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Mammals of Spanish Peaks State Wildlife Area, Colorado

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COLORADO**

Third Series


No. 9

1987

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MAMMALS OF SPANISH PEAKS STATE WILDLIFE AREA, COLORADO

By

Ron S. Mellott, Jerry R. Choate, and Charles Loeffler

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ABSTRACT

Habitats and relative abundance of small mammals in the Spanish Peaks State Wildlife Area in western Las Animas Co., Colorado, were assessed. A total of 821 mammals of 20 species was collected in 2750 trapnights between 31 May and 19 August of 1981. Eight additional species of mammals were observed on the wildlife area but not documented. The deer mouse (*Peromyscus maniculatus*) and rock mouse (*P. difficilis*) were the most abundant small mammals, accounting for 63 and 16%, respectively, of the total catch. The deer mouse was the only species caught in every habitat sampled. Abert's squirrel (*Sciurus aberti*) previously has not been recorded in Colorado from as far southeast as the Spanish Peaks State Wildlife Area.

The mammalian fauna of Colorado has been the subject of numerous studies since the late 1800s. Early studies were by Cockerell (1890), Warren (1906), Cary (1911), and Warren (1942, published posthumously). More recent investigations include the book by Lechleitner (1969), the exhaustive compilation by Armstrong (1972), and the latilong surveys by Bissell (1978, 1982). In spite of these studies, several regions of Colorado remain poorly represented in collections. Armstrong (1972) noted that "certain poorly surveyed parts of the western two-thirds of the state appear to me to be . . . significant from the standpoint of zoogeography. Western Las Animas County--the Park Plateau and Culebra Range [of the Sangre de Cristo Mountains]--is such an area." In a later publication, Armstrong et al. (1973) noted that additional field investigations were needed in the vicinity of the Wet Mountains, a biogeographically important region where several species of grassland mammals reach altitudinal extremes and certain southern species reach northern limits.

With this in mind, the Colorado Division of Wildlife initiated fieldwork in the Spanish Peaks State Wildlife Area to sample the vertebrate fauna in general and to assess habitat associations and relative abundance of small mammals in particular. This report documents the mammals collected and observed in the Spanish Peaks State Wildlife Area during summer of 1981 and summarizes biological data on mammals obtained at that time.

DESCRIPTION OF AREA

Western Las Animas County is in the transition between the Raton Section of the Great Plains Physiographic Province and the Southern Rocky Mountain Physiographic Province (Fenneman, 1931). The latter is represented at the western border of Las Animas County by the Sangre de Cristo Mountains. The topography is characterized by numerous canyons that form the drainage basins for the Apishapa and Purgatoire

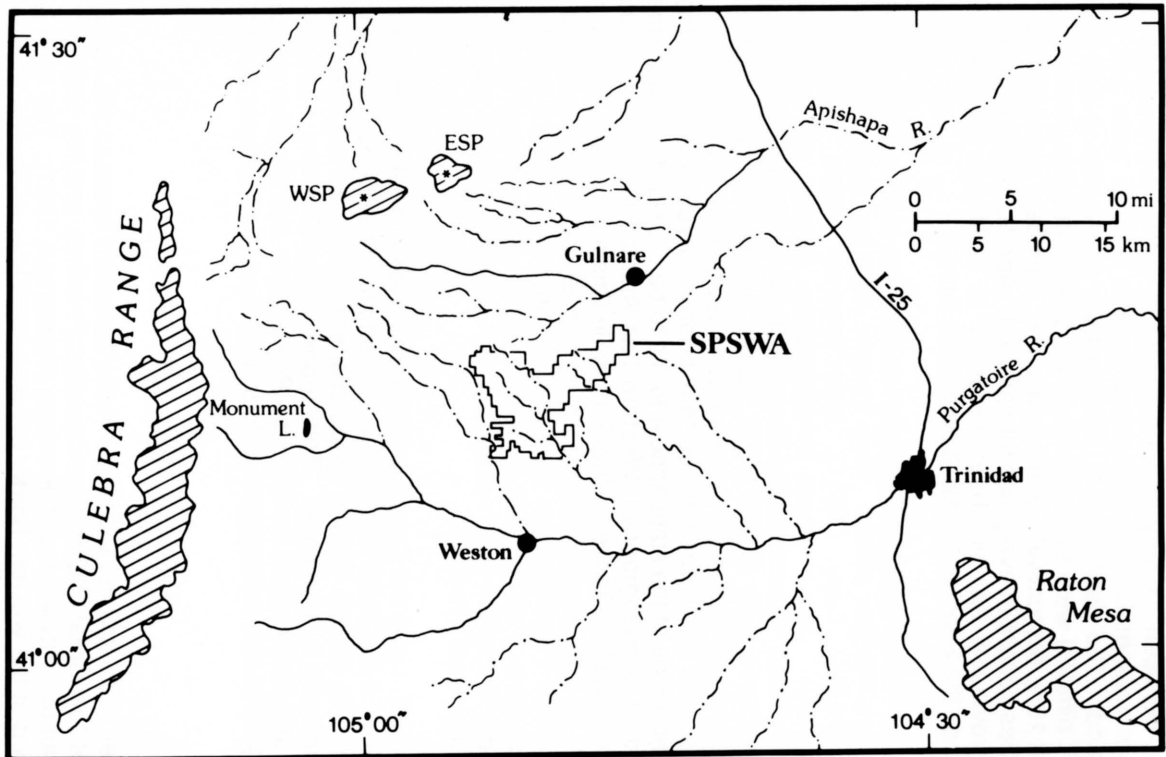


Fig. 1.—Map of Spanish Peaks State Wildlife Area relative to other places mentioned in text. Designations are as follows: SPSWA, Spanish Peaks State Wildlife Area; WSP, West Spanish Peak; ESP, East Spanish Peak; solid lines, permanent streams; dot-dash lines, intermittent streams. The line identified as I-25 is an interstate highway, which separates the foothills and mountains to the west from the plains to the east.

ivers. These canyons are composed of sandstones, siltstones, and shales of the Raton Formation (lower Cretaceous) in the vicinity of Trinidad and of the Poison Canyon Formation (lower Paleocene) on the Park Plateau (Johnson, 1969). Elevations in the region range from about 1,830 m at Trinidad to more than 3,810 m on the Sangre de Cristo Mountains and the Spanish Peaks.

The Spanish Peaks State Wildlife Area is located approximately 43 km northwest of Trinidad, Colorado. The position of the state wildlife area relative to topographic features mentioned in text is shown in Fig. 1. The name of the area is misleading in that the Spanish Peaks State Wildlife Area actually is on the southeastern edge of the Park Plateau, approximately 18 km southeast of the Spanish Peaks. The wildlife area is on the divide separating the drainages of the Apishapa River to the north and the Purgatoire River to the south. Elevation of the wildlife area ranges from 2225 to 2500 m. Approximately 83% of the land surface of the wildlife area consists of forested slopes and canyons that are oriented mostly in a northwest to southeast direction. The remaining 17% of the surface area consists of lowland meadows.

