *Mycoplasma haemofelis* and *M. haemominutum* was performed on EDTA whole blood from FeLV positive panthers at the University of Illinois (College of Veterinary Medicine, Urbana, Illinois). Hair and heparinized whole blood was analyzed for methyl mercury (Hg) concentration at the Florida Department of Environmental Protection (Tallahassee, Florida) by cold vapor atomic absorption spectrophotometry (Hatch and Ott, 1968).

Neonatal kittens <6 weeks-of-age were handled according to Land et al. (1998) and marked with a SQ transponder identification chip. Pyrantel pamoate (0.10 mg/lb, Anthelban V, Phoenix Pharmaceutical, Inc., St. Joseph, Missouri) was administered orally, and blood was collected from the jugular vein for CBC and serum chemistry. Feces was collected and placed in individual open topped containers in a 2% solution of potassium dichromate. Samples were allowed to aerate for 14 to 30 days to allow any coccidia present to sporulate. Samples were then analyzed for coccidia and helminth eggs using a saturated sugar fecal flotation method.

Florida panthers dying from infectious disease or of unknown causes were completely necropsied by board-certified pathologists at the University of Florida Veterinary Medical Teaching Hospital (VMTH, Gainesville, Florida) or Disney's Animal Kingdom (Celebration, Florida). Panthers dying from known trauma were necropsied by the Panther Section veterinarian at the Wildlife Research Laboratory (WRL, Gainesville, Florida). Testes or ovaries were immediately collected from fresh carcasses, wrapped in saline soaked gauze, and shipped chilled overnight to White Oak Plantation (Yulee, Florida) for semen analysis and/or gamete cryopreservation. Semen was analyzed for volume, sperm concentration, forward progression, total sperm count, and sperm motility. A semen sample was also stored in 0.3%

glutataldehyde fixative for later morphological examination. Ovaries were separated from uterine horns and placed in Hepes Minimum Essential Medium with 0.4 g/ml Bovine Serum Albumin (HMEM) at room temperature. Ovaries were sliced in HMEM at room temperature to recover the oocytes.

Lymph nodes, muscle, spleen, and skin biopsies were also collected from fresh carcasses and shipped overnight to NCI. All tissues from live-captured and necropsied panthers not immediately analyzed were archived at -20° to -70°C at the WRL. Hides and skeletal remains were deposited in the Florida Museum of Natural History (Gainesville, Florida).

Instrumented animals were monitored approximately every other day (M, W, F) from fixed-wing aircraft. Locations were plotted on 7.5-minute USGS topographic maps and recorded as Universal Transverse Mercator points. Our location accuracy was $115\text{ m} \pm 29.7$ based on differences between aerial locations and GPS locations of 36 panther dens or carcasses (Appendix I). Mating and denning behavior, aggressive encounters among panthers, movements and home range shifts, dispersal, survival, recruitment, displacements and replacements of individuals, and other social and ecological interactions were interpreted from radiotelemetry data and field investigations.

The following nomenclature will be used to identify Florida panthers, Texas pumas, and their associated intercross progeny: "FP" denotes panthers captured for radiocollaring; "K" denotes kittens handled at panther or Texas puma dens; TX denotes Texas pumas used for Panther Genetic Restoration; "F1" denotes Florida panther x Texas puma offspring; "F2" denotes offspring of F1 x F1 mating; "B-FL" denotes offspring of F1 x Florida panther mating; and "B-TX" denotes offspring of F1 x Texas puma mating.

RESULTS AND DISCUSSION

2003-2004 Capture Season Summary

Our capture efforts began 24 November 2003 and continued through 20 April 2004. We captured 14 panthers during the capture season. We recollared 6 panthers, added 7 new panthers, and captured one panther with a failed radiocollar (Table 1). A complete listing of all radiocollared panthers can be found

in Appendix II. In addition to those panthers handled during the capture season, 1 radiocollared panther was captured and relocated and 3 panthers were captured and removed for treatment due to illness or injury during the study period (Table 1).

The primary objectives of our capture work this season were to pursue panthers for 1) assessment and management of FeLV, 2) assessment of the panther deaths by unknown cause(s) on the Big Cypress Seminole Indian Reservation, 3) replacement of radiocollars equipped with break-away devices, and 4) routine radiocollar replacement. In concert with the above objectives, we also continued our evaluation of GPS radiocollars. We chose to maintain the status quo with respect to capture activities this season and did not make a concerted effort to expand the radiocollared sample beyond that necessary to achieve above objectives 1 and 2. Therefore, our pursuit of uncollared panthers was primarily centered on Okaloacoochee Slough State Forest, Big Cypress Seminole Indian Reservation, Florida Panther National Wildlife Refuge, and the Bear Island Unit of Big Cypress National Preserve. Eight radiocollared panthers were scheduled for capture prior to the start of the 2003-2004 capture season for the reasons explained above. We successfully captured 6 of the panthers scheduled (Table 1). One radiocollared panther (FP114) died prior to the start of the season and one radiocollared panther (FP101) was not captured due to premature radiocollar failure.

Status of Radiocollared Florida Panthers

FWC and NPS monitored 37 radiocollared panthers this reporting period. A complete listing of radiocollared panthers can be found in Appendix II. Locations of radio-instrumented Florida panthers showed spatial use patterns similar to previous years (Appendix III, Figs. 1-7). Home range sizes (minimum convex polygon method) for established, non-dispersing adult panthers averaged 156.1 km² for females ($n = 22$) and 416.5 km² for males ($n = 10$) (Appendix III, Figs. 2-5).

¹
All FWC/NPS

¹ / 2 = all FWC/NPS
left out which 2?

Status of Female Texas pumas

Florida panther genetic restoration began in 1995 with the release of 8 female Texas puma, none of which remain in the wild today. Five of the 8 Texas puma produced litters and a minimum of 20 kittens were born in Florida (Appendices IV and V). No displacement of Florida panthers occurred and no disruptions to the existing social organization were observed. No Texas puma exhibited aberrant behaviors or unacceptable human interactions. Three Texas puma (TX 108, TX106, and TX 105) were removed from the wild last reporting period because they had produced a sufficient number of offspring into the panther population and because they were thought to be reproductively senescent. These cats have been placed into permanent captivity at various approved institutions.

Biomedical Summaries of Florida Panthers Handled in 2003-2004

Eighteen adult or juvenile panthers and 18 neonatal kittens were handled during this study period. Capture date, capture location, age, weight, presence of kinked tail, cowlick, number of testes and significant medical findings and procedures are summarized in Tables 1 and 2. All panthers captured for routine radio-instrumentation were in good to excellent body condition with the exception of FP122 (poor condition). FP122 was severely anemic (PCV 18%), was antigen and IFA positive for FeLV, and died 2 weeks post-capture. A heart murmur (Grade I, systolic) was detected in only one panther (FP71) this Fiscal Year (FY).

Capture related injuries

Capture-related injuries were categorized as moderate or severe. Moderate injuries were defined as those that were not life-threatening and were treated in the field (e.g., mild to moderate hyperthermia [106°F to <108°F], lacerations, dog-bite wounds, hypoxia [lack of oxygen] without respiratory arrest). Moderate injuries sustained by panthers this capture season were limited to moderate hyperthermia (106.3°F) in one panther (FP100).

Severe injuries were defined as those that were life-threatening but treated in the field (e.g., severe hyperthermia [$\geq 108^{\circ}\text{F}$], respiratory arrest, penetration of abdomen or thorax with dart, fractures of non-weight-bearing bones) or injuries that required removal from the wild for treatment (e.g., fractures of weight-bearing bones). No captures of adult or juvenile panthers resulted in severe injury.

Another complication was vomiting while under anesthesia. This occurred in FP123 and FP132 approximately 30-60 minutes following immobilization. Both had recently fed and had been immobilized with a combination of xylazine HCl and ketamine HCl. In both cases swallowing reflexes were present. Treatment included extending the head and neck, removing vomitus from the mouth, administering metoclopramide HCl (0.2 mg/kg IM), and partially reversing the xylazine. Prophylactic use of metoclopramide was used in one other panther immobilized under similar conditions, and vomiting did not occur.

FP113, a female born in April 2002, appeared to be in the late stages of pregnancy when captured. A serosanguinous discharge from the vagina was observed and two large fetuses were palpated. Mammary tissue was developed and milk could be expressed from the teats. Serum progesterone concentration was 10.4 ng/ml, and parturition appeared eminent. Pyometra was not suspected due to lack of discharge odor, normal body temperature, and normal white blood cell count on CBC. Cytology of the vaginal discharge was not performed. Following capture, FP113 did not appear to den and no kittens were found upon inspection of the capture site the following day.

Biomedical summaries for panthers requiring special medical attention

We handled four panthers this past year that required special medical care and treatment. Three of these cats were radiocollared previously and the fourth panther was injured in a collision with a vehicle. None of these panthers' conditions were caused by research capture activities.

Florida panther 60. FP60 had repeatedly visited the Trail Lakes Campground and Skunkape Research Center beginning in early June 2004, and killed several captive domestic animals during this

period. At approximately 0200 hrs on 29 June 2004, FP60 was captured in a box-type trap at Trail Lakes Campground as part of an aversive conditioning exercise. While in the trap, the panther did not make aggressive attempts to escape and did not appear to be concerned with people. The panther was immobilized later that morning with ketamine HCl (13.4 mg/kg) and xylazine HCl (1 mg/kg) and examined. FP60 was found to be in poor condition, weighed 92 lbs (and this was with an estimated 5-10 lbs of meat in him that was eaten the night before) with muscle wasting and little/no subcutaneous fat. There was evidence of soft tissue injury to the left side of the head and possible dermatophytosis (ringworm infection) which is unusual in an adult animal. Because of his poor condition he was removed to White Oak Plantation for further evaluation.

Complete blood count indicated a severe nonregenerative anemia and evidence of a bacterial infection (high neutrophil count). Severe hookworm infection was also diagnosed and anthelmintics were administered. Blood tests for anticoagulant rodenticides were negative. Radiographs indicated pneumonia (cause unknown) as well as head injuries. Fractures of the left zygomatic arch (cheek bones) and mandible could be seen and correlated well with the skin and muscle injuries seen on the left side of his head. Skin culture resulted in growth of the dermatophyte *Trichophyton mentagrophytes*. Closer gross and histologic examination of the skin indicated that some lesions, in addition to dermatophytosis, were likely healing abrasions.

FP60 was further evaluated at the University of Florida, College of Veterinary Medicine (CVM) by magnetic resonance imaging (MRI), electromyography (EMG), and bronchoscopy. The MRI showed no significant evidence of brain injury. Minor differences in ventricle size were likely congenital (possibly due to inbreeding). The fractures of the left cheek bone and upper part of the mandible were confirmed, and there did not appear to be any other fractures. The EMG indicated that there was nerve damage to the temporalis muscle on the left side resulting in severe atrophy. Bronchoscopy confirmed the presence of pneumonia and a culture and sensitivity was taken – heavy growth of *Pseudomonas aeruginosa* was cultured.

It is possible that FP60 survived a vehicular collision. Telemetry data indicated normal movements until mid-May 2004 when movements were suddenly restricted to a few hundred yards. This occurred within ¼ mile of US41 and it is possible that he was struck by a vehicle (D. Jansen, NPS, unpubl. data). Frequenting of the Trail Lakes Campground (1/4 mi to the west) began shortly afterwards. Healing skeletal fractures, soft tissue injuries, and abrasions support the theory of vehicular collision. Behavioral abnormalities could have been due to brain damage from the accident, poor condition and anemia, or individual variation. The anemia was likely the result of his poor condition and pneumonia combined with blood loss due to the severe hookworm infestation. The pneumonia may be the result of lung injury or possibly aspiration pneumonia secondary to nerve damage. Resolution of the pneumonia supports the first hypothesis.

The pneumonia and dermatophytosis eventually resolved with antimicrobial treatment, and his weight and PCV improved to normal. However, mentation may still be impaired as he still does not appear to have a normal fear of humans. FP60 will likely remain in captivity.

Florida panther FP86. FP86 was a female panther born in June 1999. Following 2 weeks of restricted movements in Big Cypress National Preserve (BCNP), FP86 was immobilized 6 November 2003²⁰⁰⁴ with midazolam HCl (0.5 mg/kg), ketamine HCl (9 mg/kg), and examined in the field. Physical examination revealed severe emaciation and dehydration with no apparent voluntary movement of the hind limbs. A large mass was also observed at the base of the tail. FP86 was removed to the CVM for further evaluation and treatment. Radiographs did not reveal injuries to the vertebral column, however, a cerebral spinal fluid lumbar tap revealed evidence of a spinal injury with myelin degeneration, a high lymphocyte to neutrophil ratio, and chronic hemorrhage. Fine-needle aspirate of the tail-base mass suggested bacterial infection, although later it was determined to be a primary fungal infection with secondary bacteria. Initially it was hoped that the infection penetrated into the spinal canal (or rather just outside the meninges) and was putting pressure on the cord (and was thus potentially treatable). However, a myelogram the next day revealed dilatation of the central canal higher in the spinal cord

(T12). This lesion was confirmed by computed tomography (CT). The chronic nature of the injury combined with evidence of permanent damage led to the decision of euthanasia (see Appendix VI for necropsy results). The ovaries were collected before euthanasia and shipped to White Oak Plantation for oocyte recovery (see Semen analysis/oocyte recovery).

Florida panther UCFP60. UCFP60, a 2-3 year-old male panther, was struck and injured by a vehicle along US 41 near Collier Seminole State Park on 9 December 2003. UCFP60 appeared disoriented and was unable to stand. He was immobilized with ketamine HCl (4.7 mg/kg) and midazolam HCl (0.4 mg/kg) by hand injection and removed to the Emergency Pet Clinic (Naples) where he was stabilized. Possible cerebral edema was treated with an IV injection of mannitol (250 mg/kg) and antibiotic treatment was begun (cefazolin 20 mg/kg IV every 8 hrs). He was then transported to the CVM for treatment and surgery. Initial treatment involved removal of approximately 900 ml of air from the pleural space (chest tap). Radiographs revealed simple closed fractures of the left radius and ulna, luxation of the right tibiotarsal joint, pneumothorax, and fractures of the left zygomatic arch. On 11 December, the radius/ulna fracture was stabilized by plates and the luxated tibiotarsal joint fused. The surgery and subsequent recovery were successful, however, on 13 December 2003, UCFP60 died spontaneously, most likely from neurogenic pulmonary edema (see Appendix VI for necropsy results).

Clinical pathology

Hematology and serum chemistry results for adult and juvenile Florida panthers captured this FY were similar to Florida panther reference intervals reported by Dunbar et al. (1997) (Tables 3 and 4). FP122 had a nonregenerative anemia which was likely related to the FeLV infection. Evidence of acute leukemia was seen on EDTA blood smears from FP122 and FP123 (both infected with FeLV). Further confirmation and characterization of this neoplasia is pending. Severely elevated creatine phosphokinase levels in several panthers was likely due to exertion during capture.

Virology and serology

All Florida panthers sampled FY03-04 were negative for exposure to FECV/FIP based on ELISA tests. Results of serological testing for exposure to FPV, FCV, FVR, FIV, and FeLV, and presence of FeLV antigen for live-captured panthers are summarized in Table 5. Of greatest significance were positive FeLV ELISA antigen findings for FP122 and FP123 – which were confirmed by polymerase chain reaction (PCR) and viral culture. Both were negative for FIV by ELISA and Western Blot at Cornell, however, Western Blot for the puma lentivirus strain of FIV at the National Cancer Institute was positive for FP123 (pending for FP122). Samples collected at necropsy from FP122 and FP123 were again positive for p27 antigen by immunochromatic lateral flow devices; samples from all other necropsied panthers were FeLV antigen negative. See Appendix VII for distribution of FeLV antigen positive and negative panthers sampled since July 2002.

Three panthers (FP124, FP127, FP129) were positive for FIV by both ELISA and Western Blot (Cornell Diagnostic Laboratory), and all were captured south of I-75 in BCNP. Both offspring of FP124 (FP125, FP126) were negative.

All ($n = 13$, 100%) panthers not previously vaccinated had positive antibody titers to FPV, and all but one (UCFP60, 92%) were positive for FCV. All panthers not previously vaccinated were negative for FVR. All ($n = 23$, 100%) panthers sampled this FY were positive for WNV by SN. The significance of this is under investigation as a certain proportion of these are likely to be false positives. Cross reactivity with related virus(es) may explain these findings, and further testing is necessary. West Nile Virus has not been isolated from panthers dying of unknown causes.

Fluorescent antibody tests for rabies were negative for FP122, UCFP61, and UCFP63 and were unsatisfactory for FP85, UCFP58, and UCFP65. Viral isolation and PCR for WNV, canine distemper virus, Eastern Equine Encephalitis virus, and pseudorabies virus was negative for FP85 and FP122.

Immunofluorescent antibody tests for FeLV on blood smears from FP122 and FP123 confirmed FeLV infection and indicated persistent infection. Viral culture for FeLV of EDTA blood from FP122 and 123 (as well as FP109 and FP115) was successful. Isolates from FP109, FP115, and FP123 appear to

be subgroup A, while there is evidence of recombinants (subgroups B and/or C) in FP122. The latter may be an artifact resulting from recombination of FeLV from FP122 with endogenous retroviral DNA in domestic cat co-culture lymphocytes. Results of genetic sequencing are pending. Polymerase chain reaction results were also positive for FP122 and FP123. Complete results of the FeLV investigation will be summarized in a separate report.

Serum progesterone

Serum progesterone concentrations were determined for 10 female Florida panthers this capture season (Table 4). All panthers with values <10 ng/ml ($n = 6$) did not have kittens within 90 days (gestation period) of sampling. Three panthers had serum progesterone concentrations ≥ 10 ng/ml (range 10.4-15.3 ng/ml), suggesting pregnancy, yet failed to have kittens (although, late-term pregnancy was strongly suspected in one case [FP113]). These findings may have been due to pseudopregnancy, loss of pregnancy, or early loss of kittens. Serum progesterone concentrations less than 5 ng/ml are strongly suggestive of non-pregnancy while values greater than this appear to be inconclusive.

Semen analysis and oocyte recovery

Results for semen characteristics of Florida panthers examined this FY were not available from White Oak Plantation at the time of preparation for this report. Results will be presented in the 04-05 Annual Report.

Ovaries from FP86 were collected under anesthesia just before euthanasia and shipped to White Oak Plantation for oocyte recovery. Examination of both ovaries revealed no ovulation sites (corpora lutea); this finding is consistent with field data that suggested this 4.5 year-old had never denned. However, several follicles (~1 mm diameter) were observed at the surface. A total of 18 oocytes was collected (9 oocytes classified as Grade I [excellent] and 9 oocytes classified as Grade II [good]) and stored in liquid nitrogen.

Parasitology

Polymerase chain reaction for *Mycoplasma hemofelis* and *M. hemominutum* was performed on EDTA blood from four FeLV positive Florida panthers (FP109, FP115, FP122, FP123) at the University of Illinois, College of Veterinary Medicine. Two panthers (50%, FP109, FP115) were positive for *M. hemominutum* and one (25%, FP115) was also positive for *M. hemofelis*. Parasites were not seen on blood smears, and impact on the health of these panthers is unknown. Testing of samples collected from FeLV-negative panthers is pending.

Severe ancylostomiasis may have contributed to a life-threatening anemia in FP60. A total of 21 gastrointestinal tracts have been examined for helminthes since 2000 (G. Foster, unpubl. data). Results are being submitted for publication. Identification of ticks collected from Florida panthers captured and necropsied this fiscal year is pending.

Mercury

Whole blood and/or hair Hg concentrations for Florida panthers live-captured and/or necropsied this FY are listed in Tables 6 and 7. Most significantly, FP85 had concentrations of 150 ppm Hg at necropsy. FP85's home range has been in Everglades National Park (ENP) and other areas of the eastern Everglades, and hair Hg concentrations in this panther have risen steadily from 12 ppm (FY99-00) to 22 ppm (FY00-01) to 72 ppm (FY02-03). Other tissues collected at necropsy from FP85 also had elevated Hg concentrations (see Appendix VI), although brain Hg concentrations were only 3.6 ppm. Mercury concentrations in the brain are considered most important when diagnosing Hg toxicosis, and brain Hg concentrations in FP85 were considered below harmful levels (Heinz, 1996). High levels of selenium (Se) were also seen in liver (36.3 ppm), and this mineral is believed to protect against Hg toxicity (Heinz, 1996). The cause of death in this panther remains undiagnosed.

Hair Hg values for all other adult panthers this FY were ≤ 8.2 ppm. Highest values were seen in a family group captured in the Loop Road Unit of BCNP. The mother (FP124) had hair Hg concentrations of 8.2 ppm while the 10 month-old kittens had levels of 3.4 (FP125) and 3.9 (FP126) ppm. Two months

later, values in FP126 had risen to 5.6 ppm. Interestingly, hair Hg concentrations in FP113 and 114, two 7 month-old siblings orphaned in Florida Panther National Wildlife Refuge (FPNWR) decreased from 9.7 and 10 ppm to 5.5 and 0.36 ppm respectively – likely as a result of decreased exposure while in captivity. Other decreasing values were seen in FP75 (from 21 ppm in FY99-00 to 7.9 in FY02-03 [not included in last year's annual report]) and FP83 (from 5.5 ppm in FY00-01 to 1.2 ppm this FY). Consistently high hair Hg values in ENP and FPNWR and the recent finding of elevated values in the Loop Road Unit warrant continued monitoring.

Feline leukemia virus vaccine trial

ELISA antibody titers for panthers and cougars participating in the vaccine trial are presented in Table 8. No adverse reactions were observed following initial inoculation or booster. Two Florida panthers (FP113, FP116) involved in the trial had negative titers when handled approximately 7 months after the booster.

Feline leukemia virus vaccination

Management for FeLV in the Florida panther population initially began with a vaccination program. On 20 August 2003, the three vaccinated and boosted orphaned kittens (FP113, FP114, FP116) that were part of the vaccine trial were released into the FPNWR (FP113, FP114) and private lands east of Immokalee (FP116). Vaccination of free-ranging panthers began in November 2003. As of 1 September 2004, 21 free-ranging FeLV-negative panthers have received at least one inoculation; of these 11 have been boosted (Table 9). Assuming a population size of 90, the largest percentage of the population that had received at least one inoculation was 23% (9 April to 28 July 2004); the largest percentage vaccinated and boosted was 12% (same time period). Positive PCR findings in FP100 and FP110 indicate latent infections and subsequent protection from further exposure. As such these panthers may be considered “boostered” and bring the total up to 14% considered effectively protected.

One vaccinated panther (FP132) was initially vaccinated approximately 2 days after exposure, boosted 1 month later, but nevertheless became persistently infected. Because exposure was known to have occurred before vaccination, FP132 was not considered vaccinated and is not included in the vaccination table. To date no other vaccinated panthers have become infected. See Appendix VIII for distribution of FeLV vaccinated panthers.

Congenital defects detected at necropsy

Atrial septal defects were not found in 14 panthers examined at necropsy this FY. Unilateral cryptorchidism was observed in 2 of 8 (25%) necropsied male Florida panthers (for whom examination was possible) and large splenic clefts were observed in 10 of 14 (71%) panthers necropsied this FY. Panthers with small splenic clefts (FP91, UCFP62) or no clefts (FP85, FP86) had evidence of Texas cougar ancestry.

Captive Florida panthers

As of 30 June 2004, five Florida panthers were in captivity. Two (FP207, 12 year-old male; FP208, 12 year-old female) are at Lowry Park Zoo, two (FP60, 8.5 year-old male; FP204, 14 year-old female) at White Oak Plantation, and one (FP210, 14 year-old female) at Jacksonville Zoo. FP209 (14 year-old female), a sibling of FP210, died at the Jacksonville Zoo this FY (see Appendix VI). FP's 204, 207, 208, and 210 represent the remaining individuals originally removed in 1991-92 for captive breeding purposes.

Florida Panther and Texas puma Reproduction

We documented 6 panther dens during the study period producing a total of 18 neonate kittens (9♀, 9♂). These neonate kittens were handled successfully at their dens, permanently marked with subcutaneous transponder chips and skin biopsies taken. In addition to these 6 dens, FP83 gave birth to a litter of kittens but this den was not visited. BCNP personnel handled the kittens of FP93, FP120, and

FP70. A description of Florida panther litters handled during the reporting period can be found in Table 2 and lists of all known panther and Texas puma dens and kittens handled can be found in Appendices IV and V.

Female Florida panthers and Texas pumas have produced litters throughout the year, however, there is a decided peak of Florida panther denning from March – July (Fig. 1).

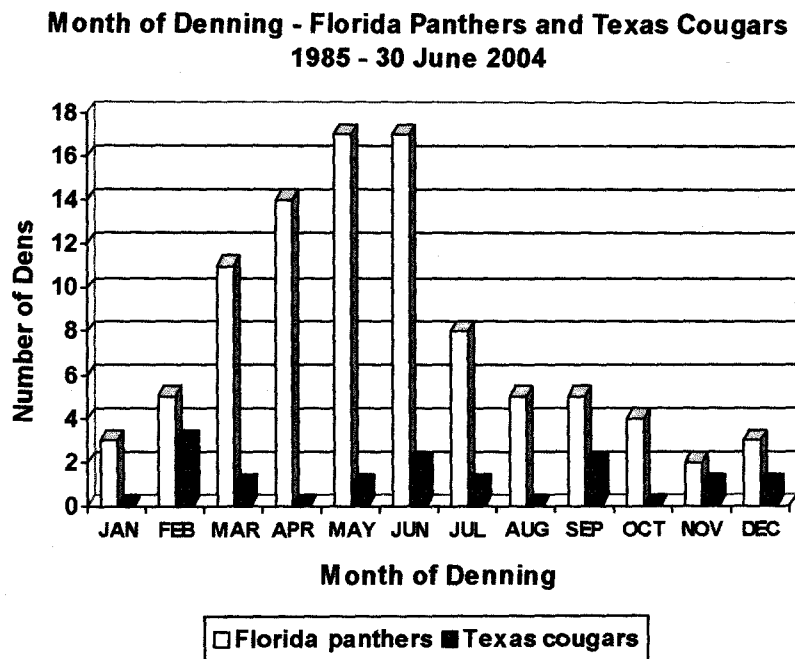


Figure 1

Female panthers have bred as young as 18 months-of-age (Maehr et al. 1989) and successful reproduction has occurred up to 11 years-of-age (Fig. 2). Mean age of denning females was 5.1 years. Age at first reproduction for 18 known-aged female Florida panthers averaged 2.2 ± 0.22 years and ranged from 1.8 to 3.2 years (Table 10). There was no difference ($t_{13.3} = -0.74$, $P = 0.24$) between ages of first reproduction for original Florida panthers ($2.1 \text{ yrs.} \pm 0.26$; $n = 10$) and panthers with Texas ancestry ($2.3 \text{ yrs.} \pm 0.53$; $n = 8$). Average litter size for all panthers was 2.5 ± 0.92 kittens. Seventy percent of all litters were comprised of either 2 or 3 kittens (Fig. 3). Frequencies were 15.6%, 34.4%, 35.9%, and 14.1% for litter

sizes of 1, 2, 3, and 4 kittens, respectively. Mean birth intervals (elapsed time between successive litters)

Ages of Denning Florida Panthers 1985 - 2004

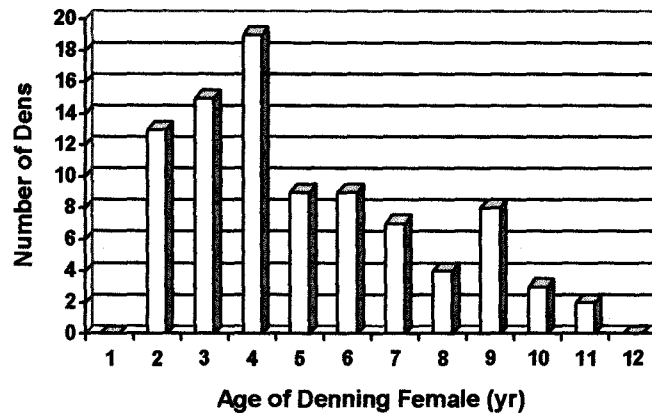


Figure 2

were 19.8 ± 9.0 months for female panthers ($n = 56$) and 22.3 ± 6.7 months for female Texas puma ($n = 5$). From 1990-2004, the number of births in the radiocollared population has exceeded the number of radiocollared panther deaths (Fig. 4).

