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ABSTRACT--Veterinary medical management has improved the safety of Florida panther (Felis concolor coryi) immobilizations. Since veterinary involvement began in January of 1983, 127 immobilizations involving 56 individuals have been accomplished with one possible capture mortality (0.79%). This year a total of 144 hunt-days resulted in the re-collaring of 11 panthers and the capture and/or radio-instrumentation of 11 new panthers (3 neonates, 5 juveniles, and 3 young adults). Presently, 23 free-ranging panthers are radio-collared and are being monitored. Four panther deaths have been documented this past year: 1 (25%) intraspecific aggression, 1 (25%) bacterial infection/cellulitis, and 2 (50%) of unknown causes.

Serologic evidence from 19 Florida panthers indicates that they were exposed to or are infected with several potentially pathogenic agents: feline immunodeficiency virus (26%), feline calicivirus (25%), and feline enteric corona virus/feline infectious peritonitis virus (5%). All were negative for feline panleukopenia virus (FPV), feline leukemia virus, feline viral rhinotracheitis virus, encephalomyocarditis virus, and Brucella sp. All of the 12 kittens captured in the last 2 years lacked antibodies for FPV. These findings support our earlier hypothesis that kittens less than 1 year of age are unprotected and are the ones most at risk for succumbing to FPV. Mercury continues to be a significant contaminant in free-ranging panthers that inhabit the southern Big Cypress National Preserve and Everglades National Park. One male living in this area had whole blood concentrations (>0.5 ppm) that will necessitate his capture next year for follow up sampling.

Two kittens were removed from the wild for use in the captive breeding program: a 9 to 12-day-old kitten and a 7 to 8-month-old kitten. This brings the number of captive individuals to 7, representing 8 different wild founders. Since 1989, 28 individuals have been identified as potential contributors to the captive breeding program. Within the past 3 years 12 of these (43%) have already died, and only 2 of the dead founders have offspring in captivity.

Laparoscopic artificial insemination (AI) studies utilizing captive cougars (E. c.) as a model for the Florida panther were initiated. Initial efforts resulted in a successful pregnancy with a live birth in February 1992. Four male Florida panthers were electroejaculated, and semen was cryopreserved. All males examined had semen that was of low concentration, low volume, poor sperm motility, and with $>90\%$ abnormal sperm forms. Sixty-four percent (11 of 17) of all living males have a testicular descent abnormality (usually unilaterally cryptorchid). This year 2 new sub-adult males were captured that were bilaterally cryptorchid, rendering them functionally sterile.

A congenital heart defect (atrial septal defect) has recently contributed to the death of 2 panthers and, this year, is seriously compromising a third. The abnormal male seminal, hormonal, and testicular traits coupled with the recent appearance of serious heart defects raise a serious concern for the

reproductive potential, genetic health, and ultimate long term survival of this subspecies without genetic intervention.

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INTRODUCTION

The endangered Florida panther (Felis concolor coryi), voted by school children as the state mammal of Florida in 1982, remains estimated to number less than fifty individuals (Hines et al. 1987) and currently is protected under both state and federal endangered species statutes. This remnant population of the subspecies that once occupied the entire southeastern United States is now isolated in the remote cypress swamps and hardwood hammocks of southern Florida, primarily in the Big Cypress Swamp and Everglades ecosystems (Belden 1986). Human population growth in southern Florida with the concomitant loss of suitable panther habitat has been and continues to be the major threat to the continued survival of this rare mammal. A detailed review of the life history and status of the panther is presented in the United States Fish and Wildlife Service recovery plan (USFWS 1987).

The critically small population size of the Florida panther makes the subspecies particularly vulnerable to demographic catastrophes. Chance events such as periodic road-kills, illegal hunting, or loss of prey species can be devastating to very small populations. In addition, disease outbreaks caused by adventitious agents are a constant threat to small populations, especially when those populations become relatively inbred over time (O'Brien and Evermann, 1988). Decreased genetic diversity, increased neonatal mortality, abnormal reproductive traits, and lowered disease resistance often accompany such inbreeding in mammals (O'Brien et al. 1983 and 1985). There is reason to believe that the Florida panther is already experiencing many of these problems (Roelke 1990 and 1991).

Objective:

The objective of this study is to provide high quality medical care during capture and immobilization of free-ranging and captive panthers; to evaluate animal health with respect to selected parasites and diseases, environmental contaminants, reproductive physiology, and genetics; to provide necessary medical care of individual animals being prepared for placement

into captive breeding and those requiring emergency treatment; and to act as liaison with other resource agencies involved in biomedical panther research issues.

Cooperative research:

This document also serves as the Annual Performance Report for work conducted under the contract entitled "Studies on Certain Health and Reproductive Parameters of the Florida Panther", D.J. Forrester, principal investigator. This yearly contract, covering 1 July 1991 through 30 June 1992, was between the Florida Game and Fresh Water Fish Commission (GFC) and the Department of Infectious Diseases, College of Veterinary Medicine, University of Florida, Gainesville, FL.

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administered through the U.S. Fish and Wildlife Service under section 6 of the Endangered Species Act of 1973 (PL No. 93-205), and Nongame Trust Fund.

METHODS AND MATERIALS

Field Capture Technique:

A primary objective of veterinary involvement on the capture team was to insure safe handling and proper medical management of panthers during the capture effort. The decision to immobilize a treed panther was made after accessing its health, physical condition, and level of stress. Also considered were the ambient temperature, humidity, site conditions, and other factors that might result in an unacceptable risk. For details about special capture equipment, darts, and drugs used to immobilize panthers, refer to Roelke, 1990.

Following immobilization, each panther was given a thorough physical examination which included an evaluation of its health, physical condition, and reproductive status. Additionally, body measurements and biological samples were taken as previously described (Roelke 1990).

Clinical Pathology Analysis:

Samples of blood, urine, and feces were submitted for laboratory analyses which included complete blood count (CBC), serum chemistry profile, urinalysis, and fecal culture. Two primary clinical laboratories were utilized during the past year dependent on their proximity to our field location. These included Diagnostic Services Inc. in Naples, FL. and the Veterinary Medical Teaching Hospital Laboratory (VMTH) in Gainesville, FL. When possible duplicate whole blood samples were shipped to the VMTH to validate the CBC results that were being obtained from the human hospital laboratory. In these cases the VMTH was used as the veterinary standard.

Post Mortem Analysis:

Four *F. c. coryi* specimens were examined during the past year. The carcasses were subjected to a complete post mortem examination by pathologists at the College of Veterinary Medicine, University of Florida. A complete exam included gross and microscopic examination of tissues, serology, bacteriology, parasitology, toxicology, and radiography. If the carcass was very fresh, attempts were made to collect and preserve living gametes (oocytes and spermatozoa) and skin. Hides and skeletal remains were deposited in the Florida Museum of Natural History in Gainesville, FL.

Sero-survey of Infectious Disease Agents:

Serum samples collected from immobilized panthers were assayed for exposure to various infectious disease agents. A summary of the disease agents, serologic test methods, source and type of antigens used, number of samples tested, positive antibody thresholds, and references for the detailed test procedures are presented in Table 1.

Mercury Studies:

Hair and whole blood from 19 free ranging panthers were sampled during routine immobilizations. Liver, kidney, muscle, brain, hair, and blood were collected at necropsy from 4 dead panthers. All samples were stored at either -10°C or -75°C until submitted for analysis. The reference laboratory used to analyze panther tissue was the Patuxent Analytical Control Facility (U.S. Fish and Wildlife Service) in Laurel, Maryland. Tissue sample homogenates were digested under reflux in sulfuric and nitric acids (Monk 1961). Total mercury concentrations (the combined amount of organic and inorganic mercury) were determined by cold vapor atomic absorption spectrophotometry (Hatch and Ott, 1968) using a Spectro Products mercury analyzer equipped with a Varian VGA-76 vapor generation accessory.

Genetic Analysis:

Blood and tissue samples for genetic analysis were obtained from 11 panthers not handled prior to FY 1991-92. The blood samples were processed and frozen for future genetic analysis; whole blood and skin biopsies were sent directly to the laboratory of viral carcinogenesis at the National Cancer Institute for lymphocyte isolation (FIV research) and fibroblast tissue culture, respectively.

RESULTS AND DISCUSSION

MEDICAL MANAGEMENT OF FLORIDA PANTHERS

Field Capture of Free-Living Panthers:

The main capture season of 1992 extended from January 6 to March 26. Three additional trips were made in April, May, and June for kitten removal and recollaring efforts. The total effort involved 144 hunt-days by the field capture teams of the Florida Game and Fresh Water Fish Commission (GFC) and the National Park Service (Everglades National Park (ENP) and Big Cypress National Preserve (BCNP)). This hunting effort resulted in the capture of 11 uncollared panthers (three of which were neonatal kittens) and the recapture of 11 collared panthers for a total of 22 panthers handled, 19 of which were immobilized (Table 2). Eight of the uncollared panthers were neonatal or juvenile offspring of previously captured females. Two were young adult males and 1 a young adult female.

Two of the 8 kittens captured were removed from the wild to participate in the captive breeding program. As of June 30, 1992 1 male kitten had been transported to White Oak Plantation in Yulee, Florida, and one female kitten had been transported to the Lowry Park Zoo in Tampa, FL. Four male and 2 female kittens remain in the wild. (Two of the males were handled as neonates and were not radio-collared.)

As of 30 June 1991, 32 Florida panthers were part of our radio-telemetry and captive breeding projects. Seven animals were in captivity at White Oak Plantation, 1 at the Gainesville Wildlife Research Laboratory, 1 at the Lowry Park Zoo and 23 radio-instrumented, free-ranging panthers were being monitored: 20 in southwestern Florida, 1 in southern BCNP/ENP, and 2 in eastern BCNP (Table 2).

Physical condition, body weights, hematology, and reproductive status of wild Florida panthers:

The physical condition, body weight, reproductive status, and selected hematology values (hemoglobin and packed cell volume) for wild-caught male and female panthers examined in FY 1991-92 are presented in Tables 3 and 4, respectively. Data from these same animals captured previously are presented for comparison of respective parameters over time. All panthers examined this year were generally in good condition at the time of capture. Comparable data for the captive animals are presented in Table 5.

FLORIDA PANTHER LONGEVITY AND MORTALITY

Radio-Collaring of Panthers:

The 27 free-ranging, collared panthers still alive in 1991-92 have been captured and immobilized a total of 81 times (3.0 captures per panther) and have been followed for a total of 999 months, or an average of 37.0 months per panther (range 1 to 102 months) (Table 6).

Panther Mortality:

Four panther deaths were documented in FY 1991-92; 3 occurred among radio-collared animals, and 1 was a sub-adult female who was part of the captive breeding program. The causes of mortality for the 4 panthers are listed in Tables 6, 7, & 8. One of the 4 deaths was due to intraspecific aggression (25%), 1 died of bacterial infection/cellulitis (25%), and 2 died of unknown causes (50%).

SERO-EPIDEMIOLOGY OF FLORIDA PANTHERS

Serum samples obtained antemortem from 21 wild Florida panthers collected in FY 1991-92 were screened serologically for 11 infectious disease agents known to be important to felidae and/or reported previously as endemic to other wildlife species in Florida. A summary of the prevalence and maximum titers are presented in Table 9, and the results from the individual panthers examined are presented in Table 10.

All samples tested were negative for feline viral rhinotracheitis virus, encephalomyocarditis virus, Brucella sp. antibodies, and feline leukemia virus antigen. All panthers other than neonates were negative for feline panleukopenia virus (FPV). High antibody levels to FPV and FCV in three neonatal kittens can probably be explained by passive transfer of maternal antibodies rather than actual exposure to the disease. A variable number of panthers were positive for feline calicivirus (FCV) (18.2%), feline enteric corona virus/infectious peritonitis virus (FECV/FIPV) (5.0%), and feline immunodeficiency virus (FIV) (26.3%). Results for pseudorabies virus, arbovirus, Toxoplasma gondii, and feline syncytia forming virus are still pending.

Feline Panleukopenia Virus:

Feline panleukopenia (FPL), also known as viral enteritis or feline distemper, is caused by the extremely environmentally resistant FPV. FPL is a highly contagious, devastating, viral disease causing mortality chiefly in young kittens, especially accompanying stress or co-infection with other agents or parasites (Scott 1990).

A marked decline in the prevalence of FPV positive animals has been noted for the past 2 years compared to the 1981-90 period; 0%, 10%, and 64%, respectively. Since this comparison includes only newly captured, unvaccinated animals, this apparent drop may be artifactual due to the few new adults and the predominance of juveniles captured in the last 2 field seasons.

In the last 2 years, 12 kittens, 3 to 10 months old, were tested, and none had detectable antibody levels for FPV (titers $< 1:10$). This finding substantiates our early hypothesis that kittens less than 1 year of age are unprotected and are the ones most at risk for succumbing to FPV (Roelke, 1990). All of their mothers had positive antibody titers when last sampled (sampling ranged from 1 year prior to conception to 45 days after conception) and all received booster immunizations for FPV at that time and, therefore, should have had high titers when their kittens were born and first suckled. Antibody acquired from the mother (passive antibody) is present in the neonate for only a matter of weeks or a couple of months in the domestic cat (Scott et al. 1970). Therefore, even with high initial titers in the dams, all the passive antibody would be expected to be gone by 3 to 5 months, rendering the kittens vulnerable to FPV. All kittens were vaccinated at or after 6 weeks of age to initiate active immunity, and monitored captive kittens all developed protective titers ($1:10$ to $> 1:10,000$). It is possible that without immunization, exposure to the virus in the wild would have resulted in a significant number of deaths.

This year, for the first time, 3 wild neonatal kittens were handled. This afforded an opportunity to examine levels of maternally derived antibody in the kittens, and, in the case of one kitten brought into captivity, the declining titers could be tracked over time. Additionally, 3 captive born cougars (*F. c.*) were also serially sampled to determine the rate of loss of maternal antibody. All neonatal kittens tested (less than 4 weeks of age) demonstrated passive transfer of maternal antibodies adequate to provide protection from FPV in the early weeks of life ($> 1:10$) (Table 10). The exact level of maternal antibody at the time of birth was not known for these litters; however, like the domestic cat, antibody levels in all serially bled cougar kittens declined over time (Figure 1). As of yet, we do not have enough data to determine the half-life for panleukopenia antibodies in the panther kitten. After maternal antibodies disappear,

kittens become vulnerable to infection with this virus. This may be a very critical time of survival for wild panther kittens.

The number of early mortalities that occur in the wild panther population due to FPV is unknown, but should be seriously examined. Van Rensburg et al. (1987) describes a significant negative impact of FPV on an island population of domestic cats. The primary effects following the introduction of FPV were lowered fecundity, a dramatic decrease in the population density, and adverse changes in the age structure. Despite an 82% decline in the population over a 5-yr period (from 3,409 down to 615 cats), no clinically affected animals were documented. Further, the authors believe that there was an annual epizootic of FPV among the susceptible young kittens at the time the maternal antibody waned. Perhaps wild, unvaccinated kittens likewise are succumbing to FPV.

Feline Calicivirus:

The prevalence of feline calicivirus (FCV) antibodies is fairly comparable to levels observed in the past (25% for 1990-91, 30% for 1991-92, and 38% for 1981-90). In 1991 FCV was cultured from a wild-caught kitten (#204♀) with oral and nasal lesions and her asymptomatic mother (#31♀) and it thought to be endemic in the south Florida panther population. Viral isolations for FCV and FVR were attempted on all suspicious lesions noted on panthers in the wild this year, however, no virus was recovered. Like FPV, passive transfer of FCV antibodies was observed in all three panther neonates (#40k1♂, #40k2♂, and #208♀).

Feline Immunodeficiency Virus / Puma lente virus:

Serologic evidence of FIV infection was detected in 5 of 19 (26.3%) panthers examined this past year. In the domestic cat, FIV can cause severe immunosuppression and disease. At this point, it is not clear what the true significance of the infection is to Florida panther individuals and to the population as a whole. In order to understand more about the pathogenicity and routes of transmission of FIV among panthers, a collaborative research effort

was initiated with Dr. Robert Olmstead of the National Institutes of Health. Our efforts have resulted in the isolation of 4 different viral strains of a FIV-like agent from the panther (Olmstead et al. In press). Olmstead's DNA sequencing of this agent indicates that the panther virus isolates are similar to each other, but are distinctly different from the previously described domestic cat FIV isolates. This new virus has been named puma lente virus (PLV), and analysis of the evolutionary distance between it and FIV suggest that it may have been associated with panthers and cougars for thousands of years (Olmstead et al. In press).

Until it is proven otherwise, the presence of PLV must be viewed in light of what is known for domestic cats; the incubation period is long (years) and ultimately results in non-specific immunosuppression and death (Pedersen et al. 1988/Yamamoto et al. 1989). Thus, in order to limit transmission to seronegative captive panthers and other felid species, current management decisions dictate that seropositive animals will be handled separately when they come into captivity. Transmission of this virus does not appear to occur readily. Several kittens born to seropositive mothers came into captivity (at 6 months of age) and remained negative over the following year. The only indication of maternally transmitted infection occurred in two litters of Everglades panthers where older kittens (> 1 yr) were still with their mother and had contracted the identical virus as their mother by 16 and 22 months of age (Roelke et al. In press and Olmstead et al. In press). Even with the estimated 25-30% of the wild population infected with PLV, with this low rate of maternal transmission, it may be possible to obtain genetically desirable animals and to create a PLV-free captive population by judiciously removing kittens from seropositive dams by 6 months of age.

Feline Enteric Coronavirus / Feline Infectious Peritonitis Virus:

The prevalence of FECV/FIPV remained very low (5%) in 1991-92, as in previous years. Since the antibody may be cross-reacting to other coronaviruses of canids (canine coronavirus) and swine (transmissible gastroenteritis virus), the presence of low antibody titers typically found

in the Florida panther may indicate exposure by way of food ingestion rather than natural infection with a feline coronavirus. Therefore, the finding of one low-titer, FECV/FIPV-positive animal this year is not considered to be significant.