Soils of the wildlife area are of five types, of which two occur in upland areas and three in lowland areas. Sanchez Sandy Loam, the most common soil type in the area, occurs on all cardinal facings but is predominant on south-facing slopes. Its characteristics are fast surface permeability and shallow depth, with bedrock located within 50 cm of the surface. Wahatoya Sandy Loam is similar to Sanchez but occurs almost exclusively on northwest- and north-facing slopes. Surface permeability is moderately rapid and soil depth is moderate, the bedrock being within about 1 m of the surface. Toben Loam consists of silt, clay, and loam and is found only in lowland meadow areas. The surface layer is situated above the water table and thus remains dry throughout the year. Fury Loam is similar to Toben, differing only in that the surface layer is located within the water table and remains wet or frozen throughout the year. Noden Loam is the most common soil type in lowland areas. It is similar to Fury Loam but has a thicker surface layer.

No weather station is located in the vicinity of the Spanish Peaks State Wildlife Area. Weather data summarized herein are from stations at North Lake (Fig. 1), located 18 km west of the wildlife area at an elevation of 2,560 m, and at Trinidad, 43 km to the southeast at 1,830 m. Patterns of temperature and precipitation are identical at the two localities, the difference being in the magnitude of the variables. Annual precipitation at North Lake is 53 cm, whereas Trinidad receives approximately 33 cm. A minor peak in precipitation occurs in spring (March-May) in the form of wet snowfall. The major peak in precipitation occurs in late summer (July and August) as thundershowers that often cause extensive flooding of canyons. Average mean temperatures for January and July at North Lake

are -4° C and 16° C, respectively. Comparable temperatures for Trinidad are 1° C and 22° C, respectively.

Vegetation in the Spanish Peaks State Wildlife Area is transitional between grassland and shrub communities of the Great Plains and montane communities of the Rocky Mountains. Several classifications have been used to describe the vegetational communities of the Front Range in Colorado. The wildlife area is located within the following: Ponderosa Pine Zone (Daubenmire, 1943); Transitional Life Zone (Cary, 1911); *Pinus-Pseudostuga* forest (Küchler, 1964); Lower Montane Forest Climax Region (Marr, 1964); Southern Rocky Mountain Foothills Land Resource Area (U. S. Department of Agriculture, 1971). This diversity of classifications is a consequence of variation observed among sites with regard to predominant species, stand-types, and stand-complexes (terminology of Marr, 1961). Recognition of vegetation zones is obscured by the effects of slope exposure and degree of slope, which permit grassland communities to occur at higher elevations and montane communities to occur at lower elevations than normal. Several studies have noted the pronounced effects that slope exposure and degree of slope have on both vegetational communities and associated small mammals (Armstrong et al., 1973; Marr, 1961; McKeever, 1961; Ostler and Buchanan, 1973; Stinson, 1978; Williams, 1955). For the purposes of this report, we prefer the designation Southern Rocky Mountain Foothills Land Resource Area because it is based on two interrelated factors--vegetation and precipitation.

The most common plant species in grassland communities of the Spanish Peaks State Wildlife Area are big bluestem (*Andropogon gerardii*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), fringed sage (*Artemesia frigida*), and smooth brome (*Bromis inermis*). Species with strong affinities to grassland communities but that also occur in shrub-woodland areas of transition zones include small soapweed (*Yucca glauca*), blue yucca (*Y. baccata*), and prickly pear (*Opuntia* sp.). The most common plant species in montane communities are ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudostuga menziesii*), white fir (*Abies concolor*), aspen (*Populus tremuloides*), western dock (*Rumex occidentalis*), and harebell (*Campanula rotundifolia*). Additional species that commonly occur in transition zones include pinyon pine (*Pinus edulis*), one-seeded juniper (*Juniperus monosperma*), willow (*Salix* sp.), Gambel oak (*Quercus gambelii*), mountain mahogany (*Cercocarpus montanus*), rabbitbrush (*Rhus trilobata*), and skunkbrush (*Chrysothamnus nauseosus*).

Before the state of Colorado purchased the land included in the wildlife area, it was used mostly for grazing by domestic livestock. Native ungulates in the area prior to settlement included elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and bighorn sheep (*Ovis canadensis*). Slopes, ridges, and lowland areas still are grazed by wildlife,

although the most intense grazing now is by domestic cattle and horses. Bighorn sheep were reintroduced in March of 1980. Many lowland areas have been cultivated for production of agricultural crops such as wheat, barley, and alfalfa.

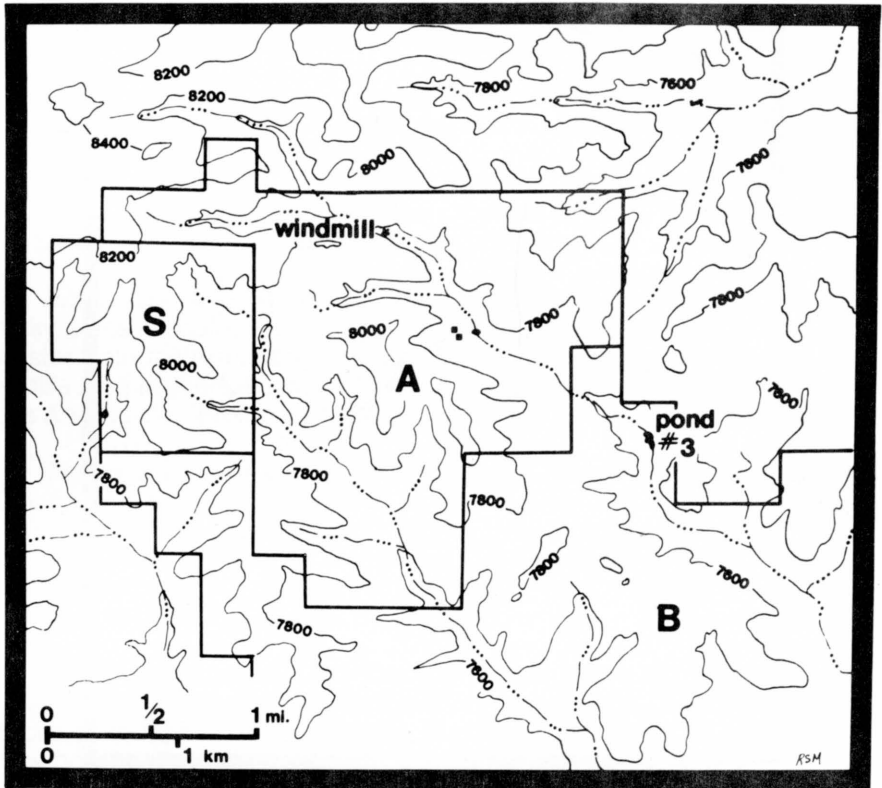


Fig. 2.—Diagram of the western half of the Spanish Peaks SWA. Countour intervals are 200 ft. Dashed-dotted lines represent intermittent streams. Letter designations: A, Sakariason; B, McDonald (partial); S, school section.

