Howard, W.E. 1988. Why Lions Need to be Hunted. Pgs. 66-68 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

Biological facts rather than personal feelings should be used if we want to show genuine compassion for the welfare of the mountain lion. It is necessary for State Game Departments to use licensed hunters as predators to maintain healthy breeding populations of lions in remaining suitable lion habitat. Often ignored is the cruelty and suffering that occurs when surplus lion populations are left to their own population control devices. In disturbed environments people need to manage the plant and animal communities, not leave them to the whims of nature. The author believed that whenever a lion ventured beyond the geographic boundaries of its designated management range, it should automatically lose all protective status. In modified environments it is just as cruel to let mountain lions overpopulate as it is to stop harvesting cattle or sheep and let them die from starvation and disease. Current lion populations need to be harvested by people just as much as livestock, and hunting provides the best solution.

Howard, W.E. 1991. Mountain Lion and the Bambi Syndrome. Pgs. 96-97 In: Mountain Lion-Human Interaction Symposium, C.E. Braun (ed.), Col. Div. Wildl., Denver. 114pp.

In most modified environments, nature requires the assistance of human predators if many of the desirable species, including endangered species, are to be preserved in a healthy reproducing population. Surplus mountain lions can no longer use nature's way of regulating their numbers by dispersing from what now is often restricted mountain lion habitat, because people force these animals back to face territorial strife. Another essential reason for regulating mountain lion populations is to prevent serious conflicts from surplus mountain lions with livestock, pets, and humans. If the Bambi-ites do not condone mountain lion hunting, they must accept the responsibility for forcing an entire population to suffer the tragedies of population self-limitation by mountain lions rather than encourage that a few be harvested relatively humanely by hunters.

Hubbard, J. 1975. Felis concolor, Our Big and Mysterious Cat. New Mexico Wildlife. Jan/Feb.

The author draws heavily on Stanley Young and Edward Goldman's book, The Puma, Mysterious American Cat, for this account of the mountain lion. The name puma is from the language (Quechua) of the Incas of Peru. Pre-Columbian natives of lower California would locate a cache of prey hidden by the lion and eat from the carcass left by the cat. The lion was also eaten and it was reported that "it's flesh... was accounted the choicest which the wilderness afforded, not excepting even the tail of the beaver or more delicate morsels from the buffalo." The mountain lion was also revered by Indians in New Mexico and it is there that the only known shrine in the west exists. The shrine consists of a pair of lions, side by side, carved from native rock by the pre-Columbian ancestors of the present-day Cochiti Indians and preserved in Bandelier National Monument.

Ingles, L.G. 1939. In Defense of the Lion. American Forests 45(l):21-22.

Field naturalists, lion hunters, and authorities on mountain lions have never heard the cat scream and this claim appears to be fictitious. Also refuted is the lion's supposed propensity for attacking humans. Only a few authenticated cases of attacks exist and it was thought that the lion prefers almost any other kind of flesh to that of human beings. Domestic animals comprise less than 2% of the prey taken by lions. Scientists and expert lion hunters agree that the lion does not distinguish between healthy and weak deer and kills whatever it can. However, a study of 11 deer examined that were killed by cougars in New Mexico showed that all of them were found to be abnormal and this was evidence that lions do eliminate the sick and diseased individuals. It seemed more sensible to authorize local lion control and place the lion on the list of large game animals.

Ingram, R. 1984. Oregon-Cougar Status Report. Pgs. 53-55 In: J. Roberson and F. Lindzey (eds.), Proc. of the Second Mountain Lion Workshop. Utah Div. Wildl. Res. and Utah Coop. Wildl. Research Unit. Zion National Park. 271pp.

The mountain lion was declared a game animal in 1967. The general feeling is that the population of mountain lions is continuing to expand and has increased substantially from pre-1970 levels. Harvest data for five years (1979-83) is provided. A total of 817 permits were authorized with 423 hunters taking a total of 198 lions.

Iriarte, J.A. 1988. Feeding Ecology of the Patagonian Puma (Felis concolor patagonica) in Torres del Paine National Park, Chile. M.A. Thesis, University of Florida, Gainesville.

The puma (Felis concolor) has the most extensive range of any terrestrial mammal in America. The focus of this paper is on the feeding ecology of the southernmost subspecies of puma, the patagonian puma, F.c. patagonica, in Torres del Paine National Park, Magallanes region, Chile. This study analyzes the seasonal variation and the spatial use of prey by the patagonian puma in the study area, based on 630 individual prey items that were found in 409 puma feces and in six puma stomachs. Mammalian species accounted for almost 92% of all items present in the puma feces and stomachs. The European hare (Lepus capensis) was the most common vertebrate prey item found in the puma diet, representing 51% of items in the puma feces. The guanaco (Lama guanicoe) represented 22% of frequency of occurrence of prey in the puma feces, although this species accounted for 64% of the total biomass consumed by pumas. Between 1975 and 1988 the guanaco population in the study area has increased from 100 to over 1,500 individuals. This increase could explain why the proportion of guanaco remains in puma feces increased from 7.6% to almost 24% between data collected by Yanez and his associates in 1983-84 and this study's 1987-88 data. Yearling and juvenile guanacos were taken more than expected from their abundance on the field by pumas, representing 65% of the puma-killed guanacos. Guanaco inhabiting areas of low guanaco density had life expectancies three times higher than those in areas of high guanaco density (94 vs. 32 months). The only livestock species found in the puma diet was sheep, representing 5% and 25% of the total prey found in feces and stomachs, respectively. The occurrence of guanaco and sheep in puma feces appears to be strongly correlated with their abundance in different areas of the park. Finally, North America ungulates (especially deer) represented 76% of the puma's diet, contrasting with 38% found in Central and South American studies. Mean weight of vertebrate prey (MWVP) values appeared positively correlated (r=0.875) with puma body weight and inversely correlated (r=-0.836) with food niche breadth in all America. In general, MWVP's values were lower in areas closer to the Equator. On the other hand, the occurrence of guanaco and sheep in puma feces appears strongly correlated with their respective abundances

in each areas recognized within the park. In areas with the highest guanaco densities, their representation in the puma feces was the highest in the study area.

Iriarte, J.A., W.E. Johnson, and W.L. Franklin. 1988. Feeding Ecology of the Patagonian Puma (Felis concolor patagonia) in Torres Del Paine National Park, Chile. Pg. 53 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

This paper focuses on the ecology of the southernmost subspecies of puma, the patagonian puma, Felis concolor patagonia in Torres del Paine National Park, Magallanes region, Chile. There are numerous studies on the feeding ecology of puma in the temperate and sub-tropical areas of North America, but few studies have been done in Neotropics. Despite the fact that the puma inhabits almost all of the Neotropical region, within this region it has only been studied in the northern parts of Mexico, in the Pantanal region in southern Brazil, in Manu National Park, Peru, in southern Chile, and in the chilean patagonia. Field studies were conducted at Torres del Paine National Park (51 degree's 3'S, 72 degree's 55'W) in the Ultima Esperanza province, Chile on the eastern foothills of the Andes and on the western edge of Patagonia. The 240,000 hectare park extends from glacier-covered mountains to desert- grasslands of Patagonia. Elevations range from 100 to 3,000 meters. The steppe biome is represented by the characteristic pampa grassland of the southern part of South America, which is extensive in both Chile and Argentina at elevations below 500 meters. This study analyzes the seasonal variation and the spatial use of prey by the patagonian puma in the study area, based on six-hundred and thirty individual prey items that were found in 409 puma feces and in six puma stomachs. Mammalian species accounted for almost 92% of all items present in the puma feces and stomachs. The European hare (Lepus capensis) was the most common vertebrate prey item found in the puma diet, representing 51% of items in the puma feces. The guanaco (Lama guanicoe) represented 22% of frequency of occurrence of prey in the puma feces although this species accounted for 64% of the total biomass consumed by pumas. Between 1975 and 1988 the guanaco population in this study area has increased from 100 to over 1,500 individuals. This increase could explain why the proportion of guanaco remains in puma feces increased from 7.6% to almost 24% between 1986 and 1987-88 data. Yearling and juvenile guanacos were taken more than expected from their abundance on the field by pumas, representing 65% of the puma-killed guanacos. Guanaco inhabiting areas of low guanaco density had life expectancies three times higher than those in areas of high guanaco density (94 vs 32 months). The only livestock species found in the puma diet was sheep, representing 5% and 25% of the total prey. Guanaco and sheep in puma feces appear to be strongly correlated with their abundance in different areas of the park. Finally, in North American ungulates (especially deer) represented 76% of the puma's diet, contrasting with 38% found in Central and South American studies. Mean Weight of vertebrate prey (MWVP) values appeared positively correlated with puma body weight and inversely correlated with food niche breadth along the Americas. In general, MWVP's values were lower in areas closer to the Equator.

Iriarte, J.A., W.L. Franklin, W.E. Johnson, and K.H. Redford. 1990. Biogeographic Variation of Food Habits and Body Size of the American Puma. Oecologia 85:185-190.

SUMMARY

The puma (Felis concolor) has the most extensive range of any terrestrial mammal in

the Western Hemisphere, covering 100 degrees latitude. Food habits of different puma subspecies vary with latitude. Subspecies from temperate habitats generally eat larger prey and specialize on a smaller number of prey taxa, whereas, in tropical habitats, they prey on smaller, more varied prey. In North America, ungulates (primarily deer) represented 68% of the puma's diet by frequency of occurrence. Mean weight of vertebrate prey (MWVP) was positively correlated (r=0.875) with puma body weight and inversely correlated (r=-0.836) with food niche breadth in all America. In general, MWVP was lower in areas closer to the Equator. Patterns of puma prey selection are probably influenced by prey availability and vulnerability, habitat characteristics, and potential competition from the jaguar (Panthera onca).

Jackson, C.F. 1922. Notes on New Hampshire Mammals. J. Mammal. 3:13.

A pair of cougars were discovered whose range extended along the east side of the Androscoggin River in the town of Cambridge to the southern shores of Lake Umbagog. A specimen was taken in the White Mountains in 1885 which is the last record the author had for the state. The latest Vermont record was reported as being 1894, and that of Maine was 1906.

Jackson, H.H.T. 1955. The Wisconsin Puma. Proc. Biol. Soc. Washington 68:149-150.

Upon critical examination of a dismounted specimen skull of a puma, it was found that the specimen represented an undescribed subspecies that inhabited the upper Mississippi Valley and Western Great Lakes region. The subspecies was named Felis concolor schorgeri after Dr. A. W. Schorger, professor of Wildlife Management at the University of Wisconsin. The type specimen, locality, geographic range, diagnostic characters, measurements, and specimens examined are listed.

Jalkotzy, M., O. Pall, and H.D. Carr. 1983. The 1982-83 Cougar Hunt in Alberta. Energy and Natural Resources, Fish and Wildl. Div., Calgary, Alberta, Canada.

The results of the 1982-83 cougar hunt and harvest in Alberta were summarized from compulsory registration forms. Cougar skulls submitted by successful cougar hunters were aged. Cougar license sales in 1982-83 were 18% lower than the annual average of 154 between 1977 and 1981 probably because of poor snow conditions during the winter season (with dogs). Twenty-one legally killed cougars were registered, representing a 17% success rate. This harvest was 32% less than the annual average of 31 between 1973 and 1981. Fifty-seven percent of the harvest was recorded south of the Bow River. The sex ratio of the legal registered harvest was 1 female: 2.3 males, a reversal from the 2 previous years when more females were harvested than males. The majority of the 16 skulls aged were prime adults (56%) while subadults and young adults represented 31% and 13%, respectively. One adult male cougar qualified for Boone and Crockett trophy status. Preliminary analysis of the stomach contents of 27 cougars taken in 1981-82 and 1982-83 indicated that cervids made up the bulk of their diets (67% occurrence), whereas beaver (22%) and porcupine (19%) were of secondary importance.

Jalkotzy, M., O. Pall, J. Kansas and H. D. Carr. 1984. The Population Status of Cougars Near Sheep River, Alberta, 1983-84. Energy and Natural Resources, Fish and Wildl. Div., Calgary, Alberta, Canada. Progress Report.

