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Lay Summary

Project Title: A Survey of Carnivore Community Structure at Chiricahua National Monument

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Background:

The Chiricahua Mountains of southeastern Arizona represent a relict of mesic forested habitat that remains from the last glaciation (Gehlbach 1993). Organisms once found in the continuous cool and moist forests that connected the high peaks as recently as 7,000 years ago (VanDevender and Spaulding 1979) have been restricted to the fragmented montane 'sky island' landscape that characterizes the southwestern United States and northwestern Mexico (Gehlbach 1993).

Carnivores are among the most highly valued wildlife species by visitors to ecological preserves with charisma due to a relatively large body size and typically solitary and secretive lifestyle. Conservation efforts often focus around such charismatic megafauna that may serve as indicators of community health and rally support for ecosystem preservation. Unfortunately, most communities of carnivores have been so greatly altered that the widespread applicability of data collected is unknown. Although grizzly bears and wolves no longer inhabit the Chiricahua mountains and were extirpated by humans in the previous century, the SE Arizona mountains

continue to house an exceptionally rich community of carnivores (Cahalane 1939, Hoffmeister 1986, Gittleman 1989). At least 4 species of skunk, a weasel, badger, 3 species from the raccoon family, 2 canids and 2-4 felids may occur in the Chiricahua Mountains. This highly diverse guild of carnivorous mammals is unique to the sky islands of the desert Southwest (Gehlbach 1993, Gittleman 1989) and has not been studied. In fact, current restoration plans for the endangered Mexican Wolf call for a future reintroduction to the Chiricahua Mountains; however, no baseline data exist on current carnivore community structure.

This project examined carnivore diversity within the protected Chiricahua National Monument to assess the species richness of carnivores within different habitats and in different seasons. These data provide significant insight into the ecology and diversity of these secretive mammals in the major habitats found in the Chiricahua Mountains. Furthermore, the resultant data set provides baseline data on carnivore community structure in the mountain islands of the desert southwest.

Objectives

The goals of the research were:

1) To establish a baseline data set on the diversity of carnivores
2) To determine carnivore use and partitioning of different microhabitats
3) To identify key centers of carnivore diversity and promote their conservation
4.) To work with the staff at Chiricahua National Monument and develop interpretive materials to focus on the unique ecology of the park.

Major Findings:

The carnivore community in Chiricahua National Monument is indeed highly diverse. I used two techniques to detect carnivores in the park in summer and winter. Remote cameras triggered by the body heat and motion of animals were used to assess visitation at the major permanent water sources in the park. Scent stations consisting of a sandy circle centered on a wooden post with various scents were placed evenly in the four major habitats (grasslands, rocky outcroppings, lower Madrean oak-pine forest, upper Madrean oak-pine forest) found in the park. My studies recorded 11 species of carnivores within Chiricahua National Monument (black bears, gray foxes, coyotes, bobcats, mountain lions, ringtails, raccoons, coatis, striped skunks, hooded skunks, and hog-nosed skunks). During winter, carnivores are found relatively equally through all habitats with a slight tendency to avoid the high elevation rocky outcroppings (Figure 1). During summer, carnivore activity increases dramatically in upper elevation forests and rocky outcroppings (Figure 2). White-nosed coatis and mountain lions in particular favor the rocky outcroppings in summer. The diversity of carnivores is especially great in summer when species that often reduce activity or hibernate in the winter (skunks, ringtails, bears) are common in the park. Also important to the diversity of mammals in Chiricahua National Monument are the 4 permanent sites of water; all carnivores except coyotes and many prey species were documented to use these water sources.

Management Implications:

1. The diversity of habitat types appears to be important in maintaining the guild of mammalian carnivores within the park; this mosaic of habitat types should be retained.
2. Upper elevation forests and rocky outcroppings appear to be especially critical to

many carnivores during summer. These areas contain a majority of the trails and roads in the park that will increase opportunities for visitors to encounter carnivores but also increase the likelihood of negative interactions between visitors and carnivores.

3. Grassland habitats within the park are used by fewer carnivores; however, they increase the species richness of CNM due to species such as coyotes that are strongly associated with this habitat.
4. Permanent water is used by the full diversity of carnivores found within CNM. In addition, a number of prey species also use these sites, in particular white-tailed deer. These sites and covered access to them should be maintained.

Figure 1. Mean species richness of carnivores at scent stations during winter, Chiricahua National Monument, Cochise Co., Arizona.