The first land for the wildlife area was purchased by the Colorado Division of Wildlife in 1965 and was designated the Sakariason Tract (Fig. 2). Within two years, the Dochter and Oberosler tracts were obtained (Fig. 3). Areas of the Sakariason, Dochter, and Oberosler tracts are 534, 720, and 785 ha, respectively. A school section adjoins the Oberosler Tract on the east. In addition to the state-owned lands, a lease was obtained on 3,157 ha connecting the Sakariason and Dochter tracts. This land is designated the McDonald Lease Tract. The total area of the

Spanish Peaks State Wildlife Area, including the leased tract, is approximately 5,670 ha.

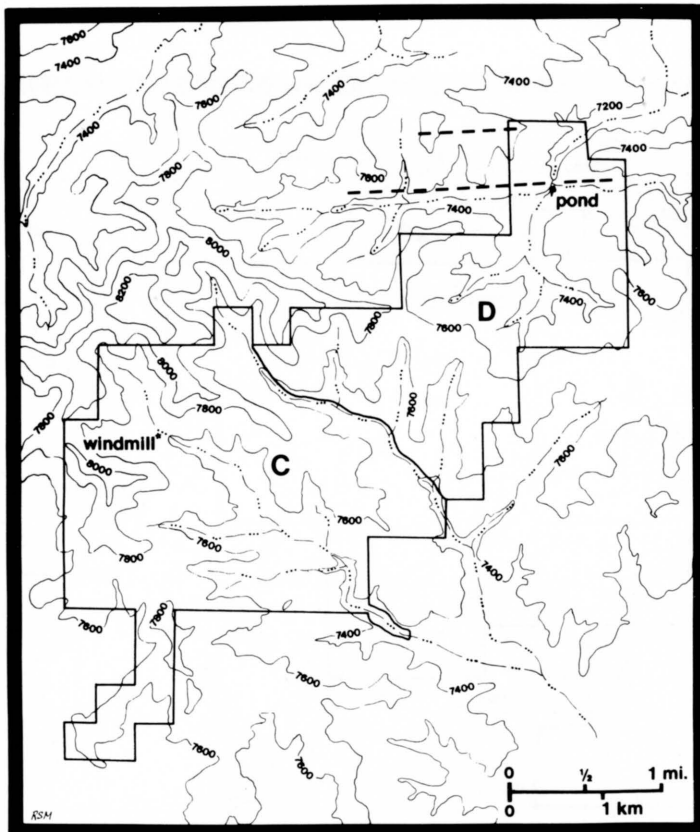


Fig. 3. — Diagram of the eastern half of the Spanish Peaks SWA. Legend the same as for Fig. 2. Letter designations: C, Dochter Tract; D, Overosler Tract.

The Colorado Division of Wildlife manages the wildlife area for game species such as elk, mule deer, bighorn sheep, wild turkey (*Meleagris gallopavo*), and mourning dove (*Zenaidura macroura*). Management practices have included reseeding of meadows to grass in areas where overgrazing has been severe, establishment of earthen holding dams to prevent erosion, construction of windmills and stock tanks to provide water, and establishment of plantings for wildlife. These plantings include maintenance of 154 ha of lowlands in a crop-rotation system as well as establishment of shrubs for the benefit of wildlife. Crops include winter wheat, barley, oats, peas, and alfalfa. Introduced plantings include "Eurasian sage," honeysuckle (*Lonicera* sp.), Hanson's rose (*Rosa* sp.),

and multiflora rose (*Rosa multiflora*). At present, timber is not harvested on the wildlife area. In the future, certain timber stands may be thinned or clearcut to stimulate growth of shrubs and aspen.

METHODS AND MATERIALS

Small mammals were trapped on the wildlife area from 31 May through 18 August of 1981. A total of 24 sites was sampled during the 2750 trapnights. Ten sites were trapped on the Sakariason Tract, two on the McDonald Lease Tract, nine on the Tochter Tract, and three on the Oberosler Tract. Mist nets were set to capture bats at two stock tanks associated with windmills. The stock tanks are designated "windmill" on Figs. 2 and 3, and the pond was located 92 m south of McDonald Pond #2 (Fig. 1). Finally, three species of small mammals were sampled with a .22 caliber rifle.

Traplines initially had 20 stations per line and three traps per station. As the study progressed, the number of stations was reduced to 12, 11 with three traps each and the remaining station with one trap. Initially, a Sherman live trap, a Museum Special snaptrap, and a Victor rattrap were set at each station; a Museum Special was substituted whenever there was a shortage of a particular type of trap. On most sites, traps were left in place, open and baited, for three consecutive days and nights. Live traps were baited with a mixture of peanut butter, raisins, sunflower seeds, and oatmeal applied as described by Stout and Sonenshine (1973). Bait for snaptraps was a mixture of peanut butter and cornmeal applied to treadles from a plastic squeeze tube.

Overstory vegetation, defined herein as vegetation more than 1 m in height, was analyzed using the point-center quarter technique (Cottam et al., 1953). A transect was established through each stand sampled for use in determining sampling points, as explained by Beason and Haucke (1975). Overstory vegetation on seven slopes was sampled in this manner. Importance values were calculated for each species by computing relative density, relative frequency, and relative dominance values (Cox, 1980). For comparisons among slopes, average importance values also were calculated. Understory vegetation was sampled using the modified step-point procedure (Evans and Love, 1957). A single-point sampling device (Owensby, 1973) was used to sample the vegetation at four sites.

All specimens captured were identified to species, sexed, and weighed to the nearest gram on Pesola spring scales. For specimens retained as museum study skins, pertinent reproductive data were recorded. Specimens were deposited in either the Museum of the High Plains, Fort Hays State University (MHP), or the Biological Survey Collections of the U.S. Fish and Wildlife Service (BS/FC). Localities and elevations of specimens deposited in those collections were recorded in miles and feet, respectively, and, in accordance with standard museum

TABLE 1.—Average importance values calculated from point-center quarter data. Upper case letters represent cardinal slope facing. **Rdg**—ridgetop.

SPECIES	RDG	RDG	Slope Facing				
			NE	NE	N	W	SW
Ponderosa Pine <i>Pinus ponderosa</i>	72.9	45.6	86.7	45.7	17.2	16.3	22.3
Douglas-Fir <i>Pseudotsuga menziesii</i>	—	—	2.9	16.3	25.4	11.1	7.3
White Fir <i>Abies concolor</i>	—	—	—	8.8	27.1	8.2	12.3
Pinyon Pine <i>Pinus edulis</i>	7.5	6.3	—	—	—	3.3	—
Juniper <i>Juniperus</i> sp.	—	—	1.4	—	3.9	2.1	—
Gambel's Oak <i>Quercus gambelii</i>	11.0	31.8	5.6	15.4	11.0	21.7	29.3
Mountain Mahogany <i>Cercocarpus montanus</i>	8.6	16.3	—	13.8	15.5	37.3	28.3
Aspen <i>Populus tremuloides</i>	—	—	3.4	—	—	—	—
<i>Number of points sampled</i>	25	25	25	25	16	15	25
<i>Mean area (m²)/plant</i>	24.1	9.4	56.1	6.3	4.2	5.1	7.1

practice, are listed as such herein. Also, statements regarding elevations in the accounts of species that relate or compare with elevations at which specimens were collected in the Spanish Peaks State Wildlife Area are given in both metric and non-metric units.

