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## A PROFILE OF DEPEDATING MOUNTAIN LIONS

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**ABSTRACT:** Information regarding the demographics and physical condition of mountain lions (*Felis concolor*) killed during damage control efforts in Nevada was gathered and compared to sport harvested mountain lions. The average age of depredating male lions was 4.92 years of age compared to 4.95 years for sport harvested males. Depredating female lions were older than sport harvested females averaging 5.09 years compared to 4.44 years. Older age class mountain lions of both sexes were more likely to commit depredations than expected. Male lions were involved in depredations 45% more often than females. Domestic sheep comprise more than 90% of depredation events in Nevada.

**KEYWORDS:** animal damage control, wildlife management, mountain lion, puma, cougar, depredation, population characteristics

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### INTRODUCTION

In 1864, the Reese River Reveille, an Austin, Nevada, based newspaper recorded the first incident involving a conflict between the mountain lion and livestock. Since that first incident the control of depredating mountain lions has been a focus of debate between livestock producers, preservationists, mountain lion hunters and big game hunters. Mountain lion depredation management by the Nevada Animal Damage Control Program (ADC) was developed and has evolved with the participation from these stakeholders.

Mountain lion depredation management by the Nevada ADC Program has essentially moved through three phases since its inception in 1915. The first phase involved the focused attempt to control numbers of coyotes and the incidental take of mountain lions. From 1917 until 1949 this effort yielded an average of 3.1 lions per year and a total of 103 lions. In 1947, the ADC program began a second phase with a program to reduce lion numbers and hired a full time lion hunter to facilitate that objective. From 1950 when the project objective became operational until 1969, 1,821 lions were taken by ADC. The average kill per year during this phase was 91 lions. In the mid 1960s the mountain lion was classified by the State Board of Fish and Game Commissioners as a game animal. This classification, along with a national shift in sensitivity to environmental issues and predator management, fostered the implementation of the third phase of the mountain lion damage control program. The third phase, beginning in 1970, directed control efforts only to lions that were actively depredating. Since 1970, a total of 943 mountain lions have been taken on depredation complaints and averaging 37.7 per year.

Although many mountain lions have been taken during this third phase, the number of depredation complaints and livestock losses continue to rise and fall in synchrony with the lion population trends. The current program is effective at limiting mountain lion depredations once an event has occurred. This paper will explore some demographic characteristics of depredating lions in Nevada.

### METHODS

Each mountain lion killed by sport hunters or ADC Specialists since 1970 in Nevada has been validated by the Nevada Division of Wildlife. As part of the validation process State biologists collect data on the age, sex and physical condition of the dead lion. These data are stored in a statewide computer database. Mountain lion ages are determined by a physical evaluation of the tooth wear, staining, tooth eruption and the occurrence and degree of spotting on the pelage. These criteria were developed by Ashman during the 1970s and reported in Ashman et al. 1983.

The physical condition of mountain lions was determined by examination and interviews with the hunters. Nevada regulations require that a hunter only retain the head and hide for validation resulting in most carcasses remaining in the field. Hunters were queried about the general condition of the lion, generally rating the lion from starving to excellent. Hunters are asked about fat observed on the carcass and the estimated or actual body weight. The subjective evaluation of the hunter or examining biologist was scaled to a rating scale from one for a lion in starving condition to five for a lion rated as in excellent body condition. Female lions that had dependent kittens were reported, but not compared with the sport harvest take of females.

The actual weights recorded for lions taken by both sport hunters and mountain lions taken on depredations were collected. Only actual weights were compared in this analysis, however, no allowances were made for stomach contents.

Analysis was conducted on all age classes of mountain lions once the animal became independent of its mother. All lions that were aged older than 1.5 years were assumed to be independent. Basic descriptive statistics were developed to describe means, standard deviations and standard errors. Comparisons between sport harvested mountain lions and depredating mountain lions were computed using Chi square tests, two sample t-tests, one sample t-tests and ANOVA tests.