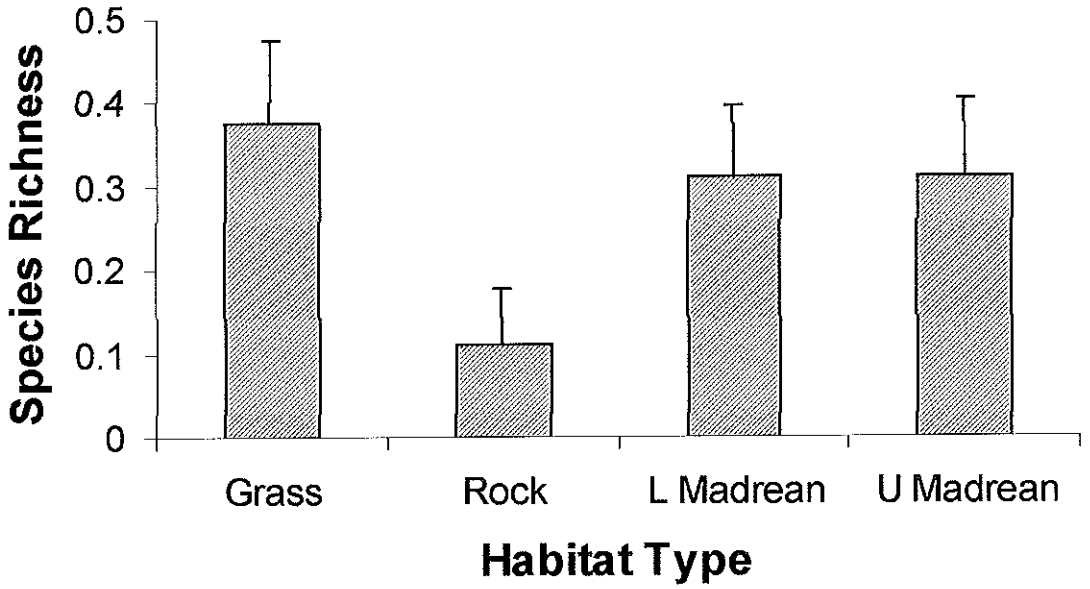

Figure 2. Mean species richness of carnivores at scent stations during summer, Chiricahua National Monument, Cochise Co., Arizona.

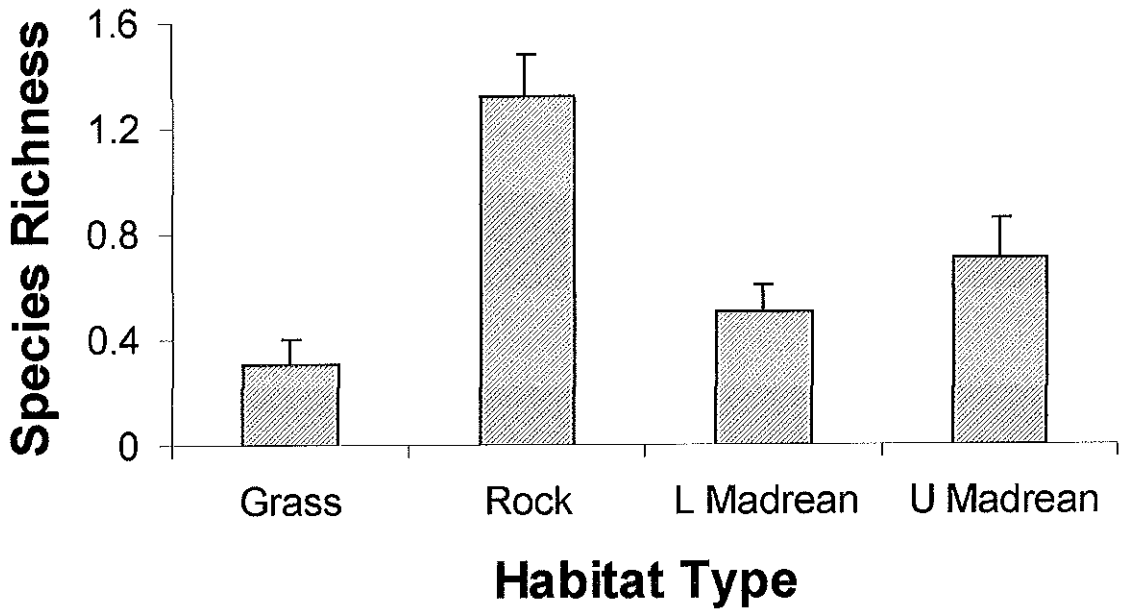

Figure 3. Frequency of carnivores at scent stations compared between winter and summer, Chiricahua National Monument, Cochise Co., Arizona.