Feline Syncytia-forming Virus:

Approximately 59% of all the Florida panthers that have been tested were found to be infected with FeSFV (Table 11). This virus is also quite common in healthy as well as sick domestic cats (Gaskin and Gillespie 1973) and has been reported in conjunction with diseases such as FIP (Scott 1971), chronic progressive polyarthritis (Pedersen et al. 1980), and respiratory infections (Ellis 1985), but a pathogenic role has yet to be established.

At this time the recognized importance of this virus to the Florida panther is that it destroys the fibroblast tissue cultures of infected individuals (Table 11). These primary skin cultures are important for growing cellular material for DNA isolation used in ongoing genetic studies. Once the skin biopsy material is away from the host's virus-neutralizing antibodies, the virus is able to grow unchecked, which results in the destruction of the desired cells and the inability to maintain the cell cultures. This destruction of the cultures is quite costly in lost time, effort, and transportation costs and necessitates repetition of the surgical procedure to obtain another sample, which is often not possible with free-ranging animals. Possible means to mitigate this problem are being investigated.

MERCURY IN THE FREE RANGING FLORIDA PANTHER

Mercury contamination of largemouth bass (Micropterus salmoides) and alligators (Alligator mississippiensis) in various watersheds throughout the state of Florida has recently been identified as a human health issue (Delany et al. 1988, Hord et al. 1990). The entire Everglades watershed in southern Florida has been closed to the hunting of alligators, and health

advisories have been issued to curtail the consumption of bass due to the elevated mercury residue in the flesh of these species.

We first became aware of mercury contamination in the Florida panther in 1989, when a 3 to 4-year-old adult, radio-instrumented female (#27) died of probable mercury toxicosis in the ENP (USFWS 1989, Roelke et al. 1991). The liver of that panther contained 110 parts per million (ppm, wet wt.) of mercury. Since that time, mercury probably contributed to the deaths of 2 other panthers, also living in the ENP (Roelke et al. 1992).

The discovery of mercury as a significant contaminant in the initial panther led to an intensive retrospective study of mercury levels in archived tissue samples. This study was completed in March 1992 (Roelke et al. 1992) and the most important conclusions and recommendations of that report are summarized below.

Major Conclusions from mercury report:

1. Mercury contamination of Florida panthers has been documented, with the highest levels observed in animals examined in the southern Everglades portion of their range and lowest levels observed in animals inhabiting the more upland, pine flatwood, and mixed hardwood hammock habitats in the northwest portion of their range.
2. Mercury appears to bio-accumulate through aquatic, carnivorous links in the panther food web; the primary dietary source of mercury for panthers appears to be raccoons.
3. Mercury contamination in raccoons is documented to occur in a distributional pattern similar to that of Florida panthers with highest body burdens observed from the southern Everglades region.
4. Elevated body burdens of mercury have been documented in Florida panthers whose diets appeared to comprise a higher relative occurrence of raccoons and/or included raccoons from areas likely to be more highly contaminated with mercury.
5. Mercury contamination may be contributing to lower reproductive performance of panthers in those areas where elevated body burdens of mercury have been documented.
6. Chronic exposure of Florida panthers to mercury appears to be compromising their relative health and possibly productivity, especially in Everglades portions of their ranges; mercury must be considered a threat to the continuing existence of this already endangered taxon.

7. Management practices that encourage greater availability of ungulate prey (i.e., white-tailed deer) may result in reduced dietary exposure to mercury of certain panthers.
8. Although various management actions may be taken to reduce exposure of certain panthers to mercury (i.e. prey management, land management, removal of individual panthers from contaminated areas) the ultimate need is to understand the environmental processes responsible for the availability of mercury in the areas and aquatic food web affecting panthers.

Recommendations for action from mercury report:

1. Tissues from all living and dead Florida panthers handled as study animals should be evaluated for mercury contamination upon initial capture and reevaluated upon routine subsequent captures.
2. Any study animal that is determined to have a relatively elevated body burden of mercury upon initial capture, or subsequent captures, should be monitored intensively and reevaluated as follows. Panthers with whole blood mercury values of 0.5 ppm to ≤ 1.0 ppm should be recaptured and analyzed on a yearly basis, while those with mercury levels 1.0 ppm or greater should be re-evaluated within 4-6 months. Those individuals found with mercury levels of 1.0 ppm or greater should be immediately evaluated by the technical staff of the FPIC to determine any emergency actions which may be appropriate and which may include translocation or removal of that individual from the wild. (Three of 4 panthers that have had blood mercury levels above 1.0 ppm died within 3-17 months of documentation of elevated levels, with mercury likely responsible for or contributing to their deaths.)
3. Raccoons from select sites within panther habitat should be collected on an annual basis to evaluate trends in the availability of mercury to panthers.
4. Current and optional management practices which may affect prey resources should be evaluated for all public lands occupied by panthers and appropriate recommendations for action identified annually in revised participation schedules.
5. The Florida panther habitat preservation plan should be aggressively implemented to preserve sufficient habitat, space, and non-contaminated prey resources to assure the continued existence of the panther in south Florida.
6. Strong support should be given to the Governor's Mercury Technical Subcommittee proposal for studies required to understand the processes responsible for accelerated availability of mercury in Florida aquatic environments and to develop appropriate solutions for reducing levels of mercury exposure in those areas.
7. The nature and extent of mercury contamination in the ENP and adjacent watersheds should be further investigated and a strategy developed for the safe reestablishment of panthers to that area.

1992 Mercury Analyses:

During FY 1991-92 mercury concentrations in whole blood and hair were measured from 15 free ranging living Florida panthers (Tables 12 & 13). Only 1 panther sampled in 1992 still utilizes part of the ENP, and only that panther, #16♂, had whole blood mercury concentrations at a high enough level to be of concern: 0.533 ppm. The concentration of mercury in his hair (31.8 ppm) was also higher than that of the other sampled panthers. As stipulated by the action recommendation mentioned above, because his whole blood is >0.5 ppm, this animal will be reevaluated in the next capture season as early as possible to assess his condition at that time.

REPRODUCTIVE AND GENETIC RESEARCH**Male Reproductive Traits:**

Four males were electroejaculated in FY 1991-92 to obtain semen for evaluation and cryopreservation. These panthers included #16, #26, #28, and an uncollared male, #46. Seminal traits from these males were very similar to those of other male panthers collected previously and included low volume, low spermatozoa concentration, and poor sperm motility (Table 14) (Barone et al. 1991).

To appreciate how many usable sperm we have frozen on each of our males, the number of "AI units" is calculated. One AI unit is the estimated number of post-thaw, motile sperm needed for one artificial insemination procedure (5×10^6 motile sperm per mL). Table 14 lists the individual semen characteristics and quantities of frozen sperm from this year's males and all others currently represented in the sperm bank. Even with the best quality ejaculates we have procured from male #16, there is only enough sperm for 5 AI breeding attempts from him, and successful impregnation would probably not be greater than 50% (based on domestic cat research). Dr. David Wildt, reproductive physiologist at the National Zoo, recommends that we strive to freeze a minimum of 6 AI units per male, but all together, we now have only 13.7

AI units total from 11 males. Figure 2 indicates that we have no semen frozen from 6 wild living males (4 of which will be sexually mature in January 1993), and that since 1987, when we first had the capability to freeze sperm, ten males (≥ 2 years old) have died with little or no sperm bank contribution. Obviously, we should continue to bank sperm on all males whenever possible to increase the chances of preserving each male's genetic material in the event that he should die before procreating in the wild.

In addition to the seminal defects described above, the majority (11 of 17 = 64.7%) of the living males have a testicular descent abnormality (cryptorchidism) usually affecting only one testicle. This year, however, 2 young males (#47 and #207) were captured that were affected on both sides, rendering them functionally sterile. Cryptorchidism has been documented in the domestic cat and various wild felid species but at very low frequencies. Our studies with Felis concolor have documented only 2 other cryptorchid males in over 100 captive and wild non-coryi cougars examined. This anomaly can affect either the right or left testicle or both, and those retained are generally atrophied and sterile due to the high body temperature. Circulating testosterone concentrations are lower ($P < 0.05$) in the cryptorchid compared to the non-cryptorchid Florida panthers (0.27 ± 0.11 nc/ml verses 0.61 ± 0.11 nc/ml), which in turn are not significantly different from males in other puma populations (0.81 ± 0.14 nc/ml, $P > 0.05$) (Barone et al. In press). The high frequency of the trait in the Florida panther is probably the result of inbreeding. Understanding the inheritance pattern of this deleterious trait in Florida panthers is critical. At this time, possible modes of inheritance are being investigated with the limited pedigree data available.

Female Reproduction:

There has not been any successful reproductive activity in the eastern portion of the panthers' range (eastern and southern BCNP and ENP) since the spring of 1989, with the birth of #42♂ in the ENP. In August 1991, the Everglades population of Florida panthers became

extinct with the death of the last known female panther. Thirty days of intensive hunting effort during the spring 1992 capture season yielded no evidence of uncollared panthers in the area. Only a sole male (#16♂), now living primarily in the southern BCNP, occasionally visits the ENP. This 7-year-old male is now the only documented panther south of SR 41 and has no opportunity to encounter females in his home range.

Unlike the ENP, the reproductive demographics of the eastern BCNP has changed positively during the past 12 months. Because of the physical absence of any males in the area, panther #42♂ was originally targeted for translocation to the eastern BCNP, but in January of 1992, he made the move on his own, emigrating into the area inhabited by females #23 and #38. This young male, born in the ENP, came from the south, crossing SR 41 to establish a new home range overlapping that of both of these females. During the two-year period prior to this, no males had been documented in that area, and the 2 females bore no young. These are now the only known females on the public lands south of Alligator Alley and east of SR 29. Unfortunately, despite regular encounters between #42♂ and both females since January of this year, no kittens have been documented. This male was just under 3 years of age when he started interacting with the females, and it is possible that he was not yet fully mature. Unsuccessful breeding may also be related to the females. Vaginal lesions present in #38♀ may contribute to anatomical dysfunction of her lower reproductive tract, and #23♀ has prematurely lost a litter of kittens in the past.

Female panthers living in the Fakahatchee Strand State Preserve, northern Big Cypress Swamp ecosystem, and surrounding private ranches were documented to produce at least 8 offspring this year (Table 2 & 4). Only 2 of 8 adult females in this area have not produced kittens this year: #49 and #09. Female #49, a previously uncollared female, was estimated to be of reproductive age and was not pregnant at the time of examination. Panther #09, the

resident female in the FSSP, has not produced another litter since the removal of 2 kittens in February 1991.

Other females, (#19, #31, #40), who had kittens removed last year, have all rebred and given birth. Female #31 had 2 healthy female offspring captured in the spring of 1992. Female #40 had 2 neonatal male kittens, which were examined and left at the den site. These kittens were estimated to be 10-14 days of age; they were vigorous and appeared to be in very good condition. Conversely, female #32, a young female of prime breeding age, in excellent panther habitat (FPNWR), had only one surviving 9 to 12-day-old kitten when her den was investigated. This female kitten was in very poor condition compared to #40♀'s 2 male kittens examined the month before, although the mother had been at the den site for >48 hours prior to entry of the den. Panther #32♀ has had a history of poor reproductive success, and the marginal status of her single 1992 kitten indicates that she may have low reproductive soundness, offer inadequate neonatal care, or produce (together with her mate) kittens with poor viability.

Assisted Reproductive Technology Research:

In addition to intensive efforts to monitor reproductive output of free ranging panthers, research in the development of artificial reproductive technologies for application to the Florida panther recovery effort has been initiated. The collaborative research project between the reproductive specialists at the National Zoological Park in Washington D.C. and veterinarians at the GFC has been funded in large part by the U.S. Fish and Wildlife Service and the Gilman Paper Company. The primary thrust of the project is to develop techniques of artificial insemination (AI) for application in the Florida panther. This effort has involved three major areas of study: 1) establishing guidelines for handling, storage, and cryopreservation of domestic cat and panther semen for artificial insemination and *in vitro* fertilization (IVF), including the study of *in vivo* sperm transport and the viability of frozen-thawed versus fresh sperm, 2) development of atraumatic laparoscopic artificial insemination technique in domestic cats and in

cougars, and 3) delineation of the timing of and necessary doses of reproductive hormones to stimulate ovulation for oocyte harvest or insemination.

The progress in developing a successful semen handling and AI technique in domestic cats was rapid (Barone, Nat. Zoo., pers. comm.). Since 1990 over 100 domestic kittens were produced by AI with approximately a 50% success rate. Adaptation of these successful domestic cat techniques to the cougar commenced in August 1991. During the past year, private cougar owners who were willing to participate in the AI project were identified¹. Fertility evaluations of available males were made to identify good quality sperm donors. AI procedures were performed in females following exogenous hormonal stimulation (using pregnant mare serum and human chorionic gonadotrophin). Previously selected sperm donors were used for these inseminations. All together, 28 cougars have been immobilized 95 times (Table 15). Twenty-one of these events involved insemination of females, and 1 successful pregnancy has been achieved thus far with a live kitten born at Octagon Wildlife Sanctuary on February 10, 1992. One AI of a Florida panther was performed in June 1992, and the outcome is still unknown.

Development of the techniques of *in vitro* fertilization has been pursued along with the AI project. Oocytes from Florida panther #205 were collected in June 1992 because of the concern that her progressive heart condition would limit her reproductive life span. Fifteen oocytes were incubated with semen from a Florida panther, and 1 embryo resulted. This embryo was transferred into a recipient cougar on 9 June 1992. The outcome is still unknown.

Successful development of AI techniques may allow primary use of fresh Florida panther semen in a variety of both captive and wild situations. Combining the techniques of assisted

¹Cooperating facilities included: Octagon Wildlife Sanctuary, Ft. Myers, FL, director Pete Caron; Everglades Holiday Park, Ft. Lauderdale, FL, director Mitchell Bridges; Wild Animal Retirement Village, Waldo, FL, directors Gene and Rusty Schuller; and White Oak Plantation, Yulee, FL, conservatory director John Lukas.

reproductive technology with natural breeding may become the most effective means for rapidly increasing the numbers of panthers in captivity and in the wild.

CAPTIVE BREEDING PROJECT

Initiation of the captive breeding project:

Available Florida panther reproductive and demographic data were analyzed by the Captive Breeding Specialists Group of the International Union for the Conservation of Nature and a Viability Analysis and Species Survival Plan was produced (Seal and Lacy 1989). Seal and Lacy reported that the wild panther population was in decline at a rate of 6 - 10% per year, with a loss of genetic diversity of 3 - 7% per generation. Further, they predicted that, without intervention in the form of a captive breeding program, the subspecies would be extinct within 25-40 years due to genetic and demographic factors.

There are numerous morphologic indicators to suggest that the Florida panther has already experienced a notable degree of inbreeding and concomitant genetic loss. These include "kinked-tail" and mid-thoracic cowlick traits (Belden 1986, Wilkins 1990), very low semen quality with an extremely high percentage of abnormal sperm (Roelke et al. 1986, Barone et al. 1991), high frequency of cryptorchids, and congenital heart defects (Roelke 1991).

All of the above stress the importance of moving ahead quickly and aggressively with our captive breeding efforts. The primary goals of this project are to secure, in captivity, genetic representation of all wild founder individuals, to stabilize the loss of genetic diversity due to inbreeding, and to increase the number of individuals as a hedge against catastrophes. In the 3 years that have lapsed since the decision to proceed with the program, 12 of 28 (43%) identified wild founders have died (Figure 3). Of these 12 dead founders, only 2 (16.6%) have genetic representation in captivity. Therefore, if we can actually secure, in captivity, offspring

from all of the 16 remaining individuals², we will have representation from only 57% of the individuals which were potentially available since the initiation of this project. The projected success and long range survival of the panther via the captive breeding program were based on the premise that we could maintain 90% of the existing genetic diversity found in the wild for 100 years (Seal and Lacy 1989). However, due to the delays imposed by a lawsuit in 1990 and 1991 to halt the captive breeding program (Fund for Animals and Holly Jensen verses the U.S. Fish and Wildlife Service) and limited availability of litters in 1992, we are probably already well below that 90% level.

Selection of zoological institutions:

Four different zoological institutions have received endangered species permits from the U.S. Fish and Wildlife Service to participate in the captive breeding effort: White Oak Plantation, Yulee, FL.; Miami Metro Zoo, Miami, FL.; Lowry Park Zoo, Tampa, FL; and Jacksonville Zoo, Jacksonville, FL.

Proposed selection of animals for captive breeding project:

At the beginning of the 1992 capture season, an assessment of the living wild population was made to determine which animals might be appropriate candidates for inclusion in the captive breeding program this year. Adults and litters were ranked based on the importance of their lineage and the adult's age and previous reproductive history. Three females that had litters in the summer and fall of 1991 (D. Maehr, GFC, pers. comm.) as well as 6 other females that could potentially give birth in 1992 were identified as possible kitten donors. Table 16 lists the rationale that was used for kitten selection and the proposed priority of that selection as it existed in early January 1992. From this array, we planned to remove six kittens. No adults were targeted for removal this year.

²The 16 individuals actually represent portions of 20 full founders (See Table 19) e.g. #23♀ is the only living representative of #15♀ and ENP#2♂, therefore in Figure 3 is herself considered a founder.

Founder representation of panthers removed from the wild:

Two panther kittens (1 female & 1 male), 9 days and 10 months old, respectively, were brought into captivity in the spring of 1992. The captures went smoothly and the kittens were transported without incident. Table 17 lists the capture outcome for each 1991-92 litter and gives the number, sex, age, and original capture priority of each kitten removed from the wild.

Table 18 lists the 9 panthers in the captive breeding population as of June 30, 1992. Their age, founder representation, genetic history, and deleterious traits are tabulated. Complete genetic representation (at the 99% level) of a given wild founder can be obtained by securing 7 or more of its offspring in captivity. This number is based on the premise that an offspring receives 50% of its genetic make up from each parent. Therefore, if a founder were to be represented in captivity by only 1 offspring, then only 50% of that adult's genes would be in captivity. With each new offspring procured, a decreasing increment of genetic representation would be added, e.g., 1st = 50%, 2nd = 25%, 3rd = 12.5%, 4th = 6.25%, etc. Table 19 lists the 20 full founders which either are still living or are partially represented by living offspring. Eight of these founders are represented in our current functional³ captive population. It is imperative that genetic representation be obtained from the remaining 12 founders as quickly as possible, particularly from the older living ones.

