



Sand Dune Mammals at Guadalupe Mountains NP

Guadalupe Mountains National Park (NP) is a critical location for understanding the distribution of mammals in the Chihuahuan Desert. Situated along the Texas-New Mexico border, the park includes representative habitats from desert lowlands to mountainous highlands. Situated at the base of the western escarpment of the Guadalupe Mountains in northern Hudspeth County, Texas, are a series of gypsum and quartz dunes of which the park recently acquired approximately 10,000 acres. There have been several surveys of the mammalian fauna of the area in, and around the park (1905, 1940, 1970s, 1985, and 1992), but most of these surveys concentrated on the mountainous regions of the park. To date, there have been few studies that have examined the mammals of the lower desert regions of the park, in particular the sand dune areas. This study began in October 2003, and ended in February 2004. The objectives of this study were: (1) to determine the occurrence of mammal species in the Sand Dune Complex, (2) to estimate the relative abundance of small mammal species, and (3) to establish permanent sampling sites. The information gathered in this study is valuable as baseline data for future studies of biodiversity and detection of change at the park.

Methods

The sand dunes were divided into four generalized dune categories based on sand particle composition and vegetation type. Two of the dune categories were quartz-based “Red” dunes and gypsum-based “White” dunes. The third category was dunes designated as Intergrade Dunes (the area which separated the red and white dunes). Finally, the sand that surrounded both dune fields was designated as the Cover Sands. Three trap lines (transects) of 50 Sherman live traps each line, were set in each dune category for sampling small to medium-sized mammals. Pocket gophers were sampled opportunistically using McAbee gopher traps. Spotlighting at night was utilized to sample species that are difficult to sample by trapping. Large mammals were recorded by sightings or other sign. No attempts were made to capture or identify bat species. Relative abundance for small rodents was estimated based on the number of individual animals captured per unit of time and effort (e.g., trap night). Each dune category was sampled for 500 trap nights (total 2,000 trap nights). An index of species diversity (Shannon’s Diversity Index) was estimated for each of the dune.

Results

Thirteen mammal species were either trapped, or animal signs (tracks and fresh burrows) observed. An additional ten species are known to be present in the dunes from earlier studies and museum records. A total of 144 captures were recorded from the dunes representing seven species of small rodent. Overall,



Gypsum (White) dunes at Guadalupe Mountains National Park.

the three most common species were Merriam’s kangaroo rat (*Dipodomys merriami*), the most abundant, with 52% of all captures, desert pocket mouse (*Chaetodipus eremicus*, 29% of captures), and Ord’s kangaroo rat (*Dipodomys ordii*, 13% of captures). Abundance of small rodents was also examined by dune category, with the most species (n=6) trapped in the gypsum (White) dunes. The fewest species (n=3) trapped was in the Cover Sands, though this area had the highest trap success rate. The lowest trap success rate was in the Intergrade Dunes. Statistical tests within the dune categories revealed: (1) the White Dunes are significantly more diverse than either