Litter Sizes of Radiocollared Female Florida Panthers

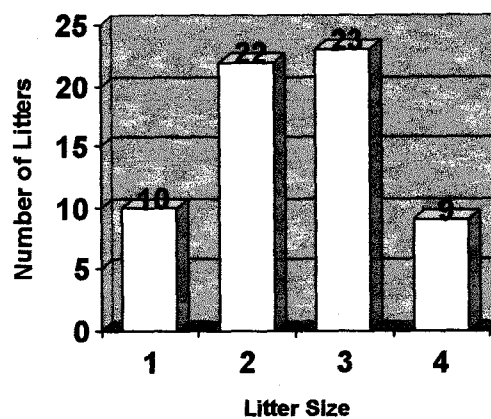


Figure 3

Number of Kittens Produced by Radiocollared Panthers vs. Number of Radiocollared Panther Deaths Jan 1990 - Jun 2004

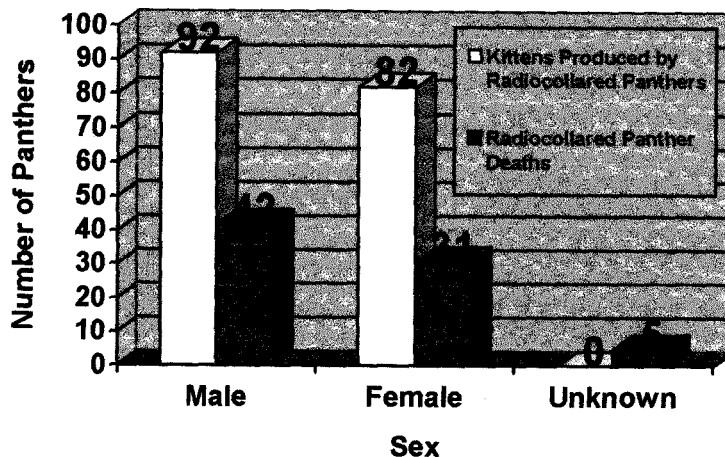


Figure 4

Florida Panther and Texas puma Descendant Kitten Survival

We have been visiting den sites of female Florida panthers and Texas puma females since 1992 and have documented the number of kittens that survived to 6 months-of-age for 38 of these litters (Table 11). Florida panther and Texas puma kitten survival to 6 months-of-age were estimated to be 52 and 72%, respectively, but were not significantly different ($P = 0.2776$; Appendix IX). Average kitten survival, therefore, was 62% from birth to 6 months-of-age. Survival of kittens > 6 months-of-age was determined by following the fates of 55 radiocollared dependent-aged kittens, including 17 Texas puma descendants from 1985-2004 (Table 10). Only 1 of these 55 kittens (FP53) died before reaching independence for a 98.2% survival rate. Twenty-three of 24 female panthers, first captured as kittens, became residents and 18 (78.3%) produced litters (Table 10); one female is too young to determine residency. Female panthers were considered as adult residents if they were older than 18 months-of-age, established home ranges, and have bred, or if they were older than 3 years-of-age and established a home range (Maehr et al. 1991). Twenty-eight male panthers were captured as kittens and 12 (42.8%) of these

cats eventually became residents (Table 10); three males are too young to determine residency status.

Male panthers were considered as residents if they were older than three years-of-age and established a home range that overlapped with females. Successful male recruitment appears to depend on the death, or home range shift, of a resident adult male (Maehr *et al.* 1991).

Florida Panther Mortality

Fourteen (7 radiocollared, 7 uncollared) free-ranging and one captive Florida panther mortalities were recorded between 1 July 2003 and 30 June 2004. No radiocollared panthers and seven uncollared panthers died from vehicular trauma (Appendix VI). Although 3 panthers were killed on I-75 and SR 29, none died in areas with wildlife underpasses and fencing. Three radiocollared panthers (2 males, 1 female) died from intraspecific aggression and the female FP91 was never known to have produced kittens even though she was 4.5 years-of-age. FP122, a 2.5 year-old female panther, died of pneumonia and complications of a feline leukemia infection. Two panthers (FP77 and FP85) died of unknown causes. Mortality cause for FP77 may be related to those of FP73, FP118, UCFP55, UCFP56, and UCFP57. The cause of these mortalities is under investigation. FP86 was removed from the wild due to hind limb paralysis and very poor health; this cat was euthanized after extensive medical examinations revealed no hope for recovery. One captive panther (FP209) died from clostridial enteritis. A brief description of these mortalities can be found in Appendix VI. All documented Florida panther and Texas puma mortalities occurring in South Florida since 1972 are listed chronologically by cause of death in Appendix X.

Eighty-four free-roaming radiocollared panthers have died since 1981 and intraspecific aggression has accounted for 41% of these mortalities (Fig. 5). Unknown causes and collisions with vehicles accounted for 24% and 19% of mortalities, respectively. Various diseases, infections, and other factors caused the remaining mortalities. The causes of mortality were independent of gender ($\chi^2 = 8.59$, $df = 5$, $P = 0.1882$).

**Causes of Mortality for Radiocollared Florida Panthers
(*n* = 84) 1981 - June 2004**

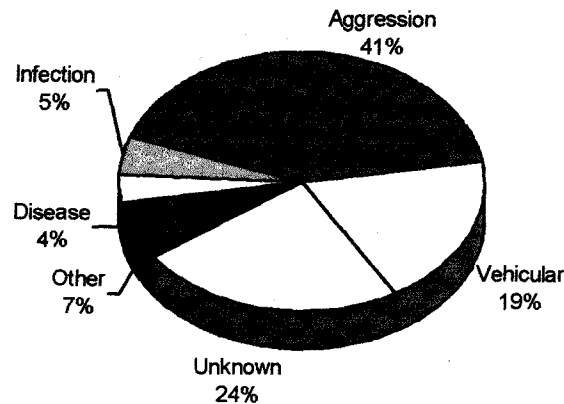


Figure 5

There has been a popular misconception that vehicular trauma causes most panther mortalities, but this is the result of sampling bias because uncollared panther mortalities are, with the rare exception, only found if they are caused by humans (e.g., vehicular trauma and the rare instances of illegal shootings). This bias is evident when 59 uncollared panther deaths (49 vehicular traumas, 5 illegal shootings, and 5 unknowns) are added to the above tallies, thereby artificially and incorrectly switching the 2 most important mortality sources.

We estimated survivorship curves (the probability of surviving from 1 time interval to the next) based on ages-at-death for 35 female and 51 male panthers (Fig. 6). Female panthers exhibited low mortality rates throughout their lives as indicated by the gradual slope of the survivorship curve. Male panthers, conversely, exhibited a much steeper slope in their survivorship curve, with higher rates of mortality from 1 to 6 years-of-age, followed by more gradual mortality rates up to 12 years-of-age. From 1990-2003, mean annual survivorship of radiocollared adult panthers was greater for females ($0.895 \pm$

0.103; Table 12) than males (0.787 ± 0.125 ; Table 13). These survivorship patterns were consistent with panther ecology where males compete for large home ranges that overlap with females and where females are more tolerant of overlap with other females (Machr et al. 1991).

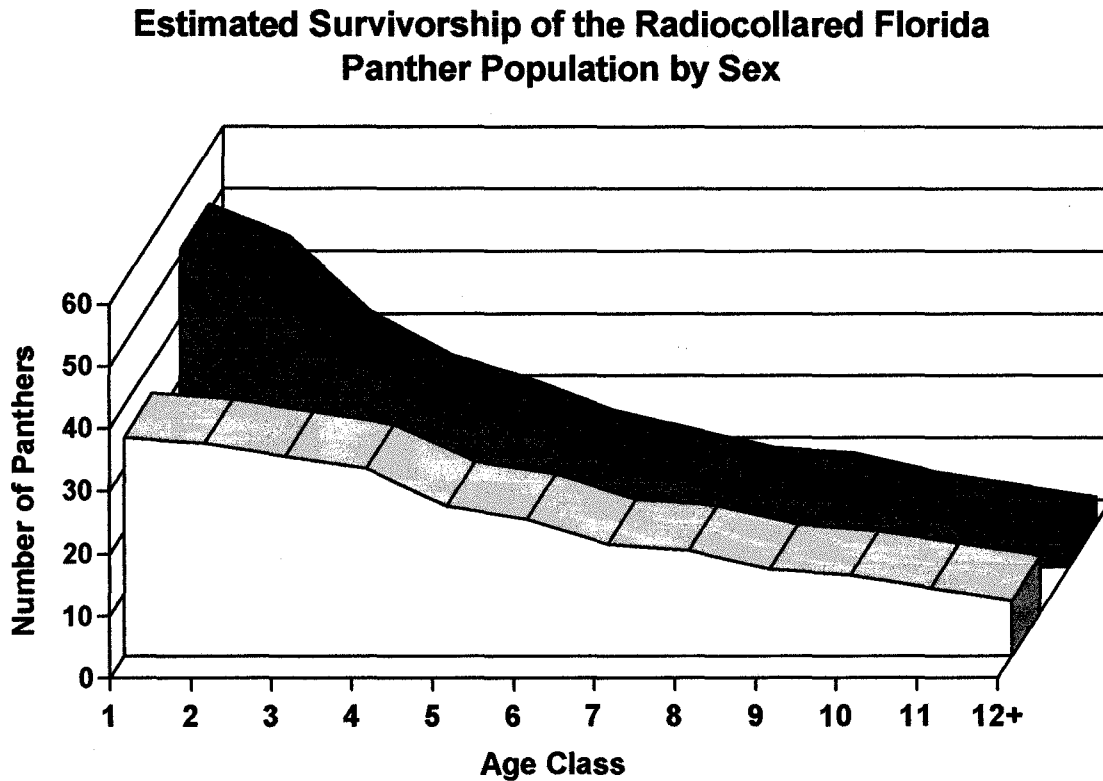


Figure 6

Status of Genetic Restoration

As of 27 January 2003, none of the 8 female Texas pumas introduced in 1995 remain in the wild. Five Texas pumas died in the wild and the remaining 3 were removed during this study period and placed into permanent captivity. Five Texas pumas contributed 20 first-generation offspring, whereas the remaining 3 died prior to successful reproduction (Appendix V).

Genetic analyses are progressing with genotypes completed at 23 microsatellite loci for 175 panthers (Johnson et al. 2002, Update of genetic analysis of Florida panther recovery efforts, Appendix XI). Comparisons between field observations and genetic analyses continue and initial results indicate an increase in observed panther population genetic heterozygosity since the release of Texas puma females in 1995. Various inbreeding loops have also been identified within the panther population and there is evidence that certain matrilineages are being lost as well.

Apparently, genetic introgression is reducing the occurrence of kinked tails (Table 14). Since October 1995, 46 of 76 (61%) kittens produced by Florida panthers had kinked tails (Table 15). In contrast, only 4 of 85 (5%) progeny produced by Texas pumas or their offspring had kinked tails (Tables 16 and 17).

Unlike the presence of kinked tails, which can be assessed at any age (including as neonates handled at the den), the presence of cowlicks cannot be assessed until panthers are old enough to be radiocollared (> 6 months-of-age). However, preliminary assessments suggest that genetic introgression is also reducing the occurrence of cowlicks (Table 14). Fifty-three panthers estimated to have been born since October 1995 have been handled at >6 months-of-age during capture or during carcass recovery and 33 (62%) had cowlicks. In contrast, 30 panthers with Texas puma ancestry have been handled at > 6 months-of-age and only 9 (30%) had a cowlick. The reduction in occurrence of kinked tails and cowlicks in the intercrossed progeny mirrors what was observed in panthers sampled from ENP that were descendants of the introduced "Piper Stock".

No Texas puma descendants in the Florida panther population have exhibited cryptorchidism (Mansfield and Land 2002). Expression of cryptorchidism among original stock Florida panthers was increasing over time with an overall prevalence rate of 49%. Unilaterally cryptorchid males were capable of siring offspring, but no bilaterally cryptorchid males were known to reproduce. Furthermore, Mansfield and Land (2002) offered more evidence to corroborate the findings of O'Brien et al. (1990) and Barone et al. (1994) that cryptorchidism is caused by genetic factors, and that genetic restoration holds promise in reducing or eliminating occurrence of this trait.

Other morphological traits such as sperm deformities, atrial septal defects, and skull morphology can only be scored once the animal reaches maturity or at necropsy after death. The FWC Genetic Restoration Final Report will provide summaries of the occurrence of these traits to date, but the full extent of genetic restoration on panther morphology may only become apparent over the next decade.

The likely representation of Texas puma genes in the southern Florida population is probably close to the original genetic restoration program goal of 20%. However, more than 40% of the TX genes are derived from TX101 with much of the remaining TX genes derived from TX107 (both now deceased); this unequal representation in the intercross descendants reduces the genetic diversity inserted into the population. Although 5 of the original 8 Texas pumas have contributed some descendants, the diversity contributed by those five is equivalent to about 3 founders that have contributed equally to the population. Therefore, the reversal of prior inbreeding attributed to genetic restoration may be a relatively short-term benefit. To counter a resumption of inbreeding and loss of genetic diversity, further releases of non-local cats may be considered as part of ongoing management of the genetic restoration. The preceding summary was excerpted and paraphrased from Land and Lacy 2001.

SUMMARY

This is the ninth year of our study to evaluate Florida panther genetic restoration. Originally, the study was scheduled for completion in five years, but we have since discovered that schedule to have been naively optimistic. Collection and analyses of genetic samples continue and many of the latest samples are critical for evaluation of genetic restoration. Dr. Stephen O'Brien and his staff at the National Cancer Institute are culturing, analyzing, and archiving these samples. The importance of including samples from subsequent generations of Texas puma descendants gathered recently outweighed a premature end to the study. Preliminary analyses indicate that the likely representation of Texas puma genes is on target with the originally proposed introgression level of 20%. Our goal is to continue genetic analyses and to provide measures of how we have altered the panther's genetic complement as well as providing insight into panther pedigree. This information should provide us the means to fully evaluate

the success of the genetic restoration program and to enable us to develop a management strategy to preserve wild Florida panthers into the foreseeable future. In terms of population size and occupied range, the Florida panther population has increased in size since initiation of genetic restoration. From 1990-2004, the number of births in the radiocollared population has exceeded the number of deaths by a factor of 3 and the primary cause of panther mortality from 1979-2004 was intraspecific aggression.

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An extensive bibliography of Florida panther literature can be found in Appendix XII.

Table 1. Summary of adult and juvenile Florida panthers handled by Florida Fish & Wildlife Conservation Commission from 01 July 2003 – 30 June 2004.

Cat ID	Sex	Capture Date	Capture Location	Age	Weight (lb.)	Kinked Tail	Cowlick	Descended Testicles	Capture Comments and Medical Notes
FP86	F	06 Nov 2003	BCNP	4.5 yr	46	N	N	N/A	Captured and removed from wild after restricted movements revealed hind-limb paralysis and emaciation. Euthanized on 07 Nov 2003.
FP121	F	02 Dec 2003	BCSIR	~2.5 yr	91	N	N	N/A	First capture. FeLV booster administered on 05 Jan 2004.
FP117	M	03 Dec 2003	FPNWR	~20 mo	128	N	N	2	Replaced VHF break-away collar with GPS radiocollar. FeLV booster administered on 08 Apr 2004.
UCFP60	M	09 Dec 2003	US41	~1.5 yr	117	N	N	2	Injured by vehicle collision. Captured and removed for treatment at UF Veterinary Teaching Hospital. Died on 13 Dec 2003.
FP100	M	06 Jan 2004	BCNP	~7 yr	144	Y	N	1	Replaced VHF radiocollar with GPS radiocollar.
FP122	F	30 Jan 2004	OSSF	~27 mo	71	Y	Y	N/A	First capture. Fitted with GPS radiocollar. FeLV+. Died 2 weeks post-capture.
FP123	M	02 Feb 2004	OSSF	~3.5 yr	~140	N	Y	2	First capture. Fitted with GPS radiocollar. FeLV+.
FP71	F	17 Feb 2004	BCNP	5.5 yr	80	N	N	N/A	Failed radiocollar. Fitted with GPS radiocollar.
FP128	F	18 Feb 2004	BCNP	3.7 yr	97.5	N	Y	N/A	First capture. Kitten of FP77. Fitted with GPS radiocollar. FeLV booster administered on 26 Mar 2004.
FP130	M	04 Mar 2004	OSSF	9.5 mo	63	Y	N	2	First capture. Dependent kitten of FP110. Fitted with break-away. FeLV booster administered on 19 Mar 2004.
FP131	M	10 Mar 2004	FPNWR	~5 yr	133	N	N	2	First capture. Fitted with GPS radiocollar. FeLV booster administered on 09 Apr 2004.
FP132	M	17 Mar 2004	OSSF	~3 yr	146	N	N	2	First capture. Opportunistic capture during FP123's carcass recovery. Found on deer kill. FeLV booster administered on 12 Apr 2004.
FP116	F	22 Mar 2004	Private	21.5 mo	79	Y	Y	N/A	Replaced VHF break-away collar. Pregnant.
FP83	F	31 Mar 2004	FSSP	4 yr 10 mo	99	N	N	N/A	Routine radiocollar replacement.
FP113	F	07 Apr 2004	FPNWR	2 yr	66	Y	Y	N/A	Replaced VHF break-away collar. Pregnant with 2 near-term fetuses.
FP110	F	13 Apr 2004	OSSF	4 yr 4 mo	-	-	-	-	*Did not immobilize. Remotely administered FeLV booster.
FP59	M	20 Apr 2004	FSSP	9 yr 4 mo	115	N	Y	2	Routine radiocollar replacement. Fitted with GPS radiocollar.
FP126	M	28 May 2004	BCNP	~11-12 mo	62	N	N	2	*Translocated to Okaloacoochee Slough in response to Miccosukee fears.
FP60	M	29 June 2004	BCNP	9 yr	93	Y	Y	2	Captured in box trap after repeated depredations of domestic livestock at the Skunk Ape Research Headquarters. Possible sustained debilitating injury from vehicle collision. In convalescence at White Oak Plantation as of 30 June 2004.

Table 2. Summary of neonate kittens handled at Florida panther dens 01 July 2003 – 30 June 2004.

Skin biopsies were obtained from all kittens and all kittens were marked with subcutaneous transponder identification chips.

	Dam ID ^a	Kitten ID	Sex	Location ^b	Date Handled	~ Age	Weight	Kinked Tail	Comments
B1C4 handled	FP93 ^c	K152	F	BCNP	05 Aug 2003	21 days	3 lb 0 oz	No	No significant observations when handled. Kitten appeared in good health.
		K153	M	BCNP	05 Aug 2003	21 days	3 lb 10 oz	No	No significant observations when handled. Kitten appeared in good health.
		K154	M	BCNP	05 Aug 2003	21 days	3 lb 2 oz	No	No significant observations when handled. Kitten appeared in good health.
B1C4 handled	FP120 ^c	K155	F	BCNP	07 Feb 2004	14 days	2 lb 0 oz	No	No significant observations when handled. Kitten appeared in good health.
		K156	M	BCNP	07 Feb 2004	14 days	2 lb 9 oz	No	No significant observations when handled. Kitten appeared in good health.
FWC	FP75	K157	M	BCNP	21 Mar 2004	25 days	3 lb 10 oz	Yes	No significant observations when handled. Kitten appeared in good health.
		K158	M	BCNP	21 Mar 2004	25 days	4 lb 8 oz	Yes	No significant observations when handled. Kitten appeared in good health.
		K159	F	BCNP	21 Mar 2004	25 days	3 lb 10 oz	No	No significant observations when handled. Kitten appeared in good health.
FWC	FP116	K160	F	STOF	11 May 2004	14 days	2 lb 5 oz	No	No significant observations when handled. Kitten appeared in good health.
		K161	F	STOF	11 May 2004	14 days	2 lb 6 oz	No	No significant observations when handled. Kitten appeared in good health.
		K162	M	STOF	11 May 2004	14 days	2 lb 5 oz	No	No significant observations when handled. Kitten appeared in good health.
PWC	FP107	K163	M	FPNWR	21 May 2004	7 days	2 lb 0 oz	Yes	No significant observations when handled. Kitten appeared in good health.
		K164	M	FPNWR	21 May 2004	7 days	1 lb 14 oz	Yes	No significant observations when handled. Kitten appeared in good health.
		K165	F	FPNWR	21 May 2004	7 days	1 lb 10 oz	No	No significant observations when handled. Kitten appeared in good health.
		K166	F	FPNWR	21 May 2004	7 days	1 lb 10 oz	No	No significant observations when handled. Kitten appeared in good health.
B1C4	FP70 ^c	K167	F	BCNP	06 Jun 2004	12 days	2 lb 8 oz	No	No significant observations when handled. Kitten appeared in good health.
		K168	M	BCNP	06 Jun 2004	12 days	3 lb 0 oz	No	No significant observations when handled. Kitten appeared in good health.
		K169	F	BCNP	06 Jun 2004	12 days	2 lb 8 oz	No	No significant observations when handled. Kitten appeared in good health.

^aFP denotes panthers captured for radiocollaring; K denotes kittens handled at panther dens.

^bBCNP = Big Cypress National Preserve; STOF = Seminole Tribe of Florida Property; FPNWR = Florida Panther National Wildlife
Refuge.

^cKittens handled by BCNP personnel.

Table 3. Individual and mean hematological values for adult and juvenile Florida panthers captured by the Florida Fish and Wildlife Conservation Commission and National Park Service 1 July 2003 to 30 June 2004.

ID ^a	Hb ^b g/dl	HCT ^c %	WBC ^d 10 ³ /μl	RBC ^e 10 ⁶ /μl	MCV ^f fl	MCH ^g pg	MCHC ^h g/dl	polys ⁱ /μl	polys %	band s ^j /μl	bands %	lymphs ^k /μl	lymphs %	monos ^l /μl	monos %	eos ^m /μl	eos %	basos ⁿ /μl	basos %
FP59	11.6	37	6.2	8.23	45	14.1	31.4	5332	86	0	0	434	7	124	2	310	5	0	0
FP71	10.5	32.3	12.4	6.18	52	17	32.5	9672	78	0	0	1612	13	496	4	620	5	0	0
FP79	10.4	33.4	4.4	6.51	51	16	31.1	3256	74	0	0	748	17	44	1	352	8	0	0
FP79	10.4	33.4	4.4	6.51	51	16	31.1	3256	74	0	0	748	17	44	1	352	8	0	0
FP83	9.3	30.2	6.3	6.04	50	15.4	30.8	5481	87	0	0	441	7	189	3	189	3	0	0
FP86*	9.88	32.4	10.7	6.95	46.6	14.2	30.5												
FP100	10.7	32.5	7.1	7.07	46	15.1	32.9	5751	81	0	0	639	9	355	5	355	5	0	0
FP102	11.3	36.5	9.5	6.99	52	16.2	31	5985	63	0	0	3420	36	95	1	0	0	0	0
FP103	12.1	40.9	6.7	7.57	54	16	29.6	5963	89	0	0	670	10	67	1	0	0	0	0
FP113	9.3	29.6	12.2	6.34	47	14.7	31.4	9516	78	0	0	1708	14	488	4	488	4	0	0
FP116	10.2	33.1	9.7	7.63	43	13.4	30.8	5917	61	0	0	3104	32	291	3	388	4	0	0
FP117	12.1	37	8.1	8.1	46	14.9	32.7	4779	59	0	0	2754	34	324	4	243	3	0	0
FP121	11.6	35.6	8.1	7.56	47	15.3	32.6	6642	82	0	0	1053	13	243	3	162	2	0	0
FP122	7.2	22.5	8.5	4.18	54	17.2	32	4845	57	0	0	2550	30	1020	12	85	1	0	0
FP123	13.2	42.5	5.2	8.75	49	15.1	31.1	3848	74	0	0	884	17	416	8	52	1	0	0
FP124	10	32.3	8.1	6.2	52	16.1	31	7128	88	0	0	567	7	243	3	162	2	0	0
FP125	12	39.9	7.3	8.21	49	14.6	30.1	5840	80	0	0	730	10	511	7	219	3	0	0
FP126	10.3	33.7	12.9	7	48	14.7	30.6	11481	89	0	0	903	7	387	3	129	1	0	0
FP126	11.5	34.3	8	6.88	50	16.7	33.5	5280	66	0	0	2160	27	160	2	400	5	0	0
FP127	8.4	26.6	10.8	5.63	47	14.9	31.6	8208	76	0	0	2160	20	432	4	0	0	0	0
FP128	10.8	32.8	6	7.01	47	15.4	32.9	3720	62	0	0	1560	26	180	3	540	9	0	0
FP129	10.4	32.1	9	6.43	50	16.2	32.4	5850	65	0	0	2070	23	540	6	540	6	0	0
FP130	9.4	30.5	6.1	6.72	45	14	30.8	3294	54	0	0	2318	38	244	4	244	4	0	0
FP131	10.6	31.5	12.4	7.09	44	15	33.7	10044	81	0	0	992	8	744	6	496	4	124	1
FP132	12.3	37.8	5.8	8.01	47	15.4	32.5	4060	70	0	0	1392	24	232	4	116	2	0	0
UCFP60*	13	37.4	12.6	9.08	41.2	14.3	34.7												
Mean	10.7	33.8	8.4	7.0	48.2	15.3	31.7	6047.8	73.9	0.0	0.0	1484.0	18.6	327.9	3.9	268.4	3.5	5.2	0.0
STD	1.3	4.2	2.6	1.0	3.2	0.9	1.2	2225.8	10.6	0.0	0.0	874.2	10.0	226.7	2.5	182.3	2.5	24.8	0.2

^aFP denotes panthers captured for radiocollaring; UCFP denotes uncollared Florida panther.

^bHb = hemoglobin; ^cHCT = hematocrit; ^dWBC = white blood cells; ^eRBC = red blood cells; ^fMCV = mean red cell volume; ^gMCH = mean red cell hemoglobin; ^hMCHC = mean red cell hemoglobin concentration; ⁱpolys = polymorphonucleocytes; ^jbands = band cells; ^klymphs = lymphocytes; ^lmonos = monocytes; ^meos = eosinophils; ⁿbasos = basophil

*Captured and sampled due to illness or injury.

Table 4. Individual and mean serum biochemical values for adult and juvenile Florida panthers captured by the Florida Fish and Wildlife Conservation Commission and National Park Service 1 July 2003 to 30 June 2004.

