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"The Florida Panther Project"

Final Report

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Introduction

"Do we want 'Florida panthers' or panthers in Florida?"

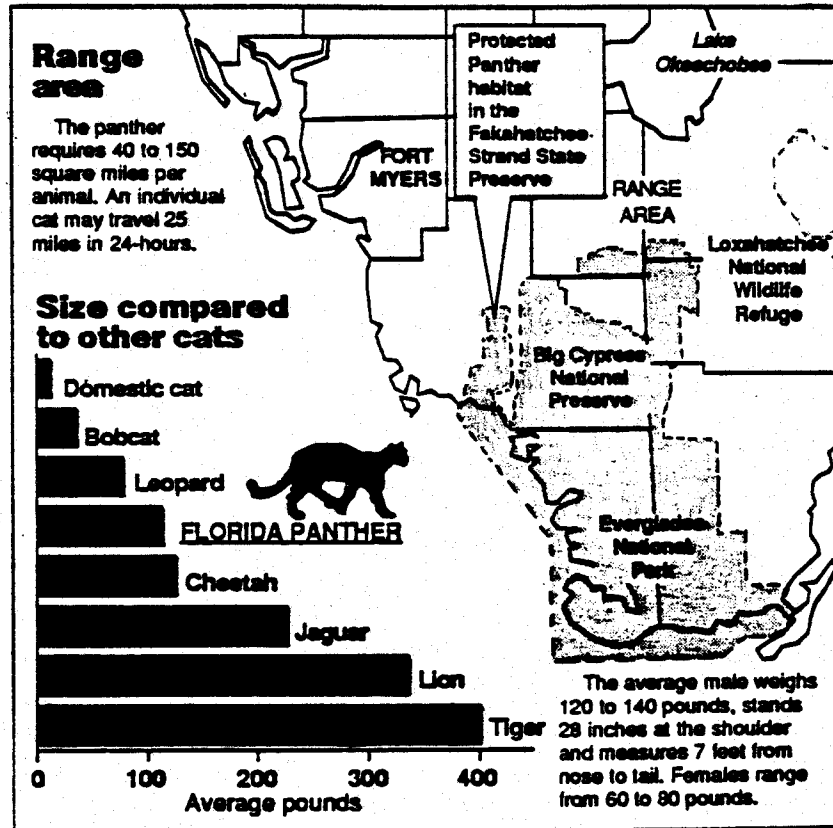
-Chris Belden, explaining that the real issue is not whether the panthers in Florida are "pure" or not, but whether we can maintain a viable panther population in the state at all, a population whose presence is very important to the overall effort to conserve what little is left of Florida's wilderness.

There are currently 27 subspecies of cougar recognized in the Americas (Anderson, 1983). The Florida panther, Felis concolor coryi, is the only subspecies left in the eastern United States. Today's estimates place the entire Florida panther population at between 30 and 50 animals.

The Florida panther was not given full legal protection from hunting until 1958 (Belden, 1977). In 1967, the U. S. Department of the Interior's first federal list of endangered and threatened species included the Florida panther as endangered. Currently, Felis concolor coryi is listed as endangered by the federal government and the State of Florida (Robertson and Bass, 1987).

The Florida Panther Project actually began in 1976, when the U. S. Fish and Wildlife Service assembled a Florida Panther Recovery Team whose task it was to develop a plan to save the big cat from extinction (Robertson and Bass, 1987). Today the administration of the Florida Panther Project is overseen by the Florida Panther Interagency Committee, which is composed of representatives from four governmental agencies: (1) the Florida Game and Fresh Water Fish Commission, (2) the Florida Department of Natural Resources, (3) the U. S. Fish and Wildlife Service, and (4) the National Park Service. There is quite an administrative hierarchy involved in this project, but this is not too surprising when one realizes that this is a multi-million dollar effort overall.

The cats themselves resemble western mountain lions to the untrained eye, but after working with them one soon sees that these cats have several physical characteristics (to be discussed later), besides their overall smaller size, which distinguish them from their western cousins. To give the reader some perspective on the relative size of the Florida panther and its geographic range, I include the following chart from "The Tampa Tribune," (Sargeant, 1987):



The Florida panther, the only subspecies of cougar left east of the Mississippi, exists in extremely low numbers confined to small portions of southern Florida.

My attention was first drawn to the biomedical aspects of the Florida Panther Project when Dr. Melody Roelke, the State of Florida's wildlife veterinarian on the project, came to Cornell's New York State College of Veterinary Medicine as a speaker for the student chapter of the American Association of Zoo Veterinarians. Her involvement in the project includes the following responsibilities (Roelke, et. al., 1986):

- 1) To assist in field work being conducted by the Florida Game and Fresh Water Fish Commission in southern Florida by insuring safe handling and proper medical management of panthers during the capture effort.
- 2) To evaluate the physical condition and reproductive status of captured panthers.
- 3) To collect and process biological material for establishment of a data base.
- 4) To determine the prevalence of selected parasitic and infectious diseases within the panther population.
- 5) To identify and initiate ancillary studies pertaining to panther health and reproduction, including:
 - a. Assess prevalence of parvovirus, calicivirus, and pseudorabies using seroepidemiology in small wild carnivores.
 - b. Use sympatric bobcat populations as an indicator of feline parasites and diseases in the panther.
 - c. Evaluation of the panthers' immune response to killed feline viral vaccines.
 - d. Determine safe and effective chemotherapeutic agents for use as parasiticides.
 - e. Develop techniques of ejaculation and cryopreservation of panther semen.
 - f. Initiate aging studies based on skeletal elements and radiographs of cadavers.
 - g. Evaluate mortality data in relationship to seasonality and age of panther at time of death.

I was (and continue to be) very impressed with Dr. Roelke's work. While visiting Cornell, she mentioned her interest in getting students involved in the Florida Panther Project. Later on in the year the "Expanding

Horizons of Veterinary Medicine Summer Fellowship 1987" was announced, and I submitted a proposal. (See Appendix II: Original Proposal Submitted for the "Expanding Horizons of Veterinary Medicine Summer Fellowship 1987.") Because of this fellowship opportunity, I was able to spend the summer exploring the biological, political, and economic aspects of this intense conservation effort.

Fieldwork

"It's not panthers who can't tolerate people, it's people who can't tolerate panthers."

-Chris Belden, explaining that panthers actually can live in areas that man is marginally disturbing, but that people still opt to kill them instead of trying to live with them.

The first exposure I had to the Florida Panther Project was in Everglades National Park, at the southern tip of mainland Florida. Working in such an ecosystem, as I recorded in my journal, was extremely exciting:

Sunday May 24, 1987

The scenery here is spectacular. What's most amazing about it is the diversity- the way new scenery pops up and disappears every few minutes as one drives around. It's sort of like the backdrop to one of those cartoons made by lazy animators. You know, the ones where Fred and Barney are running while behind them you see mountains-pine trees-lake-bushes-mountains-pine trees-lake-bushes... etc., etc. But here it's much nicer. The ecosystem changes with the elevation. Just a few inches can change everything. Hardwood forests, big cypress, 'dwarf' cypress (same species as the 'big' but stunted due to lower nutrient availability), palms, pine trees, sawgrass, willows, on and on.

Spent some time hiking and driving through the park looking for signs of panthers: footprints, scat, and "scrapes," scratched-up piles of rubble made as part of territorial scent-marking. Roy McBride, the houndsman and tracker, can spot a scrape or a track with relative ease, and can even tell the sex of the individual responsible by the scrape's size and shape. I must admit I still have trouble. Chris Belden and Deb Jansen taught me how to use the radio-telemetry equipment as we tracked a young male panther northeast of the park. Radio-telemetry is a basic tool that's often utilized in wildlife conservation research, but which is obviously not part of the veterinary curriculum! By the end of the summer, I would also be introduced to radio-tracking from small airplanes and from helicopters.

One of the interesting things about the radio-collars placed on the panthers is that the transmitter's signal changes with the cat's activity. A moving cat's signal is different from a stationary cat's.

In addition, if a cat is still for more than two hours, a "mortality signal" is transmitted. (A live panther is rarely continuously still for two hours.) Thus, radio-telemetry can contribute data on the animals' locations and activity levels.

My first two stays in the Everglades did not involve any captures. Animals were "treed" to be looked at, but no cats had to be anaesthetized. "Treeing" is the process by which Roy's dogs get the scent of a panther and chase it into a tree so it can be looked at. It's virtually impossible to catch or even just look at a panther without using dogs. One of these treeings involved the checking of two 9-month-old kittens as to how well their radio-collars were adjusted. At this age kittens are still with their mother: in the Everglades it appears that the young disperse at approximately 18 months of age. For some reason, one of the kittens became separated from the family after the treeing. This same kitten, female #23, had been separated from the family before, when the kittens were first immobilized to be radio-collared. The three cats had been successfully reunited after that by bringing them all into captivity together and then re-releasing them.

This second orphaning of the same kitten was very disconcerting to the members of the capture team. I should note that the team acknowledges that the orphaning was a result of their actions. They have learned from this: young kittens will no longer be radio-collared. While potentially important information will be lost, the Florida panther population is simply too small to risk more orphanings. A great deal of time would be spent planning and attempting another reunion of the orphaned female #23 with her family, but more on that later. Until a reunion seemed feasible, the orphaned kitten would be kept in captivity in the Everglades to be "fattened-up." The information gained from radio-tracking studies will be vital to understanding, for example, what habitat require-

ments the panther actually has and what areas will have to be set aside and protected to provide for a recovery of the panther population. There are, obviously, some risks to the individual animals during the course of such studies. As in all other aspects of a wildlife conservation project, careful cost/benefit analysis must be employed to decide what types of investigations will be most valuable to the effort overall. Is what is "good" for the population the same as what is "good" for the individual? Sometimes. Where should our priorities lie? Somewhere in the middle. The wildlife biologist and the veterinarian tend to have different perspectives on these questions: it's beneficial to have input from both on a conservation project.

My first hands-on experience with a Florida panther involved female #08, an old (11-13 years) cat who had been brought into captivity in April after it had been observed that her condition in the wild was deteriorating. Her biological value in the wild was probably zero: her reproductive years seemed to be over. The hope is that by building her up in captivity with high quality food, vitamins, parasiticides, etc., we may be able to get her to breed and produce a litter. She is the founding female for the captive breeding program of the Florida Panther Project.

Female #08 is currently in quarantine in Gainesville at the Wildlife Research Laboratory where Dr. Roelke is based. We anaesthetized her on June 9 to do a full work-up to evaluate any changes that had occurred since she was brought into captivity. This procedure gave me an introduction to what each panther goes through when it is knocked-down in the field. I was able to get my hands on the cat, palpate, auscult, and collect biological samples.

Female #08 provided for several interesting findings. I detected the first murmur found in a Florida panther: a holosystolic grade 3 out

of 6 "shshsh," loudest on the right side. This would take on greater significance when we auscultated a similar murmur in a 3 to 4-year-old male panther later on in the summer. (See "Animal's Story" ahead.) Female #08 also came up as having a slightly positive FeLV-titer according to Cornell University's N.Y.S.C.V.M. Diagnostic Laboratory. This seemed highly unlikely, and the explanation uncovered will undoubtedly be published and is the subject of Noel Lopez's (NYSCVM '88) upcoming senior seminar.

