Diet Composition of Mountain Lions on the Modoc Plateau

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Introduction

- The primary prey of mountain lions (Puma concolor) across western North America are mule deer (Odocoileus hemionus) and elk (Cervus canadensis)2.
- Mountain lions have also been documented feeding on an extensive variety of secondary prey items1,4.
- Mountain lions have not been widely studied in the northeastern region of California, and very little is known about their prey habits in this area.
- In a 2014–16 study, the Institute for Wildlife Studies found that 62% of known mortalities (n=17) for collared adult female pronghorn (Antilocapra americana) on the Modoc Plateau were attributed to mountain lions (Figure 1).
- Established gray wolf (Canis lupus) packs exist north, south, and west of the Modoc Plateau and multiple individuals have traversed through the study area.
- After wolves recolonized Banff National Park, mountain lions were documented shifting from their primary prey to secondary and alternative prey items5.

Study Area

- The study area consists of a portion of the Modoc Plateau, that is encompassed within Modoc and Lassen counties in the northeast corner of California and is approximately 23,110 km² (Figure 2).
- The Modoc Plateau is a series of large tablelands sculpted from volcanic lava rock, dominated by sagebrush-steppe habitat with intermixed western juniper (Juniperus occidentalis).

Methods

- 21 mountain lions (14 male, 7 female) were captured using box traps or hounds and were fitted with GPS collars which upload locations daily.
- GPS clusters (spatially aggregated GPS points) were used to search for large prey items of mountain lions.
- GPS locations occurring within 50 m over the course of a 6-h time span, with at least one point occurring nocturnally were considered a GPS cluster.

Results

- We detected prey items at 231 of the 258 sites investigated (89.5%).
- The 5 most prevalent items detected in the diet of lions were: mule deer 61.1%, feral horse (Equus caballus) 11.6%, coyote (Canis latrans) 7.9%, birds 4.1%, and pronghorn 3.4%.
- One lion’s diet (M166) was strikingly dissimilar to other individuals (Figure 3).

Discussion

- Mule deer were the primary prey of mountain lions in this region.
- If M166, who preyed almost exclusively on feral horses, is removed as an outlier, the diet composition would shift to 69.07% mule deer and feral horses would represent 1.27% of the diet (Figures 3 & 4).
- GPS clusters were biased toward larger prey items, therefore some smaller prey items were likely underrepresented.
- We did not detect any mountain lions that specialized in pronghorn, but found that several lions consume them. As a result, we do not believe that pronghorn determine the distribution or numbers of lions on the Modoc Plateau.

Management Implications

- Once wolves are established in the study area, wildlife managers will have the ability to assess diet changes within this population of mountain lions.
- We conducted habitat surveys at kill sites to better understand the habitat characteristics lions are selecting. These data could be used to inform habitat management, which may reduce the risk of lion predation to game species.

Objectives

- Establish a baseline diet composition of mountain lions in the unstudied Modoc Plateau population prior to the establishment of wolves.
- Determine if there are significant differences in diet between individuals.
- To obtain a better understanding of what percentage of mountain lion diet is comprised of pronghorn.

Figure 1. A radio collared pronghorn that was killed and cached by a mountain lion.

Figure 2. The study area illustrating 95% Kernel Density home ranges of collared mountain lions.

Figure 3. Morisita’s index of overlap, displaying the variation in diet between individuals. Maximum variation=0, maximum similarity=1. See of the individuals (M=male, F=female) is represented by the letter within the ID. Individual M166 highlighted for emphasis.

Figure 4. Diet composition of the 15 individuals with ≥5 clusters investigated, as well as the total diet composition for all lions.

Literature Cited:


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