ID ^a	P4 ^b ng/ml	BUN ^c mg/dl	creat ^d mg/dl	TP ^e g/dl	alb ^f g/dl	bili ^g mg/dl	ALP ^h u/l	ALT ⁱ u/l	AST ^j u/l	cho ^k mg/dl	Ca ^l mg/dl	P ^m mg/dl	Na ⁿ meq/ml	K ^o meq/ml	CP ^p meq/ml	Glob ^q g/dl	trig ^r mg/dl	CPK ^s u/l	Mg ^t meq/ml	Osm ^u mosm/l
FP59		20	2.8	8.2	3.4	0.1	4	37	34	116	10.4	5.4	150	4.5	113	4.8	10	180	2.6	301
FP71	12.6	17	0.5	7.2	1.1	0.1	3	78	128	51	8.4	2.1	147	5.4	96	6.1	17	224	1.5	292
FP79		48	1.9	6.9	3.3	0.1	5	42	51	154	9.6	4.9	156	5.2	117	3.6	12	502	1.6	328
FP79		48	1.9	6.9	3.3	0.1	5	42	51	154	9.6	4.9	156	5.2	117	3.6	12	502	1.6	328
FP83	11.3	43	1.8	7	3.2	0.1	11	57	84	99	8.7	5.8	151	4	111	3.8	62	291	2	316
FP86*		34	1.6	6.9	2.6	0.4	3	35	10	57	9.7	5.3	151	4.5	120	4.3			2	
FP100		30	3	7.6	3.3	0.2	6	64	66	126	10.1	6.2	152	5.4	120	4.3	5	708	1.6	317
FP102	15.3	31	2.7	6.7	3.3	0.2	19	93	190	140	9.3	6.8	156	6.4	111	3.4	104	574	2	322
FP103	7.9	50	2.2	7.1	3	0.1	17	126	382	107	9.5	10.5	165	5.6	111	4.1	191	572	2.3	343
FP113	10.4	32	1.7	6.4	3.1	0.1	10	29	59	104	9.9	7	151	4	106	3.3	29	252	1.7	311
FP116	8.2	61	1.8	7.4	3.5	0.1	17	39	40	154	9.9	6.9	157	4.8	115	3.9	56	372	2	327
FP117		42	2	7.2	3.7	0.1	55	28	37	192	10.4	7.5	152	4.5	112	3.5	94	483	2.1	312
FP121	1.3	60	2.7	6.9	3.3	0.1	9	36	58	138	9.8	5.1	159	4.3	113	3.6	17	777	1.6	330
FP122	0.7	24	2.4	6.5	3.3	0.3	8	35	28	62	10.3	5	158	4	122	3.2	9	244	1.7	316
FP123		59	1.5	7.4	3.6	0.3	7	62	68	133	9.8	5.2	161	4.7	114	3.8	222	470	2.3	336
FP124		57	1.3	7	2.8	0.1	6	45	49	141	9.1	5.4	151	4.1	108	4.2	62	580	1.8	324
FP125		82	1.5	6.6	3.2	0.1	50	37	53	130	9.7	8	153	4.8	110	3.4	53	437	1.9	345
FP126		76	1.3	6.3	2.8	0.1	40	24	49	112	10.2	7	142	4.1	98	3.5	48	901	2.1	305
FP126		27	1.7	6.6	3	0.1	38	26	30	119	8.7	7.7	154	4.7	120	3.6	20	187	1.8	311
FP127		22	1.8	6.1	3.3	0.1	39	35	31	147	9.9	5	152	3.9	117	2.8	22	732	1.5	311
FP128	10.3	64	1.7	7.8	3.5	0.1	7	115	198	143	9.3	5.3	158	4.8	117	4.3	39	1005	2	332
FP129	1.3	51	2.1	6.6	3	0.3	12	45	78	93	8.4	8.1	153	5.1	104	3.6	39	687	1.5	317
FP130		28	1.7	6.4	3.5	0.2	78	42	34	151	9.9	8.6	159	4.8	124	2.9	14	450	1.9	322
FP131		25	1.7	7.3	3.3	0.1	11	48	62	153	9.1	3.9	149	4.4	114	4	20	500	2.1	309
FP132		57	1.2	7.5	3.9	0.3	9	57	51	195	9.9	6.6	168	4.5	105	3.6	66	582	1.8	349
UCFP60*		38	3	4.9	2.4	0.1	124			118	8.7	8.5	147	3.7	111	2.5			1.7	
Mean	7.9	43.3	1.9	6.9	3.1	0.2	22.8	51.1	76.8	126.5	9.6	6.3	154.2	4.7	112.5	3.8	51.0	508.8	1.9	321.0
STD	4.9	17.3	0.6	0.6	0.5	0.1	27.7	25.9	76.5	34.9	0.6	1.7	5.6	0.6	6.7	0.7	53.9	215.8	0.3	13.7

^aFP denotes panthers captured for radiocollaring; UCFP denotes uncollared Florida panther.

^bP4 = progesterone; ^cBUN = blood urea nitrogen; ^dcreat = creatinine; ^eTP = total protein; ^falb = albumin; ^gbili = bilirubin; ^hALP = alkaline phosphatase; ⁱALT = alanine aminotransferase;

^jAST = aspartate aminotransferase; ^kchol = cholesterol; ^lCa = calcium; ^mP = phosphorus; ⁿNa = sodium; ^oK = potassium; ^pCl = chloride; ^qGlob = globulin; ^rtrig = triglyceride; ^sCPK = creatine kinase;

^tMg = magnesium; ^uOsm = osmolality.

*Captured and sampled due to illness or injury.

Table 5. Reciprocal antibody titers to feline panleukopenia virus (FPV), feline calicivirus (FCV), and feline viral rhinotracheitis virus (FVR), presence of antibody to feline immunodeficiency virus (FIV), presence of feline leukemia virus (FeLV) antigen (ag), and reciprocal antibody (ab) titers to FeLV in Florida panthers sampled in south Florida, 2003-2004 by the Florida Fish and Wildlife Conservation Commission and National Park Service.

Cat ID ^a	Previously Vaccinated	FPV	FCV	FVR	FIV (kela) ^{b,d}	FIV (wblood) ^{c,d}	FeLV (ELISA ag)	FeLV (ELISA ab)	WNV
FP59	Yes	80 (P)	384 (P)	12 (P)	e	e	n	0.176	64 (P)
FP71	Yes	320 (P)	768 (P)	8 (N)	e	n	n	0.173	256 (P)
FP79	Yes	320 (P)	64 (P)	12 (P)	p	n	n	0.116	128 (P)
FP83	Yes						n*ANTECH		
FP86	Yes	20 (P)	24 (P)	8 (P)	n	n	n	0.094	1024 (P)
FP100	Yes	320 (P)	192 (P)	8 (N)	e	n	n	0.155	1024 (P)
FP102	Yes	10 (P)	16 (P)	8 (N)	n	n	n	0.121	256 (P)
FP103	Yes	160 (P)	32 (P)	8 (N)	e	n	n	0.143	256 (P)
FP113	Yes	40 (P)	64 (P)	16 (N)	p	e	n	0.237	64 (P)
FP116	Yes	80 (P)	64 (P)	12 (P)	n	n	n	0.142	256 (P)
FP117	Yes	640 (P)	12 (P)	8 (N)	e	n	n	0.157	512 (P)
FP121	No	640 (P)	256 (P)	8 (N)	n	n	n	0.148	2048 (P)
FP122	No	640 (P)	256 (P)	8 (N)	n	n	p	0.183	256 (P)
FP123	No	160 (P)	>1024 (P)	8 (N)	n	n	p	0.151	512 (P)
FP124	No	160 (P)	8 (P)	8 (N)	p	p	n	0.155	1024 (P)
FP125	No	10 (P)	48 (P)	8 (N)	e	n	n	0.135	1024 (P)
FP126	No	10 (P)	16 (P)	8 (N)	n	n	n	0.155	1024 (P)
FP127	No	1280 (P)	48 (P)	8 (N)	p	p	n	0.149	512 (P)
FP128	No	160 (P)	192 (P)	8 (N)	p	n	n	0.171	2048 (P)
FP129	No	640 (P)	12 (P)	8 (N)	p	p	n	0.157	256 (P)
FP130	No	10 (P)	48 (P)	8 (N)	n	n	n	0.181	8 (P)
FP131	No	80 (P)	48 (P)	8 (N)	p	n	n	0.193	1024 (P)
FP132	No	160 (P)	32 (P)	8 (N)	e	n	n	0.108	512 (P)
UCFP60	No	320 (P)	8 (N)	8 (N)	n	n	n	0.144	512 (P)
UCFP63	No							0.166	

^aFP denotes panther captured for radiocollaring; ^bpresence of antibodies determined by ELISA; ^cpresence of antibodies determined by Western Blot; ^d P=positive, N=negative, E=equivocal.

Table 6. Hair (1996-2004) and blood (2003-2004) mercury concentrations (ppm) in adult or juvenile Florida panthers live-captured by the Florida Fish and Wildlife Conservation Commission and National Park Service 1 July 2003 – 30 June 2004.

ID ^a	Date	Sex	Age (yr)	Location ^b	Hair 96-97	Hair 97-98	Hair 98-99	Hair 99-00	Hair 00-01	Hair 01-02	Hair 02-03	Hair 03-04	Blood 03-04
FP59	4/20/04	M	9.33	FSSP	18		4.3		0.69			2.2	0.11
FP60	6/29/04	F	8.75	BCNP	5.4		19			8.1		8	0.12
FP71	2/17/04	F	5.5	BC-SIR								0.85	0.032
FP75 ^c	5/6/03	F	5	BCNP-BI			3.6	21			7.9		0.52 (FY02-03)
FP79	3/17/04	M	7.25	BCNP			2.1		1.2			1.1	0.093
FP83	3/31/04	F	4.83	FSSP				2.9	5.4			1.2	0.083
FP86	11/6/03	F	4.08	N of Oasis				0.89	12		4	7	0.56
FP100	1/6/04	M	7	BCNP-AL					1.1			0.45	0.039
FP102	3/24/04	F	6	BCNP					2.6			0.91	0.11
FP103	2/27/04	F	3.75	BCNP					1.5	7.9		2.8	0.37
FP113	4/7/04	F	2	FPNWR							9.7	5.5	0.48
FP116	3/22/04	F	1.79	Green Glades West							1.7	2.4	0.1
FP117	12/3/03	M	1.73	BC-SIR							0.71	0.52	0.035
FP121	12/2/03	F	2.5	BC-SIR								1.1	0.11
FP122	1/30/04	F	2.25	OKS								4.3	0.094
FP123	2/2/04	M	3.5	OKS								0.31	0.026
FP124	2/13/04	F	4	BCNP								8.2	0.41
FP125	2/13/04	M	0.75	BCNP								3.4	0.17
FP126	2/13/04	F	0.75	BCNP								3.9	0.2
FP126	5/28/04	F	1	BCNP								5.6	0.21
FP127	2/16/04	M	1	BCNP								0.62	0.058
FP128	2/18/04	F	3.7	BC-SIR								0.98	0.04
FP129	2/20/04	F	4	BCNP-RP								4.5	0.45
FP130	3/4/04	M	0.79	OKS								0.59	0.028
FP131	3/10/04	M	5	FPNWR								0.55	0.034
FP132	3/17/04	M	3	OKS								0.17	0.021
UCFP60	12/10/03	M	2.5	US41-Collier Co.									0.12

^aFP denotes Florida panther captured for radio-collaring; UCFP denotes uncollared Florida panther.

^bBCNP = Big Cypress National Preserve (AL = Addition Lands, BI = Bear Island Unit, ML = Monument Lake Unit, TR = Turner River Unit), BC-SIR = Big Cypress Seminole Indian Reservation, ENP = Everglades National Park, FPNWR = Florida Panther National Wildlife Refuge, OKS = Okaloacoochee Slough Wildlife Management Area, PSSP = Picayune Strand State Preserve, PL = Private Lands north of FPNWR and BCNP-BI

^cData not included in last year's report.

Table 7. Hair (1996-2004) mercury concentrations (ppm) in adult and juvenile Florida panthers necropsied 1 July 2003 – 30 June 2004.

ID ^a	Date	Sex	Age (yr)	Location ^b	Hair 96-97	Hair 97-98	Hair 98-99	Hair 99-00	Hair 00-01	Hair 01-02	Hair 02-03	Hair 03-04
FP114	10/17/03	M	1.5	FPNWR							10	0.36
FP122	2/14/04	F	2.25	OKS								3.8
FP73	7/16/03	F	6.5	BC-SIR			0.99				0.8	0.38
FP77	7/15/03	F	6	BC-SIR			0.7					0.21
FP82	5/26/03	F	6.5	OKS				0.7			0.93	0.15
FP85	3/1/04	M	5	ENP								150
UCFP53	8/7/03	F	3.5	SR29-Collier Co.								0.4
UCFP54	8/11/03	M	0.75	SR29-Collier Co.								0.26
UCFP55	6/19/03	M	1.5	Billie Swamp Safari								0.4
UCFP57	6/17/03	F	4.5	Billie Swamp Safari								1.3
UCFP58	8/8/03	F	0.83	CR846-Hendry Co.								0.27
UCFP59	1/27/04	M	0.75	CR858-Collier Co.								0.46
UCFP60	12/13/03	M	1.5	US42-Collier Co.								4.9
UCFP61	1/28/04	F	2.5	CR833-Hendry Co.								0.77
UCFP62	4/28/04	F	0.63	US41-Dade Co.								2
UCFP63	2/29/04	M	3.5	I75-Collier Co.								0.24
UCFP65	5/96/04	M	1.5	SR29-Collier Co.								2.7

^aFP denotes Florida panther captured for radio-collaring; UCFP denotes uncollared Florida panther.

^bBC-SIR = Big Cypress Seminole Indian Reservation, FPNWR = Florida Panther National Wildlife Refuge, ENP = Everglades National Park, OKS = Okaloacoochee Slough Wildlife Management Area.

Table 8. Reciprocal antibody titers for feline leukemia virus (FeLV) in captive Florida panthers and Texas cougars vaccinated for FeLV at White Oak Plantation.

ID#	Pre-vaccination		Booster		15 d post booster	
	Titer	Date	Titer	Date	Titer	Date
TX105	0.201	6/9/03	0.285	6/30/03	0.247	7/15/03
TX106	0.191	6/9/03	0.313	6/30/03	0.407	7/15/03
TX108	0.185	6/9/03	0.242	6/30/03	0.224	7/15/03
FP113	0.177	7/8/03	0.199	8/20/03	nd	nd
FP114	0.215	7/8/03	0.247	8/20/03	nd	nd
FP116	0.183	7/14/03	0.27	8/20/03	nd	nd

Titer:

<0.251 = Negative

0.251 – 0.350 = Low positive

0.351 – 0.500 = Medium positive

0.501 – 1.0 = High positive

Table 9. Free-ranging Florida panthers vaccinated for feline leukemia virus by the Florida Fish and Wildlife Conservation Commission and National Park Service since 8 July 2003.

FP#	Age (yr)	Sex	Initial vaccine	Date	Booster vaccine	Date	Inoculation-booster interval (wks)	Additional boosters	Status	% vaccinated ¹
113	1.08	F	Fel-O-Vax	7/8/03 ²	Fel-O-Vax	8/20/03 ³	6.14	4/7/04	A	3.3
114	1.08	F	Fel-O-Vax	7/8/03 ²	Fel-O-Vax	8/20/03 ³	6.14		D 10/17/03	3.3
116	1.12	F	Fel-O-Vax	7/8/03 ²	Fel-O-Vax	8/20/03 ³	6.14	3/22/04	A	3.3
121	2.5	F	Fel-O-Vax	12/2/03	Fel-O-Vax	1/5/04	4.86		A	4.4
117	1.73	M	Fel-O-Vax	12/3/03	Fel-O-Vax	4/8/04	18.14		D 7/28/04	5.6
100	7	M	Fel-O-Vax	1/6/04					A	6.7
124	4	F	Fel-O-Vax	2/13/04					A	7.8
125	0.75	M	Fel-O-Vax	2/13/04	Fel-O-Vax	3/22/04	5.43		A	8.9
126	0.75	M	Fel-O-Vax	2/13/04	Fel-O-Vax	3/22/04	5.43	5/28/04	A	10
127	1	M	Fel-O-Vax	2/16/04	Fel-O-Vax	3/12/04	3.57		A	11.1
71	5.5	F	Fel-O-Vax	2/17/04					A	12.2
128	3.7	F	Fel-O-Vax	2/18/04	Fel-O-Vax	3/26/04	5.29		A	13.3
129	4	F	Fel-O-Vax	2/20/04					A	14.4
103	3.75	F	Fel-O-Vax	2/27/04					A	15.6
130	0.79	M	Fel-O-Vax	3/4/04	Fel-O-Vax	3/19/04	2.14		A	16.7
131	5	M	Fel-O-Vax	3/10/04	Fel-O-Vax	4/9/04	4.29		A	17.8
79	7.25	M	Fel-O-Vax	3/17/04					A	18.9
102	6	F	Fel-O-Vax	3/24/04					A	20
83	4.83	F	Fel-O-Vax	3/31/04					A	21.1
110	4.33	F	Fel-O-Vax	4/13/04					A	22.2
59	9.33	M	Fel-O-Vax	4/20/04					A	23.3

¹% vaccinated = $x/90 * 100$ (assumption: population = 90), refers to initial inoculation only, ² in captivity, ³ released into wild

Table 10. Survival to independence and established residency of radiocollared Florida panther and Texas puma descendant kittens in southern Florida, 1985-2004.

Are these all known birthdates?

Panther ID	Sex	Capture Age (mos)	Capture Date	Live to Independence	Resident	Texas Genes	Birth Date	Loss Date	Loss Type	Loss Age	First Litter	Age at First Litter
10	M	5	1/15/1986	TRUE	FALSE	FALSE	8/15/1985	1/27/1987	AGGRESSION	1.5		
16	M	13	1/12/1987	TRUE	TRUE	FALSE	12/15/1985	1/3/2000	UNKNOWN	14.1		
19	F	9	2/9/1987	TRUE	TRUE	FALSE	5/15/1986	12/2/1997	OTHER	11.6	3/15/1988	1.8
22	F	5	3/18/1987	TRUE	TRUE	FALSE	10/15/1986	7/20/1991	OTHER	4.8		
29	M	6	1/3/1989	TRUE	TRUE	FALSE	5/15/1988	5/27/1992	OTHER	4.0		
30	M	9	1/6/1989	TRUE	FALSE	FALSE	3/15/1988	1/29/1990	AGGRESSION	1.9		
34	M	10	1/8/1990	TRUE	TRUE	FALSE	3/15/1989	11/15/1993	OTHER	4.7		
42	M	11	3/6/1990	TRUE	TRUE	FALSE	5/15/1989	6/22/1995	UNKNOWN	6.1		
43	M	9	5/1/1990	TRUE	FALSE	FALSE	7/15/1989	10/31/1991	AGGRESSION	2.3		
44	M	6	4/30/1991	TRUE	FALSE	FALSE	11/15/1990	7/6/1993	AGGRESSION	2.6		
45	M	6	5/8/1991	TRUE	TRUE	FALSE	11/15/1990	8/2/1998	AGGRESSION	7.7		
47	M	6	2/21/1992	TRUE	FALSE	FALSE	7/15/1991	2/19/1993	AGGRESSION	1.6		
48	F	4	2/24/1992	TRUE	TRUE	FALSE	10/15/1991	7/5/2000	RADIOFAIL	8.7	10/15/1993	2
50	M	8	3/4/1992	TRUE	FALSE	FALSE	5/15/1991	12/6/1993	VEHICLE	2.6		
52	F	6	5/5/1992	TRUE	TRUE	FALSE	10/15/1991	1/14/1995	VEHICLE	3.3	7/15/1993	1.8
53	M	10	2/10/1993	FALSE	FALSE	FALSE	4/15/1992	2/26/1993	AGGRESSION	0.9		
54	M	10	2/10/1993	TRUE	TRUE	FALSE	4/15/1992	10/23/2000	RADIOFAIL	8.5		
55	F	14	1/25/1994	TRUE	TRUE	FALSE	12/15/1992				4/15/1995	2.3
58	M	8	2/8/1995	TRUE	FALSE	FALSE	4/15/1994	3/30/1997	AGGRESSION	3.0		
59	M	6	1/4/1996	TRUE	TRUE	FALSE	6/15/1995					
60	M	5	3/6/1996	TRUE	TRUE	FALSE	10/15/1995					
61	F	8	3/4/1997	TRUE	TRUE	TRUE	7/15/1996	6/6/2003	RADIOFAIL	6.9	3/15/1999	2.7
62	M	6	3/18/1997	TRUE	FALSE	FALSE	9/15/1996	7/24/2000	RADIOFAIL	3.9		
64	M	8	5/24/1997	TRUE	FALSE	FALSE	9/15/1996	3/26/1999	AGGRESSION	2.5		
65	M	11	11/19/1997	TRUE	TRUE	TRUE	12/15/1996					
66	F	12	12/9/1997	TRUE	TRUE	TRUE	12/15/1996	5/1/2000	RADIOFAIL	3.4	9/15/1998	1.8
67	F	8	1/19/1998	TRUE	TRUE	FALSE	6/15/1997	1/15/2003	AGGRESSION	5.6	8/15/2000	3.2
69	F	9	2/5/1998	TRUE	TRUE	FALSE	5/15/1997	2/5/2001	RADIOFAIL	3.7	7/15/1999	2.2
70	F	10	2/25/1998	TRUE	TRUE	TRUE	5/15/1997				6/15/1999	2.1
71	F	10	3/5/1998	TRUE	TRUE	TRUE	5/15/1997	7/12/2000	RADIOFAIL	3.2	6/15/1999	2.1

Panther ID	Sex	Capture Age (mos)	Capture Date	Live to Independence	Resident	Texas Genes	Birth Date	Loss Date	Loss Type	Loss Age	First Litter	Age at First Litter
75	F	7	1/11/1999	TRUE	TRUE	FALSE	6/15/1998				3/15/2000	1.8
83	F	8	2/8/2000	TRUE	TRUE	TRUE	6/15/1999					
85	M	10	2/17/2000	TRUE	TRUE	TRUE	3/15/1999					
86	F	8	2/21/2000	TRUE	TRUE	TRUE	6/15/1999				4/15/2002	2.8
87	F	10	2/28/2000	TRUE	TRUE	TRUE	4/15/1999	6/20/2003	AGGRESSION	4.2	1/15/2001	1.8
88	F	9	3/2/2000	TRUE	TRUE	TRUE	6/15/1999				5/15/2001	1.9
90	M	9	3/8/2000	TRUE	FALSE	TRUE	6/15/1999	4/26/2001	VEHICLE	1.9		
91	F	9	3/17/2000	TRUE	TRUE	TRUE	6/15/1999	12/12/2003	AGGRESSION	4.5		
92	M	10	4/6/2000	TRUE	FALSE	TRUE	6/15/1999	9/15/2001	UNKNOWN	2.3		
93	F	14	4/10/2000	TRUE	TRUE	TRUE	2/15/1999				4/15/2002	3.2
94	F	10	5/1/2000	TRUE	TRUE	TRUE	7/15/1999					
96	M	9	1/7/2001	TRUE	FALSE	FALSE	4/15/2000	1/17/2002	AGGRESSION	1.8		
97	M	11	1/19/2001	TRUE	FALSE	FALSE	2/15/2000	12/2/2001	AGGRESSION	1.8		
99	M	11	1/26/2001	TRUE	TRUE	FALSE	2/15/2000	11/28/2002	VEHICLE	2.8		
103	F	7	3/13/2001	TRUE	TRUE	TRUE	8/15/2000					
104	M	7	4/2/2001	TRUE	TRUE	UNK	9/15/2000					
106	F	13	4/12/2001	TRUE	TRUE	FALSE	2/15/2000	2/20/2003	VEHICLE	3.0	5/15/2002	2.2
107	F	19	11/1/2001	TRUE	TRUE	FALSE	4/15/2000				6/15/2002	2.2
108	M	11	11/3/2001	TRUE	FALSE	TRUE	1/15/2001	11/16/2002	AGGRESSION	1.8		
FP113	F	6	10/23/2002	TRUE	TRUE	FALSE	4/15/2002					
FP114	M	6	10/23/2002	TRUE	FALSE	FALSE	4/15/2002	10/17/2003	AGGRESSION	1.5		
FP116	F	7	1/20/2003	TRUE	TRUE	TRUE	6/15/2002				4/15/2004	1.8
FP125	M	8	2/13/2004	TRUE	FALSE	UNK	6/1/2003					
FP126	M	8	2/13/2004	TRUE	FALSE	UNK	6/1/2003					
FP130	M	9	3/4/2004	TRUE	FALSE	TRUE	5/15/2003					

Table 11 . Litter size at birth and at 6 months-of-age for select female Florida panthers and Texas puma descendants.

Dam ID ^a	Ancestry	Den year	Litter size	# Alive at 6 mos.
FP32	FLA	1996	1	0
FP40	FLA	1992	2	2
FP40	FLA	1993	3	2
FP48	FLA	1995	2	2
FP48	FLA	1996	3	2
FP48	FLA	1998	2	2
FP48	FLA	1999	2	0
FP49	FLA	1999	1	0
FP56	FLA	1995	3	0
FP56	FLA	1996	2	0
FP56	FLA	1997	4	2
FP67	FLA	2002	3	1
FP69	FLA	1999	3	2
FP75	FLA	2002	2	2
FP78	FLA	2000	2	2
FP78	FLA	2002	4	2
FP101	FLA	2002	2	0
FP106	FLA	2002	3	1
FP107	FLA	2002	2	0
FP55 _{B-FL}	TX	2002	1	0
FP61 _{F1}	TX	1999	1	1
FP61 _{F1}	TX	2002	4	2
FP66 _{F1}	TX	1998	3	0
FP66 _{F1}	TX	1999	3	2
FP70 _{B-TX}	TX	1999	3	3
FP71 _{B-TX}	TX	1999	4	3

Dam ID ^a	Ancestry	Den year	Litter size	# Alive at 6 mos.
FP73 _{FI}	TX	2002	3	2
FP77	TX	2000	3	1
FP77	TX	2001	1	
FP83 _{FI}	TX	2002	1	1
FP93 _{B-TX}	TX	2002	4	3
FP95 _{FI}	TX	2002	2	2
FP102 _{B-FL}	TX	2002	2	2
TX101	TX	1995	2	2
TX101	TX	1996	2	2
TX106	TX	1998	1	0
TX106	TX	1999	2	1
TX107	TX	1997	2	2
TX108	TX	1998	2	1

^aFP denotes panthers captured for radiocollaring; TX denotes Texas pumas used for Panther Genetic Restoration; FI subscript denotes Florida panther x Texas puma offspring; B-FL subscript denotes offspring of FI x Florida panther; B-TX subscript denotes offspring of FI x Texas puma mating.

Table 12. Estimated annual survival rates (Heisey and Fuller 1985) for adult female Florida panthers in southern Florida based on radiocollared panthers from 1990-2003.

Year	No. of panthers	Radio-days	Total deaths	Mortality cause			Radio failure	Interval survival rate
				Aggression	Roadkill	Other		
1990	13	4374	2	2	0	0	0	0.846
1991	11	3656	2	0	0	2	0	0.811
1992	12	4158	0	0	0	0	0	1.000
1993	12	4380	0	0	0	0	0	1.000
1994	14	4599	2	0	1	1	0	0.853
1995	13	4363	1	0	1	0	0	0.920
1996	12	4392	0	0	0	0	0	1.000
1997	14	4533	1	0	0	1	1	0.922
1998	17	4990	2	1	0	1	1	0.864
1999	17	5878	0	0	0	0	1	1.000
2000	26	7675	2	0	1	1	3	0.909
2001	27	8470	1	1	0	0	2	0.958
2002	27	8473	5	3	0	2	0	0.806
2003	28	7214	9	3	1	5	2	0.634

n 14
Mean $\pm$ SD 0.895 $\pm$ 0.103
95% CI 0.841 to 0.949

↑
70% sample killed

Table 13. Estimated annual survival rates (Heisey and Fuller 1985) for adult male Florida panthers in southern Florida based on radiocollared panthers from 1990-2003.