The past 2 years' procurement of kittens represents a good start toward the ultimate goal of having complete genetic representation of all wild founders in the captive breeding program. Removing 7 or more kittens per founder would be ideal, however, initially it would be prudent to limit the number to insure that the ultimate survival of the wild population is not adversely effected. The number of kittens a given female contributes can be adjusted once female

³Three additional founders (#11♀, #26♂, and #36♀) are represented in captivity by 2 animals not currently capable of breeding (#205♀ and #207♂). It is hoped that the medical problems of these animals can be corrected so that they might be able to contribute genetically to the captive population.

recycling and productivity following kitten removal has been assessed. At present, securing 3 to 4 offspring per founder should be possible over the next few years and would represent 87.5% to 93.8% of a given founder. However, these minimal numbers do not allow for individuals which fail to breed in captivity or should die before reaching sexual maturity.

Health status of captive kittens:

Growth rate in captivity

Florida panther #204♀ - Poor growth rate:

Panther #204♀ was removed from the wild in May 1991 and transported to the White Oak Plantation. She was initially housed with male #203 and was found to be in good health at the 2 month post-capture evaluation. At her 6 month post-capture examination her weight had begun to drop below the observed growth rates of the other 5 kittens, but she still appeared clinically normal on physical exam and routine blood work. In February 1992, she appeared to be excessively lean and was reevaluated. Her body weight growth rate and blood parameters were all below normal, but no specific disease process was identified in screening tests (Tables 20 & 21, Figure 4). Management changes were instituted to reduce competition for food and increase her caloric intake. Objective evaluation of her condition indicated that she was able to regain body weight soon after these changes. She had regained a normal growth rate by her annual examination in June. However, at that time she was diagnosed as suffering from chronic low grade, bacterial pneumonia (*Pseudomonas* sp.) and is under treatment and close monitoring at this writing. This female's case illustrates the point that now that normal growth and hematologic patterns of captive kittens are known, these can be used as valuable tools, giving early warning of underlying disease states and helping to direct our management practices.

Florida panther #208♀ - Neonatal growth and characteristics:

A 9 to 12-day-old female kitten (#208♀) was removed from the den site of her mother, #32♀, on 6 June 1992 as part of the captive breeding program. At the time of removal, the

kitten was found to be underweight, slightly dehydrated, and dull in attitude in comparison to 2 similarly aged male kittens handled earlier that month. The kitten was documented to be infected with hookworms (Ancylostoma pleuridentatum) and with mange mites (Notoedres cati), both of which were causing clinical symptoms that resolved with treatment. This unthrifty kitten probably would not have survived in the wild.

The kitten was transported to the Lowry Park Zoo without incident and was converted to nursing of prepared formula within hours. Since that time she has been in quarantine under close observation. Fecal samples were examined daily the first 6 weeks for parasite ova; only hookworm infestation was documented. A complete physical examination and blood sampling has been performed at two-week intervals, with marked improvement in overall physical condition noted (Table 20). The initial capture weight almost quadrupled after 3 weeks in captivity (1.4 lbs to 5.25 lbs) as shown in Figure 5.

Health parameters are being carefully documented for this panther, including hematologic values, presence of parasites and infectious diseases brought in from the wild, body weight, and morphologic and behavioral traits. This information will provide valuable insight to many unknown aspects of neonatal development in Florida panthers and may point out possible problems affecting the survival of wild kittens.

Congenital anomalies

Cardiac anomalies

The most lethal problem identified so far in panther kittens is congenital heart defects. Last year, the daughter of #11♀ was diagnosed at necropsy to have had a congenital heart anomaly. This kitten was dying of congestive heart failure secondary to a congenital atrial septal defect (ASD, a hole between the upper chambers of the heart) at the time she was hit by a car and was the second panther known to die with this type of cardiac lesion. Heart murmurs have been heard in other living kittens, the causes of which have not yet been resolved. Definitive

causes for most cardiac deformities have not yet been determined, but because of the documented inbreeding, the lowered genetic diversity, and the high incidence of these anomalies in the Florida panther population (not documented in other cougars), a genetic basis is suspected.

Florida Panther #205♀:

Florida panther #205♀ was captured for removal from the wild on 5 May 1991, as 1 of 6 kittens taken for the captive breeding project. A severe heart murmur was noted at the time of capture. In July 1991, an initial diagnosis of tricuspid valve dysplasia and heart enlargement was made. The additional diagnosis of an ASD was made on 19 June 1992, after cardiac catheterization, contrast angiography, and a cardiac radionucleotide scan were performed. It appears that the ASD is the primary lesion and that the tricuspid valve dysplasia (causing tricuspid valve regurgitation) and heart enlargement are secondary changes.

In human medicine, when addressed early (before the onset of heart failure), the success rate of surgically closing the ASD is very high. The opinion of the veterinary cardiology specialist at the University of Florida's College of Veterinary Medicine is that surgical closure of this panther's ASD would be worthwhile and possible. The Florida Panther Interagency Committee's (FPIC) technical subcommittee approved such an approach, and plans are now being made for this surgery, in September or October 1992. If successful, the tricuspid valve regurgitation is likely to diminish as the heart size decreases. As a result, her life span could be extended, greatly increasing her currently limited value as a contributor to the captive breeding program.

Bilateral Cryptorchidism

Florida Panther #207♂:

An 8-month-old male panther (#207♂) was taken out of the wild on 4 March 1992 to represent #36♀ and #26♂ in the captive breeding program. He was diagnosed to be bilaterally cryptorchid, with one retained and one partially retained testicle. Although a partially retained

testicle may continue to descend into a scrotal position, it will be smaller and less developed than a testicle which undergoes normal descent and is in the scrotum at birth. Without treatment, it is likely that this animal will be sterile.

Extensive research in humans, where this condition is common, has shown that a surgical procedure known as orchiopexy (placement of the retained testes into normal scrotal position) can enhance the potential for normal fertility. The degree of success is related to the age at correction. Because #207♂ is already a member of the captive breeding population and is not yet mature, the FPIC Technical Subcommittee has agreed to orchiopexy for the panther in the hopes of increasing his future fertility and, thereby, salvaging genetic material that would be lost if the condition were left untreated. Depending on the success of the operation (scheduled for September or October 1992), this procedure may be necessary to save genetic representation of other panthers in the future in this population with 64% cryptorchid males.

CONCLUSIONS

From the biomedical perspective, the Florida panther is not faring well and is still sliding toward extinction despite efforts to stop the process. The major areas of concern are:

1) Stochastic demographic events-

- the panther is virtually extinct on all the public land south of Alligator Alley (3 female and 2 male panthers on >1,200,000[±] acres). In August 1991, the last known female in the ENP died where there had been an active breeding population less than 5 years ago;

2) Degradation of genetic quality-

- within the last 5 years, a rapid rise in the proportion of males with only one descended testicle has occurred (now comprising 64% of all living males), and, this past year, 2 bilaterally cryptorchid males with no functional testicles were captured;
- a pattern of lethal congenital cardiac anomalies has suddenly become evident in the past two years. Two panthers have died and another is predicted to die before she reaches sexual maturity (all have had atrial septal defects);

3) Serious environmental contamination with mercury-

- mercury likely is responsible for the death of 1 female panther, may have contributed to the the deaths of 2 others in the Everglades National Park, and may be contributing to lower reproductive performance of panthers in those areas where elevated body burdens of mercury have been documented.

Actions to alleviate the above problems must be initiated or accelerated if these spiraling problems are to be turned around before it is too late. Actions that should be considered include the following:

- A) Aggressively procure genetic representation from all wild living founders and add them to the captive breeding population. This action is particularly important for older living founders and from offspring of founders that have already died;
- B) Maximize the effort to cryopreserve gametes from all available animals to enhance our capability to maintain the current level of genetic diversity;
- C) Investigate the possible judicious introduction of non-coryi genetic material to overcome the observed deleterious effects of inbreeding;
- D) Actively support assisted reproductive technologies research (artificial insemination and *in vitro* fertilization) that will enhance the speed at which the captive breeding program can proceed and will help stabilize the loss of genetic diversity (points A-C above);
- E) Create a breeding situation for #16 σ either by moving a female into his area (undesirable at present due to mercury problem) or by moving him into captivity or into another area which lacks a resident male.. From the genetic standpoint, he is one of the 2 most important males in the population and has no opportunity to breed;
- F) Continue to handle and take samples from neonatal kittens, even if they are not targeted for removal into the captive breeding program. Virtually nothing is known about survival and disease/medical problems of kittens of this age cohort;
- G) Continue to investigate the presence of mercury in the ENP, east Everglades, and southern BCNP and study the dynamics of mercury in the ecosystem and in its effect on panthers and various prey species;
- H) Support the possibility of introducing surrogate, non-endangered cougars into ENP to elucidate the effects of mercury on panther/cougar physiology;

- I) Secure unprotected prime panther habitat, especially on private lands north of Alligator Alley.

Unless the loss of genetic diversity can be halted and the panther density on public lands can be markedly improved by rectifying or mitigating demographic and contaminate problems, the future of the wild Florida panther is bleak.

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- Figure 4. Growth rates of captive Florida panthers, February 1991 to June 1992.
- Figure 5. Growth rate of a wild born captive neonatal Florida panther kitten: #208♀.

Table 1. Serologic tests, antigens, and references used to determine antibody titers for selected pathogenic agents in Florida panthers sampled FY 1991-92.

Agent (antigen)	No. of samples	Test	Positive threshold	Reference
BACTERIA				
<u>Brucella</u> spp. (<u>Brucella abortus</u>)	19	Plate agglutination	$\geq 1:25$	USDA, no date
PROTOZOA				
<u>Toxoplasma gondii</u>	26	IHA ^{AB}	$\geq 1:48$	Jacobson et al. (1982)
VIRUSES				
Feline calicivirus (FP 255)	31	Plaque reduction	$> 1:4$	Scott (1977)
Feline enteric coronavirus/feline peritonitis virus	29	IFA ^{CD}	$\leq 1:25$	Evermann et al. (1986)
Feline immunodeficiency virus	33	ELISA ^{EF}	Qual. ^G	Barr et al. (1989) Olmstead et al, in press
	34	Western Blott		
Feline leukemia virus	34	ELISA ^{EF}	Qual.	Mia et al. (1981)
Feline parvovirus	31	Serum neutralization	$\geq 1:50$	Scott et al. (1970a)
Feline viral rhinotracheitis virus (FVR-Goldstein)	31	Plaque reduction	$\geq 1:4$	Scott (1977)
Pseudorabies virus	19	Latex agglutination ^H	$> 1:4$	Pirtle et al. (1986)
Rabies virus	0	Serum neutralization	≥ 6 IU	Reagan et al. (1983)
Syncicial forming virus	19	IFA AGID ^I	Qual. Qual.	Gaskin and Gillespie (1973)
Encephalomyocarditis virus	19	IHA	1:10	Gaskin (1973)

^AIHA: indirect hemagglutination. ^BPerformed at Colorado State University. ^CPerformed at Wash. State Univ. Pullman, WA. ^DIFA: indirect immunofluorescence assay. ^EELISA: enzyme-linked immunosorbant assay ^FCITE Combo® Feline Leukemia Virus Antigen/Feline Immunodeficiency Virus Antibody Test Kit by IDEXX Corporation, 100 Fore St., Portland, ME 04101, USA. ^GQualitative tests, no titers determined. ^HPseudorabies Virus antibody test kit-Latex agglutination from Viral Antigens, INC.; ^IAgar gel immunodiffusion.

Table 2. Summary of significant dates and events: Florida panthers alive in FY 1991-1992.

ID# & SEX	CAPTURE			EVENT · LOCATION · COMMENT
	DATE	EST AGE	AREA ^A	
#09♀	08-02-91	11-12 yr	I-FSSP	Captured and immobilized for collar change and examination. Collar malfunctioning at the time. In good condition—not pregnant. (living offspring include #202♂ & #203♂)
#11♀	02-21-92	10-11 yr	I-BI	Treed in northern end of Bear Island in pursuit of kittens; captured #47♂ (4-6 mo-old) sired by #12♂. Female in good condition, not anesthetized.
	05-09-92	10-12 yr	I-BI	Captured and immobilized for routine work-up and collar change. Female in good condition male kitten #47 in proximity, not captured. (living offspring include #19♀ & #47♂)
#12♂	————	11-12 yr	I-N.FS	Not immobilized this year. Sired litters with #11♀, #19♀, and #31♀ in 1991 and #32♀ in 1992. (living offspring include #19♀, #45♂, #47♂, #48♀, #52♀, #201♂, #204♀, #205♀, #208♀, & possibly #34♂)
#16♂	11-26-92	6-7 yr	I-SS	Observed lying in prairie motionless and unresponsive to low passes by the plane (#42 & #16 were in too close proximity to differentiate the signals). Approach on the ground 11-27-91; both males had moved off in different directions, no evidence of injury found at the site when examined, many tracks seen.
	01-23-92	6-7 yr	I-SS	Captured and immobilized for work-up, collar change and ejaculation, near Lostman's Pines. In good condition. Semen collected, examined and frozen by Dr. Barone of the National Zoo (offspring of #14♀, sib of #21♀; living offspring include #42♂)
#19♀	01-06-92	5-6 yr	I-FPNWR	Captured and immobilized just north of the clear cut area for work-up and collar change. In good condition; thought she was 45 days post breeding, but really 2-3 wks pregnant (litter confirmed later.) Had recent association with #12♂. (#19 is offspring of #11♀ and #12♂, and is sib of #47♂; living offspring include #45♂ & #205♀)
#21♀	6-09-92	7 yr	C-WOP	Immobilized for routine annual physical examination and laparoscopic artificial insemination. Insemination performed with

Table 2. (continued)

Capture summary FY 1991-92 p.2

ID# & SEX	CAPTURE			EVENT · LOCATION · COMMENT
	DATE	EST AGE	AREA ^A	
#21♀ (cont.)				sperm from PCO-10. (offspring of #14♀, sib of #16♂)
#22♀	07-19-91	4-5 yr	II-ENP	Died in ENP on that approximate date. Final cause of death undetermined. Extremely emaciated, had acute cellulitis. (offspring of #15♀, sib of #23♀)
#23 ♀	-----	7 yr	I-RP	Not handled this year. She is living in the Corn Dance unit of BCNP. She has been repeatedly with #42♂ since 1/92, but has shown no signs of denning. (offspring of #15♀, sib of #22♀)
#26♂	01-21-92	8-10 yr	I-ACQ	Captured and immobilized north of Noble's ranch for work-up, collar change and ejaculation. In good condition except for recent injury to left rear foot (claws missing). Semen collected, examined and frozen by Dr. Barone of the National Zoo. Sired litter with #36♀ & #40♀. (living offspring include #44♂, #50♂, #207♂, #40k1♂, & #40k2♂)
#28♂	01-24-92	4-5 yr	I-SIR	Captured and immobilized for work-up, collar change and ejaculation, north of Noble's ranch. In good condition, old injury in right foot now callused and stable. Semen collected, examined and frozen by Dr. Barone of the National Zoo. Treed inadvertently while hunting for #36's kittens who were in close proximity. Male in good condition, not immobilized.
	03-03-92	4-5 yr	I-ACQ	
#29♂	05-27-92	3 yr	I-PR	Found dead, no obvious signs of trauma. Cause of death under investigation. (offspring of #11♀ and either #20♂ or #25♂)
#31♀	02-20-92	11-13 yr	I-FPNWR	Treed on the northern end of the FPNWP looking for kittens. Female in good condition, not anesthetized, no kittens found in the area.
	02-24-92	11-13 yr	I-FPNWR	Not directly treed or handled. First capture of her female kitten #48, who was in good condition.
	05-05-92	11-13 yr	I-PR	Not directly treed or handled. Recollaring of #48♀ and first capture of sibling #52♀. Both in good condition. (living offspring include #34♂, #48♀, #52♀, #201♂, & #204♀)

Table 2. (continued)

Capture summary FY 1991-92 p.3

ID# & SEX	CAPTURE			EVENT • LOCATION • COMMENT
	DATE	EST AGE	AREA ^A	
#32♀	06-06-92	5-6 yr	I-FPNWR	Not directly treed or handled. Capture team waited for > 48 hours for #32 to leave her den site. Her 9-12 day-old kitten #208♀ was then removed and transported into captivity (Lowry Park, Tampa, FL). (possible offspring of #31♀) (living offspring include #208♀)
#34♂	02-22-92	3-4 yr	I-ACQ	Treed inadvertently while hunting for uncollared panthers. He appeared to be in good condition. (offspring of #31♀ & #12♂ possible sire)
#36♀	01-08-92	5-7 yr	I-ACQ	Captured and immobilized for work-up and collar change, NW of Nobles ranch. Still in association with kittens, although none were seen. In very good condition.
	03-03-92	5-7 yr	I-ACQ	Treed while looking for kittens, near a fresh deer kill, very high in tree, not immobilized, no kittens found.
	03-04-92	5-7 yr	I-ACQ	Captured #36♀'s uncollared male kittens #50 & #207, sired by #26♂. Immobilized kittens for routine work-up and radio collar fitting. #50♂ left to recover at den site with mother, #207♂ transported to WOP for inclusion in captive breeding program. (living offspring include #50♂, #207♂)
#38♀	02-11-92	5-7 yr	I-BI	Radio collar in mortality signal in AM, NW of the oil pads at the end of 11 mile Rd. Cat moved off from a hardwood hammock when approached on the ground. No evidence of injury found.
	02-29-92	5-7 yr	I-RP	Captured 3 miles north of 11 mile road. Immobilized for routine work-up and collar change. She had been with #42♂, 30 days earlier and again 2 days earlier, pregnancy evaluation equivocal. Hair "rubbed" and broken off all over sides of body, otherwise in good condition.
#40♀	01-08-92	3-4 yr	I-ACQ	Treed in very tall pine tree - capture called off.
	01-10-92	3-4 yr	I-ACQ	Captured and immobilized for work-up and collar change, NE of trailer camp on Nobles ranch. In good condition, early pregnancy later confirmed (kittens born approximately 80 days later).
	04-07-92	3-4 yr	I-PR	Walked in on her den site. Found and examined 2, 10-14 day old male kittens (#40k1 & 40k2),

Table 2. (continued)