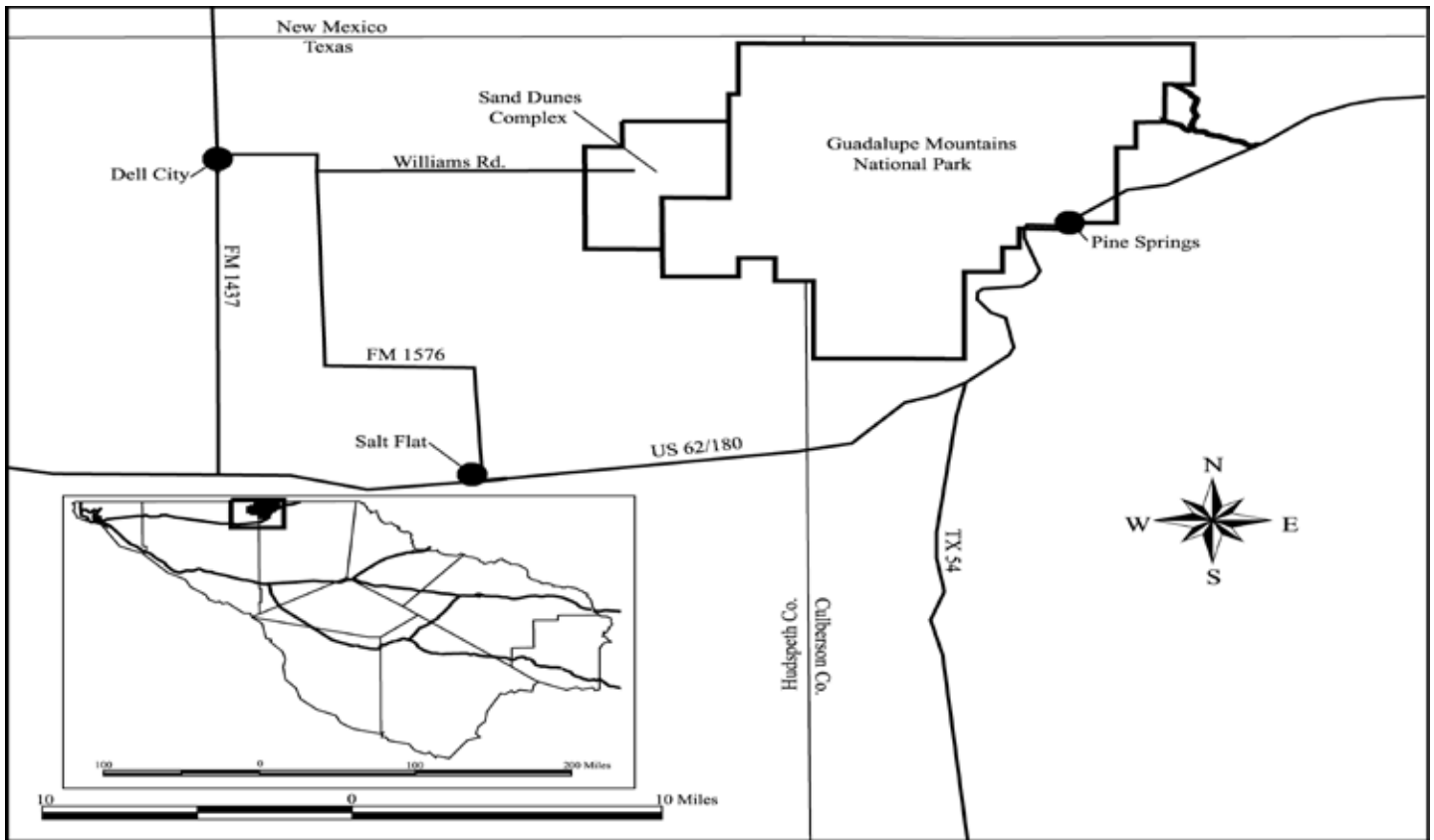


Figure 1. Map showing the location of the Sand Dunes Complex, Guadalupe Mountains National Park, in Hudspeth County, Texas.

the Red Dunes or the Cover Sands; (2) the Cover Sands are also significantly less diverse than the Red Dunes; and (3) the Intergrade Dunes are not significantly different from any of the other dune categories: Red Dunes, White Dunes, and Cover Sands.

Discussion

Fieldwork, museum surveys and literature searches recorded the presence of 23 species of mammals occurring within the Sand Dunes Complex of the park. These species were comprised of 5 carnivores, 1 artiodactyl (hooved animal like deer), 15 rodents, and 2 lagomorphs (cottontails and jackrabbits). Only three species were encountered in sufficient numbers, and from several dune categories to be informative as to the abundance patterns in this area. Merriam's kangaroo rat was the most abundant species and desert pocket mouse was second in abundance in the Cover Sands, Intergrade Dunes, and Red Dunes. The desert pocket mouse was more abundant in the Red Dunes than any other dune category. The White Dunes diverge from the pattern displayed in the other dune categories in that Ord's kangaroo rat displaced Merriam's kangaroo rat as the most abundant species. The Cover Sands had the lowest diversity value, and are significantly less diverse than either the Red Dunes or the White Dunes. The White Dunes have the highest diversity value and are significantly more diverse than the Red Dunes. The Intergrade Dunes, however have a moderate diversity value, and are not significantly different

than any on the other dune categories. This implies that the Intergrade Dunes are an area where species transition between the three other dune categories. The geographic relationships of the mammals found in the Sand Dune Complex, demonstrate that this area of the park has a high affinity to the Chihuahuan Desert and the rest of the Trans-Pecos region of Texas.



White dunes differed from other dune types in that Ord's kangaroo rat (above, left) replaced Merriam's kangaroo rat (above, right) as the most abundant species.