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The Mammals of the Animas Mountains and Adjacent Areas, Hidalgo County, New Mexico

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Abstract

A study of the mammals of the Animas Mountains and adjacent areas of Hidalgo County, New Mexico, was conducted from February 1981 to March 1982. Some 745 specimens were collected along with data concerning the habitat affinities, natural history, and relative abundance of the mammalian fauna. Examination of an additional 947 specimens and reporting of specimens in museums supplemented the fieldwork.

The recent mammals of the Animas Mountains include 76 species in 21 families. *Didelphis virginiana, Lasionycteris noctivagans, Lasiurus ega, Ammospermophilus harrisii,* and *Reithrodontomys fulvescens* are reported for the first time from the study area. The most abundant mammal in the area is *Peromyscus boylii;* while *Didelphis virginiana, Choeronycteris mexicana, Leptonycteris sanborni, Lasionycteris noctivagans,* and *Tadarida macrotis* may be present only at irregular intervals.

Within historic time, two species, *Mus musculus* and *Sus scrofa,* have been introduced and three species, *Cynomys ludovicianus, Canis lupus,* and *Ursus arctos,* have been extirpated. The subspecies *Thomomys umbrinus emotus* is the only mammal endemic to the Animas Mountains. Other montane relicts include *Sorex arizonae, Sylvilagus floridanus, Eutamias dorsalis,* and *Neotoma mexicana.*

Sorex arizonae and *Lepus callotis* are the most restricted species, occuring in only one habitat type. *Myotis leibii, Neotoma albigula,* and *Canis latrans* are the most euryecious, being found in 9 of the 10 habitat types. Riparian habitats exhibit the greatest species richness and coniferous forest the least. A general trend of decreasing number of species with increasing elevation is evident among the various habitat types. A Jaccard's index of similarity matrix indicates a decreasing faunal resemblance with increasing elevational separation of habitats.

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INTRODUCTION

The Animas Mountains are the highest mountain range in New Mexico south of the Deming Plain and west of the Rio Grande and they support a remarkable biotic diversity (Fig. 1). Wagner (1977) noted the occurrence of 718 taxa of plants (ca. 20% of the known flora of New Mexico; Martin and Hutchins 1980) and Hubbard (1977) listed 99 bird species. This study documents the occurrence of 76 mammal species in the study area, which is roughly 52% of all the mammal species found in New Mexico (Findley et al. 1975). In addition to this diversity, the Animas Mountains harbor (or harbored) 33% of the mammal species currently found on the New Mexico Department of Game and Fish list of endangered species and subspecies (New Mexico Department of Game and Fish 1985).

The Animas Mountains have intrigued biologists since the end of the nineteenth century. E.A. Mearns (1907) noted in his mammal survey of the Mexican boundary that in July of 1892 he and F.G. Irwin travelled northward from San Luis Pass along the crest of the Animas Mountains. This appears to be the first visit by a biologist to the area, although no specimens were taken.

The earliest mammal specimens from the area were obtained by E.A. Goldman, C. Birdseye, and V. Bailey of the United States Biological Survey. They visited Double Adobe Camp, the mouth of Indian Creek, and the Gray Ranch Headquarters and collected primarily mammal, bird, and plant specimens from the Animas Valley and the northern and northeastern end of the Animas Mountains between 27 July and 10 August 1908. These specimens are deposited in the National Museum of Natural History. Subsequent reports on the mammals (Bailey 1932), plants (Wooton and Standley 1915), and the birds (Bailey 1928) relied principally on the data collected in that early fieldwork. Since that time ornithologists (Ligon 1961, Niles 1966, Hubbard 1977), herpetologists (Bogert and Degenhardt 1961, Harris and Simmons 1976), and botanists (Hubbard 1977, Wagner 1977) have visited the area.

In the late 1950's and early 1960's, J.S. Findley and his students at the University of New Mexico, including E.D. Fleharty, C. Jones, and A.H. Harris, made periodic trips to the Animas Mountains, working primarily in Indian Creek, Double Adobe Creek, and Black Bill Canyon. J. Druecker collected at 13 localities within the mountain range for his thesis (1966) on the distribution and ecology of the bat fauna of southern Hidalgo County. Specimens collected by these mammalogists are reported by Findley et al. (1975).

In the ensuing years, a few small mammal collections were made in the area by individuals associated with academic institutions and by individuals supported by the New Mexico Department of Game and Fish. These studies have resulted in several reports concerning the Animas Mountains' mammalian fauna (e.g., Bednarz 1977, Hubbard 1977, Conway and Schmitt 1978, Thaeler and Hinesley 1978).

Surveys of the mammals of the nearby Chiricahua Mountains (Cahalane 1939, Cockrum and Ordway 1959), the Huachuca Mountains (Hoffmeister and Goodpaster 1954), and the Graham Mountains (Hoffmeister 1956) of southeastern Arizona have established invaluable baseline inventories for later investigators in those areas. The Big Hatchet and Alamo Hueco Mountains of eastern Hidalgo County, New Mexico, have been surveyed for mammals (Hayward et al. 1978), but a comprehensive description of the mammalian fauna of the Animas Mountains has not been completed previously. This study was designed to inventory the mammals of the Animas Mountains and provide data concerning their distribution and natural history.

METHODS AND MATERIALS

The information summarized in the individual species accounts is based on examination of 1,692 specimens housed in the following institutions: The Museum of Southwestern Biology, University of New Mexico, (MSB), 1,516; New Mexico State University (NMSU), 117; New Mexico Department of Game and Fish Endangered Species Program, Santa Fe (ESP), 33; Western New Mexico University (WNMU), 26.

These specimens are listed in the individual species accounts in the specimens examined section. Of the specimens at the MSB, 745 were collected in this study. The additional records section includes primarily specimens listed in the *Mammals of New Mexico* (Findley et al. 1975) that were not examined in this study. These specimens are at the American Museum of Natural

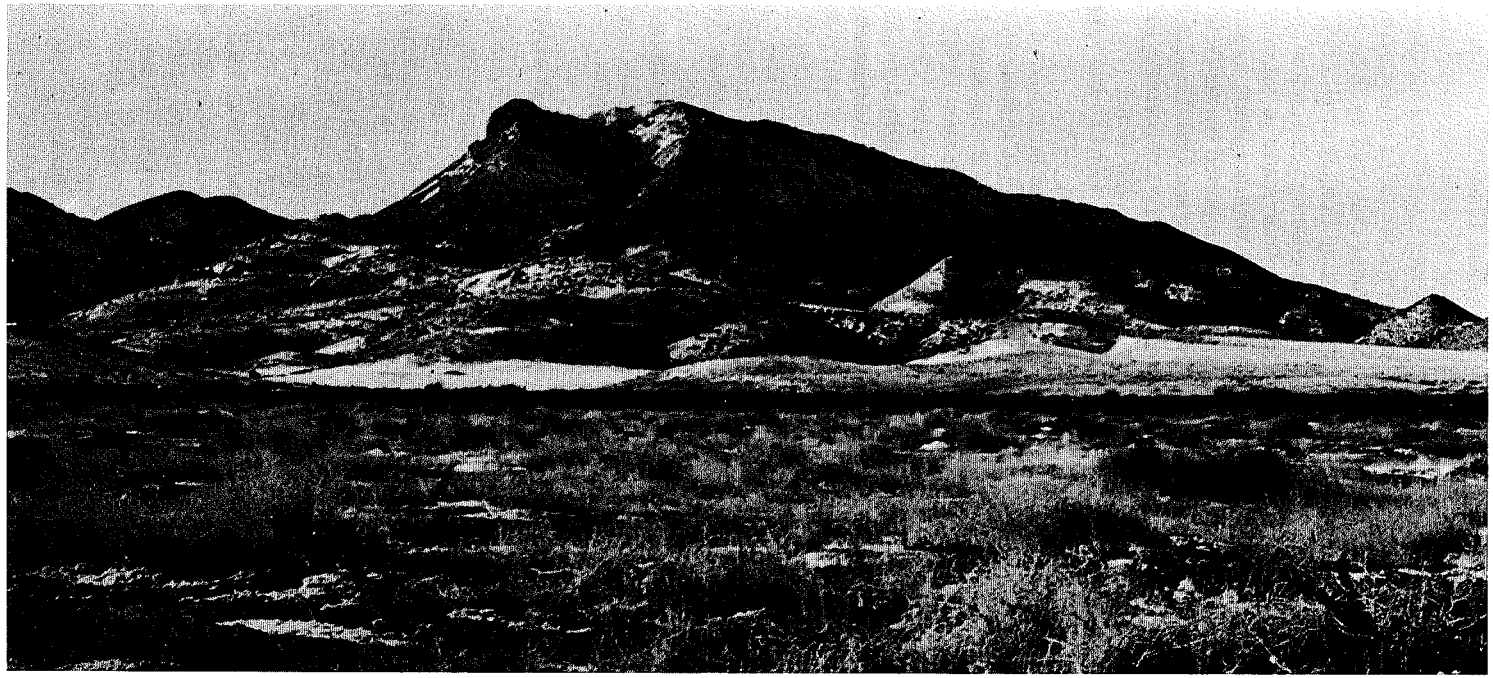

Figure 1. The Animas Mountains exhibit a variety of habitats as evidenced in this view from 5 km W of Double Adobes in the Animas Valley. Distinguishable habitats include shortgrass plains in the foreground and on the lowest foothills, oak savannah in the intermediate zones, and a dense chaparral on the upper slopes.

History (AMNH), National Museum of Natural History (USNM), University of Kansas Museum of Natural History (KUM), Museum of Vertebrate Zoology, University of California (MVZ), and Museum of the High Plains, Fort Hays Kansas State University (MHP). Specimen records from other literature sources are cited. Specimens (not personally examined by me) in the Museum of Arid Land Biology, University of Texas at El Paso (UTEP), and the Museum of Illinois at Urbana-Champaign (UI) are listed in the specimens reported section.

Interviews with ranchers, biologists, and trappers working in the Animas Mountains vicinity yielded additional information concerning the mammalian fauna.Fieldwork was conducted on the following dates: 26 February through 1 March 1981, 18 March through 21 March 1981, 18 May through 5 August 1981, 7 October through 13 October 1981, 19 December through 12 January 1982, and 12 March through 17 March 1982. More than 11,000 trap nights were completed in this study.Trapping localities were selected to sample the major habitats found in the Animas Mountains. A qualitative assessment of dominant vegetation types and percentage canopy, shrub, and grass and forb cover was recorded for each trapline to determine vegetative affinities for each mammal species trapped. Latin binomials for the plants mentioned in the text are given in Appendix 1.

Specimens were prepared as skins and skeletons, skins and skulls, skeletons, or alcoholics and have been deposited in the MSB. Karyotypes, frozen tissue for electrophoresis, and intestinal parasites were collected from selected specimens and deposited in the MSB.

Bats were mist netted at 12 locations on 19 occasions, from 25 May to 11 October 1981. Nets were generally erected over water sources at sunset and observed until after midnight. Bat activity was usually low after midnight and the nets were sometimes taken down, depending primarily on weather conditions. Due to the high winds that accompanied the localized rainstorms during July and August, netting was frequently interrupted during these months. Captured bats were kept until the following morning, when those not retained as voucher specimens were identified, weighed, sexed, and released.

Night surveys were conducted on 10 occasions from an open-top vehicle equipped with two roof-mounted spotlights (250,000 candle-power) positioned at 30 degree angles from the center axis of the vehicle. A hand-held spotlight (200,000 candle-power) was scanned slowly between the beams of the mounted lights, illuminating a total width of 75 m. Spotlighting was employed primarily to survey *Lepus callotis* along a predetermined census route established in the Animas Valley (Bednarz and Cook 1984); however, these surveys also yielded data on the distribution and habits of other nocturnal species.

DESCRIPTION OF THE STUDY AREA

Geography and Climate

The study area includes the Animas Mountains and the majority of the Animas Valley to the west and encompasses an area roughly bounded to the north by 31° 45′ N latitude, to the south by San Luis Pass, to the west by 108° 53′, and to the east by 108° 35′ W longitude (Fig. 2). The study area is some 29 km east to west by 40 km north to south, with the northern boundary 19 km south of Animas, New Mexico.

Animas Peak, the highest point in the mountain range at 2,597 m, is 24 km east of Arizona and 27 km north of the Mexican boundary. The main massif of the mountain range (above 1,800 m) is approximately 14 km wide by 21 km long. Major drainages in the Animas Mountains include Double Adobe, Bear, and Indian Creeks in the north, Spring Canyon and Deer Creek in the southeast, and Black Bill Canyon and Animas Creek in the west. Water in these drainages is intermittent throughout the majority of their lengths, although Double Adobe Creek near Double Adobe Camp, Indian Creek in the vicinity of Aspen Spring, the intermediate elevations of Spring Canyon, Animas Creek near the Gray Ranch Headquarters, and Clanton Draw Ponds usually contain surficial water. Below 1,800 m numerous stock tanks skirt the base of the mountains and provide perennial sources of water. The Animas Valley, to the west, and the Playas Valley, to the east, bound the mountain range.

Sixty percent of the annual precipitation in southwestern New Mexico is received from July to September (Fig. 3) in the form of localized thundershowers. The annual precipitation at the Fitzpatrick Camp for a 3 year period was 343.1

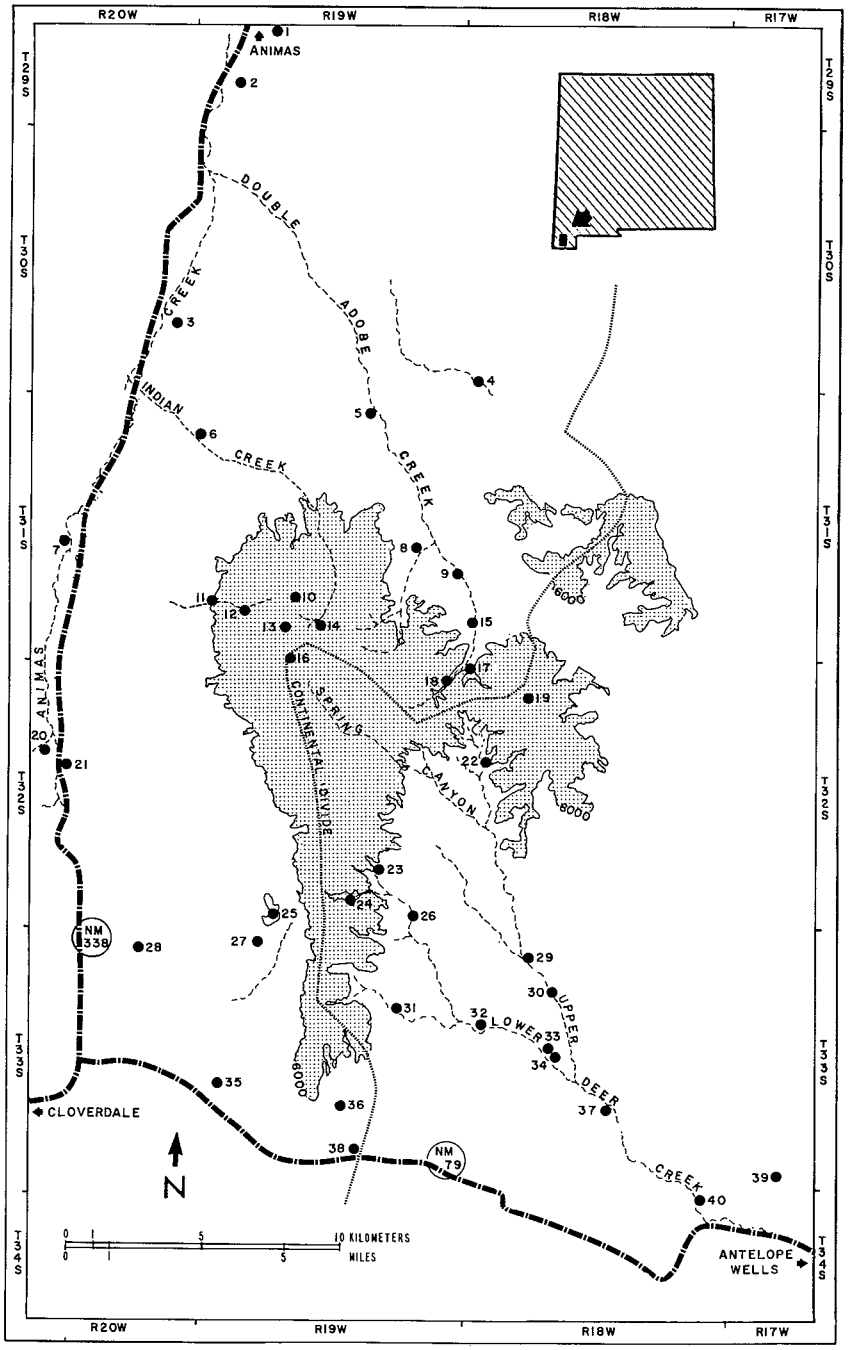

Figure 2. Map of the Animas Mountains study area. Stippled areas are above 1,830 m. Numbers refer to localities listed in the gazetteer (Appendix 2).

mm. Typically April, May, June, and November are the driest months in this area. July is the warmest month and January is the coldest.

Wagner (1977) presented a concise overview of the geology of the Animas Mountains. Briefly, they are the result of a series of volcanic events beginning in the early Miocene. These Miocene formations are composed primarily of quartz-latite ash-flows, with lesser amounts of rhyolite ash-flows and mid-Miocene Gila conglomerate. There are no limestone or gypsum deposits within the study area. Most of the Animas Valley contains fine-textured Pleistocene alluvial deposits. One of the outstanding geologic features of the area is Pleistocene Lake Cloverdale at the southwest corner of the study area. Large sand deposits are found at the northwestern edge of this level, former lake bed.

Between 1909 and 1952, the Animas Mountains were part of the Coronado National Forest. Today the study area is privately owned and operated primarily for cattle production by the Gray Ranch Company of Animas, New Mexico. Access to the area is restricted. As little water is available above 1,800 m and the upper elevations of the Animas Mountains are typically precipitous, the main massif has been minimally impacted by grazing.

Habitat Types

The vegetation classification that follows has been modified from Hubbard (1977) and Wagner (1977) and the reader is referred to those accounts for a more detailed discussion of these habitats and the Animas Mountains flora in general. A

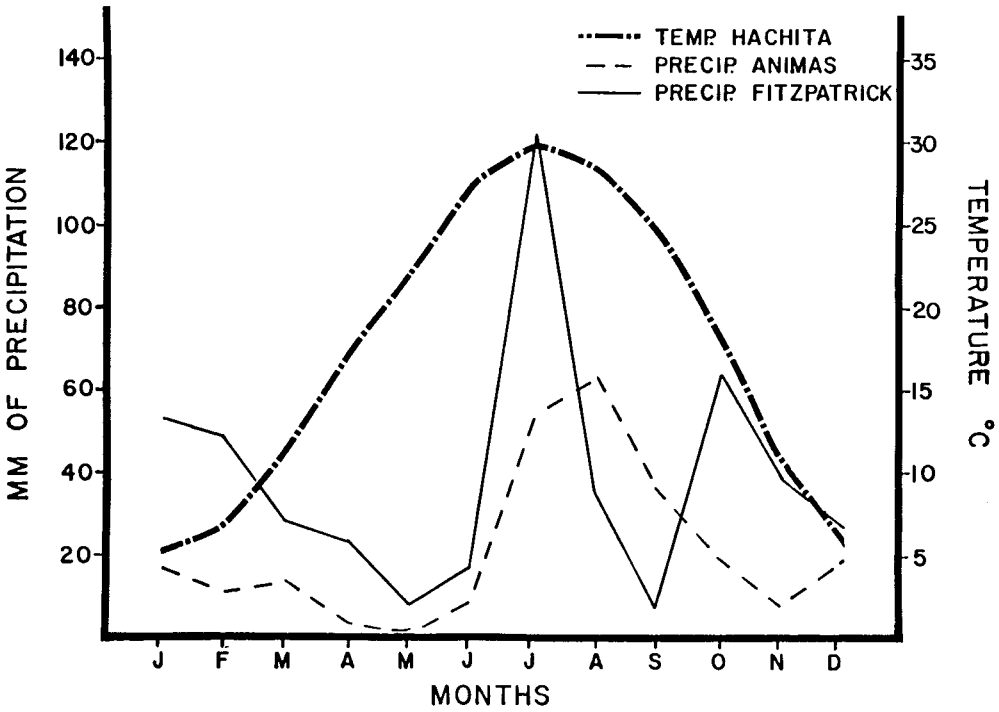

Figure 3. Average monthly temperature for Hachita, New Mexico (elevation 1,235 m) 60 km NE of the study area, and monthly precipitation for Animas, New Mexico (elevation 1,346 m) 12.5 km N of the study area and the Fitzpatrick Camp (elevation 1,571 m) 1 km SW of the study area. Data for Hachita and Animas are 30 year averages (1941–1970) from the Environmental Data Service (1973), and data from the Fitzpatrick Camp are a 3 year average (1976–1978) and were provided by S. Dobrott (pers. comm.).

brief description of the major floral components of each habitat and an example of a locality typical of that habitat are presented.

