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FOOD HABITS OF MOUNTAIN LIONS IN THE TRANS-PECOS REGION OF TEXAS

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Abstract: Information regarding mountain lion (*Felis concolor*) food habits is relatively scarce overall, and this is particularly true in the Trans-Pecos region of Texas. Most information currently available is from Big Bend National Park where livestock are excluded and game animals are not actively managed. This study involved the analysis of 32 mountain lion stomachs collected throughout the Trans-Pecos over a 14 month period. Deer (*Odocoileus spp.*) and javelina (*Tayassu tajacu*) were the predominate prey species, each occurring in 39% of the stomachs analyzed. Domestic livestock was found in 9% of the total stomachs and non-game wildlife in 13%. Samples taken from areas with and without livestock differed significantly ($P < 0.05$). Samples from areas with livestock contained deer (50%), javelina (19%), small game (19%), and livestock (12%). Samples from areas without livestock contained javelina (86%) and deer (14%). No differences ($P > 0.05$) in food habits were found between sexes or among seasons of the year.

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Key Words: *Felis concolor*, food habits, mountain lion, Texas

Nationwide, studies have shown that a mountain lion's diet is almost completely carnivorous with the primary prey being the most abundant large game animals, most often the white-tailed deer (*Odocoileus virginianus*) and mule deer (*O. hemionus*). In Arizona, Cashman et al. (1992) found that diets of mountain lions consisted primarily of mule deer and javelina (*Tayassu tajacu*) which are commonly found in desert areas. Wade (1990) found that mountain lion diets in Big Bend National Park in southwest Texas were similar to those in Arizona. These studies revealed that mountain lions preyed on those species that were most available in their home range. If large animals are not readily available, the lion will take advantage of smaller, more numerous prey such as lagomorphs (Yanez et al. 1986).

Estimates of the dietary requirements of mountain lions in the wild are not easily ascertained. Much speculation has taken place over the years about the number of deer killed per lion per year. Hornocker (1970) estimated that lions kill an average of 1 deer every 10 days in Idaho, which corresponds with the estimate of Robinette et al. (1959) in Utah and Nevada.

Although the mountain lion's preferred, year-round food is deer, past studies indicate a

preference for buck deer during the fall and winter months (Spalding and Lesowski 1971, Hornocker 1970, and Shaw 1983). All of these authors believe the reason for this preference is that bucks are much less wary during the rut, and following the rut, bucks prefer ledgy, broken terrain in the rougher peripheries of wintering deer herds, which is also the preferred habitat of mountain lions. When deer numbers are limited, lions can readily switch to other available wild or domestic prey species. Livestock depredation by lions has been documented in most areas where the 2 animals overlap. Bodicker (1983) noted that predation from mountain lions is often random and unpredictable, but when it occurs, large numbers of livestock can be killed in a short

period of time. Shaw (1983), based on studies conducted on Arizona ranches, commented that all lions will kill livestock on occasion and where livestock depredation occurs, all mountain lions are “problems.”

In the Trans-Pecos region, overall numbers of wildlife and livestock have declined recently due to drought conditions and low forage production. Under this situation, the impact of mountain lion predation becomes even more important to landowners and managers. Ranchers suffer direct economic losses from livestock predation and indirect losses from wildlife predation since income derived from leasing of hunting rights may decrease.

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METHODS

Study Area

The study area was located in the western part of Texas commonly known as the Trans-Pecos region. This area was chosen because it supports the largest population of mountain lions in the state. The Trans-Pecos region extends from the southwestern border of Texas, the Rio Grande, northward to New Mexico and east to the Pecos river. Elevations range from 305 m at the mouth of the Pecos river to 2667m at Guadalupe Peak (Powell 1994). Topography ranges from rolling lowlands to rugged mountains and basins. Located in the Chihuahuan desert, this area is considered semi-arid but the climate varies extensively according to elevation. Average annual precipitation is 25 cm and increases with elevation up to 76 cm. Typically, most rainfall is recorded in the summer months. Average maximum temperatures range from 28°C in the highlands to 36°C in the lowlands. The average minimum winter temperature is 0°C (Schmidly 1977).