RESULTS

Importance values for the point-center quarter analyses are presented in Table 1. The data are variable both within and among categories of slope. This is attributable to the effects of slope exposure, degree of slope, and local environmental and edaphic factors. Therefore, the following generalizations may not hold in every instance. Relatively open stands (with greater mean area per plant) occur on ridgetops. These usually are the least diverse of the stands on the Spanish Peaks State Wildlife Area, consisting predominantly of ponderosa pine with lesser amounts of mountain mahogany, Gambel oak, and pinyon pine. Stands on north- to northeast-facing slopes are relatively open but more diverse. They may include Douglas-fir, white fir, juniper, and aspen in addition to ponderosa pine and the shrubby species but often lack pinyon pine. Stands on west- to southeast-facing slopes are comparable in diversity to those on north- to northeast-facing slopes although the more xeric nature of the former reduces the importance values for Douglas-fir and white fir and increases the values for pinyon pine, juniper, Gambel oak, and mountain mahogany. Species with the greatest overall importance values are ponderosa pine, Gambel oak, and mountain mahogany.

Relative abundance of the nine most common species of small mammals in each of seven categories of habitat on the wildlife area is given in Table 2. Only one species, *Peromyscus maniculatus*, was found in all habitats sampled, and it was the most abundant species in every category of habitat. The second most abundant species, *Peromyscus difficilis*, apparently preferred west- to southeast-facing slopes with rock outcrops and shrubby vegetation. *Neotoma mexicana*, *Tamias minimus*, and *Tamias quadrivittatus* also occurred primarily in these habitats but were less common. *Microtus mexicanus* was most abundant in a forest-meadow ecotone with deep litter but also inhabited mesic areas with tall, herbaceous cover. *Microtus pennsylvanicus* was found only in wet habitats where tall grasses provided cover for runways. *Reithrodontomys megalotis* was not restricted to wet areas but occurred only where tall or mid-height grasses or grain were available.

Richness (number of species present) of small mammals was greatest in the forest-meadow ecotone, in wetland habitats, and on rocky hillsides, and was least in agricultural cropland. Overall relative abundance of small mammals was greatest around erosion control dams, but this resulted from the large number of deer mice found there. Relative abundance for small mammals other than *P. maniculatus* was greatest on west- to

TABLE 2.—Relative abundances of species trapped, by habitat type, calculated as catch per 1000 trapnights.

	NW-E facing slopes	SE-W facing slopes	Meadows	Riparian	Erosion dams	Forest/meadow ecotone	Agricultural fields
<i>Peromyscus maniculatus</i>	19.8	33.1	13.3	14.4	40.0	11.0	21.9
<i>Peromyscus difficilis</i>	1.3	17.3	—	—	—	11.0	0.2
<i>Neotoma mexicana</i>	0.7	1.6	—	1.2	—	1.0	—
<i>Eutamias minimus</i>	0.9	0.7	—	0.2	—	1.0	—
<i>Eutamias quadrivittatus</i>	1.3	1.2	—	—	—	1.0	—
<i>Microtus montanus</i>	—	—	2.2	0.2	—	6.0	—
<i>Microtus pennsylvanicus</i>	—	—	0.3	4.9	5.0	—	—
<i>Reithrodontomys megalotis</i>	—	—	1.6	—	4.2	—	0.2
TRAPNIGHTS	460	680	315	430	120	100	645

southeast-facing slopes and in the forest-meadow ecotone and was least in agricultural cropland, in meadows, and on northwest- to east-facing slopes.

ACCOUNTS OF SPECIES

Myotis evotis, Long-eared Myotis

Specimens examined (16).--3 1/2 mi. S, 7 1/4 mi. W Gulnare, 7900 ft., 9 (BS/FC); 4 mi. S, 3 3/4 mi. W Gulnare, 7600 ft., 6 (2 BS/FC; 4 MHP); 7 mi. S, 5 mi. W Gulnare, 7350 ft., 1 (BS/FC).

The long-eared myotis inhabits mid-elevation coniferous forests in Colorado, and is found most frequently (Armstrong, 1984b) in ponderosa pine and pygmy conifer woodlands ranging in elevation from 1800 to 2700 m (6000 to 9000 ft.). Specimens from the wildlife area are the southeasternmost known in Colorado, but Findley et al. (1975) listed localities of record for the species in New Mexico. The species possibly occurs wherever suitable habitat is found on foothills and slopes of the Sangre de Cristo Mountains.

One female netted on 15 August still was lactating. Other females netted in August evinced no reproductive activity.

Myotis leibii, Small-footed Myotis

Specimen examined (1).--3 1/2 mi. S, 7 1/2 mi. W Gulnare, 7900 ft., 1 (BS/FC).

The small-footed myotis seems to prefer saxicolous habitats and generally is solitary (Armstrong, 1972). In Colorado, it roosts in trees, crevices, mines, and caves (Lechleitner, 1969) wherever suitable habitat occurs except (Bissell, 1984a) in mountains at elevations greater than 2550 m (8500 ft.). The specimen listed was netted on 14 August over a stock tank located at the upper end of a canyon on the Sakariason Tract (Fig. 2, "windmill").

Myotis lucifugus, Little Brown Bat

Specimen examined (1).--6 mi. N, 1/2 mi. E Weston [= 7 mi. S, 5 mi. W Gulnare], 7350 ft., 1 (BS/FC).

The little brown bat apparently prefers forested habitats but roosts in caves, mine tunnels, hollow trees, and crevices in cliffs (Lechleitner, 1969). The specimen from the wildlife area, which was netted on 12 August over a small pond approximately 100 m south of McDonald Pond #2 (Fig. 1), extends the known range in Colorado approximately 75 km southeastward. The species is known from the Sangre de Cristo

Mountains in New Mexico (Findley et al., 1975), and possibly occurs in suitable areas all along the Sangre de Cristo Range.

Myotis thysanodes, Fringed Myotis

Specimens examined (2).--4 mi. S, 3 3/4 mi. W Gulnare, 7900 ft., 2 (1 BS/FC; 1 MHP).

Bats of this species roost in caves and buildings, and can be found singly or in small groups (Lechleitner, 1969). They seem to prefer coniferous woodland and desert scrub habitats (Barbour and Davis, 1969), especially those in which ponderosa pine, pinyon, juniper, greasewood (*Sarcobatus vermiculatus*), saltbush (*Atriplex* sp.), or scrub oak predominate (Armstrong, 1984c).