Grassland (3,772 trap nights)

This habitat occurs extensively at elevations below 1,676 m and varies considerably in species composition. Two subtypes may be defined.

A. Shortgrass Plains (892 trap nights)

Blue grama, black grama, three-awn, and tobosa grasses and honey mesquite, fourwing saltbush, joint-fir, and soaptree yucca are common floral elements along with numerous perennial and annual forbs. This xerophytic vegetation type is found primarily on the bajadas or lower slopes of the mountains. Species composition varies throughout the study site and has been influenced heavily by grazing intensity. Unpalatable shrub species are most abundant in the northern portion of the study site where grazing pressure has been greatest (Wagner 1977). A trapping site 2.4 km S of Double Adobes (Appendix 2, Locality 5) is characteristic of this habitat type.

B. Sacaton Grassland (2,880 trap nights)

Sacaton is the dominant species in this riparian association with other grasses such as plains bristlegrass and vine-mesquite present. Common forbs include pepper-grass, silver-nettle, and annual sunflower. Sacaton grassland is found primarily along the lower Animas Creek floodplain in the northwest corner of the study area. The XT Camp (Locality 2) is characteristic of this habitat.

Riparian (2,941 trap nights)

This habitat is restricted to the major drainages of the Animas Mountains. In the riparian areas above approximately 1,800 m, a distinct riparian habitat is lacking; instead, the surrounding woodland and forest associations, with mesic sub-dominants, are found in these areas (Fig. 4). Below 1,800 m, however, at least three subdivisions may be made.

A. Sycamore Riparian (1,575 trap nights)

This is the most extensive riparian habitat found in the study area. It is characterized by an overstory composed of sycamore, velvet ash, Arizona walnut, desert willow, and netleaf hackberry with a varied understory including mesquite, pale wolfberry, and rabbit brush. Joyce Mill in lower Deer Creek (Locality 37) is characteristic of this vegetative type.

B. Cottonwood Riparian (1,073 trap nights)

Fremont cottonwood and Goodding willow are the dominant overstory elements with various mesophytic grasses, sedges, and rushes forming a dense grassland below. Clanton Draw Ponds (Locality 20) is characteristic of this habitat.

C. Rabbit Brush Riparian (293 trap nights)

Rabbit brush forms nearly monotypic stands along the lengths of several drainages. OK Bar in Double Adobe Creek (Locality 9) is characteristic of this habitat.

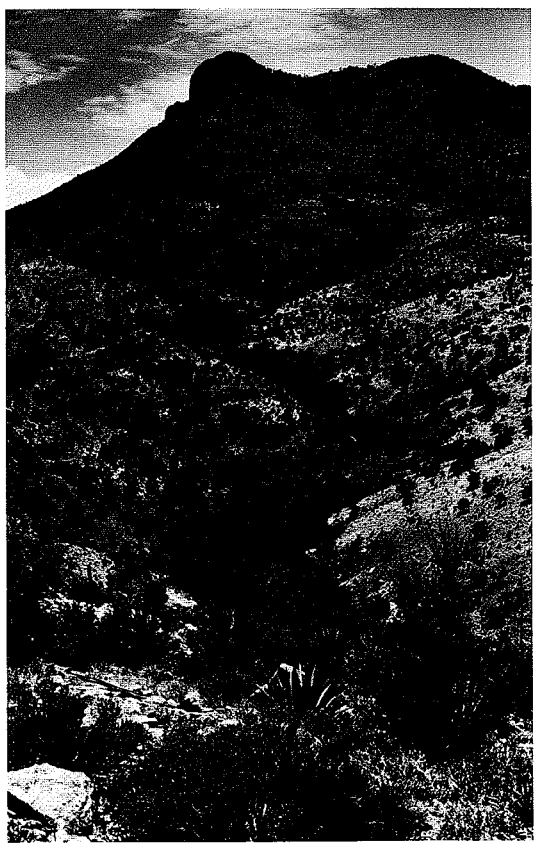

Figure 4. Indian Creek, Animas Mountains (1,900 m) showing a riparian zone composed of oaks, pinon, and juniper. The lower slopes are oak savannah, which grade into chaparral on the upper slopes, and coniferous forest on Indian Peak (left) and Animas Peak (right).

Oak Associations (1,363 trap nights)

This general habitat type occurs extensively throughout the Animas Mountains from 1,800 to 2,440 m. The oak associations have been subdivided into two principal groups.

A. Oak Savannah (793 trap nights)

At the lower elevational extreme a savannah type is present with Emory oak and shrub live oak found in association with alligator-bark juniper, pointleaf manzanita, sacahuista, turpentine bush, Palmer century plant, datil, and such grasses as mountain muhly, side-oats grama, and blue grama. The oak savannah found on the bajada west of Black Bill Spring (Locality 12) is characteristic of this habitat type.

B. Oak Woodland (570 trap nights)

This habitat type is found generally above the oak savannah subtype in the more mesic canyons. Within this subtype an elevational zonation of oak species is found, with Emory oak replaced by Arizona white oak (the most common dominant), and finally by Gambel oak as the elevation increases. Netleaf oak and silverleaf oak may also be assigned to this woodland type, although these species frequently grade into chaparral (Hubbard 1977). Spur Mill (Locality 22) is in close proximity to this habitat type.

Pinon-Juniper Woodland (1,444 trap nights)

Mexican pinon and alligator-bark juniper and various interspersed oaks are the dominant overstory elements in this habitat type, with pointleaf manzanita, Apache plume, and mountain mahogany present as common understory shrubs. This habitat association is less extensively developed in the Animas Mountains than it is in the surrounding larger mountain ranges like the Chiricahua, Burro, and San Luis Mountains. Hubbard (1977) estimated the extent of this type at a few hundred acres with an elevational range of 2,286–2,439 m. I found this type occurring down to 1,980 m on north facing slopes. Horse Thief Tank (Locality 24) is a site characteristic of this vegetative type.

Chaparral (1,100 trap nights)

This is the most extensive habitat type in the study area, other than grassland. Chaparral is found from approximately 1,600 m at the southern end of the main massif to over 2,400 m. At higher elevations, species such as mountain mahogany, pointleaf manzanita, netleaf oak, and silverleaf oak are typical elements and may form a virtually impenetrable thicket.

Wagner (1977) noted that this community has the lowest species diversity within the study area as occasionally only two plant species co-occur. The northwestern end of Cistern Saddle (Locality 13) supports a vegetation characteristic of this type.

Coniferous Forest (963 trap nights)

This habitat type is dominated by a relatively open canopied mixed-conifer community composed principally of ponderosa pine and Douglas-fir although these dominants are seldom found together. Gambel oak, Mexican white pine, alligator-bark juniper, Mexican pinon, and Apache pine are also present with an understory consisting of skunkbush, New Mexico locust, and snowberry and bunchgrasses like mountain muhly. The forest habitat is restricted to elevations ranging from 2,100 m in canyons and 2,286 m on north facing slopes (Wagner 1977) to 2,591 m on Animas Peak. Hubbard (1977) estimated the total extent of this type at 1,100 acres. The southern end of Cistern Saddle (Locality 13) is characteristic of the coniferous forest habitat.

RESULTS

Native Species

Species found to occur in the Animas Mountains (including those species recently extirpated and those based on reliable sight records) are discussed in the following accounts. Each account is headed by the currently accepted scientific name to subspecific level and by the vernacular name (Hall 1981). These designations do not reflect a systematic analysis of each subspecific taxon, but are based on distributions detailed in Hall (1981), except in those instances where other publications have provided more consistent information or where a subspecific designation was not possible. These have been cited in the text. Species accounts include a general discussion on abundance, distribution, habitat requirements, reproduction, and appropriate taxonomic questions.

Distribution maps are included in Appendix 3

for those species for which at least three exact collecting localities could be determined. Dots on the maps refer to localities listed in the specimens examined, additional records, and specimens reported sections of the individual species accounts.

ORDER MARSUPIALIA

Family Didelphidae

Didelphis virginiana Kerr

Virginia Opossum

D. Goodin (pers. comm.) provided an accurate description of a single opossum he trapped at Eicks Tank in the southeastern foothills of the Animas Mountains in the spring of 1980. This is the first report of *D. virginiana* from southwestern New Mexico and may represent an animal released from captivity (Hock 1952) or an individual that dispersed from Mexico.

Unfortunately, a voucher specimen is not available from the study area. Interviews with ranchers and biologists working in this area revealed no other records and it is reasonably certain that opossums are not established in the Animas Mountains.

ORDER INSECTIVORA

Family Soricidae

Sorex arizonae Diersing and Hoffmeister

Arizona Shrew

The Arizona shrew is currently included on the New Mexico Department of Game and Fish list of endangered species and is known only from the Huachuca, Santa Rita, and Chiricahua Mountains of Arizona (Diersing and Hoffmeister 1977), one locality in Chihuahua, Mexico (Caire et al. 1978), and the Animas Mountains of New Mexico. The first Arizona shrew taken in the Animas Mountains (an adult male) was found drowned at Aspen Spring in 1976 (Conway and Schmitt 1978). Intensive use of pitfall traps in the area of Aspen Spring resulted in an additional male captured some 15 m from the cistern where the original specimen was secured.

Sorex arizonae has been taken only in the mesic areas of the coniferous forest zone of the mountain ranges listed above. As this habitat is extremely limited in the Animas Mountains and this species apparently is not very abundant (based on our trapping efforts), a disturbance of these areas may seriously jeopardize this relictual species. Suitable habitat also may occur in limited stretches along Spring Canyon.

Specimens examined (2).—Aspen Spring, 2 (MSB).

Notiosorex crawfordi crawfordi (Coues)

Desert Shrew

Three records of this species are available from the area. Two desert shrews taken in the present study were captured in pitfall traps set beneath the sycamore and hackberry trees of Double Adobes in a thick accumulation of leaf litter and detritus. The third specimen was recovered from an owl pellet by J. Findley in 1959. *Notiosorex* is probably more abundant in the study area than is indicated by these observations because conventional rodent traps (i.e., snap and Sherman live traps) seldom catch desert shrews.

Specimens examined (3).—18.2 mi S Animas, 1 (MSB); Double Adobes, 2 (MSB).

ORDER CHIROPTERA

Family Phyllostomatidae

Choeronycteris mexicana Tschudi

Long-tongued Bat

Choeronycteris mexicana is an uncommon inhabitant of the Animas Mountains that is probably present in the study area only at irregular intervals. Two females (one lactating) were collected at Aspen Spring on 1 September 1964. This locality, at 2,134 m, is a higher elevation than is normal for this species in New Mexico (Findley et al. 1975).

Specimens examined (2).—T31S R19W sec. 33, 2 (MSB).

Leptonycteris sanborni Hoffmeister

Sanborn's Long-nosed Bat

Leptonycteris sanborni is an occasional inhabitant of the Animas Mountains. A single specimen (MSB 19727) was obtained by J. Druecker on 17 August 1964 at OK Bar. This locality, at 1,676 m, is at the upper elevational limit for this species (Baker and Cockrum 1966) which is typically found in low elevation desert grassland associations (Hayward and Cockrum 1971).

Specimen examined (1).—OK Bar, 1 (MSB).

Family Vespertilionidae

Myotis velifer velifer (J.A. Allen)

Cave Myotis

Myotis velifer is commonly associated with low elevation desert, grassland, and savannah communities. Three male cave myotis were netted in this survey on 8 June at Joyce Mill (1,532 m). Druecker (1966) captured a male on 29 June at the XT Camp (1,433 m) and a female on 16 August at Pit Tank (1,707 m), somewhat above the described elevational range of *M. velifer* (Findley et al. 1975).

Most individuals of this species migrate south in winter (Hayward 1970). The southwestern population is known to occur in the state from 8 May to 22 September (Findley et al. 1975).

Specimens examined (5).—Joyce Mill, 3 (MSB); T29S R19W sec. 32, 1 (MSB); T32S R19W sec. 35, 1 (MSB).

Myotis auriculus apache (Hoffmeister and Krutzsch)

Southwestern Myotis

Myotis auriculus was the most commonly encountered bat species in the survey. In one night (20–21 June) of mist netting over the steel trough at Aspen Spring, 19 *M. auriculus* were captured. Bat activity was continuous from dusk until well after midnight.

This species is closely associated with the wooded areas of the Animas Mountains. Although the majority of *M. auriculus* specimens were collected at Aspen Spring, this species has also been taken in sycamore and cottonwood riparian areas at lower elevations. Extensive rock outcroppings and cliffs that are important roost sites for *M. auriculus* are present throughout the region.

A total of eight pregnant females, each with one embryo, was recorded in the study. Crown/rump length measurements of the embryos progressed from 14 mm for a 4 June specimen to 19 mm for a 9 June specimen; 16, 19, 20, and 21 mm from four taken on 10 June; and 19 mm from a 23 June specimen. According to Barbour and Davis (1969) these females were probably near parturition from mid- to late June. Indeed, a female netted at Aspen Spring on 20 June had given birth by the following morning.

Specimens examined (25).—Aspen Spring, 16 (11 MSB, 2 ESP, 3 NMSU); Gibson Tank, 3 (1 MSB, 2 WNMU); New Well, 1 (MSB); Rock Ridge Windmill, 1 (MSB); Spillsbury Windmill, 4 (MSB).

Specimen reported (1).—Indian Creek Canyon, 1 (UTEP).

Myotis thysanodes thysanodes (Miller)

Fringed Myotis

Myotis thysanodes has a wide habitat tolerance and elevational range in the Animas Mountains. Fringed myotis are most abundant in the desert shrub-grassland areas and the majority of the specimens (77%) were taken below 1,675 m.

On 23 June I collected two male fringed myotis that were roosting on the ceiling of the abandoned OK Bar house at 2345 h. Several authors (Bailey 1932, Barbour and Davis 1969, Findley et al. 1975) have noted that *M. thysanodes* may often be found roosting in buildings. Druecker (1966) found this species to be the most frequently encountered night roosting bat in southern Hidalgo County.

Two pregnant females (embryo crown/rump length 23 and 26 mm) were netted on 29 June 1963 and lactating females have been taken on 29 June and 2 August. B. Hayward (pers. comm.) reported a maternity colony of fringed myotis at the U Bar Cave in the nearby Alamo Hueco Mountains in 1960. The existence of a maternity roost in the Animas Mountains is doubtful as no females were captured in this survey.

Specimens examined (44).—Aspen Spring, 8 (3 MSB, 1 ESP, 4 NMSU); Double Adobe Canyon, 10 (MSB); Gibson Tank, 2 (MSB); pond on Godfrey Ranch, T29S R19W sec. 32, 10 (MSB); OK Bar Ranch, 3 (NMSU); T31S R18W sec. 6, 1 (MSB); T33S R18W sec. 12, 4 (MSB); T29S R19W sec. 32, 3 (MSB); 17 mi S, 6.6 mi E of Animas, T31S R19W sec. 3, 2 (MSB); T30S R18W sec. 18, 1 (MSB).

Myotis volans interior (Miller)

Long-legged Myotis

The long-legged myotis was relatively abundant in the area, although rather limited in distribution. This species is typically found at intermediate elevations in the pinon-juniper zone in southwestern New Mexico. *Myotis volans* has been collected at six sites located at the northern end of the Animas Mountains within the encinal zone.

No breeding data are available for the *M. volans* of the Animas Mountains and of the 36 specimens examined, only one (collected on 1 September) was a female. Males have been taken from 4 June to 1 September. Very little is known of the winter activity of the long-legged myotis.

Specimens examined (36).—Aspen Spring, 24 (20 MSB, 1 ESP, 3 NMSU); OK Bar, 4 (MSB); Gibson Tank, 3 (2 MSB, 1 WNMU); New Well, 3 (MSB); tank at Double Adobe Creek, T31S R19W sec. 3, 1 (MSB); 17 mi S, 6.6 mi E of Animas, T31S R19W sec. 3, 1 (MSB).

Myotis californicus californicus (Audubon and Bachman)

California Myotis

The California myotis is one of the smaller bat species found in the Animas Mountains. This species has been taken in a variety of habitats, ranging from low elevation grassland up to the wooded habitats surrounding Aspen Spring.

Breeding data for the California myotis within the area consists of a single pregnant female (one embryo, crown/rump length 23 mm) taken near San Luis Pass (T33S R19W sec. 33) on 18 June.

Winter records of *M. californicus* in the United States are common (Krutzsch 1954, Barbour and Davis 1969, Findley et al. 1975) and it seems likely that this species may overwinter in the region. I collected a male on 8 October at the Godfrey Camp.

Specimens examined (12).—Aspen Spring, 3 (MSB); 36 mi S 3 mi E Animas, upper Animas Valley, 1 (MSB); Dirt Tank N of NM 79, T33S R19W sec. 33, 1 (MSB); Godfrey Camp, 1 (MSB); OK Bar, 1 (MSB); T31S R18W sec. 6, 3 (MSB); T33S R18W sec. 12, 2 (MSB).

Additional record (1).—Birch Spring, 1 (KUM).

Myotis leibii melanorhinus (Merriam)

Small-footed Myotis

The small-footed myotis was collected from 1,578 m up to 2,134 m in a variety of habitat zones. Druecker (1966) noted that *M. leibii* was most abundant in the desert shrub-grassland habitat association in southern Hidalgo County. *Myotis leibii* has been captured in the Animas Mountains from 13 May to 28 July.

Three pregnant females were collected on 7 June (1 embryo, 15 mm), 10 June (1 embryo, 19mm), and 23 June (2 embryos, 17 mm) in the study area. As with the other species of myotis of the area, parturition usually occurs in middle to late June.

Specimens examined (10).—Aspen Spring, 1 (NMSU); Black Bill Canyon, 1 (MSB); Gibson Tank, 2 (MSB); Godfrey Ranch, T29S R19W sec. 32, 1 (MSB); New Well, 1 (MSB); Red Hill Cement Tank, 1 (MSB); Spillsbury Windmill, 2 (MSB); tank at OK Bar, 1 (MSB).

Lasionycteris noctivagans (Le Conte)

Silver-haired Bat

The three (one male and two females) collected silver-haired bats are the first records of this species for the Animas Mountains. All were netted on 25 May and may represent migrant individuals. Silver-haired bats may leave the area during midsummer for higher elevations. None of these individuals appeared to be in breeding condition.

Although classified as a migratory bat, very little is actually known about the winter habits of the silver-haired bat. Only one specimen has been reported from Mexico (Yates et al. 1976). Although this was taken in Tamaulipas, it seems likely that this species' range in Mexico may be more extensive since specimens collected in this survey were within 25 km of the Mexican border.

Specimens examined (3).—Gibson Tank, 3 (MSB).

Pipistrellus hesperus (H. Allen)

Western Pipistrelle

The western pipistrelle is one of the most abundant species in the study area, particularly in the oak savannah and grassland associations that are near cliffs and canyons. I also collected one at Aspen Spring.

Breeding data for western pipistrelles in the Animas Mountains include a pregnant female (two embryos, 17 mm) taken on 23 June and lactating females taken on 1, 12, 14, and 21 July and 2, 3, and 4 August. These data are consistent with Hayward and Cross' (1979) statement that parturition occurs in southern New Mexico in late June. This species may hibernate in the area during the winter (Findley and Traut 1970, Hayward and Cross 1979).

Specimens examined (52).—Aspen Spring, 1 (MSB); Big Brushy Creek, T33S R18W sec. 1,

7 (MSB); Double Adobe Cement Tank, T31S R19W sec. 3, 1 (MSB); OK Bar, 17 (16 MSB, 1 NMSU); tank on Double Adobe Creek, T31S R19W sec. 3, 6 (MSB); 17 mi S, 6.6 mi E Animas, T31S R19W sec. 3, 1 (MSB); T30S R18W sec. 18, 3 (MSB); T31S R18W sec. 6, 1 (MSB); T33S R18W sec. 12, 5 (MSB); T33S R18W sec. 18, 10 (MSB).

Eptesicus fuscus pallidus Young

Big Brown Bat

The big brown bat is a relatively common and widespread member of the Animas Mountains bat fauna. My survey found them in a variety of woodland habitat situations ranging from the riparian associations at Double Adobes up to the oak woodland at Aspen Spring. This species was more common at higher elevations.

Pregnant females (one embryo each) have been taken on 16 June, 2 July, and 12 July and lactating females have been collected on 29 June and 12 July. This suggests that parturition may be variable in *E. fuscus,* occurring from at least late June to mid-July. This species may overwinter in the area.

Specimens examined (32).—Aspen Spring, 7 (5 MSB, 2 ESP); Gibson Tank, 6 (MSB); Godfrey Ranch, T29S R19W sec. 32, 2 (MSB); New Well, 1 (MSB); OK Bar, 12 (11 MSB, 1 NMSU); T31S R19W sec. 3, 1 (MSB); 17 mi S, 6.6 mi E Animas, T31S R19W sec. 3, 3 (MSB).