Capture summary FY 1991-92 p.4

ID# & SEX	CAPTURE			EVENT • LOCATION • COMMENT
	DATE	EST AGE	AREA ^A	
#40♀ (cont.)				weighed, tattooed, drew blood, and left at den site. #40 in very close proximity at the end of the exam. (possible offspring of #36♀) (living offspring include #44♂, #40k1♂, & #40k2♂)
#42♂	11-26-92	3-4 yr	I-SS	Observed lying in prairie motionless and unresponsive to low passes by the plane (#42♂ & #16♂ were in too close proximity to differentiate the signals). Approach on the ground 11-27-91; both males had moved off in different directions, no evidence of injury found at the site when examined, many tracks seen.
	-----	3-4 yr	I-SS to I-RP	Not handled this year. He crossed SR41 in 1/92 and has established a home range overlapping both #23♀ and #38♀, whom he regularly associates with. (offspring of #14♀ and back crossed to son #16♂)
#43♂	10-31-91	26 mo	I-PR	Found dead, Intraspecific aggression. Necropsy performed 11-2-91. Severe external wounds and pneumonia observed. (offspring of #19♀ backcrossed to her father #12♂; sib of #45♂ & #205♀)
#44♂	01-13-92	14 mo	I-ACQ	Captured and immobilized west of Collier's on Baker's ranch for work-up and collar change. In fair condition, too immature for semen collection. Pronounced heart murmur observed and slightly unthrifty condition noted. (offspring of #26♂ and #40♀)
#45♂	01-07-92	14 mo	I-FPNWR	Captured and immobilized for work-up and collar change (collar notably tight). In good condition, too immature for semen collection. (offspring of #19♀ backcrossed to her father #12♂; sib of #43♂ & #205♀)
#46♂	01-30-92	2-3 yr	I-BI	Captured, immobilized, radio instrumented and electroejaculated, NW of Bear Island road grade. Semen examined and frozen by Dr. Roelke.
#47♂	02-21-92	4-6 mo	I-BI	Uncollared male captured in northern end of Bear Island. Routine work-up performed and radio-instrumented, kitten left to recover near work-up site. No normal testicles palpated. #47♂'s initial serum chemistry suggested that he

Table 2. (continued)

Capture summary FY 1991-92 p.5

ID# & SEX	CAPTURE			EVENT • LOCATION • COMMENT
	DATE	EST AGE	AREA ^A	
#47♂ (cont.)				had severe renal disease when handled — Calcium 9.2 mg/kL, Phosphorus 9.5 mg/dL, BUN 75 mg/dl, Creatinine 0.8 mg/dL, Potassium 5.5 mmol/L. He stayed in private land. He was unavailable on private land for recapture & retesting throughout remainder of capture season. (offspring of #11♀ & #12♂; sib of #19♀)
#48♀	02-24-92	3-4 mo	I-FPNWR	Uncollared female kitten captured in the north-west corner of the FPNWR. Routine work-up performed and radio-instrumented. Left at deer kill site nearby to recover. (offspring of #31♀ and #12♂, sib of #34♂, #52♀, #201♂, & #204♀)
	05-05-92	6 mo	I-N.FS	Captured with female sibling #52♀ on Pacific Fruit Co. land. Immobilized for work-up and collar adjustment.
#49♀	02-25-92	20-24 mo	I-ACQ	Uncollared adult female captured in the northern end of the acquisition lands. Female in excellent condition, immobilized for routine work-up and radio collar fitting.
#50♂	03-04-92	8-9 mo	I-ACQ	Uncollared male kitten captured with male sibling #207. Immobilized for routine work-up and radio collar fitting. Left at work-up site to recover. Two normal descended testicles palpated. (offspring of #36♀ & #26♂; sib of #207♂)
#51♂	03-26-92	2-2.5 yr	I-FSSP	Uncollared adult male captured on the western edge of the FSSP. Immobilized for routine work-up and radio collar fitting, not electroejaculated due to prolonged period of time in tree. He was subsequently with #09♀.
#52♀	05-05-92	6 mo	I-N.FS	Uncollared female captured and immobilized for routine work-up and radio collar fitting. Captured with sibling (#48♀), both kittens in good condition, left at work-up site to recover, #31 returned to them by the afternoon. (offspring of #31♀ & #12♂; sibling of #34♂, #48♀, #201♂, & #204♀)

Table 2. (continued)

Capture summary FY 1991-92 p.6

ID# & SEX	CAPTURE			EVENT • LOCATION • COMMENT
	DATE	EST AGE	AREA ^A	
#200♂	6-08-92	10.5-12.5 yr	C-WOP	Previously known as PCO-10 alias "Big Guy." Immobilized and transported to GFC for electroejaculation for use <i>in vitro</i> fertilization. Semen used to incubate with oocytes from #205♀.
	06-09-92	10.5-12.5 yr	C-WOP	Immobilized for electroejaculation. Semen used for artificial insemination of #21♀.
#201♂	10-30-91	15 mo	C-WOP	Immobilized for six month post capture examination & collar adjustment, transported to/from VMTH for radiographs, ultrasound and cardiac evaluation by Dr. King (evaluation = normal). Cat in excellent condition.
	06-04-92	22 mo	C-WOP	Immobilized for routine annual physical examination and for semen collection and evaluation. Semen evaluated, very low concentration, none frozen. (offspring of #31♀ and #12♂; sib of #34♂, #48♀, #52♀, & #204♀)
#202♂	10-30-91	16 mo	C-WOP	Immobilized for six month post capture examination and collar adjustment, radiographs taken. Cat in very good condition.
	06-04-92	23 mo	C-WOP	Immobilized for routine annual physical examination and semen collection. Semen examined & frozen by Dr. Roelke.
	06-08-92	23 mo	C-WOP	Immobilized and transported to GFC for electroejaculation for use <i>in vitro</i> fertilization. Insufficient sperm and urine contamination. (offspring of #09♀ and #37♂; sib of #203♂)
#203♂	10-21-91	15 mo	C-WOP	Immobilized for six-month post-capture examination and collar adjustment, radiographs taken. Cat in excellent condition.
	06-04-92	23 mo	C-WOP	Immobilized for routine annual physical examination and semen collection. Very low sperm concentration and motility, none frozen. (offspring of #09♀ and #37♂, sib of 202♂).
#204♀	10-22-91	15 mo	C-WOP	Immobilized for six month post-capture examination, collar adjustment, transported to/from VMTH for radiographs, ultrasound and cardiac evaluation by Dr. King (evaluation = normal). Cat in good condition.
	02-03-92	19 mo	C-WOP	Immobilized for examination due to low body weight. No significant findings, few fleas.
	06-19-92	22 mo	C-WOP	Immobilized for routine annual physical

Table 2. (continued)

Capture summary FY 1991-92 p.7

ID# & SEX	CAPTURE			EVENT · LOCATION · COMMENT
	DATE	EST AGE	AREA ^A	
#204♀ (cont.)				examination. Harsh lung sounds and airway congestion noted. Low body weight and heavy flea infestation. Presumptive diagnosis of bacterial pneumonia made. Antibiotic treatment started on 6-26-92. (offspring of #31♀ and #12♂; sib of #34♂, #48♀, #52♀, & #201♀)
#205♀	09-24-91	10 mo	C-WOP/GFC	Immobilized, examined, and transported to GFC for observation. Grade IV/VI heart murmur still present. She was clinically normal and in good condition.
	12-31-91	14 mo	C-GFC	Immobilized for six month post capture examination & collar adjustment, radiographs taken. Dr. King from VMTH evaluated her heart, she was still clinically normal, but had cardiac enlargement and a grade IV/VI murmur.
	04-02-92	17mo	C-GFC	Immobilized and transported to VMTH to evaluate status of heart condition. Radiographs, blood tests, and contrast angiography performed. Returned to GFC and recovered there. Cardiac condition gradually progressing.
	06-08-92	19 mo	C-GFC	Immobilized for oocyte recovery for <i>in vitro</i> fertilization. 15 eggs harvested and incubated with semen from PCO 10♂ (FP#202 semen used initially, but all appeared to die.) One embryo cleaved, transferred into captive cougar PCO 411 (Twyla).
	6-17-92	19 mo	C-GFC	Immobilized and transported to the Veterinary College for cardiologic diagnostic work-up. Contrast angiography, radiology and nuclear radioisotope scan performed. Presumptive diagnosis of atrial septal defect confirmed. (offspring of #19♀ backcrossed to her father 12♂; sib of #43♂ & #45♂)
#206♀	09-24-91	10 mo	C-WOP	Immobilized and examined, cat was inadvertently darted, she was mistaken for #205♀ (caged in the same pen). Cat in good condition.
	01-02-92	14 mo	C-WOP	Immobilized for six months post capture examination, collar adjustment, radiographs taken. In excellent condition.
	05-02-92	19 mo	C-WOP	Seen looking normal on rounds at 2:00 PM, found dead at 7:00 PM. Transported on ice to VMTH that night. Necropsy performed 05-03-92. Cause of death under investigation.

Table 2. (continued)

Capture summary FY 1991-92 p.8

ID# & SEX	CAPTURE			EVENT • LOCATION • COMMENT
	DATE	EST AGE	AREA ^A	
#206♀ (cont.)				(offspring of #40♀ & #26♂; sib of #40k1♂, & #40k2♂)
#207♂	03-04-92	8-10 mo	I-ACQ	Uncollared male kitten captured with male sibling #50. Immobilized, for transport out of the field to WOP, for inclusion in the captive breeding program. No normal testicles palpated.
	06-05-92	11-13 mo	C-WOP	Immobilized for routine two month post capture physical examination. Generally healthy. (offspring of #36♀ & #26♂; sib of #50♂)
#208♀	06-06-92	9-12 days	I-FPNWR	Captured female kitten at den site. Removed from the wild and transported to Lowry Park Zoo. Kitten small, thin, and slightly dehydrated. (offspring of #32♀ & #12♂)

^ARefer to legend of Table 10 for location information.

Table 3. Physical and hematological parameters and reproductive status of wild male Florida panthers, FY 1991-92.

Location	ID#	Date	Age	Body WT ^A	Phys Cond ^B	HGB/PCV ^C	Repro ^D
N. Fakahatchee Strand, Florida Panther National Wildlife Refuge, Bear Island Unit (BCNP), Acquisition lands (BCNP), and adjacent Private Ranches Collier and SW Hendry counties	#26	01Mar88	4-5 yr	125	I	15.1/45.5	+/1/?
		10Feb90	6-7 yr	130	I	13.1/40.8	+/1/?
		21Jan92	8-10 yr	121	II	15.2/46.7	+/1/S
	#28	29Nov88 ^F	18-24 mo	93	I	11.1/33.8	?/1/?
		07Jan91	3.5-4 yr	120	II	13.5/41.4	+/1/?
		01Jan92	4.5-5 yr	128	II	11.4/35.3	+/1/Y
	#29	03Jan89	6 mo	44	II	13.5/43.7	?/1/I
		01May89	11.5 mo	76	II	12.7/38.8	?/1/I
		12Feb90	20 mo	101	I	12.4/39.0	+/1/?
		09Jan91	2.5 yr	121	I	10.9/34.5	+/1/S
		27May92 ^F	4 yr	110	I ⁻	na ^F	+/1/S
	#43	01May90	10 mo	54	II	11.6/35.4	?/1/I
		05Jan91	16-17 mo	86	II	8.6/28.0	-/1/I
		31Oct91 ^F	27 mo	76	III	na ^F	+/1/?
	#44	30Apr91	6 mo	33	II	10.8/34.2	?/1/I
		13Jan92	14 mo	77	III	12.0/37.0	?/1/I
	#45	08May91	6 mo	38	II	11.6/37.1	?/1/I
		07Jan92	12 mo	89	II	12.3/13.9	?/1/I
	#46	30Jan92	2-3 yr	116	II	15.2/47.2	+/1/?
	#47	21Feb92	6-7 mo	42	II	12.4/37.0	?/ < 1/I
	#50	04Mar92	8-10 mo	62	I	13.3/40.0	?/1/I
	#207	05Jun92	10 mo	75	II	13.2/38.0	?/ < 1/I
Fakahatchee Strand S. P.	#51	26Mar92	2.5 yr	108	I	17.0/49.0	?/2/?
Everglades National Park and Stair Steeps Unit of BCNP	#16	12Jan87	16-22 mo	84	II	13.1/38.0	+/2/?
		02Feb88	28-34 mo	86	III	12.0/33.9	+/2/?
		21Feb90	4.5-5 yr	104	II	9.7/29.9	-/2/Y
		04Feb91	5.5-6 yr	98	II	11.2/33.7	+/2/Y
		01Jan92	6.5-7 yr	120	II	13.5/39.5	+/2/N

^APounds (lbs.); ^BPhysical condition score: I-Excellent, II-Good, III-Poor, IV-Grave; ^CHemoglobin (gms/100ml) PCV = packed cell volume; ^DReproductive status; results of semen evaluation (+ = sperm present, - = no sperm present, ? = unknown)/number of descended testicles/documentated reproduction (Y = known sire, S = suspected sire, N = no sire, ? = unknown, I = immature). ^EOriginally hit-by-car near Ft. Myers airport. ^FDeath date; parameters not available (na) if carcass is decomposed.

Table 4. Physical and hematological parameters and reproductive status of wild female Florida panthers, FY 1991-92.

Location	ID#	Date	Age	Body WT ^A	Phys Cond ^B	HGB/PCV ^C	Repro ^D
N. Fakahatchee Strand, Florida Panther National Wildlife Refuge, Bear Island Unit (BCNP), Acquisition lands (BCNP), and adjacent Private Ranches Collier and SW Hendry counties	#11♀	21Jan86	5-6 yr	92 ^B	I ⁻	10.4/25.6	?/?/NPG
		07Jan88	7-9 yr	91	II	12.0/34.8	2/6/NPG
		02Jan90	9-11 yr	88	II	11.7/35.7	1/20/PG ³
		09May92	10-11 yr	88	II	10.7/33.4	1/9/NPG
	#19♀	09Feb87	9 mo	49	II	12.7/27.1	Immature
		09Nov87	18 mo	70	II	11.2/34.2	Immature
		04May89	36 mo	75-80	II	12.3/37.4	1/13/PG
		16Feb90	4 yr	78	II	12.9/42.4	1/7/-
		06Jan92	5.5-6 yr	81	II	13.0/40.1	2/14/PG ^{2,5}
	#31♀	12Jan89	8-10 yr	85	II	12.6/38.5	?/-/NPG
		14Mar91	10-12 yr	92	I	12.7/39.9	2/7/NPG
		24Feb92 ^F	11-12 yr	---	--	-----	≥2/3/NPG
	#32♀	03Feb89	24-30 mo	79	II	10.7/36.8	?/-/PG ³
		11Jan91	4-4.5 yr	76	II	11.1/33.5	0/-/SPG ^{1,4,5}
		06Jun92 ^F	5-6 yr	---	--	-----	1/<1/N
	#36	27Jan90	3-5 yr	108	I	12.5/37.6	?/?/SPG
		08Jan92	5-5.5 yr	90	I	13.4/40.5	2/-/N
		04Mar92	6-7 yr ^F	---	--	-----	≥2/7/NPG
	#40	26Feb90	1.5-2 yr	65	I	11.7/38.2	?/?/NPG
		10Jan92	3.5-4 yr	80	II	11.9/36.6	2/14/PG ^{2,5,6}
		05May92 ^F	4-5 yr ^F	---	--	-----	2/<1/N
	#48♀	05May92	5-6 mo	39	II	12.6/38.6	0/-/I
	#49♀	25Feb92	2 yr	72	I	9.1/28.6	?/-/NPG
	#52♀	05May92	5-6 mo	39	II	12.0/36.9	0/-/I
	#208♀	06Jun92	12-14 days	1.4	II	13.4/32.8	0/-/I ^o
East BCNP	#38♀	29Feb92	5-7 yr	98	II	10.9/34.8	0/-/SPG ^{4,5}

^APounds (lbs.); ^BPhysical condition score: I-Excellent, II-Good, III-Poor, IV-Grave; ^CHemoglobin (gms/100ml) PCV = packed cell volume; ^DReproductive status; number of kitten documented within previous 12 months/age of kittens in months on capture date/pregnancy status of female at last handling: (PG - pregnant, N - nursing, NPG - not pregnant, SPG - suspect pregnant, I - immature [Diagnosis of pregnancy status based on ¹association with a male and subsequent ²denning behaviour, ³palpation of fetuses, ⁴nipple &/or mammary development, &/or ⁵elevated progesterone, ⁶kittens located]); ^EFull stomach, est 6-8 lbs. ^FFemale not handled, den site entered. ^oNow at Lowry Park Zoo.

Table 5. Physical and hematological parameters and reproductive status of captive Florida panthers, May-June, 1992.

Location	ID#	Date	Age	Body WT ^A	Phys Cond ^B	HGB/PCV ^C	Repro ^D
White Oak Plantation	#21♀	09Jun92	6-7 yr	61	III	8.3/24.3	0/-/AI
	#200♂ ^E	08Jun92	10-12 yr	108	II ⁺	12.2/36.6	+/2/N
	#201♂	04Jun92	24 mo	97	I	10.8/35.0	+/2/I
	#202♂	04Jun92	24 mo	105	I	12.0/35.8	+/2/I
	#203♂	04Jun92	24 mo	96	II ⁺	11.9/32.9	+/2/I
	#204♀	20Jun92	22 mo	69	II	12.0/39.8	0/-/I
	#206♀	05May92 ^F	18 mo	78	II	-----	0/-/I
	#207♂	05Jun92	11 mo	75	II	13.2/38.0	?/0/I
Gainesville Research Lab.	#205♀	08Jun92	20 mo	77	II	12.9/40.0	0/-/IVF
Lowry Park	#208♀	28Jun92	5 wk	5.25	II	12.1/37.9	0/-/I

^APounds (lbs.); ^BPhysical condition score: I-Excellent, II-Good, III-Poor, IV-Grave; ^CHemoglobin (gms/100ml) PCV = packed cell volume; ^DReproductive status; If female, number of kittens documented within previous 12 months/age of kittens in months on handling date/pregnancy status of female at last handling: AI - Artificial insemination performed, IVF - in vitro fertilization with embryo transfer performed, I - immature. If male, results of semen evaluation (+ = sperm present, - = no sperm present, ? = unknown)/number of descended testicles/documentated reproduction (N = no offspring, Y = known sire, S = suspected sire, ? = unknown, I = immature). ^EAlso known as "Big Guy;" ^FDeath date.