The two specimens from the wildlife area include a female netted on 15 August and a male netted on 17 August. Both were captured over a stock pond on the Tochter Tract (Fig. 3, "windmill").

Myotis volans, Long-legged Myotis

Specimens examined (32).--3 1/2 mi. S, 7 1/4 mi. W Gulnare, 7900 ft., 21 (BS/FC); 4 mi. S, 3 3/4 mi. W Gulnare, 7600 ft., 11 (8 BS/FC; 3 MHP).

More bats of this species than any other were collected on the wildlife area. The species was particularly abundant at the stock tank on the Sakariason Tract (Fig. 2, "windmill"), where 21 captures were recorded. This bat is most common in open forest, where it roosts in rock fissures, hollow trees, caves, mines, abandoned buildings, or beneath loose bark (Jones et al., 1983, 1986).

One female captured on 13 August still was lactating. None of the remainder evinced reproductive activity.

Eptesicus fuscus, Big Brown Bat

Specimens examined (5).--4 mi. S, 3 3/4 mi. W Gulnare, 7600 ft., 5 (4 BS/FC; 1 MHP).

The big brown is perhaps the most common bat in Colorado. It frequently inhabits ponderosa pine woodland and roosts in caves, crevices, and hollow trees. Lechleitner (1969) reported that bats of this species seem to arrive in Colorado in May and depart in early September, and that nothing is known of their movements or destinations. The five specimens listed, all males, were netted on 15 August above the stock pond on the Tochter Tract (Fig. 3, "windmill").

Sylvilagus nuttallii, Nuttall's Cottontail

Specimen examined (1).--4 mi. S, 4 3/4 mi. W Gulnare, 7840 ft., 1 (MHP).

Nuttall's cottontails are the most visible mammalian inhabitant of the wildlife area. Cottontails commonly are seen during early morning and evening when they forage in brushy, rocky areas along roadways and on open or exposed slopes and ridges. They frequently occur around buildings, and often forage in emerging wheat and pea fields (during June) and alfalfa fields (in July) maintained for wildlife.

The specimen listed was shot in August on the west approach to Cottontail Pass. It is a male with testes that measured 14 mm.

Tamias minimus, Least Chipmunk

Specimens examined (10).--2 1/2 mi. S, 1 1/4 mi. W Gulnare, 7240 ft., 1 (BS/FC); 3 3/4 mi. S, 6 1/4 mi. W Gulnare, 7800 ft., 4 (2 BS/FC; 2 MHP); 3 3/4 mi. S, 4 mi. W Gulnare, 7680 ft., 1 (MHP); 4 mi. S, 4 1/2 mi. W Gulnare, 7920 ft., 4 (BS/FC).

The least chipmunk inhabits the rocky, forested slopes of the wildlife area. Stinson (1978) found least chipmunks occupying the same habitats as deer mice on both north- and south-facing slopes. Vaughan (1974) observed that this species is most active where rocks, stumps, and fallen logs provide lookout points and avenues of escape. Although this chipmunk was not caught in as many traplines as the Colorado chipmunk, it has broad ecological requirements (Bissell, 1982) and likely occurs in virtually all upland habitats on the wildlife area.

None of five females trapped in June was pregnant. Two males trapped in June had testicular measurements of 4 and 2 mm.

Tamias quadrivittatus, Colorado Chipmunk

Specimens examined (16).--2 1/2 mi. S, 1 1/2 mi. W Gulnare, 7280 ft., 1 (BS/FC); 3 3/4 mi. S, 6 1/4 mi. W Gulnare, 7800 ft., 5 (3 BS/FC; 2 MHP); 3 3/4 mi. S, 4 mi. W Gulnare, 7680 ft., 1 (BS/FC); 4 mi. S, 6 1/4 mi. W Gulnare, 7680 ft., 2 (MHP); 4 mi. S, 4 1/4 mi. W Gulnare, 7920 ft., 4 (2 BS/FC; 2 MHP); 4 mi. S, 4 1/4 mi. W Gulnare, 7740 ft., 1 (BS/FC); 4 1/2 mi. S, 3 mi. W Gulnare, 7680 ft., 2 (1 BS/FC; 1 MHP).

Colorado chipmunks were trapped on all cardinal slope facings. At four of the eight sites at which the species was obtained, *T. minimus* also occurred. Moreover, the two species were caught at the same trap station in several instances. Lechleitner (1969) noted that the habitat requirements of the two species are similar, and Armstrong (1972)

emphasized the need for analysis of ecological factors that minimize competition of these two species.

Measurements of testes of five males trapped in July ranged from 3 to 6 mm. One of nine females trapped in July contained seven small fetuses.

Spermophilus lateralis, Golden-mantled Ground Squirrel

Specimens examined (2).--3 3/4 mi. S, 7 mi. W Gulnare, 7760 ft., 1 (MHP); 4 mi. S, 4 1/2 mi. W Gulnare, 7920 ft., 1 (BS/FC).

Habitat of the golden-mantled ground squirrel reportedly includes rocky areas, meadows, forest-edge communities, and relatively open woodlands where the squirrels burrow beneath rocks and trees (Armstrong, 1972; Lechleitner, 1969). Armstrong et al. (1973) asserted that the species often is locally abundant in rocky areas. Despite an abundance of seemingly suitable habitat, the two specimens listed were the only golden-mantled ground squirrels trapped or observed on the wildlife area during the study period. They were obtained from a meadow and a north-facing slope near the summit of Cottontail Pass. One, a subadult female, was captured on 31 May. The other, an adult female evincing no evidence of reproduction, was captured on 29 July.

Spermophilus variegatus, Rock Squirrel

Specimen examined (1).--2 1/2 mi. S, 1 1/2 mi. W Gulnare, 7280 ft., 1 (MHP).

Rock squirrels frequently were seen as they foraged among rocks and shrubs along roadways both on the wildlife area and adjacent to the road north from the wildlife area toward Gulnare. The association of the rock squirrel with rocky, brushy habitats (Lechleitner, 1969) makes it a likely resident of essentially all habitats on the wildlife area except those in which the forest canopy is nearly closed and there is little understory vegetation. The specimen listed, an adult female evincing no reproductive activity, was shot on 6 August on a sandstone outcrop on the Oberosler Tract where vegetation included pinyon pine, juniper, ponderosa pine, and scattered Gambel oak and mountain mahogany. Two additional rock squirrels were shot on 15 June by Mike Telck, Wildlife Technician at the Spanish Peaks State Wildlife Area, as they foraged in his garden. Those specimens were discarded.

Sciurus aberti, Abert's Squirrel

Specimen examined (1).--4 1/2 mi. S, 6 mi. W Gulnare, 7640 ft., 1 (MHP).