Lasiurus borealis (Müller)

Red Bat

The red bat is not an abundant species in the study area and has been found only at lower elevations among the sycamore, cottonwood, or oak riparian habitats along the major drainages. Druecker (1966) noted that *L. borealis* and *P. hesperus* display the earliest evening activity patterns of all the bats of Hidalgo County and my data corroborate this.

Only two of the 10 specimens from the study area were males. At Double Adobes, an adult male was taken with two females on 16 June and a subadult male was taken on 4 August at the Lynch Camp. Females have been found in May, June, July, and August. Pregnant females have been noted on 26 May (four embryos, 10 mm) and 30 June, while lactating females have been taken on 29 June, 1 and 2 July, and 3 August.

Specimens examined (10).—Clanton Draw Ponds, 1 (MSB); Double Adobe Canyon, 2 (MSB); Gibson Tank, 1 (MSB); T33S R18W sec. 18, 1 (MSB); T29S R19W sec. 32, 2 (MSB); 17 mi S, 6.6 mi E Animas, T31S R19W sec. 3, 3 (MSB).

Lasiurus cinereus cinereus (Palisot de Beauvois)

Hoary Bat

The hoary bat is a common inhabitant of the foothills and main massif of the mountains. *Lasiurus cinereus* may be a summer resident in the area as males have been taken in May, June, August, and September and females have been taken in May, June, July, and August. Breeding data consist of two pregnant females (each with two embryos) collected on 26 May at Gibson Tank.

Specimens examined (30).—Aspen Spring, 1 (MSB); Double Adobe, 4 (MSB); Gibson Tank, 5 (MSB); Joyce Mill, 1 (MSB); New Well, 1 (MSB); OK Bar, 2 (MSB); Rock Ridge Windmill, 1 (MSB); Spillsbury Windmill, 1 (MSB); T29S R19W sec. 32, 4 (MSB); T31S R18W sec. 18, 1 (MSB); 17 mi S, 6.6 mi E Animas, T31S R19W sec. 3, 9 (MSB).

Lasiurus ega xanthinus (Thomas)

Southern Yellow Bat

All yellow bats taken in this study were captured relatively late at night. On 26 May a female with two embryos (11 mm) was netted over Gibson Tank at 2230 h. Another pregnant female (two embryos, 23 mm) was collected on 11 June at 2300 h over a shallow pool in Double Adobe Creek. In addition to these early summer records, a lactating female was netted over the cement tank at Joyce Windmill in Lower Deer Creek in the early morning hours of 5 August. Previous to this study, all the specimens of *L. ega* collected in New Mexico had been from Guadalupe Canyon in Hidalgo County (Findley et al. 1975; W.H. Baltosser, pers. comm.) and this species is currently included on the New Mexico Department of Game and Fish list of endangered species.

Females of this species appeared to be regular members of the mammalian fauna of the Animas Mountains during the summer of 1981. Whether or not this species overwinters in the area is not known; however, it is believed that the southern

yellow bats are migratory at least in a part of their range (Barbour and Davis 1969).

The capture of these three *L. ega* supports Barbour and Davis' (1969) hypothesis that this species may be extending its range northward into the United States.

Specimens examined (2).—Double Adobe, 1 (MSB); Gibson Tank, 1 (MSB).

Plecotus townsendii pallescens (Miller)

Townsend's Big-eared Bat

Plecotus townsendii is rarely caught in mist nets and may be more abundant than is indicated by the number of specimens available. Three Townsend's big-eared bats were netted over a trough at Aspen Spring. These include a female (no embryos) netted at 2355 h on 20 June, a male taken on 29 June early in the morning (after 0200 h), and a male captured later that evening at 2145 h. Druecker (1966) netted a male on 2 August in the eastern foothills of the mountains and another male the next evening at the Lynch Camp. A sixth *P. townsendii* was found roosting during the day (1130 h on 23 May) in a mine shaft at Black Bill Spring. *Plecotus townsendii* probably hibernates in the Animas Mountains as it is frequently found overwintering throughout New Mexico (Findley et al. 1975).

Specimens examined (5).—Aspen Spring, 3 (MSB); T33S R18W sec. 18, 1 (MSB); T33S R18W sec. 12, 1(MSB).

Antrozous pallidus pallidus (Le Conte)

Desert Pallid Bat

The apparent scarcity of the desert pallid bat in the study site in 1981 may be a function of the poor bat netting success within desert and grassland habitats. Sites within these habitat zones were not netted intensively until after the rainy season had begun and surface water became very abundant.

On 29 and 30 June 1963, Druecker collected 108 female desert pallid bats at the XT Camp. These females were all lactating and came from a maternity colony located in a nearby log cabin. A pregnant female (two embryos, 20 mm) was taken on 10 June in this study and parturition probably occurs in the last two weeks of June.

Whether the desert pallid bat overwinters in the Animas Mountains is not known; however, Barbour and Davis (1969) hypothesize that this species does not move far between summer and winter homes.

Specimens examined (131).—Double Adobe Creek, tank, T31S R19W sec.3, 4 (MSB); OK Bar Ranch, 2 (1 MSB, 1 NMSU); 4 mi N, 3 mi E Gray Ranch HQ, 1 (MSB); Rock Ridge in lower Deer Creek, 1 (MSB); Spillsbury Windmill, 1 (MSB); T29S R19W sec. 32, 108 (MSB); T32S R19W sec. 35, 3 (MSB); T33S R18W sec. 18, 10 (MSB); T33S R19W sec. 33, 1 (MSB).

Family Molossidae

Tadarida brasiliensis mexicana (Saussure)

Brazilian Free-tailed Bat

Tadarida brasiliensis is the smallest free-tailed bat in the area and was one of the more common species encountered. It occurs widely in the lowlands and foothills surrounding the mountains, primarily in the grassland associations.

There apparently are no large maternity colonies in the study area probably due to a dearth of large caves. The nearby Alamo Hueco Mountains supported a large colony for many years (B. Hayward, pers. comm.). In 1981, three pregnant females, each with one embryo (13 mm, 22 mm, and 25 mm) were netted between 4 June and 9 June, suggesting that parturition occurs in mid to late June.

Specimens examined (50).—Big Brushy Creek, T33S R18W, 1 (MSB); T33S R18W sec.18, 2 (MSB); T33S R18W sec. 17, 1 (MSB); Gibson Tank, 3 (MSB); Godfrey Ranch, T29S R18W sec. 32, 23 (MSB); 0.5 mi NW Gray Ranch HQ, 5,100 ft, T32S R20W sec. 16, 1 (MSB); Joyce Mill, 2 (MSB); New Well, 9 (8 MSB, 1 NMSU); T31S R18W sec. 6, 1 (MSB); 17 mi S, 6.6 mi E Animas, T31S R19W sec. 3, 7 (MSB).

Tadarida macrotis (Gray)

Big Free-tailed Bat

The only records of the big free-tailed bat from the area are 10 individuals netted over an earthen tank near San Luis Pass in desert grassland. All 10 *T. macrotis* were taken on 18 June 1964 and were pregnant females each with one embryo which ranged in length from 24 mm to 38 mm. A maternity colony may have occurred nearby that year. This species has not been reported from the Animas Mountains since that time.

Specimens examined (10).—Dirt tank N of NM 79, T33S R19W sec. 33, 10 (MSB).

ORDER LAGOMORPHA

Family Leporidae

Sylvilagus floridanus holzneri (Mearns)

Eastern Cottontail

Sylvilagus floridanus inhabits the chaparral and forests of the upper elevations of the mountains and, except for repeated observations of two individuals that appeared to be referable to this species on Cistern Saddle, I seldom encountered it.

Specimens examined (3).—Indian Creek, T31S R19W sec. 16, 1 (MSB); 3 mi S, 0.5 mi W Double Adobes, above Indian Creek, 6,500 ft, 1 (MSB); Spring Canyon, T32S R19W sec. 14, 5,900 ft, 1 (MSB).

Additional records (1).—Animas Peak, 1 (USNM).

Sylvilagus audubonii minor (Mearns)

Desert Cottontail

Sylvilagus audubonii was frequently sighted on the alluvial fans and flats below 1,800 m in the shrub grassland around the perimeter of the main massif. Above this elevation, the vegetation includes progressively more chaparral or pinon-juniper and *S. floridanus* replaces *S. audubonii*. These species are difficult to distinguish externally. *Sylvilagus audubonii* is smaller (usually <400 mm in total length) and has relatively larger ears than does *S. floridanus*. Differences in cranial characters between the two species have been detailed by Findley et al. (1975) and Hoffmeister and Lee (1963).

As noted by Findley et al. (1975), the exact systematic relationship of these species is uncertain. An analysis of electrophoretic data, especially from elevations where there is apparent overlap in the species ranges, may help to elucidate the status of these morphologically similar taxa.

Specimens examined (13).—13 mi, S Animas, T30S R20W sec. 24, 1 (MSB); 22 mi S Animas, mouth of Indian Creek Canyon, 3 (MSB); 28 mi S Animas, 1 (MSB); Horse Thief Tank, 1 (MSB); Rock Ridge Exclosure, 1 (MSB); 1 mi N San Luis Pass, 1 (MSB); 1.5 mi N, 3 mi W San Luis Pass, NM 79, 2 (MSB); 15 mi S, 8 mi E Animas, T30S R19W sec. 34, 1 (MSB); T33S R19W sec. 29, 1 (MSB); 15 mi S, 8.6 mi E Animas, T30S R18W sec. 19, 1 (MSB).

Additional records (3).—Adobe Ranch, N base Animas Peak, 1 (USNM); San Luis Pass, 1 (MHP); 4 mi NW San Luis Pass, 1 (MVZ).

Lepus californicus texianus Waterhouse

Black-tailed Jackrabbit

The black-tailed jackrabbit was one of the more visible and common mammal species encountered around the base of the main massif. *Lepus californicus* may be distinguished from *L. callotis* in that the ears are black-tipped externally and it does not have white extending up onto the rump. *Lepus callotis* has externally white-tipped ears and a visible white band extending over the haunches.

The highest elevational sightings were near 1,830 m in Spring and Horse Thief Canyons. This hare is commonly found in shrub grassland areas and its distribution broadly overlaps that of the desert cottontail. I sighted these species together on more than 16 occasions. During night spotlighting sessions, I found black-tailed jackrabbits heavily concentrated near stock tanks, counting as many as 18 in a single sighting at the Sacahuista Mill.

Specimens examined (4).—15 mi S, 5.5 mi E Animas, T30S R19W sec. 21, 2 (MSB); Double Adobes, 1 (MSB); Spur Windmill, 1 (MSB).

Additional records (2).—4 mi NE San Luis Pass, 2 (MVZ).

Lepus callotis gaillardi Mearns

White-sided Jackrabbit

The white-sided jackrabbit is one of the more exceptional species found in this area and is presently included on the New Mexico Department of Game and Fish list of endangered species. *Lepus callotis* is found in the United States only in the southern Animas and Playas valleys of Hidalgo County (Bednarz and Cook 1984).

Lepus callotis and *L. californicus* exhibit a parapatric distribution in this area. The white-sided jackrabbit is dependent on well-developed grasslands that have low shrub density and level terrain, such as is found from Foster Draw south to the Mexican border. *Lepus californicus* occurs

along the periphery of these large pastures in the broken terrain of the bajadas.

The white-sided jackrabbit is frequently found forming male-female pairs and the behavioral ecology of this species warrants further study. The pair-bond may not be broken by pregnancy, as I collected a pair on 12 March 1982 comprised of a male and near-term pregnant female with one embryo. This record represents the earliest breeding record of *L. callotis* in New Mexico. The latest breeding evidence is a very young *L. callotis* that was spotlighted on 10 October 1981.

Specimens examined (4).—1.5 mi N of junction NM 338 and NM 79, T33S R20W sec. 10, 5,150 ft, 2 (MSB); 4 mi N of NM 79, W of 338, 2 (MSB).

ORDER RODENTIA

Family Sciuridae

Eutamias dorsalis dorsalis (Baird)

Cliff Chipmunk

Eutamias dorsalis is the only species of chipmunk found in the Animas Mountains. It inhabits the woodlands and forest associations of the upper elevations and extends down to the lower elevations in the rocky outcroppings along riparian corridors such as Deer, Indian, Bear, and Double Adobe Creeks.

The cliff chipmunk was collected from 1,675 m in lower Bear Canyon to over 2,540 m on the summit of Pinnacle Peak and was consistently found in close proximity to canyon walls, cliffs, or rocky slopes. A. Harris (field notes, MSB) noted that *E.dorsalis* fed heavily on Douglas fir cones in the vicinity of upper Indian Creek.

Specimens examined (26).—Aspen Spring, 19 (18 MSB, 1 NMSU); Cistern Saddle, T31S R19W sec. 33, 1 (MSB); Indian Creek Canyon, 1 (ESP); Lower Bear Canyon, T31S R19W sec. 23, 5,550 ft, 1 (MSB); Pinnacle Peak, 1 (MSB); 1 mi SW Aspen Spring, 1 (MSB); 0.25 mi below Aspen Spring, Indian Creek Canyon, 1 (MSB); 0.25 mi N New Well, Double Adobe Canyon, T31S R18W sec. 30, 1 (MSB).

Additional records (6).—Animas Peak, 2 (USNM); N slope Animas Mountains, 3 (USNM); Summit Animas Peak, Animas Mountains, 1 (USNM).

Specimen reported (1).—Indian Creek Canyon, ca. 0.5 mi beyond road's end, 1 (UTEP).

Ammospermophilus harrisii harrisii (Audubon and Bachman)

Harris's Antelope Ground Squirrel

The first specimens of Harris's antelope ground squirrel from the Animas Mountains were collected in 1977 by New Mexico Department of Game and Fish personnel and, together with specimens collected in the present study, represent the easternmost records for this primarily lower Sonoran Desert species.

Antelope ground squirrels were not abundant in the area and exhibited a disjunct distribution as they were found only along sections of lower Deer Creek, at Double Adobes, and in Cottonwood Canyon east of the Godfrey Camp.

Specimens examined (7).—1 mi NW Double Adobes, 5,050 ft, 2 (MSB); Joyce Well, 4 (3 MSB, 1 ESP); 1.5 mi S Lynch Ranch, 1 (ESP).

Spermophilus spilosoma canescens Merriam

Spotted Ground Squirrel

The spotted ground squirrel is locally abundant on the mesquite grassland flats. Specimens were collected from the northwest edge of the mountains where their burrow systems are numerous in roadside drainages and along arroyos. *Spermophilus spilosoma* was also sighted in the vicinity of lower Deer Creek. In contrast to *S. variegatus,* this species displays an affinity for sandy soils and relies heavily on its extensive burrow systems for protection.

Specimens examined (3).—17.5 mi S, 3 mi E Animas, 1 (MSB); 13 mi S Animas, 1 (MSB); T30S R19W sec. 16, 1 (MSB).

Additional records (2).—Deer Creek, 2 (USNM).

Spermophilus variegatus grammarus (Say)

Rock Squirrel

Spermophilus variegatus is the largest sciurid in the area. This wide-ranging species was found in a variety of habitats from 1,500 m to the crest of the range and seems to be limited to broken or rocky terrain.

Specimens examined (7).—Birch Spring, 1 (MSB); Indian Creek, 3 (MSB); New Well, 1 (MSB); OK Bar House, 1 (MSB); 1 mi E Pit Tank, T32S R19W sec. 36, 1 (MSB).

Additional records (2).—Animas Peak, 2 (USNM).

Family Geomyidae

Thomomys bottae mearnsi (V. Bailey)

Botta's Pocket Gopher

Thomomys bottae is locally very abundant, and numerous mounds were found along the lengths of lower Deer, Bear, Double Adobe, and Animas Creeks. The ranges of *T. bottae* and *T. umbrinus* are separated elevationally with the former occupying friable soils below 1,675 m and the latter occurring above this. There is occasionally overlap, however, as C. Thaeler (pers. comm.) took a male *T. bottae* (NMSU 7375) and 11 *T. umbrinus* on the same night at the head of Horse Thief Canyon.

C. Thaeler (pers. comm.) also has evidence for hybridization between these species in the Animas Mountains. Of 106 pocket gophers, 13% were morphologically intermediate. Hybridization between *T. umbrinus* and *T. bottae* has been reported by Patton and Dingman (1968), Hoffmeister (1969), and Patton (1973), although introgressive hybridization was not found. A careful analysis of the extent of introgression (if any) between these species in the Animas Mountains needs to be completed.

Pregnant females have been collected on 22 March (one individual with six embryos and one with four embryos) and on 24 March (three individuals, each with three embryos).

Specimens examined (84).—Double Adobes Exclosure, 2 (MSB); 1.5 mi S Double Adobes, T31S R19W sec. 10, 5,400 ft, 6 (MSB); 1.75 mi S Double Adobes, T31S R19W sec. 10, 1 (MSB); 0.25 mi E New Well, Double Adobe Canyon, T31S R18W sec. 31, 3 (MSB); OK Bar Mill, 17 (MSB); Indian Creek Canyon, 2 (MSB); Animas Valley, Grey Ranch, 2 (MSB); 14.5 mi S, 0.5 mi E by road, Animas, 4 (MSB); 21.7 mi S Animas, 1 (MSB); 25.4 mi S Animas, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 5 (MSB); 0.25 mi N Indian Creek Mill, upper Deer Creek, T33S R18W sec. 5, 1 (MSB); Pit Tank, 1 (MSB); 30 mi S Animas, Animas Canyon, 1 (WNMU); 2.0 mi N, 0.2 mi E Animas Peak, 5,800 ft, T31S R19W sec. 16, 1 (NMSU); 4.9 mi W, 3.4 mi N Hilo Peak, T33S R18W sec. 16, 5,125 ft, 5 (NMSU); 5.9 mi N Hilo Peak, T33S R19W sec. 5, 5,280 ft, 9 (NMSU); 6.1 mi W, 5.6 mi N Hilo Peak, T32S R18W sec. 32, 5,325 ft, 6 (NMSU); 6.3 mi W, 6.1 mi N Hilo Peak, T32S R18W sec. 31, 5,440 ft, 3 (NMSU); 7.2 mi W, 5.8 mi N Hilo Peak, T32S R19W sec. 36, 2 (NMSU); 8.1 mi W, 5.3 mi N Hilo Peak, T33S R19W sec. 2, 5,475 ft, 5 (NMSU); 8.4 mi W, 5.3 mi N Hilo Peak, 5,520 ft, T33S R19W sec. 2, 1 (NMSU); 10.1 mi W, 6.1 mi N Hilo Peak, T32S R19W sec. 32, 5,975 ft, 1 (NMSU); 0.9 mi SE OK Bar Ranch, 5,600 ft, T31S R18W sec. 30, 4 (NMSU).

Additional records (10).—Animas Mountains, 2 (USNM); Animas Valley, Gray Ranch, 4 (USNM); N base Animas Peak, Adobe Ranch, 1 (USNM); San Luis Pass, 3 (MHP).

Thomomys umbrinus emotus Goldman

Southern Pocket Gopher

In New Mexico, the southern pocket gopher is restricted to the Animas Mountains; and due to this limited distribution, the species is currently included on the New Mexico state endangered species list (New Mexico Department of Game and Fish 1985). At the time of its original inclusion on the list, *T. umbrinus* was believed to be restricted to the higher timbered areas (Findley et al. 1975) based on specimens collected above 2,134 m, however, Hinesley and Thaeler (1977) took four specimens in Indian Creek between 1,768 and 1,989 m. Later work designed to determine the distribution of *T. umbrinus* in the Animas Mountains (Thaeler et al. 1977, Thaeler and Hinesley 1978) led these workers to conclude that this species reaches its greatest abundance in the thin soils of rocky canyons between 1,676 and 1,981 m.

I collected two individuals in the arroyo west of Horse Thief Tank where Apache plume was dominant; oak and pinon-juniper woodlands covered the surrounding hillsides.

Thaeler and Hinesley (1978) reported that they found fresh *T. umbrinus* mounds only in late winter and early spring when soil moisture was high and hypothesized that activity ceased by late April. However, I found fresh activity and collected specimens on 20 May during the dry season. Pregnant females were collected between 19 March and 3 April, each with either two or three embryos.