Year	No. of panthers	Radio-days	Total deaths	Mortality cause			Radio failure	Interval survival rate
				Aggression	Roadkill	Other		
1991	9	2977	1	1	0	0	0	0.885
1992	12	3847	2	1	0	1	0	0.827
1993	11	3270	4	2	1	1	0	0.640
1994	7	2324	2	2	0	0	0	0.730
1995	6	2152	0	0	0	0	0	1.000
1996	8	2860	0	0	0	0	0	1.000
1997	11	3171	1	1	0	0	0	0.891
1998	13	3966	3	2	1	0	0	0.759
1999	12	3530	4	3	1	0	0	0.661
2000	14	3353	5	2	1	2	1	0.646
2001	14	3986	3	1	1	1	0	0.833
2002	14	4209	5	3	2	0	1	0.648
2003	11	3248	2	2	0	0	0	0.799

$n = 14$
Mean $\pm$ SD 0.787 ± 0.125
95% CI 0.721 ± 0.853

Table 14. Occurrence of kinked tails and cowlicks among Florida panthers and Texas puma descendents.

Ancestry	N	Kink			Cowlick		
		Yes	No	Unk	Yes	No	Unk
FLA	200	141 (70.5%)	48 (24.0%)	11 (5.5%)	97 (48.5%)	23 (11.5%)	80 (40.0%)
TEX	83	3 (3.6%)	78 (94.0%)	2 (2.4%)	9 (10.8%)	21 (25.3%)	53 (63.9%)
EVER	18	4 (22.2%)	14 (77.8%)	0 (0.0%)	1 (5.6%)	11 (61.1%)	6 (33.3%)
Unknown	28	4 (14.3%)	22 (78.6%)	2 (7.1%)	3 (10.7%)	17 (60.7%)	8 (28.6%)

Do these include kittens?
If so, are cowlicks apparent at <1 month of age?

Table 15. Kittens produced by female Florida panthers from October 1995 to 20 June 2004.

Panther ID	Den Date	Litter Size	Sex Ratio	Prevalence of Kinked Tail
FP19	Apr 1996	2	2♀:0♂	2 Yes:0 No
FP32	Apr 1996	1	0♀:1♂	1 Yes:0 No
FP36	Feb 1996	3	1♀:2♂	3 Yes:0 No
FP40	May 1997	2 (?)	1♀:1♂	2 Yes:0 No
FP48	Sep 1996	3	0♀:3♂	2 Yes:1 No
	Jun 1998	2	1♀:1♂	2 Yes:0 No
	Oct 1999	2	2♀:0♂	0 Yes: 1 No:1 UNK
FP49	Jan 1999	1	0♀:1♂	0 Yes:1 No
	Aug 2001	1	0♀:1♂	0 Yes: 1 No
FP55	Sep 1997	3	2♀:1♂	0 Yes:3 No
	Feb 1998	2	1♀:1♂	1 Yes:1 No
	June 2001	1	0♀:1♂	0 Yes:1 No
FP56	Oct 1995	3	0♀:3♂	3 Yes:0 No
	Aug 1996	2	2 UNK	2 Yes:0 No
	Jun 1997	4	2♀:2♂	3 Yes:1 No
FP67	August 2000	2	1♀:1♂	1 Yes: 1 No
	May 2001	4	1♀:3♂	0 Yes: 4 No
	June 2002	3	1♀:2♂	3 Yes: 0 No
FP69	Jul 1999	3	2♀:1♂	1 Yes: 2 No
FP75	June 2001	2	0♀:2♂	1 Yes: 1 No
	May 2002	2	0♀:2♂	2 Yes: 0 No
	Mar 2004	3	1♀:2♂	2 Yes: 1 No
FP78	Apr 2000	2	1♀:1♂	2 Yes: 0 No
	Apr 2002	4	3♀:1♂	4 Yes: 0 No
FP101	Apr 2002	2	1♀:1♂	0 Yes: 2 No
	Apr 2003	3	2♀:1♂	0 Yes: 3 No
FP106	May 2002	3	1♀:2♂	3 Yes: 0 No
FP107	June 2002	2	1♀:1♂	2 Yes: 0 No
	May 2004	4	2♀:2♂	2 Yes: 2 No
FP112	June 2002	2	0♀:2♂	2 Yes: 0 No
FP116	May 2004	3	2♀:1♂	0 Yes: 3 No
Mean/Total		2.5/76	31♀:43♂:2 UNK	Yes: 46 No: 29 UNK: 1

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Table 16. F1 kittens produced by female Texas pumas from October 1995 to 30 June 2003.

Cat ID	Den Date	Liter Size	Sex Ratio	Prevalence of Kinked Tail
TX101	Sep 1995	2	1♀:1♂	2 No
TX101	Dec 1996	2	1♀:1♂	2 No
TX105	Sep 1996(?)	1	1♀:0♂	1 No
TX105	Jul 1999	1(?)	1♀:0♂	1 No
TX106	Nov 1995	1	1♀:0♂	1 No
TX106	Feb 1998	1	0♀:1♂	1 No
TX106	Jun 1999	2	2♀:0♂	2 No
TX106	Mar 2001	2	1♀:1♂	2 No
TX107	May 1997	2	2♀:0♂	2 No
TX108	Jun 1996	1	1♀:0♂	1 No
TX108	Feb 1998	2	1♀:1♂	2 No
Mean/Total		1.5/17	12♀: 5♂	0 Yes: 17 No

missing
Feb 1999

Table 17. Documented litters with Texas puma ancestry produced from October 1995 – June 2004, excluding F1 generation.

Panther ID	Den Date	Litter Size	Sex Ratio	Prevalence of Kinked Tail	Pedigree/Suspected Sire
FP55	Apr 1999	2	1♀:1♂	1 Yes:1 No	Florida backcross / FP79 _{F1}
	May 2002	1	1♀:0♂	0 Yes: 1 No	Florida backcross / FP79 _{F1}
FP61 _{F1}	Mar 1999	1	0♀:1♂	0 Yes:1 No	Florida backcross / FP16
	Aug 2002	4	2♀:2♂	0 Yes; 4 No	Unclassified ^b / Unknown
FP66 _{F1}	Sep 1998	3	1♀:2♂	0 Yes:3 No	Florida backcross / FP72
	Dec 1999	3	2♀:1♂	0 Yes:3 No	Florida backcross / FP59
FP70 _{B-TX}	Jun 1999	3	2♀:1♂	0 Yes:3 No	Unclassified / FP79 _{F1}
	Jun 2004	3	2♀:1♂	0 Yes:3 No	Unclassified / Unknown
FP71 _{F1}	Jun 1999	4	2♀:2♂	0 Yes:4 No	Unclassified / FP79 _{F1}
FP73 _{F1}	?	1 (?)	?	1 Yes:0 No	Florida backcross / Unknown
	Apr 1999(?)	1(?)	?	0 Yes:1 No	Florida backcross / Unknown
	Feb 2002	3	1♀:2♂	0 Yes: 3 No	F1 / Unknown
FP77	May 2000	3	1♀:2♂	0 Yes: 3 No	Florida backcross / Unknown
	Aug 2001	1	0♀:1♂	1 Yes: 0 No	Florida backcross / Unknown
FP82	Dec 2000	3	2♀:1♂	1 Yes: 2 No	Florida backcross / FP65 _{F1}
FP83 _{F1}	Apr 2002	1	0♀:1♂	0 Yes: 1 No	F1 / Unknown
FP87 _{B-FL}	Jan 2001	3	1♀: 2♂	0 Yes: 3 No	Unclassified / FP79 _{F1}
	Mar 2003	3	2♀:1♂	0 Yes: 2 No: 1 Unk	
FP88 _{F2}	May 2001	4	2♀: 2♂	0 Yes: 4 No	Unclassified / Unknown
FP93	Apr 2002	4	3♀:1♂	0 Yes: 4 No	Texas backcross / FP79 _{F1}
	Aug 2003	3	1♀:2♂	0 Yes: 3: No	Texas backcross / FP60
FP95 _{F1}	Mar 2002	1	1♀:0♂	0 Yes: 1 No	F1 (ENP) / FP85 _{B-FL}
FP102	Jun 2001	2	0♀:2♂	0 Yes: 2 No	Unclassified/ FP79 _{F1}
	Jul 2002	2	1♀:1♂	0 Yes: 2 No	Unclassified/FP79 _{F1}
FP110 _{B-FL}	May 2003	3	2♀:1♂	0 Yes: 3 No	Unclassified / Unknown
TX107	Mar 1999	3	2♀:1♂	0 Yes:3 No	Texas backcross / FP79 _{F1}
FP93 _{B-TX}	Jul 2003	3	1♀: 2♂	0 Yes: 3 No	Texas backcross/FP60
Mean/Total		2.6/66^c	33♀:33♂	4 Yes: 63 No: 1 Unk	

^aFP denotes panthers captured for radiocollaring; F1 subscript denotes Florida panther x Texas puma offspring; F2 subscript denotes offspring of F1 x F1 mating; B-FL subscript denotes offspring of F1 x Florida panther mating.

^bDescendant of Texas puma, however, ancestry cannot be classified.

^cMean and Total does not include dens of FP73_{F1} that were not visited.

Appendix I. Aerial telemetry accuracy estimated by recovery of radiocollared panther carcasses or discovery of radiocollared panther dens.

Cat Number/Date	GPS Location		Flight Location		Distance	Type		
	EWUTM	NSUTM	EWUTM	NSUTM				
FP76 11/13/1999	462421	2881806	462500	2882200	401.84	death	AVGDIST	115.02
FP84 4/20/2000	460012	2982446	460300	2982300	322.89	death	COUNT	36
FP89 11/9/2000	484485	2884281	484500	2884200	82.38	death	STDDEV	91.06371
FP97 12/2/2001	465509	2926001	465500	2926000	9.06	death	CONFIDE	29.74693
FP49 1/3/2002	493213	2900108	493200	2900100	15.26	death		
FP105 1/15/2002	462385	2899168	462400	2899200	35.34	death		
FP92 9/15/2001	430933	2924962	430900	2924900	70.24	death		
FP111 9/4/2002	466864	2942850	466700	2942800	171.45	death		
FP112 9/11/2002	474998	2900155	475000	2900200	45.04	death		
FP78 10/17/2002	465297	2896039	465300	2896000	39.12	death		
FP32 9/12/2002	451442	2892859	451400	2892900	58.69	death		
FP67 1/15/2003	480986	2909860	480800	2909900	190.25	death		
FP73 3/3/02	507954	2899970	508000	2900000	54.92	den		
FP78 4/30/02	457513	2897669	457500	2897700	33.62	den		
FP101 5/9/02	494316	2905244	494100	2905100	259.60	den		
FP83 5/12/02	460796	2871524	460900	2871800	294.94	den		
FP106 5/27/02	464472	2903247	464400	2903200	85.98	den		
FP75 6/6/02	465967	2894804	466100	2894800	133.06	den		
FP112 6/15/02	473274	2901576	473200	2901600	77.79	den		
FP67 6/18/02	481599	2909277	481500	2909300	101.64	den		
FP107 7/7/02	452223	2894360	452000	2894300	230.93	den		
FP77 8/30/01	502626	2903898	502600	2903900	26.08	den		
FP49 8/27/01	495337	2900840	495200	2900900	149.56	den		
FP75 6/15/01	466823	2899382	466800	2899500	120.22	den		
FP67 5/26/01	486177	2909773	486300	2909800	125.93	den		
TX106 3/17/01	453401	2896211	453400	2896300	89.01	den		
FP82 1/3/01	472619	2933590	472400	2933300	363.40	den		
FP67 8/19/00	486062	2910750	486000	2910900	162.31	den		
FP109 2/26/03	467475	2943647	467600	2943600	133.54	death		
FP109 2/24/03	467475	2943647	467400	2943600	88.51	death		
FP109 2/21/03	467475	2943647	467600	2943500	192.96	death		
FP82 5/13/2003	472357	2929848	472400	2929900	67.48	death		
FP110 6/3/2003	467115	2938383	467100	2938400	22.67	den		
FP114 10/16/2003	465207	2896201	465193	2896199	14.14	death		
FP122 2/13/2004	467173	2935428	467292	2935303	172.59	death		
FP123 3/17/2004	473157	2930309	473125	2930292	36.24	death		
FP75 3/21/04	468375	2894039	468312	2894050	63.95	den		

Appendix II. List of radio-instrumented Florida panthers and Texas pumas in southern Florida from 10 February 1981 to 30 June 2004.

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP01	M	10 Feb 1981	10	-	-	-	Fakahatchee	14 Dec 1983	Vehicle (SR 84 mm 18)
FP02	M	20 Feb 1981	10	-	-	-	Fakahatchee	27 Nov 1984	Intraspecific aggression
FP03	F	23 Jan 1982	9	-	-	-	Fakahatchee	17 Jan 1983	Capture
FP04	M	27 Jan 1982	7-8	-	-	-	Fakahatchee	18 Apr 1985	Vehicle (SR 84 mm17)
FP05	F	23 Feb 1982	7-8	-	-	-	FPNWR	23 Nov 1982	Unknown
FP06	M	27 Feb 1982	6-8	-	-	-	Raccoon Pt. (North Swamp)	16 Apr 1982	Unknown
FP07	M	02 Mar 1982	6-7	-	-	-	Raccoon Pt.- Fakahatchee	26 Oct 1985	Vehicle (SR 29 C. prison)
FP08	F	25 Mar 1984	9-10	-	-	-	Fakahatchee	20 Aug 1988	Liver failure, old age
FP09	F	26 Jan 1985	3-4	-	-	-	Fakahatchee	-	-
FP10	M	15 Jan 1986	5 mos.	Aug 1985	FP09	-	GG Estates, Fakahatchee	27 Jan 1987	Intraspecific aggression
FP11	F	21 Jan 1986	4-5	-	-	-	Bear Island, Price's	25 Feb 2001	Intraspecific aggression
FP12	M	28 Jan 1986	5	-	-	-	Bear Is., FPNWR, FSSP	08 Nov 1994	Intraspecific aggression
FP13	M	27 Feb 1986	4-5	-	-	-	Bear Is. To Alico	14 Dec 1987	Vehicle (SR 29 Sunniland)
FP14	F	07 Dec 1986	5-6	-	-	-	Everglades	21 Jun 1991	unknown
FP15	F	13 Dec 1986	5-6	-	-	-	Everglades	10 Jun 1988	unknown
FP16	M	12 Jan 1987	12-14 mos.	-	FP14	-	Everglades to Stairsteps	3 Jan 2000	Unknown
FP17	M	20 Jan 1987	6-7	-	-	-	Gum Swamp to Nobles	20 Jul 1990	Unknown
FP18	F	22 Jan 1987	7-8	-	-	-	Gum Swamp, Scofields, BCSIR	01 Oct 1990	Intraspecific aggression
FP19	F	09 Feb 1987	9 mos.	May 1986	FP11	FP12	Bear Is., Prices, FPNWR	02 Dec 1997	Aortic aneurysm
FP20	M	10 Mar 1987	3-4	-	-	-	Alico to Bear Island	24 Aug 1988	Heart defect
FP21	F	16 Mar 1987	12-14 mos.	-	FP14	-	Everglades/White Oak	26 Dec 1997	Euthanasia

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP22	F	18 Mar 1987	5-6 mos.	-	FP15	-	Everglades	20 Jul 1991	Infection
FP23	F	18 Mar 1987	5-6 mos.	-	FP15	-	ENP, SBCNP	25-26 Nov 2000	Unknown
FP24	M	30 Jan 1988	3-4	-	-	-	Highlands Co.	22 Aug 1988	Unknown
FP25	M	16 Feb 1988	4-5	-	-	-	FPNWR	26 Aug 1988	Intraspecific aggression
FP26	M	01 Mar 1988	5-6	-	-	-	BCSIR, NBCNP	08 Jul 1994	Intraspecific aggression
FP27	F	11 Apr 1988	2-3	-	-	-	Everglades	23 Jul 1989	Unknown
FP28	M	29 Nov 1988	1.5	-	-	-	Ft. Myers, Lake Hiopoochee, Gum Swamp to Nobles	25 Sep 1992	Intraspecific aggression
FP29	M	03 Jan 1989	6.5 mos.	May 1988	FP11	FP20	Bear Island, Gum Swamp	27 May 1992	Pseudorabies
FP30	M	06 Jan 1989	9 mos.	Mar 1988	FP19	FP13	Bear Is., Prices, FPNWR, FSSP	29 Jan 1990	Intraspecific aggression
FP31	F	12 Jan 1989	7-9	-	-	-	FPNWR	03 Mar 1994	Vehicle (SR 29 Sunniland)
FP32	F	03 Feb 1989	2-2.5	-	-	-	FPNWR	12 Sep 2002	Unknown (old age?)
FP33	M	05 Mar 1989	1.5-2	-	-	-	Loop Rd. to Gum Swamp	23 Nov 1989	Rabies
FP34	M	08 Jan 1990	10 mos.	Mar 1989	FP31	FP12	FPNWR, BCSIR, Gum Swamp	15 Nov 1993	Esophageal puncture
FP35	M	15 Jan 1990	10 mos.	Mar 1989	FP31	FP12	Regency Farms	24 Jan 1990	Bacterial infection from capture
FP36	F	27 Jan 1990	4-5	-	-	-	Nobles	10 Oct 1998	Unknown natural causes
FP37	M	30 Jan 1990	3-4	-	-	-	FSSP, FPNWR, Bear Is.	26 Nov 1990	Vehicle (SR 29 Miles City)
FP38	F	08 Feb 1990	4.5	-	-	-	Raccoon Pt., Cons. Area 3a	04 Aug 1994	pleuritis in chest
FP39	M	19 Feb 1990	3-4	-	-	-	ENP	18 May 1990	Pyrothorax
FP40	F	26 Feb 1990	1.5-2	-	-	-	Nobles, Bear Island	01 Feb 1998	Intraspecific aggression
FP41	F	28 Feb 1990	1.5-2	-	-	-	Nobles, BCSIR	22 Sep 1990	Intraspecific aggression
FP42	M	06 Mar 1990	11 mos.	May 1989	FP14	FP16	Everglades, Raccoon Pt.	22 Jun 1995	Unknown
FP43	M	01 May 1990	9.5 mos.	Jul 1989	FP19	FP12	FPNWR, Nobles	31 Oct 1991	Intraspecific aggression

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP44	M	30 Apr 1991	6 mos.	Nov 1990	FP40	FP26	Bakers, Naples, ENP, SBCNP	06 Jul 1993	Intraspecific aggression
FP45	M	08 May 1991	6 mos.	Nov 1990	FP19	FP12	FPNWR, NBCNP, BCSIR	02 Aug 1998	Intraspecific aggression
FP46	M	30 Jan 1992	2-2.5	-	-	-	Bear Island, Gum Swamp, Okaloacoochee Slough	03 Feb 1999	Intraspecific aggression
FP47	M	21 Feb 1992	6 mos.	Jul 1991	FP11	FP12	Bear Island, Belle Meade, FSSP	19 Feb 1993	Intraspecific aggression
FP48	F	24 Feb 1992	4 mos.	Oct 1991	FP31	FP12	NBCNP	-	-
FP49	F	25 Feb 1992	2	-	-	-	NBCNP	03 Jan 2002	Intraspecific aggression
FP50	M	04 Mar 1992	8 mos.	May 1991	FP36	FP26	Nobles, Alico, Devils Garden	06 Dec 1993	Vehicle (CR 846 5 mi E of Immokalee)
FP51	M	26 Mar 1992	3	-	-	-	FSSP, FPNWR	17 Jul 1998	Vehicle (SR 29)
FP52	F	05 May 1992	6 mos.	Oct 1991	FP31	FP12	FPNWR, Sadie Cypress	14 Jan 1995	vehicle (CR 846 & Dupree Rd)
FP53	M	10 Feb 1993	10 mos.	Apr 1992	FP19	FP12	FPNWR	26 Feb 1993	Intraspecific aggression
FP54	M	10 Feb 1993	10 mos.	Apr 1992	FP40	-	FSSP, FPNWR	-	-
FP55	F	25 Jan 1994	2 yrs.	Dec 1992	FP23	FP42	SBCNP	-	-
FP56	F	03 Feb 1994	2-3	-	-	-	NBCNP	-	-
FP57	F	31 Jan 1995	3	-	-	-	FPNWR, FSSP	-	-
FP58	M	08 Feb 1995	8 mos.	Apr 1994	FP56	-	NBCNP, FPNWR, FSSP	30 Mar 1997	Intraspecific aggression
FP59	M	04 Jan 1996	6 mos.	Jun 1995	FP48	-	NBCNP, FPNWR, FSSP	-	-
FP60	M	06 Mar 1996	5 mos.	Oct 1995	FP40	-	NBCNP, FSSP, FPNWR, Turner River	-	-
TX101	F	05 Apr 1995	-	-	-	-	BCSIR	29 Mar 2000	Unknown
TX102	F	05 Apr 1995	-	-	-	-	E. Hendry County	22 Sep 1995	Vehicle (CR833 5 mi. N BCSIR)
TX103	F	04 May 1995	-	-	-	-	SBCNP	19 Aug 1999	Metabolic complications from pregnancy
TX104	F	24 Mar 1995	-	-	-	-	Fakahatchee Strand, Belle Meade	18 Apr 1998	Gunshot
TX105	F	05 Jul 1995	-	-	-	-	ENP	-	Removed from wild 1/27/2003

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
TX106	F	09 Apr 1995	-	-	-	-	PSSF, FPNWR, FSSP	-	Removed from wild 1/8/2003
TX107	F	04 May 1995	-	-	-	-	SBCNP	18 Jan 2001	Pneumonia
TX108	F	26 Jul 1995	-	-	-	-	ENP	-	Removed from wild 11/18/2003
FP61 _{FI}	F	04 Mar 1997	8 mos.	Jul 1996	TX108	FP16	ENP	-	-
FP62	M	18 Mar 1997	6.5 mos.	Sep 1996	FP48	-	Catfish Creek, Polk Co.	-	-
FP63	M	13 Apr 1997	2	-	-	-	BCSIR, NBCNP, Private Lands	15 Jan 2000	Vehicular trauma / Drowning
FP64	M	24 May 1997	8 mos.	Sep 1996	FP48	-	Corkscrew Marsh	26 Mar 1999	Intraspecific aggression
FP65 _{FI}	M	19 Nov 1997	11 mos.	Dec 1996	TX101	FP45	Okaloacoochee Slough	-	-
FP66 _{FI}	F	09 Dec 1997	1	Dec 1996	TX101	FP45	Belle Meade, FPNWR, Private Lands	-	-
FP67	F	19 Jan 1998	8 mos.	Jun 1997	FP56	FP45	BCSIR, Private Lands	15 Jan 2003	Intraspecific aggression (FP65)
FP68	M	23 Jan 1998	4.5	-	-	-	NBCNP	01 Mar 2000	Unknown (likely intraspecific aggression)
FP69	F	05 Feb 1998	9 mos.	May 1997	FP40	FP45	NBCNP	-	-
FP70 _{FI}	F	25 Feb 1998	10 mos.	May 1997	TX107	-	SBCNP	-	-
FP71 _{FI}	F	05 Mar 1998	10 mos.	May 1997	TX107	-	SBCNP	-	-
FP72	M	24 Apr 1998	2.5	-	-	-	BCSIR	23 Dec 1998	Intraspecific aggression
FP73 _{FI}	F	12 Nov 1998	3	Sep 1995	TX101	-	BCSIR	27 June 2003	Unknown
FP74	M	12 Nov 1998	1.5	-	FP73 _{FI}	-	Fishcating Creek, Glades and Highlands Co.	08 Sep 1999	Vehicle (SR 27 north of Palmdale)
FP75	F	11 Jan 1999	7 mos.	Jun 1998	FP48	FP68	NBCNP	-	-
FP76	M	13 Jan 1999	22 mos	-	-	-	FPNWR, SBCNP	13 Nov 1999	Intraspecific aggression (FP54)
FP77	F	22 Jan 1999	1.5-2	-	-	-	NBCNP, BCSIR	12 July 2003	Unknown
FP78	F	16 Feb 1999	2.0	-	-	-	FPNWR	17 Oct 2002	Intraspecific aggression
FP79 _{FI}	M	03 Mar 1999	3.5	Sep 1995	TX101	-	BCNP	-	-

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP80	F	14 Jan 2000	4.0	-	-	-	BCSIR	10 Feb 2000	Vehicle (BCSIR)
FP81	M	14 Jan 2000	4.0	-	-	-	BCSIR, Hendry Co. private lands	-	-
FP82	F	25 Jan 2000	3.0	-	-	-	Okaloacoochee Slough	9 May 2003	Unknown (possible IA)
FP83 _{FI}	F	08 Feb 2000	8 mos.	Jun 1999	TX106	FP54	FSSP	-	-
FP84 _{B-FL}	M	11 Feb 2000	1.0	-	FP73 _{FI}	-	Dispersed from BCSIR to Fisheating Creek	20 Apr 2000	Unknown
FP85 _{B-FL}	M	17 Feb 2000	10-11 mos.	Mar 1999	FP61 _{FI}	FP16	ENP	1 Mar 2004	Unknown
FP86 _{F2}	F	21 Feb 2000	8 mos.	Jun 1999	FP71 _{FI}	FP79 _{FI}	SBCNP	7 Nov 2003	Spinal trauma
FP87 _{B-FL}	F	28 Feb 2000	10 mos.	Apr 1999	FP55	FP79 _{FI}	SBCNP	-	-
FP88 _{F2}	F	02 Mar 2000	9 mos.	Jun 1999	FP70 _{FI}	FP79 _{FI}	SBCNP	-	-
FP89	M	02 Mar 2000	2.5	-	-	-	SBCNP	9 Nov 2000	Intraspecific aggression
FP90 _{F2}	M	08 Mar 2000	9 mos.	Jun 1999	FP71 _{FI}	FP79 _{FI}	SBCNP	26 April 2001	Vehicle (US27 Terrytown)
FP91 _{F2}	F	17 Mar 2000	9 mos.	Jun 1999	FP70 _{FI}	FP79 _{FI}	SBCNP	12 Dec 2003	Intraspecific aggression
FP92 _{F2}	M	06 Apr 2000	10 mos.	Jun 1999	FP70 _{FI}	FP79 _{FI}	SBCNP	Sep 2001	Unknown
FP93 _{B-TX}	F	10 Apr 2000	14 mos.	Feb 1999	TX107	FP79 _{FI}	SBCNP	-	-
FP94 _{FI}	F	01 May 2000	10 mos.	Jul 1999	TX105	FP16	ENP	-	-
FP95 _{FI}	F	07 Nov 2000	2.8 yrs.	Nov 1998	TX108	FP16	ENP	-	-
FP96	M	07 Jan 2001	9 mos.	Apr 2000	FP78	FP59	FPNWR	17 Jan 2002	Intraspecific aggression
FP97	M	19 Jan 2001	11 mos.	-	FP105	-	FPNWR	2 Dec 2001	Intraspecific aggression
FP98	M	25 Jan 2001	3	-	-	-	Bear Island, Hendry Co. private lands	1 July 2002	Vehicle (SR29 N of Pistol Pond)
FP99	M	26 Jan 2001	11 mos.	-	FP105	-	FPNWR	28 Nov 2002	Vehicle (CR846 Collier fairgrounds)
FP100	M	31 Jan 2001	4	-	-	-	NBCNP, BCSIR	-	-
FP101	F	5 Feb 2001	2	-	-	-	NBCNP, BCSIR	-	-

Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP102	F	20 Feb 2001	3	Feb 1998	FP55	-	Turner River	-	-
FP103	F	13 Mar 2001	7 mos.	Aug 2000	FP102	-	BCNP-Sandy Road	-	-
FP104	M	2 Apr 2001	6-7 mos.	-	-	-	Turner River	-	-
FP105	F	12 Apr 2001	6	-	-	-	FPNWR	1/15/2002	Unknown
FP106	F	12 Apr 2001	13 mos.	-	FP105	-	FPNWR	20 Feb 2003	Vehicle (SR29 Sunniland)
FP107	F	01 Nov 2001	19 mos.	Apr 2000	FP78	FP59	FPNWR	-	-
FP108	M	03 Nov 2001	11 mos.	Jan 2001	FP87 _{B-FL}	FP79 _{FI}	BCNP-N of Oasis	16 Nov 2002	Intraspecific aggression
FP109	M	02 Feb 2002	10+	-	-	-	OK Slough	~23 Feb 2003	Unknown
FP110	F	13 Feb 2002	13 mos.	Dec 2000	FP82	FP65 _{FI}	OK Slough	-	-
FP111	M	14 Feb 2002	10	-	-	-	OK Slough	4 Sep 2002	Intraspecific aggression
FP112	F	25 Feb 2002	3-4	-	-	-	Bear Island	11 Sep 2002	Intraspecific aggression
FP113	F	23 Oct 2002	6 mos.	Apr 2002	FP78	FP59	FPNWR, White Oak	-	-
FP114	M	23 Oct 2002	6 mos.	Apr 2002	FP78	FP59	FPNWR, White Oak	17 Oct 2003	Intraspecific aggression
FP115	F	26 Nov 2002	4-5	-	-	-	OK Slough	17 May 2003	Pneumonia (FeLV positive)
FP116	F	20 Jan 2003	7 mos.	Jun 2002	FP67	-	Hendry Co. private lands	-	-
FP117	M	25 Feb 2003	11 mos.	-	-	-	BCSIR Game Pen	-	-
FP118	F	5 Mar 2003	11 mos.	-	-	-	BCSIR Game Pen	3 Apr 2003	Unknown
FP119 ^c	M	2 Apr 2003	1	Apr 2002	FP93	FP79	BCNP – East Crossing Strand	-	-
FP120 ^c	F	8 Apr 2003	3	-	-	-	BCNP – W Turner River Rd.	-	-
FP121	F	2 Dec 2003	2.5	-	-	-	BCSIR	-	-
FP122	F	30 Jan 2004	2-2.5	-	-	-	OK Slough	13 Feb 2004	Pneumonia/feline leukemia
FP123	M	2 Feb 2004	3.5	-	-	-	OK Slough	15 Mar 2004	Intraspecific aggression
FP124	F	13 Feb 2004	3-4	-	-	-	Loop Road, BCNP	-	-

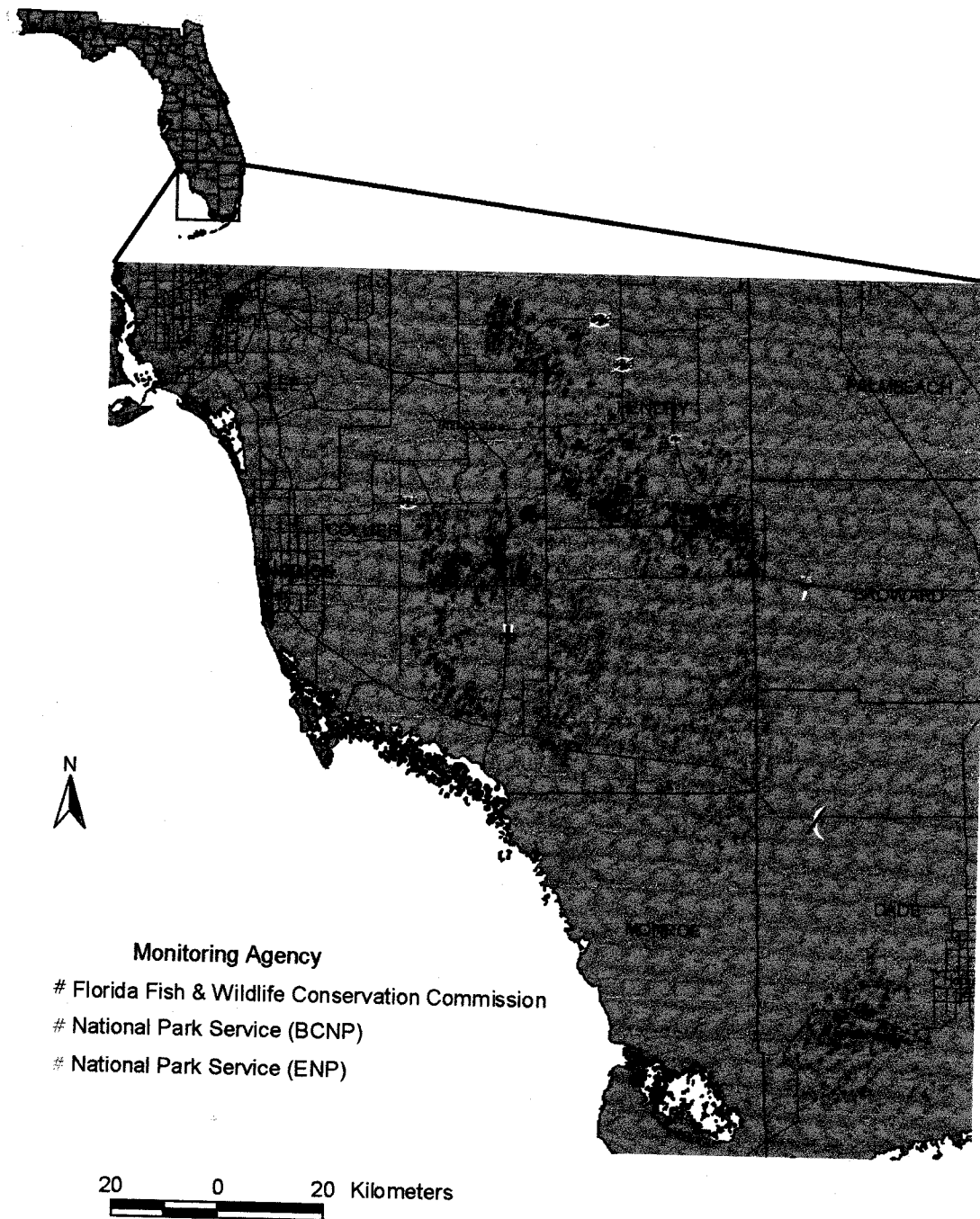
Cat ID ^a	Sex	Capture Date	Age at First Capture	Birth Date	Dam	Sire	Use Area ^b	Death Date	Cause of Death
FP125	M	13 Feb 2004	8 mos.	-	FP124	-	Loop Road, BCNP	-	-
FP126	M	13 Feb 2004	8 mos.	-	FP124	-	Loop Road, BCNP, OK Slough	-	-
FP127	M	16 Feb 2004	2	-	-	-	Turner River Rd., BCNP	-	-
FP128	F	18 Feb 2004	3.7	Jun 2000	FP77	-	BCSIR/Add Lands	-	-
FP129	F	20 Feb 2004	3	Jan 2001	FP87	FP79	Raccoon Point, BCNP	-	-
FP130	M	4 Mar 2004	9.5 mos.	May 2003	FP110	-	OK Slough	-	-
FP131	M	10 Mar 2004	5	-	-	-	FPNWR	-	-
FP132	M	17 Mar 2004	3	-	-	-	OK Slough/Dinner Island	-	-

^aFP denotes panthers captured for radiocollaring; K denotes kittens handled at panther or Texas puma dens; TX denotes Texas pumas used for Panther Genetic Restoration; F1 subscript denotes Florida panther x Texas puma offspring; F2 subscript denotes offspring of F1 x F1 mating; B-FL subscript denotes offspring of F1 x Florida panther mating; B-TX subscript denotes offspring of F1 x Texas puma mating.

^bENP = Everglades National Park; BCSIR = Big Cypress Seminole Indian Reservation; PSSF = Picayune Strand State Forest; FPNWR = Florida Panther National Wildlife Refuge; OSSF = Okaloacoochee Slough State Forest; NBCNP = Big Cypress National Preserve north of Interstate 75; FSSP = Fakahatchee Strand State Preserve; SBCNP = Big Cypress National Preserve south of Interstate 75.

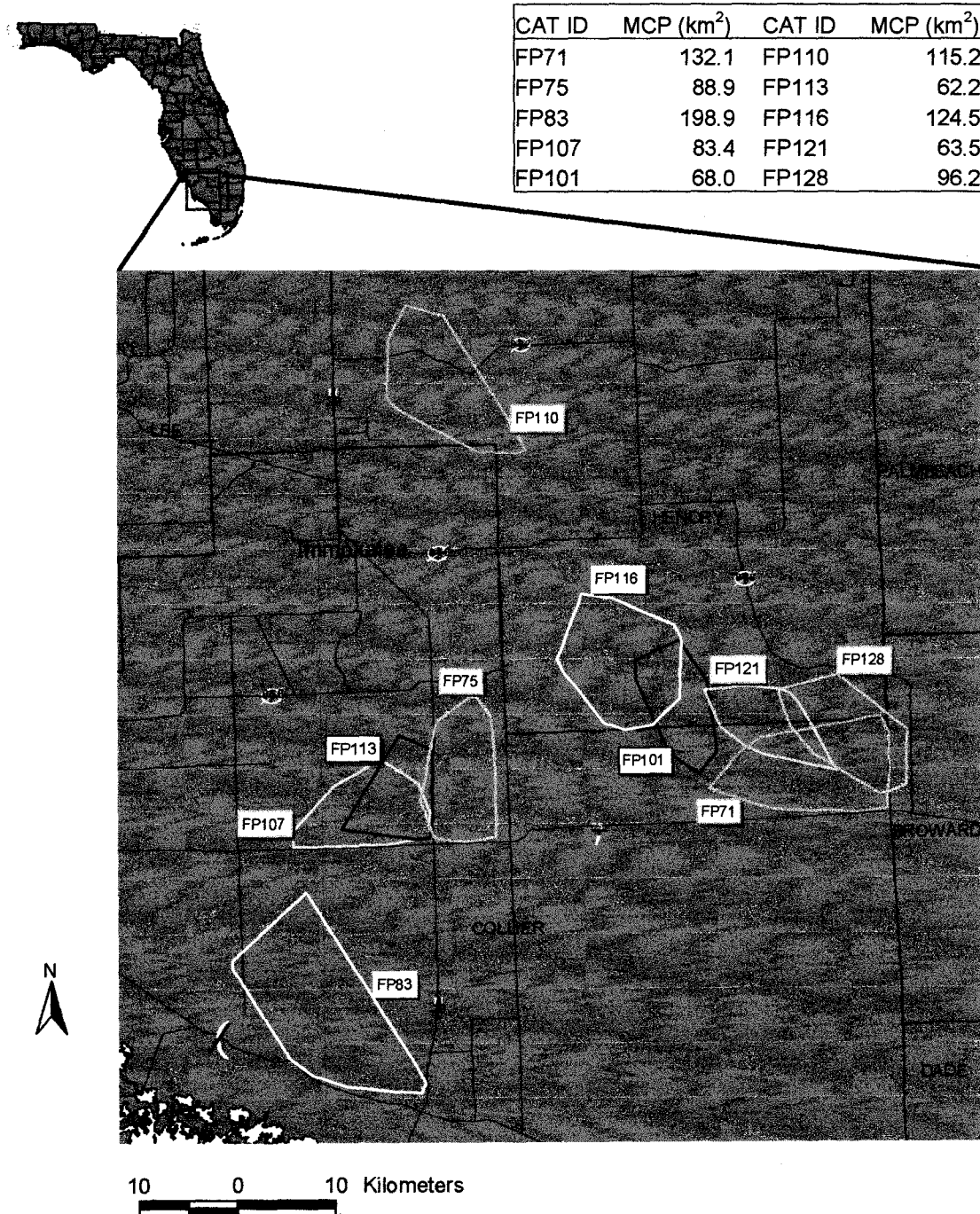
^cCaptured by BCNP personnel.

**Locations of all Radiocollared Florida Panthers in Southern Florida
01 July 2003 – 30 June 2004**



Appendix III, Figure 1

**Minimum Convex Polygon Home Ranges of Radiocollared Adult Female
Florida Panthers monitored by FWC in Southern Florida from 01 July
2003 – 30 June 2004**

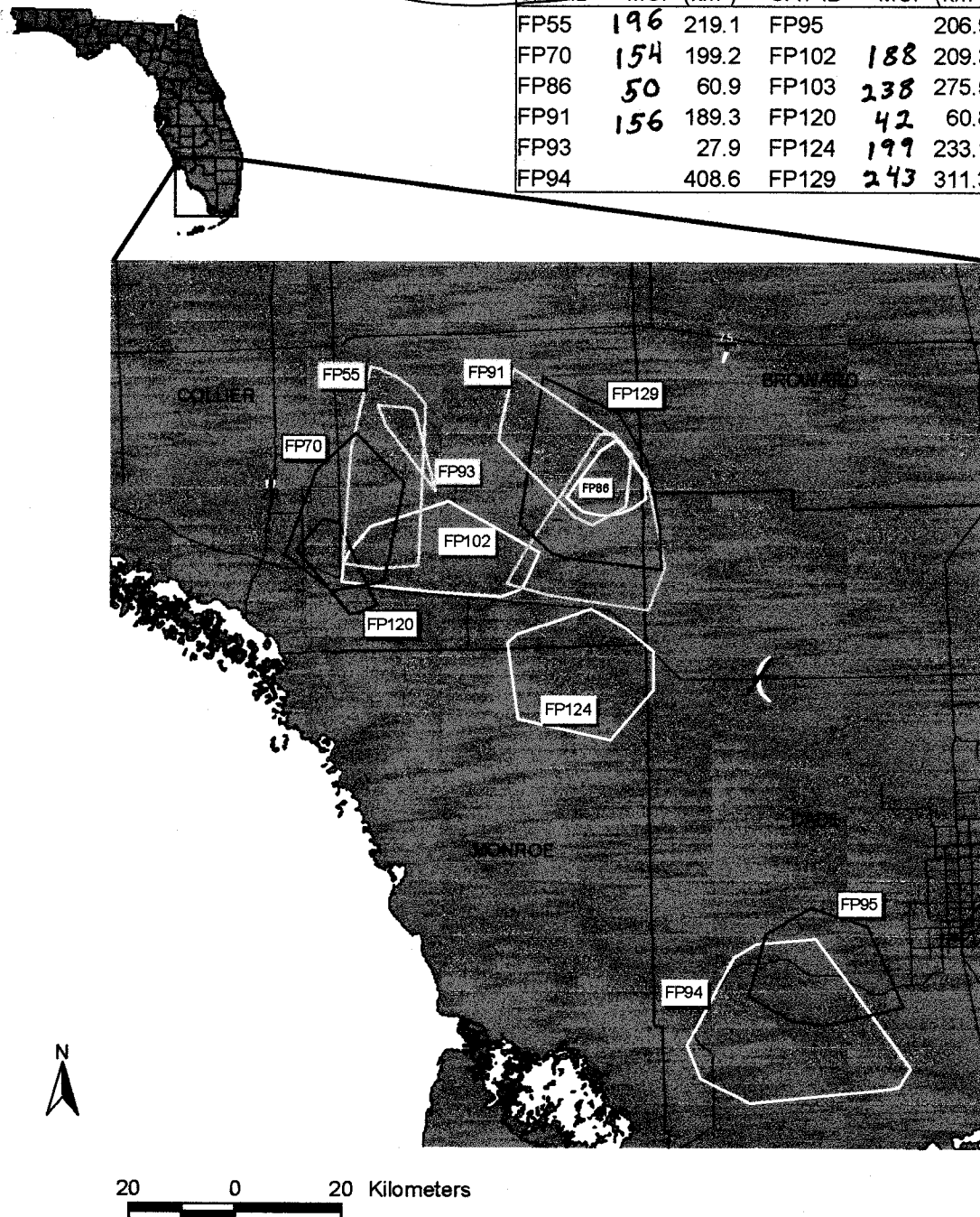


Appendix III, Figure 2

**Minimum Convex Polygon Home Ranges of Radiocollared Adult Female
Florida Panthers monitored by NPS in Southern Florida from 01 July
2002 – 30 June 2003**

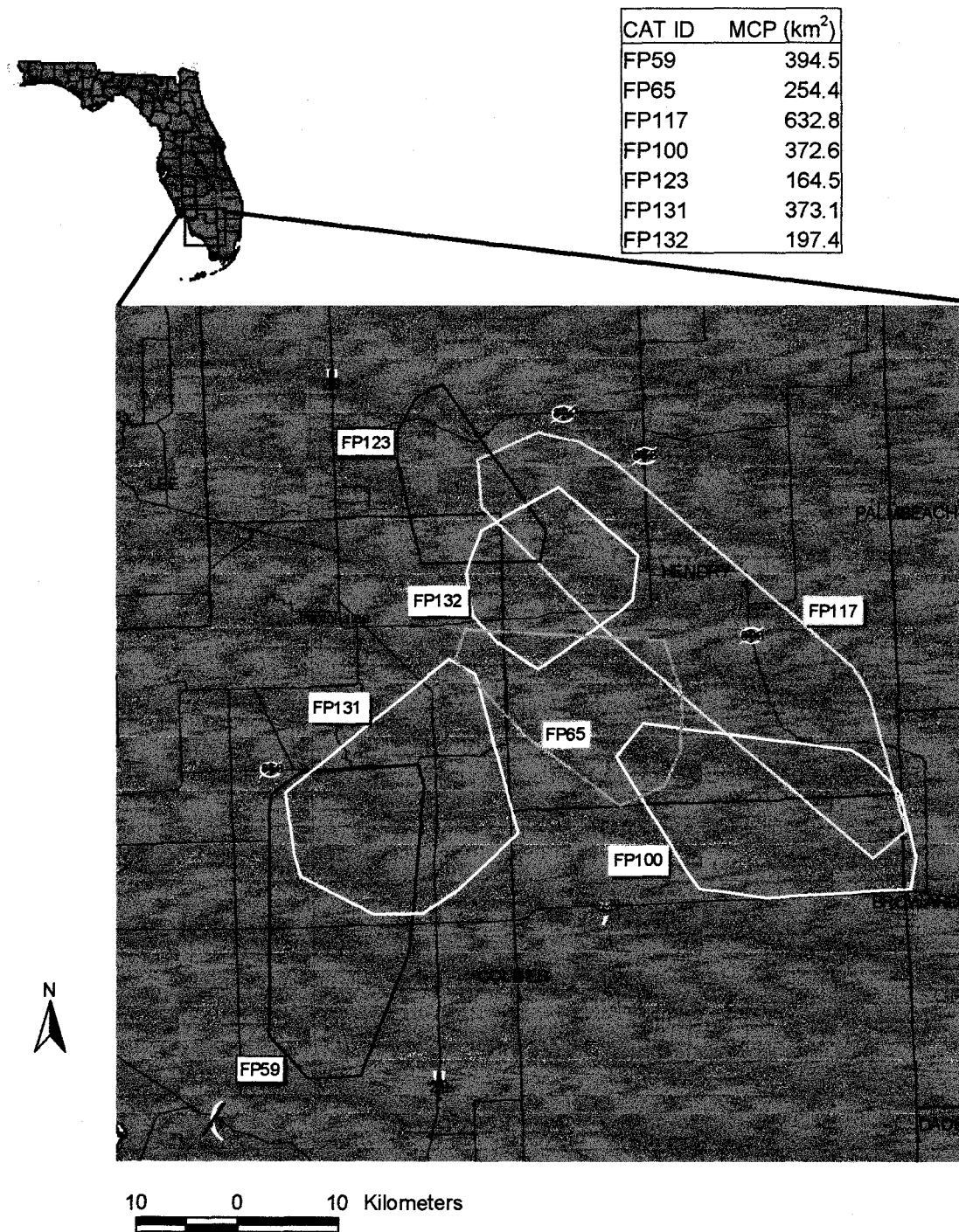
CAT ID	MCP (km ²)	CAT ID	MCP (km ²)		
FP55	196	219.1	FP95	206.9	
FP70	154	199.2	FP102	188	209.3
FP86	50	60.9	FP103	238	275.5
FP91	156	189.3	FP120	42	60.8
FP93		27.9	FP124	199	233.1
FP94		408.6	FP129	243	311.3

2401 ÷ 12 = 200 km²



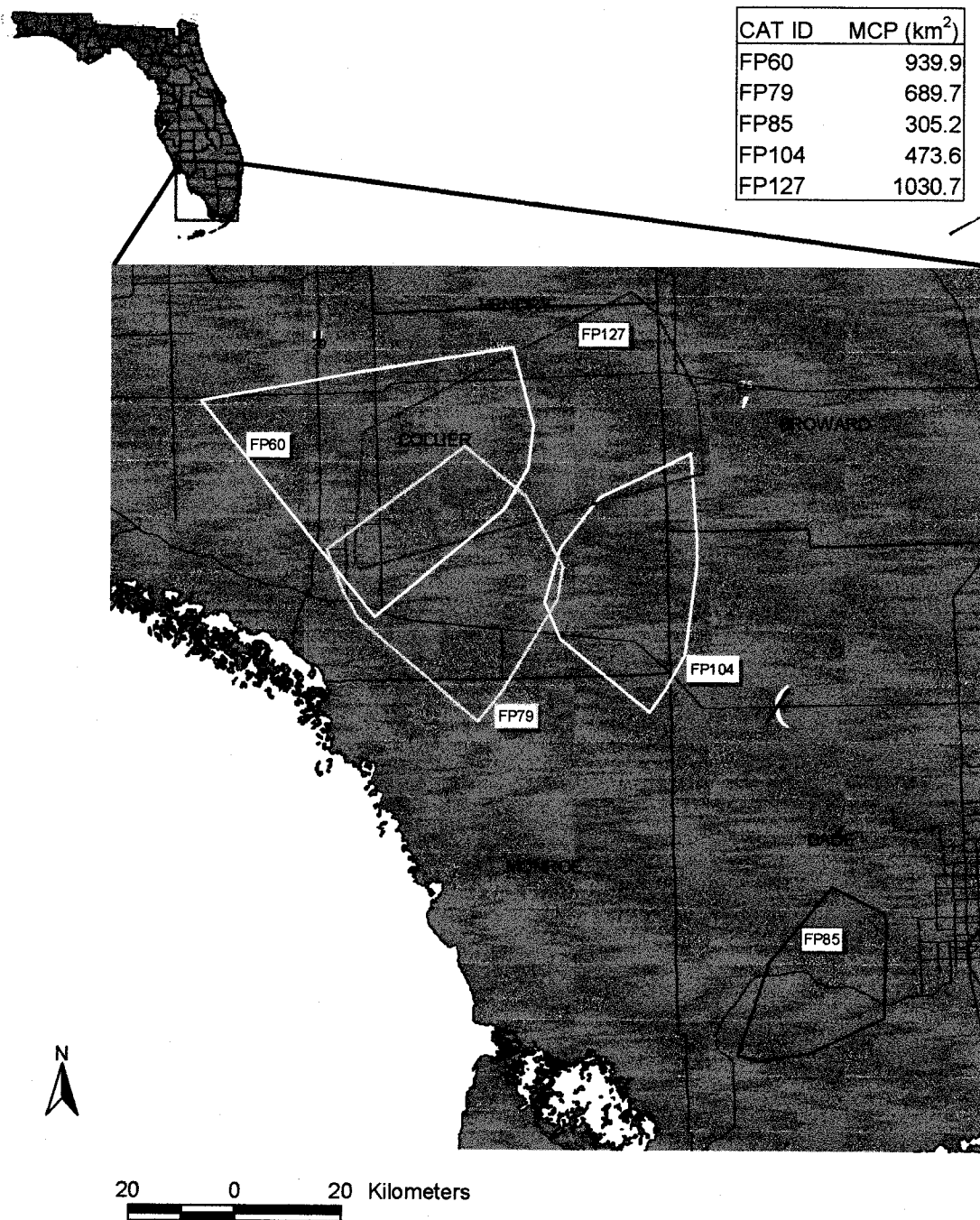
Appendix III, Figure 3

**Minimum Convex Polygon Home Ranges of Radiocollared Adult Male
Florida Panthers monitored by FWC in Southern Florida from
01 July 2003– 30 June 2004**



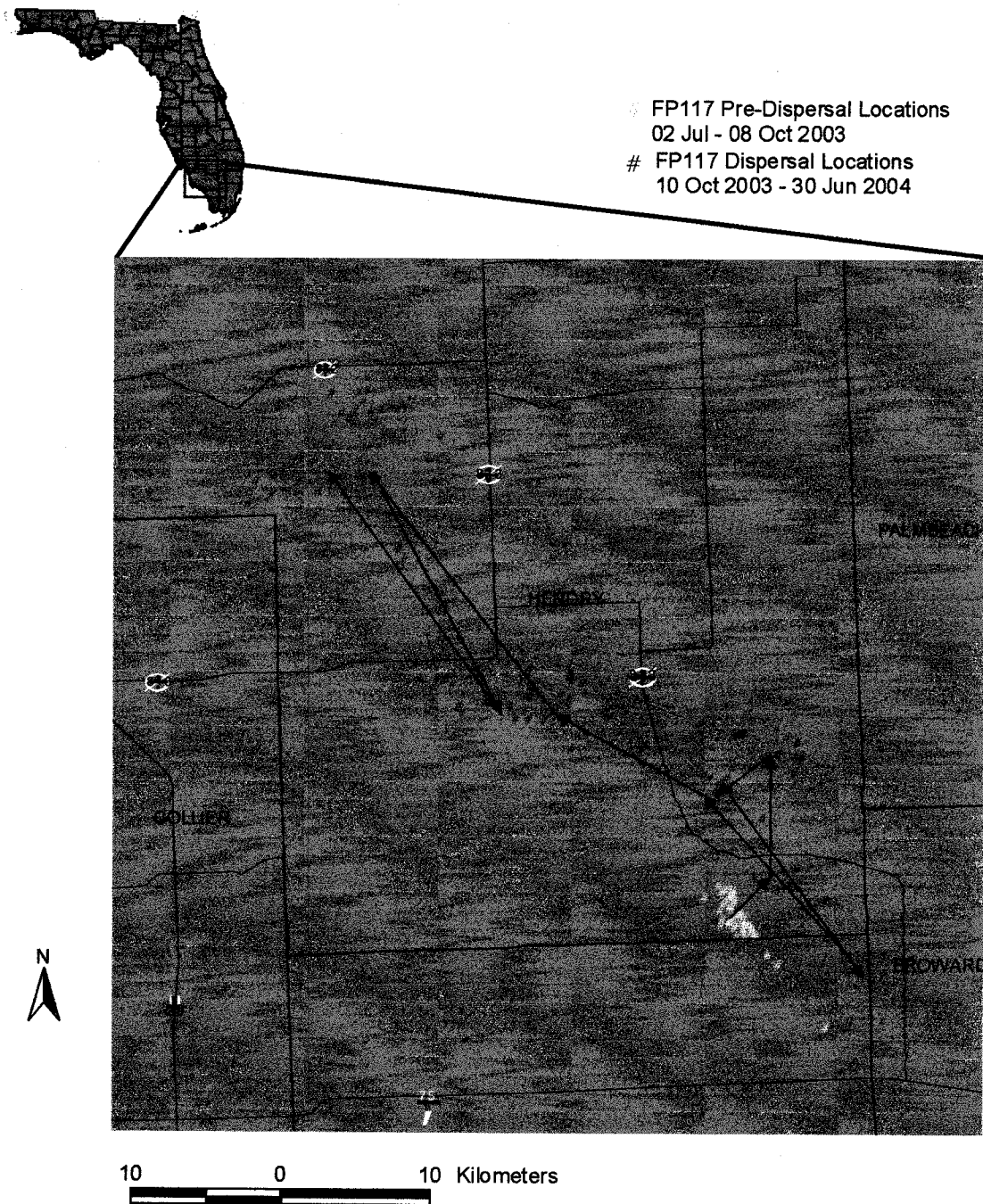
Appendix III, Figure 4

**Minimum Convex Polygon Home Ranges of Radiocollared Adult Male
Florida Panthers monitored by NPS in Southern Florida from
01 July 2003 – 30 June 2004**