**RESULTS**

Evaluations were made of 3,129 mountain lion mortality reports from mountain lions taken in Nevada from the period between 1970 and 1994. A total of 943 mortality reports resulted from the kill of mountain lions at depredation events. This sample included 772 mountain lions judged to be at least 1.5 years of age. A total of 2,051 mountain lions was harvested during the same period in Nevada's sport hunting program. Of these lions, 1,875 were judged to be at least 1.5 years of age.

A strong bias was expected to exist between the sexes of sport harvested mountain lions. Most sport hunters reportedly attempt to select large males for their trophy quality. The ratio of sport harvested males to females is 1.36:1. Mountain lions killed during depredation events are hunted based upon the fact that an event occurred without regard to the size or sex of the offending lion. The ratio of males to females from the ADC sample was 1.45:1 (Table 1). Anderson (1983) concluded that data do not exist to make a valid estimation of natural sex ratios. Subsequent modeling and research (Hemker 1984, Lindzey 1987, Logan 1983) indicate that male to female sex ratios should be less than 1:1. Both methods of a kill are significantly different from the projected proportions of males in the population. No significant difference between the type of kill and sex was detected.

Table 1. Sex ratios—lions older than 1.5 years.

	Males	Females	Ratios
ADC	456	315	1:45:1
Sport	1079	796	1:39:1
Modeled Population			0.95:1

Ages of male lions killed during the sport hunting program were compared with those males killed by ADC specialists. The average age of males killed by sport hunters was 4.95 years (n=1079) compared with 4.92 years (n=457) of age for ADC lions. This difference was not significant (p<0.79). The mean age of females killed during the sport hunting season was different (p<0.0008) than ADC killed females with a mean age of 4.44 years (n=796) compared with 5.09 years (n=316) of age, respectively (Table 2). Both male and female ADC mountain lions showed significant tendencies toward a bimodal age distribution. Male and female mountain lions from two years to six years of age showed age frequencies that are within expected values for a lion population. Male lions seven years of age and older were

Table 2. Age Samples.

Age	Male			Female		
	ADC	Sport	Modeled	ADC	Sport	Modeled
1-2	93	91	100	73	154	100
2-3	78	172	69	51	174	69
3-4	59	233	63	33	154	63
4-5	47	204	51	35	107	51
5-6	36	158	41	29	75	41
6-7	49	100	33	27	46	33
7-8	68	60	26	34	29	26
8-9	10	23	21	4	12	21
9-10	8	34	17	12	39	17
10+	8	4	12	17	6	12
Totals	456	1079	NA	315	796	NA
Average Age	4.92	4.95		5.09	4.44	

significantly (p<0.004) more common in the ADC kill than they should exist in a natural population. Female mountain lions seven years and older were also represented in the ADC kill at a greater frequency than they exist in a natural population (p<.047).

Body condition can be evaluated by both weight and condition. Mountain lion body weight was determined from whole carcass weights taken from mountain lions shortly after death. The body conditions were subjectively rated for both sport harvested and ADC

killed mountain lions. The rating scale ranged from one to five, with a one being equivalent to a lion described as starving and a five describing excellent condition. Male weights were not significantly different between sport harvested and depredating mountain lions. Depredating males weighed 60.3 kg (n=49) compared to 63.0 kg (n=305) for sport harvested males. Female weights were significantly different ( $p < 0.0001$ ) between sport harvested and depredating animals. Depredation females weighed 39.7 kg (n=36) with sport harvested females weighing 45.0 kg (n=175). Body condition ratings for male lions were 3.9 for depredation and 4.1 for sport harvested cats. Females rated 3.8 for both classes of animal.

#### DISCUSSION

Demographic and physical characteristics of mountain lions involved in a depredation do not appear to show any particular deviation from sport harvested lions, except older age class lions. Both classes of mountain lion kill differ from the expected representation of both sex and age classes in the population.

Male mountain lions are more likely to be involved in a depredation event compared to females. Male mountain lions that are in older age classes (seven+ years) are more likely to be involved in a complaint than they exist in the population.

Management practices that limit the number of old age class male lions in a population may decrease the number of depredation events in Nevada.

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