Specimens examined (71).—Aspen Spring, 5 (MSB); 1 mi SW Aspen Spring, 1 (MSB); Cistern Saddle, 2 (ESP); 0.5 mi N, 0.6 mi E Animas Peak, T31S R19W sec. 22, 6,550 ft, 1 (NMSU);

0.7 mi E, 0.6 mi N Animas Peak, T31S R19W sec. 22, 6,525 ft, 4 (NMSU); 0.7 mi E, 0.2 mi N Animas Peak, T31S R19W sec. 27, 6,600 ft, 1 (NMSU); 0.8 mi E, 0.6 mi N Animas Peak, T31S R19W sec. 22, 6,525 ft, 1 (NMSU); 2.0 mi N, 0.2 mi E Animas Peak, T31S R19W sec. 16, 5,800 ft, 1 (NMSU); 4.7 mi S, 2.6 mi E Animas Peak, T32S R19W sec. 24, 5,850 ft, 1 (NMSU); 4.9 mi S, 0.8 mi E Animas Peak, T32S R19W sec. 21, 6,500 ft, 1 (NMSU); 7.5 mi W, 5.5 mi N Hilo Peak, T32S R19W sec. 36, 5,650 ft, 1 (NMSU); 8.3 mi W, 6.2 mi N Hilo Peak, T32S R19W sec. 35, 5,590 ft, 2 (NMSU); 8.4 mi W, 6.3 mi N Hilo Peak, 5,700 ft, 4 (NMSU); 8.4 mi W, 5.3 mi N Hilo Peak, T33S R19W sec. 2, 5,520 ft, 4 (NMSU); 8.6 mi W, 5.2 mi N Hilo Peak, T33S R19W sec. 2, 5,575 ft, 3 (NMSU); 8.6 mi W, 6.5 mi N Hilo Peak, T32S R19W sec. 35, 5,640 ft, 3 (NMSU); 8.7 mi W, 6.6 mi N Hilo Peak, T32S R19W sec. 26, 5,675 ft, 5 (NMSU);8.9 mi W, 5.2 mi N Hilo Peak, T33S R19W sec. 2, 5,750 ft, 3 (NMSU); 8.9 mi W, 6.7 mi N Hilo Peak, T32S R19W sec. 26, 5,725 ft, 4 (NMSU); 9.1 mi W, 6.3 mi N Hilo Peak, T32S R19W sec. 34, 5,725 ft, 1 (NMSU); 9.2 mi W, 6.3 mi N Hilo Peak, T32S R19W sec. 34, 5,800 ft, 5 (NMSU); 9.2 mi W, 6.7 mi N Hilo Peak, T32S R19W sec. 27, 5,775 ft, 1 (NMSU); 9.4 mi W, 6.2 mi N Hilo Peak, T32S R19W sec. 34, 5,880 ft, 5 (NMSU); 9.4 mi W, 6.7 mi N Hilo Peak, T32S R19W sec. 27, 5,850 ft, 2 (NMSU); 9.6 mi W, 6.2 mi N Hilo Peak, T32S R19W sec. 34, 5,925 ft, 5 (NMSU); 9.6 mi W, 6.4 mi N Hilo Peak, T32S R19W sec. 34, 3 (NMSU); Horse Thief Tank, 2 (MSB).

Additional records (2).—Animas Mountains, Animas Peak, 2 (USNM; see Thaeler et al. 1977).

Family Heteromyidae

Perognathus flavus flavus Baird

Silky Pocket Mouse

The silky pocket mouse is the smallest and most euryecious heteromyid found in the area. I encountered *P. flavus* at 12 different locations on 19 occasions; however, the species was never abundant. *Perognathus flavus* is characteristically an open-grassland species and was frequently encountered below 1,830 m particularly in the Animas Valley.

Specimens examined (27).—Big Brushy Creek, T33S R18W sec. 1, 1 (MSB); Black Bill Canyon, 3 (MSB); Double Adobes, T30S R19W sec. 34, 1 (MSB); 1.5 mi S Double Adobes, T31S R19W sec. 10, 5,400 ft, 1 (MSB); 13 mi S Animas, T29S R19W sec. 29, 1 (MSB); 13.5 mi S Animas, T29S R19W sec. 30, 3 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 2 (MSB); 17 mi S Animas by road, 5 (MSB); 22 mi S Animas, T31S R20W sec. 2, 4,950 ft, 2 (MSB); 27.3 mi S Animas, 1 (MSB); 9 mi E Cloverdale, 1 (MSB); Red Hill, T33S R19W sec. 5, 5500 ft, 2 (MSB); Spur Windmill, 1 (MSB); T33S R19W sec. 29, 2 (MSB); 16 mi S Animas, T30S R20W sec. 24, 1 (WNMU).

Additional records (9).—Animas Valley, Gray's Ranch, 5 (KUM); Animas Valley, 3 mi NW San Luis Pass, 2 (MVZ); Animas Valley, 4 mi NW San Luis Pass, 2 (MVZ).

Chaetodipus hispidus paradoxus Merriam

Hispid Pocket Mouse

The three species of spiny pocket mice are included in the genus *Chaetodipus* following the conclusions of Hafner and Hafner (1983). *Chaetodipus hispidus* is the largest and least common pocket mouse in the Animas Mountains. Specimens were taken in the dense grass of Clanton Draw Ponds, in Johnson grass at Middle Wells, and in a bluestem-grama grass association near Rattlesnake Tank. Only four individuals were captured during the study.

Specimens examined (5).—Clanton Tanks, 1 (MSB); Middle Wells, 1 (MSB); Rattlesnake Tank, 2 (MSB); 19.4 mi S Animas, 1 (MSB).

Chaetodipus intermedius intermedius Merriam

Rock Pocket Mouse

The rock pocket mouse is found on the relatively steep slopes of the alluvial fans, such as those found west of Black Bill Spring, that skirt the Animas Mountains. Gravelly or rocky soils or areas of exposed rock are a requisite for this mouse and I commonly found *C. intermedius* in association with agaves, live oaks, sacahuista, and mountain mahogany.

Specimens examined (26).—Black Bill Canyon, 5 (MSB); 0.5 mi S Black Bill Tank, 1 (MSB); lower Bear Canyon, T31S R19W sec. 23, 5,550 ft, 6 (MSB); Rock Ridge Exclosure, 2 (MSB); Horse Thief Tank, 1 (MSB); Indian Creek, 1 (MSB); Indian Creek, T31S R19W sec. 16, 2

(MSB); mouth of Indian Creek, 4 (MSB); 25 mi S Animas on NM 338, 2 (MSB); Spur Windmill, 1 (MSB); 0.5 mi below OK Bar, 1 (MSB).

Specimens reported (4).—Indian Creek, 5,700 ft, 4 (UTEP).

Chaetodipus penicillatus Woodhouse

Desert Pocket Mouse

The desert pocket mouse generally is found at lower elevations than is *C. intermedius*. The species occurs on fine alluvial soils primarily in the grassland associations such as those found near Double Adobes and lower Deer Creek.

The subspecific status of *C. penicillatus* in this area is uncertain. Hoffmeister and Lee (1967) surmised that the Continental Divide in southwestern New Mexico separated the Chihuahuan subspecies *C. p. eremicus* from the Sonoran form *C. p. pricei*. Specimens from "8 mi S of Lordsburg" were considered morphologically intermediate between the two taxa (Hoffmeister and Lee 1967). My comparison of the specimens from the Animas Mountains with specimens taken from southeastern Arizona and south central New Mexico did not reveal consistent differences.

Specimens examined (11).—Double Adobes, T31S R19W sec. 2, 5,200 ft, 1 (MSB); Double Adobes, T31S R19W sec. 3, 5 (MSB); E Culberson Ranch, 1 (ESP); 30 mi SE Animas, 1 (WNMU); Red Hill, T33S R19W sec. 5, 5,500 ft, 2 (MSB); Rock Ridge Windmill, 1 (MSB).

Additional records (3).—15 mi S Animas, 1 (KUM); 16 mi S Animas, 2 (KUM).

Dipodomys ordii ordii Woodhouse

Ord's Kangaroo Rat

In the mesquite grassland association of the bajadas and lowlands surrounding the Animas Mountains, kangaroo rats (*Dipodomys*) are the most abundant mammal. *Dipodomys ordii* and *D. merriami* were taken in the same traplines on 11 occasions. Where these species coexist, *D. ordii* is more abundant on finer soils, while *D. merriami* is more commonly taken on desert pavement, a relationship noted by Findley et al. (1975). In lower and upper Deer Creek, *D. ordii* was captured on the sandy alluvium of the creek bottom and *D. merriami* inhabited the rockier soils of the ridges. In the sand dunes near Juniper Tank, I took 21 *D. ordii* and no *D. merriami*.

Three pregnant females (each with three embryos) were taken, one in early June and two in early September. All three of the kangaroo rats that occur in the area probably breed more than once a year in southern Hidalgo County.

Specimens examined (40).—13 mi S Animas, T29S R19W sec. 29, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 6 (MSB); 13.4 mi S Animas, 1 (MSB); 17 mi S Animas, Animas Creek, 4 (MSB); 18 mi S Animas, T30S R20W sec. 35, 1 (WNMU); Double Adobe Ranch, 1 (MSB); 0.5 mi NW Double Adobes, T30S R19W sec. 34, 1 (MSB); 15 mi S Animas, 5 (MSB); Gilliland Well, 13 mi S Animas, T29S R19W sec. 20, 1 (MSB); Middle Wells, 4,950 ft, 1 (MSB); Spillsbury Windmill, 1 (MSB); 8.5 mi E Cloverdale, 7 (MSB); 9 mi E Cloverdale, 2 (MSB); 1 mi N, 3 mi W San Luis Pass, 6 (MSB); Rock Ridge Exclosure, T33S R18W sec. 20, 5,050 ft, 2 (MSB).

Additional records (7).—Deer Creek, 2 (USNM); 4 mi NW San Luis Pass, Animas Valley, 5 (MVZ).

Dipodomys spectabilis spectabilis Merriam

Banner-tailed Kangaroo Rat

The characteristic large mounds constructed by the banner-tailed kangaroo rat are commonly found on the mesquite bajadas and level grasslands of the Animas Mountains. Along the northwestern boundary of the area, their mounds are particularly numerous and 10 specimens were collected there in 1979.

Specimens examined (17).—15 mi S, 5.5 mi E Animas, T30S R19W sec. 21, 10 (MSB); 17 mi S Animas by road, 3 (MSB); 25 mi S Animas on NM 338, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 3 (MSB).

Additional records (5).—N base Animas Peak, Adobe Ranch, 1 (USNM); Deer Creek, Culberson Ranch, 2 (USNM); San Luis Pass, 2 (MHP).

Specimen reported (1).— Indian Creek Road, ca. 1 mi from NM 338, 1 (UTEP).

Dipodomys merriami olivaceus Swarth

Merriam's Kangaroo Rat

Dipodomys merriami is the most widespread and abundant kangaroo rat in the area. Merriam's kangaroo rat was found at higher elevations on the alluvial fans than either *D. ordii* or *D. spectabilis*. I captured *D. merriami* up to 1,800 m at

Spur Windmill and at the north end of the mountains in a thick rabbit brush swale at OK Bar.

The subspecific status of these individuals is unclear. Lidicker (1960) stated that *D. merriami* specimens from the Peloncillo Mountains were morphologically intermediate, apparently due to secondary intergradation, between *D. m. merriami* of southeastern Arizona and *D. m. olivaceus* of New Mexico. Based on Lidicker's (1960) description, specimens from the Animas Mountains may be referable to *D. m. olivaceus* due to their darker color; however, color was variable among these specimens.

Specimens examined (34).—13 mi S Animas, T29S R19W sec. 29, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 7 (MSB); Gilliland Well, 3 (MSB); 15 mi S Animas, 1 (MSB); 15 mi S, 5.5 mi E Animas, T30S R19W sec. 21, 1 (MSB); 19.4 mi S Animas, 1 (MSB); Double Adobe Exclosure, T30S R19W sec. 34, 2 (MSB); Godfrey Camp, T30S R19W sec. 36, 2 (MSB); mouth of Indian Creek Canyon, 1 (MSB); OK Bar, 2 (MSB); Rock Ridge Windmill, 1 (MSB); Spillsbury Windmill, 2 (MSB); Spur Windmill, 1 (MSB); 8.5 mi E Cloverdale, 2 (MSB); 9 mi E Cloverdale, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 4 (MSB); T33S R19W sec. 29, 2 (MSB).

Additional records (7).—15 mi S Animas, 6 (KUM); N base Animas Peak, Adobe Ranch, 1 (USNM).

Family Cricetidae

Reithrodontomys megalotis megalotis (Baird)

Western Harvest Mouse

Reithrodontomys megalotis is the most common harvest mouse in the Animas Mountains. I collected *R. megalotis* from the crest of Animas Peak at 2,591 m to the sacaton grassland of Animas Creek at 1,433 m where it was particularly abundant. I captured 189 individuals on 28 occasions in the study, all west of the Continental Divide. Throughout the study I found few of the more typical grassland species on the eastern side of the Animas Mountains. This may reflect the relatively limited extent of grasslands in this area, however, I did trap in well-developed grassland situations east of Birch Spring. The lack of grassland species in these areas suggests instead that this may be indicative of a past history of overgrazing.

One female collected on 20 December was pregnant with three embryos, indicating that *R. megalotis* breeds in the winter, at least in more moderate years.

Specimens examined (111).—12.5 mi S Animas, T29S R19W sec. 29, 8 (MSB); 13 mi S Animas, T29S R19W sec. 29, 6 (MSB); 13 mi S Animas, T29S R19W sec. 30, 14 (MSB); 13.5 mi S Animas, T29S R19W sec. 30, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 14 (MSB); 15 mi S Animas, 10 (MSB); 17 mi S Animas, 20 (MSB); 22 mi S Animas, T31S R20W sec. 2, 1 (MSB); Animas Peak, 3 (MSB); Aspen Spring, 3 (MSB); 1 mi SW Aspen Spring, 3 (MSB); Black Bill Canyon, 3 (MSB); Clanton Draw Tanks, 13 (11 MSB, 2 WNMU); Double Adobe, T30S R19W sec. 34, 1 (MSB); Gilliland Well, 13 mi S Animas, T29S R19W sec. 20, 2 (MSB); 2 mi N Gray Ranch, 2 (ESP); Indian Creek, 2 (MSB); Aspen Springs, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 4 (MSB).

Additional records (9).—15 mi S Animas, 4 (KUM); Gray's Ranch, Animas Valley, 2 (MVZ); 4 mi NW San Luis Pass, Animas Valley, 3 (MVZ).

Reithrodontomys fulvescens canus Benson

Fulvous Harvest Mouse

Prior to this study, *R. fulvescens* was known in New Mexico only from the Peloncillo Mountains (Findley et al. 1975). On 10 January I collected a female (MSB 46255) in the dense grass beneath the sycamore trees of the Rock Ridge Exclosure of lower Deer Creek. This specimen represents a 25 km eastern extension of the known range of the fulvous harvest mouse in New Mexico.

Specimen examined (1).—Deer Creek, Rock Ridge Exclosure, T33S R18W sec. 2, 1 (MSB).

Peromyscus eremicus anthonyi (Merriam)

Cactus Mouse

The cactus mouse is an inhabitant of the rocky, xeric hillsides below the wooded zone of the Animas Mountains, where it usually is found in association with Schott's century plant, ocotillo, and turpentine bush.

I did not frequently encounter *P. eremicus* in this study. In contrast, Hayward et al. (1978) found *P. eremicus* to be the most abundant species in the Big Hatchet and Alamo Hueco Mountains,

reflecting perhaps the vegetational differences between these areas. Those mountain ranges support a more xeric vegetation with Chihuahuan Desert occurring extensively at lower elevations. The Animas Mountains support well-developed woodland and forest habitats, with a grassland association at the lowest elevation.

Specimens examined (25).—17 mi S Animas, 1 (MSB); lower Bear Canyon, T31S R19W sec. 23, 1 (MSB); 0.25 mi up S fork Bear Creek, 1 (MSB); lower Deer Creek, T33S R19W sec. 21, 1 (MSB); Double Adobes, T32S R19W sec. 2, 1 (MSB); Double Adobe Ranch, 1 (MSB); 1.5 mi S Double Adobe, T31S R19W sec. 10, 1 (MSB); Godfrey Camp, 4 (MSB); mouth Indian Creek Canyon, 1 (MSB); 0.25 mi N Indian Creek Mill, upper Deer Creek, T33S R18W sec. 5, 2 (MSB); OK Bar, 1 (MSB); Pit Tank, 1 (MSB); San Luis Campground, T33S R19W sec. 29, 4 (MSB); 1 mi N, 3 mi W San Luis Pass, 2 (MSB); Spillsbury Windmill, 2 (MSB); 0.25 mi E New Well, Double Adobe Canyon, 1 (MSB).

Peromyscus maniculatus blandus Osgood

Deer Mouse

The deer mouse was frequently encountered in grassland situations where it was often found sympatrically with *P. leucopus*. I took these two species together on 22 occasions and rarely was *P. maniculatus* more abundant than *P. leucopus*.

Deer mice were not found above 1,770 m, which precludes the occurrence of the montane subspecies *P. m. rufinus* that is found farther north in the mountains of New Mexico (Findley et al. 1975) and to the south in Chihuahua, Mexico (Anderson 1972). *Peromyscus melanotis,* a similar species found in the nearby Chiricahua, Graham, and Santa Catalina Mountains of Arizona, apparently does not occur in the Animas Mountains.

Pregnant females were captured in February, May, and June. Of these, three individuals contained four embryos and one individual had three embryos. Several lactating females were captured in late December.

Specimens examined (55).—12.5 mi S Animas, T29S R19W sec. 29, 6 (MSB); Gilliland Well, 10 (MSB); 13 mi S Animas, T29S R19W sec. 29, 10 (MSB); 13 mi S Animas, T29S R19W sec. 30, 9 (MSB); 13.4 mi S Animas, 1 (MSB); 13.5 mi S Animas, T29S R19W sec. 30, 2 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 2 (MSB); 15 mi S Animas, 3 (MSB); 17 mi S Animas, 1 (MSB); 30 mi S Animas, Animas Canyon, 1 (WNMU); Clanton Draw Tanks, 1 (MSB); 1 mi E Culberson Ranch, Deer Creek, 1 (MSB); 0.5 mi NW Double Adobes, T30S R20W sec. 25, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 3 (MSB); Upper Animas Valley, 36 mi S, 3 mi E Animas, 4 (MSB).

Additional records (6).—15 mi S Animas, 4 (KUM); Gray's Ranch, Animas Valley, 1 (MVZ); N Base Animas Peak, Adobe Ranch, 1 (USNM).

Peromyscus leucopus arizonae (J.A. Allen)

White-footed Mouse

Peromyscus leucopus was frequently taken in high densities, along with *P. maniculatus, R. megalotis,* and *Sigmodon hispidus,* in the sacaton of Animas Creek and in the dense grass of Clanton Draw Ponds and Double Adobes. This species is more euryecious than the deer mouse as I captured only *P. leucopus* in the mesquite area northwest of Double Adobes, at the mouth of Indian Creek, and on the bajada below Black Bill Canyon.

Specimens examined (85).—12.5 mi S Animas, T29S R19W sec. 29, 1 (MSB); 13 mi S Animas, T29S R19W sec. 29, 5 (MSB); 13 mi S Animas, T29S R19W sec. 30, 5 (MSB); 13.4 mi S Animas, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 3 (MSB); 15 mi S Animas, 1 (MSB); 15 mi S, 5.5 mi E Animas, T30S R19W sec. 21, 1 (MSB); 17 mi S Animas, 25 (MSB); 17 mi S (by road) Animas, Animas Creek, 1 (MSB); 30 mi S Animas, Animas Canyon, 2 (WNMU); Clanton Draw Tanks, 8 (MSB); 8.5 mi E Cloverdale, 1 (MSB); 9 mi E Cloverdale, 1 (MSB); Double Adobes, T30S R19W sec. 34, 4 (MSB); Double Adobe Ranch, 1 (MSB); Gilliland Well, 1 (MSB); 2 mi N Gray Ranch, 3 (ESP); 8 mi S, 4 mi E Gray Ranch HQ, 1 (MSB); mouth of Indian Creek, T31S R19W sec. 16, 7 (MSB); Middle Wells, 2 (MSB); Rock Ridge Exclosure, Deer Creek, T33S R18W sec. 20, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 2 (MSB); upper Animas Valley, 36 mi W Animas, 7 (MSB); T33S R19W sec. 29, 1 (MSB).

Additional records (2).—15 mi S Animas, 1 (KUM); 4 mi NW San Luis Pass, Animas Valley, 1 (MVZ).

Peromyscus boylii rowleyi (J.A. Allen)
Brush Mouse

The brush mouse is a widespread and abundant inhabitant of the forested and chaparral areas of the Animas Mountains. In this study, 205 individuals were captured on 28 occasions, making *P. boylii* the most commonly trapped mouse in the area. *Peromyscus boylii* was taken along with *P. eremicus, P. maniculatus,* and *P. leucopus* at Double Adobes. Throughout most of its range in the Animas Mountains, however, it is not sympatric with other *Peromyscus,* but it is frequently associated with either *Neotoma albigula* or *N. mexicana.*

Peromyscus boylii is a highly arboreal species (Holbrook 1979a, 1979b) and I did not encounter the species in open areas. Above 1,675 m it is the most common mammal and I frequently took the brush mouse in association with oaks, mountain mahogany, and pointleaf manzanita.

Findley et al. (1975) listed a single specimen of *P. truei* from "1 mi SW Aspen Springs." An examination of this specimen, together with some 52 additional specimens collected from the same locality, did not reveal consistent morphological differences from *P. boylii* collected in the study area. Additionally, I karyotyped four specimens collected at this locality and found them to have the same metacentric chromosome complement as that described for *P. boylii rowleyi* (Lee et al. 1972). There is, therefore, no evidence of *P. truei* in the area. *Peromyscus gratus,* known from southwestern New Mexico (Modi and Lee 1984), also was not found.