Abert's squirrels can be found on the wildlife area wherever stands of predominantly ponderosa pine occur. Such stands usually are on west- to southeast-facing slopes or ridgetops where the canopy is interrupted by clearings and rock outcrops. Less commonly, north- to northeast-facing slopes have predominantly ponderosa pine overstories, and it was from such a site that the specimen listed was obtained. When the canopy becomes interspersed with white fir and Douglas-fir, Abert's squirrel is replaced by another tree squirrel, *Tamiasciurus hudsonicus*. Although such mixed stands occasionally occur almost adjacent to stands of predominantly ponderosa pine, the two species of squirrel were not observed to overlap in their habitat usage.

The specimen listed, a male with testes measuring 30 mm, was one of two Abert's squirrels observed foraging on the McDonald Tract, just southeast of the gate to the Sakariason Tract, on 3 June. Other Abert's squirrels were seen regularly on both approaches to Cottontail Pass and on the ridge between the Dochter and Oberosler tracts. These specimens extend the known range of *S. aberti* in Colorado approximately 72 km to the southeast (Mellott and Choate, 1984).

Tamiasciurus hudsonicus, Chickaree

Specimen examined (1).--4 mi. S, 3 3/4 mi. W Gulnare, 7720 ft., 1 (MHP).

In Colorado, chickarees are most common in habitats characterized by lodgepole pine (*Pinus contorta*), Douglas-fir, blue spruce, and aspen (Bissell, 1982). On the wildlife area, they appear to be restricted to mixed stands of ponderosa pine, white fir, and Douglas-fir, which occur exclusively on northwest- to northeast-facing slopes. Vocalizations of chickarees were heard commonly on the east side of Cottontail Pass, where the road descended toward a meadow, and in the mixed forest southwest of the buildings on the Sakariason Tract. Two middens were located at the latter site by Robert B. Finley. The possibility of competitive exclusion of the chickaree by Abert's squirrel where the species occur together in mixed forest was proposed by Ferner (1974). In this regard, Abert's squirrels were observed near habitats occupied by chickarees on both sides of Cottontail Pass and also in trees north of the buildings on the Sakariason Tract.

The specimen listed was shot on 17 August. It was an adult male with testes measuring 13 mm.

Thomomys bottae, Botta's Pocket Gopher

Specimens examined (3).--3 3/4 mi. S, 6 3/4 mi. W Gulnare, 7720 ft., 2 (MHP); 4 mi. S, 6 1/2 mi. W Gulnare, 7720 ft., 1 (BS/FC).

The distribution of Botta's pocket gopher on the wildlife area is restricted mostly to meadows and canyons. The species seemingly is abundant wherever it occurs but especially around erosion control dams and recently plowed cropfields.

All three specimens were collected on 7 June. These include a male with testes measuring 9 mm and two females, one carrying three fetuses with crown-rump lengths of 40 mm.

Reithrodontomys megalotis, Western Harvest Mouse

Specimens examined (9).--3 3/4 mi. S, 7 mi. W Gulnare, 7760 ft., 4 (2 BS/FC; 2 MHP); 4 mi. S, 6 1/2 mi. W Gulnare, 7720 ft., 4 (2 BS/FC; 2 MHP); 4 1/2 mi. S, 3 1/4 mi. W Gulnare, 7520 ft., 1 (BS/FC).

The western harvest mouse, like the meadow vole and Botta's pocket gopher, is most abundant on the wildlife area in grassy meadows and areas around erosion control dams where the predominant vegetation consists of midgrass and tallgrass species. One individual was trapped in a mature wheat field in July. Meserve (1977) demonstrated that harvest mice spend a portion of their time foraging in vegetation above ground. Trapping in the seed-head layers of crops (wheat, barley, or oats) on the wildlife area perhaps would indicate that cropfields also are frequented by *R. megalotis*.

Four males trapped in June had testes measuring 7-8 mm. A female containing two fetuses also was trapped in June.

Peromyscus difficilis, Rock Mouse

Specimens examined (57).--2 1/2 mi. S, 1 1/2 mi. W Gulnare, 7280 ft., 3 (2 BS/FC; 1 MHP); 3 3/4 mi. S, 6 1/4 mi. W Gulnare, 7800 ft., 21 (6 BS/FC; 15 MHP); 4 mi. S, 4 1/2 mi. W Gulnare, 7920 ft., 2 (BS/FC); 4 mi. S, 4 1/4 mi. W Gulnare, 7740 ft., 7 (4 BS/FC; 3 MHP); 4 1/4 mi. S, 4 1/4 mi. W Gulnare, 8000 ft., 1 (MHP); 4 1/4 mi. S, 3 1/4 mi. W Gulnare, 7520 ft., 1 (MHP); 4 1/2 mi. S, 3 mi. W Gulnare, 7680 ft., 22 (18 BS/FC; 4 MHP).

The rock mouse was the second most abundant and widespread species collected on the wildlife area. Optimal habitats appeared to be west- to southeast-facing slopes with rock outcrops and vegetation consisting of mountain mahogany, Gambel oak, pinyon pine, and juniper. However, six individuals were trapped in a relatively dense stand of ponderosa pine, white fir, and Douglas-fir on a north-facing slope. This area contained small, scattered rock outcrops, and the understory

differed from that of optimal habitats in that it contained less mountain mahogany and shrub oak.

The association of *P. difficilis* with rock outcrops has been noted by several authors (Baker, 1968; Cinq-Mars and Brown, 1969; Geluso, 1971). Baker (1968) suggested that the association has a strong vegetational component in that the most of shrubs and trees, in particular acorns, are preferred foods of the rock mouse and several other species of *Peromyscus*. It is noteworthy that, at the two localities where pinyon pine and juniper were most abundant, rock mice were trapped much more frequently than deer mice (33 rock mice and only one deer mouse at one site; 28 rock mice and 15 deer mice at the second site). One rock mouse was trapped in a wheat field approximately 100 m from the nearest rocky slope.

Testes measurements of nine males trapped in July ranged from 3 to 7 mm. None of nine females trapped in July was pregnant, but one female trapped on 31 July was lactating.

Peromyscus maniculatus, Deer Mouse

Specimens examined (114).--2 1/2 mi. S, 1 1/2 mi. W Gulnare, 7280 ft., 3 (1 BS/FC; 2 MHP); 2 1/2 mi. S, 1 1/4 mi. W Gulnare, 7240 ft., 1 (MHP); 3 3/4 mi. S, 7 mi. W Gulnare, 7760 ft., 19 (10 BS/FC; 9 MHP); 3 3/4 mi. S, 6 1/4 mi. W Gulnare, 7800 ft., 9 (3 BS/FC; 6 MHP); 3 3/4 mi. S, 4 mi. W Gulnare, 7680 ft., 9 (6 BS/FC; 3 MHP); 4 mi. S, 6 1/2 mi. W Gulnare, 7720 ft., 34 (17 BS/FC; 17 MHP); 4 1/4 mi. S, 6 mi. W Gulnare, 7640 ft., 11 (6 BS/FC; 5 MHP); 4 1/4 mi. S, 4 1/4 mi. W Gulnare, 8000 ft., 19 (10 BS/FC; 9 MHP); 4 1/4 mi. S, 3 1/4 mi. W Gulnare, 7520 ft., 7 (2 BS/FC; 5 MHP); 4 1/2 mi. S, 5 3/4 mi. W Gulnare, 7560 ft., 2 (MHP).