Vegetation in this region varies with location. Low grasslands support a variety of grasses, including tobosagrass (*Hilaria mutica*) and certain species of grama (*Bouteloua spp.*). The lower and more arid desert scrub region consists mainly of succulents, woody shrubs and few grasses. As elevation increases, especially on north facing slopes, stands of cedar (*Juniperus pinchotii*), oak (*Quercus spp.*) and pine (*Pinus*

spp.) can be found (Powell 1988).

Data Collection

Thirty-two mountain lion stomachs were obtained over a 14-month period and divided into 2 seasons, summer (May to October) and winter, (November to April). Collection of these stomachs was accomplished through cooperation with federal, state, and private trappers, and hunters throughout the Trans-Pecos region. The most common methods of collecting mountain lions in this region are with the use of 4 1/2 steel, leg-hold traps, snares and trailing dogs. Each collector was asked to place the stomach into a plastic freezer bag and mark the bag with a permanent marker. The information provided included age (juvenile or adult), sex, collection date, capture location, capture method, and, when applicable, type of livestock present in the area. These bags were then frozen for lab analysis.

Analysis

Visceral contents were examined in the laboratory. Immediately recognizable prey items in the stomach were removed and remaining materials were then sorted by gross examination with samples used for analysis. Hair was then identified macroscopically with the use of hair keys and by comparison with a reference collection of hair samples obtained from specimens collected by the investigator. Any items not identified by these methods were identified microscopically.

Statistical analysis of the data was conducted using log-likelihood ratio (Zar 1984) with SPSS 6.1 for comparison of dietary classes between seasons, areas, and sexes.

RESULTS

A total of 32 mountain lion stomachs were collected over a 14-month period from February, 1995 to March, 1996. All specimens were collected from the Trans-Pecos region. Seventeen males and 15 females were collected representing 8 counties in the region. Of these 32 samples, 8 were empty and 1 contained unidentifiable hair resulting in a total of 23 samples containing identifiable food items. Twenty-two of the stomachs with identifiable food contained a single food type, and 1 contained javelina and unidentifiable hair.

Deer and javelina were the most frequently found food items, each occurring 9 times, (39% frequency). Rabbit (*Sylvilagus spp.*), porcupine, sheep, goat and swine occurred once each (4.5% frequency each). With 78% of the stomachs containing deer and javelina, our results correspond with other studies conducted in the southwestern United States. Cashman (1992) found that deer made up 39% of lion diets and javelina 25% in southwestern Arizona. In Big Bend National Park, deer comprised 44% of the diet and javelina 41% (Leopold and Krausman 1986)

Domestic livestock (sheep and goat) occurred in 2 samples, representing 9% of the samples collected. Although cattle ranching is the predominate livestock industry in the region, no evidence of cattle consumption was found in the samples. Swine was found in one. This was assumed to be a feral hog (*Sus scrofa*), which inhabit this region, thus this sample was not considered to be domestic livestock.

Statistical analysis of the data showed no significant differences ($P > 0.05$) in food habits among sex or seasons but did differ significantly ($P = .0145$) among locations with and without livestock. Of 23 lions collected from ranches with livestock, 16 samples contained identifiable food items consisting of deer (50%), javelina (19%), small game (19%), and livestock (12%). Samples from ranches without livestock contained 86% javelina and 14% deer.

DISCUSSION

Evidence from this project and other sources suggest that mountain lions have an impact on sheep and goat operations in the Trans-Pecos region. Considering current market prices, drought, and changing grazing strategies, it is important to note that any lion predation on domestic livestock is a direct financial loss to the rancher. Of 7 mountain lions sampled from ranches raising sheep and goats, 2 of those revealed sheep and goat hair in the stomach, which represented 29% of the stomachs where these types of livestock were available. The fiscal-year 1994 annual report from the Texas Animal Damage Control Service (ADC) illustrates financial losses of sheep and goats to mountain lion predation. They report a total loss of \$16,158 statewide. These kills were personally verified and recorded by trained ADC specialists on site. During this time period only 1 incident of cattle predation by lions was reported for a loss of \$1,200. In supplemental statements, ranchers through their personal observations reported sheep and goat losses at approximately \$77,239 for 1993. Calf losses were also estimated during this period at \$1,323. In Texas, mountain lion depredation does not appear to have as major an impact on the cattle industry as it does in other western states where cattle and lions coexist. No evidence of lion predation on cattle was found in this study.