Specimens examined (247).—Aspen Spring, 16 (14 MSB, 2 ESP); 1 mi SW Aspen Springs, 2 (ESP); Animas Peak, 2 (ESP); SW Aspen Spring, 2 (ESP); lower Bear Canyon, 5,550 ft, T31S R19W sec. 23, 13 (MSB); 0.25 mi up S Fork Bear Creek, 5,600 ft, T31S R19W sec. 23, 2 (MSB); Birch Spring, 9 (5 MSB, 4 WNMU); Black Bill Canyon, 15 (MSB); Black Bill Tank, 7 (MSB); 0.5 mi S Black Bill Tank, T31S R19W sec. 31, 2 (MSB); Cistern Saddle, T31S R19W sec. 33, 48 (MSB); Double Adobes, T30S R19W sec. 34, 2 (MSB); Double Adobe Exclosure, T31S R19W sec. 3, 1 (MSB); Godfrey Ranch HQ, T30S R18W sec. 31, 5,400 ft, 2 (WNMU); Horse Thief Tank, T32S R19W sec. 34, 4 (MSB); Aspen Spring, 4 (MSB); Indian Creek Canyon, 27 (MSB); mouth of Indian Creek Canyon, 45 (40 MSB, 5 ESP); Indian Creek, T31S R19W sec. 16, 11 (MSB); OK Bar, 5 (MSB); 1 mi NW OK Bar, T31S R19W sec. 13, 2 (MSB); Pine Flat, Pine Canyon, T32S R19W sec. 1, 1 (MSB); Pit Tank, 2 (MSB); Red Hill, T33S R19W sec. 5, 1 (MSB); Rock Ridge Exclosure, T33S R19W sec. 17, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 13 (MSB); Spring Canyon, T32S R19W sec. 14, 2 (MSB); Spur Windmill, 4 (MSB); T33S R19W sec. 19, 2 (MSB).

Additional records (19).—Animas Peak, 7 (USNM); Summit, Animas Peak, 4 (USNM); N slope Animas Mountains, Animas Creek, 6 (USNM); 5 mi N San Luis Pass, Animas Mountains, 2 (KUM).

Baiomys taylori ater Blossom and Burt
Pygmy Mouse

The pygmy mouse occurs in New Mexico only in southwestern Hidalgo County. I found it sympatrically with *Sigmodon hispidus, S. fulviventer,* and *S. ochrognathus* in grassy habitat. The pygmy mouse ranges from 1,433 m in Animas Creek to 1,829 m at the mouth of Indian Creek. One was also collected along Double Adobe Creek near OK Bar.

Previously, pygmy mice have not been taken in large numbers at their most northern distributional limit in southwestern and southeastern New Mexico (Hoffmeister 1956, Packard 1960, Findley et al. 1975); however, in two trapping sessions in March 1982, I captured 37 pygmy mice in the sacaton grassland where previous intensive trapping (2,400 trap nights) had revealed only one. Several traps contained two individuals each. One pregnant female (two embryos, 4 mm) was collected on 15 March.

Specimens examined (45).—13 mi S Animas, T29S R19W sec. 30, 18 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 20 (MSB); 22 mi S Animas, T31S R20W sec. 2, 1 (MSB); 30 mi S Animas, Animas Canyon, 1 (WNMU); Clanton Draw Tanks, 3 (2 MSB, 1 WNMU); 1 mi NW OK Bar, T30S R19W sec. 13, 1 (MSB); Middle Wells, 1 (MSB).

Additional records (2).—18 mi S, 2 mi W Animas, 2 (KUM).

Specimen reported (1).—Indian Creek Canyon, ca. 0.75 mi beyond road's end, 1 (UTEP).

Onychomys leucogaster ruidosae Stone and Rehn

Northern Grasshopper Mouse

Onychomys leucogaster has a more stenoecious distribution in the study area than *O. arenicola*. The northern grasshopper mouse has been found only along Animas Creek, lower Deer Creek, and on the sand dunes northeast of Lake Cloverdale. As was noted by Findley et al. (1975), *O. leucogaster* is commonly found in association with *D. ordii* and *P. penicillatus* in areas with sandy soils.

Specimens examined (26).—12.5 mi S Animas, T29S R19W sec. 29, 1 (MSB); 13 mi S Animas, T29S R19W sec. 29, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 3 (MSB); 16 mi S Animas, T30S R20W sec. 24, 1 (WNMU); 17 mi S Animas, Animas Creek, 3 (MSB); 36 mi S, 3 mi W Animas, upper Animas Valley, 6 (MSB); 8.5 mi E Cloverdale, 6 (MSB); 9 mi E Cloverdale, 2 (MSB); 8 mi SE Gray Ranch HQ, T33S R19W sec. 19, 5,200 ft, 1 (MSB); 15 mi S Animas, 2 (MSB).

Additional records (6).—17 mi S, 2 mi W Animas, 2 (KUM); Deer Creek, Culberson Ranch, 2 (USNM); 4 mi NW San Luis Pass, Animas Valley, 2 (MVZ).

Onychomys arenicola Mearns

Eastern Grasshopper Mouse

Onychomys arenicola was found commonly on the gravelly bajadas that support a mesquite grassland. This species occurs as high as Cistern Saddle (2,488 m) although not in large numbers.

Specimens of this taxon from the study area had been previously assigned to *O. torridus* (Findley et al. 1975), but are here referred to *O. arenicola* based on chromosomal and morphologic data presented by Hinesley (1979) and Sullivan et al. (in press). Pregnant females were taken on 25 May (4 embryos, 18 mm), 5 June (3 embryos, 11 mm), and 6 June (2 embryos, 21 mm).

Specimens examined (54).—14.5 mi S Animas, T29S R19W sec. 31, 2 (MSB); 17.5 mi S, 3 mi E Animas, T30S R19W sec. 15, 1 (MSB); Animas Valley, T30S R19W sec. 16, 1 (MSB); 1 mi SW Aspen Spring, 1 (MSB); lower Bear Canyon, T31S R19W sec. 23, 1 (MSB); 0.25 mi up S fork Bear Creek, 1 (MSB); Black Bill Canyon, 1 (MSB); 8.5 mi E Cloverdale, 5 (MSB); 9 mi E Cloverdale, 3 (MSB); 1 mi E Culberson Ranch, Deer Creek, 1 (MSB); Rock Ridge Exclosure, T33S R18W sec. 20, 5,050 ft, 1 (MSB); Double Adobes, 5,100 ft, T31S R19W sec. 3, 2 (MSB); Double Adobe Canyon, T31S R19W sec. 24, 2 (MSB); Double Adobes Exclosure, T30S R19W sec. 34, 2 (MSB); 0.5 mi NW Double Adobes, T30S R19W sec. 34, 1 (MSB); 8 mi S, 4 mi E Gray Ranch HQ, 2 (MSB); mouth of Indian Creek, T31S R19W sec. 16, 2 (MSB); OK Bar, 1 (MSB); 0.5 mi below OK Bar, Double Adobe Creek, 5,500 ft, T31S R19W sec. 24, 1 (MSB); 1 mi NW OK Bar, T31S R19W sec. 13, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 18 (MSB); 1 mi N, 5 mi W San Luis Pass, 1 (MSB); T33S R19W sec. 29, 3 (MSB).

Additional records (3, as *O. torridus*).—15 mi S Animas, 1 (KUM); Gray Ranch, Animas Valley, 1 (MVZ); Animas Mountains, San Luis Pass, 1 (MVZ).

Sigmodon hispidus berlandieri Baird

Hispid Cotton Rat

This is the most common cotton rat in the Animas Mountains. I frequently encountered it in areas of high grass cover. Populations of this species may fluctuate greatly in these areas. I caught no hispid cotton rats in the sacaton along Animas Creek in the spring of 1981, but I caught 39 in the spring of 1982 under similar trapping intensity (480 trap nights each).

Few cotton rats have been taken east of the Continental Divide in the Animas Mountains. Suitable grass cover, that would support large numbers of these species, may not or did not exist on the eastern flanks of these mountains, perhaps due to a history of overgrazing. Cotton rats do occur just east of the Animas Mountains, as both *S. hispidus* and *S. fulviventer* have been taken in the Alamo Hueco and Big Hatchet Mountains (Hayward et al. 1978). Mohlhenrich (1961) noted that in southwestern New Mexico, *S. hispidus* may be commonly associated with fourwing saltbush, honey mesquite, creosote, cholla, and prickly-pear. I did not find hispid cotton rats in this habitat type. No evidence of *S. arizonae*, known from southeastern Arizona (Zimmerman 1970), was found in this study.

Specimens examined (29).—14.5 mi S Ani-

mas, T29S R19W sec. 31, 3 (MSB); 15 mi S Animas, 2 (MSB); 22 mi S Animas, T31S R20W sec. 2, 1 (MSB); Clanton Draw Tanks, 11 (MSB); Double Adobe, T31S R19W sec. 34, 1 (MSB); Double Adobe Exclosure, T31S R19W sec. 3, 1 (MSB); Double Adobe Ranch, 6 (MSB); Middle Wells, 3 (MSB); E Culberson Ranch, 1 (MSB).

Sigmodon fulviventer minimus Mearns

Tawny-bellied Cotton Rat

Mohlhenrich (1961) concluded that the tawny-bellied cotton rat is dependent on a high percentage of grass cover, and data collected in this study corroborate his findings. I found *S. fulviventer* only in the lush pastures, consisting primarily of grama grass, Bermuda grass, and bulrush surrounding Clanton Draw Tanks and in the sacaton bottomland of Animas Creek.

Sigmodon fulviventer was found with *S. hispidus,* but was never abundant. Where these species were captured in the same traplines I could not determine any ecological differences. Nevertheless, the tawny-bellied cotton rat is more stenoeciously distributed. A pregnant female with four embryos was taken on 21 December 1981. Several other rodent species were also noted to be actively breeding in late December, perhaps in response to the mild temperatures and abundant rainfall experienced prior to this time.

Specimens examined (9).—12.5 mi S Animas, T29S R19W sec. 30, 2 (MSB); 13 mi S Animas, T29S R19W sec. 30, 1 (MSB); 20 mi S, 3 mi W Animas, 5 (MSB); Clanton Draw Tanks, 1 (MSB).

Additional records (7).—18 mi S, 2 mi W Animas, 7 (KUM).

Sigmodon ochrognathus V. Bailey

Yellow-nosed Cotton Rat

The Animas Mountains are the northernmost distribution limit in New Mexico for the yellow-nosed cotton rat. This species has been found in a wide variety of habitats in this area from bottomland pasture at 1,554 m up to a Mexican white pine, Mexican pinon, and Douglas-fir association at 2,408 m on Cistern Saddle. The species is most often found on rocky slopes in the encinal zone (Findley and Jones 1960).

One specimen was taken on 19 July just south of the Gray Ranch Headquarters in a grassland very similar to that in which I caught *S. hispidus* and *S. fulviventer.* These species were taken less than 1 km away in Clanton Draw. A second specimen was taken on 8 January in Double Adobe Canyon near OK Bar in a field of grama and bluestem grasses. Although this species is disjunct throughout its range, it exhibits minimal geographic variation and is considered monotypic (Findley and Jones 1960).

Specimens examined (15).—Aspen Spring, 5 (MSB); 22 mi S Animas, Indian Creek Canyon, 3 (MSB); 1 mi SW Aspen Spring, 4 (MSB); Gray Ranch HQ, 1 (MSB); 1 mi NW OK Bar, T31S R19W sec. 13, 1 (MSB); mouth of Indian Creek Canyon, 1 (MSB).

Additional records (1).—4 mi NW San Luis Pass, Animas Valley, 1 (MVZ).

Neotoma albigula albigula Hartley

White-throated Woodrat

The white-throated woodrat is common and widespread from 1,433 m in the sacaton of Animas Creek up to 2,134 m in Indian Creek. I captured 146 individuals on 46 different occasions. The species appears to be limited by a lack of shrub cover at lower elevations. At its upper elevational limit, its range overlaps that of *N. mexicana*. I took both species in a trapline set at the mouth of Black Bill Canyon at 1,848 m and there are specimens of *N. albigula* and *N. mexicana* from Aspen Spring at 2,134 m.

White-throated woodrat nests were most numerous in the encinal, especially along riparian areas, and near stock tanks such as Horse Thief Tank.

Specimens examined (87).—14.5 mi S Animas, T30S R19W sec. 31, 4 (MSB); 15 mi S Animas, 2 (MSB); 17 mi S Animas, 3 (MSB); 18 mi S, 3.2 mi W Animas, 1 (MSB); Aspen Spring, 1 (MSB); lower Bear Canyon, T31S R19W sec. 23, 5,550 ft, 3 (MSB); Birch Spring, 3 (MSB); Black Bill Tank, 1 (MSB); Black Bill Canyon, 1 (MSB); 0.5 mi S Black Bill Tank, T31S R19W sec. 31, 1 (MSB); S fork Bear Creek, 0.25 mi from mouth, T31S R19W sec. 23, 1 (MSB); Clanton Draw Tanks, 1 (MSB); Double Adobes, 1 (MSB); Horse Thief Canyon, 0.25 mi W Horse Thief Tank, T32S R19W sec. 34, 2 (MSB); Horse Thief Tank, 4 (MSB); Indian Creek Canyon, 37 (MSB); Joyce Well, 1 (MSB); OK Bar, 3 (MSB); Red Hill, T33S R19W sec. 5, 1 (MSB); Rock

Ridge Exclosure, lower Deer Creek, T33S R18W sec. 20, 3 (MSB); Rock Ridge Exclosure, lower Deer Creek, T33S R18W sec. 17, 1 (MSB); Spillsbury Windmill, 1 (MSB); Spring Canyon, T32S R19W sec. 14, 1 (MSB); Spur Windmill, 1 (MSB); 0.25 mi E New Well in Double Adobe Canyon, T31S R18W sec. 31, 2 (MSB); 1 mi N, 3 mi W San Luis Pass, 1 (MSB); 1 mi N, 2.5 mi W San Luis Pass, T33S R19W sec. 29, 2 (MSB); 18 mi S Animas, T30S R20W sec. 35, 2 (WNMU); 36 mi S, 3 mi W Animas, upper Animas Valley, 1 (MSB); N end of Animas Mountains, Godfrey Ranch HQ, T30S R18W sec. 31, 5,400 ft, 1 (WNMU).

Additional records (4).—N base Animas Peak, Adobe Ranch, 1 (USNM); N slope Animas Peak, Animas Mountains, 3 (USNM).

Neotoma mexicana mexicana Baird

Mexican Woodrat

This woodrat is restricted to the high elevation coniferous forest and chaparral of the mountain range and, unlike *N. albigula,* is never very abundant. Goldman and Birdseye caught a few among the rocks between 6,800 and 8,000 ft (2,073 to 2,338 m) in the Animas Mountains throughout the Transition Zone (Bailey 1932). I took them from 1,814 m in Black Bill Canyon to 2,530 m near the crest of Animas Peak.

In contrast to *N. albigula,* nests of *N. mexicana* are difficult to locate and as described by Bailey (1932) are "limited to a few sticks dropped among the clefts and cracks of rocks."

Specimens examined (11).—Animas Peak, 3 (2 MSB, 1 ESP); Aspen Springs, 1 (MSB); 1 mi SW Aspen Springs, 3 (MSB); Black Bill Tank, 1 (MSB); Cistern Saddle, T31S R19W sec. 33, 2 (MSB); Indian Creek Canyon, 7,500 ft, 1 (ESP).

Additional records (8).—Animas Peak, 8 (USNM).

Family Erethizontidae

Erethizon dorsatum couesi Mearns

Porcupine

Findley (field notes, MSB) collected a female in Deer Creek in 1956 (labelled as "E of San Luis Pass"). This individual was found in a lone Emory oak tree. S. Dobrott (pers. comm.) observed porcupines in the cottonwood trees along Animas Creek and near Hunter Spring in the Indian Creek drainage. He also reported one that had been trapped inadvertently in Animas Creek near Middle Wells in February 1982. Porcupines probably occur throughout the lower slopes of the Animas Mountains, as has been noted in the Graham (Hoffmeister 1956) and Huachuca Mountains (Hoffmeister and Goodpaster 1954).

Specimen examined (1).—E San Luis Pass, 1 (MSB).

ORDER CARNIVORA

Family Canidae

Canis latrans mearnsi Merriam

Coyote

Coyotes were seen at 11 locations and were heard on numerous occasions throughout the Animas Mountains. Trapping records compiled by W. Donell, a local trapper, indicate that *C. latrans* is the most commonly captured furbearer in the area. In the 1979–1980 season, coyotes comprised 85% of the 117 mammals trapped; and in the 1981–1982 season, 78% of 40 captures were coyotes.

Specimens examined (4).— Double Adobes, T30S R19W sec. 34, 1 (MSB); Double Adobe Ranch, T31S R19W sec. 3, 1 (MSB); 4 mi N, 2 mi E Gray Ranch HQ, 2 (MSB).

Additional Records (2).—Indian Canyon, Animas Mountains, 1 (Jackson 1951:302); Turkey Spring, 1 (Jackson 1951:302).

Specimens reported (6).— Animas Mountains, 6 (UI).

Vulpes macrotis neomexicana Merriam

Kit Fox

There are no specimens of *V. macrotis* from the study area; however, I sighted kit foxes in the level grasslands southwest of the main massif. On 28 May and 5, 7, 13, 21, and 29 June I sighted 2, 4, 2, 3, 3, and 1 kit foxes, respectively, 9 km S of the Gray Ranch Headquarters. These were a mother with three pups; and after locating their den, P. Packard photographed a pup at sunset on 13 June. I also spotlighted one at the junction of NM 79 and NM 338 on 21 June and another three about 2 km N of that location on 29 June.

Urocyon cinereoargenteus scottii Mearns

Gray Fox

The gray fox, in contrast to the kit fox, is found at higher elevations in more broken country. It typically occurs in pinon-juniper and oak woodlands and oak savannah associations. Specimens prepared in this study were trapped at Double Adobes and in Black Bill Canyon. W. Donell trapped five gray foxes in 1979–1980 and five in 1981–1982, and S. Arreola, a cowboy on Gray Ranch, reported trapping 45 gray foxes from 1975 to 1980. I spotlighted a gray fox in an arroyo 6 km southeast of the Gray Ranch Headquarters on 29 June.

Specimens examined (3).—Double Adobes, 2 (MSB); Black Bill Canyon, 25 mi S Animas, 1 (MSB).

Additional records (1).—Animas Mountains, 1 (USNM).

Family Ursidae

Ursus americanus amblyceps Baird

Black Bear

Black bears are present in the Animas Mountains in moderate numbers. In Black Bill Canyon I followed a set of bear tracks that covered our footprints from the previous day. On 30 July, P. Packard found one of our Sherman traplines disturbed with a fresh bear scat at the end of the line. I also encountered fresh bear sign in Spring Canyon, Pine Canyon, and at Birch Spring.

Black bears are found primarily at elevations above 1,675 m and help to keep game trails open throughout the dense chaparral. A. Bayne (pers. comm.) noted that he had seen them feeding on cholla fruit near San Luis Pass. *Ursus americanus* probably moves freely between the San Luis and Animas Mountains. Lonnie Moore shot a bear in upper Deer Creek in 1980.

Family Procyonidae

Bassariscus astutus arizonensis Goldman

Ringtail

Ringtails are probably fairly common in the Animas Mountains, but due to their secretive manner they are seldom observed. Findley et al. (1975) noted that the species frequented rocky habitats, which are common in the Animas Mountains. S. Arreola (pers. comm.) reported the capture of four ringtails in the area from 1975 to 1980. Other local trappers reported that the species is captured infrequently.

Specimen examined (1).—2 mi W of Black Bill Spring, T31S R20W sec. 25, 1 (MSB).

Specimen reported (1).—near Aspen Spring, 1 (UTEP).

Nasua narica molaris Merriam

Coatimundi

Coatis are common in the Animas Mountains. I watched one in Pine Canyon; and they have recently been seen at Birch Spring (Egbert 1980) and at the mouth of Pine Canyon (1), upper Double Adobe Canyon (2), 1 km E of Spur Windmill (1), and in Walnut Canyon (12) by S. Dobrott (pers. comm.). Hayward et al. (1978) felt that this species may be expanding its range northward as it has been recorded in northern Grant County. *Nasua narica* is primarily an oak and pinon-juniper woodland species in this area.

Specimen examined (1).—Indian Creek Canyon, 1 (ESP).

Additional record (1).—Animas Mountains, Pine Canyon, 1 (USNM).

Procyon lotor mexicanus Baird

Raccoon

Raccoons occur primarily in the riparian associations of the lower elevations of the Animas Mountains. Specimens have been collected at Clanton Draw tanks and near 44 Well (17 mi S Animas). W. Donell (pers. comm.) reported trapping one in the Taylor pasture (T32S R20W sec. 4) and S. Arreola (pers. comm.) took one in lower Bear Canyon. Ranchers in the area noted that raccoons are occasionally seen at night along NM 338 where the highway parallels Animas Creek.