The deer mouse occurs ubiquitously on the wildlife area. The broad ecological tolerance of *P. maniculatus* and its use of disturbed sites has been noted by numerous authors (Bissell, 1982; Brown, 1967; Lovell et al., 1985; Stinson, 1978; Williams, 1955). Optimal habitats on the wildlife area, based on captures per 100 trapnights, include disturbed sites (agricultural plantings and areas adjacent to erosion control dams) and west- to southeast-facing slopes characterized by sandstone outcrops, Gambel oak, and mountain mahogany. Baker (1968) commented that, where two or more species of *Peromyscus* occur sympatrically, one or more species may be limited in local distribution. This notion has received support from several subsequent studies (Geluso, 1971; Holbrook, 1978; Wilson, 1968). Results of our trapping indicate that, when *P. maniculatus* and *P. difficilis* occur in the same habitat, deer mice are less abundant or are less susceptible to trapping until *P. difficilis* has been removed. Whether an ecological or behavioral mechanism is responsible for the observed separation of species of *Peromyscus* remains to be determined.

Deer mice captured in June included three adult males with testes measuring 8-10 mm and two subadult males with testes measuring 7 and 8 mm. Two of five adult females captured in June were pregnant, one with three fetuses and one with five. We observed that 41% of the deer mice captured from agricultural plantings during the first two weeks of June were juveniles, suggesting that deer mice are establishing breeding populations therein. In July, three adult males were captured with testicular measurements of from 6 to 8 mm.

Neotoma mexicana, Mexican Woodrat

Specimens examined (16).--2 1/2 mi. S, 1 1/2 mi. W Gulnare, 7280 ft., 1 (BS/FC); 3 3/4 mi. S, 6 1/4 mi. W Gulnare, 7800 ft., 3 (MHP); 3 3/4 mi. S, 4 mi. W Gulnare, 7680 ft., 1 (MHP); 4 mi. S, 6 1/4 mi. W Gulnare, 7680 ft., 1 (MHP); 4 mi. S, 4 1/4 mi. W Gulnare, 7740 ft., 2 (BS/FC); 4 1/2 mi. S, 5 3/4 mi. W Gulnare, 7560 ft., 5 (2 BS/FC; 3 MHP); 4 1/2 mi. S, 3 1/4 mi. W Gulnare, 7480 ft., 1 (BS/FC); 4 1/2 mi. S, 3 mi. W Gulnare, 7680 ft., 2 (BS/FC).

The Mexican woodrat is widespread and abundant on the wildlife area. This is attributable, as with the rock mouse and the least and Colorado chipmunks, to the sandstone formations found throughout the region and the abundance of Gambel oak and mountain mahogany (Bissell, 1982). With one exception, these rats were taken only on forested slopes and ridges. The one exception involved a family of five Mexican woodrats taken from stick lodges constructed at the bases of willows at the northwest end of McDonald Pond #3 (Fig. 2). The pond is in a meadow approximately 0.4 km from the nearest rock outcrops. It is uncertain whether the lodges at the pond were made by woodrats or are abandoned muskrat lodges that subsequently became inhabited by woodrats. In this regard, Finley (1958:410-411) noted that "Except for . . . man-made habitats, *mexicana* rarely, if ever, occurs away from rock shelter of some kind Stick houses have been found only where some rock shelter was already present over which the pile of sticks and other debris could be heaped."

A subadult male captured in June had testes measuring 10 mm. The family of woodrats mentioned above was trapped in July and included an adult female (total length, 343 mm; weight, 214 g) that appeared to have lactated recently and four juvenile females (total lengths, 235-250 mm; weights, 72-80 g). Six adult males trapped in July had testes measuring 6-11 mm.

Microtus mexicanus, Mexican Vole

Specimens examined (11).--2 1/2 mi. S, 1 1/4 mi. W Gulnare, 7240 ft., 1 (MHP); 3 3/4 mi. S, 7 mi. W Gulnare, 7760 ft., 3 (MHP); 3 3/4 mi. S, 4 mi. W Gulnare, 7680 ft., 5 (MHP); 4 mi. S, 6 1/2 mi. W Gulnare, 7720 ft., 1 (BS/FC); 4 mi. S, 2 3/4 mi. W Gulnare, 7550 ft., 1 (BS/FC).

Specimens of this species from the wildlife area (Mellott and Choate, 1984) and from northeastern New Mexico (Dalquest, 1975) originally were misidentified as *Microtus montanus*. The taxonomic confusion that has existed regarding the identity of these specimens was reviewed by Hubbard et al. (1983) and Finley et al. (1986). Accordingly, the montane vole (*M. montanus*) is not known to occur on the wildlife area or in any other areas of southern Colorado or northern New Mexico east of the San Juan and Jemez mountains, and the specimens from the wildlife area (Mellott and Choate, 1984) and from northeastern New Mexico (Dalquest, 1975) document the existence of *M. mexicanus* on foothills of the Sangre de Cristo Mountains and surrounding areas of Colorado and New Mexico.

Mexican voles utilize a greater variety of habitats on the wildlife area than do meadow voles. Habitats in which Mexican voles were trapped included meadows, riparian communities, a woodpile in a forest clearing, and tall grass beneath a house trailer. Five specimens also were trapped in a forest-meadow ecotone adjacent to an alfalfa field. The litter layer in this ecotone was composed predominantly of oak leaves and ranged up to 8 cm in depth. Numerous well-defined runways were observed throughout this habitat. It may be that such ecotonal areas, bordering the extensive agricultural plantings maintained on the wildlife area, constitute optimal habitat for Mexican voles in this region.

A male captured in June had testes that measured 7 mm. One of the two females trapped in June was pregnant with three fetuses. A male trapped in July had testes that measured 12 mm. Two females captured in July contained two and three fetuses. Captures in August included a male with testes that measured 9 mm and a female containing three fetuses.

Microtus pennsylvanicus, Meadow Vole

Specimens examined (28).--2 1/2 mi. S, 1 1/4 mi. W Gulnare, 7240 ft., 22 (2 BS/FC; 20 MHP); 4 mi. S, 6 1/2 mi. W Gulnare, 7720 ft., 6 (2 BS/FC; 4 MHP).

The two habitats in which meadow voles were trapped were the riparian vegetation surrounding Oberosler Pond (22 voles) and the mesic vegetation adjacent to and above an erosion control dam on the Sakariason Tract (6 voles). Riparian habitats such as the former probably are optimal for meadow voles on the wildlife area because all ponds are spring-fed and thus support lush riparian vegetation throughout the year. The latter mesic habitats, although numerous in tributary canyons, probably are marginal and seasonal because they depend entirely on precipitation for maintenance of their mesic character.