In an attempt to compile baseline population data for cougars (Felis concolor) in southwestern Alberta to help formulate a Provincial cougar management plan, a

capture and radio tracking study commenced in March, 1982. The 750 km^2 core study area (the area regularly searched) was located 40 km southwest of Calgary in the Sheep River vicinity. By 30 April 1984, 28 cougars had been captured 41 times and radio collared despite very poor searching conditions and unseasonably mild winters. The mean weight for 7 adult females was 46 kg. For 5 adult males, it was 70. Adult males were larger for all physical characteristics measured. Seven cougar family groups have been documented with litters averaging 2.3 kittens each. Kittens were born in February, April, August, September and October. Seven collared kittens became independent at ages of 12 to 16 months and 2 dispersed at least 100 km from their maternal home ranges. Over 900 ground and air telemetry fixes have been recorded for 28 collared cougars. The average size of the areas travelled for at least 1 complete year by 8 resident female cougars was 259 km^2. For the single adult male collared for more than 1 year, the size was 454 km^2. Field work had not progressed to the point that confident population densities could be determined. Legal hunting accounted for all 3 collared cougar mortalities documented during the winter of 1983-84. Approximately 10% of the provincial cougar harvest from 1973 to 1984 has occurred in the study area and immediate vicinity. Of 37 cougar prey kills identified, 12 (32%) were moose, 8 (22%) were mule deer, 7 (19%) were elk, and 5 (14%) were porcupines. In addition 1 (3%) white-tailed deer, 1 (3%) bighorn sheep, 1 (3%) cougar, 1 (3%) snowshoe hare and 1 (3%) spruce grouse were identified.

Jalkotzy, M.G., and P.1. Ross. 1988. Cougar Hunting Regulations and Harvest in Alberta Between 1973 and 1987. Pg. 6 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

A license and mandatory registration of all cougar kills has been required in Alberta since 1973. Hunting seasons have been reduced substantially since 1973. An average of 30 cougars were harvested each year between 1973 and 1987. Between 1978 and 1987, adult males and juvenile males comprised 31% and 16%, respectively, of the harvest. It appeared that cougar hunters select for male cougars in Alberta. Variability in harvests appeared to be often linked to differences in snow conditions. Ease of motorized access seemed to play an important role in where harvests were concentrated.

Jalkotzy, M.G., and P.I. Ross. 1988. Population Ecology of Cougars in Southwestern Alberta. Pg. 47 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

Sixty-two cougars were captured 109 times in and around the 780km^2 study area. Home ranges of 14 adult females averaged 158km^2 compared to a variable range of 232.3km^2 to 1031.4km^2. Home ranges of females travelling with kittens was significantly smaller than that of lone females. Probably due to a non-migratory prey base, winter and summer home range boundaries were not appreciable. Overlapping of female home ranges was variable and sometimes extensive, while males overlapped less. Twenty-three litters were documented between 1981 and 1988. Litter size averaged 2.2 between 4 and 6 months of age and the sex ratio favored females 1.3 to 1.0. Births predominated during spring and summer and peaked in August. Juveniles became independent at an average age of 15 months with mean dispersal age at 16 months. Humans were the main source of mortality of the cougars radio-collared on the study area with 14 of 23 being shot. The total population of cougars in the study area was estimated at 30-32 in 1985-86, and 35-37 in 1988. Resident adults comprised 43-61% of the population and dependent kittens and juveniles comprised between 22-49%. Density estimates varied from 2.7 to 4.1

cougars/100 km^2 between 1984 and 1986.

Jalkotzy, M. and I. Ross. 1991. The Sheep River Cougar Project-Phase III, Cougar/Prey Relationships. Progress Report 1990-1991. Arc Associated Resource Consultants Ltd., Calgary, Alberta.

EXECUTIVE SUMMARY

Phase III of the Sheep River Cougar Project was initiated in 1989 to investigate the relationship between cougars and their prey in the Sheep River study area. This report summarizes the results of the second year of the scheduled three year project. In 1990-91, 215 man-days were spent in the field. Nine captures were made. Since the study's inception in 1982, 84 different cougars have been captured 150 times. Collared cougars were radio tracked on the ground for 194 man-days and 186 ground radio telemetry locations were logged. All portions of the study area were occupied by male and female resident cougars. Resident males occupied larger home ranges than resident females. The large turnover of resident cougars in the study area during 1990 and 1991 resulted in several shifts in home range boundaries. The resident adult population in the study area numbered 15 to 16, a decline of 2 resident females from 1990. The number of independent juveniles and subadults in the population increased from an estimated 4 in 1990 to 9 in 1991. The estimate of independent cougars in the study area in 1991 was 24 to 25, up slightly from 1990. When the 17 dependent young were added, there were about 41 to 42 cougars in the study area in March 1991. Fifty-nine kills made by cougars were identified in 1990-91. Mule deer (61%), white-tailed deer (19%), elk (7%), moose (10%), and bighorn sheep (2%) comprised 58 of the 59 kills. Two large ungulates, a cow moose and a cow elk, were scavenged. Twelve predation sequences involving 58 kills were recorded for 1 male and 7 female cougars between early January and mid-April, 1991. Cougars appear well adapted to a feast and famine feeding regime. Females with young tended to kill more frequently than solitary females. However, predation rates were extremely variable within all reproductive classes. The number of days between leaving a kill and making another varied from 0 to 23 days; 10 days between consecutive deer kills by adult females with kittens or juveniles was not uncommon. However, while they were on kills, cougars gorged. A mule deer fawn was usually completely consumed in 3 to 4 days by a solitary female. Snow tracking between kills indicated that small prey were an insignificant source of winter food for cougars in the study area. Fieldwork in 1991/92 will continue to be oriented towards the collection of cougar/prey relationships data. Most of our efforts will be expended collecting predation rate data from radio collared cougars.

Jalkotzy, M. and I. Ross. 1992. The Sheep River Cougar Project-Phase III, Cougar/Prey Relationships. Progress Report 1991-1992. Arc Associated Resource Consultants Ltd., Calgary, Alberta.

EXECUTIVE SUMMARY

Phase III of the Sheep River Cougar Project was initiated in 1989 to investigate the relationship between cougars and their prey in the Sheep River study area. This report summarizes the results of the third year of the scheduled three year project. Since the project has been extended for 2 additional years, a final report will not be completed until after the fifth year. In 1991-92, 276 man-days were spent in the field. Four captures were made. Since the study's inception in 1982, 87 different cougars have been captured 154 times. Collared cougars were radio tracked on the ground for 267 man-days and 194 ground radio telemetry locations were logged.

Sixty-six kills made by cougars were identified in 1991-92. Mule deer (72%), white-tailed deer (8%), elk (8%), moose (2%), and bighorn sheep (2%) comprised 60 of the 66 kills. In addition, 3 beaver, 2 snowshoe hare, and 1 ruffed grouse were killed. No instances of scavenging were recorded. When converted to biomass, the small prey items represented <1% of all that was consumed. Eight predation sequences involving 57 kills were recorded for 5 female cougars between early December 1991 and early April, 1992. Young-of-the-year ungulates were important components of the winter diets of radio collared cougars. Twenty (38%) of the 52 deer killed by cougars were fawns. In addition, the 1 moose taken and 3 of the 5 elk killed were calves. All portions of the study area continued to be occupied by male and female cougars, as has been the case in previous years. The poor snow conditions experienced during the 1991-92 winter made finding cougar tracks a rare event. Because of this, an estimate of the size of the study area population was not made in 1992. At least 10 litters totalling 20 kittens were travelling with females in and around the study area during 1991-92. Two litters were travelling with unmarked females; the other 8 accompanied radio-collared females. Two of the 8 litters were of juveniles that had been initially documented in 1990-91, while the other 6 litters were <1 year old. Four cougars, 3 males and 1 female, were shot legally in the study area during the 1991-92 hunting season. None of these cougars was marked. Four marked cougars were shot outside the study area; all were male dispersers from earlier litters of radio-collared females in the study area. Fieldwork in 1992-93 will continue to be oriented towards the collection of cougar/prey relationships data. Most of our efforts will be expended collecting predation rate data from radio collared cougars.

Jalkotzy, M. and I. Ross. 1993. The Sheep River Cougar Project-Phase III, Cougar/Prey Relationships. Progress Report 1992-1993. Arc Associated Resource Consultants Ltd., Calgary, Alberta.

EXECUTIVE SUMMARY

Phase III of the Sheep River Cougar Project was initiated in 1989 to investigate the relationship between cougars and their prey in the Sheep River study area. This report summarizes the results of the fourth year of the scheduled five year project. A final report will be completed in 1994. In 1992-93, 102 days and 203 man-days were spent in the field. Two captures were made. Since the study's inception in 1981, 87 different cougars have been captured 156 times. Collared cougars were radio tracked on the ground for 100 days and 154 ground radio telemetry locations were logged. An average of 37 ground radio locations (range 30-44) was collected during the field season (Dec.-Apr.) for each of the 4 cougars which were subjects of the predation study in 1992-93. Forty-two kills made by cougars were identified in 1992-93. Mule deer (55%), white-tailed deer (2%), moose (19%), and bighorn sheep (19%) comprised 40 of the 42 kills. In addition, 2 snowshoe hares were killed. When converted to biomass, small prey items represented <1 % of all that was consumed. Seven predation sequences involving 40 kills were recorded for 1 male and 3 female cougars between early December 1992 and early April 1993. Three instances of scavenging were recorded. All portions of the study area continued to be occupied by male and female cougars, as has been the case in previous years. Excellent snow conditions resulted in 4,013 km of trails searched for cougar tracks during the winter. Because the radio-collared cougars used in the predation study were centrally located in the study area, the area searched intensively for cougar tracks was smaller than in previous years. There were at least 10 adult females including at least 7 residents living in this area; 5 of the residents were radio collared. There were 6 kittens travelling with resident females in the area searched. In addition to 1 radio-collared resident male, there were 3 other adult males identified during track searches. Since

their tracks were seen on a number of occasions, they were considered residents. Tracks of young transient males were seen on 6 occasions. At least 9 litters totalling 10-12 kittens were travelling with females in and around the study area during 1992-93. Two litters were travelling with unmarked females; the other 7 accompanied radio-collared females. Four cougars, 3 males and 1 female, were shot legally in the study area during the 1992-93 hunting season. None of these cougars was marked. Natural mortalities accounted for at least 4 and probably 5 cougars in the study area in 1992-93. Two or 3 kittens were killed by male cougars, 1 kitten was killed by wolves and a young adult female died of unknown natural causes. One marked male disperser was shot during the hunting season 117 km north of his maternal home range. In addition, a radio-collared adult female that disappeared from the study area as a young adult in 1986, was snared 266 km to the north. She was 9 years old. Fieldwork in 1993-94 will continue to be oriented towards the collection of cougar/prey relationships data. Most of our efforts will be expended collecting predation rate data from radio-collared cougars.

Jalkotzy, M. and I. Ross. 1995. Cougar Responses to Human Activity at Sheep River, Alberta. Arc Wildlife Services Ltd., Calgary. 31pp.

EXECUTIVE SUMMARY

The goal of the Sheep River Cougar Project in summer 1994 was to acquire a better understanding of the effects of human activity on the activity and movements of cougars in the Sheep River drainage. The study area is located on the Eastern Slopes of the Rocky Mountains, southwest of Calgary, Alberta at approximately 50 degrees 39' N, 114 degrees 38' W. Human use of the study area was primarily confined to Secondary Road 546 and a network of equestrian and hiking trails. Intensive radio-tracking data collected from radio-collared cougars in summer 1994 were compared with telemetry data from the same cougars during winter 1993 and 1994. In addition, comparisons were made between radio-collared cougars which used the S.R. 546 corridor and those that did not during the summer months. Four radio-collared female cougars were intensively tracked in the Sheep River study area. Forty-four days were spent in the field and 213 radio telemetry locations were collected for F25, F73, F84, and F86. These included 21 radio locations which were collected during aerial telemetry flights between 19 and 24 September. Cougars in the Sheep River study area appear well-adapted to the level of human activity that occurs there during the summer. In summer 1994, radio-collared cougars did not abandon core home ranges along S.R. 546 solely to avoid contact with humans. Cougars whose summer home ranges overlapped with a 2-km wide corridor centered on S.R. 546 did not prefer or avoid corridor land. Although radio-collared cougars were recorded moving throughout the day in the study area, they were more active between late afternoon and early morning than during the mid-afternoon hours. Radio-collared cougars crossed roads and trails more often between late afternoon and early morning. Human activity in localized areas did not deter radio-collared cougars from entering the immediate vicinity in some cases. Cougars may be more sensitive to disturbance at kill sites than when they are travelling. Levels of human activity in the Sheep River study area in the summer were variable and discontinuous. Campgrounds which were full on weekends were empty during cold, rainy weekdays. S.R. 546 was busy with vehicles on weekends and generally less so during the week. Other studies indicate that the cougar's tolerance of different types of human disturbance, particularly disturbances that are continuous, may be less than what we recorded in the Sheep River study area.