Table 6. Documented panther longevity, injury and mortality for free-ranging panthers alive in FY 1991-92.

ID# & Sex	Capture Date		Field ^A Captures	Months Collared		Age ^C	Date	Dead or Injured Panthers Cause/Location ^D
	Initial	Latest		Total	Recent ^B			
#09♀	01-26-85	01-08-87	2	24	RFW ^{E-1}	5-7 yr	01-08-87	Treated for gunshot wound & osteomyelitis of rear foot, Cco. Returned to wild 1/87, FSSP.
	01-31-87	08-02-91	4	102	9	10-11 yr	* Alive *	
#11♀	01-21-86	05-09-92	4	77	2	10-12 yr	* Alive *	
#12♂	01-28-86	01-14-91	4	77	18	10-11 yr	* Alive *	
#16♂	01-12-87	01-23-92	5	66	7	6-7 yr	* Alive *	
#19♀	02-09-87	01-06-92	5	66	6	6 yr	* Alive *	Radio-collar malfunctioned, "lost" cat between 9/89 and 2/90.
#21♀	03-16-87	07-23-88	2	18	RFW ^{E-2}	2.5-3 yr	07-23-88	Hit-by-car, Palm Dr., SE Homestead, Dco. Alive in captivity at WOP.
#22♀	03-18-87	02-11-91	5	51	5	6 yr	07-19-91	Cause of death is undetermined--emaciation & cellulitis, Dco.
#23♀	03-18-87	06-22-88	5	15 ^F	RFW ^{E-3}	21-22 mo	06-22-88	Stranded on island, removed from wild Returned to wild 2/89 ENP
	02-22-89	05-10-91	7	55 ^F	14	6 yr	* Alive *	
#26♂	03-01-88	01-21-92	3	52	7	8-9 yr	* Alive *	
#28♂	11-29-88	11-29-88	1	0	RFW ^{E-4}	18-24 mo	11-29-88	Hit-by-car, Ft. Myers airport, Lco. Returned to wild 3/89.
	03-15-89	01-24-92	3	44	7	5-6.5 yr	* Alive *	
#29♂	01-03-89	01-09-91	4	41	17	4 yr	05-27-92	Found dead, private ranch land NE of BCNP, Cco.
#31♀	01-12-89	03-14-91	2	42	15	11-12 yr	* Alive *	

Table 6. (continued)

Mortality and longevity p.2

ID# & Sex	Capture Date		Field ^A Captures	Months Collared		Age ^C	Date	Dead or Injured Panthers Cause/Location ^D
	Initial	Latest		Total	Recent ^B			
#32♀	02-03-89	01-11-91	2	41	18	5-5.5 yr	* Alive *	
#34♂	01-08-90	01-11-91	3	29	18	3 yr	* Alive *	
#36♀	01-27-90	01-08-92	2	30	7	5-7 yr	* Alive *	
#38♀	02-08-90	02-29-92	2	31	6	5-7 yr	* Alive *	
#40♀	02-26-90	01-10-92	2	31	7	4-4.5 yr	* Alive *	
#42♂	03-06-90	02-05-91	2	28	16	3 yr	* Alive *	
#43♂	05-01-90	01-05-91	2	17	8	28 mo	10-31-91	Intrasp aggression. Cco.
#44♂	04-30-91	01-13-92	2	15	7	18 mo	* Alive *	
#45♂	05-08-91	01-07-92	2	14	7	18 mo	* Alive *	
#46♂	01-30-92	-----	1	7	7	2-3 yr	* Alive *	
#47♂	02-21-92	-----	1	6	6	11-12 mo	* Alive *	
#48♀	02-24-92	05-05-92	2	5	2	8-9 mo	* Alive *	
#49♀	02-25-92	-----	1	5	5	2 yr	* Alive *	
#50♂	03-04-92	-----	1	4	4	11-12 mo	* Alive *	
#51	03-26-92	-----	1	4	4	2.5-3 yr	* Alive *	
#52	05-05-92	-----	1	2	2	8-9 mo	* Alive *	
#200♂ ^G	11-02-84	-----	1	0	RFW ^{E-6}	3-5 yr	11-02-84	Hit-by-car, Ochopee, Cco.: Alive WOP
#201♂	02-20-91	-----	1	0	RFW ^{E-5}	7 mo	02-20-91	Captive breeding program: Alive WOP
#202♂	02-23-91	-----	1	0	RFW ^{E-5}	7 mo	02-23-91	Captive breeding program: Alive WOP
#203♂	02-25-91	-----	1	0	RFW ^{E-5}	7 mo	02-25-91	Captive breeding program: Alive WOP
#204♀	02-27-91	-----	1	0	RFW ^{E-5}	7 mo	02-27-91	Captive breeding program: Alive WOP

Table 6. (continued)

Mortality and longevity p.3

ID# & Sex	Capture Date		Field ^A Captures	Months Collared		Age ^C	Date	Dead or Injured Panthers Cause/Location ^D
	Initial	Latest		Total	Recent ^B			
#205♀	05-03-91	-----	1	0	RFW ^{E-5}	6 mo	05-03-91	Captive breeding program: Alive WOP
#206♀	05-06-91	-----	1	0	RFW ^{E-5}	6 mo	05-06-91	Captive breeding program: Died 05-02-92
#207♂	03-04-92	-----	1	0	RFW ^{E-5}	8-10 mo	03-04-92	Captive breeding program: Alive WOP
#208♀	06-06-92	-----	1	0	RFW ^{E-5}	9-12 days	06-06-92	Captive breeding program: Alive LPZ

^AField captures = total number of times panther was captured and immobilized in the wild (field).

^BMonths collared: As of June 31, 1992 the "Total" months since initial collaring and the number on months since the most "Recent" capture.

^CAge at death or injury and removed from the wild or if still alive estimated age on June 30, 1992.

^DLocation: County-Collier (Cco), Dade (Dco), Hendry (Hco), Lee (Lco); ENP-Everglades Nat. Park; SunL-Sunniland; GFC - Gainesville Wildlife Research Laboratory, LPZ - Lowry Park Zoo, WOP- White Oak Plantation.

^ERFW = Removed from wild:

¹Illegally shot. Fractured metatarsal, osteomyelitis, removed from wild for one month. Treated at Miami Metro Zoo Hospital. Returned to wild.

²hit-by-car, removed to fix fractured femur, still in captivity.

³stranded on island surrounded by water in Shark River Slough, ENP.

⁴uncollared panther, hit-by-car, rehabilitated and released.

⁵chosen for captive breeding program, now at White Oak Plantation.

⁶uncollared panther, hit-by-car, rehabilitated, still in captivity.

^F#23 was in captivity from 6-22-87 until 5-14-88 (11 months) then returned to the wild and was removed 1 month later. She was then held in captivity for 8 more months before released on 02-22-89.

^G#200♂ previously known as PCO 10, alias "Big Guy."

Table 7. Documented panther longevity, injury and mortality for captive panthers alive in FY 1991-92.

ID# & Sex	Date & Location ^A	Anesthesia ^B	Origin	Age ^C	Status ^D	Cause of removal from wild
#21♀	07-23-88 WOP	> 10	Wild	7 yr	* Alive *	Hit-by-car, Palm Dr., SE Homestead. Alive in captivity at WOP.
#200♂ ^E	11-02-84 WOP	> 10	Wild	10.5-12.5 yr	* Alive *	Hit-by-car, Ochopee 10 SR41. Alive in captivity at WOP.
#201♂	02-20-91 WOP	4	Wild	23 mo	* Alive *	Captive breeding program.
#202♂	02-23-91 WOP	5	Wild	24 mo	* Alive *	Captive breeding program.
#203♂	02-25-91 WOP	4	Wild	24 mo	* Alive *	Captive breeding program.
#204♀	02-27-91 WOP	5	Wild	23 mo	* Alive *	Captive breeding program.
#205♀	05-03-91 GFC	5	Wild	20 mo	* Alive *	Captive breeding program.
#206♀	05-06-91 WOP	4	Wild	18 mo	* Dead *	Captive breeding program 05-02-92, found dead, cause under investigation.
#207♂	03-04-92 WOP	2	Wild	12-14 mo	* Alive *	Captive breeding program.
#208♀	06-06-92 LPZ	0	Wild	5 weeks	* Alive *	Captive breeding program.

^ADate removed from the wild & current housing facility, WOP= White Oak Plantation, GFC= Gainesville Wildlife Research Laboratory, LPZ= Lowry Park Zoo. ^BNumber of anesthetic events, including initial capture. ^CAge as of June 30, 1992. ^DAlive/dead as of June 30, 1992. ^EAlso known as "Big Guy" and PCO 10.

Table 8. Causes of documented panther mortality, FY 1991-92.

Category of Death/Injury	<u>Collared</u>		<u>Uncollared</u>		<u>Total</u>	
	No.	(Percent)	No.	(Percent)	No.	(Percent)
Intraspecific Aggression	1	(25.0)	0		1	(25.0)
Bacterial Infection	1 ^A	(25.0)	0		1	(25.0)
Unknown cause	2 ^B	(50.0)	0		2	(50.0)
TOTAL	4		0		4	

^A Postmortem examination of #22♀ revealed severe bacterial infection and cellulitis of soft tissues as the proximal cause of death, however the panther had suffered severe emaciation for which no underlying cause was identified.

^B Two recent cases of panther mortality (#29♂ & #206♀) are still under investigation. Obvious causes of death were not evident.

Table 9. Prevalences and reciprocal titers for antibodies to selected pathogens in individual wild Florida panthers, FY 1991-92.

Agent ^A	Number of panthers			Reciprocal titer	
	Examined ^B	Positive	Percent	Minimum	Maximum
BACTERIA					
<u>Brucella</u> spp.	19	0	0%	< 25	
PROTOZOA					
<u>Toxoplasma gondii</u>	13	— ^C	— ^C	< 64	
VIRUSES					
Feline calicivirus ^B	11 ^D	2(3 ^E)	25.0% ^F	< 2	8
Feline enteric coronavirus/ Feline infectious peritonitis (coronavirus)	20 ^D	1	5.0%	< 25	25
Feline immunodeficiency virus	19 20	5 6	26.3% 30%	Qual. ^H Qual. ^{H,I}	ELIZA test. Western blot.
Feline leukemia virus	19	0	0%	Qual.	
Feline parvovirus ^B (panleukopenia virus)	11 ^F	0(3 ^E)	0%	< 10	
Feline rhinotracheitis virus ^B (herpesvirus)	11 ^F	0	0%	< 4	
Pseudorabies virus	19	— ^C	— ^C		
Rabies virus ^B	0	—	—	< 10	
Feline syncytia forming virus	19	— ^C	— ^C	< 10	
Encephalomyocarditis virus	19	0	0%	< 10	

^ARefer to Table 1 for details of specific test used. ^BResults are presented for samples collected from panthers prior to vaccination; ^CResults are pending on these samples; ^DEight of these 11 were less than 1 year of age. ^EAll less than 4 weeks of age, possibly reflecting maternal antibodies; ^FNeonates not included in prevalence percentage. ^GIFA results, Washington State University, Pullman, Washington. ^HQualitative assays, no titers determined. ^IWestern blot assay.

Table 10. Seroprevalence of selected disease agents in Florida panthers handled in FY 1991-92.

ID#	SEX	LOCATION ^B	DATE	AGE CLASS ^C	TESTS ^A								
					FPL	FCV	TOX	FVR	FELV	FIP	FIV	BRUC	PRV
# 11	F	I-BI	01-21-86	5	500	2	-	<2	-	-/-	-	nd ^D	nd
		I-PR	01-07-88	5	500 ^V	24 ^V	15	6 ^V	-	-/+	-	-	-
		I-N.FS	01-02-90	6	5,000 ^V	12 ^V	<48	8 ^V	-	/+	-/-	-	-
		I-BI/PR	05-09-92	6	500 ^V	16 ^V	pe ^E	12 ^V	-	/-	-/-	-	nd
# 16	M	II-ENP	01-12-87	2	<10	48	6	<2	-	-/+	+	-	-
		II-ENP	02-02-88	4	<10	240	12	<2	-	-/-	+	-	-
		II-ENP	02-21-90	4	<10	8	<48	<2	-	/+	+	-	-
		I-SS	02-04-91	5	50 ^V	48 ^V	6	<2 ^V	nd	/-	/+	nd	nd
		I-SS	01-23-92	5	50 ^V	48 ^V	pe	<2 ^V	-	/-	+/+	-	nd
# 19	F	I-BI	02-09-87	2	10,000	8	17	<2	-	-/-	-	-	-
		I-BI/PR	11-09-87	3	5,000 ^V	≤2 ^V	73	≤2 ^V	-	-/-	-	nd	nd
		I-N.FS	05-04-89	4	5,000 ^V	4 ^V	66	12 ^V	-	-/-	-	nd	nd
		I-N.FS	02-16-90	4	>10,000 ^V	4 ^V	<48	8 ^V	-	/-	/-	-	-
		I-FPNWR	01-06-92	5	5,000 ^V	96 ^V	pe	24 ^V	-	/-	-/-	-	nd
# 21	F	II-ENP	03-16-87	2	<10	2	15	<2	-	-/-	/+	-	-
		II-HST	07-23-88	4	<10	<2	<10	<2	-	-	-	-	-
		C/GFC	10-19-88	4	nd	nd	nd	nd	nd	nd	-	nd	nd
		C/GFC	12-29-88	4	nd	nd	nd	nd	nd	/-	nd	nd	nd
		C/GFC	01-28-89	4	nd	nd	nd	nd	nd	nd	-	nd	nd
		C/GFC	02-24-89	4	nd	nd	nd	nd	nd	nd	-	nd	nd
		C/GFC	05-23-89	4	>10,000 ^V	24 ^V	<10	16 ^V	-	-	-	nd	nd
		C/WOP	01-17-91	5	nd	nd	nd	nd	nd	nd	/+	nd	nd
		C/WOP	06-09-92	5	>10,000 ^V	64 ^V	pe	6 ^V	nd	nd	/-	nd	nd
# 26	M	I-SIR	03-01-88	5	500	16	8	<2	-	-/-	+	-	-
		I-ACQ	02-10-90	5	>10,000 ^V	4 ^V	<48	<2	-	/+	/+	-	-
		I-ACQ/PR	01-21-92	5	1,000 ^V	32 ^V	pe	32 ^V	-	/-	+/+	-	nd
# 28	M	I-CORK	11-29-88	2	<10	<2	nd	<2	nd	nd	nd	nd	nd
		C/GFC	12-30-88	2	nd	nd	nd	nd	nd	/-	-	-	-
		C/GFC	02-24-89	3	nd	nd	nd	nd	nd	/-	nd	nd	nd
		C/GFC	03-02-89	3	10,000 ^V	<2 ^V	<10	<2 ^V	-	-/-	nd	nd	nd
		I-PR	01-07-91	4	48 ^V	2 ^V	2	2 ^V	-	-/-	+/+	nd	nd
		I-ACQ/PR	01-24-92	5	1,000 ^V	96 ^V	pe	<2 ^V	-	/-	+/+	-	nd
# 36	F	I-ACQ	01-27-90	4	1,000	6	<48	<2	-	/-	/+	-	-
		I-ACQ	01-08-92	5	500 ^V	6 ^V	pe	<2 ^V	-	/-	-/+	-	nd
# 38	F	I-RP	02-08-90	4	10,000	<2	<48	<2	-	/-	/+	-	-
		I-RP	02-29-92	5	5,000 ^V	32 ^V	pe	<2 ^V	-	/-	-/-	-	nd
# 40	F	I-ACQ	02-26-90	3	>10,000	<2	<48	<2	-	/-	/+	-	-
		I-ACQ	01-10-92	4	5,000 ^V	<2 ^V	pe	<2 ^V	-	/-	+/+	-	nd

Table 10. (continued)

Seroprevalence p. 2

ID#	SEX	LOCATION ^B	DATE	AGE CLASS ^C	TESTS ^A								
					FPL	FCV	TOX	FVR	FELV	FIP	FIV	BRUC	PRV
# 40K1	M	I-FPNWR	04-07-92	1	500 ^M	6 ^M	pe	<4 ^M	nd	nd	nd	nd	nd
# 40K2	M	I-FPNWR	04-07-92	1	500 ^M	8 ^M	pe	<4 ^M	nd	nd	nd	nd	nd
# 44	M	I-N.FS	04-31-91	1	<10	<2	8	<2	-	/-	-/-	nd	nd
		I-ACQ/PR	01-13-92	2	<10 ^V	<2 ^V	pe	<2 ^V	-	/-	-/-	-	nd
# 45	M	I-N.FS	05-08-91	1	<10	48	1	<2	-	/-	-/+	nd	nd
		I-FPNWR	01-07-92	2	<10 ^V	24 ^V	pe	<2 ^V	-	/-	-/+	-	nd
# 46	M	I-BI	01-30-92	4	<10	3	pe	<2	-	/-	-/-	-	nd
# 47	M	I-ACQ	02-21-92	1	<10	8	pe	2	-	/-	-/-	-	nd
# 48	F	I-FPNWR	02-24-92	1	<10	3	pe	<2	-	/-	-/-	nd	nd
		I-FPNWR	05-05-92	1	<10	<4	pe	<4	-	/-	-/-	-	nd
# 49	F	I-ACQ	02-25-92	4	<10	3	pe	<2	-	/-	-/-	-	nd
# 50	M	I-ACQ	03-04-92	2	<10	6	pe	<2	-	/-	-/-	-	nd
# 51	M	I-FSSP	03-26-92	4	<10	<4	pe	<4	-	/-	-/-	-	nd
# 52	F	I-FPNWR	05-05-92	1	<10	<4	pe	<4	-	/-	-/-	-	nd
# 200 ^F	M	I-MO	11-02-84	4	<20	40	-	5	-	-	-	-	-
		C-WOP	11-20-84	4	nd	nd	nd	nd	nd	/-	nd	nd	nd
		C-WOP	06-13-87	5	nd	nd	nd	nd	nd	nd	-	nd	nd
		C-WOP	06-02-88	5	5,000 ^V	12 ^V	<10	8 ^V	-	-/-	-	nd	nd
		C-WOP	01-17-91	5	nd	nd	nd	nd	nd	nd	/-	nd	nd
		C-WOP	06-09-92	5	10,000 ^V	192 ^V	pe	6 ^V	nd	-/	nd	nd	nd
# 201	M	I-N.FS	02-20-91	2	<10	<2	2	<2	-	/25	-/-	nd	nd
		C-WOP	04-23-91	2	5,000 ^V	12 ^V	nd	<2 ^V	-	/-	-	nd	nd
		C-WOP	10-30-91	2	>10,000 ^V	64 ^V	pe	8 ^V	nd	nd	/-	nd	nd
		C-WOP	06-04-92	3	nd	nd	nd	nd	nd	nd	/-	nd	nd
# 202	M	I-S.FS	02-23-91	2	<10	<2	5	<2	-	/-	-/-	nd	nd
		C-WOP	04-23-91	2	500 ^V	4 ^V	nd	<2 ^V	-	/-	-/	nd	nd
		C-WOP	10-30-91	2	>10,000 ^V	12 ^V	pe	6 ^V	nd	nd	/-	nd	nd
		C-WOP	06-04-92	3	nd	nd	nd	nd	nd	nd	/-	nd	nd
# 203	M	I-S.FS	02-25-91	2	<10	<2	1	<2	-	/-	-/-	nd	nd
		C-WOP	04-23-91	2	10 ^V	6 ^V	nd	<2 ^V	-	/-	-	nd	nd
		C-WOP	10-21-91	2	5,000 ^V	8 ^V	pe	<4 ^V	nd	nd	/-	nd	nd
		C-WOP	06-04-92	3	nd	nd	nd	nd	nd	nd	/-	nd	nd