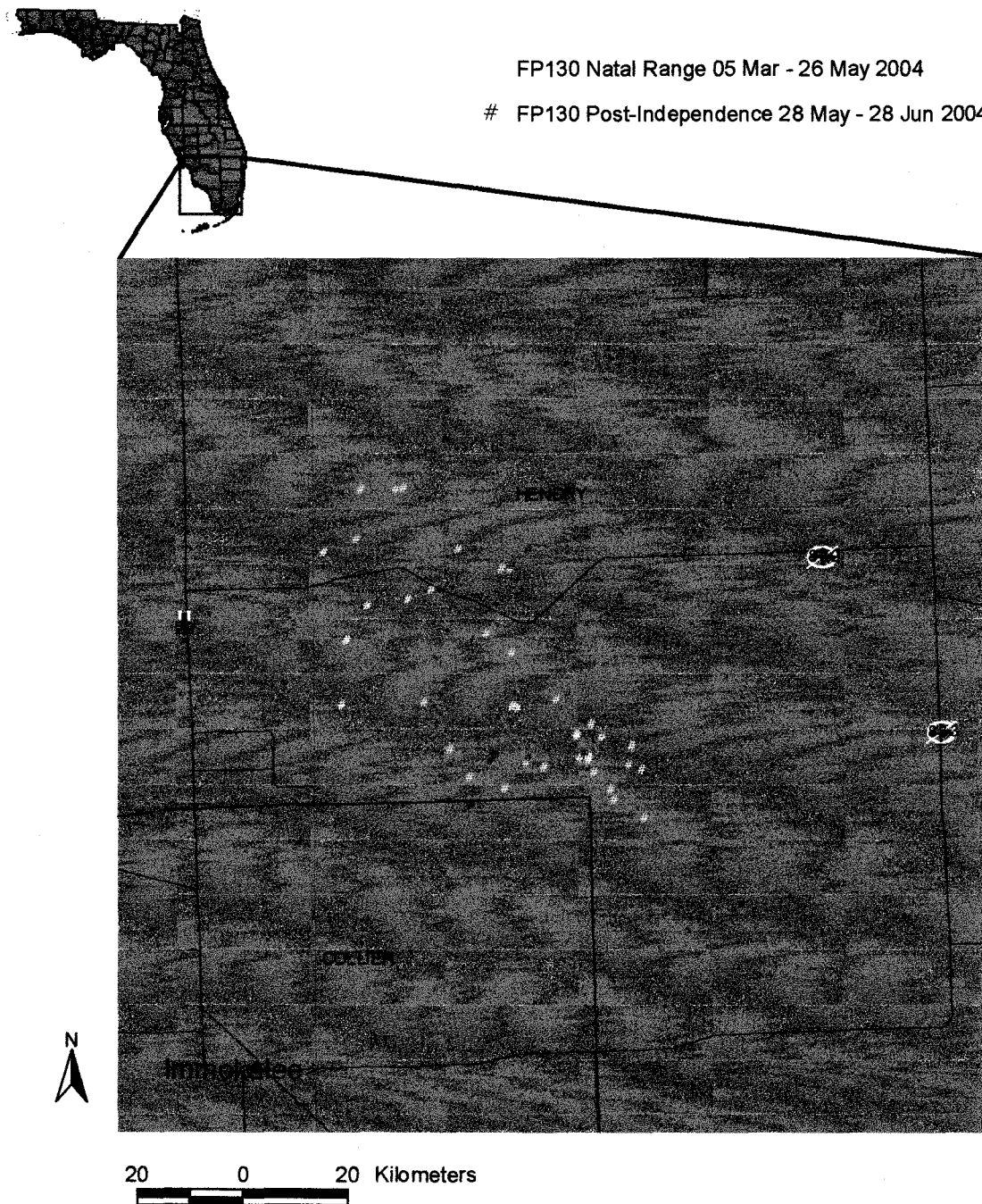
Appendix III, Figure 5

Dispersal Locations of Male Florida Panther FP117 02 July 2003 – 30 June 2004



Appendix III, Figure 6

**Natal Range and Dispersal Locations of Male Florida Panther FP130
05 March 2004 – 28 June 2004**



Appendix III, Figure 7

Appendix IV. List of panther kittens, including Texas intercrosses, handled at dens from 1992-June 2004.

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
FP40	K01	M	not marked	4/7/1992	14-21	FP28	2/10/1993	FP54	a	U	Y
FP40	K02	M	not marked	4/7/1992	14-21	FP28			u	U	
FP40	K03	M	not marked	6/18/1993	21	FP26			u	N	
FP40	K04	F	not marked	6/18/1993	21	FP26			u	N	
FP40	K05	F	not marked	6/18/1993	21	FP26			u	N	
FP48	K06	M	not marked	10/30/1993	8	FP12			u	U	
FP48	K07	F	not marked	10/30/1993	8	FP12			u	U	
FP48	K08	F	not marked	10/30/1993	8	FP12			u	U	
FP56	K09	M	not marked	4/21/1994	14	unknown			u	Y	
FP56	K10	F	not marked	4/21/1994	14	unknown			u	Y	
FP56	K11	M	not marked	4/21/1994	14	unknown			u	N	
FP19	K12	F	not marked	5/17/1994	14-17	FP51			u	N	
FP19	K13	F	not marked	5/17/1994	14-17	FP51			u	N	
FP55	K14	F	not marked	4/8/1995	12	FP42			u	N	
FP55	K15	F	not marked	4/8/1995	12	FP42			u	N	
FP48	K16	M	12A4640	6/20/1995	12	unknown	1/7/1996	FP59	A	Y	N
FP48	K17	F	129FE45	6/20/1995	12	unknown			u	Y	
TX101	K18	F	F82665	10/10/1995	21	unknown	11/12/1998	FP73 _{F1}	A	N	N
TX101	K19	M	F79CB9	10/10/1995	21	unknown	3/3/1999	FP79 _{F1}	A	N	N
FP56	K20	M	762141	10/31/1995	14	FP45			d	Y	
FP56	K21	M	632448	10/31/1995	14	FP45			d	Y	
FP56	K22	M	F6642F	10/31/1995	14	FP45			d	Y	
TX106	K23 _{F1}	F	11DFD74	12/1/1995	21	FP51			u	N	
FP36	K24	F	12AB55F	2/6/1996	14	FP45			u	Y	
FP36	K25	M	1147C9B	2/6/1996	14	FP45			u	Y	
FP36	K26	M	11DF0DA	2/6/1996	14	FP45			u	Y	
FP19	K27	F	114DAFE (11363DC)	4/17/1996	24	FP54/FP51			u	Y	
FP19	K28	F	11EOD50	4/17/1996	24	FP54/FP51			u	Y	
FP56	K29	F?	11EAB72T	8/14/1996	14	FP45			d	Y	
FP56	K30	F?	1142876	8/14/1996	14	FP45			d	Y	

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
FP48	K31	M	7037C2	9/18/1996	14-17	unknown	3/18/1997	FP62	a	N	Y
FP48	K32	M	11EA2EC	9/18/1996	14-17	unknown	5/24/1997	FP64	D	Y	Y
FP48	K33	M	6FFD52	9/18/1996	14-17	unknown		UCFP50	D	Y	U
TX105	K34 _{FI}	F	11EAO30T	10/4/1996	30-35	FP16			u	N	
TX101	K35 _{FI}	M	12AFFBF	12/21/1996	4	FP45	11/19/1997	FP65 _{FI}	A	N	N
TX101	K36 _{FI}	F	142581A	12/21/1996	4	FP45	12/9/1997	FP66 _{FI}	a	N	N
FP40	K37	M	1146911	5/14/1997	21	FP45			u	N	
TX107	K38 _{FI}	F	1311B3B	6/4/1997	30+	unknown	3/5/1998	FP71 _{FI}	a	N	N
TX107	K39 _{FI}	F	771B4D	6/4/1997	30+	unknown	2/25/1998	FP70 _{FI}	a	N	N
FP56	K40	M	1412E16	6/17/1997	25-28	FP45			u	Y	
FP56	K41	F	14259BF	6/17/1997	25-28	FP45			d	Y	
FP56	K42	F	1425A07	6/17/1997	25-28	FP45	1/19/1998	FP67	A	N	N
FP56	K43	M	12C2B93	6/17/1997	25-28	FP45			u	Y	
FP55	K44	M	12A9E4AT	10/2/1997	25-30	unknown			u	N	
TX108	K45 _{FI}	F	1D1DFDOT	2/11/1998	21	FP16	11/7/2000	FP95 _{FI}	A	N	N
TX108	K46 _{FI}	M	143E96ET	2/11/1998	21	FP16			u	N	
TX106	K47 _{FI}	M	1D3E32OT	2/17/1998	7-10	FP54			d	N	
FP55	K48	F	121134F	2/25/1998	14	unknown	2/20/2001	FP102	A	N	N
FP55	K49	F	1D2B3AET	2/25/1998	14	unknown			u	N	
FP55	K50	M	12A94A6T	2/25/1998	14	unknown			u	N	
FP48	K51	M	1D2A504T	6/27/1998	28	unknown			u	Y	
FP66 _{FI}	K52 _{B-FL}	M	1D21638T	10/2/1998	12	FP72			d	N	
FP66 _{FI}	K53 _{B-FL}	F	1C49E48T	10/2/1998	12	FP72			d	N	
FP66 _{FI}	K54 _{B-FL}	M	1D2CBC3T	10/2/1998	12	FP72			d	N	
FP49	K55	M	1211046	2/23/1999	25	unknown			d	N	
TX107	K56 _{B-TX?}	F	1327679T	3/11/1999	21+	FP79 _{FI?}			u	N	
TX107	K57 _{B-TX?}	M	14245FOT	3/11/1999	21+	FP79 _{FI?}			u	N	
TX107	K58 _{B-TX?}	F	12A9FE5T	3/11/1999	21+	FP79 _{FI?}	4/10/2000	FP93 _{B-TX?}	A	N	N
FP61 _{FI}	K59	M	1EFF6EFT	4/6/1999	14	FP16	1/17/2000	FP85 _{B-FL}	A	N	N
FP55	K60	F	1EFA75T	5/10/1999	24-26	FP79 _{FI?}	2/28/2000	FP87 _{B-FL?}	A	N	N
FP55	K61 _{B-FL?}	M	1EFF978T	5/10/1999	24-26	FP79 _{FI?}			u	Y	

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
TX106	K62 _{F1}	F	114C9D7T	6/18/1999	14	FP54/FP60			D	N	
TX106	K63 _{F1}	F	12AFC11T	6/18/1999	14	FP54/FP60	2/8/2000	FP83 _{F1}	A	N	N
FP70 _{F1}	K64	F	1E2EB33T	6/23/1999	10-12	FP79 _{F1}	3/2/2000	FP88 _{F2}	A	N	N
FP70 _{F1}	K65	M	703A4AT	6/23/1999	10-12	FP79 _{F1}	4/6/2000	FP92 _{F2}	A	N	N
FP70 _{F1}	K66	F	1EFFF55T	6/23/1999	10-12	FP79 _{F1}	3/17/2000	FP91 _{F2}	A	N	N
FP71 _{F1}	K67	M	1E2EBFET	7/4/1999	17	FP79 _{F1}	3/8/2000	FP90 _{F2}	D	N	N
FP71 _{F1}	K68	F	20509A9T	7/4/1999	17	FP79 _{F1}	2/21/2000	FP86 _{F2}	A	N	N
FP71 _{F1}	K69 _{F2}	M	1E2F6B7T	7/4/1999	17	FP79 _{F1}			d	N	
FP71 _{F1}	K70 _{F2}	F	1E2DF2BT	7/4/1999	17	FP79 _{F1}			a	N	
FP69	K71	M	1E2F276T	8/1/1999	7	unknown			u	Y	
FP69	K72	F	1F07255T	8/1/1999	7	unknown			u	N	
FP69	K73	F	1F014C2T	8/1/1999	7	unknown			u	N	
FP48	K74	F	1EFFF38T	10/25/1999	14-17	FP63,FP68			d	N	
FP48	K75	F	1F01BEDT	10/25/1999	14-17	FP63,FP68			d	U	
FP66 _{F1}	K76 _{B-FL}	M	1D2C5F6T	12/24/1999	14	FP60			D	N	
FP66 _{F1}	K77 _{B-FL}	F	1F00067T	12/24/1999	14	FP60			u	N	
FP66 _{F1}	K78 _{B-FL}	F	1E2F2D6T	12/24/1999	14	FP60			u	N	
FP78	K79	F	1D1CDD8T	4/26/2000	10-14	FP59	11/1/2001	FP107	A	Y	Y
FP78	K80	M	1F07DD7T	4/26/2000	10-14	FP59	1/7/2001	FP96	A	Y	Y
FP77	K81	M	1D3B75CT	6/27/2000	28	?			u	N	
FP77	K82	F	1433F77T	6/27/2000	28	?	2/18/2004	FP128	A	N	N
FP77	K83	M	1D3A078T	6/27/2000	28	?			u	N	
FP67	K84	M	143F34DT	8/19/2000	12	?			d	Y	
FP67	K85	F	1E2E834T	8/19/2000	12	?			d	N	
FP82	K86 _{B-FL}	F	1E2F17ET	1/3/2001	14	FP65 _{F1}	2/13/2002	FP110	A	N	N
FP82	K87 _{B-FL}	F	1E2EFB7T	1/3/2001	14	FP65 _{F1}			u	Y	
FP82	K88 _{B-FL}	M	1F00D57T	1/3/2001	14	FP65 _{F1}			u	N	
FP87 _{B-FL}	K89	F	20501C5T	2/7/2001	14-21	FP79 _{F1}	2/20/2004	FP129	A	N	N
FP87 _{B-FL}	K90	M	1E2F06B	2/7/2001	14-21	FP79 _{F1}	11/3/2001	FP108	A	N	N
FP87 _{B-FL}	K91	M	1F071F4T	2/7/2001	14-21	FP79 _{F1}			u	N	
TX106	K92 _{F1}	F	600DBE9	3/17/2001	14-16	FP60			u	N	

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
TX106	K93 _{F1}	M	600CCC4	3/17/2001	14-16	FP60			u	N	
FP88 _{F2}	K94	M	1E2EB3DT	5/25/2001	21	?			D	N	N
FP88 _{F2}	K95	F	1EFF463T	5/25/2001	21	?			u	N	
FP88 _{F2}	K96	M	1F00576T	5/25/2001	21	?			u	N	
FP88 _{F2}	K97	F	204F878T	5/25/2001	21	?			u	N	
FP67	K98	F	11D5AFD	5/26/2001	21	?		UCFP49	D	N	N
FP67	K99	M	1248B13T	5/26/2001	21	?			u	N	
FP67	K100	M	600EFAF	5/26/2001	21	?			u	N	
FP67	K101	M	600E363	5/26/2001	21	?			u	N	
FP75	K102	M	600E58A	6/15/2001	10-12	FP59			u	Y	
FP75	K103	M	6000FA1	6/15/2001	10-12	FP59			u	N	
FP55	K104	M	1EFFFC5T	6/28/2001	17	?			d	N	
FP102	K105	M	1E2DFA4T	7/12/2001	21	FP79 _{F1}			u	N	
FP102	K106	M	600E036	7/12/2001	21	FP79 _{F1}			u	N	
FP49	K107	M	000600F828	8/27/2001	21	?			u	N	
FP77	K108	M	000600F0EA	8/30/2001	30	?			u	N	
FP73 _{F1}	K109	M	000600FD77	3/3/2002	7	?			u	N	
FP73 _{F1}	K110	M	0001E2D9E2T	3/3/2002	7	?			u	N	
FP73 _{F1}	K111	F	000600A2C9	3/3/2002	7	?			u	N	
FP95 _{F1}	K112	F	0001E2E9D3T	4/21/2002	25	FP85 _{B-FL}			u	N	
FP93 _{B-TX}	K113	F	0001EFF813T	4/23/2002	18	FP79 _{F1}			u	N	
FP93 _{B-TX}	K114	F	000600CC53	4/23/2002	18	FP79 _{F1}			u	N	
FP93 _{B-TX}	K115	M	0001F071E4T	4/23/2002	18	FP79 _{F1}	4/2/2003	FP119	A	N	N
FP93 _{B-TX}	K116	F	0001F01C76T	4/23/2002	18	FP79 _{F1}			u	N	
FP78	K117	F	000600CDB3	4/30/2002	21	FP59			d	Y	
FP78	K118	F	000600DB01	4/30/2002	21	FP59			d	Y	
FP78	K119	F	000600E3E3	4/30/2002	21	FP59	10/23/2002	FP113	A	Y	Y
FP78	K120	M	0001F01D1CT	4/30/2002	21	FP59	10/23/2002	FP114	A	Y	Y
FP101	K121	M	000204F9EAT	5/9/2002	10	?			u	N	
FP101	K122	F	0001E2D6FDT	5/9/2002	10	?			u	N	
FP83	K123	M	000631AED6	5/12/2002	28	?			u	N	

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
FP106	K124	F	0001F003A0T	5/27/2002	10	?			u	Y	
FP106	K125	M	0001D2CBC4T	5/27/2002	10	?			u	Y	
FP106	K126	M	0001E2E8F6T	5/27/2002	10	?			u	Y	
FP55	K127	F	000600EAD2	5/30/2002	10	FP79 _{FI}			u	N	
FP75	K128	M	000600E84B	6/6/2002	10	FP100/FP98			u	Y	
FP75	K129	M	00060101BC	6/6/2002	10	FP100/FP98			u	Y	
FP112	K130	M	0001EFF497T	6/15/2002	7	FP100/FP98			d	Y	
FP112	K131	M	000600E4CE	6/15/2002	7	FP100/FP98			d	Y	
FP67	K132	F	000600D0F1	6/18/2002	10	?	1/20/2003	FP116	A	Y	Y
FP67	K133	M	000600EBA8	6/18/2002	10	?			d	Y	
FP67	K134	M	000600E776	6/18/2002	10	?			d	Y	
FP107	K135	M	0006010509	7/7/2002	9-10	?			u	Y	
FP107	K136	F	000600F465	7/7/2002	9-10	?			u	Y	
FP102	K137	F	0006318229	7/19/2002	15	FP79 _{FI}			u	N	
FP102	K138	M	000630E287	7/19/2002	15	FP79 _{FI}			u	N	
FP61 _{FI}	K139	F	000204FBC3T	9/27/2002	10	?			u	N	
FP61 _{FI}	K140	M	000600D0D4	9/27/2002	10	?			u	E	
FP61 _{FI}	K141	M	000600F2F8	9/27/2002	10	?			u	N	
FP61 _{FI}	K142	F	0001D29A56T	9/27/2002	10	?			u	N	
FP87	K143	F	000600DD57	3/25/2003	15	FP79?			u	N	
FP87	K144	M	chipped # unk	3/25/2003	15	FP79?			u	N	
FP87	K145	F	chipped # unk	3/25/2003	15	FP79?			u	?	
FP101	K146	F	00062EDF9D	4/19/2003	10	FP65/FP100			u	N	
FP101	K147	M	0006328F81	4/19/2003	10	FP65/FP100			u	N	
FP101	K148	F	00062E2A15	4/19/2003	10	FP65/FP100			u	N	
FP110	K149	F	000600F8DE	6/3/2003	6-10	?			u	N	
FP110	K150	M	000600CCD1	6/3/2003	6-10	?	3/4/2004	FP130	A	N	Y
FP110	K151	F	000600C049	6/3/2003	6-10	?			u	N	
FP93 _{B-TX}	K152	F	000600037C	8/5/2003	21	FP60			u	N	
FP93 _{B-TX}	K153	M	0005FFE2D6	8/5/2003	21	FP60			u	N	
FP93 _{B-TX}	K154	M	0006000B2A	8/5/2003	21	FP60			u	N	

Female #	Kitten #	Sex	Transponder #	Date Marked	Age in Days	Sire	Date Collared	Eventual Panther #	Alive or Dead	Kinked tail at birth	Kinked tail at > 6 mo
FP120	K155	F	0005FFEB0A	2/7/2004	14	?			u	N	
FP120	K156	M	0005FFE0DA	2/7/2004	14	?			u	N	
FP75	K157	M	0006327AC0	3/21/2004	23	?			u	Y	
FP75	K158	M	000632781C	3/21/2004	23	?			u	Y	
FP75	K159	F	00062EE361	3/21/2004	23	?			u	N	
FP116	K160	F	0006479F70	5/1//2004	14	FP65			u	N	
FP116	K161	F	000647D7A6	5/1//2004	14	FP65			u	N	
FP116	K162	M	0006485640	5/1//2004	14	FP65			u	N	
FP107	K163	M	0006327255	5/21/2004	7	?			u	Y	
FP107	K164	M	0006326E04	5/21/2004	7	?			u	Y	
FP107	K165	F	000632227C	5/21/2004	7	?			u	N	
FP107	K166	F	000647A475	5/21/2004	7	?			u	N	
FP70	K167	F	00064DBAB1	6/6/2004	12	?			u	N	
FP70	K168	M	00064DAB32	6/6/2004	12	?			u	N	
FP70	K169	F	00064D7C86	6/6/2004	12	?			u	N	
FP102	K170	F	00064DEB7D	8/5/2004	15	FP79			u	N	
FP102	K171	M	00064DDEEA	8/5/2004	15	FP79			u	N	
FP102	K172	F	00064D918C	8/5/2004	15	FP79			u	N	

^a FP denotes panthers captured for radiocollaring; K denotes kittens handled at panther or Texas puma dens; TX denotes Texas pumas used for Panther Genetic Restoration; F1 subscript denotes Florida panther x Texas puma offspring; F2 subscript denotes offspring of F1 x F1 mating; B-FL subscript denotes offspring of F1 x Florida panther mating; B-TX subscript denotes offspring of F1 x Texas puma mating.

^b a = no evidence of mortality, presumed alive; A = known to be alive; d = some evidence of mortality, presumed dead; D = known to be dead; u = last seen at den, status unknown.

^cHandled by BCNP personnel.

Appendix V. List of all known dens of radio-instrumented female Florida panthers and Texas pumas in southern Florida from June 1985

to June 2004. Kitten numbers preceded with K indicate natal den was visited.

Cat ID	Den Date	Location	UTM-E	UTM-N	Habitat	No. of Kittens	Kittens Handled	Sire
FP09	Jun-85	S Golden Gate Estates	unknown	unknown	?	1?	FP10♂ den not visited	Unknown
FP09	Jun-87	FSSP	454400	2891300	hardwood hammock	1?	den not visited	FP12
FP09	May-89	FSSP	461100	2878600	mixed swamp	?	den not visited	Unknown
FP09	Jul-90	FSSP	462300	2882200	mixed swamp	2?	FP202♂, FP203♂ den not visited	FP37
FP09	Jun-93	FSSP	456000	2873800	hardwood hammock	Unsuccessful?	den not visited	FP51
FP11	May-86	BCNP - Bear Island	468100	2896400	pine/palmetto	3?	FP19♀ den not visited	FP12
FP11	May-88	BCNP - Bear Island	468100	2896400	pine/palmetto	1?	FP29♂ den not visited	FP20
FP11	Apr-90	BCNP - Bear Island	469900	2898700	pine/palmetto	1?	♀(roadkill) den not visited	FP12
FP11	Jul-91	Price's	469800	2907100	hardwood hammock	1?	FP47♂ den not visited	FP12
FP11	Mar-93	BCNP - Bear Island	468900	2896200	hardwood hammock	?	den not visited	FP12?
FP14	Apr-89	Long Pine Key	537200	2799200	hardwood hammock	2?	FP42♂, den not visited	FP16
FP14	Mar-91	Long Pine Key	536900	2808000	hardwood hammock	Unsuccessful	den not visited	FP16
FP15	May-88	Long Pine Key	525100	2807200	hardwood hammock	Unsuccessful	den not visited	FP16
FP19	Mar-88	Price's	468100	2906000	Hardwood hammock	4?	FP30♂ den not visited	FP13
FP19	Jul-89	FPNWR	460600	2893700	Hardwood hammock	1?	FP43♂ den not visited	FP12
FP19	Nov-90	Rock Spring Island	460600	2902700	Pine/palmetto	2?	FP205♀, FP45♂ den not visited	FP12
FP19	Mar-92	NE Hog Pond	459800	2900700	Pine/palmetto	2?	UCFP21♀, FP53♂ den not visited	FP12
FP19	May-94	FPNWR	464600	2902900	Pine/palmetto	2	K12♀, K13♀	FP51?
FP19	Apr-96	Barfield's	463100	2904500	Palmetto/oaks	2	K27♀, K28♀d	FP54, FP51?
FP23	Aug-92	BCNP - Raccoon Point	502300	2877300	Unknown	2	FP209♀, FP210♂	FP42
FP23	Dec-92	BCNP - Raccoon Point	502800	2872100	Unknown	1?	FP55♀ den not visited	FP42
FP31	Mar-89	Catherine Island	454000	2907000	Pine/palmetto	3?	FP34♂, FP35♂ den not visited	FP12
FP31	Jul-90	Regency Farms	459900	2903900	Pine/palmetto	2?	FP201♂, FP204♀ den not visited	FP12
FP31	Sep-91	Barfield's	464700	2906000	Hardwood hammock	2?	FP48♀, FP52♀ den not visited	FP12
FP32	Mar-89	Catherine Island	457100	2898600	pine/palmetto	unsuccessful?	den not visited	Unknown
FP32	May-92	FPNWR	457400	2897400	pine/palmetto	1?	FP208♀	FP12
FP32	Mar-96	FPNWR	464600	2896200	pine/palmetto	1	UCFP24 (Dead ♀)	
FP36	Mar-90	BCSIR	492500	2906200	Hardwood hammock	?	den not visited	Unknown