Jenkins, J. H. 1971. The Status and Management of the Bobcat and Cougar in the Southeastern United States. Pgs. 87-91 In: Jorgensen, S.E. and L.D. Mech. Proc. of

a Symposium on the Native Cats of North America, Their Status and Management. U.S. Dept. Int., Fish and Wildlife Service, Twin Cities, Minnesota.

Several recent sight records in Alabama, Georgia, and South Carolina by competent biologists were reported. The cougar had long been wiped out in Maryland. Cougars are absent in Kentucky as well, although there was a vague record of one killed near Central City around 1960, which may have escaped from a roadside zoo. Although there are no substantial records of the cougar in the past 10 years in Virginia, a ranger reported sighting a cougar in 1970, but no tracks or scrapes have been found. There were no verified recent sightings or records of the cougar in North Carolina, but persistent sight records come in from the extreme Western mountains and the Eastern coastal counties. There was a flurry of cougar rumors in coastal South Carolina about 15 years earlier, but none were verified by tangible evidence. A cougar was sighted in 1964 by a game biologist on the Savannah River Project in west-central South Carolina. Another cougar was sighted by a wildlife biologist near Allendale, South Carolina, south of the Savannah River Project in 1955. Georgia has more than its share of cougar sight records, but these have been investigated without success. The author reported seeing a photo of a cougar kill made within a few miles of the Georgia line in eastern Alabama. The last records of specimens seems to have been in the 1920's when they were reasonably common in the Okefenokee Swamp. The population in Florida was considered between 50 and 100. There are valid recent records in Alabama. Plaster casts of two tracks were verified from Clarke County in 1961. A cougar kill was recorded in 1948 and in 1956 by a game biologist on the Upper State Game Sanctuary. There were recent cougar specimen records for both Louisiana and Arkansas. Specimens were taken in 1966 (DeSoto Parish) and 1970 (Vernon Parish) in Louisiana, and one taken by deer hunters in 1969 near Hamburg, Arkansas just across the Louisiana line. Another specimen was reported around 1967 from Caddo Parish, Louisiana. Cougars were apparently present in both states in very low numbers.

Jessup, D.A., K.C. Pettan, L.J. Lowenstine and N.C. Pedersen. 1993. Feline Leukemia Virus Infection and Renal Spirochetosis in a Free-Ranging Cougar (Felis concolor). J. Zoo Wildl. Med. 24(1):73-79.

A young adult male free-ranging cougar (Felis concolor) was removed from a college campus in Sacramento, California. Blood samples taken shortly after capture revealed it to be anemic, lymphopenic, suffering from renal disease, and feline leukemia virus (FeLV) antibody positive. The animal was euthanized. On postmortem examination, generalized lymphadenopathy and lymphoproliferative disease were noted. FeLV was isolated in cell culture and demonstrated within lymph nodes and salivary glands by immunohistochemistry. Bilateral subacute tubulointerstitial nephritis was also noted, and silver staining revealed spirochetes. This is the first case report of FeLV infection of a free-ranging wild felid in North America.

Johnson, A.S. 1988. Arizona's Beleaguered Lions. Defenders Sept./Oct. Pgs. 32-34.

A few incidences of mountain lions approaching human beings and in some cases attacking and killing dogs which accompanied human beings were reported in the Mount Wrightson Wilderness Area of the Coronado National Forest south of Tuscon, Arizona. The Arizona Game and Fish Department closed the area and hired a professional hunter to track and kill the lion. A 30-pound immature lion in poor shape was killed and may have represented a kitten raised in captivity and released in

the area. Arizona is the least restrictive lion hunting state except Texas, where no protection at all is provided. Arizona sells more lion permits than the other 10 western states combined, averaging more than 7,600 permits a year since 1979 as opposed to some 5,500 a year for the remainder of the West. Based on calculations of deer/lion ratios from previous studies, Arizona's estimated 170,000 deer indicate a lion population of somewhere between 472 and 850. However, the Arizona Game and Fish Department estimated the lion population to be between 1500 and 2500 which would mean that between 54,780 and 91,250 deer or 32 to 54% of all the deer in the state would be consumed each year. This plus the annual hunter kill of about 14,000 deer would mean an annual deer mortality of 40 to 60% which is more than any deer population can withstand. The author felt that the Arizona Game and Fish Department may be greatly overestimating the lion population in the state.

Johnson, H.G. 1942. Mountain Lion Bags New Kaibab Record. Arizona Wildlife and Sportsman 4:10-11.

A mountain lion killed a buck with the greatest spread of antlers ever recorded (46-11/16 inches) on a deer on the Kaibab National Forest. The record had been a 44-1/2 inch spread taken by a hunter. The kill was found by a lion hunter, and his dogs immediately set out on the lion's trail and he shot and killed the large tom. The buck was in the prime of life and in great physical condition. The author believed that lions frequently kill deer in prime physical condition which seemed to disprove the hypothesis that lion kill primarily the weak or sick.

Johnson, J.F. 1980. Mountain Lion Research (1976-80). Final Report. Proj. No. W-124-R-4, Job 1. New Mexico Dept. of Game and Fish. 16pp.

The objectives of this study resulted from earlier mountain lion research studies under Project W-93-R. Some of the objectives could not, however, be completed as desired, in part due to the small sample of radio-collared lions on the study area. The information obtained on sizes of home ranges varied from approximately nine square miles to 40 square miles per month. On an overall basis, lion home ranges varied from 21 square miles to 162 square miles. The total area occupied by males appeared slightly larger than that occupied by females. This may be due in part to the females' ranges being restricted as a result of being followed by young. One female, captured with cubs and monitored for an extended period of time, appeared to extend her range as her young increased in size. As lions were monitored during this study, a determination was made whether the particular individual was active or inactive. Insufficient information was obtained to state the activity period over a 24-hour period, but activity from 6:00 a.m. to 10:00 p.m. was established. Peak activity periods appear to occur at approximately 6:00 a.m. and from 6:00 p.m. to 8:00 p.m. The least active periods appear to occur around 10:00 a.m. and 1:00 p.m. The composition of prey species identified by the study teams was composed primarily of mule deer. One domestic calf and one fox, which had been trapped by a rancher, were also taken. The physical condition of all animals taken appeared to be good at the time of death. Movements of radio-collared study lions appeared to be very erratic. Their movements would range from only several airline miles to 15 miles or more per day. Their staying within a more restricted area for a period of time caused study personnel to search more intently for signs of kills, but this later proved not to be a reliable method of locating kills.

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Johnson, J.H.J., A.M. Wolf, T.L. Johnson, and J.M. Jensen. 1993. Gentamicin Toxicosis in a North American Cougar. J. Am. Vet. Med. Assoc. 203(6):854-856.

A cougar with gentamicin toxicosis developed pyrexia, dehydration, and renal damage during the treatment period. To minimize adverse reactions to aminoglycosides, animals should be monitored by sequentially measuring serum urea nitrogen and creatinine concentrations, creatinine clearance, urine volume, osmolarity, and protein content as well as evaluating urine sediment before and during treatment. Extrapolating drug dosages by metabolic scaling provides a method of calculating a drug dosage outside the range for which dosages have been reported for the species.

Johnson, K.A., and W.L. Franklin. 1984. Ecology and Management of the Patagonian Puma (F. c. patagonica) in Southern Chile. Pgs. 141-145 In: J. Roberson and F. Lindzey (eds.), Proc. of the Second Mountain Lion Workshop. Utah Div. Wildl. Res. and Utah Coop. Wildl. Research Unit, Zion National Park. 271pp.

The puma population in and around Torres del Paine National Park is a classic example of wildlife in conflict with man. This population is believed to have increased rapidly over the last several years. Depredation is causing serious concern among local ranchers who claim that pumas leave the park to kill and return for protection. Study objectives and methods are discussed.

Johnson, K.G., T.H. Logan, E.D. Land, M.A. Lotz, M.R. Dunbar, R. McBride, D.K. Jansen, and O.L. Bass Jr. 1997. Preliminary Evaluation of Florida Panther Genetic Restoration and Management. Page 87 *in* W.D. Padley, ed., Proc. Fifth Mountain Lion Workshop: 27 February- 1 March 1996; San Diego, California.

Eight non-pregnant female Texas cougars (*Puma concolor stanleyana*) were quarantined and then released at five locations in South Florida from 29 March-26

July 1995 for genetic restoration of the Florida Panther (*P.c. coryi*) population. Genetic restoration is intended to reduce inbreeding and restore genetic variability and vitality for a healthier, more resilient population of Florida panthers. Management strategies will be developed to maintain genetic diversity that is historically typical of the North American population, and will restore the long-term, adaptive capacity of the panther population. Telemetry and biomedical data were collected on 18 radio-collared Florida panthers and eight female Texas cougars. No significant biomedical or health problems were detected during quarantine. Social interactions have occured between Texas cougars and both female and male Florida panthers. One litter of intercrossed kittens (F,M) were born in late September and the second intercrossed litter (F) was born in mid-October. Four female panthers denned during the previous year; seven neonate kittens (3F, 4M) were examined at three dens and five panther kittens were marked with transponders; all intercrossed kittens have been marked with transponders. One Texas cougar was struck and killed by a motor vehicle on 20-21 September; she was found to contain three half-term fetuses upon necropsy. Mortalities of instrumented panthers included three males and two females; two males died from intraspecific aggression, a female died of pleuritis, another female was struck and killed by a vehicle, and the third male's cause of death was unknown. Florida panthers showed spatial use patterns similar to previous years. No displacements of Florida panthers have occured nor have disruptions to the existing social organization been observed. Movements of Texas cougars were generally within habitat areas used by Florida panthers and the occasional movements in atypical areas such as mangroves and suburban areas were probably typical of animals exploring unfamiliar terrain. Evaluation of genetic restoration of the panther population will be based on the relative demographic and reproductive performance, morphological traits, and genetic characteristics of F1 and F2 intercrossed offspring.

Johnson, K.H., C. Wernstedt, T.D. O'Brien, and P. Westermark. 1991. Amyloid in the Pancreatic Islets of the Cougar (Felis concolor) is Derived from Islet Amyloid Polypeptide (IAPP). Comp. Biochem. Physiol. 98B(1):115-119.

1. Islet amyloid isolated from the pancreas of a 20-year-old cougar (Felis concolor) was dissolved and purified by gel permeation and reversed phase HPLC for amino acid sequence analysis. 2. N-Terminal amino acid sequence analysis of the purified protein revealed a primary structure (positions 1-28) identical to islet amyloid polypeptide (IAPP) from domesticated cats. 3. IAPP from the cougar, like IAPP from the human and domesticated cat, incorporates an inherently amyloidogenic AILS sequence at positions 25-28.

Johnson, M.K., R.C. Belden, and D.R. Aldred. 1984. Differentiating Mountain Lion and Bobcat Scats. J. Wildl. Manage. 48(1):239.