Specimens examined (2).—17 mi S Animas, 1 (MSB); 30 mi S, 4 mi W Animas, T32S R20W sec. 16, 1 (MSB).

Family Mustelidae

Taxidea taxus berlandieri Baird

Badger

Badgers are common inhabitants of the grasslands surrounding the Animas Mountains as is evidenced by their frequently encountered burrows and excavations. Badger excavations are

commonly associated with kangaroo rat and pocket gopher mounds. I sighted badgers at night in the lowlands of the southwestern Animas Mountains where my most intensive spotlighting was conducted. These sightings include one on 7 June about 4 km SE of the Gray Ranch Headquarters and two at the junction of NM 338 and NM 79.

Specimen examined (1).—2 mi W San Luis Pass, 1 (MSB).

Spilogale gracilis (Linnaeus)

Spotted Skunk

I did not find this species in the Animas although it is known to occur there. S. Dobrott (pers. comm.) observed one at the Godfrey Camp. The local trappers rarely catch spotted skunks in Animas Creek and in the western foothills of the mountains (W. Donell, pers. comm.). Van Gelder (1959) reported measurements for seven individuals collected in the Animas Mountains between 1,768 and 2,438 m in elevation. These specimens are at the National Museum of Natural History and are apparently the only specimens from Hidalgo County.

Additional records (7).—North Slope of Animas Peak, 5,800 and 6,000 ft, 6 (USNM; see Van Gelder 1959); summit of Animas Peak, 8,000 ft, 1 (USNM; see Van Gelder 1959).

Mephitis mephitis estor Merriam

Striped Skunk

The striped skunk may be the most abundant mustelid in the mountains. W. Donell and R. Moore (pers. comm.) stated that this species is commonly taken in steel leg-hold traps set in the study area. The single specimen I collected was caught by Moore beneath the sycamores of Double Adobes.

I sighted striped skunks on several occasions south of the Gray Ranch Headquarters near a garbage dump, as well as at Spur Windmill, Aspen Spring, the Godfrey Camp, and on the bajada west of Black Bill Canyon.

Specimen examined (1).—Double Adobes, T30S R19W sec. 34, 1 (MSB).

Mephitis macroura milleri Mearns

Hooded Skunk

Mephitis macroura is relatively uncommon in the area. A single specimen (MSB 10562) was taken from a cave "22 mi S of Animas" in 1957 by A. Harris. I sighted one 6 km S of the Gray Ranch Headquarters while spotlighting in March 1982. The habits of this species are poorly known; however, the hooded skunk is generally associated with desert and grassland habitats in southwestern New Mexico.

Specimen examined (1).—22 mi S Animas, 1 (MSB).

Conepatus mesoleucus venaticus Goldman

Hog-nosed Skunk

The hog-nosed skunk may be as common as the striped skunk in the Animas Mountains. I obtained one that had been trapped by W. Donell among the live oaks 2.5 km W of Black Bill Spring. I also spotlighted one approximately 5 km SE of the Gray Ranch Headquarters on 28 May. The four specimens taken previously are also from oak or juniper woodland.

Specimens examined (5).—Black Bill Canyon, 25 mi S Animas, 1 (MSB); Indian Creek Canyon, 3 (MSB); T33S R19W sec. 29, 1 (MSB).

Family Felidae

Felis concolor azteca Merriam

Mountain Lion

Paul Packard sighted one mountain lion in the Rock Ridge Exclosure in Deer Creek and I found mountain lion tracks in lower Deer Creek, Indian Creek, Black Bill Canyon, and at Birch Spring. D. Goodin (pers. comm.), a local rancher and lion hunter, noted that *F. concolor* is relatively abundant in the southeastern Animas Mountains, especially in the rock cliffs and bluffs along Deer Creek. He reported that his dogs frequently locate fresh mountain lion sign in the vicinity of Birch Spring and Hell's Canyon of lower Deer Creek. At least 18 mountain lions were taken in the Animas Mountains between 1974 and 1982; including six taken in the winter of 1980–1981 and three taken in January and February of 1982. The latter three were males taken at the Sims Place in Deer Creek, 0.75 mi W of Smith Tank, and 0.25 mi W of Birch Spring (S. Dobrott, pers. comm.).

Specimens examined (2).—Horse Thief Tank, T32S R19W sec. 32, 1 (MSB); Animas Mountains, 1 (MSB).

Additional records (18).—Animas Mountains, near Animas, 4 (USNM); Animas Mountains, Bear

Canyon, 2 (USNM); Animas Mountains, 8 (USNM); Animas Mountains, Coronado National Forest, 2 (USNM); Animas Mountains, Indian Creek, 2 (USNM).

Specimen reported (1).—Indian Creek Canyon, 1 (UTEP).

Felis rufus baileyi Merriam

Bobcat

Bobcats are common inhabitants of the Animas Mountains. Of the four specimens I prepared, two were caught at Double Adobes (by R. Moore) and two were shot. W. Donell (pers. comm.) noted that she frequently trapped bobcats along Animas Creek and in the oak savannah west of Black Bill Canyon. Although I found sign on several occasions, I did not observe any individuals of this secretive species.

Specimens examined (6).—14 mi S, 1 mi W Animas, T29S R19W sec. 31, 1 (MSB); 21 mi (by road) S Animas, 1 (MSB); Double Adobes, T30S R19W sec. 34, 2 (MSB); Double Adobe Creek, T31S R19W sec. 3, 1 (MSB); OK Bar, T31S R19W sec. 24, 1 (MSB).

ORDER ARTIODACTYLA

Family Tayassuidae

Tayassu tajacu sonoriensis (Mearns)

Javelina

Javelina skulls were collected at Indian Creek Mill in upper Deer Creek, in Pine Canyon, and near Joyce Mill in lower Deer Creek. Javelinas are common throughout the savannah and riparian associations of the lower elevations of the mountain range. I spotted three javelinas near Joyce Mill in lower Deer Creek on 9 June and 10 at San Luis Pass on 21 March.

Tayassu tajacu and *Sus scrofa* habits appear to be very similar and a study of these species' ecological requirements and the impact, if any, of feral hogs on javelina would be interesting.

Specimens examined (5).—Bear Canyon, 1 (MSB); Indian Creek Canyon, 1 (MSB); Indian Creek, T31S R19W sec. 16, 2 (MSB); Indian Creek Mill, 1 (MSB).

Family Cervidae

Odocoileus hemionus crooki (Mearns)

Mule Deer

Mule deer were most commonly found in the open savannah country below 1,830 m in the Animas Moutains. I found mule deer in limited sympatry with white-tailed deer (*O. virginianus*) along Double Adobe Creek, on the eastern flanks of the Animas Mountains near the Spur Windmill, and in the vicinity of Horse Thief Tank. S. Dobrott (pers. comm.) noted that mule deer have been spotted on Cistern Saddle (2,408 m). Generally however, *O. virginianus* inhabits the higher elevations of the Animas Mountains. Anthony and Smith (1977) found these species to be sympatric in the Dos Cabezas Mountains and parapatric in the San Cayetano Mountains of southeastern Arizona. In the Animas Mountains, white-tailed and mule deer ranges overlap, particularly between 1,830 and 2,100 m.

Specimen examined (1).—Bear Canyon, 1 (MSB).

Odocoileus virginianus couesi (Coues and Yarrow)

White-tailed Deer

White-tailed deer inhabit the narrow canyons and rugged terrain of the higher elevations of the Animas Mountains. Based on his observations as the wildlife biologist in the Animas Mountains from 1978 to 1982, S. Dobrott (pers. comm.) feels that white-tailed deer are more abundant than are mule deer, and Raught (1967) concluded that the Animas Mountains had one of the largest populations of white-tailed deer in New Mexico. In other areas of New Mexico and Arizona, the range of white-tailed deer has been substantially reduced within historic times (Raught 1967, Brown and Henry 1981). Anthony and Smith (1977) hypothesized that a climatic shift to hotter and drier conditions, overgrazing by livestock, and fire suppression may have produced vegetational changes that have favored the displacement of white-tailed deer by the more xeric-adapted mule deer. The white-tailed deer of the Animas Mountains have not been as drastically affected.

The range of white-tailed deer is primarily above the 1,830 m contour and we spotted them on several occasions, frequently in association with

mountain mahogany, skunkbush, and silk-tassel. In the years 1978 to 1981, 4, 8, 15, and 14 white-tailed deer, respectively, were harvested from the Animas Mountains. The increased numbers taken in the latter years are due to increased hunter effort at higher elevations (S. Dobrott, pers. comm.).

Specimens examined (3).—Bear Canyon, 1 (MSB); Black Bill Canyon, 1 (MSB); Indian Creek Canyon, 1 (MSB).

Additional records (3).—Animas Mountains, 1 (USNM); Animas Peak, 1 (USNM); Animas Valley, Gray Ranch, 1 (USNM).

Specimens reported (2).—Indian Creek Canyon, ca. 0.5 mi beyond road's end, 2 (UTEP).

Family Antilocapridae

Antilocapra americana mexicana Merriam

Pronghorn

Pronghorns were frequently observed in the extensive pastures of the Animas Valley south of the Howe Camp and on the east side of San Luis Pass in the pastures of the south fork of the Playas Valley. *Antilocapra americana* is restricted to the desert grassland and savannah associations, rarely venturing into the denser vegetation of the foothills of the mountains. S. Dobrott (pers. comm.) believes there is little movement across the Continental Divide by antelope and he has observed only three males in the San Luis Pass area.

Aerial surveys were conducted by S. Dobrott in 1979 when 73 pronghorns (26 males, 39 females, 6 immatures, and 2 unclassified) and in 1981 when 144 pronghorns (31 males, 66 females, 46 immatures, and 1 unclassified) were counted. Fawning in *A. americana* occurs in July in Hidalgo County (S. Dobrott, pers. comm.) and the 1981 survey, conducted in late September, reveals a larger population due to recruitment of young (32% recruitment in 1981). The 1979 survey was completed in early August, possibly before recruitment of all the young into the population. Different aerial routes were also used between years, further confounding the comparison. Nevertheless, these data give an estimate of sex ratios and population size within these years. Ligon (1927), in his detailed map of distribution and numbers in New Mexico in 1927, estimated this southwestern Hidalgo County population at 11 individuals. Apparently the herd has increased dramatically since that time. Five were harvested in 1980 and four in 1981 from these herds (S. Dobrott pers. comm.). T. Yates (pers. comm.) noted that horn sheath development and fawning in this population are approximately 1 month behind the pronghorns of Otero County in south-central New Mexico.

Specimens examined (2).—10 mi W, 5.5 mi N Antelope Wells, T33S R18W sec. 11, 2 (MSB).

Introduced Species

ORDER RODENTIA

Family Muridae

Mus musculus domesticus Rutty

House Mouse

The house mouse was encountered infrequently in the dense sacaton grass near the XT Camp. It may be more abundant near the barns, houses, and other buildings associated with the ranch, but minimal trapping effort was expended around these structures.

The house mouse has also been taken at the southwest corner of the mountains and may be expected in dense grass in the lower elevations of the area.

Specimens examined (3).—13 mi S Animas, T29S R19W sec. 30, 1 (MSB); 14.5 mi S Animas, T29S R19W sec. 31, 1 (MSB); 1 mi N, 3 mi W San Luis Pass, 1 (MSB).

ORDER ARTIODACTYLA

Family Suidae

Sus scrofa Linnaeus

Feral Hog

Feral hogs are highly visible inhabitants of the lowlands and sycamore and cottonwood riparian corridors of the mountains. This species can regularly be found in the vicinity of the cienega near the Gray Ranch Headquarters, by the tanks of Clanton Draw, and in Whitmire Canyon just north of the Howe Camp. I encountered *S. scrofa* on numerous occasions near the stock tanks and windmills along the lengths of Double Adobe Creek and Deer Creek.

Feral hogs have been managed as a game species by the Gray Ranch Company. As of July 1982, 12 individuals had been tagged and were

being monitored in an effort to determine their distribution and habits. These individuals were tagged at Double Adobes (1), the sand dune area northeast of Lake Cloverdale (1), San Luis Pass (2), and in the vicinity of the Gray Ranch Headquarters (8).

Specimens examined (3).—lower Bear Canyon, T31S R19W sec. 23, 1 (MSB); 8 mi S, 4 mi E Gray Ranch HQ, T33S R19W sec. 29, 2 (MSB).

Recently Extirpated Species

ORDER RODENTIA

Family Sciuridae

Cynomys ludovicianus arizonensis Mearns

Black-tailed Prairie Dog

Bailey (1932) reported that in 1908 the Animas Valley was nearly a continuous prairie dog town. As a result of control measures, particularly poisoning, the black-tailed prairie dog has been exterminated from southwestern New Mexico (Findley et al. 1975). Anderson (1972) reported prairie dogs from northwestern Chihuahua and the Rio San Pedro in Sonora, but it is not apparent how recent these records are.

Specimens reported (2).—Animas Valley, Victorio Cattle Company horse camp, 2 (MVZ).

ORDER CARNIVORA

Family Canidae

Canis lupus baileyi Nelson and Goldman

Mexican Gray Wolf

In the Animas Mountains, the Mexican gray wolf has probably received more attention than any other wild mammal. It is currently included on the federal and state endangered species lists (U.S. Fish and Wildlife Service 1984, New Mexico Department of Game and Fish 1985). From the late 1910's through the 1960's, government trappers (U.S. Biological Survey and later U.S. Fish and Wildlife Service) have worked extensively to reduce the impact of wolf depredations on livestock in southwestern New Mexico.

The OK Bar house was used as a base by wolf hunters during the 1920's and 1940's, and trappers were later stationed at several locations in the Animas Valley until 1962, according to A. Bayne (pers. comm.). Bayne was a U.S. Fish and Wildlife Service trapper in Hidalgo County from 1943 to 1977. Young and Goldman (1944) detailed the Mexican gray wolf's major runways which include the Animas Mountains. A. Bayne (pers. comm.) noted that wolves used several canyons when passing through the northern end of the mountains, but invariably they would pass near Double Adobe Camp and OK Bar in Double Adobe Creek.

Red Hill was a favorite wolf denning area (Young and Goldman 1944), although Bayne contends that no pups have been raised in Hidalgo County since 1943 (Nunley 1977). Due to the intensive control measures employed in the last 50 years, this species has been extirpated from most of its historic range, although it may still occur in small numbers in Chihuahua and Durango, Mexico (McBride 1980). A. Bayne (pers. comm.) reported that the last wolf taken in the Animas Mountains was in 1965 in Pine Canyon. Since that time, no wolves have been positively identified from the study area.

Specimen examined (1).—Animas Mountains, 1 (MSB).

Additional records (9).—25 mi S Animas, Adobe Ranch, 1 (USNM); 30 mi S Animas, 2 (USNM); 30 mi SE Animas, 1 (USNM); Animas Mountains, 1 (USNM); NE Animas Peak, OK Bar Ranch, 1 (KUM); 50 mi SW Hachita, near Adobe Ranch, 1 (USNM); 25 mi N Cloverdale, Indian Creek, 2 (USNM).

Specimens reported (14).—Animas Mountains, 13 (UI); Indian Creek, 1 (UI).

Family Ursidae

Ursus arctos horribilis Ord

Grizzly Bear

There are no specimens of grizzly bears known from the Animas Mountains, but Findley et al. (1975) listed a specimen from the San Luis Mountains on the Mexican boundary and *U. arctos* most likely ranged into the Animas Mountains. Indeed, Bailey (1932) reported a nearly full-grown male that was tracked by B. Lilly from the Animas Mountains into northwestern Chihuahua where it was killed.

DISCUSSION

Ecological relationships among the mammalian species are summarized in Table 1 by identifying the habitats (as earlier described) where each spe-

Table 1. Habitat affinities of the 76 recent mammalian species of the Animas Mountains. An "x" indicates that the species has been either collected or sighted in a particular habitat and a "p" indicates that the species potentially may be found in the habitat based on literature records. Habitat types are: Shortgrass Plains (SP), Sacaton Grassland (SG), Sycamore Riparian (SR), Cottonwood Riparian (CR), Rabbit Brush Riparian (RR), Oak Savannah (OS), Oak Woodland (OW), Pinon-juniper Woodland (PJ), Chaparral (CH), and Coniferous Forest (CF). The habitats are listed across the top and down the left column and are arranged in order of increasing elevation, so that Shortgrass Plains (SP) is the lowest habitat and Coniferous Forest (CF) is the highest. There is some overlap in the elevational ranges of the grassland and riparian communities.

	HABITAT									
	SP	SG	SR	CR	RR	OS	OW	PJ	CH	CF
Didelphis virginiana	x		p	p	p					
Sorex arizonae										x
Notiosorex crawfordi	p	p	x	p	p	p	p	p		
Choeronycteris mexicana		p	p	p	p	p				x
Leptonycteris sanborni	p	p	p	p	x	p				
Myotis velifer	x	x	x	p	p	p				
Myotis auriculus			x	p	p	x	x	x	p	x
Myotis thysanodes	x	x	x	p	x	x	p	x	p	x
Myotis volans			x	p	x	x	x	x	p	x
Myotis californicus	x	p	p	p	x	x	x	x	x	x
Myotis leibii	x	x	x	p	x	x	x	x	x	x
Lasionycteris noctivagans						x	p	p	p	p
Pipistrellus hesperus	x	p	x	p	p	p	p	x	x	x
Eptesicus fuscus	x	x	x	p	x	x	x	x	x	x
Lasiurus borealis		x	x	x	p	x	p	p		
Lasiurus cinereus	p	x	x	p	x	x	x	x	x	x
Lasiurus ega			x	p	p	x				
Plecotus townsendii							x	x	x	x
Antrozous pallidus	x	x	x	x	p	x				
Tadarida brasiliensis	p	x	x	x	p	x	x			
Tadarida macrotis	x	p	p	p	p					
Sylvilagus floridanus							x	x	x	x
Sylvilagus audubonii	x	x	x	x	x	x			x	
Lepus californicus	x	x	x	x	x	x	x		x	
Lepus callotis	x									
Eutamias dorsalis						x	x	x	x	x
Ammospermophilus harrisii			x	p						
Spermophilus spilosoma	x	x	x	p	p					
Spermophilus variegatus	x		x		x	x	x	x	x	x
Cynomys ludovicianus	p	p	p	p	p					
Thomomys bottae	x	x	x	x	x	x				
Thomomys umbrinus					x	x	x	x	x	x
Perognathus flavus	x	x	x	p	x	x				
Chaetodipus hispidus	x	p	x	x		p				
Chaetodipus intermedius	x		x		x	x		p	x	
Chaetodipus penicillatus	x	x	x	p	x	p				

(Table continued on next page)

	HABITAT									
	SP	SG	SR	CR	RR	OS	OW	PJ	CH	CF
Dipodomys ordii	x	x	x	p	p					
Dipodomys spectabilis	x	p	x	p	p					
Dipodomys merriami	x	x	x	p	x	x				
Reithrodontomys megalotis	x	x	x	x	x	x				x
Reithrodontomys fulvescens	p	p	x	p	p	p				
Peromyscus eremicus	x		x	p	x	x				
Peromyscus maniculatus	x	x	x	x	x					
Peromyscus leucopus	x	x	x	x	x	p				
Peromyscus boylii			x	p	x	x	x	x	x	x
Baiomys taylori	x	x	x	x	x	x	p			
Onychomys leucogaster	x	x	x	x	x					
Onychomys arenicola	x	x	x	x	x	x			x	
Sigmodon hispidus	x	x	x	x	x					
Sigmodon fulviventer		x	p	x						
Sigmodon ochrognathus	x			x	x	x	x	x		x
Neotoma albigula	x	x	x	x	x	x	x	x	x	
Neotoma mexicana							p	x	x	x
Mus musculus	x	x	p	x	p	p				
Erethizon dorsatum	x	p	x	x	p	x	p	p		
Canis latrans	x	x	x	x	x	x	x	x	x	p
Canis lupus	p	p	p	p	p	p	p	p	p	p
Vulpes macrotis	x	x								
Urocyon cinereoargenteus	p		x	x	x	x	x	p	x	p
Ursus arctos			p	p	p	p	p	p	p	p
Ursus americanus	p		p	p	p		x	x	x	x
Bassariscus astutus			p		p	x	p	x	x	x
Nasua narica			p		p	x	x	x	x	p
Procyon lotor	x	x	p	x	p					
Taxidea taxus	x	x	x	x	x	x				
Spilogale gracilis	p	p	p	x	p	p	x	p	x	x
Mephitis mephitis	x	x	x	x	x	x	x	p	p	p
Mephitis macroura	x	p	p	p	p	p				
Conepatus mesoleucus	x	p	p	p	p	x	x	p	p	p
Felis concolor			x		x	x	x	x	x	x
Felis rufus	x	x	x	p	x	x	x	p	p	p
Sus scrofa	x	x	x	x	x	x	x	p	x	
Tayassu tajacu	x	x	x	x	x	x	x	p	x	
Odocoileus hemionus	x	p	x	x	x	x	x	x	x	p
Odocoileus virginianus			x	x	x	x	x	x	x	x
Antilocapra americana	x		p		p	p				
Totals	57	50	66	61	65	57	40	38	37	34
Percentage of Total Fauna	75	66	87	80	86	75	53	50	49	45

cies may be encountered. This list is based on the data gathered in this study (X), supplemented with habitat information (P) reported in the general species accounts of mammals of nearby mountain ranges (Bailey 1932, Cahalane 1939, Hoffmeister and Goodpaster 1954, Hoffmeister 1956) and information reported by other investigators as noted in the individual accounts.