The ELISA test kit that revealed a positive FeLV result uses monoclonal antibodies of mouse cell-line origin. After a bit of detective work, we discovered that female #08 had been vaccinated with a killed rabies vaccine of infant mouse brain origin. It looks as if she had developed anti-mouse antibodies as a result of this vaccine, and that these anti-globulin antibodies accounted for a false-positive FeLV ELISA. When anti-mouse activity was eliminated from #08's serum in vitro, the ELISA came out negative. It is not confirmed yet whether the rabies vaccine was the original source of the antigenic mouse globulin in female #08. I look forward to further analysis of this situation by Cornell's Dr. Richard H. Jacobson and Mr. Noel Lopez.

The importance of female #08's FeLV status to the Florida Panther Project is clear. She cannot be transported north to the captive breeding facility, located at the Gilman Paper Company's White Oak Plantation, until she clears quarantine. The White Oak Plantation already serves as home for the male of the captive breeding program, as well as for many other endangered animals including cheetahs. Before female #08 could be moved, her vaccine titers all had to be at protective levels and her FeLV status obviously had to be confirmed as negative.

After we were done working on female #08 herself, my work was cut

out for me. I was to learn first-hand the protocols for working up the samples collected from panthers:

Spent the next several hours processing the samples we had taken: made blood smears, spun-down clot-tubes for serum, obtained a PCV, submitted EDTA tubes for a CBC/differential and serum for chemistries, and carried out the protocol for submitting samples to Dr. Steve O'Brien's lab at the National Cancer Institute. Dr. Roelke spends part of the year in Dr. O'Brien's lab looking at various plasma proteins, red cell isoenzymes, and white cell isoenzymes to try to determine the amount of genetic variability in a given group of animals. It took approximately 3 hours for me to isolate the plasma, washed RBC's, and washed WBC's that are needed for the assays. It was interesting for me to see what kind of preparation the samples need before they can be used. I had seen the samples drawn. I had processed them. Eventually I will read of the results of the analyses. The procedures I used are not used everyday in veterinary practice- they are similar to the ones used by Dr. O'Brien to unravel the cheetah's genetic history.

Another part of each panther's evaluation is a parasitological examination of blood and feces. Interestingly, examination of buffy coat smears of most of the cats reveals microfilaria of a species of Dirofilaria. Work by Forrester, et. al. (1985) indicates that the species is Dirofilaria striata, not D. immitis, although heartworm in Florida is a serious clinical problem in domestic dogs and cats.

The most common parasites uncovered via fecal examinations include members of the genera Spirometra, Ancylostoma, and Alaria. The following table (Forrester, et. al., 1985) summarizes the prevalence and intensity of parasites from 12 Florida panthers examined between 1978 and 1983:

Parasite	No. panthers		Intensity ^a		
	Examined	Positive	Mean	Median	Range
Protozoa					
<i>Toxoplasma gondii</i> (Nicolle and Manceaux, 1908) (1) ^b	5 ^c	1 ^d	—	—	—
Trematoda					
<i>Alaria marcianae</i> (LaRue, 1917) (2)	7	7	2,972	1,090	238-9,689
<i>Heterobilharzia americana</i> Price, 1929 (3)	7	5	4	3	1-7
Cestoda					
<i>Mesocostoides</i> sp. (2)	7	4	212	6	1-833
<i>Spirometra mansonoides</i> (Mueller, 1935) (2)	7	4	13	8	4-33
<i>Taenia omis</i> Lühe, 1910 (2)	7	4	7	6	1-15
Nematoda					
<i>Ancylostoma pluriidentatum</i> (Alessandrini, 1905) (2)	7	6	254	160	36-744
<i>Trichinella</i> sp. larvae (4)	7	4 ^e	—	—	—
<i>Dirofilaria striata</i> (Molin, 1858) (4) ^f	7	4	3	2	1-7
<i>Capillaria aerophila</i> (Creplin, 1839) (5)	7	2	2	2	1-3
<i>Strongyloides</i> sp. (2)	7	2	9	9	1-16
<i>Toxocara cati</i> (Schrunk, 1788) (2)	7	1	2	2	2
<i>Toxocara</i> sp. larvae (2)	7	1	25	25	25
<i>Molineus barbatus</i> Chandler, 1942 (2)	7	1	2	2	2
Arthropoda					
<i>Dermacentor variabilis</i> (Say, 1821) (6)	12	9	8	4	1-26
<i>Ixodes scapularis</i> Say, 1821 (6)	12	7	49	39	3-222
<i>Ixodes affinis</i> Neumann, 1899 (6)	12	4	5	5	1-10
<i>Amblyomma americanum</i> (Linnaeus, 1758) (6)	12	1	8	8	8
<i>Amblyomma maculatum</i> (Koch, 1844) (6)	12	1	2	2	2
<i>Dermacentor nitens</i> Neumann, 1897 (6)	12	1	1	1	1
<i>Ctenocephalides felis</i> (Bouché, 1835) (6)	12	1	1	1	1

^a Number of parasites per infected or infested host.

^b Numbers in parentheses indicate site in host: (1) blood, (2) small intestine, (3) blood vessels of liver and lungs, (4) connective tissue between muscles, (5) lungs, and (6) skin and pelage.

^c Information on *Toxoplasma* is based on serologic studies. Data on one of these negative serum samples were given in an earlier paper (Burridge et al., 1979).

^d The titer on this animal was 1:256.

^e Intensity of infection was determined for one panther that had < 1 larva per gram of diaphragm and psoas muscle.

^f Values for *Dirofilaria striata* are based on adults found at necropsy. The prevalence of this filarid is probably greater than indicated because the adult forms are difficult to locate.

The orphaned female kitten #23 had been in captivity for about two weeks when we returned to the Everglades. She appeared to be in good physical condition and had been eating very well. Dr. Roelke felt that the cat would be strong enough to endure the stress of another knock-down and a reunion attempt with her mother and sister. Her physical condition was a very important consideration in this decision. Afterall, even if the family was successfully reunited, the mother might not hunt for several days after that. If the mother doesn't hunt, the kittens don't eat anything substantial.

In order to reunite the family, the other kitten, female #22, would be brought into captivity with female #23 for 24 hours. That way they could get "reacquainted" and roll around and mix their scents together. Ideally, the next step would be to immobilize the mother (#15) and bring her to a suitable reunion site. We would then dart the two kittens and transport them to the site. The goal would be to have the three cats wake-up at approximately the same time and stay together.

All the dartings involved ketamine, at dosages usually ranging from 4-6 mg./lb. for the initial dart, depending on the physical condition of the animal and what procedures needed to be performed. Keeping an animal under an adequate plane of anaesthesia once it was on the ground involved additional doses of ketamine, a dissociative anaesthetic, IM or IV, and/or intravenous administration of a benzo-diazapine such as Valium[®] (diazepam) or the water-soluble Versed[®] (midazolam). I am not going to go into many specific dosages in my account of the knock-down procedures here, but I do have that information if the reader is interested.

When an animal is captured, Dr. Roelke collects a large variety of samples: ectoparasites, vaginal swabs, feces, urine, skin biopsies

for tissue culture and subsequent genetic analysis, dental and paw impressions for aging studies, semen via electroejaculation, and most importantly- blood. The basic protocol for the initial set-up and blood sampling is as follows:

I) When the cat is treed:

- (1) clear a working area with a machete.
- (2) put up a line to hang a Lactated Ringer's IV set-up on.

II) When the cat is on the ground:

- (1) establish temperature, pulse, respiration (TPR).
- (2) start the IV (if the animal is overheated, use extension tubing wrapped around ice-packs).
- (3) take blood samples. To do this, insert a butterfly catheter with tubing attached via an adapter to a Vacutainer™ hub.

Collect: 2 EDTA tubes (purple top)- for blood work-up, Knott's test, smears.
6 heparin tubes (green top)- for genetics.
3-4 serum (clot) tubes (red/black top)- for serology.
1 glucose tube (grey top)- optional, to examine level of stress-induced hyperglycemia.
1 toxicology tube (blue top)- heavy metals, pesticides, etc.

At the end of the procedure, draw one more EDTA tube and one more serum tube for comparison to pre-procedure values. If a male is to be electroejaculated, take a serum sample: (1) immediately before, (2) immediately after, and (3) when everything is finished. This series is for measurements of testosterone, LH, and cortisol.

Monday June 15, 1987

.... We successfully captured the other kitten today (female #22). I'm not going to go into all of the details of the capture- the doses, heartrates, temperatures, etc., although all of that was recorded. I'm going to try and convey the quickness of pace of the capture, the transport, the taking of samples....

We drove out to the area where we thought the kitten and mother were.... Upon finding, from the helicopter, that the cats could indeed be treed in low trees, Sonny and Roy flew back and picked up the dogs. They then flew back out to chase the panthers. Meanwhile, two of our vehicles drove on to a point closer to where the cats were. The chopper came back for us.... We loaded equipment into the helicopter, keeping in mind the invisible vertical blade in the back.

I should mention that Dr. Roelke has all of her essential equipment

organized in a system of backpacks. We can take everything we might need, from blood-collecting supplies to the electroejaculation equipment to emergency drugs, right into the field with us.

When I got to the site, the dogs had treed the kitten and the mother. The team was around the base of the tree where the kitten was perched. Roy and Melody were loading the Tel-injectTM rifle with a dart containing 200 mg. of ketamine. I came into the thickly wooded area to help surround the cat. Indeed an unpleasant experience for the animal, but a temporary one....

Roy darted the cat perfectly in the hip. As she went out (about 5 minutes), I went out of the dense woods to clear an area with a machete for our 'emergency room.' Tommy the chopper pilot carried the cat out of the woods and laid her down. I got out 'leeches' (the pack with all the venipuncture supplies) and we set-up an IV. Some protective boric acid ointment for the cat's eyes; the insertion of a thermometer; a stethoscope in hand (in ears); ice ready to help cool #22 off.

One of the biggest risks in capture, especially in this heat and humidity, is that the cat will overheat. Dr. Roelke was well prepared to deal with that. Extension tubing on the IV line was wrapped around a chemical cold pack; a cooler of ice was a source of cubes to put on the cat (in between her legs, on her paws, etc.). The cat's temperature was kept within a safe range. Captures are carried out early in the morning. If the ambient temperature goes above 76°F, a capture attempt will most likely be aborted.

The IV was running into one of the kitten's cephalic veins. We drew blood from a medial saphenous vein. Several samples were obtained and the cat given about 400cc of fluids before we were ready to move her into the lab. I held the IV as we carried her into the helicopter. Dr. Roelke and I held her and monitored her on the early morning chopper ride back to the Research Center. I did not have time to notice much of the green landscape I knew was below me. I was monitoring the cat's heartrate and respiration, and keeping an eye on the IV-line.

Back at the lab, we had to give the cat more ketamine and some Valium[®] as she was being worked on. More blood was drawn, teeth and paw impressions were made, skin biopsies were taken, a fecal sample obtained, more IV and sub-Q fluids were given, body measurements were taken, and the radio-collar was changed....

No murmur in this cat. I find ausculting in this situation very useful. I could hear the heartrate increasing as she periodically started to wake up. A heartbeat is very real, very tangible and immediate. That series of sounds can tell you so much. It told me that this kitten was doing fine.