The objective of this study was to determine if thin-layer chromatographs of fecal bile acids could be used to distinguish between mountain lion and bobcat scats. Of all known samples, 64% of the bobcat and 79% of the mountain lion scats were correctly identified by thin-layer analysis. Twenty-one (88%) of the known mountain lion scats were correctly identified visually and 18 (86%) of these were also correctly identified chemically. For the samples for known bobcats, nine (64%) were correctly identified visually and seven (78%) of these were correctly identified chemically. No identification errors were made when visual and chemical identification matched. Although 4 different bile acids occur in both mountain lion and bobcat scats, only cholic and deoxycholic acids regularly occurred in mountain lion scats in concentrations detectable by thin-layer analysis. According to gas chromatography analysis, these two compounds also comprised higher ($P<0.05$) proportions of total

bile acids in mountain lion scats than in bobcat scats. Total bile acid concentrations were so low in mountain lion scats that only cholic and/or deoxycholic acids were detected by thin-layer chromatography of extracts from a 1 g sample. This is distinctive for mountain lion scats. However, thin-layer analysis appears to be only about 80% accurate for mountain lion scats and about 65% for bobcat scats.

Johnson, M.L., and L.K. Couch. 1954. Determination of the Abundance of Cougar. J. Mammal. 35:255-256.

The use of the formula (N= 3K + 3K divided by 10) to determine the abundance of cougar is described where K is the number of cougars killed each year and N is the total population. The result is an absolute minimal figure because it ignores theoretical factors of death by starvation, accidents, and other considerations.

Johnson, N. 1984. Idaho-Cougar Status Report. Pgs. 37-38 In: J. Roberson and F. Lindzey (eds.), Proc. of the Second Mountain Lion Workshop. Utah Div. Wildl. Res. and Utah Coop. Wildl. Research Unit. Zion National Park. 271pp.

The mountain lion reached Big Game status in 1972, with a one lion limit per year. Tags were first required in 1975 even though they could be purchased after the take. The mountain lion harvest from 1973-1984 is presented. A mandatory report has been required since the 1973 season. A tag now has to be purchased prior to the take and the skull must be brought in when complying with the mandatory check requirement.

Johnson, S.C. 1986. Centralization and Investigation of Cougar Sighting Data in Georgia. Final Report. Georgia Endangered Species Proj. W-47, Georgia Dept. Nat. Resources. Atlanta.

Investigation of cougar sighting reports from various sources has continued in Georgia since 1978. A total of 296 reports were investigated during this eight year period. Each report was assigned to one of five reliability categories based on the results of investigations. A total of 23 reports (7.8%) were assigned to Category 3, 237 reports (80.1%) to Category 4, and 36 reports (12.2%) to Category 5. Approximately 20 to 30 formal reports are received each year by the project leader from throughout the state. No physical evidence directly attributable to cougar has been received to date. The identification of several hair samples was pending as of the date of this report.

Jordan, D.B. 1990. Mercury Contamination: Another Threat to the Florida Panther. End. Sp. Tech. Bull. 15(2):l, 6. USDI, U.S. Fish and Wildlife Service.

Extremely high levels of mercury, over 100 parts per million (ppm) have been found in the liver of a panther that died in the Everglades last summer. Although no generally acceptable explanation has surfaced, the mercury could be coming from the peat and muck soils that are common throughout Florida. These often flooded and highly anaerobic soils provide a suitable environment for the methylation of inorganic mercury. Methylmercury, a product primarily of anaerobic bacteria, is the biologically active and toxic form of mercury. Inorganic mercury is considered to be biologically harmless. The methylmercury enters the food web where the contaminant accumulates in the predators of aquatic animals. Liver and hair samples from archived dead panthers and live panthers were taken. Six of 10 liver samples and hair samples contained mercury levels of 7.8 ppm or higher. The presumed source of the contamination is the panther's prey, particularly raccoons, which

bioaccumulate mercury through the aquatic food web.

Jordan, D.B. 1990. Draft Environmental Assessment- A Proposal to Issue Endangered Species Permits to Capture Select Florida Panthers (Felis concolor coryi) for the Establishment of a Captive Population. U.S. Fish and Wildl. Service Florida Panther Recovery Coordinator, Univ. of Florida, Gainesville. 13pp.

The purpose and need for action, location, and background of the Florida panther is presented. Six alternatives are offered along with a general description of the environment that could be affected by these alternatives. Included are the discussions of the physical, biological, social, and economic components of the environment. A section is devoted to answering specific questions and alleviating major concerns with regard to the intention of preparing an Environmental Assessment on the proposed establishment of a captive Florida panther population.

Jordan, D.B. 1994. Identification and Evaluation of Candidate Florida Panther Population Reestablishment Sites. In: Dennis Jordan, ed., Proc. of the Florida Panther Conf., USFWS. 18pp.

Population reestablishment is essential to achieve recovery of the Florida panther. With only one wild population remaining, at least two additional populations will have to be reestablished to achieve the Recovery Plan's objective of a minimum of three viable, self-sustaining populations within the panther's historic range. Actions have been initiated to identify and evaluate potential reintroduction sites throughout the panther's historic range. Fourteen tentative sites have been initially identified and undergone preliminary evaluation. Site evaluation factors for this initial analysis were: proportion of site in forest cover, human population density, and road density. Each site was considered to be of sufficient size and be comprised of a prey density sufficient to support a self-sustaining panther population. Six candidate sites achieved a higher ranking (total score on evaluation criteria) than did the panther-occupied area in south Florida. Additional evaluation and analysis is planned. The goal is to develop weighted, scientifically definitive evaluation factors.

Kane, K.K., and W.J. Boever. 1976. An Evaluation of the Use of FVR C-P (Pitman-Moore Laboratories) Vaccine in Four African Lions and Two Mountain Lions. Proc. AAZV, Pgs. 45-49.

CONCLUSION

Several premises have been drawn from the study. First, there appeared to be no ill effects with the use of the FVR C-P vaccine when administered intramuscularly in the four African lions and the two mountain lions. Secondly, the response of the trivalent vaccine was significant. Three out of four seronegative exotic felines responded to the Rhinotracheitis component of the vaccine, while four out of four seronegative felines responded to the Calici Virus component of the vaccine. In addition, three out of four of the exotic cats developed or increased their titers of the Panleukopenia Antigen of the vaccine. In regards to the FVR component of the vaccine it is thought that a 13-day interval between vaccines is not as desirable as a 21-day interval which is recommended by the manufacturer. This may be a factor as to why the one African lion did not develop a detectable titer to the Rhinotracheitis portion of the vaccine. There is not enough information to comment on whether a double dose of this vaccine is more desirable than a single dose. Obviously, it is evident that further data is needed to adequately assess the value of this vaccine in

these and other exotic feline species.

Kautz, R. 1994. Historical Trends Within the Range of the Florida Panther. In: Dennis Jordan, ed., Proc. of the Florida Panther Conf., USFWS. 8pp.

Based on a GIS analysis of habitat use, Florida panthers prefer forest habitats, particularly cypress swamp, hardwood hammock, hardwood swamp, and pinelands. Statewide, forest habitats declined 4.30 million acres, or 21 percent, in the 51-year period from 1936 to 1987. This may have been enough habitat to support 35-70 male and 100-200 female Florida panthers. In a 10-county region of south Florida, forest lands declined 0.98 million acres between 1936 and 1987. All of the forest land converted to other uses came from the lands classified as commercial forest land, whereas lands classified as non-commercial forest land showed no decrease over time. Between 1949 and 1987, marsh land in south Florida decreased by 1.39 million acres. Between 1959 and 1987, cropland increased by 0.65 million acres, pasture increased by 0.53 million acres, and urban area increased by 0.71 million acres. Within a five-county area of southwest Florida that includes the current range of the panther, 92 percent of commercial forest land, which comprises important habitat for the panther, was in private ownership in 1987. A GIS analysis of ownership patterns revealed that 67 percent of the four vegetation types most preferred by the Florida panther were in private ownership in 1994. Cypress-gum forests accounted for 59 percent of the forests on commercial forest lands in southwest Florida, pine forests accounted for 32 percent, and hardwood forests accounted for 9 percent in 1987. Hardwood forests, which are the most important habitat types for panthers, are also the most rare forest type and are more likely to occur on private land. Sawtimber- and poletimber-size stands comprised 68 percent of commercial forest lands in southwest Florida whereas sapling, seedling, and nonstocked sites comprised 31 percent in 1987.

Kennedy, G.A. and A.C. Strafuss. 1976. Multiple Neoplasia in an Aged Cougar. J. Zoo Animal Medicine 7(l):24.

SUMMARY

The most striking of multiple necropsy lesions found in an 18-year-old cougar (Felis concolor) was a bilateral adenocarcinoma of the thyroid. Other lesions included a bile duct carcinoma in the liver, an adenocarcinoma in the lung, cholesterol pneumonitis, nodular hyperplasia of the adrenal cortex, accessory adrenal cortical tissue, chronic interstitial nephritis, and a malacic focus in one cerebral hemisphere. The animal was in good flesh but had been lethargic and lame in both hind legs before it was found dead in its cage. Adenocarcinomas of the thyroid appear to be relatively rare in felines. Of those reported, advanced age seems to be a common finding. This report describes an adenocarcinoma of the thyroid in an 18-year-old cougar (Felis concolor). In addition to various age-associated lesions, carcinomatous foci apparently unrelated to the thyroid tumor, were found in the liver and lung.

Kirkwood, J.K. and A.A. Cunningham. 1994. Epidemiological Observations on Spongiform Encephalopathies in Captive Wild Animals in the British Isles. Vet. Record 135(13):296-303.

Since 1986, scrapie-like spongiform encephalopathy had been diagnosed in 19 captive wild animals of eight species from eight zoological collections in the British Isles which included one puma (Felis concolor). This female puma had remained where she was born throughout her life and was separated from her dam at 10 months

of age. Both parents died of non-neurologic diseases and her diet consisted of rabbit and chicken carcasses and parts of cattle carcasses deemed unfit for human consumption, including split spinal columns without heads with offals rarely offered. On one occasion, three months prior to the onset of clinical signs and 4½ months before her death, was fed meat from two eland that had been culled from the collection. These eland were born in 1988 and were fed commercially prepared cattle food. Although unconfirmed, the authors considered that this puma acquired the disease from (BSE) bovine spongiform encephalopathy-infected cattle tissue (Willoughby and others 1992).

Kisling, V.N., Jr. 1976. Captive Propagation and Study as an Integral Component of a Field-Captive Management Program for the Florida Panther, Felis concolor coryi. Pgs. 46-58 In: Proceedings of the Florida Panther Conference, P.C.H. Pritchard (ed.). Orlando, Fl. 121pp.

A brief presentation of the Miami Zoological Park Research Department demonstrates why the zoo would be a facility with the capability to assist in a Florida panther conservation program. The captive breeding project as a conservation technique is discussed. How captive propagation and study can be integrated with field studies to form a cooperative and unified conservation management program is considered.

Kistner, T.P., D. Wyse, and J.A. Schmitz. 1979. Pathogenicity Attributed to Massive Infection of Nanophyetus Salmincola in a Cougar. J. Wildl. Dis. 15:419-420.

An estimated 650,000 Nanophyetus salmincola were recovered from the small intestine of a wild female cougar kitten (Felis concolor). The trematodes stimulated marked mucosal thickening in the duodenum and jejunum and caused a marked enteritis. Malnutrition was listed as the cause of death due to impaired nutrient absorption resulting from combined effects of the diarrhea and thickening of the intestine.

Kluge, J.P. 1967. Trichinosis and Sarcosporidiosis in a Puma. Bull. Wildl. Dis. Assoc. 3:110-111.

There had been no prior reports of Trichinella spiralis larvae in the puma Felis concolor. Multiple cysts containing larvae were present within skeletal muscle bundles in the esophagus and tongue upon necropsy of a 13-year old male puma obtained from the National Zoological Park. The puma was purchased from a dealer in Colorado at six years of age and was fed a diet of primarily raw horsemeat and occasional raw beef during the seven years at the National Zoo. A few parasitic cysts with different morphological characteristics were present in skeletal muscle and the author believed these were caused by a member of the genus Sarcocystitis.

Koch, D.B. 1994. Biopolitical Management of Mountain Lions, Tule Elk, and Black Bears in California. Int. Conf. Bear Res. and Manage. 9(1):561-566.