Table 10. (continued)

Seroprevalence p. 3

ID#	SEX	LOCATION ^B	DATE	AGE CLASS ^C	TESTS ^A								
					FPL	FCV	TOX	FVR	FELV	FIP	FIV	BRUC	PRV
# 204	F	I-N.FS	02-27-91	2	<10	6	nd	<2	—	/25	-/-	nd	nd
		C-WOP	04-23-91	2	100 ^V	12 ^V	—	<2 ^V	—	/25	—	nd	nd
		C-WOP	10-23-91	2	5,000 ^V	32 ^V	pe	<4 ^V	—	nd	—	nd	nd
		C-WOP	06-19-92	3	nd	nd	nd	nd	—	nd	-/-	nd	nd
# 205	F	I-N.FS	05-03-91	1	<10	8	3	<2	—	/25	-/-	nd	nd
		C-WOP	07-02-91	2	nd	pe	nd	nd	—	-/25	/-	nd	nd
		C-WOP	09-24-91	2	500 ^V	128 ^V	pe	8 ^V	nd	nd	nd	nd	nd
		C-GFC	12-31-91	2	100 ^V	96 ^V	pe	16 ^V	—	—	-/-	nd	nd
		C-GFC	04-02-92	3	500 ^V	64 ^V	pe	6 ^V	nd	-/25	/-	nd	nd
# 206	F	I-BI/PR	05-06-91	1	<10	<2	13	<2	—	/-	-/-	nd	nd
		C-WOP	07-02-91	2	nd	nd	nd	nd	—	/25	-/-	nd	nd
		C-WOP	09-24-91	2	100 ^V	4 ^V	pe	12 ^V	—	—	-/	nd	nd
		C-WOP	01-04-92	2	100 ^V	8 ^V	pe	8 ^V	—	nd	-/-	nd	nd
# 207	M	I-BI/PR	03-04-92	2	<10	<2	pe	<2	—	/25	-/-	nd	nd
		C-WOP	06-05-92	2	nd	nd	nd	nd	—	nd	-/-	—	nd
# 208	F	I-FPNWR	06-06-92	1	nd	nd	nd	nd	—	nd	—	nd	nd
		C-LPZ	06-14-92	1	500 ^M	128 ^M	pe	<4 ^M	nd	nd	nd	nd	nd
		C-LPZ	06-28-92	1	10 ^M	4 ^M	pe	<2 ^M	nd	nd	nd	nd	nd
		C-LPZ	07-12-92	1	<10 ^M	48 ^M	pe	<2 ^M	nd	/-	/-	—	nd

Legend on next page.

LEGEND: SEROPREVALENCE TABLE

^ASEROLOGICAL TESTS:

BRUC - brucellosis, +/- = plate agglutination test screens serum for antibodies against bacteria Brucella spp., titer = tube agglutination; FCV - feline calicivirus, SN antibody > 1:4 titer considered positive; FELV - feline leukemia virus, ELISA test detects presence of virus; FIP - feline infectious peritonitis - KELA test determines antibody to coronaviruses (+ or -) at Cornell /IFA titer determined at WADDL, $\geq$ 1:25 positive; FIV - feline immunodeficiency virus, ELISA test detects presence of antibodies/Western blot detects antibodies both are qualitative, Western blot is more sensitive; FPL - feline panleukopenia virus, serum neutralizing antibody titer, test detects and cross reacts with all parvoviruses, titers $\geq$ 1:50 are considered positive; FVR - feline viral rhinotracheitis, SN antibody titer $\geq$ 1:2 considered positive; TOX - toxoplasmosis, caused by protozoan Toxoplasma gondii, KELA antibody titer > 1:48 considered positive; PRV - pseudorabies virus, latex agglutination antibody titer > 1:4 considered positive.

^BLOCATION OF PANTHER- (major population followed by locality)

MAJOR POPULATIONS: I- Southwestern Florida, Big Cypress Swamp & Fakahatchee Strand and surrounding ecosystem including privately owned land; II- Southeastern Florida, Everglades National Park; C- captivity.

LOCALITY OF RANGE: ACQ - Acquisition lands (BCNP) east of BI and north of SR 84; BI - Bear Island Unit of Big Cypress National Preserve; CAI - Catherine Island, SW of Immokalee, north and south of Hwy 856 and west of Hwy 29; CORK - Corkscrew Swamp Sanctuary and Ft. Myers area; EE- East Everglades; ENP - Everglades National Park; FSSP- Fakahatchee Strand State Preserve; FPNWR - Florida Panther National Wildlife Refuge; GFC - Florida Game and Fresh Water Fish Commission, Wildlife Research Laboratory, Gainesville, Fl.; HST - Homestead, Florida; LPZ - Lowery Park Zoo; MMZ - Miami Metro Zoo, Miami, Fl.; MO - Southwestern Monument Unit, Big Cypress National Preserve; N.FS - Northern Fakahatchee Strand; PR - Private ranches east of Immokalee; RP - Raccoon Point, Eastern Big Cypress National Preserve; S.FS - Southern Fakahatchee Strand (Fakahatchee Strand State Preserve); SIR - Seminole Indian Reservation; SS -Stair Steps Unit of Big Cypress National Preserve; WOP - White Oak Plantation, Yulee, Fl.

^CAGE CLASS: 1 - kitten (0-6 months); 2 - juvenile (7-18 months); 3 - subadult (19-24 months); 4 - young adult (2-4 years); 5 - mature adult (5-8 years); 6 - older adult (> 8 years).

^Dnd- not determined

^Epe- test results pending

^FAlso known as "Big Guy" and PCO 10.

^MTiter levels reflect maternal antibody levels

^VCertain test results on this date may be influenced by vaccinations received on the previous immobilization date. Panthers were vaccinated with killed virus vaccine (Fort Dodge: FEL-O-VAX^R) for FPL, FCV, and FVR.

Table 11. Syncicial forming virus antibodies in Florida panthers and the presence of tissue culture lysis, 1987-92.

ID#	SEX	LOCATION ^B	DATE	AGE CLASS ^C	TESTS ^A		FIBROBLAST TISSUE CULTURE LYSIS
					IFA	AGID	
#07	M	I-S.FS	01-26-85	6	+	nd ^D	
#08	F	I-S.FS	01-13-86	6	-	-	Growth
		I-S.FS	04-13-87	6	-	-	Growth
		C-WOP	06-01-88	6	-	nd	
#09	F	I-S.FS	01-08-87	5	+	+	Lysis
#10	M	I-S.FS	05-02-86	2	+	nd	
#11	F	I-BCNP	01-21-86	5	+	nd	Growth
		I-BCNP	01-02-90	6	+	nd	Lysis
		I-BI	05-09-92	6	pe	nd	
#12	M	I-N.FS	01-14-91	6	+	nd	na ^E
#13	M	I-BI/PR	02-27-86	5	+	nd	
#14	F	II-ENP	12-07-86	5	-	-	Lysis
		II-ENP	04-11-88	5	+	nd	Growth
		II-ENP	02-22-90	6	-	nd	
#15	F	II-ENP	12-13-86	5	-	-	Growth
		II-ENP	06-16-87	5	-	nd	
#16	M	II-ENP	01-12-87	2	-	-	Growth
		II-ENP	02-04-91	5	+	nd	na
		II-SS	01-23-92	5	pe	nd	
#17	M	I-PR	01-20-87	6	+	+	Lysis
		I-PR	01-26-89	6	+	nd	
#18	F	I-PR	01-22-87	6	+	+	Lysis
		I-PR	01-23-89	6	+	nd	
#19	F	I-BI	02-09-87	2	-	-	Lysis
		I-BI/PR	11-09-87	3	-	nd	Growth
		I-N.FS	02-16-90	4	+	nd	na
		I-FPNWR	01-06-92	5	pe	nd	
#20	M	I-PR	03-10-87	4	+	+	Lysis
		CAP/MMZ	07-06-87	4	+	nd	
#21	F	II-ENP	03-16-87	2	-	-	Lysis
		II-ENP	05-23-89	4	-	nd	
		C-WOP	06-09-92	5	pe	nd	
#22	F	II-ENP	03-18-87	2	-	-	Growth
			02-11-91	4	-	nd	

Table 11. (continued)

p.2

ID#	SEX	LOCATION ^b	DATE	AGE CLASS ^c	TESTS ^a		FIBROBLAST TISSUE CULTURE LYSIS
					IFA	AGID	
#23	F	II-ENP I-RP	03-18-87	2	-	-	Growth na
			05-10-91	5	+	nd	
#24	M	III-FEC	01-30-88	4	-	nd	
#25	M	I-N.FS	02-16-88	4	-	nd	
#26	M	I-SIR	03-01-88	5	+	nd	Lysis Growth
		I-ACQ	02-10-90	5	+	nd	
		I-ACQ	01-21-92	6	pe	nd	
#27	F	II-ENP	04-11-88	4	-	nd	
#28	M	I-PR	01-07-91	4	+	nd	na
		I-SIR	01-24-92	4	pe	nd	
#29	M	I-PR	01-09-91	4	+	nd	Growth
		I-PR	05-27-92	4	pe	nd	
#30	M	I-BI/PR	01-06-89	2	-	nd	
#31	F	I-N.FS	03-14-91	6	+	nd	na
#32	F	I-N.FS	01-11-91	5	-	nd	Growth
#33	M	I-SS	03-05-89	4	-	nd	
#34	M	I-PR	01-11-91	3	+	nd	Growth
#35	M	I-CAI	01-15-90	2	+	nd	
#36	F	I-ACQ	01-27-90	4	+	nd	Growth
		I-ACQ	01-08-92	5	pe	nd	
#37	M	I-S.FS	01-30-90	4	+	nd	
#38	F	I-RP	02-08-90	4	+	nd	Growth
		I-RP	02-29-92	5	pe	nd	
#39	M	II-ENP	02-19-90	4	+	nd	
#40	F	I-ACQ	02-26-90	3	-	nd	na
		I-ACQ	01-10-92	4	pe	nd	
#41	F	I-ACQ	02-28-90	3	+	nd	
#42	M	II-EE	02-05-91	3	+	nd	na
#43	M	I-PR	01-09-91	2	+	nd	

Table 11. (continued)

ID#	SEX	LOCATION ^B	DATE	AGE CLASS ^C	TESTS ^A		FIBROBLAST TISSUE CULTURE LYSIS
					IFA	AGID	
#44	M	I-N.FS I-ACQ	04-31-91 01-13-92	1	+	nd	Growth
					pe	nd	
#45	M	I-N.FS I-FPNWR	05-08-91 01-07-92	1 2	- pe	nd nd	Growth
#46	M	I-BI	01-30-92	4	pe	nd	
#47	M	I-BI	02-21-92	1	pe	nd	
#48	F	I-N.FS	05-05-92	1	pe	nd	
#49	F	I-ACQ	02-25-92	3	pe	nd	
#50	M	I-ACQ	03-04-92	2	pe	nd	
#51	M	I-FSSP	03-26-92	4	pe	nd	
#52	M	I-N.FS	05-05-92	1	pe	nd	
#200	M	C-WOP C-WOP	11-19-90 06-08-92	6 6	- pe	nd nd	
#201	M	I-N.FS C-WOP	02-20-91 06-04-92	2 3	- pe	nd nd	Growth
#202	M	I-S.FS C-WOP	02-23-91 06-08-92	2 3	- pe	nd nd	Growth
#203	M	I-S.FS C-WOP	02-25-91 06-04-92	2 3	- pe	nd nd	Growth
#204	F	I-N.FS C-WOP	02-27-91 06-19-92	2 3	- pe	nd nd	Growth
#205	F	I-N.FS C-GFC	05-03-91 06-08-92	1 3	- pe	nd nd	Growth
#206	F	I-BR/PR C-WOP	05-06-91 05-03-92 ^F	1 3	- pe	nd nd	Growth
#207	M	C-WOP	03-04-92	2	pe	nd	

^ASerological tests: IFA - Indirect immunofluorescence assay; AGID - Agar gel immunodiffusion.

^BLocation of panther- See Footnote Table 10.

^CAge class: See Footnote Table 10.

^DNot determined.

^ETissue not available.

^FSample taken post mortem.

Table 12. Mercury concentration in whole blood (ppm, wet weight) over time for panthers captured in FY 1991-92.

ID#	1987	1988	1989	1990	1991	1992
#16 M	0.180	1.80		3.10	0.21	0.533
#19 F			0.100	0.11		<0.047
#26 M		0.069		0.053		<0.047
#28 M		0.320			0.024	<0.047
#36 F				0.035		<0.048
#38 F				0.650		0.067
#40 F				0.039		0.154
#44 M					0.172	0.147
#45 M					0.185	0.067
#46 M						0.147
#47 M						<0.047
#48 F						<0.047
#49 F						0.199
#50 M						<0.046
#51 M						0.055

Table 13. Mercury concentration in hair (ppm, dry weight) over time for panthers captured in FY 1991-92.

ID#	1987	1988	1989	1990	1991	1992
#16 M	4.00	82.00		90.00	67.00	31.80
#19 F	3.00		6.90	21.00		1.75
#26 M		1.20		0.82		1.33
#28 M		8.40			0.55	0.52
#36 F				0.77		1.04
#38 F				47.0		3.47
#40 F				0.90		9.90
#44 M					2.84	9.52
#45 M						2.21
#46 M						11.1
#47 M						6.81
#48 F						0.68
#49 F						11.1
#50 M						1.01
#51 M						6.25

Table 14. Fertility assessment and contribution to frozen sperm bank for male panthers as of June 30, 1992.

ID#	Date	Age	Breeder Status	Reproductive evaluation (Series I-III) ^A						Sperm Bank ^A	
				# Testicles ^B	Motility ^C	Status ^D	Concentration ^E	Volume	TMS/Ejac ^F	# Pellets	AI units ^{G,P}
# 12	01-28-86	4-5 yr	Presumed	1	70%	2.5	10.8 x 10 ⁶	0.77 ml	5.8 x 10 ⁶	0	0
	01-31-88	6-7 yr	Presumed	1	40%	3.0	10.5 x 10 ⁶	2.20 ml	9.2 x 10 ⁶	169	0.92
	01-14-91	9-10 yr	Presumed	1	50%	2.5	19.0 x 10 ⁶	1.58 ml	15.0 x 10 ⁶	51	1.50
# 13	12-15-87	6-8 yr	Suspect	2	nd	nd	nd	nd	nd	22 ^H	nd
# 16	02-02-88	28-34 mo	Unknown ^I	2	40%	3.5	2.0 x 10 ⁶	0.53 ml	0.4 x 10 ⁶	20	0.04
	02-21-90	4.5-5 yr	Presumed	2	—	—	0	0.22 ml	0	0 ^J	0
	02-04-91	5.5-6 yr	Presumed	2	70%	3.0	23.0 x 10 ⁶	2.10 ml	33.8 x 10 ⁶	83	3.38
	01-23-92	6.5-7 yr	Presumed	2	60%	3.0	12.0 x 10 ⁶	2.30 ml	16.6 x 10 ⁶	122	1.66
# 26	02-10-90	6-7 yr	Unknown ^K	1	50%	2.5	1.0 x 10 ⁶	1.14 ml	0.6 x 10 ⁶	1 ^L	0.06
	01-22-92	8-9 yr	Presumed	1	50%	2.5	6.0 x 10 ⁶	2.01 ml	6.0 x 10 ⁶	64	0.60
# 28	03-11-89	20-26 mo	Unknown	1	10%	2.0	0.5 x 10 ⁶	0.30 ml	0.02 x 10 ⁶	0 ^J	0
	01-07-91	3.5-4 yr	Unknown	1	30%	3.0	20.0 x 10 ⁶	1.31 ml	7.9 x 10 ⁶	8 ^L	0.79
	01-25-92	6-7 yr	Unknown	1	40%	2.5	8.0 x 10 ⁶	3.40 ml	10.9 x 10 ⁶	170	1.09
# 29	02-12-90	1.5 yr	Unknown	1	30%	2.5	3.0 x 10 ⁶	0.22 ml	0.2 x 10 ⁶	0 ^J	0
	01-09-91	2.5 yr	Suspect	1	30%	3.0	56.4 x 10 ⁶	1.30 ml	21.9 x 10 ⁶	50	2.20
# 33	03-05-89	3-4 yr	Unknown	2	30% ^M	nd	1.0 x 10 ⁶	0.93 ml	0.3 x 10 ⁶	17	0.03
# 34	01-11-91	22 mo	Unknown	1	0%	0	4.0 x 10 ⁶	2.77 ml	0	0 ^J	0
# 39	02-19-90	3-4 yr	Unknown	2	50%	2.5	13.0 x 10 ⁶	1.80 ml	11.7 x 10 ⁶	3 ^L	1.17
# 42	02-05-91	21 mo	Unknown	2	70%	3.0	2.0 x 10 ⁶	1.30 ml	1.8 x 10 ⁶	37	0.18
# 43	01-05-91	16-17 mo	Unknown	1	—	—	0	0.21 ml	0	0 ^J	0
# 46	01-31-92	2-3 yr	Unknown	1	38%	2.5	1.8 x 10 ⁶	0.65 ml	0.43 x 10 ⁶	33	0.04

Table 15. Summary of assisted reproduction research activities in panthers and cougars, 1991-1992.