We now had both kittens in captivity. The next day was the reunion effort,

involving the anaesthesia of three Florida panthers and a good deal of logistics:

Tuesday June 16, 1987

.... Got up at 4:30 AM. Rinsed the dart needles which had been soaking in Nolvasan® all night with sterile saline. Filled the ice-chest with ice. Collected all of the equipment and supplies that had been charging (i.e.- digital thermometer) or refrigerated (i.e.- long-acting tetracycline) and got it organized. Brought some extra buckets of ice-water which would later become very useful in cooling down the cats as the sun came up.

Final strategy was discussed over mobile mugs of coffee. Nine people were involved. My primary responsibility was assisting Dr. Roelke and Dr. Scott Citino (of the Miami Metrozoo). Sonny and Roy flew with the two dogs to where the mother cat (#15) was thought to be. Roy's dogs quickly found her trail and successfully treed her.

Meanwhile, we'd laid out equipment and ice-water at both the kitten pen and the final release site. We then proceeded to drive on trails through the woods as near to the treed cat as possible. We then hiked into the woods, everyone carrying at least one backpack of equipment.

At the base of the tree where the cat was perched, the team immediately began setting-up. We put up the IV sets, hanging them from a line tied between two trees. The 'leeches' pack was unrolled so blood could quickly be collected. Heparinized saline was drawn up, to be used to maintain a patent catheter.

When the basic medical area was set-up, I joined the people stuffing the crash-bag with air-filled plastic trash bags. It sounds crazy but it really works. That cat was 50 feet in the air. She was either going to fall when the ketamine took effect or else someone was going to have to climb up and untangle her from the branches.

With the 15 foot by 15 foot crash-bag underneath her to break her fall, we were ready to dart her. Melody loaded the dart with 430 mg. of ketamine. About 5 mg./lb. is a good place to start, but this cat (estimated to weigh about 80 pounds) had a history of bolting upon hitting the net so the dose was increased a bit. Roy hit her in the hip and she quickly knocked the dart out. The drug had been injected though. We watched the cat get more and more unsteady over the next five minutes. She slowly started to slip, holding on finally by just her front feet until she fell- right into the middle of the net we were supporting over the crash-bag. I should note that I later discovered that everyone secretly thinks to themselves, 'Gee, it looks like that cat is going to fall right on me!'

Once the cat was in the net we had to really hold her down for a few minutes. She was still fighting it- and growling. When the ketamine had fully taken effect, we carried the cat to the 'medical clearing' and began the work-up.

During the work-up, we found several bite- or claw-marks around the female's neck and forelimbs. Was this the work of a male panther? A mildly bloody vaginal discharge was noted. Could this female have been in estrous while still with her 10-month-old kittens? We still don't know. Gestation in panthers is approximately 3 months.

I took one end of the stretcher and Sonny took the other. Getting female #15 back to the road was no small feat. If you've never seen pinnacle rock, it's hard to imagine what it looks and feels like. Much of southern Florida is limestone. Many sink-holes have been created by erosion over time. What results is a crater-laden landscape covered with holes deep enough to break a leg in with no difficulty at all. Many of the holes are well concealed by ferns and palmettos- as if they were traps set by natives to catch the unwary field scientist. As Dr. Citino monitored the cat, we carried her back to the road.

We got her into an air-conditioned van and Scott and I monitored her as we were driven to the reunion/release site. I constantly monitored vital signs. (My stethoscope will never be the same after the rocks, water, and mud it met this summer.) At one point she was getting much too light. I had her blind-folded with a towel, but she really began to struggle. Although still too drugged to be intentionally dangerous to us, struggling raises body temperature and that we wanted to prevent. We stopped the van and Melody, who was in the truck behind us, prepared some ketamine and midazolam which Dr. Citino administered. These relaxed the cat quickly.

At the release site, Dr. Citino opted to keep the cat in the air-conditioned van until the actual reunion. After bringing Scott's medical bag and oxygen tank out of the forest (where we'd had it laid out for the release) and into the van, I drove off in a truck we had parked there earlier for this very purpose. It was a sort of relay race. I sped down the trail through the thick Brazilian pepper and poison-wood to get to the kittens to help Dr. Roelke in their knock-down and translocation.

This is where things got somewhat hectic. We darted the first kitten (#23) at 9:00 AM. The ambient temperature was already 80°F. Her temperature shot up rather quickly, all the way to 106.4°F. Subcutaneous fluids, lots of ice and ice-water, and later an enema were used to cool down #23.

The second kitten (#22) was soon darted and so we had both cats to monitor and work-up at the same time. With the heat to deal with the ice went quickly. Peggy, there to jot down notes on what was being done with each animal, donated the shirt off her back to use as a wet towel on the febrile felines.

I should reemphasize that part of Dr. Roelke's work-up is for gathering information that will eventually be helpful in handling these cats more efficiently and even more safely. Dr.

Roelke has never lost a panther. Blood work-ups can help show what the drugs are doing at different dosages. However, sometimes a complete work-up is not in order. Time is more important. Dr. Roelke sizes-up each capture situation and decides how long the cat can and should be kept down under anaesthesia. She has only their safety and well-being in mind.

Both cats' temperatures were brought down to normal relatively quickly. I carried female #22 into the truck and Roy held her IV bag. Chris and Peggy held a very active #23 next to me. As we contorted our bodies to balance ourselves and the cats on the tail-gate, Sonny drove us to the release site. I had #22 by the scruff of the neck and covered her eyes from the sun with Roy's hat. Within a few minutes we were at the release site. IV's out. Catheters removed. We brought the kittens into the Brazilian pepper (Schinus) release area and lay them out. Temperatures were taken, heartrates checked. Respiration rates were good. One final bath in ice-water for the threesome before we left them on their own to wake up without disturbance. It looked as if the mother would wake up last, increasing the chances of the family all staying together. If the mother woke up first, there would be an ~~increased~~ chance that she'd abandon the drugged kittens.

Everything seemed to have gone amazingly well. We were finished by 10:00 AM. That evening, radio-telemetry showed the three cats to still be together.

I wish that was the end of the story. The family did not stay together. After a few days it became clear that the same kitten, #23, was no longer with her mother and sister. We may never know why they did not stay together. Different reactions to the anaesthetic? Actual rejection by the mother after the two week period of separation? We simply don't know. The family had been successfully reunited before after a similar period of separation.

After 6 days, the decision was made to recapture female kitten #23 and to bring her into captivity. Overall, she looked pretty good for having been on her own for several days. We gave her 2cc. of iron dextran IM divided into two sites, 3cc. of subcutaneous B-vitamins, and 90cc. of Aminoplex[®] amino acid/vitamin supplement IV.

The Florida Panther Interagency Committee met that same week. There was much debate as to #23's fate. Should another reunion be attempted, perhaps this time by introducing a fully conscious kitten into the area where her mother and sister are? Should she be used for captive breeding? That would cause even more controversy. The Everglades population of cats is suspected of having been mixed with introduced western cougars in the 1960's (Williams, 1978). Cats in the "Big Cypress National Preserve/Fakahatchee Strand/northern private lands" ecosystem seem to be a more homogeneous group according to Dr. Roelke. These cats tend to have kinked tails, cowlicks on their backs, and many males are cryptorchids (have only one descended testicle). There is a distinct possibility that these Florida panthers are actually quite inbred. Dr. Roelke has already demonstrated a high percentage of abnormal spermatozoa in the males from that area that she's electroejaculated. She hopes to clarify this situation with the genetics work to be done at the National Cancer Institute. It will be a while before it is clear which cats would be ideal for the captive breeding program.

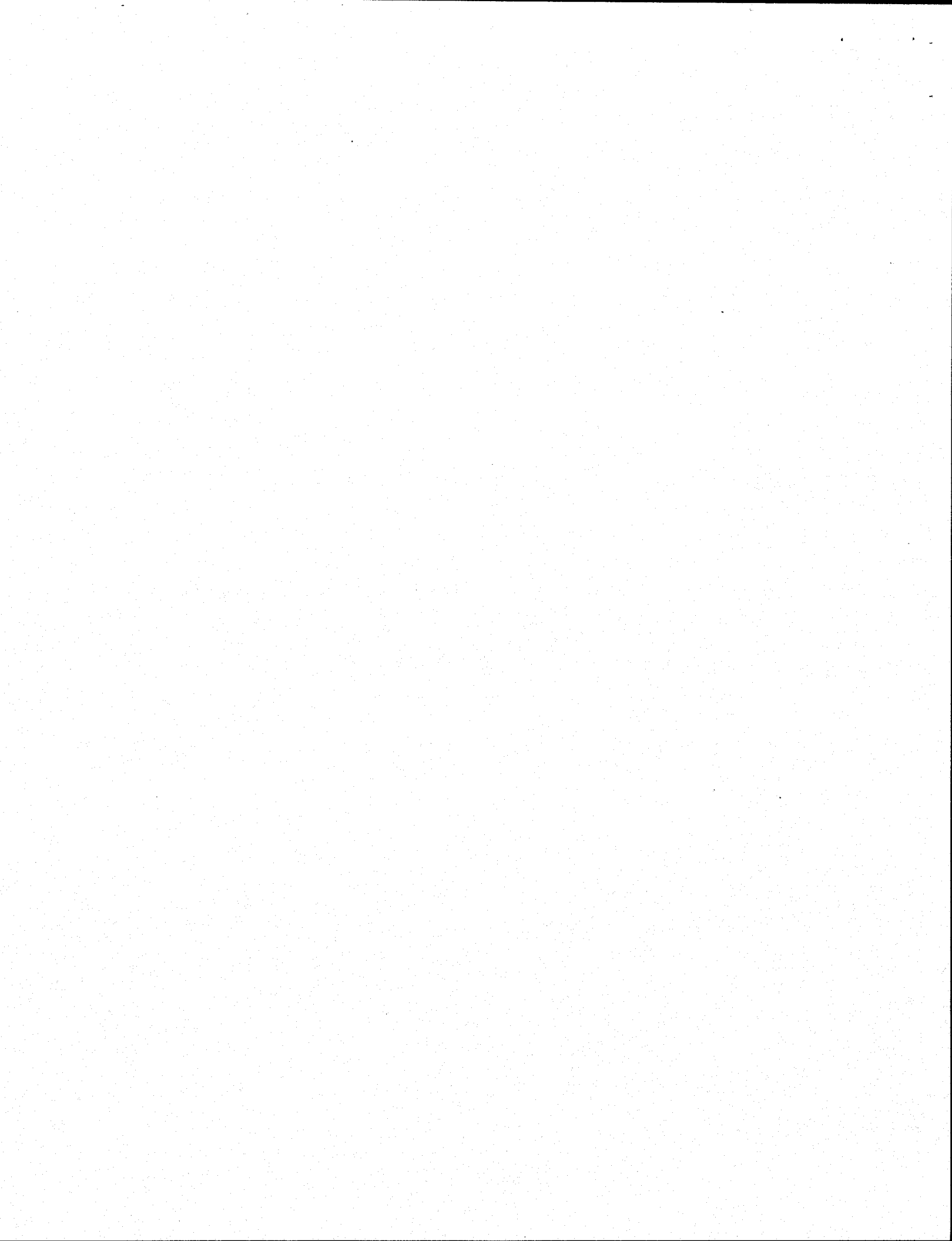
For now, the Florida Panther Interagency Committee has decided that #23 will be kept in captivity with the hope of eventual re-release when she's old enough to fend for herself. After her series of vaccinations (rabies, feline viral rhinotracheitis, calicivirus, and panleukopenia) and quarantine evaluation period, she will be brought to a specially-built enclosure at the White Oak Plantation. There she will be kept as wild as possible, with live food, maximal space, and minimal human contact. Not exactly a success story, I must admit. But not a total failure either. The Florida Panther Project has learned a lot from this experience. Perhaps female #23 will be successfully re-

released some day, and will actually have benefited from the preventative medical care she's receiving.