The hunting of mountain lions (Felis concolor), tule elk (Cervus elaphus nannodes), black bears (Ursus americanus), and other mammals has become controversial in California. Litigation by animal protection groups has resulted in several rulings regarding procedures used to adopt hunting regulations. The process has resulted in all hunting regulations being adopted pursuant to the California Environmental Quality Act. Although the process has been expensive and frustrating, and hunting opportunities have been foregone, many benefits in terms of the public's increased

awareness of key issues facing wildlife populations have resulted from the litigation.

Koehler, G.M. and M.G. Hornocker. 1984. Mountain Lions as a Mortality Factor in Bobcats. Pgs. 170-171 In: J. Roberson and F. Lindzey (eds.), Proc. of the Second Mountain Lion Workshop, Utah Div. Wildl. Res. and Utah Coop. Wildl. Research Unit. Zion National Park. 271pp.

Of twenty-seven bobcat radio-collared during the previous three years in this study, eight or 33% have died from natural causes and 5 of the 8 were believed to have been killed by mountain lions. Opportunities for increased interactions and competition between predators occurs on the winter range where major ungulates confine their activities to the lower elevations. The bobcat were killed but not eaten indicating possible defense of its kill or to steal a carcass from a bobcat. Mountain lions appear to be a significant factor in bobcat mortality in this study area on winter range.

Koehler, G.M. and M.G. Hornocker. 1986. A Preliminary Survey of Mountain Lions in Yellowstone National Park. Wildl. Res. Inst., Moscow, Idaho. 12pp.

A systematic survey was conducted to determine the status of the mountain lion on winter range within Yellowstone National Park from 7 January to 1 April 1986. A total of 60 days were spent in the field and 720 km were traveled searching for mountain lions. Tracks were observed on 13 occasions representing possibly 3 to 5 individuals, including at least one male. All observations of mountain lion sign occurred in Douglas fir forest associations at elevations below 2134 m where snow depth was less than 50 cm. Elk were abundant and deer were scarce and elk represented the dominant prey item in the areas occupied by mountain lions. Hunter harvest was greatest along the Yellowstone River north of Yellowstone National Park where 48 mountain lions were harvested from 1981 to 1985 and this area was the most likely source of recolonizing lions.

Koehler, G.M. and M.G. Hornocker. 1991. Seasonal Resource Use Among Mountain Lions, Bobcats, and Coyotes. J. Mammal. 72(2):391-396.

Use of prey, and topographic and habitat features by mountain lions (*Felis concolor*), bobcats (*Lynx rufus*), and coyotes (*Canis latrans*) in central Idaho was investigated to determine how syntopic carnivores coexist where resource use may overlap. There were significant differences in use of elevation, forest types, terrain, overstory density, and exposure by these predators during summer. Despite morphological and behavioral differences permitting these predators to partition resources, resource use overlapped during winter when snow confined prey and predators to lower elevations. Overlap in their diets was significant during winter resulting in mountain lions killing bobcats and coyotes while defending or usurping food caches.

Koford, C.B. 1946. A California Mountain Lion Observed Stalking. J. Mammal. 27:274-275.

On February 7, 1946, the author observed a California mountain lion (F.c. californica) apparently stalking deer at midday. The lion was spotted at 12:40 P.M. in the open about 300 yards downhill from nine deer grazing near the summit of Whiteacre Peak, Ventura County, California. The sequence of events is recounted. The maximum count of steps between stops was 19 going uphill and 29 downhill. According to the author, the most interesting feature of the actions of the lion was the erect pose when sitting, presumably to keep the deer in view over the intervening

ridges.

Koford, C.B. 1977. Status and Welfare of the Puma (Felis concolor) in California, 1973-1976. Final Report to the Defenders of Wildlife and the National Audubon Society, Univ. of Ca., Berkeley. 57pp.

SUMMARY

From 1973-1976, I investigated the distribution and welfare of the puma in California by means of analyzing records, perusing literature, interviewing, inspecting habitats, and ground tracking cats. Pumas now occur over most of the region they occupied half a century ago but they regularly live only in limited patches of widespread habitat types, mainly mixed conifers and mixed brushlands in mountains. Bounty records for 55 years before 1963 indicate that the rate of kill fell notably during the 1940s, that the region of greatest kill shifted from northwestern to south central mountains, that in patches where the kill-rate had been low the cats became rare, and that in patches where the kill-rate had been moderate to high the portion occupied by pumas shrank. Reductions since 1950 were largely caused by loss of habitat through increase in mountain roads and reservoirs, with concomitant human use, and this loss continues. The main prey of the puma, deer, have declined greatly since the mid 1960s. Yet, in some localities pumas have become more conspicuous during five years of hunting moratorium. Judged by the results of 3000 miles of slow tracking on roads and trails mostly in six study areas, the average summer densities per 100 square miles in favorable habitat are about 3 grown pumas. Bounty and recent reports show that the cats reside year around and produce young in a total area of perhaps 15,000 square miles, mostly in the northwestern mountains, the southern Coast Range, and the western slope of the southern Sierra Nevada. Additional pumas, mostly young males and other non-breeders, are more mobile and occur sporadically over a larger area. The number in the state changes with season and year, depending on varying rates of birth and survival in many subpopulations, and production rates are conjectural. As a working estimate of total numbers, however, I suggest an average of 1000, of which roughly 300 females are of breeding age. Numbers are apparently limited by interactions among the pumas rather than by fluctuating prey abundance, and are regulated through mortality and dispersal of young. Pumas in California survived decades of hunting, mostly during a period of rapid increase of deer and people, but they may not thrive in an increasingly modified environment. Reports of kittens are rare and in many subpopulations, especially in far southern counties, replacement of breeding females may be inadequate to sustain moderate numbers. To provide the maximal scientific, ecological, and esthetic values of our most spectacular carnivore, the basic management of the puma in California should be protection in a naturalistic setting.

Koford, C.B. 1978. The Welfare of the Puma in California, 1976. Carnivore 1(1):92-96.

California was the only state where the puma was protected by a hunting moratorium. Classed as a big game animal in 1969, public demand brought about protection in 1972. Over 12,000 bounties were paid on the puma between 1908-1963. The trend had been toward disappearance of puma kills from previously low bounty kill rate zones and into parts of earlier moderate-to-high bounty kill rate zones, as might be expected in a decreasing overall population. Average bounty kill dropped from about 290 during the first 8 years to about 135 during the last 8 years. The author concluded that the overall range of regular occurrence of puma in California had been relatively stable for decades and comprised roughly 15,000 square miles. There

appeared to be no evidence of expansion of resident range in California during this century. It was concluded that the average summer density in good puma country throughout California is 3 grown cats per 100 square miles and that there were less than 1000 pumas in California.

Kohls, R. 1988. Mountain Lion Law Enforcement Problems in Arizona. Pg. 42 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

Regulations governing the taking of mountain lions (Felis concolor) in Arizona have recently undergone some significant changes. As regulations become more restrictive it is expected that the unlawful taking of mountain lions will also increase. Seven problem areas of enforcing mountain lion regulation are: taking lions without a permit; unlawful taking of lions by trappers; "will-call" hunting; taking of lions at night; use of vehicles as aids in hunting lions; take of lions under the guise of livestock depredation; and the use of lion permits to "Buddy Hunt" for other big game. All problem areas need to be considered when proposing new regulations concerning the harvesting or protection of Arizona's mountain lions.

Kurten, B. 1976. Fossil Puma (Mammalia:Felidae) in North America. Neth. J. Zool. 26(4):502-534.

SUMMARY

Fossil finds of Felis (Puma) from North America are listed and described. They range in time from the late Blancan to the sub-Recent. Blancan and Irvingtonian material is referred to F. inexpectata, Rancholabrean and later to F. concolor. The extinct F. inexpectata differs from F. concolor in its larger size and different dental and limb proportions and probably was adapted to a more cursorial mode of predation. Sparse fossil remains of a still older, smaller form may represent the ancestry of F. inexpectata and a relationship to certain Old World felids, especially "Panthera" schaubi, is possible. Evidence of a transition in Irvingtonian-Rancholabrean times may suggest that F. inexpectata was ancestral to the living pumas. Rancholabrean pumas show north-south clines in size analogous to that in the Recent population.

Kutilek, M.J., R.A. Hopkins, E.W. Clinite, and T.E. Smith. 1983. Monitoring Population Trends of Large Carnivores Using Track Transects. Pgs. 104-106 In: Renewable Resources Inventories for Monitoring Changes and Trends; Proc. of an International Conf., J.F. Bell and T. Atterbury (eds.). Corvallis, Oregon.

There is a need to develop reliable, inexpensive ways to monitor population trends for large carnivores. During the summers of 1980 and 1981, we systematically searched for mountain lion tracks along dirt roads in five areas of California to assess the use of track transects as a population trend indicator. The number of sets of tracks for the five areas ranged from 0.6 to 3.7 lions per 100 km of road tracked. For areas of limited size, two 32-40 km-long transects repeated over five consecutive days were reasonably consistent in the number of track sets found from one year to the next. For trends over large areas (e.g. statewide) we suggest using numerous annual, one-day transects with a simplified system of data collection and analysis. Caution must be used in comparing data from one area to another due to differences in topography and vegetation and their effect on road use by carnivores.

Kuvava, G.C. 1959. Two Reports of Mountain Lion from Lake and Cook Counties.

Flicker 31(1):6.

Previous to 1958, there were only five records of the puma in the state of Minnesota. The author describes three reports of cougar sightings in Lake and Cook Counties, Minnesota. Previous records of the puma were from Lyon, Becker, Ottertail, and Chisago Counties, Minnesota.

Kuyt, E. 1971. Possible Occurrence of Cougar Near Fort Smith, N.W.T. Blue Jay 29:142-143.

Two cougars were reportedly observed about 5 miles south of the Parson's Lake fire lookout tower in the northern part of Wood Buffalo National Park at approximately 59° 50'N, 112°25'W. Another cougar was sighted on March 17, 1967 on the edge of the road about 12 miles north of Hay Camp, Wood Buffalo National Park. Another cougar was sighted in the summer of 1962 at the foot of Axe Handle Hill in Fort Smith.

Laing, S.P. 1988. Cougar Habitat Selection and Spatial Use Patterns in Southern Utah. M.S. Thesis, Univ. of Wyoming, Laramie. 68pp.

Fifty-two cougars (Felis concolor) were monitored using radio-telemetry between 1979 and 1987 in southern Utah. Tracking cougars with hounds and snow-tracking indicated that their habitat use while active (primarily nocturnal) was essentially the same as when inactive (primarily diurnal radio-locations). Cougars selected pinyon-juniper woodlands with lava boulders disrupting the understory, ponderosa pine/oakbrush, mixed aspen/spruce fir, and spruce-fir habitats. They avoided sagebrush bottomlands, agricultural and pasture lands, pinyon-juniper/ponderosa pine/sagebrush mixtures, slickrock sandstone canyons, and open meadows. A habitat model derived from discriminant function analysis indicated that overstory cover (mean = 56.6%), overstory height (mean = 8.9 m), and slope (mean = 40.0%) were the most important structural characteristics in highly used habitats. Cougar densities in the core study area averaged 1.19/100 km^2 from 1979 to 1987, monitoring an average of 19 individuals per year. Home range sizes of resident cougars averaged 731 km^2 for males (N=6) and 541 km^2 for females (N=18) using convex polygons, and 1,385 km^2 and 664 km^2 respectively, using probability ellipses. Female home range replacement was characterized by the establishment of resident progeny and/or adjacent residents in vacant ranges. Replacement usually involved 2 or more individuals sharing the range of the original resident female, while expanding into adjacent areas. Numbers of resident males was generally <2 per year prior to 1986, after which the density of male residents increased to 6, although the number of resident females remained stable throughout the study.

Laing, S.P. and F.G. Lindzey. 1991. Cougar Habitat Selection in South-central Utah. Pgs. 27-37 In: Mountain Lion-Human Interaction Symposium, C.E. Braun (ed.), Col. Div. Wildl., Denver. 114pp.

Fifty-two cougars (Felis concolor) were monitored by radiotelemetry during 1979-1987 in south-central Utah. Tracking cougars with hounds and by snow-tracking during 1986-1987 indicated essentially the same habitat use while active (primarily nocturnal) as diurnal radiolocations. Cougars used pinyon-juniper woodlands with lava boulders disrupting the understory, ponderosa pine/oakbrush, mixed aspen/spruce-fir, and spruce-fir habitat types more than availability suggested. A habitat model derived from discriminant analysis revealed that slope and overstory

cover and height were the most indicative characteristics of highly used habitats.