Although this categorization is somewhat subjective, it provides an overview of the habitat affinities of the mammals. Abundant and obvious species are readily classified, while poorly known species are less easily assigned to particular habitats. Problems also arise when attempting to characterize habitat associations of highly vagile species. Precise habitat affinities for bat species are particularly difficult to determine and the significance of habitat divisions to these species is unclear.

The most restricted species are *Lepus callotis,* found in the shortgrass plains habitat, and *Sorex arizonae,* a montane relict that was found only at Aspen Spring in coniferous forest. *Reithrodontomys fulvescens* was captured only in the thick grass of the sycamore riparian type in Deer Creek; however, based on records from the nearby Peloncillo Mountains (Findley et al. 1975), this species might be encountered in other grassland situations throughout the mountain range.

Canis lupus was the most euryecious species; it has been recorded in all habitat types but is no longer present. *Myotis leibii, Neotoma albigula,* and *Canis latrans* are the most widespread extant species, being found in nine of the 10 habitat types. Fifty species (66%) may be found in at least six of the habitat types.

The riparian habitats (SR, CR, and RR) contain the most species as these areas are important water sources. Some 89% of the bat fauna was collected there. Grasslands are somewhat less species rich, but generally there is a trend of decreasing species number with increasing elevation. Coniferous forest supports the lowest number of species (34). Wagner (1977) noted that the lack of plant reproduction in the coniferous forest of the Animas Mountains suggested unfavorable climatic conditions at the present time. Such conditions may seriously jeopardize species that are restricted to the coniferous forest and may partially explain why *Sciurus aberti, Spermophilus lateralis, Spermophilus madrensis, Peromyscus maniculatus rufinus, Peromyscus melanotis, Microtus mexicanus,* and *Microtus pennsylvanicus* are found in the surrounding mountain ranges that have more extensive coniferous forests, but not in the Animas Mountains.

Interrelationships of the mammalian faunas of these habitats are shown in Table 2. Jaccard's (1912) index of similarity (J) was used to measure the relationship between the faunas of two habitats. The formula is:

$$J = \frac{C}{N_1 + N_2 - C}$$

where C = the number of taxa common to the two areas, N_1 = the number of taxa present in one area, and N_2 = the number of taxa present in the second area. A J value of 0 means that no species are shared between two habitats and a J value of 1 means that all species are shared. The indices are dependent on the number of species in each habitat and are only roughly comparable, but they will allow a general comparison of the faunal similarities among the 10 habitats.

Lowest J values are found between those habitats that are widely separated elevationally, with the coniferous forest and sacaton grassland pair exhibiting the lowest similarity (0.20). Seven (88%) of the pairs below the 0.35 level are between grassland (SP and SG) and montane (OS, OW, CH, and CF) associations.

Highest J values occur between those habitats that border and intergrade into each other. Three pairings (SR/CR, SR/RR, and OW/PJ) have J values greater than the 0.90 level and three pairings (CR/RR, OW/CH, and PJ/CH) are in the 0.80–0.89 range. All riparian habitats (SR, CR, and RR) are related to each other above 0.85 and show a generally decreasing mammalian resemblance to the other habitats with increasing elevation.

In summary, this analysis of the habitat affinities of the mammals of the Animas Mountains has elucidated a few primary trends. Habitats at the base of the mountain are considerably more species rich than those occurring at higher elevations, with coniferous forest the most depauperate habitat. Finally there is decreasing faunal resemblance with increasing elevational separation of habitats.

Table 2. Matrix of faunal similarity among 10 habitat types. Bold-face numerals on the diagonal indicate the total number of species in a particular habitat. Numerals to the left of the diagonal indicate the number of species in common between two habitats and numerals to the right are Jaccard's indices of faunal similarity.

HABITAT TYPE	SP	SG	SR	CR	RR	OS	OW	PJ	CH	CF
Shortgrass Plains	**57**	.78	.78	.57	.77	.61	.35	.32	.32	.25
Sacaton Grassland	47	**50**	.73	.79	.69	.57	.32	.28	.26	.20
Sycamore Riparian	54	49	**66**	.90	.93	.76	.45	.42	.39	.35
Cottonwood Riparian	43	49	60	**61**	.85	.69	.42	.38	.36	.32
Rabbit Brush Riparian	53	47	63	58	**65**	.79	.50	.47	.46	.39
Oak Savannah	43	39	53	48	54	**57**	.59	.56	.54	.47
Oak Woodland	25	22	33	30	35	36	**40**	.90	.83	.72
Pinon-juniper Woodland	23	19	31	27	33	34	37	**38**	.88	.76
Chaparral	23	18	29	26	32	33	35	35	**37**	.78
Coniferous Forest	18	14	26	23	28	29	31	31	31	**34**

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Appendix 1.

List of common names and Latin binomials (Martin and Hutchins 1980) for the plant species mentioned in the text.

Apache plume	*Fallugia paradoxa*
Ash, velvet	*Fraxinus velutina*
Bulrush	*Scirpus* sp.
Cactus, prickly-pear	*Opuntia* sp.
Century plant, Palmer	*Agave palmeri*
Century plant, Schott	*Agave schottii*
Cholla	*Cylindropuntia* sp.
Cottonwood, Fremont	*Populus fremontii*
Creosote bush	*Larrea tridentata*
Datil	*Yucca baccata*
Desert willow	*Chilopsis linearis*
Douglas-fir	*Pseudotsuga menziesii*
Grass, Bermuda	*Cynodon* sp.
Grass, black grama	*Bouteloua eriopoda*
Grass, blue grama	*Bouteloua gracilis*
Grass, bluestem	*Andropogon* sp.
Grass, Johnson	*Sorghum halepense*
Grass, mountain muhly	*Muhlenbergia montanus*
Grass, plains bristle	*Setaria macrostachya*
Grass, sacaton	*Sporobolus wrightii*
Grass, side-oats	*Bouteloua curtipendula*
Grass, three-awn	*Aristida* sp.
Grass, tobosa	*Hilaria mutica*
Grass, vine-mesquite	*Panicum obtusum*
Hackberry, netleaf	*Celtis reticulata*
Joint-fir	*Ephedra trifurca*
Juniper, alligator-bark	*Juniperus deppeana*
Locust, New Mexico	*Robinia neomexicana*
Manzanita, pointleaf	*Arctostaphylos pungens*
Mesquite, honey	*Prosopis glandulosa*
Mountain mahogany	*Cercocarpus montanus*
Oak, Arizona white	*Quercus arizonica*
Oak, Emory	*Quercus emoryi*
Oak, Gambel	*Quercus gambelii*
Oak, netleaf	*Quercus rugosa*
Oak, shrub live	*Quercus turbinella*
Oak, silverleaf	*Quercus hypoleucoides*
Ocotillo	*Fouquieria splendens*
Pepper-grass	*Lepidium thurberi*
Pine, Apache	*Pinus engelmannii*
Pine, Mexican pinon	*Pinus cembroides*
Pine, Mexican white	*Pinus strobiformis*
Pine, ponderosa	*Pinus ponderosa*
Rabbit brush	*Chrysothamnus naseousus*
Sacahuista	*Nolina microcarpa*
Saltbush, fourwing	*Atriplex canescens*
Silk-tassle	*Garrya wrightii*
Silver-nettle	*Solanum elaeagnifolium*
Skunkbush	*Rhus trilobata*
Snowberry	*Symphoricarpos palmeri*
Sunflower, annual	*Helianthus annuus*
Sycamore, Arizona	*Platanus wrightii*
Turpentine bush	*Haplopappus laricifolius*
Walnut, Arizona	*Juglans major*
Willow, Goodding	*Salix gooddingii*
Wolfberry, pale	*Lycium pallidum*
Yucca, soaptree	*Yucca elata*

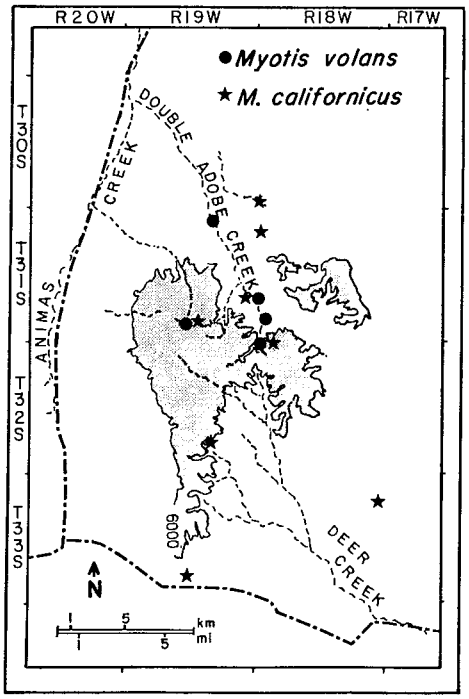
Appendix 2.

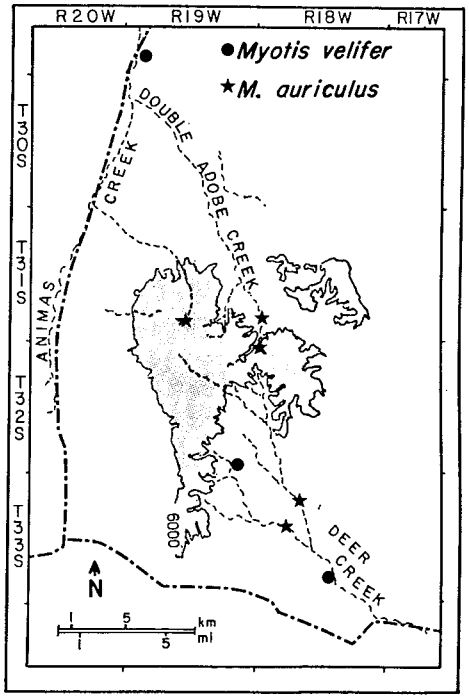
Gazetteer of major localities within the Animas Mountains. Numbers before localities refer to dots located on the map of the study area (Fig. 2). The localities are arranged from north to south. Habitat abbreviations are: Shortgrass Plains (SP), Sacaton Grassland (SG), Sycamore Riparian (SR), Cottonwood Riparian (CR), Rabbit Brush Riparian (RR), Oak Savannah (OS), Oak Woodland (OW), Pinon-juniper Woodland (PJ), Chaparral (CH), and Coniferous Forest (CF).

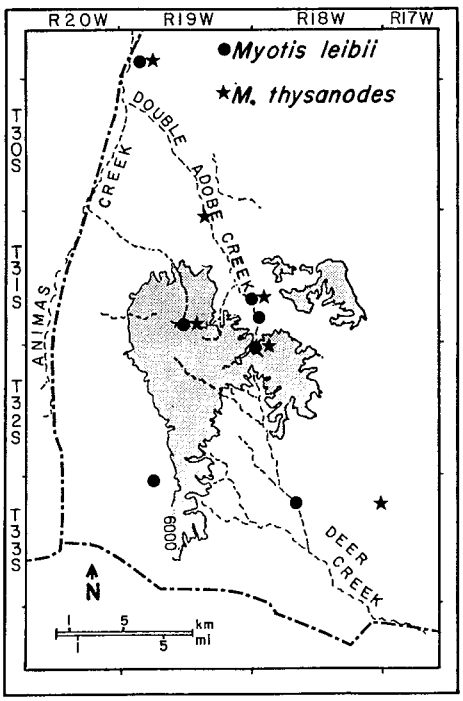
Locality	Location	Elevation	Habitat
1. Gilliland Well	T29S R19W, NE 1/4 sec. 20	1,421 m	SG
2. XT Camp	T29S R19W, NE 1/4 sec. 31	1,436 m	SG
3. Middle Wells	T30S R19W, N 1/2 sec. 25	1,478 m	SP
4. Godfrey Camp	T30S R18W, SW 1/4 sec. 31	1,646 m	SP
5. Double Adobe(s)	T31S R19W, NE 1/4 sec. 3	1,576 m	SP, SR, CR
6. Hunter Spring	T31S R20W, SE 1/4 sec. 1	1,555 m	SP
7. Howe Camp	T31S R20W, NE 1/4 sec. 21	1,524 m	SP
8. Bear Creek	T31S R19W	1,646–2,286 m	SP, OS, OW
9. OK Bar	T31S R19W, SE 1/4 sec. 24	1,677 m	SP, RR, OS
10. Animas Peak	T31S R19W, W 1/2 sec. 28	2,597 m	CH, CF
11. Black Bill Tank	T31S R19W, S 1/2 sec. 30	2,073 m	SP, OS, OW, PJ
12. Black Bill Spring	T31S R19W, SW 1/2 sec. 29	2,073 m	OW, PJ, CH
13. Cistern Saddle	T31S R19W, sec. 32, 33	2,408 m	CH, CF
14. Aspen Spring (= Turkey Spring)	T31S R19W, NE 1/4 sec. 33	2,134 m	CF, CH OW
15. New Well	T31S R18W, NE 1/4 sec. 31	1,707 m	OS, OW
16. Pinnacle Peak	T32S R19W, NW 1/4 sec. 4	2,536 m	CF, CH
17. Gibson Tank	T32S R18W, NW 1/4 sec. 6	1,760 m	OS, PJ, CH
18. Pine Canyon	T32S R19W	1,768–2,134 m	CF
19. Center Peak	T32S R18W, SE 1/4 sec. 5	2,140 m	CH
20. Clanton Draw	T32S R20W, N 1/2 sec. 16	1,555 m	CR, SP
21. Gray Ranch Headquarters	T32S R20W, E 1/2 sec. 16	1,558 m	SP
22. Spur Windmill	T32S R18W, NW 1/4 sec. 18	1,783 m	OS, OW, PJ, CH
23. Birch Spring	T32S R19W, E 1/2 sec. 27	1,799 m	OS, OW, PJ, CH
24. Horse Thief Tank	T32S R19W, NW 1/4 sec. 34	1,806 m	OS, PJ, CH
25. Red Hill	T32S R19W, SE 1/4 sec. 32	1,951 m	SP, CH
26. Pit Tank	T32S R19W, NE 1/4 sec. 35	1,707 m	SP, OS
27. Red Hill Cement Tank	T33S R19W, NW 1/4 sec. 5	1,692 m	SP, OS, CH
28. Sacahuista (= Flat Mill)	T33S R20W, sec. 2	1,600 m	SP
29. Indian Creek Mill	T33S R18W, SW 1/4 sec. 5	1,593 m	SR, SP
30. Spillsbury Mill	T33S R18W, E 1/2 sec. 8	1,578 m	SR, SP
31. Eicks Tank	T33S R19W, SW 1/4 sec. 11	1,692 m	SP, CH
32. Lynch Camp	T33S R18W, NW 1/4 sec. 18	1,601 m	SP
33. Rock Ridge Mill	T33S R18W, S 1/2 sec. 17	1,562 m	SR, SP
34. Rock Ridge Exclosure	T33S R18W, sec. 17, 20, 21	1,555 m	SR
35. Juniper Mill	T33S R19W, NW 1/4 sec. 19	1,585 m	PJ
36. Rattlesnake Tank	T33S R19W, N 1/2 sec. 27	1,638 m	SP, CH
37. Joyce Mill	T33S R18W, SW 1/4 sec. 22	1,532 m	SR, SP
38. San Luis Pass	T33S R19W, sec. 35	1,692 m	SP, CH, OS
39. Hilo Peak	T33S R17W, W 1/2 sec. 32	1,815 m	?
40. Culberson Camp	T34S R18W, NW 1/4 sec. 1	1,496 m	SP, SR

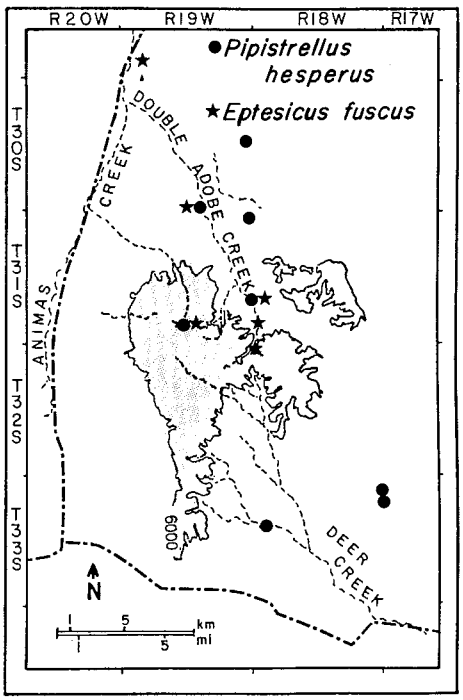
Appendix 3.

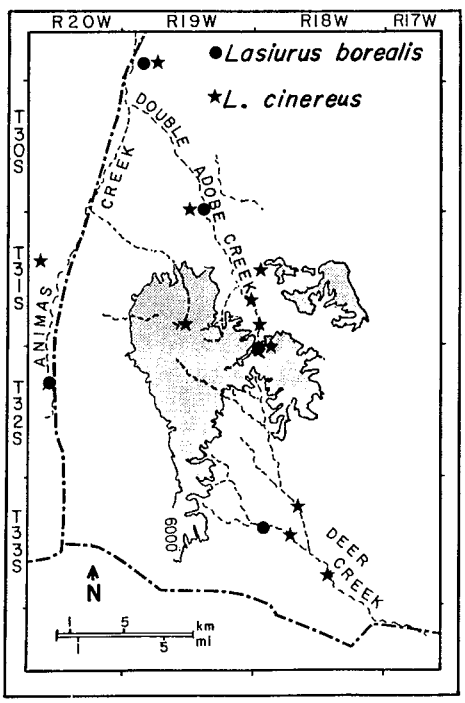
Maps of the Animas Mountains study area showing the distributions of those species with exact collecting localities. Dots on the maps refer to localities listed in the specimens examined, additional records, and specimens reported sections of the individual species accounts. Maps are provided for those species for which at least three localities could be determined.