32-02-1999
2?
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Cat ID	Den Date	Location	UTM-E	UTM-N	Habitat	No. of Kittens	Kittens Handled	Sire
FP36	May-91	BCNP - Add Lands	491100	2899000	Pine/palmetto	2?	FP207♂, FP50♂ den not visited	FP26
FP36	Oct-93	N of BCSIR	489100	2909400	Pine/palmetto	1?	den not visited	FP26, FP34
FP36	Jun-95	Canoe Lake Strand	502800	2901300	Pine/palmetto	?	den not visited	FP45?
FP36	Feb-96	BCNP - Wilson Cypress	499800	2895400	Pine/palmetto	3 (remains of 4th)	K24♀, K25♂, K26♂, UCFP44	FP45
FP40	Nov-90	BCNP - Baker's Grade	487100	2896300	pine/palmetto	2	FP206♀, FP44♂ den not visited	FP26
FP40	Mar-92	BCNP - Baker's Grade	485000	2897700	pine/palmetto	2	FP54♂, K02♂	FP28?
FP40	Jun-93	BCNP - Baker's Grade	486900	2896900	pine/palmetto	3	K03♂, K04♀, K05♀	FP26
FP40	?	?	unknown	unknown	?	2?	FP60♂, ♀ tracks, den not visited	Unknown
FP40	May-97	BCNP - Add Lands	488100	2899200	pine/palmetto	2	FP69♀, K37♂	FP45
FP48	Oct-93	BCNP - Bear Island	475900	2901600	pine/palmetto	3	K06♂, K07♀, K08♀	FP12
FP48	Jun-95	BCNP Dozier Hammock	482100	2903600	pine/palmetto	2	FP59♂, K17♀	Unknown
FP48	Sep-96	NE Doctor's Ham.	480200	2904000	vines/ferns	3	FP62♂, FP64♂, UCFP50♂	Unknown
FP48	Jun-98	BCNP - Bear Island	476300	2899200	pine/palmetto	2	K51♂, FP75♀	FP68 or FP45
FP48	Oct-99	BCNP - Bear Island	476100	2896100	Palmetto, myrtle	2	K74♀, K75♀ (abandoned)	FP63 or FP68
FP49	Jan-99	BCNP - Add Lands	497300	2897600	pine/palmetto	1	K55♂	Unknown
FP49	Aug-01	BCNP - Add Lands	495400	2900800	pine/palmetto	1	K107♂	Unknown
FP52	Jul-93	Sadie Cypress	467800	2918600	mixed swamp	2?	1♂ (roadkill) den not visited	FP46
FP52	Jul-94	Sadie Cypress	469600	2919000	Cypress swamp	?	den not visited	Unknown
FP55	Apr-95	BCNP	483700	2871800	pine/palmetto	2	K14♀, K15♀	FP42
FP55	Sep-97	BCNP - N Burns Lake	483300	2864800	pine/palmetto	1	K44♂	Unknown
FP55	Feb-98	BCNP - N Monument Lake	490500	2869800	pine/palmetto	3	FP102♀, K49♀, K50♂	Unknown
FP55	Apr-99	BCNP	479500	2876800	Palmetto/myrtle	2	FP87♀, K61♂	Unknown
FP55	Jun-01	BCNP - NE Airplane Prairie	481000	2882000	Palmetto	1	K104♂	FP79
FP55	May-02	BCNP	479900	2874300	pine/palmetto	1	K127♀	FP79
FP55	Sep-03	BCNP					den not visited	Unknown
FP56	Apr-94	BCNP Baker's Grade	485800	2897300	pine/palmetto	3	K09♂, K10♀, K11♂	Unknown
FP56	Oct-95	North BCSIR	490700	2901600	pine/palmetto	3	K20♂, K21♂, K22♂	FP45
FP56	Aug-96	North BCSIR	490700	2907400	Palmetto	2	K29♀?, K30♀?	FP45
FP56	Jun-97	BCNP - Bakers Grade	485900	2897600	pine/palmetto	4	K40♂, K41♀, K43♂, FP67♀	FP45
FP57	Jun-98	FSSP	461200	2880600	mixed swamp	?	den not visited	FP54
FP61	Mar-99	Long Pine Key	537300	2810700	Hardwood hammock	1	FP85♂	FP16
FP61	Sep-02	ENP - East	544624	2829732	hardwood/Schinus	4	K139♀, K140♂, K141♂, K142♀	Unknown

Cat ID	Den Date	Location	UTM-E	UTM-N	Habitat	No. of Kittens	Kittens Handled	Sire
FP66	Sep-98	Belle Meade	438700	2893600	pine/palmetto	3	K52♂, K53♀, K54♂	FP72
FP66	Dec-99	Private lands	464100	2909100	Cypress, cabbage	3	K76♂, K77♀, K78♀	FP60
FP67	Aug-00	Private lands	486100	2910700	palmetto	2	K84♂, K85♀	Unknown
FP67	May-01	Private lands	486200	2909800	pine/palmetto	4	K98♀, K99♂, K100♂, K101♂	Unknown
FP67	Jun-02	Private lands	481600	2909300	palmetto	3	K132♀, K133♂, K134♂	Unknown
FP69	Jul-99	BCNP - NE of Baker's Camp	485500	2902000	Palmetto	3	K71♂, K72♀, K73♀	Unknown
FP70	Jun-99	BCNP - NE of Monument Lake	491200	2865700	pine/palmetto	3	FP88♀, FP92♂, FP91♀	FP79
FP70	May-04	BCNP - Turner River Unit	472758	2867123	Pine/palmetto	3	K167♀, K168♂, K169♀	Unknown
FP71	Jun-99	BCNP	497700	2893800	pine/palmetto	4	FP90♂, FP86♀, K69♂, K70♀	FP79
FP73	?	?	unknown	unknown	?	1?	FP74♂ den not visited	-
FP73	Feb-99	BCSIR	unknown	unknown	?	1?	FP84♂ den not visited	-
FP73	Feb-02	BCNP - Addition Lands	507900	2900000	palmetto	3	K109♂, K110♂, K111♀	Unknown
FP75	Apr-00	Private lands	466400	2904800	hardwood hammock	Unsuccessful	den not visited	
FP75	Jun-01	BCNP - Bear Island	466800	2899400	pine/palmetto	2	K102♂, K103♂	FP59
FP75	May-02	BCNP - Bear Island	466000	2894800	palmetto	2	K128♂, K129♂	FP98, FP100
FP75	Mar-04	BCNP - Bear Island	468375	2894039	palmetto	3	K157♂, K158♂, K159♀	Unknown
FP77	May-00	BCNP - Addition Lands	501300	2900100	Palmetto	3	K81♂, K82♀, K83♂	Unknown
FP77	Aug-01	BCNP - Addition Lands	502600	2903900	pine/palmetto	1	K108♂	Unknown
FP78	Apr-00	FPNWR	464500	2896900	Pine/cabbage	2	FP107♀, FP96♂	FP59
FP78	Apr-02	FPNWR	457500	2897700	pine/palmetto	4	K117♀, K118♀, K119♀, K120♂	FP59
FP82	Dec-00	OK Slough	472600	2933600	sawgrass marsh	3	K86♀, K87♀, K88♂	FP65
FP83	Apr-02	FSSP	460800	2871500	fern bed	1	K123♂	Unknown
FP83	Jun-04	FSSP	457980	2872720	?	?	den not visited	Unknown
FP87	Jan-01	BCNP	496600	2868600	palmetto	3	K89♀, FP108♂, K91♂	FP79
FP87	Mar-03	BCNP - N of Oasis	499508	2866287	pine/palm	3	K143♀, K144♂, K145♀	FP79
FP88	May-01	BCNP - Loop Unit	500200	2855800	sawgrass marsh	4	K94♂, K95♀, K96♂, K97♀	Unknown
FP93	Apr-02	BCNP - Turner River Unit	484500	2874500	palmetto	4	K113♀, K114♀, K115♂, K116♀	FP79
FP93	Jul-03	BCNP - Turner River Unit	482328	2884460	hardwood hammock	3	K152♀, K153♂, K154♂	FP60
FP95	Mar-02	ENP - Long Pine Key	533700	2807600	Brazilian pepper	1	K112♀	FP85
FP101	Apr-02	BCSIR	494300	2905200	pine/palmetto	2	K121♂, K122♀	Unknown
FP101	Apr-03	Private lands	486563	2909969	palmetto/vines	3	K146♀, K147♂, K148♀	FP65/FP100
FP102	Jun-01	BCNP - Monument Lake	491400	2865600	mixed swamp	2	K105♂, K106♂	FP79

Cat ID	Den Date	Location	UTM-E	UTM-N	Habitat	No. of Kittens	Kittens Handled	Sire
FP102	Jul-02	BCNP - Monument Lake	493060	2867279	palmetto	2	K137♀, K138♂	FP79
FP106	May-02	FPNWR	464500	2903200	hardwood hammock	3	K124♀, K125♂, K126♂	Unknown
FP107	Jun-02	FPNWR	452200	2894400	pine palmetto	2	K135♂, K136♀	Unknown
FP107	May-04	FPNWR	456931	2897722	Pine/palmetto	4	K163♂, K164♂, K165♀, K166♀	Unknown
FP110	Jun-03	OK Slough	467115	2938383	palmetto/vines	3	K149♀, K150♂, K151♀	Unknown
FP112	Jun-02	BCNP - Bear Island	473300	2901600	palmetto	2	K130♂, K131♂	FP98, FP100
FP116	May-04	Hendry Co. Gum Swamp	486643	2910307	pine/palmetto	3	K160♀, K161♀, K162♂	FP65
FP120	Jan-04	BCNP - Turner River Unit	474804	2861042	pine/palmetto	2	K155♀, K156♂	Unknown
TX101	Sep-95	BCSIR	500000	2906900	pine/palmetto	2	FP73♀, FP79♂	Unknown
TX101	Dec-96	BCSIR	499400	2907600	Palmetto/oak	2	FP65♂, FP66♀	FP45
TX105	Sep-96	ENP - Long Pine Key	523200	2808000	tropical hardwood	1	K34♀	FP16
TX105	Jul-99	ENP - Long Pine Key	530700	2808300	Brazilian pepper	1?	FP94F1 ♀ den not visited	FP16
TX106	Nov-95	S Golden Gate Estates	447100	2885200	Cypress/mixed	1	K23♀	FP51
TX106	Feb-98	N Golden Gate Estates	447800	2895700	vines/cabbage	1	K47♂	FP54, FP59?
TX106	Jun-99	PSSF	453600	2891600	Cabbage	2	K62♀, FP83♀	FP54
TX106	Mar-01	FPNWR	453400	2896200	pine/palmetto	2	K92♀, K93♂	FP60
TX107	May-97	BCNP - N of Oasis	496500	2869100	pine/palmetto	2	FP70♀, FP71♀	Unknown
TX107	Feb-99	BCNP - N of Buckskin Prairie	493800	2875700	pine/palmetto	3	K56♀, K57♂, FP93♀	FP79
TX108	Jun-96	ENP - Long Pine Key	532300	2809300	tropical hardwood	1?	FP61 ♀ den not visited	FP16
TX108	Feb-98	ENP - Long Pine Key	530100	2809500	tropical hardwood	2	FP95♀, K46♂	FP16

*FP denotes panthers captured for radiocollaring; K denotes kittens handled at panther or Texas puma dens; TX denotes Texas pumas used for Panther Genetic Restoration; F1 subscript denotes Florida panther x Texas puma offspring; F2 subscript denotes offspring of F1 x F1 mating; B-FL subscript denotes offspring of F1 x Florida panther mating; B-TX subscript denotes offspring of F1 x Texas puma mating.

¹ENP = Everglades National Park; BCSIR = Big Cypress Seminole Indian Reservation; PSSF = Picayune Strand State Forest; FPNWR = Florida Panther National Wildlife Refuge; OSSF = Okaloacoochee Slough State Forest; NBCNP = Big Cypress National Preserve north of Interstate 75; FSSP = Fakahatchee Strand State Preserve; SBCNP = Big Cypress National Preserve south of Interstate 75.

²Kittens removed from wild into captive breeding program.

³Kittens marked with transponders.

⁴Handled by BCNP personnel.

Appendix VI. Summary of Florida panther mortalities in southern Florida from 1 July 2003 to 30 June 2004

Florida Panther 77.— The carcass of this approximately 6-year-old radio-collared female was recovered on 14 July 2003 from the Big Cypress Hunting Adventures area of BCSIR. The carcass was heavily scavenged and decomposed with no obvious signs of cause of death. Necropsy was performed at the University of Florida Veterinary Medical Teaching Hospital (VMTH), and cause of death was not determined. Radiographs were negative for projectile fragments. Carcass condition precluded examination for congenital defects. The death of FP77 may be related to those of UCFP55, 56, 57, and FP73, and FP118.

Florida Panther 85.—The carcass of this 5-year-old radio-collared male was recovered from Everglades National Park on 01 March 2004. There were no external signs of trauma although field sign indicated thrashing (primarily with the forelimbs) before death. Necropsy was performed at Disney's Animal Kingdom, and an immediate cause of death was not determined. There were no significant changes on gross or microscopic examination of tissues. No congenital defects were observed. Toxicological testing of tissues revealed high concentrations of Hg in hair (150 ppm), liver (85 ppm), kidney (15.5 ppm), muscle (8.2 ppm), and brain (3.6 ppm). Mercury concentrations in the brain are considered most important when diagnosing Hg toxicosis, and brain Hg concentrations in FP85 were considered below harmful levels (Heinz, 1996). High levels of selenium (Se) were also seen in liver (36.3 ppm), and this mineral is believed to protect against Hg toxicity (Heinz, 1996). No histological evidence consistent with Hg toxicity was observed in the brain or other organs. Low levels of P,P' DDE were detected in fat and stomach contents but were not believed to have caused significant health effects; gas chromatography failed to detect other toxins in stomach contents and liver. Viral culture, PCR (canine distemper, pseudorabies virus, Flaviviruses, Alphaviruses), and rabies IFA were also negative, and tests for algal toxins are pending. The cause of death for FP85 remains open.

Florida Panther 86.— This 4-year-old radio-collared female was captured in BCNP on 06 November 2003 due to emaciation and hind limb paralysis. Her movements had been unusually restricted

for about 2 weeks, and a visual check confirmed her condition. The panther was transported to the VMTH for evaluation and treatment. Physical examination revealed dehydration (10%), a 10x10 cm flocculent soft-tissue mass over the right ischium, severe muscle atrophy (most significant in hindlimbs), and hindlimb paralysis (without deep pain). There were no external signs of trauma. A cerebral spinal fluid tap, myelogram, and computed tomography showed evidence of spinal injury (T-12) – most likely due to trauma. The chronic nature of FP 86's injury and poor prognosis led to the decision of euthanasia, which was performed on 07 November 2003. FP86 was necropsied at VMTH on 8 November 2003. Examination of the spinal cord revealed a 9x6x4 subarachnoid cyst and necrosis and myelomalacia of the thoracic spinal cord were seen on histological examination. Spinal lesions were most consistent with trauma. A second 7x8 cm soft-tissue mass found at necropsy was determined to be the right iliac lymph node. Microscopic examination of the soft-tissue masses revealed pyogranulomatous inflammation with numerous translucent branching fungal hyphae. Fungus identification is pending. No congenital defects were observed, and presence of atrial-septal defect (ASD) could not be determined.

Florida Panther 91.—The carcass of this 4.5-year-old radio-collared female was recovered on 12 December 2003 from the BCNP between I-75 and US 41 following detection of a mortality signal. Upon discovery of the carcass it was determined the cat died within the past 12 hours and had been killed by intraspecific aggression (ISA). Necropsy at the WRL confirmed ISA as the cause of death. No abnormalities of the uterus or ovaries were observed. No abnormalities resulting from an imbedded dart needle were observed in the right patella. Congenital defects were limited to a small cleft in the spleen.

Florida Panther 114.—The carcass of this 1.5-year-old radio-collared male was recovered on 17 October 2003 from the FNWR following detection of a mortality signal. The carcass was found lying next to a raccoon carcass on which FP 114 had just begun to feed. Tracks of an adult male were observed in the area. Necropsy was performed at VMTH, and ISA was confirmed as the cause of death. Fatal wounds were caused by a bite to the neck which separated the cervical vertebrae. Interestingly, this bite wound caused bruising to the skin and underlying musculature but did not puncture the skin. Congenital defects included a 90° kink in the last coccygeal vertebrae, a cowlick, and retention of the left testicle.

This panther had been raised in captivity (White Oak Plantation) from age 7 months to 1.3 years when it was released 20 August 2003. The kitten, with its sibling FP113, was orphaned when their mother (FP78) was killed by a male panther.

Florida Panther 122.—This approximately 2-year-old radio-collared female was found dead in OKS following detection of a mortality signal 13 February 2004. FP 122 had been captured two weeks previous (30 January 2004) and was noted to be anemic (PCV 18%) and was positive for FeLV by ELISA antigen and IFA tests. During the ensuing 2 weeks, FP122 lost 20 lbs, despite killing and feeding on a deer one week after her capture. Necropsy was performed at Disney's Animal Kingdom. Grossly, FP122 appeared severely anemic, had generalized lymph node enlargement, and was severely dehydrated. Autolysis precluded complete histologic examination. Viral culture, PCR (canine distemper, pseudorabies virus, Flaviviruses, Alphaviruses), and rabies IFA were negative. Cause of death was likely due to complications associated with FeLV infection. Congenital defects observed included a kinked tail, cowlick, and double-cleft in the spleen.

Florida Panther 123.—This approximately 4-year-old radio-collared male was found dead in OKS following detection of a mortality signal 15 March 2004. FP123 was positive for FeLV by ELISA antigen and IFA at capture 1.5 mo earlier. Field sign indicated death by ISA approximately 24-48 hours before carcass collection and an adult male panther (FP132) was captured within 400 m of the carcass collection site the same day. FP132 had recent lacerations and bite wounds and is believed to have been the male that killed FP123. Necropsy was performed at Disney's Animal Kingdom, and extreme autolysis precluded a complete necropsy. No additional injuries, or fatal injuries associated with ISA were observed. Additionally, no obvious disease condition associated with FeLV was observed. Congenital defects observed included a kinked tail, cowlick, and a cleft in the spleen.

Florida Panther 209.—This 11.5-year-old captive (Jacksonville Zoo) female presented inappetent and slightly lethargic on 10 January 2004. FP209 failed to respond to treatment and was progressively more lethargic. Death was spontaneous at 0700 hr on 16 January 2004. Necropsy was performed at

VMTH, and enteritis due to *Clostridium perfringens* was diagnosed as the cause of death. Presence of congenital defects was not recorded at necropsy.

Uncollared Florida Panther 59.—UCFP59 was an uncollared dependent 3 to 4-month-old male kitten killed on 2 November 2003 on CR858 approximately 1.2 miles west of SR29. Necropsy was performed at WRL, and death was due to vehicular collision. Congenital defects included a slight kink in the last coccygeal vertebrae and a cleft in the spleen.

Uncollared Florida Panther 60.—This uncollared 1.5-year-old male Florida panther was injured in a collision with a vehicle on 9 December 2003 on US 41 about a mile east of CR92 near the Royal Palm Hammock. The panther was immobilized and transported to the VMTH for further evaluation and medical treatment. Following surgery UCFP60 appeared stable but died spontaneously 13 December 2003. A necropsy was performed the same day and cause of death was determined to be hypoxia secondary to pulmonary edema and effusion. There were also fractures of the frontal bone that were not seen on radiographs, and significant hemorrhage between the brain and meninges. Congenital defects observed were limited to a double cleft in the spleen.

Uncollared Florida Panther 61.—This uncollared 2 to 3-year-old female was found alive 24 December 2003 on CR833 approximately 1.7 miles north of CR846 but died just before biologists arrived. Necropsy was performed at WRL, and vehicular collision was confirmed as the cause of death. Congenital defects observed included a cowlick and a cleft in the spleen.

Uncollared Florida Panther 62.—This uncollared 7 to 8-month-old female was found dead 11 January 2004 on US41 near 40 mile bend. Necropsy was performed at WRL, and cause of death was confirmed as vehicular collision. Congenital defects observed were limited to a slight cleft in the spleen. Genetic analyses to determine her relationship, if any, to the Pinecrest family group are pending.

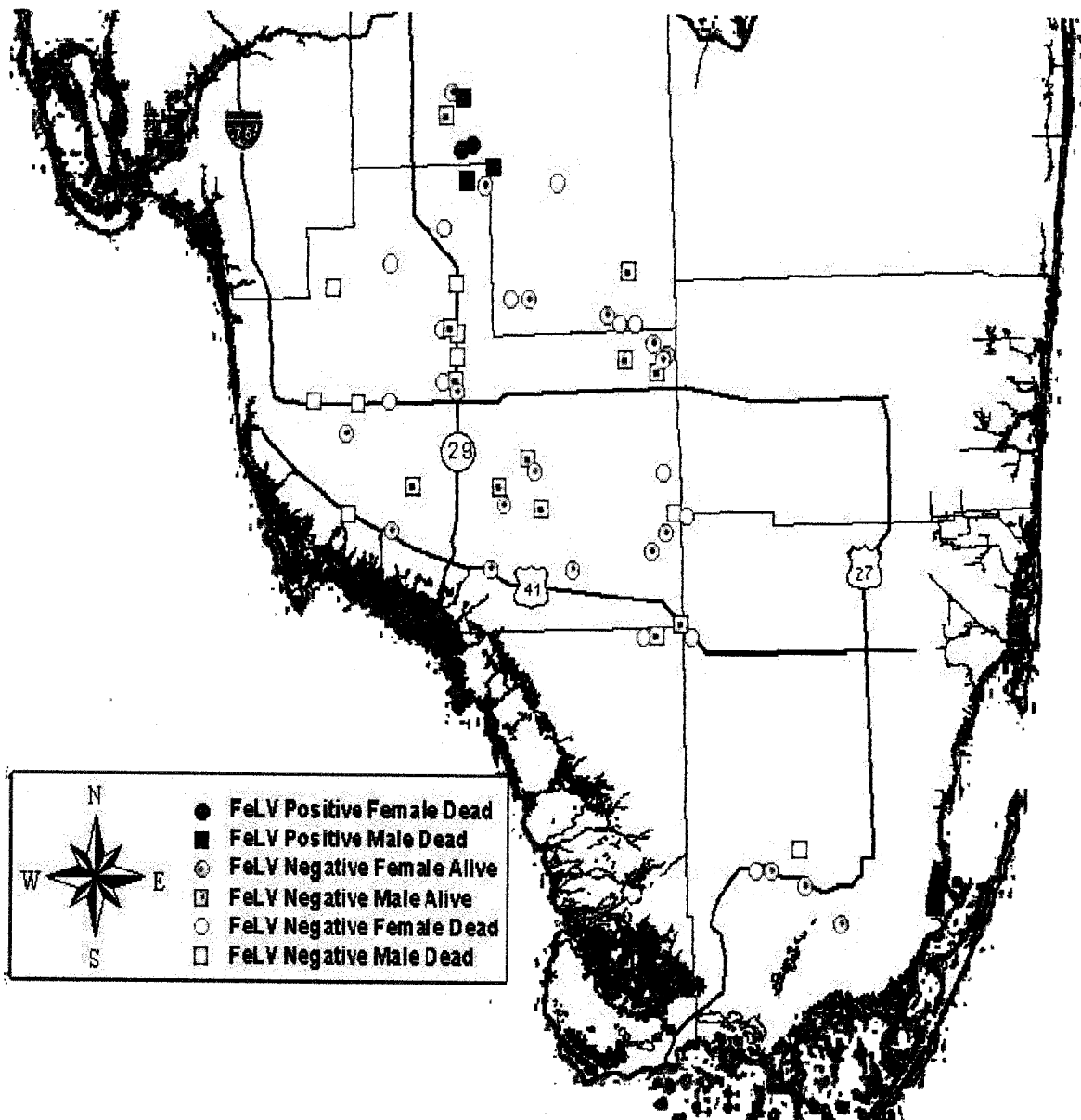
Uncollared Florida Panther 63.—This uncollared 3.5-year-old male was killed 26 February 2004 at mile marker 99 on the eastbound lane of I-75. Necropsy was performed at WRL, and vehicular collision was confirmed as the cause of death. Congenital defects observed included a 360° kink of the last coccygeal vertebrae, a complete cleft in the spleen, and retention of the left testicle.

Uncollared Florida Panther 65.—This uncollared 1.5-year-old male was found dead 6 April 2004 on the northbound lane of I-75 about 200 yards north of Bear Island Grade on SR29. Necropsy was performed at WRL, and vehicular collision was confirmed as the cause of death. Congenital defects observed included a 140° kink of the last coccygeal vertebrae, a small cowlick, and a cleft in the spleen.

Uncollared Florida Panther 66.—This uncollared 3 to 5-year-old male was hit and killed about ½ mile west of Everglades Blvd on 27 June 2004. The cat was lying on the south shoulder of the interstate; this portion of the interstate does not have wildlife crossings. UCFP66 was necropsied at WRL, and vehicular collision was confirmed as the cause of death. Congenital defects included a kinked tail, cowlick, and cleft in the spleen.

#88
occurring

Appendix VII. Distribution of feline leukemia virus antigen positive and negative Florida panthers and Texas cougars sampled 1 July 2002 to 1 September 2004.



Appendix IX. Linda 2001 – Analysis of panther survival data.

MEMORANDUM

FROM: Mr. Stephen B. Linda, Biological Scientist IV, Wildlife Technology Services Section
TO: Mr. Darrell Land, Panther Section Leader, Bureau of Wildlife Diversity Conservation
DATE: June 27, 2001
SUBJECT: Analysis of Panther Survival Data

Summary of results

Six-month survival:

- Texas ancestry did not appear to affect the probability of surviving to six months ($P = 0.2776$).
- There appeared to be weak but non-negligible evidence of mother-specific (i.e., individual) effects for the probability of surviving to six months ($P = 0.1446$).

Survival of radio-collared panthers:

The data contained only one non-censored observation for panthers with Texas ancestry (Table 2, Figure 1). Nevertheless, Texas ancestry effects on lifelength were suggested ($P = 0.1308$), with panthers descended from Texas cougars expected to have a longer lifelength than other Florida panthers.

Methods

All computations were performed using the SAS System (SAS Inst. Inc., 1999).

Six-month survival

The data used in the analysis are given in Table 1. The number of kittens surviving to six months for a given litter was assumed to follow a binomial distribution, and generalized linear mixed model (GLMM) methodology, as can be implemented in PROC NLMIXED in the SAS System, was performed. A logit link and binomial error distribution were specified; a fixed Texas-ancestry effect and a random mother-specific effect (assumed normally distributed with zero expectation and variance σ^2) were included in the linear predictor.

Survival of radio-collared panthers

The data used in the analysis are given in Table 2. The log of (possibly right censored) survival time was modeled using the Weibull, exponential, gamma, logistic, and normal distributions, with the location parameter dependent on Texas ancestry. The fits of the models were compared using AIC.

In addition, Cox's proportional hazards model was fitted to the data.

Appendix IX. Linda 2001 – Analysis of panther survival data.

Results

Six-month survival

The estimate of the square root of the panther variance component was:

$\hat{\sigma}$	SE	<i>P</i> -value for $H_0: \sigma = 0$	95% CI limits for σ	
			Lower	Upper
0.795737	0.5170143	0.1446	0.000000	1.897727

The ratio of the odds of surviving to six months for Texas descendants to the odds for non-Texas descendants was:

Log(odds ratio) scale				$H_0: \log(\text{odds ratio}) = 0$	Back-transformed (i.e., odds ratio) scale			
		95% CI limits					95% CI limits	
Estimate	SE	Lower	Upper		Estimate	SE†	Lower	Upper
0.873046	0.7749453	-0.778711	2.524803	0.2776	2.3942	1.85537	0.4590	12.4884

†Obtained by application of the delta method.

The expected probability of surviving to six months for each group was as follows:

Texas ancestry	Log(odds) scale				Back-transformed (i.e., probability) scale			
	Estimate	SE	95% CI limits		Estimate	SE†	95% CI limits	
Yes	0.955591	0.5929970	-0.308352	2.219534	0.7222	0.11896	0.4235	0.9020
No	0.082546	0.4967333	-0.976216	1.141308	0.5206	0.12397	0.2736	0.7579

†Obtained by application of the delta method.