Laing, S.P., and F.G. Lindzey. 1993. Patterns of Replacement of Resident Cougars in Southern Utah. J. Mammal. 74(4):1056-1058.

Members of a cougar (Felis concolor) population in southern Utah were monitored from 1979 through 1987. Vacated ranges of resident females commonly were filled by their independent-aged daughters or those of adjacent resident females. Less often, immigrating, transient females established residency in these vacated ranges. Adjacent resident females did not significantly shift nor expand their ranges into neighboring vacated ranges. Vacated ranges of resident males were filled by immigrating, transient males.

Lambert, H. 1955. There Ain't No "Painters" in West Virginia. West Virginia Conservation. March, pp. 11-12.

The last evidence of panthers in West Virginia was tracks found in 1936 in Pocahontas County. Hundreds of panthers have been reported since that time, but no real evidence had been presented. In the late 1800's, panther numbers dwindled with decreasing deer numbers. The panther was still considered extinct in West Virginia.

Land, E.D. 1991. Big Cypress Deer/Panther Relationships: Deer Mortality. Final Report. Study No. 7509, Fed. No. E-l II-E-5b. Florida Game and Fresh Water Fish Commission. Tallahassee. 30pp.

Sixty-six white-tailed deer (Odocoileus virginianus) were captured in the Bear Island Unit of the Big Cypress National Preserve, 57 of which were radio-instrumented. Of the 26 marked deer that died, 10 were taken by bobcats (Felis rufus), 4 by Florida panthers (Felis concolor coryi), and 1 by an alligator (Alligator mississippiensis). Four died of other natural causes, 5 were harvested (3 legally, 2 illegally), and 2 died of unknown causes. Average doe home range size was 239 ha and 2 bucks ranged from 454-1560 ha. There were no differences in survival rates among three intervals: summer (1 May - 31 August), fall/hunting season (1 September - 31 December), and spring (1 January - 30 April). The average annual survival rate was 0.813 (95% CI - 0.68, 0.94), and 64% of the annual mortality was attributable to predation. A neonate mortality rate of 37.8% plus or minus 16.1 can be inferred by examining pregnancy rates and number of fetuses from collected does and comparing to the fawn-rearing rate from observations of radio-instrumented does. Fawn mortality appeared to fluctuate with surface water levels (high water= high fawn mortality). Hunting activities had little to no impact on does, either in number of illegal kills (2) or by causing does to leave the Preserve (0). The population appeared to be stable with a net reproductive rate (R_0) of 0.97.

Land, E.D. 1994. Florida Panther Population Dynamics in Southwest Florida. In: Dennis Jordan, ed., Proc. of the Florida Panther Conf., USFWS. 5pp.

The author describes how panthers are captured and provides insights into what has been learned about them in the previous 15 years of study. Over 20,000 radio locations on 56 panthers have been collected since 1981. About 90% of the panther's diet consists of feral hogs, white-tailed deer, raccoon and armadillo with rabbit occasionally taken. Panthers killing panthers, primarily adult males killing juvenile males, is the number one cause of death among radio collared panthers. Road kills account for approximately 20% of known mortality, but all natural causes far exceed the road kill mortality of panthers. Overall, most adult females are producing kittens

every other year primarily in the late spring and early summer. The author saw many similarities between statistics in an unhunted cougar population in Utah and panthers in Florida. However, male dispersal distances in Florida are approximately half of the Utah population due to a very limited habitat base which limits the sharing of genetic material in Florida panther populations.

Land, E.D. 1994. Panther Use of the Southern Florida Landscape. In: Dennis Jordan, ed., Proc. of the Florida Panther Conf., USFWS. 4pp.

Pine palmetto communities and hardwood hammocks seem to be the preferred habitats for Florida panthers. Most of the areas occupied by panthers are mosaics, where you have open marshes, cypress domes, hardwood hammocks, and pine palmetto. Young sub-adult males are responsible for most of the use of fringe areas as they wander in search of a place to establish a territory. Females and dominant adult males tend to stay near core areas. Most reproduction occurs along a narrow corridor north of Alligator Alley stretching from the panther refuge out through the addition lands. Eighty to 90% of all panther dens occur in this narrow stretch along I-75. This area is typified by vast areas predominated by native vegetation. The challenge is to try to manage these peripheral areas where the young males are dispersing so they have safe havens that allow them to mature and better compete for prime panther areas. This would allow better gene flow which is necessary to maintain a healthy population.

Land, E.D., D.R. Garman and G.A. Holt. 1998. Monitoring Female Florida Panthers Via Cellular Telephone. Wildl. Soc. Bull. 26(1):29-31.

A method to transmit signals from denning radio-collared female panthers via cellular phone to efficiently detect opportunities for handling neonate kittens is described.

Land, E.D., S.K. Taylor and M. Lotz. 1998. Florida Panther Genetic Restoration and Management (7508). Annual Rep., Bur. Wildl. Diversity Cons., Florida Game and Fresh Water Fish Commission, Naples. 50pp.

Telemetry data were collected on 31 radio-collared Florida panthers (Puma concolor coryi) and 7 Texas cougars (P. c. stanleyana) in south Florida during the reporting period. Two instrumented panthers died (ruptured aorta, intraspecific aggression), and 1 Texas cougar was illegally shot and killed during the study period. One uncollared female panther died from a collision with a vehicle and an older captive panther was euthanized due to declining health. Eight new panthers were added to our radiocollared population this past capture season. Comparing reproduction among panthers and cougars, two female panthers denned during the past year producing 4 neonate kittens (2_, 2_) and two female Texas cougars denned producing 3 neonate kittens (1_, 2_). All were marked with transponders. A total of 12 (4_, 8_) F1 kittens have been produced and none of these kittens have exhibited kinked tails or cowlicks. Over the same time period, 24 kittens were born to panthers and 19 had kinked tails. Three panthers were held in captivity for several months this reporting period. Male panther #51, previously held to treat a mycotic dermatitis, was treated for a broken toe and to diagnose and remove a large mass from his hip. Female panther #61(F1) was placed in captivity after she was found to be suffering from severe anemia and dehydration in June 1997. She was released back into her former territory after 55 days in captivity and has resumed normal movements. Female panther #69, a 10-month-old dependent kitten, was captured in an emaciated and dehydrated state following the death of her mother. She was taken to White Oak

Conservation Center for maturation in preparation for release back into the wild.

LaPointe, D. 1978. The Cat That Isn't. Michigan Nat. Res. Magazine. Jan./Feb. pp. 28-30.

The cougar supposedly became extinct in Michigan during the 19th century. The author discusses sightings made of cougars in the Upper Peninsula of Michigan. It is still controversial whether a remnant population of cougars exist in Michigan.

Larson, J.S. 1966. Panthers. Maryland Conservationist. 43(4):2-3.

An 1830 record of a cougar in Garrett County remained the last finding for the state of Maryland. Later reports of cougars from western Maryland lacked any concrete evidence and it is believed the cougar was completely exterminated from most of the state before 1800.

Laundre, J.W., M. Sellers, T. Clark, and D.P. Streubel. 1991. Behavior, Ecology, and Conservation of Mountain Lions in Fragmented Habitat. Progress Rep., Dept. Biol. Sci., Idaho State Univ., Pocatello. 46pp.

Ten lions were treed during four winters in southcentral Idaho and northwestern Utah (2,500 km^2). Seven were adults (four females, three males) and three were kittens (two females, one male). All adults were fitted with radiocollars and released. One of the kittens was fitted with an expanding radio collar while the other two were only eartagged. Two adult females had home ranges of approximately 80 km^2. One of the two adult males had a home range of 230 km^2 while the other remained in a small (49 km^2) and rugged area of the Albion Mountains. Seventeen mule deer killed by lions had been located and included males and females, adults and juveniles, and animals in good and poor condition. Definite sign was found for 16 lions (8 adults, 8 kittens) on the study area during the 1989-90 winter. Daily activity patterns seemed to emulate the typical crepuscular pattern. In fragmented habitat, it appeared crucial that corridors between usable habitat patches be identified and protected from development.

Lawrence, R.D. 1989. Is the Eastern Cougar Making a Comeback? Canadian Geographic 109(4):32-33.

Repeated tales of sightings of the eastern cougar fueled uncertainty about its fate in spite of there being no conclusive evidence for more than a decade. In 1954, the author found tracks in the snow of an animal he believed to be a cougar in the Nagami River region of Ontario, some 70 kilometres west of Hearst. He reported the evidence he had found but was told that the cougar had been extinct in Ontario since before the turn of the century. Seven years later the author saw an eastern cougar along a stream that feeds White Lake. Another eastern cougar was spotted by the author in 1969, 900 metres north of a small lake that feeds the Mattawa River. The author wrote a book entitled "The Ghost Walker" after completing a nine-month study of cougars in British Columbia. Helen Gerson noted that between 1935 and 1983 reports have been made of 318 sightings in Ontario, including some of cougars with kittens. In addition, 260 sightings took place in Manitoba between 1920 and 1975, and in 1973 a specimen was killed only 82 kilometres from the Ontario border. Sightings and/or sign have also been reported in Minnesota and Quebec. There have been more than 200 sightings in both New Brunswick and Nova Scotia since 1977.

with 61 in 1988.

Laycock, G. 1988. Cougars in Conflict. Audubon. March. Pgs. 88-95.

By the 1600's, Jesuit priests in lower California were offering the natives one bull for every mountain lion killed. California began paying $20 bounties on mountain lions in 1907, and in 1919 employed hunters and their dogs to kill mountain lions. The bounty continued until 1963 and in 1969 the lion was protected as a big-game animal. In 1972, a moratorium was enacted on lion hunting which continued until 1987, when a limited hunt was proposed but was blocked by the courts. Lion numbers appeared to be increasing since the moratorium. Confirmed incidents of lion depredation increased from five in 1971, fifteen in 1975, forty-one in 1980, and 138 in 1985. In British Columbia, the possibility of a close encounter with a cougar is a fact of life. More than two dozen attacks have been listed since 1914, most on Vancouver Island and four have proven fatal. Accounts of attacks on humans by mountain lions are rare and several of these attacks are described. In 1986, Janice E. Schmidt, a student at the University of California at Davis, searched old records and found a total of 66 attacks, 23 of which were fatal, from 1750 to 1986. In a recent 18-month period, the Orange County, California Animal Services Department logged 51 reports of lion sightings.

Layne, J.N., and M.N. McCauley. 1976. Biological Overview of the Florida Panther. Pgs. 5-45 In: Proceedings of the Florida Panther Conference, P.C.H. Pritchard (ed.). Orlando, Fl. 121pp.

The biology of the Florida panther was poorly known, despite many years of a precarious existence. Over 200 unpublished alleged panther records were reviewed in Florida in addition to literature searches dating back to 1935. Reliability was rated on a 4-point scale, ranging from most to least reliable and represented 5 percent, 31 percent, 43 percent, and 19 percent, respectively. Felis concolor coryi Bangs was one of the 30 recognized subspecies, named by Outram Bangs in 1899 after Charles B. Cory, a prominent sportsman and scientist associated with the Field Museum of Natural History in the 1800's. The type locality was designated by Bangs as the "wilderness back of Sebastian." In his original description, Cory noted that the Florida panther had relatively long legs and small feet. Several northern specimens examined had a foot at least 4 inches wide while those in Florida would not be over 3 inches. It appeared that the relative length of the forelegs in coryi was larger when compared with other races, and may be an adaptation to wetland habitats. In addition, tail length may be shorter than some other populations. The pelage is relatively dark and characterized by short, stiff hairs and is typically rusty on the back, fulvous on the sides, and pale below. The only case of melanism actually known from the entire range of F. concolor is from Brazil. The panther is known in the fossil record of Florida from Pleistocene sites in Brevard, Gilchrist, Marion, and Pinellas Counties. Many apparently valid records suggest that if not harassed, panthers can live in close proximity to humans, but some of these records may be from dispersing young individuals. Panthers were probably still relatively abundant at the beginning of the 1900's, although their numbers were apparently already reduced in north Florida. Estimates of the number statewide range from about 30 to 300 and the number of reports of alleged panther occurrences in Florida over the previous 20 years had shown a steady increase as well as in other parts of the southeast. Persecution by man appears to have been the primary cause of the decline of the Florida. panther, and illegal killing and highway mortality probably continue to be the major forces depressing the population below the carrying capacity. The Texas cattle fever tick eradication program in the late 1930's and early 1940's in which thousands of deer were slaughtered may have had a direct effect on panther

populations. However, due to the subsequent increased human pressure on the panther population due to anticipated increases in panther attacks on livestock may have been equally or more severe.