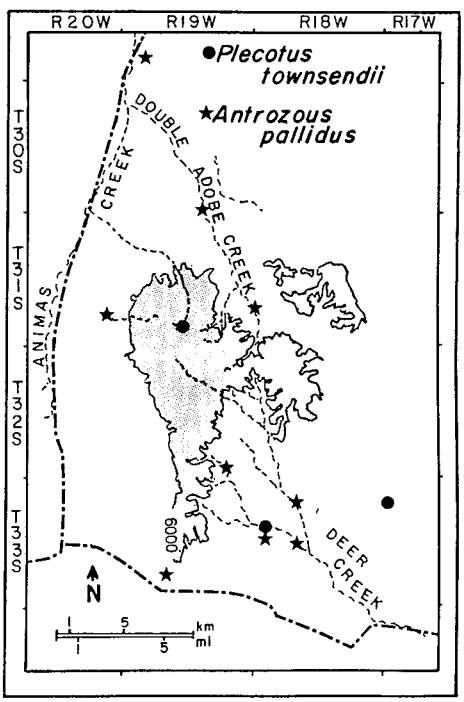


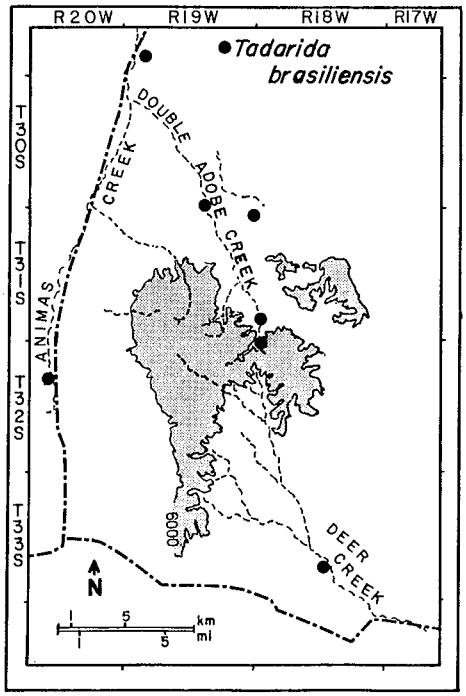


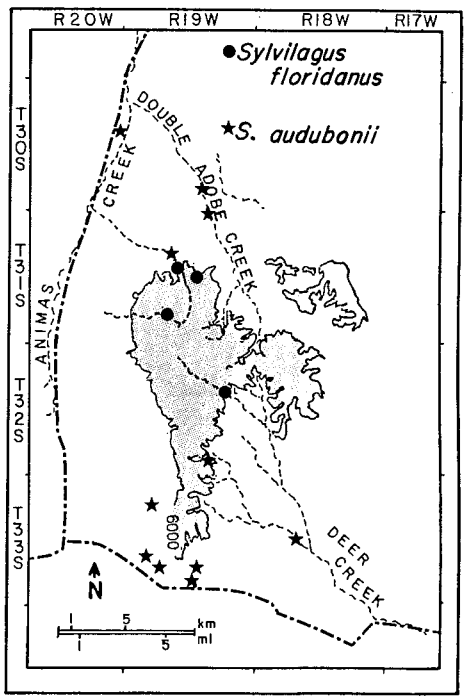

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Myotis leibii
★M. thysanodes
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

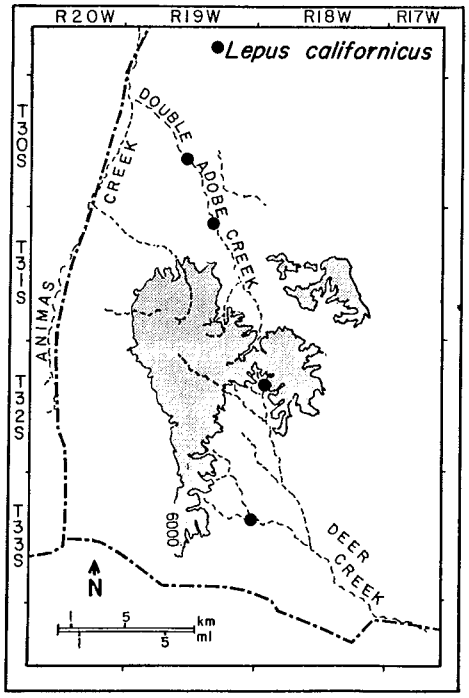

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Pipistrellus hesperus
★Eptesicus fuscus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

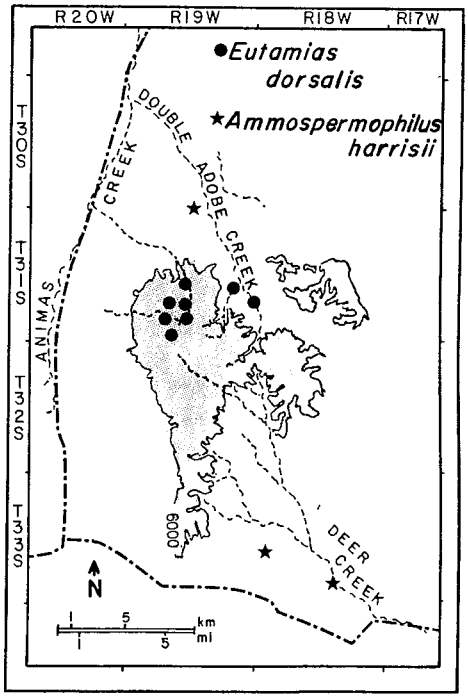

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Lasiurus borealis
★L. cinereus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

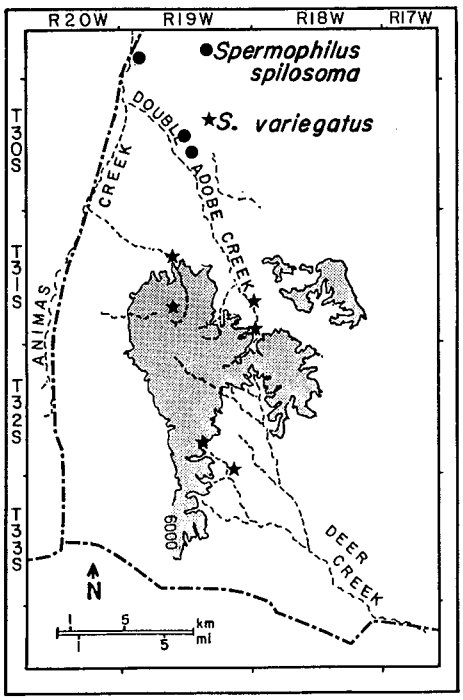

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Plecotus townsendii
★Antrozous pallidus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

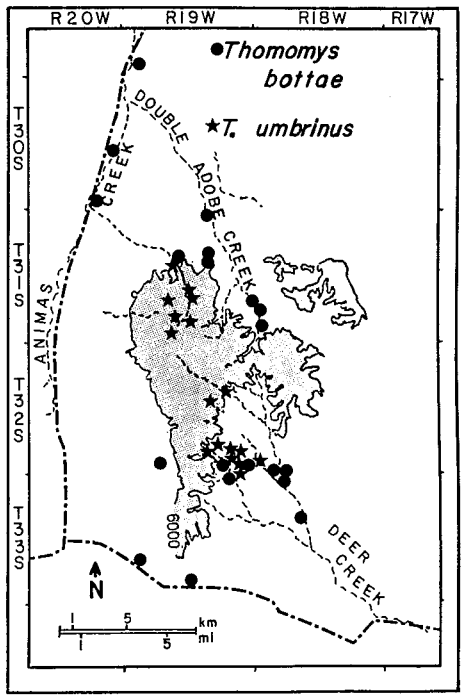

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Tadarida brasiliensis
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

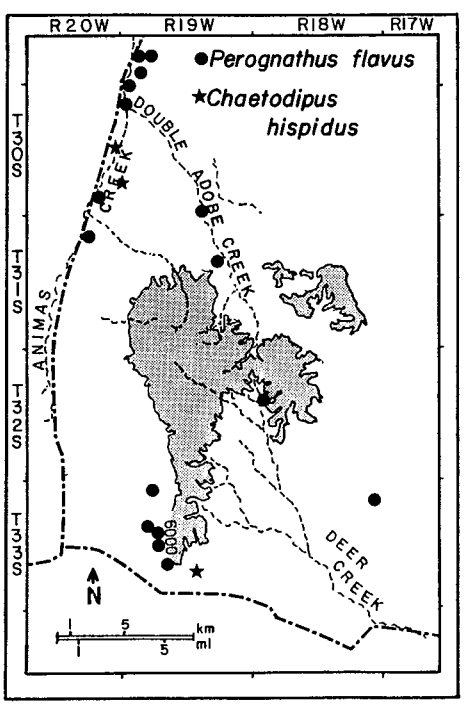

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Sylvilagus floridanus
★S. audubonii
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

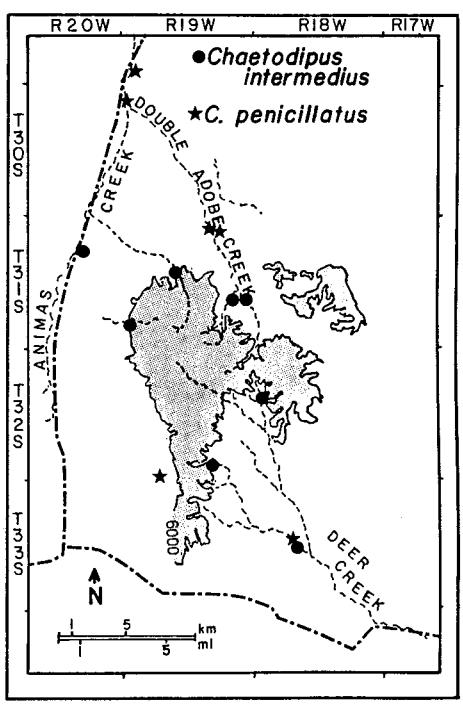

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Lepus californicus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

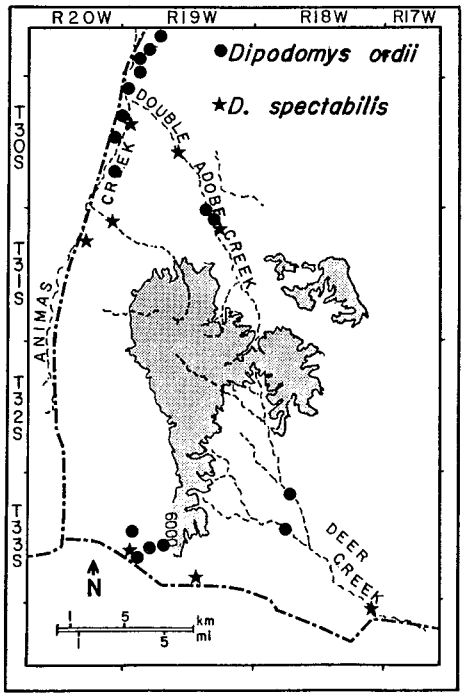

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Eutamias dorsalis
★Ammospermophilus harrisii
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

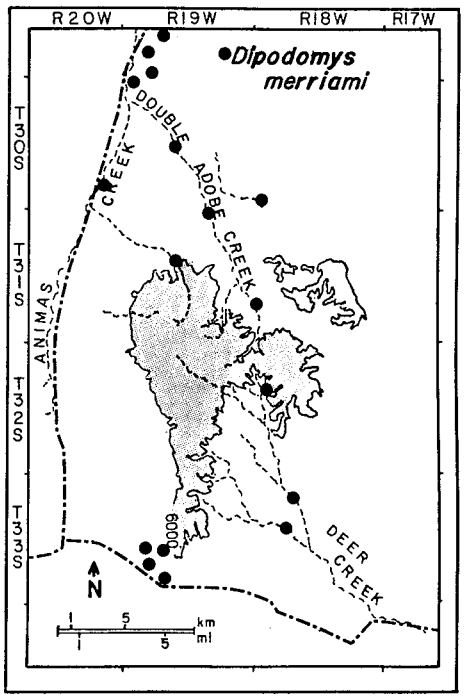

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Spermophilus spilosoma
★S. variegatus
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
5
km
mi

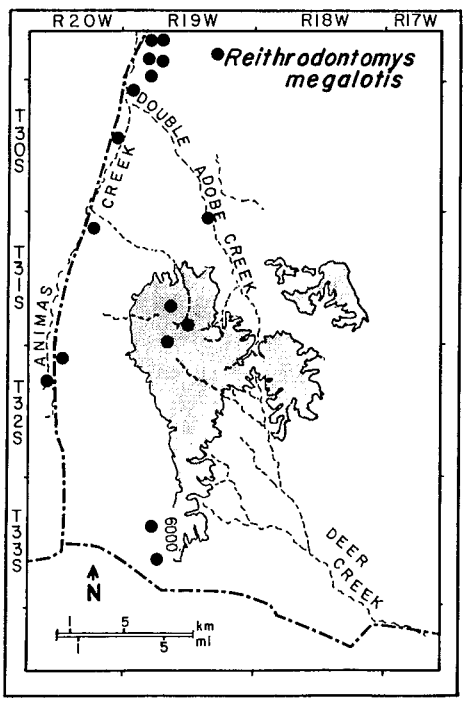

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Thomomys bottae
★T. umbrinus
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
5
km
mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Perognathus flavus
★Chaetodipus hispidus
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
5
km
mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Chaetodipus intermedius
★C. penicillatus
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
5
km
mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Dipodomys ordii
★D. spectabilis
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Dipodomys merriami
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
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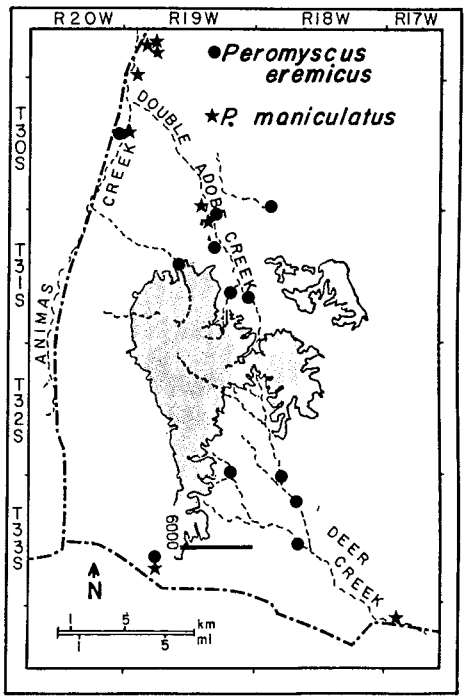
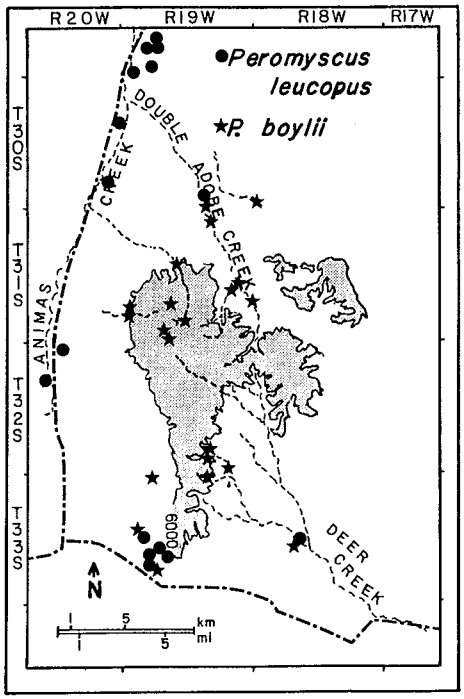
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Peromyscus eremicus
★P. maniculatus
DOUBLE CREEK
ADOBE CREEK
ANIMAS
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Peromyscus leucopus
★P. boylii
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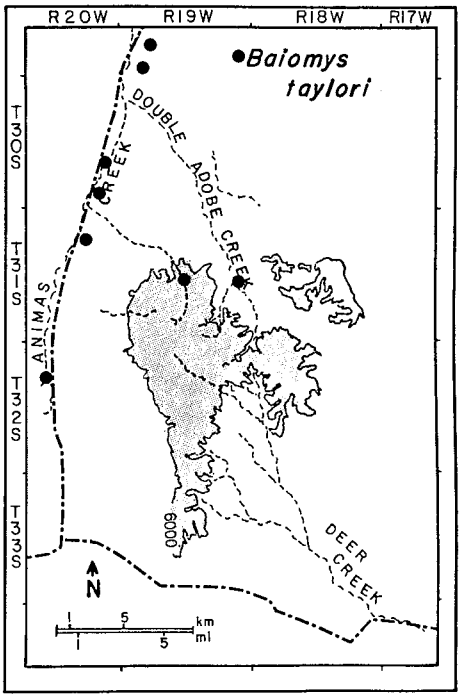
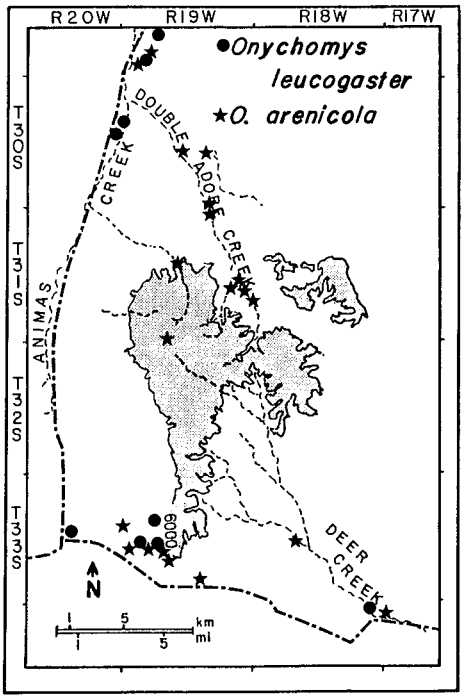
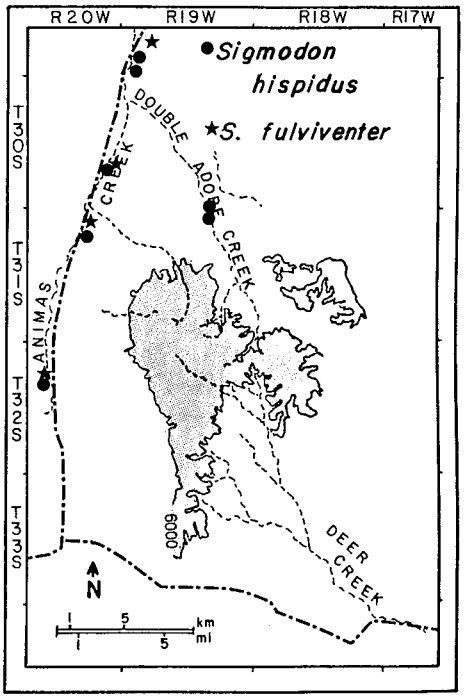
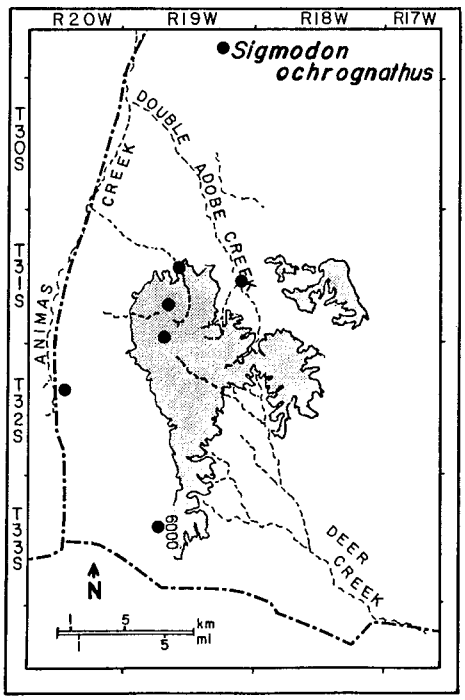
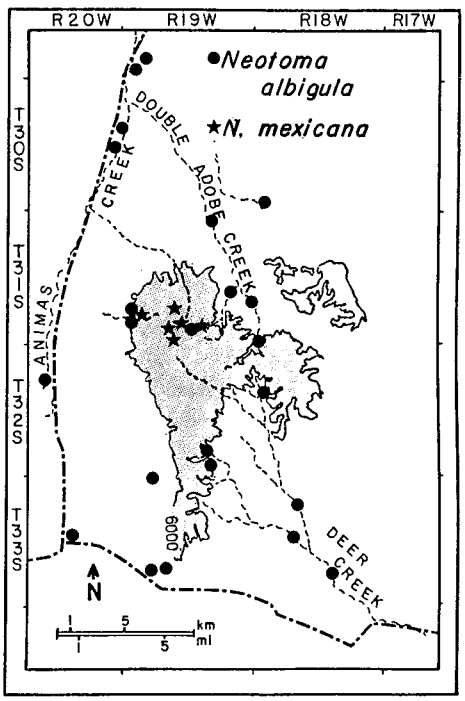
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

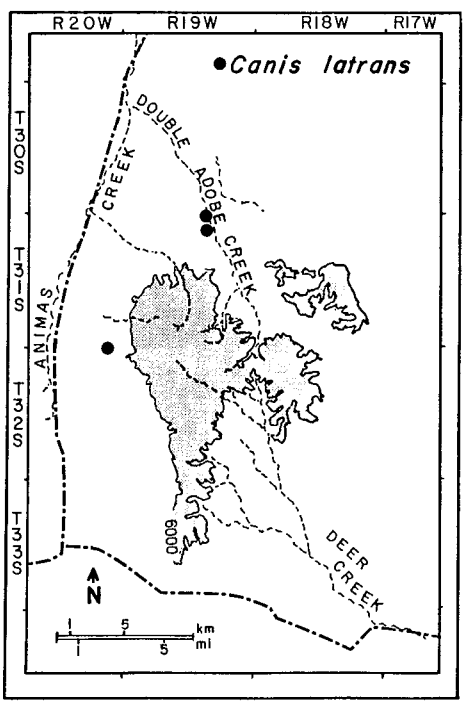

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Baiomys taylori
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

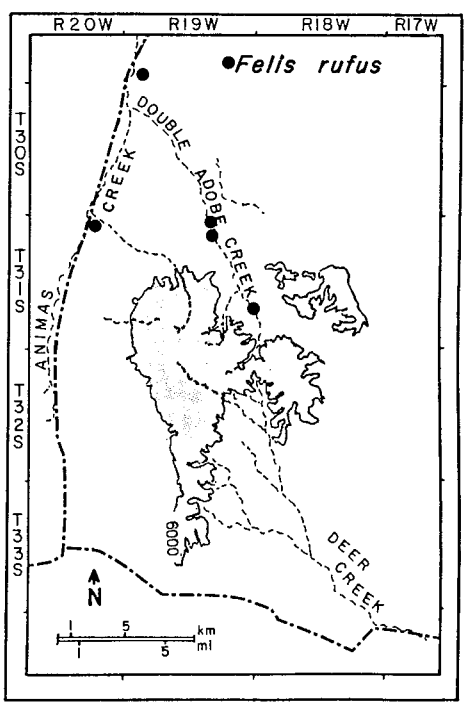

R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Onychomys leucogaster
★O. arenicola
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
●Sigmodon hispidus
★S. fulviventer
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
Sigmodon ochrognathus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
Neotoma albigula
N. mexicana
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
Canis latrans
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi


R20W
R19W
R18W
R17W
T30S
T31S
T32S
T33S
Felis rufus
DOUBLE ADOBE CREEK
ANIMAS CREEK
6000
DEER CREEK
N
1 5 km
1 5 mi

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