Animal's Story:

A Florida Panther's Recovery After Being Hit by a
Truck

Since 1972, 14 Florida panthers are known to have been hit by motor vehicles and 11 of these animals died. With an estimated population of between only 30 to 50 animals, Felis concolor coryi simply cannot continue to sustain such losses.



When I came to Florida to work with wildlife veterinarian Dr. Melody Roelke on the Florida Panther Project, I expected to and did work with the Panther Capture Team in Everglades National Park. I expected to and did work with the panthers involved in the captive breeding program in northern Florida. I did not expect to spend 7 weeks working with Florida panther male #20, the largest Florida panther known alive. As a veterinary student working on the Florida Panther Project, my association with Florida panther male #20 was a professional one: he was hit by a truck and became our patient for 7 weeks this summer.

We were still in the Everglades when we got the call at 7:30 in the morning. A radio-collared panther had been hit by a motor vehicle on State Road 858, north of the Big Cypress National Preserve. Details were sketchy. The fact that he was radio-collared made all the difference: if he hadn't been, the rescue team might never have found him.

Dr. Roelke, tracker Roy McBride, one of Roy's tracking dogs, wildlife biologists Chris Belden and Sonny Bass, and several hundred pounds of capture and rescue equipment were immediately dispatched in two helicopters to the site of the accident. Meanwhile, I drove north to the Miami Metrozoo, the zoo hospital being the best place to bring the cat if it was felt it needed treatment. In addition, our crew from the Everglades was being met by wildlife biologists from the Big Cypress National Preserve.

Within 2 hours a helicopter carrying Dr. Roelke, wildlife biologist Dave Maehr, and Florida panther male #20 landed in an unused parking lot at the Miami Metrozoo. Zoo officials had been alerted and everything was ready at the hospital.

We carried #20 into the back of a Metrozoo pick-up truck. We used our bodies to keep him off the hot metal of the truck bed. Dr.

Roelke had gotten an IV running soon after they had captured him. Apparently #20 kept running after being hit by what ironically turned out to be an off duty Florida Game and Fresh Water Fish Commission officer. The capture team caught #20 after Roy's dog was able to chase him up a tree. Dr. Roelke could see that the animal had at least several large road burns on his back and left arm. The decision was made to dart him with a dose of ketamine just strong enough to safely get him out of the tree.

Back at the hospital, #20 weighed in at 142 pounds. This big cat, radio-collared in March of this year, is estimated to be only 3 to 4 years old. External examination showed that he indeed had all of the unique characteristics often attributed to the subspecies Felis concolor coryi: a kinked tail (radiographically found to be due to a deformed coccygeal vertebra); a cowlick on his back; a palpable umbilical hernia; cryptorchidism (only one descended testicle), and white spots around the head and neck (actually most likely scars from tick-bites). New to the list may be a congenital heart defect. #20 has a grade 3 out of 6 systolic murmur, loudest on the right side, which to me sounded much like the one we found in Florida panther female #08 discussed earlier. But more on that later.

The cat seemed to be breathing without difficulty and his heartrate was normal. At first he was overheated so we cooled him down with ice. After we got him onto gas anaesthesia (halothane), his temperature dropped to below normal so we took him back outside. Eventually we got his temperature relatively stable at about 102.4°F.

The main concern was the panther's left front leg. Dr. Scott Citino, the zoo veterinarian, suspected a metacarpal fracture. There were areas of badly abraded skin on his right front leg and on several places on his sides and back. We later found out that the truck had

dragged the cat 50 feet along the road before it could come to a stop!

The left front leg was radiographed from several angles and no fractures were seen. Meanwhile, the cat was continuing to get fluids. In addition, Dr. Roelke administered an IV corticosteroid (Cort-SolTM: prednisolone sodium succinate) to reduce trauma-induced edema, deal with the potential onset of shock, etc. #20 was given antibiotics: 1400 mg. of oxytetracycline intramuscularly and 1920 mg. of a trimethoprim/sulfa combination (Di-TrimTM 48%: 80 mg. trimethoprim and 400 mg. sulfadiazine per ml.) subcutaneously, as some of his wounds were badly contaminated.

The main wound was a deep abrasion with punctures over the left carpus- some extensor tendon was exposed. Dr. Citino flushed the wound thoroughly with a Betadine[®] (povidone-iodine) solution, dressed the area with Silvadene[®] (1% silver sulfadiazine) cream, and bandaged the leg. Florida panther male #20 would need to be anaesthetized 9 more times during his stay at the Metrozo, as this carpal wound required a lot of work as it healed.

The cat's lungs did not sound normal: auscultation revealed hoarse crackles upon expiration. Thoracic radiographs revealed multiple areas of increased density, believed to be trauma-related contusions. At one point his respiration seemed seriously compromised and the doctors decided to intubate the animal. Once the endotracheal tube was in place, a suction tube was inserted through it and some bloody mucous was withdrawn. More importantly, however, a coughing reflex was elicited which allowed #20 to cough up a fair bit of clotted blood and mucous. His breathing actually sounded much better after that.

The decision was made to let him rest under observation. We

drove him to a cement enclosure normally used as a bear cubbing-den at the zoo, and put him down on the hay-covered floor. This enclosure was all that was available. A specially designed enclosure is badly needed for panthers requiring hospitalization. #20 did a lot of damage to his teeth, mostly by chewing on the cement walls, during his stay in captivity. Extensive root canal procedures were eventually necessary in all 4 canine teeth due to this self-inflicted damage. Eventually we were able to put a heavy rubber covering on the main areas he was chewing, but by then much of the damage had been done. This is a wild animal, not a zoo animal, and it has become clear that special facilities need to be built under the direction of the Florida Panther Interagency Committee. Another problem with this enclosure was poor ventilation. A ceiling fan placed over the skylight helped a bit, but #20 still spent most of his time in captivity laying in the puddle near his continuously flowing water bowl just to keep cool. Needless to say, this constant wetness made maintaining a functional bandage somewhat difficult.

Before I go on with my narrative on the management of this magnificent animal's case, some historical information would be useful. Since 1972, 14 Florida panthers are known to have been hit by motor vehicles and 11 of these animals have died. With an estimated population of between only 30 to 50 animals, Felis concolor coryi simply cannot continue to sustain such losses. The majority of all known panther deaths are due to motor vehicles, while the second leading cause of death is illegal shooting (Roelke, et. al., 1985).

Obviously the panther is in trouble because of humans. Florida is growing at an astronomical rate, with almost 1000 people a day moving into the state. With more people there will be more traffic, and there will be more panthers hit by vehicles. The state is attempting

to do something about that. State Road 84 (Alligator Alley), a known major panther crossing zone, is scheduled for expansion and it has been decided that several million dollars will be spent to build a system of fences and tunnels which are intended to "force" panthers and other animals such as deer to cross under the road. Whether the panthers will actually use the tunnels remains to be seen: hopefully they will.

Another obvious threat to the Florida panther is habitat destruction. With development out of control in the state of Florida, and with a citrus industry creeping farther and farther south each year, vital panther habitat is under siege. Keep in mind that the threatened lands are not "just" panther habitat. The Florida panther is a signal, a representative of what's left of Florida's wilderness. By trying to save the Florida panther, we're trying to save entire wilderness areas. Yes, many people are fascinated by the Florida panther all by itself, but the conservation implications of the Florida Panther Project are much broader than that. The panther is an animal that people can relate to, that they can picture in their minds even if they never actually see one "in person." By encouraging public awareness of the panther's plight, the wild lands that are the panther's home may be saved for future generations to appreciate and enjoy. If the Florida panther goes extinct, the world will have lost much more than one subspecies of cougar.

One of the successes of the Florida Panther Project has been an end to hunting of deer and wild hogs in Collier County's Fakahatchee Strand, an area where Dr. Roelke found that panthers were in relatively poor physical condition, living more off of armadillos and raccoons than the preferred deer and hogs (Roelke et. al., 1986). Hunters were competing with panthers for the deer and hogs, and the panthers

were the losers. The decision to ban the hunting of large game animals in the Fakahatchee Strand, a patchwork of state and private lands, has created much controversy, enraging many members of the hunting sector. According to Florida Game and Fresh Water Fish Commission Chairman Thomas L. Hires, Sr., "The Strand has produced high numbers of deer in the past and can be managed to do so again. When the deer and hog populations improve to the point where they will support the panther as well as hunting, we can consider opening the area to hunters again." (Ball, 1987.) At least for now, panthers (and deer and wild hogs) in the Strand will have one less threat to deal with.

It's not a new story. People verses wildlife. I'd certainly been exposed to conflicts between humans and animals while in East and Central Africa (Osofsky, 1985 and 1986a), but to experience this type of tug-of-war in a "developed" country was somehow even more disheartening. I guess it seems that here we have more of a choice.

Back to Florida panther male #20. While it's contrary to official Panther Project doctrine, #20 has a nickname: "Animál." Mexican trackers out west reportedly refer to a big cougar as "animál" upon spotting tracks, and the concept, well, got translocated to Florida. Animál had been given this name by the people who first tracked him, because he was simply so big.

Animál did not eat in captivity for over a week. According to professional tracker Roy McBride, this is not unusual. Healthy cougars may not even eat for two weeks after they've been brought into captivity (McBride, personal communication). For the first few days, Animál looked like he was indeed in pain. He was depressed, breathing heavily. He'd gotten his bandage off by himself the first day. By the third day, the skin around his carpal injury looked yellow, necrotic.

We gave the cat some more time. His breathing and attitude slowly improved. One must keep in mind that this is a wild animal. To do anything with him involves general anaesthesia, which is always a risk. Often doing very little except observing is the best medical option when handling is so stressful for an animal.

On his fifth day in captivity, he was darted with 1400 mg. of a long-acting form of the antibiotic oxytetracycline. We began giving him Valium[®] (diazepam) as he started trying to escape and abraded his face. We started him on 3.0 mg., once or twice a day as needed. The diazepam was intended to keep him calm so he wouldn't hurt himself, and to stimulate his appetite. When Animal did start to eat and get progressively stronger, the dose of diazepam he needed increased. We soon had him on it every twelve hours: by mouth if he was eating, blow-darted in if he wasn't. (I was given the opportunity to make and shoot blow-darts, thanks to the zoo's Mike Gerlach and Dr. Citino.) The week before we released him, his seventh week in captivity, #20 was on 15 mg. of diazepam twice a day.

Six days after his accident, Animal was anaesthetized via dart with 350 mg. of ketamine for reevaluation. That works out to only about 3 mg./lb., but it was enough given Animal's debilitated state. He'd lost 25 pounds in one week- he was down to 117 pounds. That was absolutely amazing to me. Dr. Citino used a Water-PikTM with a 0.2% Nolvasan[®] solution to flush and help debride the wound over the carpus. He used a scalpel to debride the perimeter of the injury until it bled. The defect left was 3 inches long and 2 inches wide. A Penrose drain was put in place, silver sulfadiazine cream was applied, and the leg was bandaged again. At one point the cat was getting hypothermic, so we microwaved the IV fluids to above 100°F before administering them.