Layne, J.N. and D.A. Wassmer. 1988. Records of the Panther in Highlands County, Florida. Florida Field Naturalist 16:70-72.

Panther (Felis concolor) sign was documented at two localities in Highlands County in south-central Florida in August and October 1987. Tracks and associated scat were found on the Archbold Biological Station 12 km south of Lake Placid. Tracks were also discovered on the Scarborough Ranch 13 km southeast of Lake Placid and approximately 13 km northeast of the previous location. The size of the tracks at both localities indicated the presence of a male (probably the same individual) as the heel pad of adult males is >50 mm in width. These tracks and scats constitute the first confirmed records of panther in Highlands County in recent years despite numerous sightings. The Glades County and Highlands County areas are probably part of a single panther population unit and they are broadly continuous with the Big Cypress-Everglades region which contains the most consistently documented panther population in Florida. As an addendum: after finding additional tracks, presumably of the same male panther, a young adult male was captured and radiocollared on January 30, 1988 by the Florida Game and Fresh Water Fish Commission's panther research team.

Leatham, J.P. 1983. The Utah Cougar Harvest Book, 1982-83. P-R Proj. No. W-65-R-D-31, Job A-7, Publication No. 83-11. Utah Dept. Nat. Resources.

SUMMARY

There were 506 cougar permits sold in 1982-83. This represents a 3 percent increase when compared to 492 permits sold during the 1981-82 season. Non-residents purchased 137(27%) permits and residents purchased 369(73%). Twenty-four out of the 506 permits were valid for specific areas only. The total cougar harvest for 1982-83 was 179 cougar, including 7 cougar taken due to livestock depredation. Two of these depredating cougar were taken by government trappers in Morgan County where there is a restriction of two permits issued to hunters. The cougar harvest of 179 is 17% less than the 216 harvested in 1981-82. There were an estimated 435 hunters afield in 1982-83 compared to 432 in 1981-82. These permitees spent 3,278 hunter-days afield while hunting cougar, a decrease of 7 percent from 1981-82. Hunter success was 54 percent.

Leatham, J.P. 1985. Utah Cougar Harvest, 1983-84. P-R Proj. No. W-65-R-D-32, Job A-7, Publication No. 85-10. Utah Dept. Nat. Resources.

There were 529 cougar permits sold in 1983-84. This represents a 5 percent increase when compared to the 506 permits sold during the 1982-83 season. Non-residents purchased 171 (32%) permits and residents purchased 358 (68%). Twenty-six out of the 529 permits were valid for specific areas only. The total cougar harvest for 1983-84 was 221 cougar, including 10 cougar taken due to livestock depredation. Three of these depredating cougar were taken by livestockmen and government trappers in Morgan County where there was a restriction of two permits issued to hunters. The cougar harvest of 221 is 23 percent more than the 179 harvested in 1982-83. There were an estimated 484 hunters afield in 1983-84 compared to 435 in 1982-83. These permitees spent 3,874 hunter-days afield while hunting cougar, an increase of 18%

from 1982-83. Hunter success was 44 percent.

LeCount, A.L. and W.J. Zimmermann. 1986. Trichinosis in Mountain Lions in Arizona. 1986. J. Wildl. Dis. 22(3):432-434.

The mountain lion in Arizona (Felis concolor azteca) had not been sampled prior to this investigation for the presence of trichinae. Samples were collected from 18 lions (13 males, 5 females) from 4 counties and trichinae were found in 66.7% (12/18) and represent a prevalence and intensity much higher than those reported in other studies. Although the source of infection was not identified, it appeared possible that the skunks (Spilogale gracilis) and (Mephitis mephitis) are both vectors and that hounds used in hunting lions may be at risk unless the mountain lion meat that they are fed is cooked.

Lee, D.S. 1979. North Carolina State Museum's Panther Survey Program. Pgs. 2-3 In: Eastern Cougar Newsletter, R.L. Downing (ed.), USDI, Fish and Wildl. Service, Dept. Forestry, Clemson Univ., Clemson, SC. January.

The occurrence of the panther (Felis concolor) had been researched by the North Carolina State Museum for the previous 4 years. Historic statewide distribution was documented and over 300 potentially valid reports were compiled with about 20% of these reports originating from observers of known reliability under optimum conditions. Nearly 1000 posters asking for sightings were distributed in 1976. Reports were generally clustered in the southeastern counties, the northern portion of the Uwharrie National Forest, and several regions in the extreme western part of the State.

Leone, C.A. and A.L. Wiens. 1956. Comparative Serology of Carnivores. J. Mammal. 37:11-23.

SUMMARY

Serological comparisons were made of serum proteins from species representative of the seven families of fissipeds and one family of pinnipeds. The Felidae, in order of decreasing relationship as determined by comparative serological data is: Felidae-Viveridae, Hyaenidae, and Ursidae-Otariidae, Mustelidae, and Procyonidae-Canidae. The puma has a serum protein level of 6.93 grams/100cc as listed by the Serological Museum, Rutgers University. A table of serological relationships of some carnivores is provided, with values representing per cent of reaction between antigens and antisera. Antisera were produced against two species of Felids. The antisera against the serum proteins of the puma was weak.

Leopold, B.D. and P.R. Krausman. 1986. Diets of 3 Predators in Big Bend National Park, Texas. J. Wildl. Manage. 50(2):290-295.

Mountain lion (Felis concolor), bobcat (Felis rufus), and coyote (Canis latrans) scats were collected during 1972-74 and 1980-81 in Big Bend National Park, Texas. Mountain lions mainly consumed deer during 1972-74 and smaller prey during 1980-81. Bobcats consumed lagamorphs as their principal food source. Coyotes primarily ate insects, birds, reptiles, and lagamorphs. All three predators consumed more deer in 1972-74 than in 1980-81. We believe that the observed changes in the predator diets were due partially to a significant decline in the desert mule deer (Odocoileus

hemionus crooki) population between the 2 sampling periods.

Leposky, G. 1975. Panther's Progress. Florida Wildlife 29(3):2-5.

Panthers were being observed near human habitation where they had never been known to occur. This led to the conclusion that perhaps protection from pursuit by man is the primary limiting factor rather than a need for wilderness seclusion. Biologists reported that convincing records of panthers in Florida during the previous 15 years were rare. Six records which were considered authentic are presented. In 1958, Florida invoked a total ban on panther hunting. It was suggested that disease and illegal hunting have held down the population despite almost two decades of complete protection.

Lesowski, J. 1963. Two Observations of Cougar Cannibalism. J. Mammal. 44:586

The author killed and skinned a cougar in December of 1960 in British Columbia and left the carcass. Seven days later the author killed a female cougar that had fed on the carcass for four or five days. In March of 1961, a large male killed and partially ate a smaller male in the same region. An account of the attack is presented. All of the cougars involved were in good physical condition and deer and moose were plentiful in the area.

Lewis, J.C. 1968. Evidence of Mountain Lions in the Ozark, Boston, and Ouachita Mountains. Proc. Oklahoma Acad. Sci. 49:182-184.

Observation and specimens of cougar were tabulated to substantiate the existence of a small cougar population which was probably contiguous with the population in northwestern Louisiana. Observations were concentrated in eastern Oklahoma, western Arkansas, and southern Missouri.

Lewis, J.C. 1968. The Lion in Seven Mile Slough. Oklahoma Outdoors 24(7):16-17.

A cougar, killed by a .22 bullet, was found on April 13 by a fisherman in Seven Mile Slough adjacent to Eufaula Reservoir in McIntosh County. The adult female weighed an estimated 150 pounds with a tail 28 inches long. The skull and skeleton represented the first cougar found in Oklahoma in modern times. The last authenticated specimen in Oklahoma was reported taken in the late 1800's or early 1900's. A cougar was spotted near Canton Reservoir in western Oklahoma in 1953 and plaster casts were made of its tracks.

Lewis, J.C. 1969. Evidence of Mountain Lions in the Ozarks and Adjacent Areas, 1948-1968. J. Mammal. 50:371-372.

Young and Goldman (1946) reported that the last mountain lion known to have been taken in Oklahoma was obtained in 1852. In April, 1968, a fisherman found a carcass of a cougar in eastern Oklahoma, 10 mi. W Checotah, McIntosh County. The cougar was a yearling female weighing an estimated 150 pounds and having a tail 28 inches long. The skeleton was donated to the Oklahoma State University Museum. There were no records of any mountain lions escaping in this part of Oklahoma. The following observations were presented to substantiate the existence of a small population of mountain lions in this region. Between 1961 and 1965 sightings of cougar were repeatedly reported in Mayes, Craig, and Tulsa Counties in northeast

Oklahoma (Daily Oklahoman, 12 issues). In Arkansas, a large male was taken near Mena in 1949 after it was treed by hounds; mountain lion or their sign were reported in 14 counties between 1949 and 1954 (Sealander 1956). A forester saw an adult and one cub near Shady Lake Recreation Area, Ouachita National Forest, in 1958. In 1962, the Chief of the Arkansas Game Division, saw a cougar in the Ozark National Forest, 25 miles N Russellville, Arkansas. The last mountain lion taken in Missouri was obtained in 1927 (Schwartz and Schwartz, 1959). In 1955, a conservation agent saw a cougar north of Shirley, Washington County (Robb, 1955), and in 1966 U.S. Forest Service employees saw two animals near Willow Springs, Missouri. In Louisiana, cougar tracks were observed in Nachitoches Parish in 1950 (St. Ament, 1959). A male cougar was shot near Keithville, Louisiana, in 1965 (Goertz and Abegg, 1966).

Lewis, P. 1976. The Mountain Lion. Colorado Outdoors 25(l):14-18.

A Colorado Division of Wildlife employee stationed at Spanish Peaks Wildlife Area was attacked by a mountain lion during the winter of 1973. An autopsy revealed that its esophagus was jammed full of porcupine quills. The Division of Wildlife estimated that there were 800 mountain lions inhabiting 40% of the state. The Division's overall management plan for mountain lions was to increase populations and sport hunting demand. Over the previous 10 years, less than 5% of the state's lion population had been harvested annually, which in 1974 amounted to 52 lions. A sport hunting permit system regulates the numbers and sexes of lions taken during the season which lasts about 200 days. All kills must be reported within 48 hours. Lion kittens and females with kittens may not be killed. Dogs (8 or less per party) may be used, but not during any open deer or elk season. It is illegal to trap mountain lions in Colorado. In 10 of 11 western states the mountain lion is classified as a game animal. General information on life history and general characteristics are also provided.

Li, X., H. Steinberg, C. Wallace, F.A. Kallfelz, R. Johnson, W.I. Anderson and R.M. Lewis. 1992. Functional Thyroid Follicular Adenocarcinoma in a Captive Mountain Lion (Felis concolor). Vet. Pathol. 29(6):549-551.

This report describes a functional adenocarcinoma of thyroid follicular origin with clinical hyperthyroidism and recurrence in an intact 12-year-old female mountain lion.

Lindzey, F.G. 1983. Procedure for Estimating Mountain Lion Allowable Harvest for Maximum Sustained Yield. Utah Div. Wildl. Resources Research Memo. 2pp.

Begin by estimating total cougar habitat in the unit and then apply the cougar density estimate to cougar habitat to arrive at total cougar population per unit figure. Multiply total estimated unit population by 70% to remove legally-protected cubs and arrive at harvestable population estimate. Multiply harvestable population by 20% to arrive at "allowable kill" figure for the unit.