Due to unstable livestock market prices, recent drought conditions, and rising costs of feed and ranch supplies, many landowners have begun to look at wildlife as a source of additional income. This income is derived from the lease of trespass rights to hunters. The amount of money gained from hunting opportunities will vary with the different programs and services each individual rancher provides. Guided hunts for trophy mule or white-tailed deer can range from \$2,000 to \$4,500. Deer management offers a strong financial incentive to the rancher and local economy. The effect of lion predation on deer

will have an indirect economic impact. Pierce et al. (1996) found that the leading cause of death in 6 mule deer populations in the Great Basin region of California and Nevada was mountain lion predation.

It is the goal of most wildlife agencies to manage for a viable and stable population of deer, but to the landowner, income from leasing is derived primarily from the availability of harvestable mature bucks. Mountain lions directly effect this availability as they show a preference for buck deer during the fall and winter months. This study did not allow for differentiation among sex or age classes of deer, but did show that deer were found in 39% of the samples.

As deer populations decline, mountain lions may shift to an alternative food source such as javelina. In a current study of mountain lions in Texas on Big Bend Ranch State Park, where few deer and no livestock occur, preliminary results show javelina to be the major food item (Pittman et al. 1996). Their findings closely corresponds with ours, as javelina were found in 39% of all stomachs analyzed, and represented 86% occurrence in lions removed from areas without livestock.

The javelina is an important game animal in Arizona, New Mexico, and Texas. In all 3 states, it's status has changed from "unprotected" to "managed" and animal numbers have increased. Harvest numbers are carefully observed by the Texas Park and Wildlife Department (TPWD) as javelina populations can be adversely affected by hunter harvest. Current prices for javelina hunts can range from \$300 to \$500 per hunt.

Economically, the mountain lion can be either desirable or undesirable. They can be a prized trophy when taken by a sportsman or a lifetime memory when viewed by a wildlife enthusiast. Hunters and trappers throughout the Trans-Pecos region earn additional income through the sport of lion hunting. Many ranchers pay private trappers to remove problem animals to prevent livestock losses. The uniqueness and limited availability of mountain lions also makes the hides desirable. Fur market prices are at an all time low but this has not effected the value of mountain lion pelts. Prices for these pelts will range from \$200 to \$400 per animal.

Mountain lion hunting with dogs is also becoming a well established sport. This generally involves running a lion with trained dogs until it is

treed and the hunter shooting the animal. Hunts such as these are becoming extremely popular and cost \$1,500 to \$2,500 per hunt. In areas with problem lions, this is a practical way to remove the animals for livestock and game protection, while providing additional income to ranchers.

MANAGEMENT CONSIDERATIONS

In 1991, the Sierra Club filed a petition to place the mountain lion on the list of threatened, non-game wildlife in Texas. In response, TPWD met to assess population status, public interest, and establish a set of goals for future lion management. This petition was formally considered by TPWD commissioners but no action was taken because no biological information was presented to support a status change. With this past history in mind, and depredation concerns from area ranchers, more research is needed in Texas to provide a reliable population estimate, to assess food habits and prey populations, and to study mountain lion movements into new areas. It is difficult to make solid management decisions on the mountain lion in Texas because so little is known about its habits or population status.

Under its current nonprotected status, the mountain lion appears to be increasing in numbers, and their range is expanding (Russ 1995). Until evidence shows a change in this trend, the present status should continue. When the mountain lion became protected in California in 1990 by popular vote on Proposition 117, its numbers increased dramatically, and numerous attacks on livestock and human encounters were reported. At the present time, more lions are killed in California for depredation or human safety purposes than were killed by sport hunters under past regulations (Torres 1996).

This research project provides baseline information which will be useful in future research. This study also serves to support past research emphasizing the importance of big game in the diets of mountain lions, and provides the only concrete information available on mountain lion diets in the Trans-Pecos where livestock occur. Hopefully the mountain lions' past, present, and future public attention will encourage all interested individuals to learn more about this unique and secretive predator in the Trans-Pecos.

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