We also used heating pads and bags of hot water to bring the cat's temperature back up from 96° F. Before we brought the cat back to his enclosure, we administered B-vitamins, Aminoplex[®], and iron dextran. We brought his hydration status back up to normal, as he was still not drinking on his own.

We took a swab from within the wound for culture and sensitivity. A β -hemolytic Streptococcus, Proteus mirabilis, Klebsiella pneumoniae, and Aeromonas hydrophila were all isolated. The organisms were all sensitive only to chloramphenicol and a trimethoprim/sulfa combination. We decided to put him on trimethoprim sulfadiazine, 960 mg. IM, BID (intramuscularly, twice a day) by blow-dart. (We were concerned about the potential for nephrotoxicity, especially given the acidity of carnivore urine and the often dehydrated state of this animal. Another culture and sensitivity two weeks later showed a light infection with trimethoprim/sulfa-resistant Klebsiella pneumoniae, Proteus mirabilis, Escherichia coli, and Clostridium sordellii. At that point Animal was put on the cephalosporin cefadroxil, 12 mg. orally BID; cephalothin by dart if he wasn't eating.)

Ten days after being taken into captivity, Animal ate:

Learned some important stuff today. Not medicine, but something a wildlife veterinarian should know how to do. Dr. Roelke got male #20 at Metrozoo to eat about 5 pounds of venison. Previously he had only partially chewed on rabbits provided for him. She was very patient. She used a long stick with a hook made from coat-hanger wire taped to it. Cubes of meat, about 2 to 3 inches square, were placed on the end of the hook one at a time.

The cat knocked the stick away with its paw the first five or six times. Very frustrating. It didn't look like he was going to eat to me. But she was persistent. I watched the cat as he grabbed at the stick with his mouth. He tasted the meat, chewed it, and swallowed it. His dealings with the stick underwent a transition. The mouthing he did changed from a hostile character to a hungry one. During this time

Melody made her 'cat noises.' Purrs and peeps, purrs and peeps (i.e.- 'cheetah peeps'). Sounded funny, but it really seemed to work. She got almost 5 pounds into the cat. Towards the end he was getting pretty full. To get him to open his mouth, she changed her approach. She hissed at him. When he opened his mouth to hiss back, she put the meat in. He then held it as she withdrew the stick. Patience, communication, and persistence all worked together. It quickly became obvious that the cat knew the stick meant food. He lay down with his head on the ground and waited for the tender morsels, as would Caesar awaiting grapes from a servant.

This was a turning point. After this we were able to get the cat to eat more and more using the same technique. Animal rarely showed much interest in meat simply put in his enclosure: he got used to eating off the stick.

A reevaluation of his leg 11 days post-injury revealed a clean wound with good vascularization but no granulation tissue grossly visible. By this time he'd badly damaged his canine teeth on the cement enclosure. He also occasionally bit at the bars in the chute where we shifted him to feed him. His claws were almost completely worn down. Why were we keeping him in captivity? That's a valid question, one we constantly had to ask ourselves. Could he survive if we let him go right now? What if we had never brought him into captivity? The fact is that this leg wound was very deep and very prone to infection. His injuries were caused by humans, not by another cat or item of prey. If he had not been taken in, his leg could easily have become gangrenous. A wild panther with 3 legs isn't going to last too long. We couldn't take that chance and we did have excellent facilities available to treat him. Still, he did

seriously damage his teeth in captivity. Every decision we made with this animal involved a cost/benefit analysis. Overall, I think we did well. Only time will tell, now that he is back on his own in the wild.

As I mentioned earlier, Florida panther male #20 needed to be kept sedated to minimize self-injury. He was most active early in the morning before sunrise. His drive to free himself was incredible: he seemed to sense no pain when he repeatedly rammed his head into a corner. This was a wild animal who'd never been confined before. What could have been going through his mind? I thought about that quite a lot. When it was light out, he'd jump towards the tiny windows instinctively. An intrinsic desire to be free, a will so strong, so driving. I wished I could explain to him that he'd be free again, but of course I couldn't. Diazepam was the best thing we could offer.

In "Some Thoughts on the Roles and Responsibilities of the Modern Zoo" (Osofsky, 1986b), I gave my perspective on what the contributions of a truly progressive zoo can be. Now I must add one more. The Miami Metrozoo has worked with the Florida Panther Project on 2 injured panthers now, and the partnership has been mutually rewarding. The Panther Project gets access to excellent hospital facilities and medical personnel in south Florida, while the zoo gets a chance to significantly help a native endangered animal. The enthusiasm and concern of the Metrozoo staff is truly inspirational. It seemed odd at times that in a zoo so much attention was focused on an animal from this country. Wildlife rehabilitation is really coming of age in the United States as of late, but I don't know of many facilities that are properly equipped to handle a large carnivore. The Miami Metrozoo has become integrated into the Florida Panther Project. A prime example of "zoo-wild cooperation!" The zoo is helping to keep Florida panthers in the

wild, hopefully precluding a scenario in which the only members of the subspecies left are in captivity.

On July 2, 16 days post-trauma, we found that #20's wound was granulating in. The cat had had his bandage off for several days. We flushed out the wound, packed it with sterile povidone-iodine-impregnated cloth strips, covered it with silver sulfadiazine cream, and rebandaged. This time the bandage was anchored to the leg by suturing it to pieces of red rubber feeding tubing which served as stints sutured to the animal's skin. If this animal and his wound could have been kept clean, one might have preferred to have left it open. Not being able to handle this animal without anaesthetizing him made bandaging the best option.

I found #20's undescended testicle via palpation-it felt relatively close to the abdominal wall. I could feel the epididymis too. Dr. Hornbuckle would be proud.

Over the course of #20's stay at the zoo, we evaluated his heart further. Radiographs hinted at some enlargement of the right heart. Two-dimensional ultrasound, as interpreted by University of Florida veterinary cardiologist Dr. Robert King, showed an enlargement of the right atrium and bubble contrast studies pointed to regurgitation from the right ventricle into the right atrium. An ECG (electrocardiogram) confirmed a right axis deviation. I did find microfilaria of a Dirofilaria species on buffy-coat smears, but we're convinced it's D. striata, as we never found any evidence of adult heartworms and immunological assays pointed away from D. immitis. Putting this all together, and given the fact that #20 is a relatively young animal, Dr. King suspects a congenital tricuspid valve defect. We can't prove

the problem was congenital. And we certainly have no proof right now that it's genetically-based. But given the other characteristics of this northern subpopulation of Florida panthers, it's strongly suspected that there might be an inbreeding problem. As discussed earlier, Dr. Roelke has already demonstrated a high percentage of abnormal spermatozoa in the semen of male Florida panthers that she's electroejaculated, including Animál. She hopes to clarify the genetic situation of the "Big Cypress National Preserve/Fakahatchee Strand/northern private lands" subpopulation of cats and compare it to that of the Everglades National Park panthers when she does more isoenzyme and DNA analysis later this year at the National Cancer Institute.

Three weeks after Animál had been injured, Dr. Roelke was able to bring the edges of the wound a bit closer together using horizontal mattress sutures anchored on stints made of rubber feeding tubing (in turn anchored to the skin). The top canine teeth also required endodontic work at this time. In addition, radiographs confirmed a palpable trauma-related fracture of a mid-tail vertebra, of no clinical significance. There was no doubt that Animál was starting to feel better:

This is not a zoo animal. It's a wild animal, and his constant attempts at escape remind us daily of that. We have to cover up the windows when he gets in one of his 'escape moods.' He'll jump, claw, and bite anywhere he sees light breaking through. I can't blame him. His drive to free himself is incredible. Fascinating. I hope we can soon have him back where he belongs. His Valium[®] dose is being increased. Dr. Roelke wants to keep the total under 30 mg. per day. It's a safe drug, and it may be the only thing that keeps him from ruining the tools of his trade- his teeth and his claws. Without them, his ability to survive in the wild would be severely, if not fatally, impaired.

One month post-injury, Dr. Citino was able to close the wound over the carpus using 3 skin-releasing incisions that allowed the

wound edges to be brought together. Overall, the leg looked very clean. Dr. Citino thoroughly debrided and flushed the area and freshened the wound edges. Exuberant granulation tissue had to be trimmed down. He then used a sliding skin-flap technique and pulled the edges of the skin on both sides of the wound together with large mattress sutures, oversewn with simple interrupted sutures. He applied Silvadene[®] cream and rebandaged the leg. I asked him about the Silvadene[®]. I had thought it might interfere with epithelialization. He said that the antibacterial action of the silver sulfadiazine actually aided the epithelialization process. At this point, the bandage is mainly serving to keep the cat from pulling out the sutures. Of course Animal got the bandage off in two days anyhow. Next time we'd use a fiberglass soft cast.

On July 20, 34 days post-injury, Animal was anaesthetized again to have more work on his leg and teeth. The ends of the suture line had come undone. Dr. Citino freshened these exposed wound edges and put in some more sutures. The leg was put in a soft cast this time, a bandage which he did not later take off himself! He also had endodontic work (a root canal procedure) on his right lower canine. Perhaps it is not clear to all readers what this involves. When a tooth is damaged so that the pulp cavity is exposed, it is prone to infection and abscessation. The root canal procedure basically involves using hand-held files to drill all of the living tissue (nerves, blood vessels, connective tissue) out of the pulp cavity. The resulting canal is then cleaned and sterilized (with 5% Chlorox[®] followed by 10% buffered formalin) and dried-out before being filled with a dental cement and sealed off with amalgam alloy. The end product is a functional tooth without any place for bacteria to get into and cause problems.

By the time Animal's stay in captivity was over, he'd needed this procedure on all 4 canine teeth. We believe that he will still be able to use these teeth to kill his prey: his tremendous jaw strength is unimpaired.

By July 27, 41 days post-injury, Animal weighed 137.5 pounds, only 4.5 pounds short of his weight at admission.

Scott removed the cast and flushed the area with a Water-PikTM using 1cc. of Nolvasan[®] in 500cc. of saline (0.2%) - very dilute so as not to disrupt healing. Higher concentrations of chlorhexidine could actually inhibit epithelialization. All remaining sutures were removed. Much epithelialization could be seen around the edges of the wound. The granulation tissue was now even and meshed with the surrounding tissue. Silvadene[®] and a new cast were applied. I gave the cat IV Keflin[®] (cephalothin: 1.0 g.) via the IV catheter which I had been able to place without too much of a mess.

The cat had gotten a total of 900 mg. of ketamine before being put on gas anaesthesia (halothane). Before we left him in his enclosure, Scott gave him 7.0 mg. of Valium[®] sub-Q, to maintain his blood level of diazepam so as not to disrupt the smooth pattern of sedation established. Altogether the cat got 2 liters of fluids.... The cast will keep the cat from constantly licking the area and interfering with epithelialization.