<u>Date</u>		Cooperating Facility*	Procedures Performed	<u>Number of Animals Handled</u>	
Month	Days/trip			Male	Female
Aug 1991	5	Everglades Holiday Park	Fertility assessment	7	1
Oct 1991	5	Octagon Wildlife Sanctuary	Fertility assessment	8	0
Oct 1991	1	Wild Animal Retirement Village	Fertility assessment	1	0
Nov 1991	6	Octagon Wildlife Sanctuary	Artificial insemination	10	8
Dec 1991	4	Wild Animal Retirement Village	Artificial insemination	6	3
Dec 1991	1	Wildlife Research Laboratory	Artificial insemination	1	1
Jan 1992	3	Octagon Wildlife Sanctuary	Pregnancy evaluation	0	8
Feb 1992	1	Wild Animal Retirement Village	Pregnancy evaluation	0	3
Apr 1992	6	Octagon Wildlife Sanctuary	Artificial insemination	8	11
Apr 1992	2	White Oak Plantation	Artificial insemination	2	1
Jun 1992	1	Wildlife Research Laboratory	In vitro fertilization	2	1
Jun 1992	1	White Oak Plantation	Artificial insemination	1	1
Jun 1992	1	Wildlife Research Laboratory	Embryo transfer	0	1
Jun 1992	5	Octagon Wildlife Sanctuary	Pregnancy evaluation	2	8
Total				48♂	47♀

*Cooperating facilities included: Wildlife Laboratory Research (Fl. Game and Freshwater Fish Commission), project supervisor Melody E. Roelke, DVM, Gainesville, FL; Octagon Wildlife Sanctuary, Ft. Myers, FL, director Pete Caron; Everglades Holiday Park, Ft. Lauderdale, FL, director Mitchell Bridges; Wild Animal Retirement Village, Waldo, FL, directors Gene and Rusty Schuller; and White Oak Plantation, Yulee, FL, wildlife director John Lukas.

Table 16. Rational for proposed selection of panther kittens for captive breeding project considering all radio-collared adult females, 1 January 1992.

FEMALE		KITTEN		Location ^C	Priority ^D	Recommendation ^E
ID#	Age ^A	Age ^B	Sire			
KITTENS BORN IN 1991 - Remove as juveniles						
#11	9-11y	5 mo ^F	#12	I-BI/PR	1+	Pull PART (prefer female) <i>D</i> is an old <i>F</i> who has only one ill <i>F</i> ₂ in captivity (#205♀). <i>S</i> is also a <i>F</i> .
#31	11-13y	5 mo ^F	#12	I-N.FS/PR	0	Pull NONE <i>D</i> is old and both <i>S</i> and <i>D</i> are <i>F</i> s, however, entire litter was removed in 1991.
#36	5-6y	7 mo	#26	I-PR	1+	Pull PART (prefer females) Both <i>S</i> and <i>D</i> are <i>F</i> s.
POSSIBLE 1992 LITTERS - Remove as neonates						
#09	9-11y	----	#12	I-FSSP	0	Pull NONE <i>D</i> is getting old and both <i>S</i> and <i>D</i> are <i>F</i> s, however, entire litter was removed in 1991.
#19	5.5y	----	#12	I-N.FS	0	PULL NONE One kitten taken in 1991. Recommend selecting no kittens from this mating as litters will be back cross with the <i>D</i> 's father. Take kittens from living mother (#11) who is an important <i>F</i> .
#23	5.5y	----	#42	I-RP	1+	PULL PART <i>D</i> and probable <i>S</i> are both <i>F</i> s.
#32	4.5-5y	----	#12	I-N.FS	1+	PULL ALL <i>D</i> is <i>F</i> (possibly daughter of #31♀) and <i>S</i> would be a <i>F</i> . <i>D</i> has history of poor survivorship of young.
#38	5-6y	----	#42	I-RP	1+	PULL PART <i>D</i> and probable <i>S</i> are both <i>F</i> s.
#40	3.5-4y	----	#26 or #28	I-PR	2+	Pull PART (prefer female) <i>D</i> is young <i>F</i> (possibly daughter of #36♀) and possible <i>S</i> s are both <i>F</i> s.

^AAge as of January 1, 1992; ^BApprox. age of kittens based on denning dates of females; ^C see Table 10.

^DOrder of preference 1⁺ = top choice, 4⁺ = lowest choice, 0 = take no kittens; ^E*D* = dam, *S* = sire, *F* = founder; ^Fkittens age at capture much younger than original denning date predicted- #11's would have been only 1-3 mo and #31 < 1 mo on January 1, 1992.

Table 17. Outcome of 1991-92 litters and disposition of kittens captured for the captive breeding program prior to 30 June 1992.

Female ID#	Number and Sex ^A of kittens		Age when captured	1992 Priority ^{BC}	Comments
	In litter	Now in captivity(#)			

KITTENS BORN IN 1991 - Handled as juveniles					
#11♀	1:0:0	0:0:0 ^C	4-6 mo	1 ⁺	Radio-collared male kitten #47♂, captured 02-21-92, remained in wild, uncollared siblings may exist.
#31♀	0:2:0	0:0:0	3 & 5 mo	0	Radio-collared female kittens, #48♀ captured 02-24-92 & #52♀ captured 05-05-92, remained in wild.
#36♀	2:0:0	1:0:0 (207♂)	8-10 mo	1 ⁺	#207♂ captured 03-04-92. Radio-collared male kitten, #50♂, remained in wild.

KITTENS BORN IN 1992 - Handled as neonates					
#09♀	0:0:0	0:0:0		0	#12♂ & #51♂ infrequently in association with #09♀, no denning documented to date.
#19♀	0:0:0 ?	0:0:0		0	Denning activity observed April, 1992, no attempt at capture was made.
#23♀	0:0:0	0:0:0		1 ⁺	Frequent association with #42♂ since Jan. 1992, no denning documented to date.
#32♀	0:1:0	0:1:0 (208♀)	9-12 days	2 ⁺	#208♀ captured 06-06-92. No other kittens in litter.
#38♀	0:0:0	0:0:0		1 ⁺	#42♂ in frequent association with #38♀ since Jan. 1992, no denning documented to date.
#40♀	2:0:0	0:0:0 ^C	10-14 days	2 ⁺	2 neonatal male kittens handled (#40k1 & #40k2 on 04-07-92) and left at den site.

^ASex 0:0:0 = males:females:unknown, # = ID# of captive offspring; ^BOriginal priority in order of preference established at beginning of capture season (1⁺ = top choice, 4⁺ = lowest choice, 0 = no kittens to be taken this year); ^COriginal plan was to take only female kittens.

Table 18. Florida panther founder representation of individuals in captivity, 30 June 1992.

ID# & Sex	Age ^A	Founders Represented		Genetic stock ^B	Deleterious traits ^C	
		Dam	Sire		# Testicles	Heart Murmurs
#21♀	6.5 yr	#14 ½	ENP#1 ^D ½	ENP	na	0
#200♂ ^E	10-12 yr	? ½	? ½	ENP ^F	2	0
#201♂	23 mo	#31 ½	#12 ½	BC ^G	1	1+
#202♂	24 mo	#09 ½	#37 ½	ENP/BC	2	3+
#203♀	24 mo	#09 ½	#37 ½	ENP/BC	1	1+
#204♀	23 mo	#31 ½	#12 ½	BC	na	3+
#205♀	19 mo	#11 ¼	#12 ¾	BC	na	6+
#207♂	12-14 mo	#36 ½	#26 ½	BC	0	1+
#208♀	2 mo	#32 ½	#12 ½	BC	na	2+

^AAge as of June 30, 1992

^BDetermined by mitochondrial DNA and APRT analysis (O'Brien et al., 1990).

^CNumber of normally descended testicles; heart murmur grades- 0 (not detected), 1+ (mild) to 6+ (severe).

^DENP #1M (uncollared sire of #16M & #21F)

^EAlso known as "Big Guy" and PCO 10.

^FEverglades genetic stock.

^GBig Cypress genetic stock.

Table 19. Florida panther founder representation in captivity as of 30 June 1992.

Wild Founder ID# ^A	# Offspring in:		% of Genome Represented in Captivity	
	Wild	Captivity	Actual	Additional Potential ^B
# 09 F	0	2	75%	
# 11 F	2	1 (F ₂)	0	25%
# 12 M	5 ^C	4	87.5%	7%
# 14 F	1	1	50%	
# 15 F	1	0	0	
# 26 M	2 ^D	1	0	50%
# 28 M	0	0	0	
# 31 F	2	2	75%	
# 32 F	0	1	50%	
# 36 F	0	1	0	50%
# 37 M	0	2	75%	
# 38 M	0	0	0	
# 40 F	0 ^D	0	0	
# 46 M	0	0	0	
# 49 F	0	0	0	
# 50 M	0	0	0	
# 51 M	0	0	0	
# 200 M	0	0 ^E	100% ^E	
ENP #1 M ^F	1	1	50%	
ENP #2 M ^G	1	0	0	
BC #1 M ^H	1	0	0	

^AFounders or their descendants still represented in the living panther population.

^BCurrently 2 individuals are not viable as breeding animals due to anatomical/medical conditions. With treatment, they could potentially contribute genetic material.

^C#34M is possibly #12's offspring.

^D2 additional neonatal kittens were handled but not radio-collared in April 1992. Status unknown at this time.

^EFounder is in captivity ("Big Guy").

^FENP #1M (uncollared sire of #16M & #21F)

^GENP #2M (uncollared sire of #23F)

^HBC #1M (uncollared sire of #34M sire; #12M is possibly #34M sire)

Table 20. Growth rates and hematology changes in wild born captive Florida panther kittens less than 24 months of age.

Location	ID#	Date	Age	Body WT ^A	Phys Cond ^B	Wt. Gain per Day ^C	HGB/PCV ^D
White Oak Plantation	#201♂	20Feb91	7 mo	34	III		8.1/25.0
		23Apr91	9 mo	52	II	0.290	12.6/38.5
		30Oct91	15 mo	84	I	0.168	12.9/37.7
		04Jun92	24 mo	97	I	0.060	10.8/35.0
	#202♂	23Feb91	8 mo	47	I		10.8/32.8
		23Apr91	10 mo	59	I	0.200	10.5/31.7
		30Oct91	16 mo	94	II	0.184	12.7/36.7
		04Jun92	24 mo	105	I	0.050	12.0/35.8
	#203♂	25Feb91	8 mo	45	II		9.8/31.4
		23Apr91	10 mo	50	II	0.088	11.7/35.2
		21Oct91	15 mo	76	I	0.144	12.8/37.0
		04Jun92	24 mo	96	II ⁺	0.088	11.9/32.9
	#204♀	27Feb91	7 mo	37	II		9.8/29.8
		23Apr91	9 mo	44	II	0.127	13.8/42.0
		22Oct91	15 mo	59	II	0.082	13.3/38.6
		03Feb92	18 mo	58	II	-0.0096	10.9/34.3
		20Jun92	22 mo	69	II ⁻	0.080	12.0/39.8
	#205♀	03May91	6 mo	31.5	II		9.9/37.1
		02Jul91	8 mo	40	II	0.142	12.3/39.5
		24Sep91	10 mo	55	II	0.179	12.7/37
		31Dec91	14 mo	69	II	0.143	12.8/38.0
		02May92	19 mo	75	II	0.049	13.7/40.8
		08Jun92	20 mo	77	II	0.054	12.9/40.0
	#206♀	06May91	6 mo	33	II ⁻		10.2/33.4
		02Jul91	8 mo	42	II	0.158	10.9/33.2
		24Sep91	10 mo	55	II	0.236	12.9/37.6
		02Jan92	14 mo	72	I	0.170	13.1/38.5
		02May92	18 mo	78	II	0.050	----- ^E
	#207♂	04Mar92	8 mo	59	II		11.5/34.9
		05Jun92	11 mo	75	II	0.172	13.2/38.0
Lowry Park	#208♀	06Jun92	9-12 day	1.4	III		13.4/32.8
		14Jun92	17-20 day	2.5	II	0.138	10.6/28.1
		28Jun92	5 wk	5.25	II	0.196	12.1/37.9
		03Jul92	6 wk	6.75	II	0.300	11.6/31.0
		12Jul92	7 wk	7.0	I ⁻	0.027	8.6/27.4

^APounds (lbs.); ^BPhysical condition score: I-Excellent, II-Good, III-Poor, IV-Grave; ^CAverage weight (lbs.) gain per day, calculated between the two recorded dates; ^DHemoglobin (gms/dl) PCV = packed cell volume; ^EDied on this date, data not available.

Table 21. Growth rates and hematology changes in wild Florida panther kittens less than 24 months of age.

Location	ID#	Date	Age	Body WT ^A	Phys Cond ^B	Wt. Gain per Day ^C	HGB/PCV ^D
N. Fakahatchee Strand, Florida Panther National Wildlife Refuge, Bear Island Unit BCNP, and adjacent Private Ranches Collier and SW Hendry Counties.	#19♀	09Feb87	9 mo	49	II		12.7/27.1
		09Nov87	18 mo	70	II	0.077	11.2/34.2
	#29♂	03Jan89	6 mo	44	II		13.5/43.7
		01May89	11.5 mo	76	II	0.271	12.7/38.8
		12Feb90	20 mo	101	I	0.087	12.4/39.0
	#30♂	06Jan89	9-10 mo	55	II		12.0/32.8
		02May89	13-14 mo	75	II	0.172	11.6/35.1
		01Jan90	21-22 mo	88	II	0.053	----- ^E
	#34♂	08Jan90	10 mo	62	I		11.4/36.5
		03May90	14 mo	68	II	0.052	11.8/35.7
		11Jan91	22 mo	110	I	0.134	11.3/35.4
	#43♂	01May90	10 mo	54	II		11.6/35.4
		05Jan91	16-17 mo	86	II	0.129	8.6/28.0
	#44♂	30Apr91	6 mo	33	II ⁻		10.8/34.2
		13Jan92	14 mo	77	III	0.170	12.0/37.0
	#45♂	08May91	6 mo	38	II		11.6/37.1
		07Jan92	14 mo	89	II	0.209	12.3/13.9
	#48♀	24Feb92	3-4 mo	25	II ⁺		10.8/33.5
		05May92	5-6 mo	39	II ⁺	0.200	12.6/38.6
Fakahatchee Strand State Preserve	#10♂	13Jan86	5-7 mo	34	III		11.3/30.0
		02May86	9-11 mo	55	II	0.192	12.9/35.0
Everglades National Park Dade Co.	#22♀	18Mar87	6-8 mo	33	II		15.7/43.3
		07Apr87	7-9 mo	36	II ⁻	0.150	11.8/34.4
		15Jun87	9-11 mo	43	II	0.100	9.8/30.0
		24Mar88	16-18 mo	60	II	0.060	9.8/30.1
	#42♂	06Mar90	10 mo	60	II		11.5/35.8
		05Feb91	21 mo	87	I	0.080	12.7/38.4

^APounds (lbs.); ^BPhysical condition score: I-Excellent, II-Good, III-Poor, IV-Grave; ^CAverage weight (lbs.) gain per day, calculated between the two recorded dates; ^DHemoglobin (gms/dl) PCV = packed cell volume; ^EDied on this date, data not available.