Lindzey, F.G. 1987. Mountain Lion. Pgs. 657-668 In: Novak, M., J.A. Baker, M.E. Obbard, and B. Malloch (eds.), Wild Furbearer Management and Conservation in North America. Ontario Trappers Association, Ontario Ministry of Natural Resources.

Information on the mountain lion, including description, distribution, life history,

ecology, food habits, behavior, management, and conclusions are provided.

Lindzey, F.G., B.B. Ackerman, D. Barnhurst, and T.P. Hemker. 1988. Survival Rates of Mountain Lions in Southern Utah. J. WildI. Manage. 52(4):664-667.

We monitored survival of resident mountain lions (Felis concolor) during a radio-telemetry study between 1980 and 1986 in southern Utah. Yearly survival of resident adults ranged from 52 to 100% (mean = 74%). Causes of death included intraspecific killing, injury related to prey capture, trapping, and starvation. Deaths of dispersing offspring were human-related.

Lindzey, F.G., and W. VanSickle. 1988. Mountain Lion Population Dynamics (Utah). Pg. 56 In: R.H. Smith (ed.), Proc. of the Third Mountain Lion Workshop. Arizona Chapter, The Wildlife Society and Arizona Game and Fish Department, Prescott, Arizona. 88pp.

Dynamics of a southern Utah mountain lion population were monitored from 1979 to 1986 when we removed 30% of the population. Resident numbers remained relatively stationary in this unhunted population and yearly survival of residents average 74%. Census techniques are currently being evaluated and the population monitored to document the influence of the removal which was done to simulate sport hunting loss.

Lindzey, F.G., B.B. Ackerman, D. Barnhurst, T. Becker, T.P. Hemker, S.P. Laing, C. Mecham, and W.D. VanSickle. 1989. Boulder-Escalante Cougar Project. Final Report. Utah Div. Wildl. Resources. 92pp.

This report synthesizes results from the study since its inception in 1978 to May 1989. The 4,500 km^2 study area was located in the Canaan, Escalante, and Boulder Mountains and associated canyonlands of Garfield and Kane counties in south-central Utah. Seventy-two radiocollared cougars were monitored an average of 16.9 months (s.d. 17.3) during the term of the project. Thirty-one litters were observed with an average litter size of 2.4 (n=26). The average age at first breeding of females that were marked as kittens and stayed on the study area was 23 (s.d. 4.5) months. The interval between successive litters (n=7) had a mean length of 24.3 months (s.d. 6.8) with the shortest at 19 months and the greatest 40 months. Radio-collared mountain lions were monitored for 17-1,825 days (x=821 days). The survival of kittens first observed at or before 4 months of age (n=10) until 10 months was 72%; of 13 kittens between 10 months of age and dispersal (16-19 months) was 92%; of 18 kittens in 8 litters monitored from contact to dispersal was 67%. Adult male (> 2 years) home ranges overlapped each other an average of 33.3% (s.d. 31.24). Resident female home ranges (n=19) shared 84.8% (s.d. 22.2) of their range with neighboring female residents. Females acquired most of their total home ranges during their first year of independence and establishment. Resident female offspring commonly replaced deceased resident females. Seven species were represented in the kill sample (112 kills examined): Mule deer accounted for 88% and elk 4%. Domestic cows, coyote, and jack rabbits were also found. Badger remains were found in the stomach of a kitten. Three instances of cannibalism were observed. Three-hundred and sixteen prey items were detected in 239 scats. Mule deer comprised 61% of items detected, but occurred in 80% of all scats. Cougars consumed an average of 73.5% + or - 4.2% by weight of each carcass. Cougar energetics was investigated and a cougar energetics simulation model was described in detail. Seventy-five cougar-killed deer were classified as part of the cougar-mule deer interactive study (19 adult males, 31 adult females, and 25 fawns). Cougars apparently killed deer above the age of 7

years out of proportion to their abundance in the population, and conversely, prime-aged adult deer were killed less frequently than expected. Cougar predation was found to be an important cause of annual adult mortality (female 41%, male 35%), although only a minor (6%) cause of fawn mortality. These results probably over-estimate the impact of cougar predation on the deer herd. A total of 3,580 telemetry locations on 52 individual cougars were assigned habitat types. Of these, 568 (15.9%) were located in sandstone ledges interspersed with pinyon pine and Utah juniper, 556 (15.5%) in ponderosa pine mixed with gambel oak, 488 (13.6%) in mixed pinyon pine and Utah juniper woodlands with lava rock boulders, and 394 (11.0%) in spruce-fir. Highly used habitats characteristically occurred at higher elevations and on steeper slopes, had denser overstory and understory cover, taller overstory heights, less horizontal visibility, more large trees present, were closer to roads and distal terrain, and were farther from ecotones in comparison to avoided habitats. A habitat model is presented and discussed. The vulnerability of cougars to hunting and the interpretation of harvest data are discussed in detail. The removal experiment (simulated harvest) was able to sustain a 30% removal of its members and other losses and recover numerically within a year. Recovery, however, was possible because of the immigration of transients into the population and the presence of female offspring > 1 year of age. A small number of cougars were transplanted or released (n=9) on the study area. Results suggested that young cougars of both sexes (transient age class) can probably be transplanted relatively short distances with a good probability that they will not return. Resident, adult males are probably the least suitable candidate. Adult females may not return if moved great enough distances (i.e. > 75km) and may establish new ranges and contribute to the population of the area into which they are moved. Moving cougars into areas that are already occupied by cougars of the same sex carries with it the risk that the transplanted cougar will be killed if it does not move. It appears feasible to maintain orphaned kittens in a cage and release them at an age that provides some opportunity for their survival (> 6 months). Kittens that eventually accept humans should not be released. Management suggestions are presented.

Lindzey, F.G. 1991. Managing Lions in a Changing Social Environment. Pgs. 81-82 In: Mountain Lion-Human Interaction Symposium, C.E. Braun (ed.), Col. Div. Wildl., Denver. 114pp.

Managing wildlife populations solely to reduce livestock losses and to provide huntable surpluses will end, and hunting as a management tool will probably receive increasing scrutiny. The best management will be a reduction of the probability of encounters between mountain lions and humans. Frequency of attacks may be explained partially by the density of humans and the density of mountain lions in an area and it is expedient to begin building management of mountain lions on the premise of a density-encounter relation. Reducing natural prey in and around areas of human development should reduce the likelihood of mountain lions remaining. Reductions of prey animals can either be direct or indirect by altering vegetation in a manner which makes it less acceptable to prey animals. Presumably, reducing densities in prescribed areas not only reduces the number of dispersing young near developments, but these areas may also function as sinks that short-stop dispersing mountain lions from other areas. A combination of many approaches rather than a single approach may resolve the problem.

Lindzey, F.G., W.D. Van Sickle, S.P. Laing, and C.S. Mecham. 1992. Cougar Population Response to Manipulation in Southern Utah. Wildlife Society Bulletin 20:224-227.

SUMMARY

A cougar population in southern Utah did not recover in 9 months from the experimental removal of 27% of its harvest-age (> 1-year-old) members. The adult resident segment, with the possible exception of 1 male, recovered through replacement by transients and female offspring of the population. This recovery included the replacement of 2 other adult resident cougars that died during the year. Failure of the population to recover to preremoval level 2 years later, and its inability to replace 1 of 3 adult residents that died the second year, suggest that the population would not have recovered as quickly from a second year's harvest of similar intensity. The effect of hunting on cougar populations will depend both on level of harvest and sex and age of cougars removed; populations will be most sensitive to loss of adult resident females. Losses to hunting will not be totally compensated for by a reduction in other deaths normally incurred by cougar populations.

Lindzey, F.G., W.D. Van Sickle, B.B. Ackerman, D. Barnhurst, T.P. Hemker, and S.P. Laing. 1994. Cougar Population Dynamics in Southern Utah. J. Wildl. Manage. 58(4):619-624.

We monitored size and composition of a southern Utah cougar (Felis concolor) population during 1979-87 to document the dynamics of this unhunted population and to test the hypothesis that cougars would regulate their density at a level below that set by prey abundance alone (Seidensticker et al. 1973). We captured cougars when detected during ongoing searches for sign in the study area. Resident adult cougar density remained relatively constant (0.37/100 km^2) for the first 7 years but increased slightly in the last 2 years. Mule deer (Odocoileus hemionus), the cougar's primary prey, increased over the 9 years, but magnitude of this increase was unknown. Results supported the hypothesis that cougar density is set by environmental features other than prey abundance alone. Adult resident females bred as young as 17 months and produced litters that averaged 2.4 kittens at an interval of 24.3 months.

Litchfield, L. 1993. Panthers in Peril. Zoo Life 4(2):42-47.

After man, pumas are probably the most widespread large mammal in the Western Hemisphere. Thirty to fifty Florida panthers still roam in the Big Cypress National Preserve and the Florida Panther National Wildlife Refuge that lies in the shrinking corridor between the fast-growing urban areas of Fort Lauderdale/Miami on the east coast and Naples on the west. Male panthers may need territories as large as 250-400 square miles in which to hunt deer, wild hogs, armadillos, raccoons and even alligator. Road kills have been the major cause of panther deaths. Since 1989 mercury poisoning, possibly from the increasing use of incinerators on the coasts, has likely contributed to the deaths of several cats in the Everglades. Two of the subspecies characteristics, a kink at the end of the tail and a cowlick in the middle of the back, are now believed to be the result of inbreeding. An increasing number of males have demonstrated cryptorchidism (one testicle fails to descend) and the males sperm is more than 90% defective. In addition, heart murmurs have been detected in the kittens and many adults. A total of twenty-two radio-collared panthers are currently being monitored. The future of the Florida panther now depends on a captive breeding program. A Species Survival Plan aims to have a breeding population of 130 animals by the year 2000 and 500 by 2010. This will be possible only with the aid of hi-tech methods such as artificial insemination and in vitro fertilization, possibly in surrogate mothers. Another possibility involves genetic contributions from Texas cougars. It has been proven with DNA analysis that at

least some of Florida's cougars in the Everglades have genes from a Latin American subspecies, probably from cats released by private owners in the 1950's and 1960's. Six kittens were removed from the wild and taken to White Oak Plantation at Yulee, Florida in 1991 to start the captive breeding program. As of November 1992, only four kittens had been taken, split up between White Oak, Jacksonville Zoo and Lowry Park Zoo in Tampa, Florida. In 1989 the 30,000-acre Florida Panther National Wildlife Refuge was established next to Big Cypress. In addition, speed limits on roads crossing panther country are being more strictly enforced, fences have been erected along the highways to help prevent road kills and 36 new underpasses provide safer wildlife crossings.

Loft, E.R. 1997. Spatial-Temporal Analyses of Mountain Lions in the Sierra Nevada: Looking for Patterns and "Bulls-Eyes" Amid the Mess. Page 87 *in* W.D. Padley, ed., Proc. Fifth Mountain Lion Workshop: 27 February- 1 March 1996; San Diego, California.

From 1983-1992, the California Department of Fish and Game and the U.S. Forest Service Pacific Southwest Research Station conducted a telemetry study of mountain lions in the Sierra Nevada to learn more about their habits and impacts on mule deer of the North Kings Deer Herd. Data on 30 animals (11 male, 19 female) were used to examine home range (95% adaptive kernel estimate), elevational change, and spatial-temporal relationships. Over 8,500 radio locations were used in analyses. Mean home range size for males during winter and summer was 139 and 176 sq. mi., respectively. Female home ranges averaged 63 and 117 sq. mi. Most lions moved up/down in elevation seasonally, while some maintained home ranges at low elevations. In summer, lion density over years ranged from 1.2-2.0 lions/100 sq. mi.; during winter, density ranged from 1.4-3.0 lions/100 sq. mi. Spatial overlap was highest among females (mean = 32%), intermediate between the sexes (mean = 31%), and lowest among males (mean = 23%). Overlap of kittens with non-mother adults was also examined. Kitten home ranges overlapped more with adult males in summer (mean = 43%) than with females (mean = 27%). Initial results of spatial-temporal relationships among lions will be presented. As an example, each male overlapped with about 85 percent of males known to be present in summer, and 94 percent of males in winter.

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