C.W. GRIFFIN / Miami Herald Staff

Panther gets the treatment

A 4-year-old male Florida panther known simply as 'No. 20' is carried out of the Metrozoo operating room after having his leg rebandaged and undergoing a root canal Monday. The panther was hit by a truck in Collier

County June 17 and is expected to recover. Carrying him are, from left, veterinary student Steven Goldberg, zookeepers Alice Gilley and Lisa Cusmano and veterinary student Steve Osofsky.

Animal soon got his cast off by himself. There would be no more need to knock him down. Scott and I had adjusted his radio-collar the last time he was down. I hope it's clear that it was the management of this animal even more than the actual medicine that made this case such a valuable learning experience for me. If a domestic cat had had a similar injury, we could have handled it everyday, and it would undoubtedly have been healed sooner. Dealing with the wild animal's stress in captivity while keeping his food intake up- these were the real challenges in this case. Close attention to doses of the sedative and to the animal's responses were needed to keep him at just the right level.

We drew blood for hematology and serum chemistries every time we handled Florida panther male #20. I refer the reader to Appendix I for these results. I do not intend to discuss the data in detail here. Perhaps I will analyze Animal's clinical pathology results further in a senior seminar and/or another paper. I will point out that Animal's BUN usually appears somewhat high. Dr. Citino attributes this at least partially to the fact that we were keeping #20 engorged with venison as much as possible. His creatinine values did not reflect any abnormality.

The end product of all of this, the goal of all of the work done on this animal, was a successful release back into the wild. The day before the release, Animal was obviously ready to go:

This weekend Scott had to up #20's day dose of Valium[®] to 15 mg. too. So, now he's on 15 mg. BID. Scott thinks he may need to go up to 20 mg. tonight. We noticed a sudden increase in the cat's activity after he was taken off of cefadroxil. Dr. Citino thinks that perhaps the antibiotic had been interfering pharmacokinetically with the diazepam at some level. Perhaps now the diazepam is being metabolized/excreted more rapidly and hence the cat is more alert. Makes

sense. He's been pulling the rubber off the walls. He looks great.

On Tuesday August 4, 1987, Animál was released:

Animál is gone. The release was everything I'd thought it would be.

We loaded him into the crate at 3:00 AM. At first he was a bit hesitant, but he eventually walked from the chute into the crate. We had to tilt the crate onto its side to get it into Melody's truck. It was a 3 hour trip to an area about 20 miles north of Big Cypress. The actual release site was a private ranch, north of State Road 846, off County Line Road (which is off of S.R. 858 where he was originally hit by the truck). The landowner raises cattle and grows citrus in this area of Hendry County within Okloacoochee Slough. Several panthers are known to live on the ranch, but they've never preyed upon the cattle, apparently preferring the abundant deer and wild hogs.

The panther was pretty good during the trip. He spent most of it lying down on his side. He occasionally got up, banged around, got himself excited; sometimes open-mouth breathing with a respiratory rate of around 120 breaths per minute. The truck's air-conditioning was always on high. I periodically peered in through the crate's air-holes using a flashlight.

The whole process was prolonged by the amount of time it took to corral and organize the press. There were many more people there than were supposed to be, and that was disappointing. There are a lot of people at the zoo who would have liked to have gone. Only one zoo keeper got to go. I resented the extra time the cat had to spend in the crate because of all the press people. But such an event does merit publicity. It's good for the project; it's good for panthers.

The drive through the ranch to the release site was quite scenic. Palms, swamp, hardwood hammocks, open fields, cattle- even a wild hog and a deer.

The chosen release site was a wet open area surrounded by forest. We unloaded the crate and the press proceeded to get organized. They were directed to line up in a row about 40 feet in front of the crate. I was surprised. I'd thought we'd have to stay in vehicles or behind trees. To the left of the crate was a tree-line several hundred yards away. Directly in front of the crate, and behind the reporters and cameramen, was a closer tree-line, about 50 yards away. The thought was that he'd come out, see all the people, and run the other way. Nice theory. That's not what happened.

The cat was lying down in the crate when Melody opened it. He immediately leaped up and darted out. He was understandably disoriented and headed... right towards where I was standing. I had been looking through my camera when I saw the panther was going in the 'wrong' direction. I temporarily dropped the camera away from my eye and looked at Animal head-on. I backed off a bit and he veered to the left. He then ran straight toward the line of reporters who quickly became disoriented themselves. Animal darted right between two photographers. He ran into the woods behind us and, surprisingly, he stopped and turned around. He looked at all of us, and all I could think of is how confusing these past weeks must have been for him.

In his final glance at us, was he thinking 'What the heck is this all about?' What goes through an animal's mind over the course of such an ordeal? Hit by a truck; flown by helicopter to the zoo; kept in a cement enclosure for almost 2 months; fed by people; blow-darted periodically with antibiotics, anaesthetics, tranquilizers; bandaged; bled; vaccinated; bathed; etc., etc.- and finally, crated-up and driven back to the woods. If this large feline has any conscious thoughts about the world around him, which anyone who's known a cat would have to agree seems quite likely, he must really be baffled. Perhaps he will at least have learned to avoid motor vehicles.

After he glanced back at the assembled crowd, he trotted off into the woods at a less hurried pace. Perhaps he felt safe in the woods. Perhaps he already knew where he was. The release site is within his known home range area. Radio-telemetry revealed that he didn't wander off too far while we were there- perhaps a few hundred yards into the woods. A Game Commission plane later circled overhead to determine his precise location.

I felt relieved. I was ecstatic. I've seen Animal's case through from start to finish and I feel a great sense of accomplishment. This was the perfect way to conclude my summer with the Florida panthers.

I kept looking at where he had run into the woods, but of course I didn't see him again. I'll never forget his run back into the wild. Never.

As of this writing, Animal was reported to be doing fine and glad to be home.

Loose Ends

"Now I know why they call her 'Dr. Whiz-Bang.'"

-Anonymous.

I hope I've given the reader a taste of what it was like to work with Dr. Melody Roelke on the Florida Panther Project. Of course I've concentrated on the more exciting aspects of the job. A lot of work needed to be done "behind the scenes" to keep things running smoothly- labwork, paperwork, telephone-work, equipment preparation and maintenance, etc.

There is one more part of my summer experience that I'd like to discuss here. One of the things that appeals to me about conservation work is that the public can play such an important role. Active citizens can really make a difference. I personally enjoy talking and writing about conservation issues, and I was able to do both as Dr. Roelke's assistant.

Part of her work involves trying to determine what makes a Florida panther a Florida panther. As I've already discussed, Dr. Roelke's genetics investigations will attempt to define whether or not the subspecies is really "pure," whether or not there are actually genetically distinct subpopulations of panther in Florida, and whether or not inbreeding is a real problem in the Florida cats.

In order to make comparisons between panthers of different backgrounds, Dr. Roelke wants to obtain blood and semen samples from some of the cougars kept as pets around Florida. In addition, such pet cougars could provide useful information on other aspects of panther biology. At this point I refer you to the following letter which I formulated with Dr. Roelke to encourage owners of pet cougars to take part in the Florida Panther Project personally:

FLORIDA GAME AND FRESH WATER FISH COMMISSION

THOMAS L. HIRES, SR.
Chairman, Lake Wales

MRS. GILBERT W. HUMPHREY
Vice-Chairman, Miccosukee

WILLIAM G. BOSTICK, JR.
Winter Haven

C. TOM RAINEY, D.V.M.
Miami

DON WRIGHT
Orlando

ROBERT M. BRANTLY, Executive Director
ALLAN L. EGBERT, Ph.D., Assistant Executive Director



Melody E. Roelke, DVM
Florida Game and Fresh
Water Fish Commission
Wildlife Research Lab
4005 S. Main Street
Gainesville, Florida
32601

July 15, 1987

Dear Friend of the Florida panther,

As an owner of a cougar, you undoubtedly realize what beautiful and fascinating creatures these big cats are. You are probably aware of the problems currently facing a wild subspecies of cougar, the Florida panther. Pressure from development projects, wilderness bordered by the dangers of major highways, inadequate food resources in important habitat areas- all of these things have helped make the unique Florida panther all but extinct. Based on available information, we estimate that there are perhaps 30-50 Florida panthers actually left in the wilderness of Florida's parks, preserves, and private lands.

The consequences of having such a small wild population are many. Each individual Florida panther's health and welfare is vital to this subspecies' future. That is why I am writing to you. As an owner of a cougar, you are in a unique position to be able to help save the Florida panther.

As the wildlife veterinarian for the state's Florida Panther Project, I am trying to gather as much information on the biomedical status of the Florida panther as I can. My work includes, for example, research on the animals' reproductive cycles, incidence of various diseases and parasites, nutritional requirements, and genetic variability. My colleagues and I are trying to gather as much data as we can on panthers- both wild Florida panthers and captive cougars. The more educated we are about Felis concolor, the better equipped we'll be to manage its populations so as to increase its chances of surviving into the twenty-first century.

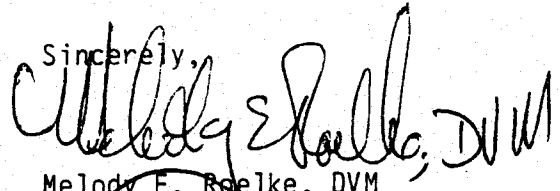
How can you help? There are many ways. I would like to be able to evaluate as many captive cougars as possible. The details of each evaluation would be up to you. At the very least I would like to talk to you about the health and reproductive history of your cats and learn what special problems cougars in captivity have to deal with. Beyond this, I would very much like to obtain blood samples from captive cougars to evaluate normal blood parameters, reproductive hormone levels, and genetic variability. We also need information about which vaccines are most effective in protecting cougar kittens against feline diseases, and which dewormers are most useful against the different types of parasites which affect cougars. To answer these important questions we need the participation of breeders with cubs. Even fecal samples alone would be very helpful to our efforts. They can be assayed for sex hormones,

which will help us to delineate the animals' reproductive cycles, and they can be analyzed for parasites. One of the questions I have, for example, is whether or not hookworms are really responsible for a high degree of panther cub mortality. Other helpful information could be gathered from urine samples, semen samples, vaginal swabs, and skin biopsies.

Your participation in this project would be strictly voluntary. The information we collect would not only help the Florida panther but would directly benefit your animal. Its individual health status can be assessed, if you so desire, and a health care program for your cat can be outlined. Possible benefits to your cat would include, for example, vaccinations and anti-parasite medications.

If you are interested in helping with this important conservation project, please return the enclosed postcard as soon as possible. Your help in the Florida Panther Project is greatly needed. The benefits to your own cat and to its kin in the wild are clear. I look forward to hearing from you soon.

Sincerely,


Melody E. Roelke, DVM
Panther Project Veterinarian

The response to the first mailing has been extremely positive. I sent out 22 letters with response cards, and at the time of this writing we had received 13 response cards with a check-mark next to "Yes, I would like you and your team to personally contact me about helping with the Florida Panther Project." These respondents filled in their phone numbers, as requested, on the cards. I was thus able to call them and visit several captive cats to evaluate how well they would fit the needs of Dr. Roelke's studies. Overall, the "Captive Cougar Project" has been, for me, an interesting experience in public relations. I believe I made some contacts that will prove very useful to Dr. Roelke in the future.

The journal I kept daily while on the Florida Panther Project is several hundred pages long. I have tried to be selective here as to what I've written about: these reports can never be completely satisfying to me. I derived so much from this summer's work: writing out a paper like this does help me put it all into some sort of perspective. It feels good to be able to share this report with other people and thus give them some sense of my perspective on the project. Thank you for taking the time to read it.