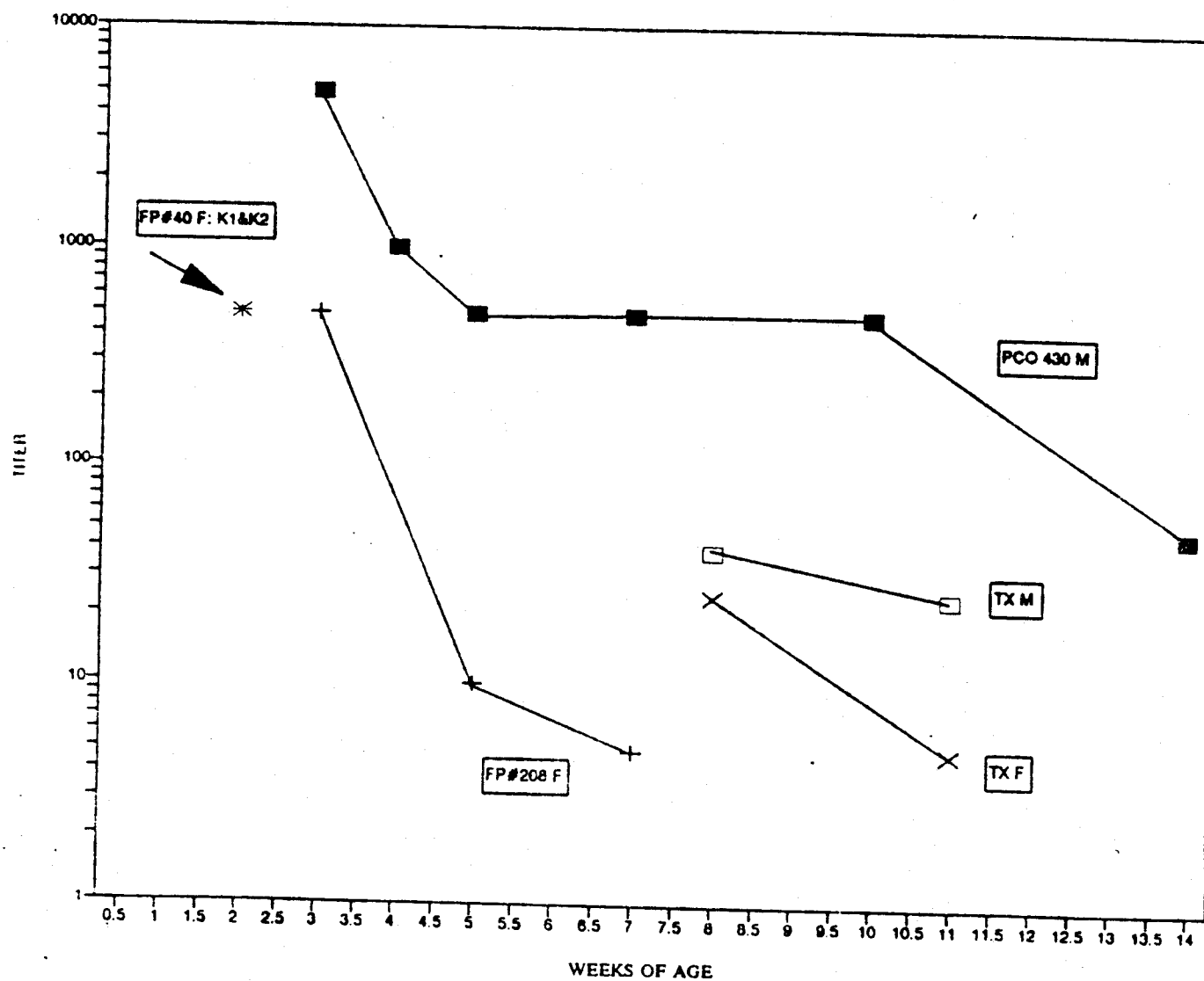
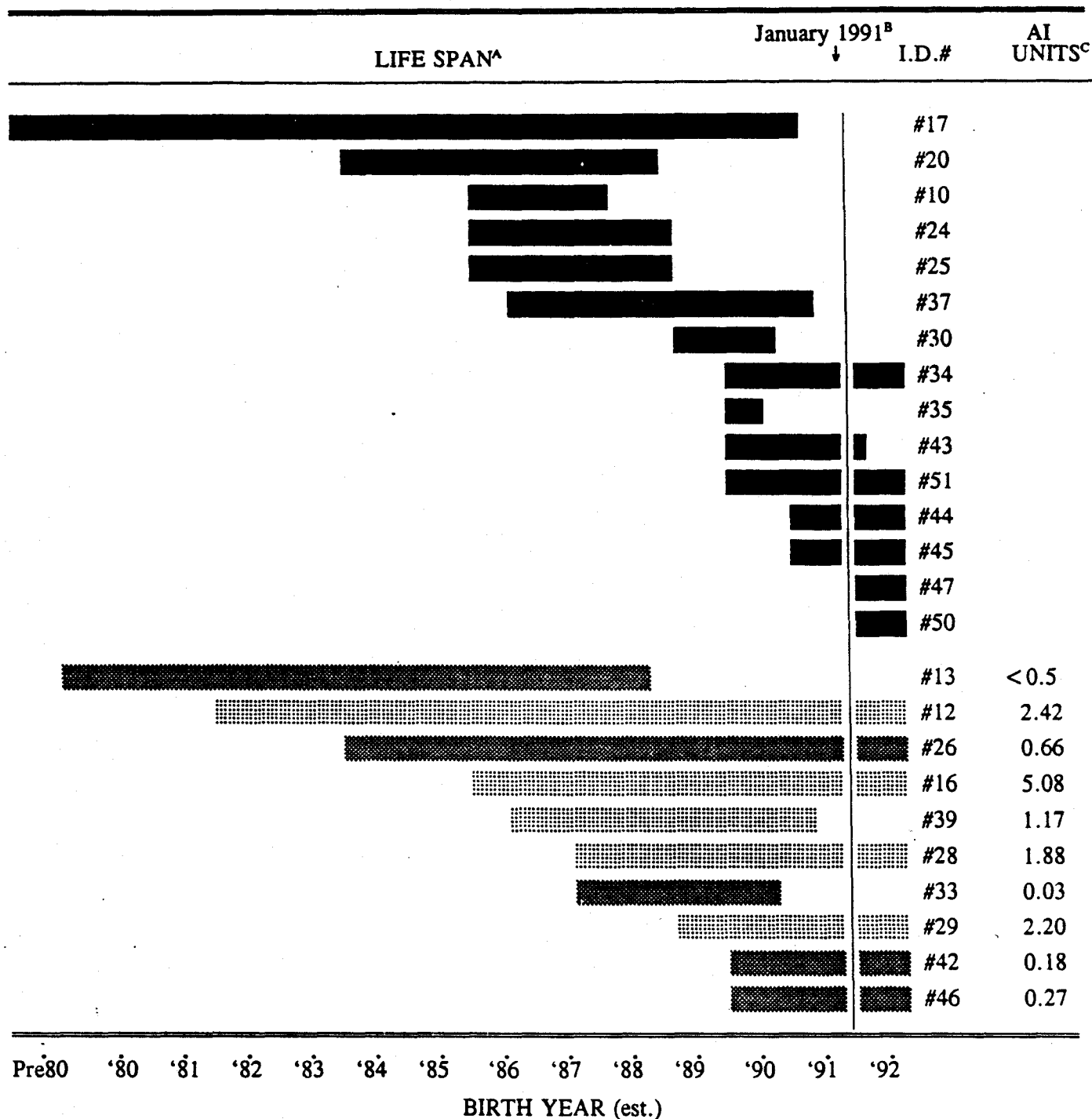


Figure 1. Decline of maternally derived panleukopenia antibody titers in neonatal *Felis concolor*.

Figure 2. Frozen semen collected from wild male Florida panthers captured between 1987 and 1992.



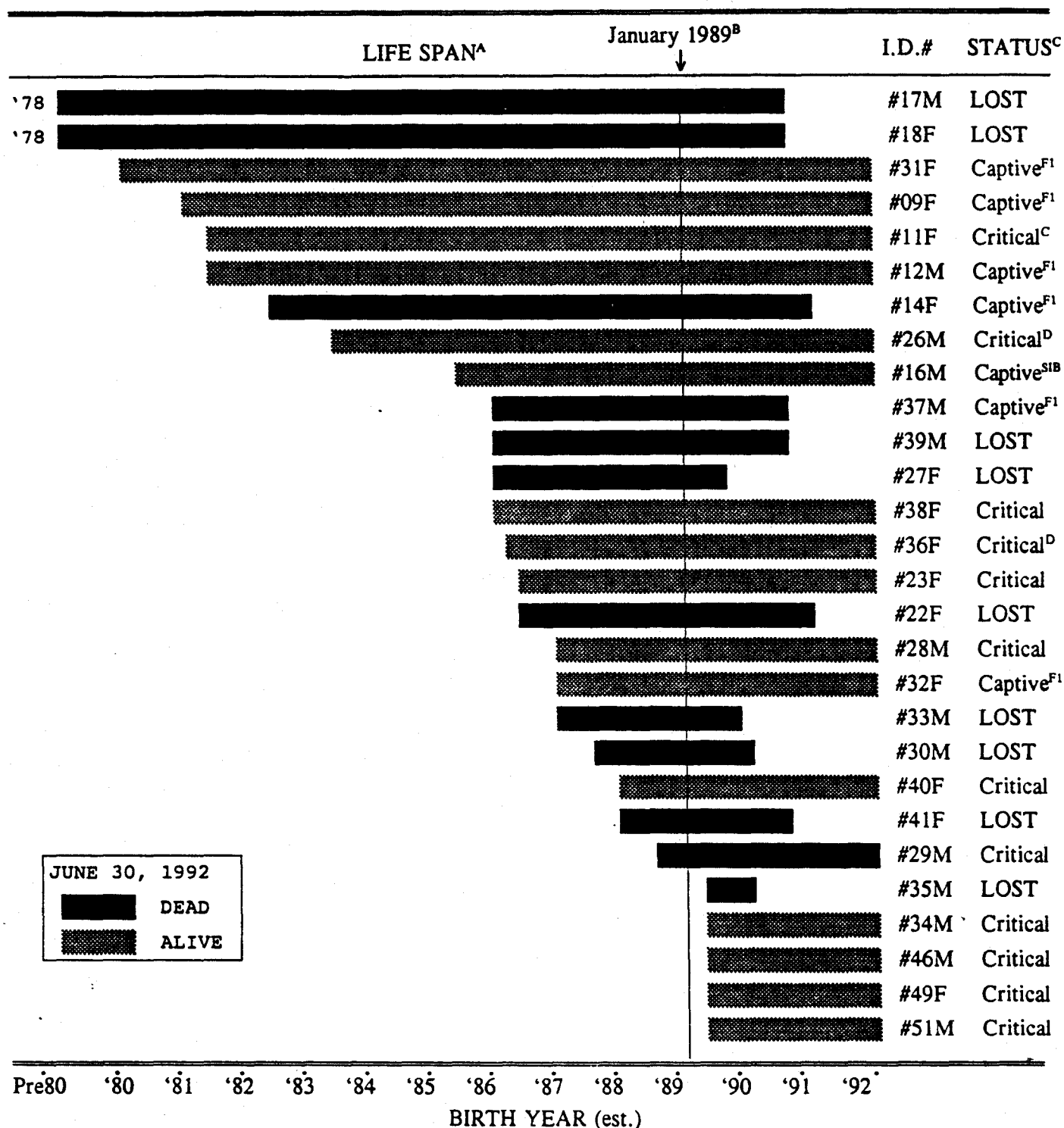
^ALength of bar corresponds to the number of years an individual panther was alive. Beginning and end of bar indicate approximate birth and death years, respectively. One inch is approx 2 1/2 years.

^BPanthers born before January 1991 should be producing sperm by January 1993 (next capture season); ≥ 2 years of age.

^CDesire a minimum of 6.0 frozen AI units/male.

[Solid bar] No sperm frozen [Dotted bar] Less than 1.00 AI Unit [Dotted bar] Greater than 1.00 AI Unit

Figure 3. Founders identified for captive breeding population, 1 January 1989 to 30 June 1992.



^ALength of bar corresponds to the number of years an individual panther was alive. Beginning and end of bar indicated approximate birth and death years, respectively. One inch is approximately 2 1/2 years. ^BPlanning for a captive breeding program and identification of possible founders started January 17, 1989. ^CLost - animal died with no known surviving decendents; Captive - F¹ or sibling (Sib) genetic representation is in captivity; Critical - no genetic representation in captivity. ^DA back crossed F² of this female is currently in captivity, however, the animal is not expected to reach breeding age due to serious heart defect. ^EMale F¹ of these founders is in captivity, but is bilaterally cryptorchid and will probably be sterile.

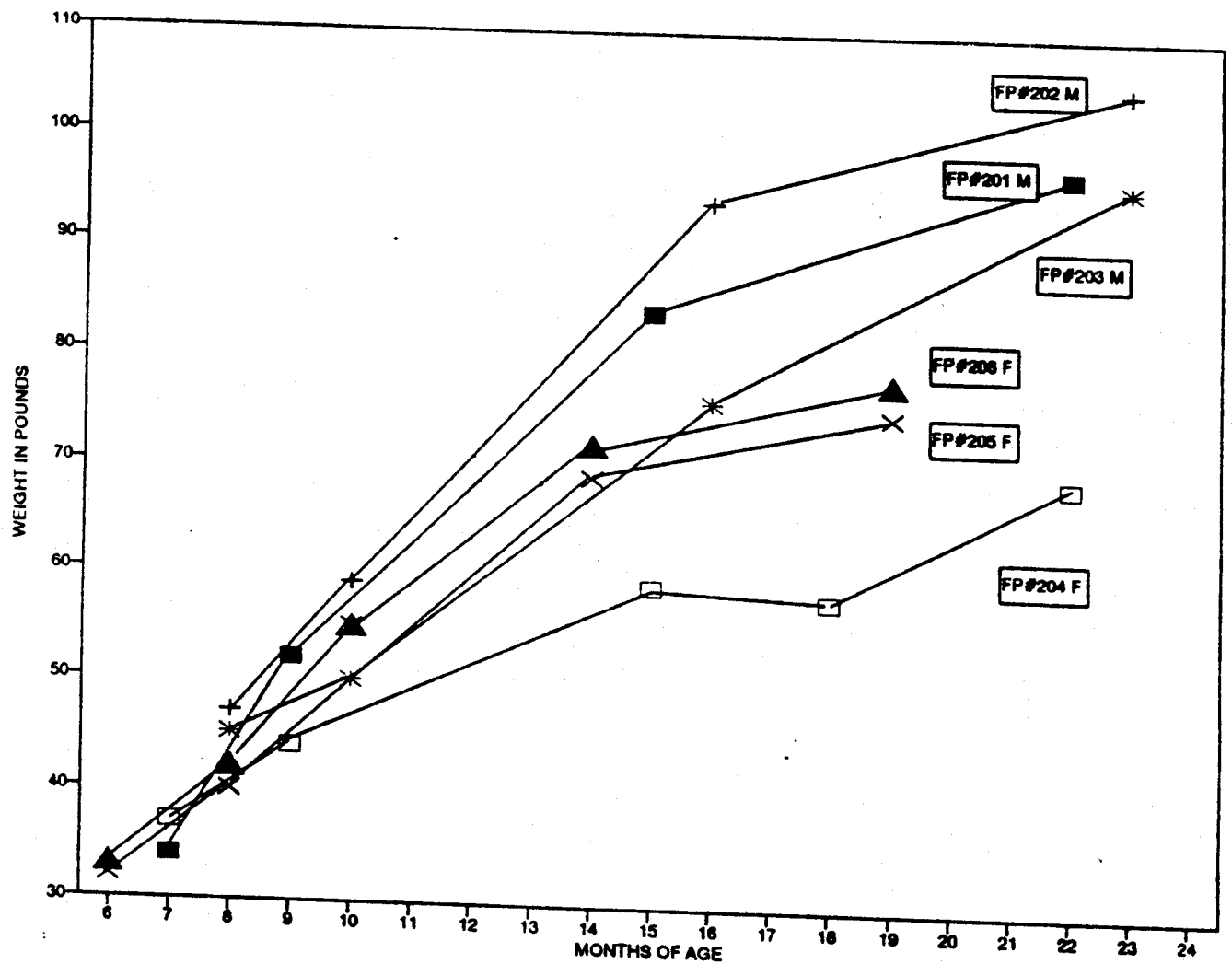


Figure 4. Growth rates of captive Florida panthers, February 1991 to June 1992.

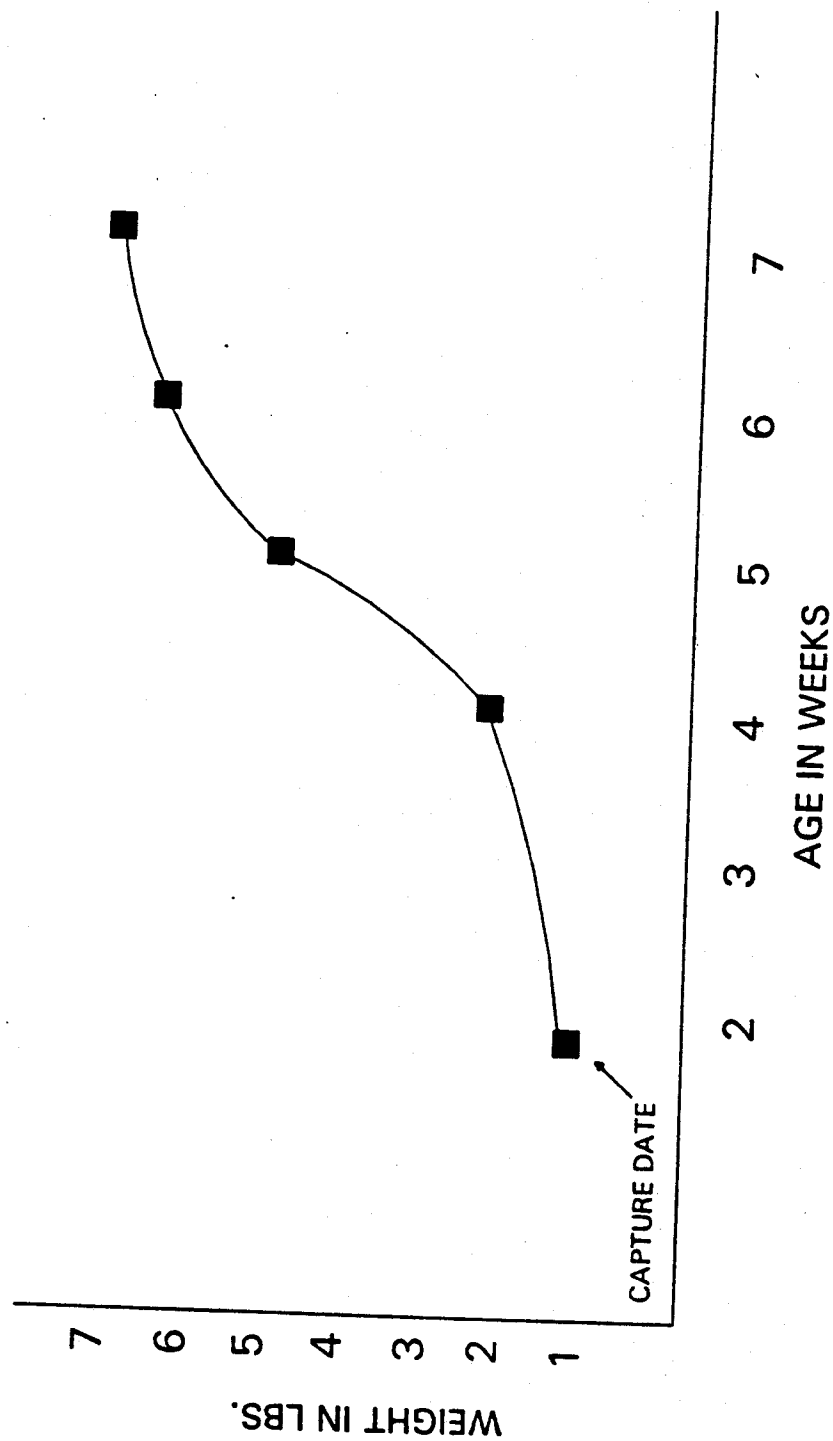


Figure 5. Growth rate of a neonatal Florida panther: #208