Thus, there was no evidence that the probability of surviving to six months depended on Texas ancestry ($P = 0.2776$). However, as indicated by relatively wide confidence intervals for the odds ratio and for the six-month survival probabilities, the experiment appeared to have low power.

Survival of radio-collared panthers

AIC values for the fitted models were as follows (gray shaded box indicates best model according to AIC):

Distribution	AIC
Weibull	35.0792
Exponential	35.6831
Gamma	35.0597
Logistic	34.7222
Normal	34.0987

Thus, according to AIC, the log-normal distribution provided the best fit to the survival data.

Based on the log-normal distribution, the ratio of the expected lifelength of non-Texas descendants to the expected lifelength for Texas descendants was:

Appendix IX. Linda 2001 – Analysis of panther survival data.

Log(ratio) scale					Back-transformed (i.e., ratio) scale			
Estimate	SE	95% CI limits		<i>P</i> -value for <i>H</i> ₀ : log(ratio) = 0	Estimate	SE [†]	95% CI limits	
		Lower	Upper				Lower	Upper
-0.76216	0.504401	-1.75077	0.22644	0.1308	0.4667	0.23538	0.1736	1.2541

[†]Obtained by application of the delta method.

[†]Obtained by application of the delta method.

Expected lifelength was as follows:

Texas Ancestry	Log-scale				Back-transformed scale			
	Mean	SE	95% CI limits		Mean	SE [†]	95% CI limits	
			Lower	Upper			Lower	Upper
No	1.58646	0.701950	0.21067	2.96226	4.88644	3.430042	1.23450	19.34168
Yes	2.34863	0.488174	1.39183	3.30543	10.47121	5.111767	4.02219	27.26031

[†]Obtained by application of the delta method

Thus, based on the log-normal distribution, Texas ancestry effects on lifelength were suggested ($P = 0.1308$), with panthers descended from Texas cougars expected to have a longer lifelength than other Florida panthers (Figure 1).

Inferences from the fit of Cox's proportional hazards model were consistent with those from the fit of the log-normal distribution ($P = 0.1429$ for H_0 : log hazard ratio depended on Texas ancestry).

Caveats

The analysis of survival of radio-collared panthers was based on rather scant data (the data contained only one non-censored observation for panthers with Texas ancestry). Therefore, assessment of the plausibility of the assumptions necessary for application of Cox's proportional hazards model was problematic. Also, as indicated by relatively wide confidence intervals for expected lifelengths and the ratio of expected lifelengths, the power of the experiment did not appear to be very high. As more lifelength data are obtained over time, we might expect to obtain more confidence in the choice of appropriate statistical methodology, and in resulting inferences concerning Texas ancestry effects on survival.

Reference

SAS Inst. Inc. 1999. *SAS OnlineDoc™*, Version 8. SAS Institute Inc., Cary, NC.

Appendix IX. Linda 2001 – Analysis of panther survival data.

Table 1: Data used in the analysis of six-month survival.

Texas ancestry	Mother ID	Den year	Litter size	Number alive at six months
No	32	1996	1	0
	40	1992	2	2
	40	1993	3	2
	48	1995	2	2
	48	1996	3	2
	48	1998	2	2
	48	1999	2	0
	49	1999	1	0
	56	1995	3	0
	56	1996	2	0
	56	1997	4	2
	69	1999	3	2
	77	2000	3	1
	78	2000	2	2
Yes	61	1999	1	1
	66	1998	3	0
	66	1999	3	2
	70	1999	3	3
	71	1999	4	3
	TX101	1995	2	2
	TX101	1996	2	2
	TX106	1998	1	0
	TX106	1999	2	1
	TX107	1997	2	2
	TX108	1998	2	1

Appendix IX. Linda 2001 – Analysis of panther survival data.

Table 2: Data used in the analysis of survival of radio-collared panthers.

Texas ancestry	Kitten ID	Birth date	Date of death [†]	Censored	Life length (yrs)
No	10	08/15/85	01/27/87	0	1.4511
	16	12/15/85	01/03/00	0	14.0507
	19	05/15/86	12/02/97	0	11.5510
	22	10/15/86	07/20/91	0	4.7611
	29	05/15/88	05/27/92	0	4.0329
	30	03/15/88	01/29/90	0	1.8754
	34	03/15/88	11/15/93	0	5.6701
	42	05/15/89	06/22/95	0	6.1027
	43	07/15/89	10/31/91	0	2.2943
	44	11/15/90	07/06/93	0	2.6393
	45	11/15/90	08/02/98	0	7.7125
	47	07/15/91	02/19/93	0	1.6016
	48	10/15/91	05/23/01	1	9.6044
	50	05/15/91	12/06/93	0	2.5626
	52	10/15/91	01/14/95	0	3.2498
	53	04/15/92	02/26/93	0	0.8679
	54	04/15/92	05/23/01	1	9.1034
	58	04/15/94	03/30/97	0	2.9569
	59	06/15/95	05/23/01	1	5.9384
	60	10/15/95	05/23/01	1	5.6044
	62	09/15/96	05/23/01	1	4.6845
	64	09/15/96	03/26/99	0	2.5243
	67	06/15/97	05/23/01	1	3.9370
	69	05/15/97	05/23/01	1	4.0219
	75	06/15/98	05/23/01	1	2.9377
Yes	61	07/15/96	05/23/01	1	4.8542
	65	12/15/96	05/23/01	1	4.4353
	66	12/15/96	05/23/01	1	4.4353
	70	05/15/97	05/23/01	1	4.0219
	71	05/15/97	05/23/01	1	4.0219
	83	06/15/99	05/23/01	1	1.9384
	85	03/15/99	05/23/01	1	2.1903
	86	06/15/99	05/23/01	1	1.9384
	87	04/15/99	05/23/01	1	2.1054
	88	06/15/99	05/23/01	1	1.9384
	90	06/15/99	04/26/01	0	1.8645
	91	06/15/99	05/23/01	1	1.9384
	92	06/15/99	05/23/01	1	1.9384
	93	02/15/99	05/23/01	1	2.2669
	94	07/15/99	05/23/01	1	1.8563

[†]Date of death for censored observations was the date the data were compiled.

Appendix IX. Linda 2001 – Analysis of panther survival data.

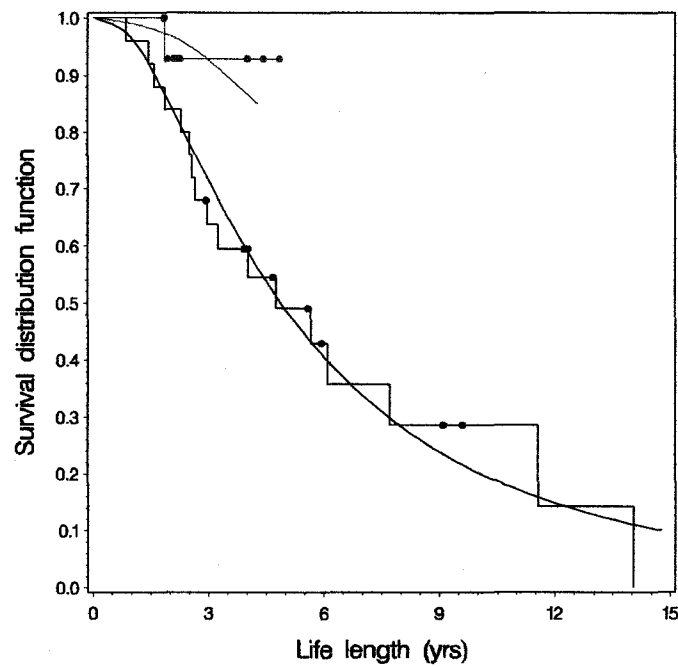


Figure 1: Survival of radiocollared panthers. Step-function indicates the product-limit estimate of the survival distribution function (steps occur at non-censored life-lengths), dots indicate censored observations, and curve indicates the survival function based on the fit of the log-normal distribution; black indicates panthers with no Texas ancestry, gray indicates panthers having Texas ancestry.

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Appendix X. Summary of Florida panther and Texas puma mortalities and injuries in southern Florida from 2 February 1972 to 30 June 2004.

Panther ID	Death Date	Sex	Age	Location	Cause
FP03	1/17/1983	F	9+	FSSP	Capture
FP35	1/24/1990	M	10 mos.	Gainesville	Capture-Related Abandonment (infection)
FP20	8/24/1988	M	4-5	Bear Island	Congenital Heart Defect
FP21	12/26/1997	F	11-12	White Oak	Euthanasia
FP86	11/7/2003	F	4.5	UF-Gainseville	Euthanasia
FP115	5/17/2003	F	4-5	OK Slough SF - Sick Island	FeLV
FP122	2/13/2004	F	2-3	OKSSF, NW Wild Cow Island	FeLV
FP132	7/22/2004	M	3-3.5	OKSSF	FeLV
FP22	7/20/1991	F	5	ENP	Infection
FP34	11/15/1993	M	5	SE Hendry Co. L28	Infection (bacterial from lacerated esophagus)
FP02	10/27/1984	M	14+	FSSP	Intraspecific Aggression
FP10	1/27/1987	M	16-20 mos.	Mud Lake Strand - by adult male panther	Intraspecific Aggression
FP25	8/26/1988	M	4-5	FPNWR - bacterial infection from panther fight	Intraspecific Aggression
FP30	1/29/1990	M	22 mos.	FSSP, Killed by adult male FP37	Intraspecific Aggression
FP41	9/26/1990	F	2	Hendry Co. W. of BCSIR - killed by male FP28	Intraspecific Aggression
FP18	10/3/1990	F	9	Hendry Co. So. of CR 846 near Rock Lake - killed by male FP28	Intraspecific Aggression
FP43	11/1/1991	M	2	BCSIR, Hendry Co. - killed by adult male FP26	Intraspecific Aggression
FP28	9/25/1992	M	5.5	BCSIR, Hendry Co. - possibly killed by male FP26	Intraspecific Aggression
FP47	2/19/1993	M	18 mos.	Killed by male FP51 in FSSP	Intraspecific Aggression
FP53	2/26/1993	M	11 mos.	Private lands N of FPNWR-killed, eaten by uncollared male	Intraspecific Aggression
FP44	7/6/1993	M	2.5	Raccoon Pt. BCNP-killed by FP42	Intraspecific Aggression
FP26	7/8/1994	M	11-12	4 mi. E. Hendry Prison - killed by male FP46 - punctured skull	Intraspecific Aggression
FP12	11/8/1994	M	13-14	Private lands, Hendry County - died of infected injury from fight w/FP46	Intraspecific Aggression
FP58	3/30/1997	M	3	Sadie Cypress - septicemia from bite wounds from intraspecific aggression	Intraspecific Aggression
FP40	2/2/1998	F	10	Bear Island - E Harrell Strand, died of infection from bite wounds to foreleg	Intraspecific Aggression
FP45	8/2/1998	M	7.5	BCSIR, Hendry Co.	Intraspecific Aggression
FP72	12/23/1998	M	3-4	BCSIR, Hendry Co.- killed by uncollared male	Intraspecific Aggression
FP46	2/3/1999	M	9-9.5	Private land S. CR 846, Hendry Co. - killed by uncollared male	Intraspecific Aggression

Panther ID	Death Date	Sex	Age	Location	Cause
FP64	3/26/1999	M	2.5	Audubon's Corkscrew Sanctuary - killed by uncollared male	Intraspecific Aggression
FP76	11/13/1999	M	2.5-3	FSSP, 1.9 mi W of SR 29 off of Lancaster Grade - killed by FP54	Intraspecific Aggression
FP89	11/10/2000	M	3.5	BCNP, 2 mi NW of Mud Lake - killed by FP79F1	Intraspecific Aggression
FP11	2/27/2001	F	19-20	200 yds. S of CR 846, 1 mi E of Dupree Rd.	Intraspecific Aggression
FP97	12/2/2001	M	2	E of Gopher Ridge Grove N of Immokalee	Intraspecific Aggression
FP96	1/15/2002	M	1.75	N end Big Corkscrew Island	Intraspecific Aggression
FP111	9/5/2002	M	9-10	OK Slough N of CR832	Intraspecific Aggression
FP112	9/11/2002	F	4	BCNP - Bear Island	Intraspecific Aggression
FP78	10/16/2002	F	6	FPNWR - Fire Tower	Intraspecific Aggression
FP49	1/3/2003	F	12	BCNP Addition Lands - Killed by uncollared male	Intraspecific Aggression
FP67	1/15/2003	F	5.5	Hendry Co. - Gum Slough, killed by FP65	Intraspecific Aggression
FP109	2/22/2003	M	10+	OK Slough N of CR832	Intraspecific Aggression
FP82	5/10/2003	F	6	OK Slough	Intraspecific Aggression
FP87	6/19/2003	F	4	BCNP - 7 mi NNE of Oasis	Intraspecific Aggression
FP114	10/17/2003	M	1.5	FPNWR, S of Oil Pad Rd. N. of the former Miles City fire tower site	Intraspecific Aggression
FP91	12/12/2003	F	4.5	BCNP, Turner River Unit	Intraspecific Aggression
FP123	3/15/2004	M	3-4	OK Slough State Forest	Intraspecific Aggression
FP55	7/7/2004	F	~11.5	BCNP	Intraspecific Aggression
FP08	8/20/1988	F	13-15	Gainesville	Liver Failure (old age)
FP32	9/12/2002	F	15	FPNWR - Rock Island	Malnutrition (old-age)
TX103	8/19/1999	F	-	SBCNP, southern Lostman's Pines 1 mi N of ENP boundary	Metabolic Complications Associated with Pregnancy
FP38	8/4/1994	F	9	Conservation Area 3A	Pleuritis (from chest puncture)
FP29	5/27/1992	M	4	Hendry Co., Gum Swamp	Pseudorabies
FP39	6/18/1990	M	3-4	ENP	Pyrothorax
FP33	11/25/1989	M	3	2 mi. NW of Hendry Prison	Rabies
FP19	12/2/1997	F	11.5	FPNWR (Merry Xmas)	Ruptured Aorta
UCFP02	3/8/1978	M	2-3	L-28, Dade County	Shooting
UCFP10	5/22/1983	F	adult	L-8 canal near Canal Point, Palm Beh Co.	Shooting
UCFP08	12/1/1983	M	3-6	Seminole Indian Reservation, Hendry Co. (James Billie)	Shooting
UCFP11	10/30/1984	F	2-3	Corbett WMA, Palm Beh. Co. (Elmer Brooker)	Shooting
UCFP14	3/23/1985	F	2-3	CSSP, Collier Co. (skeleton)	Shooting
FP09	1/1/1986	F	not fatal	Golden Gate Estates, So. of SR 84, Collier Co.	Shooting (INJURY)

Panther ID	Death Date	Sex	Age	Location	Cause
TX104	4/18/1998	F	6-7	S of Sabal Palm Road in citrus grove	Shooting
FP108	11/16/2002	M	22 mos.	BCNP Raccoon Pt.	Traumatic Neck Injury
UCFP03	2/1/1979	M?	unknown	Gannet Strand (Fl. Museum of Natural History)	Unknown
FP06	4/16/1982	M	6-7	NE BCNP	Unknown
FP05	11/18/1983	F	8-9	Fakahatchee Conserv. Club	Unknown
FP15	6/10/1988	F	7-8	ENP	Unknown
FP24	8/22/1988	M	3-5	Glades Co. near Palmdale	Unknown
FP27	7/23/1989	M	3-4	ENP	Unknown
FP17	7/23/1990	M	9	Addition lands near Tangerine Camp	Unknown
FP14	6/20/1991	F	10-11	ENP	Unknown
FP42	6/22/1995	M	6	Turner River Unit	Unknown
FP16	1/3/2000	M	14	NE boundary of ENP	Unknown
FP68	3/1/2000	M	5-7	NBCNP W of Tangerine tram	Unknown
TX101	3/29/2000	F	-	BCSIR ¼ mi W of game pen, ¼ mi S of canal	Unknown
FP84B-FL	4/20/2000	M	14 mos.	Fisheating Creek WMA, N side of creek, 5 mi W of US 27	Unknown
FP23	12/1/2000	F	14	BCNP 2 mi E of Turkey Foot	Unknown
TX107	1/18/2001	F	8-9	BCNP 11 Mile Rd.	Unknown
FP92	9/1/2001	M	2.2	N Flint Pen Strand, CREW	Unknown
FP105	1/16/2002	F	~7	FPNWR, SW corner of clearout	Unknown
FP118	4/4/2003	F	1	BCSIR - Game Pen	Unknown
UCFP55	5/11/2003	M	1-1.5	BCSIR Safari Pen	Unknown
UCFP56	5/12/2003	M	1-1.5	BCSIR Safari Pen	Unknown
UCFP57	5/15/2003	F	4-6	BCSIR Safari Pen	Unknown
FP73F1	6/28/2003	F	7 yr 10 mo	BCSIR - Game Pen	Unknown
FP77	7/12/2003	F	6	BCSIR- Game Pen	Unknown
FP85	3/1/2004	M	5	ENP	Unknown
FP117	7/28/2004	M	27 MOS	0.75 mi S of CR832, ~0.2mi E. of Wild Cow Grade	Unknown
UCFP24	3/18/1996	F	1.5-2 weeks	FPNWR	Unknown (dehydrated)
FP36	10/10/1998	F	14+	NBCNP E. of L28 interceptor canal	Unknown (likely natural)
UCFP28	2/13/1972	M	2-3	SR 25 S OF MOORE HAVEN	Vehicle
UCFP04-(G80-4)	12/23/1979	F	1.5-2.5	SR 29 JUST N SR 84	Vehicle
UCFP05-(G80-15)	2/7/1980	M	1.5-2.5	SR 29 NEAR SUNNILAND	Vehicle

Panther ID	Death Date	Sex	Age	Location	Cause
UCFP06-(G81-19)	4/19/1981	F	2-3	SR 29 NEAR COPELAND	Vehicle
UCFP09-(G83-22)	3/18/1983	M	2-3	US 27 PALMDALE	Vehicle
FP01	12/14/1983	M	12-14	SR 84 18 MM	Vehicle
BIG GUY	11/2/1984	M		US 41 1	Vehicle (INJURY)
UCFP12-(G84-26)	11/12/1984	F	8-10	SR 84 16 MM	Vehicle
UCFP13-(G85-BNZ)	1/8/1985	F	1.5-2	SR 84 MM16	Vehicle
FP04	4/18/1985	M	12+	SR 84 17 MM	Vehicle
NONE	5/12/1985	F	UNK	CR 951 2 M N US 41	Vehicle (INJURY)
FP07	10/26/1985	M	10	SR 29 4 M I S SR 84	Vehicle
UCFP15	11/15/1986	F	4-5	SR 84 16.5 MM	Vehicle
FP20	6/17/1987	M	3-4	CR 858 .8 M E SR 29	Vehicle (INJURY)
FP13	12/14/1987	M	6-8	SR 29 SUNNILAND	Vehicle
FP21	7/23/1988	F	2.5 YRS	1 MILE E US1 ON PALM DRIVE	Vehicle (INJURY)
FP28	11/29/1988	M	1.5-2	NEAR DANIELS RD. RSW	Vehicle
UCFP18-(RK-850)	1/25/1989	M	3	CR 850 1.5 M S SR 80	Vehicle
UCFP19-(RK-846)	6/18/1990	M	10 MOS.	CR 835 (846) 1 M E CR 833	Vehicle
FP37	11/26/1990	M	4-5	SR 29 .5 M N I-75	Vehicle
UCFP20-(FP11'S	2/4/1991	F	9 MOS.	SR 29 PISTOL POND BRIDGE	Vehicle
NONE	4/7/1992	M	UNK	ALICO RD. 1	Vehicle (INJURY)
UCFP21-(FP19'S	11/9/1992	F	7 MOS.	SR 29 SUNNILAND	Vehicle
UCFP22	8/9/1993	M	2-3	DANIELS RD 1 M E I-75	Vehicle
FP50	12/6/1993	M	2.5	CR 846 5 M E OF IMMOKALEE	Vehicle
UCFP23-(FP52'S	2/28/1994	M	8 MOS.	3 M N ON COUNTY LINE ROAD	Vehicle
FP31	3/3/1994	F	12-14	SR 29 SUNNILAND	Vehicle
FP52	1/14/1995	F	3.3	CR 846 NEAR DUPREE ROAD	Vehicle
TX102	9/2/1995	F	4	CR 833 JUST N CR 835 (846)	Vehicle
UCFP29	4/24/1996	M	3-5	5.5 M E SR 29 ON CR 832	Vehicle
UCFP30	5/2/1996	F	1	US 41 @ TURNER RIVER	Vehicle
UCFP31	7/13/1997	?	UNK	CR 846 1.5 M W CR 858	Vehicle
FP64	2/14/1998	M	1.5 YRS	SR 29 AT CLEARCUT, FPNWR	Vehicle (INJURY)
UCFP25	6/13/1998	F	2	CR 846 3 M E CR 858	Vehicle

Panther ID	Death Date	Sex	Age	Location	Cause
FP51	7/17/1998	M	9	SR 29 @ BEAR ISLAND GRADE	Vehicle
UCFP26	9/17/1998	M	3-5	US 41 3	Vehicle
UCFP27	7/8/1999	F	2 YEARS	FARM ROAD E HENDRY PRISON	Vehicle
FP74	9/8/1999	M	2.5 YRS	US 27 NEAR VENUS	Vehicle
UCFP33	10/29/1999	M	11 MOS.	CR 833 2 MI N BCSIR	Vehicle
FP80	2/10/2000	F	4-5	200 FT. W SWAMP SAFARI, BCSIR	Vehicle
K76-(FP66)	2/28/2000	M	3 MOS.	1 MI W SR 29, ON CR 858	Vehicle
UCFP34	3/23/2000	M	1.5-2	CR846 2 MILES E COUNTY LINE	Vehicle
UCFP35	6/23/2000	M	1.5-2	CR846 2 MILES E IMMOKALEE	Vehicle
UCFP36	8/13/2000	F	1.7 YRS	CR 846 E IMMOK. NEAR POWERLINE	Vehicle
UCFP37	12/29/2000	F	5	4.5 MI E SR29 ON CR846	Vehicle
UCFP38	4/14/2001	F	2 YEARS	CR 833 1 MI N BCSIR, HENDRY CO	Vehicle
FP90	4/26/2001	M	1.9 YEARS	US 27 2.5 MI N OF TERRY TOWN	Vehicle
UCFP39	5/7/2001	F	10 MONTHS	SR 29 1/2 MI N OF JEROME	Vehicle
UCFP40	5/7/2001	M	10 MONTHS	SR 29 1/2 MI N OF JEROME	Vehicle
UCFP41	5/22/2001	M	2-3	SR 29 SUNNILAND, NEAR MINE RD	Vehicle
UCFP42	6/14/2001	F	3-4	CR846, 1 MILE EAST POWERLINE	Vehicle
UCFP43	8/17/2001	M	2-3	CR846 1 MILE EAST OF POWERLINE	Vehicle (INJURY)
UCFP45	4/5/2002	M	3	3.4 MI N OF PALMDALE, GLADES C	Vehicle
UCFP46	4/10/2002	M	6 MONTHS	1/2 MI N OF DEEP LAKE, COLLIER	Vehicle
FP98	7/1/2002	M	4-5	1 KM N PISTOL POND, SR 29	Vehicle
UCFP48	11/10/2002	F	8-9 MOS	CR846 5-6 MI E IMMOKALEE	Vehicle
UCFP49 (K98)	11/25/2002	F	19 MOS	CR846 3-4 MI E IMMOKALEE	Vehicle
FP99	11/28/2002	M	33 MOS	CR846 1/4 MI N COLLIER FAIRGRN	Vehicle
UCFP50 (K33)	1/26/2003	M	3-4	CR846 3.4 MI E EVERGLADES BLVD	Vehicle
FP106	2/20/2003	F	3	SR29 AT SUNNILAND MINE ENTRANCE	Vehicle
UCFP51	3/10/2003	M	1.5-2.0	I-4, 0.25 MI E I-75, NEAR TAMPA	Vehicle
UCFP52	3/20/2003	M	2-3	CR833, 2MI S CR832, HENDRY CO.	Vehicle
UCFP53	5/25/2003	F	2-3	SR29, 1.4 MI N CR858, COLLIER	Vehicle
UCFP54	6/3/2003	M	8-10 MOS	SR29, 1.7 MI N CR858, COLLIER	Vehicle
UCFP58	6/30/2003	F	~1YR	CR846 3/4 MILES E OF EVERGLADS B.	Vehicle
UCFP59	11/2/2003	F	3-4 MOS.	CR 858, 1.2 MI WEST SR 29	Vehicle

Panther ID	Death Date	Sex	Age	Location	Cause
UCFP60	12/9/2003	M	~2-3	US41, ~ 1 MI EAST OF CR92	Vehicle
UCFP61	12/25/2003	F	~2-3	CR833, 1.7 MI N CR846 INTERSECTION	Vehicle
UCFP62	1/11/2004	F	~7-8 MOS	US41 NEAR 40 MILE BEND	Vehicle
UCFP63	2/26/2004	M	~3.5	I-75, MM99 EASTBOUND LANE	Vehicle
UCFP64	3/3/2004	?	?	SR66, ~0.75 MI W OF SR635	Vehicle (INJURY)
UCFP65	4/6/2004	M	~2	SR29, 200 YD N BEAR ISLAND GRADE NORTHBOUND	Vehicle
UCFP66	6/27/2004	M	~3	I-75, MM93 0.5 MI W EVERGLADES BLVD.	Vehicle

Appendix XI.

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NOT FOR CITATION WITHOUT PERMISSION

UPDATE OF GENETIC ANALYSIS OF FLORIDA PANTHER RECOVERY EFFORTS

**Warren E. Johnson, Darrell Land, Janice Martenson, Melody Roelke-Parker,
and Stephen J. O'Brien**

The goals of the research described in this draft report have been to develop an array of molecular genetic markers to characterize the status of current and past populations, to monitor the effectiveness of conservation efforts, and ultimately to help predict the future viability of the population. We have completed genotyping at 25 microsatellite loci of over 200 animals from several groups of different genetic ancestry. These included individuals from the Everglades subpopulation, the canonical Florida panther group (collared and uncollared animals), Texas females, crosses with some Texas heritage, and captive animals of generally unknown origin held in various facilities throughout Florida, and pumas from Florida of unknown origin.

For a large percentage of the populations we have either determined that the individuals were not of Everglades or Florida origin or have assigned probable dams and sires. For animals that we were not able to assign parents, it was generally possible to determine their ancestry. We are continuing to compare the conclusions that were made based on the molecular genetic analysis and the ages of animals with results with field data to identify errors in the analyses and are adding other kinds of information that will complement and expand our results and help clarify what the next steps in the analysis should be. We have also completed, to a large extent, a pedigree of the Florida populations spanning the last 30 years.

The analysis of potential parents has been completed through animals born in 2000-2001 and pedigrees have been completed to the extent possible for all animals. We are now finishing a more rigorous analysis of the current situation and of possible future trends. Physical traits are being traced in the pedigree to explore the occurrence of inheritable traits. The impact of the molecular genetic effects of the introduction of Texas females is being assessed using several criteria, including a pedigree analysis based on founders (relative contributions of genome equivalents and retention of maternal and paternal lineages), analysis of unique molecular genetic markers, and analysis of adaptive and maladaptive morphological traits.

Some of our early impressions are that males can and do breed earlier than previously expected and that established, resident adult males are not always the sire of kittens. Inbreeding loops are prevalent in many portions of the Florida panther pedigree.

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