Appendix I: Serum Chemistry and Hematology Values.

Notes

- I(a): I am including here normal reference ranges for domestic cats for serum constituents as determined by Lab I, one of the laboratories that analyzed Florida panther male #20's blood. I provide these for comparison, to give some frame of reference to the panther values.
- I(b): I also provide cougar reference ranges for serum constituents and mean values for cellular constituents of blood (Anderson, 1983). Unfortunately, these values are based on animals of various ages and sexes, both wild and captive, all mixed together. Nevertheless, they are from Felis concolor and may shed some light on interpretations of the values listed for Florida panther male #20.
- I(c): These values are from blood samples drawn on Florida panther male #20 soon after ketamine anaesthesia on the given days. (Dr. Roelke also has values for blood samples drawn periodically over the course of each procedure on a given day, as she is interested in the effects of various drugs and manipulations on panther serum chemistry and hematology values.)

Lab I= Inter-American Laboratory Service; Miami, Florida.

Lab II= Diagnostic Services, Inc.; Naples, Florida.

Lab III= James Archer Hospital Laboratory; Homestead, Florida.

Lab IV= Consulab, Inc.; Miami, Florida.

Lab V= Veterinary Medical Teaching Hospital, Clinical Pathology Laboratory (University of Florida); Gainesville, Florida.

Appendix I(a):

Normal Reference Ranges for
Domestic Cats for Serum
Constituents, Lab I.

Total Protein (g/dl)	6.3 - 8.7
Globulin (g/dl)	4.0 - 6.8
Albumin (g/dl)	1.5 - 2.5
A/G Ratio	0.2 - 0.6
LDH (IU/l)	25.0 - 250.0
CPK (IU/l)	6.0 - 130.0
ALT (SGPT) (IU/l)	6.0 - 58.0
AST (SGOT) (IU/l)	12.0 - 52.0
Alk. Phos. (IU/l)	5.0 - 30.0
Na+ (mEq/l)	144.0 - 156.0
K+ (mEq/l)	3.4 - 5.6
Cl- (mEq/l)	113.0 - 131.0
Ca++ (mg/dl)	8.7 - 11.7
P (mg/dl)	2.7 - 6.7
Glucose (mg/dl)	65.0 - 175.0
Cholestrol (mg/dl)	94.0 - 294.0
Bilirubin, Total (mg/dl)	0.1 - 0.8
Creatinine (mg/dl)	0.8 - 2.0
BUN (mg/dl)	10.0 - 30.0
GGT (IU/l)	---
Serum Iron (µg/dl)	---
Anion Gap (mEq/l)	---
TCO ₂ (mEq/l)	11.0 - 21.0
Triglycerides (mg/dl)	---
Uric Acid (mg/dl)	---

Appendix I(b):

Cougar Reference Ranges for
Serum Constituents, and Mean
Values for Cellular Constituents
of Blood (Anderson, 1983).

Total Protein (g/dl)	7.1	-	7.3
Globulin (g/dl)	3.9	-	4.3
Albumin (g/dl)	3.0	-	3.3
A/G Ratio	.77		
LDH (IU/l)	133.0	-	197.0
CPK (IU/l)	82.0	-	135.0
ALT (SGPT) (IU/l)	48.0	-	57.0
AST (SGOT) (IU/l)	58.0	-	79.0
Alk. Phos. (IU/l)	4.9	-	7.3
Na+ (mEq/l)	143.4	-	145.7
K+ (mEq/l)	4.4	-	4.7
Cl- (mEq/l)	111.9	-	116.5
Ca++ (mg/dl)	10.6	-	11.1
P (mg/dl)	4.8	-	6.3
Glucose (mg/dl)	135.0	-	154.0
Cholestrol (mg/dl)	148.0	-	185.0
Bilirubin, Total (mg/dl)	0.5	-	0.7
Creatinine (mg/dl)	2.46	-	3.07
BUN (mg/dl)	30.0	-	36.1
GGT (IU/l)	---		
Serum Iron (µg/dl)	---		
Anion Gap (mEq/l)	---		
TCO ₂ (mEq/l)	---		
Triglycerides (mg/dl)	---		
Uric Acid (mg/dl)	---		
Red Blood Cell Count (RBC), 10 ⁶ /µl	7.87		
White Blood Cell Count (WBC), 10 ³ /µl	7.3		
Hemoglobin (Hb) g/dl	13.9		
Hematocrit (PCV), %	38.0		
Mean Corpuscular Volume (MCV), fl	48.2		
Mean Corpuscular Hb (MCH), pg	17.6		
Mean Corpuscular Hb Conc. (MCHC), g/dl	36.5		
RDW	---		
Reticulocyte Count (Retic.), %	0.9		
Platelet Count, 10 ³ /µl	192.0		
<u>Differential</u> (Leukocytes)			
Band Neutrophils (band), %	0		
Segmented Neutrophils (seg), %	69		
Lymphocytes (lymph), %	28		
Monocytes (mono), %	2		
Eosinophils (eos), %	1		
Basophils (baso), %	0		

Appendix I(c):

Serum and Cellular Constituents of
Blood from Florida Panther Male #20.

Date	3/10/87	6/17/87	6/23/87	6/28/87	7/2/87
Wild/Captive? (W/C?)	W ¹	W ²	C	C	C
LAB	II	I	III	IV	IV
Total Protein (g/dl)	6.7	7.9	8.6	7.3	7.8
Globulin (g/dl)	3.4	6.0	4.5	4.0	4.4
Albumin (g/dl)	3.3	1.9	4.1	3.3	3.4
A/G Ratio	1.0	.3	0.9	0.8	0.8
LDH (IU/l)	257	477.9	219	221	210
CPK (IU/l)	642	887.0	1159	1763	---
ALT (SGPT) (IU/l)	46	71.0	91	75	105
AST (SGOT) (IU/l)	56	113.4	79	123	140
Alk. Phos. (IU/l)	29	13.0	6	19	15
Na+ (mEq/l)	154	151.0	144	142	154
K+ (mEq/l)	5.0	4.8	5.3	4.5	5.1
Cl- (mEq/l)	111	114.0	99	110	121
Ca++ (mg/dl)	10.2	10.0	10.2	9.1	10.0
P (mg/dl)	5.2	6.9	4.8	4.9	4.6
Glucose (mg/dl)	153	177.0	162	111	95
Cholesterol (mg/dl)	163	193.9	174	116	110
Bilirubin, Total (mg/dl)	0	1.6	0.4	0.1	0.3
Creatinine (mg/dl)	1.7	2.2	2.0	2.2	2.0
BUN (mg/dl)	58	62.6	34	58	48
GGT (IU/l)	0	5.0	---	---	---
Serum Iron (µg/dl)	104	---	---	97	78
Anion Gap (mEq/l)	---	23.7	---	13.0	14.0
TCO ₂ (mEq/l)	15	14.0	20	19	19
Triglycerides (mg/dl)	104	---	---	27	18
Uric Acid (mg/dl)	1.1	---	0.1	0.4	0.3

¹
Radio-collared.

²
Hit-by-truck.

Appendix I(c):
(con't)

Serum and Cellular Constituents of
Blood from Florida Panther Male #20.

Date	7/6/87	7/10/87	7/14/87	7/27/87
Wild/Captive? (W/C?)	C	C	C	C
LAB	I	I	I	I
Total Protein (g/dl)	8.0	8.0	6.9	9.3
Globulin (g/dl)	5.5	5.2	4.4	6.2
Albumin (g/dl)	2.5	2.8	2.5	3.1
A/G Ratio	0.5	0.5	0.6	0.5
LDH (IU/l)	97.0	161.7	103.9	125.6
CPK (IU/l)	437.0	761.4	267.0	232.1
ALT (SGPT) (IU/l)	59.1	65.8	63.3	119.3
AST (SGOT) (IU/l)	90.0	109.4	76.5	101.5
Alk. Phos. (IU/l)	8.0	8.0	11.0	22.0
Na+ (mEq/l)	154.0	152.0	148.0	155.0
K+ (mEq/l)	5.2	4.7	4.7	5.3
Cl- (mEq/l)	120.0	120.0	121.0	117.0
Ca++ (mg/dl)	10.3	10.1	9.1	10.6
P (mg/dl)	5.1	4.6	5.7	6.7
Glucose (mg/dl)	93.6	76.4	107.1	74.3
Cholestrol (mg/dl)	133.8	225.0	151.6	212.0
Bilirubin, Total (mg/dl)	0.3	0.3	0.3	0.6
Creatinine (mg/dl)	1.6	1.9	1.8	1.9
BUN (mg/dl)	25.7	58.8	56.2	74.3
GGT (IU/l)	3.0	0.5	4.0	4.0
Serum Iron (µg/dl)	---	---	---	---
Anion Gap (mEq/l)	13.2	14.8	9.5	15.8
TCO ₂ (mEq/l)	21.0	17.0	18.0	22.0
Triglycerides (mg/dl)	---	---	---	---
Uric Acid (mg/dl)	---	---	---	---

Appendix I(c):
(con't)

Serum and Cellular Constituents of
Blood from Florida Panther Male #20.

Date	3/10/87	6/17/87	6/23/87	6/28/87
Wild/Captive? (W/C?)	W ¹	W ²	C	C
LAB	V	I	III	I
Red Blood Cell Count (RBC), 10 ⁶ /μl	10.37	9.20	9.14	8.42
White Blood Cell Count (WBC), 10 ³ /μl	10.6	12.2	12.2	22.9
Hemoglobin (Hb), g/dl	17.2	14.8	14.9	13.3
Hematocrit (PCV), %	47.1	43.9	47.9	42.4
Mean Corpuscular Volume (MCV), fl	48.5	48.0	---	51
Mean Corpuscular Hb (MCH), pg	---	16.0	---	16
Mean Corpuscular Hb Conc. (MCHC), g/dl	35	33.6	---	31.8
RDW	---	---	---	---
Reticulocyte Count (Retic), %	1.2/4.0 ³	---	---	---
<u>Differential (Leukocytes)</u>				
Band Neutrophils (band), %	0	0	5	0
Segmented Neutrophils (seg), %	66	81	81	89
Lymphocytes (lymph), %	31	11	12	9
Monocytes (mono), %	3	6	2	2
Eosinophils (eos), %	0	2	0	0
Basophils (baso), %	0	0	0	0

- 1 Radio-collared.
- 2 Hit-by-truck.
- 3 Aggregate/Punctate.

Appendix I(c):
(con't)

Serum and Cellular Constituents of
Blood from Florida Panther Male #20.

Date	7/2/87	7/6/87	7/10/87	7/14/87
Wild/Captive? (W/C?)	C	C	C	C
LAB	I	V	I	I
Red Blood Cell Count (RBC), $10^6/\mu\text{l}$	7.24	6.52	6.49	6.16
White Blood Cell Count (WBC), $10^3/\mu\text{l}$	18.2	9.5	15.6	9.2
Hemoglobin (Hb), g/dl	11.1	9.9	10.2	9.9
Hematocrit (PCV), %	34.7	29	33	30.8
Mean Corpuscular Volume (MCV), fl	48	46.6	51	50
Mean Corpuscular Hb (MCH), pg	15.5	15.2	15.9	16.3
Mean Corpuscular Hb Conc. (MCHC), g/dl	32.3	32.6	31.3	32.6
RDW	---	16.3	---	---
Reticulocyte Count (Retic), %	---	0.4/0.8 ³	---	---
<u>Differential (Leukocytes)</u>				
Band Neutrophils (band), %	0	0	0	0
Segmented Neutrophils (seg), %	89	78	88	85
Lymphocytes (lymph), %	9	20	9	12
Monocytes (mono), %	2	2	2	3
Eosinophils (eos), %	0	0	1	0
Basophils (baso), %	0	0	0	0

3

Aggregate/Punctate.

Appendix I(c):
(con't)

Serum and Cellular Constituents of
Blood from Florida Panther Male #20.

Date	7/16/87	7/27/87
Wild/Captive? (W/C?)	C	C
LAB	I	I
Red Blood Cell Count (RBC), $10^6/\mu\text{l}$	6.11	8.09
White Blood Cell Count (WBC), $10^3/\mu\text{l}$	14.8	14.6
Hemoglobin (Hb), g/dl	10.2	13.6
Hematocrit (PCV), %	32.5	42.8
Mean Corpuscular Volume (MCV), fl	54	53
Mean Corpuscular Hb (MCH), pg	16.8	16.7
Mean Corpuscular Hb Conc. (MCHC), g/dl	31.7	31.7
RDW	---	---
Reticulocyte Count (Retic), %	---	---
<u>Differential (Leukocytes)</u>		
Band Neutrophils (band), %	0	0
Segmented Neutrophils (seg), %	79	78
Lymphocytes (lymph), %	12	18
Monocytes (mono), %	7	4
Eosinophils (eos), %	0	0
Basophils (baso), %	2	0

Appendix II: Original Proposal Submitted for the "Expanding Horizons
of Veterinary Medicine Summer Fellowship 1987."

Expanding Horizons of Veterinary Medicine
Summer Fellowships 1987

Proposal of
Steven A. Osofsky
Cornell University
NYSCVM '89

Appendix II:
(con't)

The New "Expanding Horizons of Veterinary Medicine Summer Fellowships" were designed to give students the chance "to explore novel and nontraditional employment opportunities at home or abroad." I am planning to use my D.V.M.-to-be in the field of wildlife conservation. I would like to be involved in conservation projects in the field as well as in the zoo. I believe that training in veterinary medicine, combined with interests in behavior and ecology, can provide for a unique approach to conservation projects involving reintroductions, for example. Managed breeding schemes, integrating captive and wild stock, could also benefit from someone with such a background. I opted to work towards a D.V.M. instead of a Ph.D. in some branch of behavior or ecology so as to give myself a broader base: I hope to be able to help with specific problems affecting individual animals as well as with dilemmas facing whole populations, whether captive or wild.

The current veterinary curriculum does not deal with the field of conservation, nor can it be expected to, given the tremendous amount of material that must be covered in order to yield graduates competent in the more traditional veterinary arts. I've tried to use my summers, as well as a year between college and veterinary school, to get as much relevant experience as possible. In 1984, I was granted a Research Traineeship in the genetic management of captive populations at the National Zoo. The summer I spent at the National Zoo gave me an excellent foundation for the project I was to work on over the next year. As a Harvard University Benjamin A. Trustman Travelling Fellow I would be able to travel around the world for a year observing animals in the zoo and in the wild, seeking ways to enhance zoo-wild cooperation in conservation efforts. I spent time in fifteen European zoos, observing the different ways various species are managed and talking to keepers, curators, and zoo directors. I was surprised by the wide ranges of management techniques

Appendix II:
(con't)

applied to the same species in different zoos. Social group composition, enclosure design, amount of privacy provided for the animals, breeding protocols, the diet provided- all of these things can have their own variations depending upon the particular zoo.

The obvious question one has is which management techniques are most conducive to a high quality of life and optimal productivity of the animals. To begin to answer this question, the second part of my project involved six months in East and Central Africa. I simply can't go into the impact this awe-inspiring experience had upon me in this proposal. My "Trustman Travelling Fellowship Final Report: 1984-1985" is available upon request. I observed many wildlife species in their natural habitats in Kenya, Tanzania, and Rwanda and examined conservation problems from a variety of perspectives including those of local people, conservation organizations, and governments.

This past summer I was able to return to Kenya, sponsored in part by the New York State College of Veterinary Medicine, as a research assistant on a project examining mechanisms of heat regulation in the African Elephant, Loxodonta africana. Please refer to the attached resume for more details.

I give you this brief account of some of my previous experiences to demonstrate that my interest in wildlife conservation is a deeply seeded one. There are not enough veterinarians getting involved in projects to protect threatened and endangered species outside of the zoo environment. I believe that field conservation, keeping viable populations in their natural habitats, is of primary importance. This is not to say that the zoo can not play an extremely important role in overall conservation schemes. At this point I refer the interested reader to my article in the October-November 1986 issue of "Intervet" (vol. 22, No. 2)

entitled "Some Thoughts on the Roles and Responsibilities of the Modern Zoo."

As far as I know, there are only six veterinarians working in wildlife medicine full-time in the United States. Dr. Melody Roelke is one of them. Her primary responsibility as the wildlife veterinarian for the state of Florida is the prevention of the extinction of the Florida Panther, Felis concolor coryi.

I first met Dr. Roelke at the talk she gave for our student chapter of the American Association of Zoo Veterinarians. I spoke with her after her presentation and she said she would like to take-on student assistants but would not be able to provide funding. Her offer to allow students to work with the project was more than generous. I was further encouraged to work with her when several months later Dr. Steve Chambers of the U. S. Department of the Interior Fish and Wildlife Service, Office of Endangered Species, recommended Dr. Roelke's project as a very worthwhile one.

Dr. Roelke is currently in the process of collecting vital statistics on the few panthers remaining in the swamps of southern Florida. Her team captures individuals, puts on radio-collars, tracks them over time, and makes distribution maps in order to learn more about their behavior and preferred habitats so that future land-use decisions in Florida will take the panther into consideration.

Why does such a project need a veterinarian instead of a wildlife biologist? Dr. Roelke stresses that a veterinarian is much better trained to reduce the risks to the animals before, during, and after the capture process. Panthers who are darted are put on a cardiac monitor, given fluids when necessary, and carefully observed while the necessary samples and measurements are taken. Current sampling involves blood, semen,

Appendix II:
(con't)

urine, feces, and skin biopsies. The skin biopsies are then used for fibroblast culture so that a bank of living cells for genetic analysis has been established. Another novel technique introduced by Dr. Roelke is the use of a nylon mesh tent which, believe it or not, keeps the panther contained as it recovers from anaesthesia. This prevents the animal from traumatizing itself, as could occur in a more solid structure. It also ensures that the animal will not wander off into a swamp and drown before it is fully conscious, as had happened in the past. With the nylon tent system, only a very alert animal can figure out how to slip out and thus the dangers of the recovery phase of anaesthesia (ketamine/Valium[®]/Rompun[®]) are greatly reduced.

Serology on blood samples taken so far have revealed some interesting data. Feline panleukopenia titers have been found in 85% of the cats and feline calicivirus titers have been found in 50%. No titers to FeLV or FIP have been encountered. Dr. Roelke is also compiling a profile of parasites found in and on the cats.

Genetic analyses and examination of sperm counts and morphology will play key roles in future management decisions. If the decimated population is found to be extremely inbred, the conservation plan may involve outbreeding with other Felis concolor subspecies from places like Texas.

The future of the Florida Panther is less than certain. The potential to save this Eastern subspecies is there, and even if the effort is not completely successful a great deal of important information will have been made available, information which will help similar efforts for other species.

I feel that a summer with Dr. Roelke would be a unique opportunity for me to explore the nascent field of wildlife veterinary medicine. As

Appendix II:
(con't)

human populations continue to expand all over the world, more and more land-use decisions will need to be made which will determine the fate of many wildlife species. A wildlife veterinarian is in a unique position to gather information, to educate the public, and to advise governments on how compromises between human and animal needs can be achieved.

Thank you for considering my application.

Sincerely,

A handwritten signature in cursive script that reads "Steven A. Osofsky". The signature is written in dark ink and is positioned to the right of the word "Sincerely,".

Steven A. Osofsky '89

References Cited

- 1 Anderson, Allen E. 1983. "A Critical Review of Literature on Puma (Felis concolor). " Colorado Division of Wildlife Special Report No. 54. 91 pp.
- 2 Ball, Scott. 1987. "Hunting Ban Should Help Panthers in Collier County Area." Coryi, Official Newsletter of the Florida Panther Interagency Committee: vol. 1(2), May 1987. Florida Game and Fresh Water Fish Commission, Office of Informational Services. Tallahassee, Florida.
- 3 Belden, Chris. 1977. "If You See a Panther." Florida Wildlife, Sept.-Oct.: pp. 31-34.
- 4 Forrester, Donald J., Joseph A. Conti, and Robert C. Belden. 1985. "Parasites of the Florida Panther (Felis concolor coryi). " Proc. Helminthol. Soc. Wash. vol. 52(1): pp. 95-97.
- 5 Griffin, C.W. 1987. Photo credit. The Miami Herald: Tuesday July 28, 1987.
- 6 Osofsky, Steven A. 1985. "Trustman Travelling Fellowship Final Report: 1984-1985." Harvard University O.C.S.-O.C.L. Available from author upon request. 71 pp.
- 7 Osofsky, Steven A. 1986a. "'The Elephant Research Project,' Tsavo East National Park, Kenya, Final Report, Summer 1986." Cornell University's New York State College of Veterinary Medicine. Available from author upon request. 20 pp.
- 8 Osofsky, Steven A. 1986b. "Some Thoughts on the Roles and Responsibilities of the Modern Zoo." Intervet: Journal of the Student American Veterinary Medical Association, vol. 22(2): pp. 16-20.
- 9 Robertson, William B., and Oron L. Bass. 1987. "Ecology and Population Dynamics of the Florida Panther in Everglades National Park." Research Proposal Submitted to the Florida Panther Interagency Committee Technical Subcommittee. South Florida Research Center, Everglades National Park. Homestead, Florida. 23 pp.
- 10 Roelke, Melody E., Elliott R. Jacobson, George V. Kollias, Donald J. Forrester. 1985. "Medical Management and Biomedical Findings on the Florida Panther, Felis concolor coryi, July 1, 1983 to June 30, 1985." Annual Report Presented to the Florida Panther Research Team, Florida Game and Fresh Water Fish Commission. Gainesville, Florida. 113 pp.



References Cited

(con't)

- 11 Roelke, Melody E., Elliott R. Jacobson, George V. Kollias, Donald J. Forrester. 1986. "Medical Management and Biomedical Findings on the Florida Panther, Felis concolor coryi, June 1, 1985 to June 30, 1986." Annual Report Presented to the Florida Panther Research Team, Florida Game and Fresh Water Fish Commission. Gainesville, Florida. 65 pp.
- 12 Sargeant, Frank. 1987. "The Florida Panther." The Tampa Tribune: Monday June 1, 1987.
- 13 Williams, Lovett E. 1978. "Endangered Florida Panther," in Layne, James N., Ed. Rare and Endangered Biota of Florida, Volume I: Mammals. University Presses of Florida. Gainesville, Florida. pp. 13-15.