Two males captured on 31 May and 3 June had testes that measured 15 and 17 mm. A pregnant female captured at that time contained five fetuses. Four males captured in early August had testes ranging in length from 2 to 12 mm. Three females trapped in early August were pregnant, each with five fetuses.

Canis latrans, Coyote

Vocalizations of at least three groups of coyotes were heard in August on the Tochter Tract. Mike Telck (pers. comm.) informed us that the species commonly is seen on the wildlife area.

Ursus americanus, Black Bear

Armstrong (1972) listed a specimen collected approximately 20 km northeast of the wildlife area. Black bears infrequently occur in canyons in southeastern Colorado, and occasionally move out onto the plains (J. Slater, pers. comm.).

Although no specimens were collected, a female with three cubs was observed by Mike Telck (pers. comm.) on several occasions on the Sakariason and Tochter tracts in spring of 1981. The species is hunted in areas surrounding the wildlife area.

Mephitis mephitis, Striped Skunk

The striped skunk has the broadest ecological tolerance of any species of skunk in Colorado (Armstrong, 1972; Bissell, 1982) and commonly inhabits areas such as the croplands, meadows, and grasslands represented on the wildlife area. Mike Telck (pers. comm.) informed us that the species occurs on the wildlife area but he was unsure as to the size of the population.

Felis concolor, Mountain Lion

Armstrong (1972) noted that the lower slopes of the Sangre de Cristo and Wet mountains are areas where *F. concolor* remains relatively abundant. He reported one specimen from southwest of Monument Lake, approximately 25 km from the wildlife area. There presently are no resident lions on the wildlife area although an average of two per year are seen in the area (Mike Telck, pers. comm.).

Felis rufus, Bobcat

Bobcats are common in brushy habitats of foothills and canyons in Colorado (Armstrong, 1972), and one specimen is available from 35 km northwest of the wildlife area. We saw none during this study, but Mike Telck (pers. comm.) reported seeing two on the Tochter Tract in 1980.

Cervus elaphus, American Elk

Numerous elk were seen during this study. On 14 July, a herd was observed browsing in a meadow on private land between the Sakariason and Tochter tracts (6.4 km S, 8.4 km W Gulnare). The herd consisted of two bulls, 21 cows, and six calves. Another herd was observed on 4 August in a meadow on the Oberosler Tract (5.2 km S, 2 km W Gulnare). This herd consisted of 23 individuals. Additional elk frequently were seen browsing in cropland on the Tochter Tract (7 km S, 5.2 km W Gulnare). Mike Telck (pers. comm.) estimated that from 80 to 150 elk occur on the wildlife area during spring and early summer, and that the wintering population consists of from 125 to 250 elk.

Odocoileus hemionus, Mule Deer

Mule deer were seen frequently on the wildlife area. A buck and doe were observed on the mornings of 12 and 13 June grazing along the edge of recently planted wheat on the Sakariason Tract (5.6 km S, 10.8 km W Gulnare). On the morning of 25 July, a buck was observed browsing in a cropland 8 km S and 4.4 km W Gulnare. That same evening a buck and doe were seen in a meadow 6.4 km S and 8.4 km W Gulnare. Mike Telck (pers. comm.) estimated the population of mule deer on the wildlife area to be approximately 90.

Ovis canadensis, Bighorn Sheep

The historic range of the bighorn presumably included the Sangre de Cristo Mountains in Colorado (Armstrong, 1972) and New Mexico (Findley et al., 1975). In March of 1981, 16 bighorn were introduced on the Tochter Tract by personnel of the Colorado Division of Wildlife. The decision to do so was based on the discovery of Indian petroglyphs on rocks along the Apishapa River, approximately 85 km northeast of the wildlife area. These petroglyphs depicted animals with long, curved horns, apparently representing bighorns and thereby documenting that the bighorn was native to this region. After the bighorns were released, they moved northward and westward about 4 km. It is uncertain now whether they will remain on the wildlife area or continue their movement in the direction of the Spanish Peaks.

SPECIES OF UNVERIFIED OCCURRENCE

Sorex cinereus.--The masked shrew is abundant in much of mountainous central Colorado (Armstrong, 1972). However, no records from Colorado are available from farther south than the Wet Mountains, approximately 110 km to the northwest of the Spanish Peaks State Wildlife Area, even though the species has been reported from the Sangre de Cristo Mountains in New Mexico (Findley et al., 1975).

Sorex monticolus.--The dusky or montane shrew dwells in mesic habitats in coniferous forest zones. Findley et al. (1975) noted that the species is not restricted to streamside habitats, specimens having been obtained from sheltered canyons and wherever else ground cover and moist litter provide adequate cover. This shrew has been reported from the Sangre de Cristo Mountains approximately 30 km northwest of the wildlife area (Armstrong, 1972).

Sorex palustris.--The water shrew can be found in Colorado around streams and ponds in spruce-fir forest or even at lower elevations in open pine woodland (Armstrong, 1972). It has been documented from the Sangre de Cristo Mountains approximately 30 km northwest of the wildlife area.

Notiosorex crawfordi.--Although most records of the desert shrew in Colorado are from semidesert shrubland, woodland, or grassland habitats (Bissell, 1982), Armstrong (1972) remarked that data are insufficient to determine the status of the species in southern Colorado. The highest elevation at which the species has yet been recorded is 2073 m.

Myotis yumanensis.--The Yuma myotis typically occurs in Colorado at low elevations or in canyonlands, usually in pinyon-juniper or riparian woodland (Armstrong, 1984a), where individuals roost in caves and unoccupied buildings (Armstrong, 1972). Records of this species in southeastern Colorado are few, the nearest to the wildlife area being 100 km to the southeast. Findley et al. (1975) reported the species from the Sangre de Cristo Mountains in New Mexico, and the species possibly occurs on foothills of the Sangre de Cristo Mountains in Colorado.

Lasionycteris noctivagans.--The silver-haired bat is migratory. Both sexes occur in Colorado until late May, at which time females migrate northward only to return in late August, when both sexes migrate southward (Bissell, 1984b). Habitats frequented by this bat include coniferous woodland in mountainous areas and broad-leafed riparian woodland on the eastern plains (Bissell, 1982). Records for the species above 2485 m are uncommon. The silver-haired bat has not been recorded from the Sangre de Cristo Mountains of Colorado although it occurs in those mountains in northern New Mexico (Findley et al., 1975).

Lasiurus cinereus.--The hoary bat is a solitary, migratory species that seldom is abundant in any area (Lechleitner, 1969). Males are relatively common along the eastern foothills of Colorado (Armstrong, 1972). The species has not been recorded from the Sangre de Cristo Mountains in Colorado, but occurs thereon in northern New Mexico (Findley et al., 1975). The locality of record for the species nearest the wildlife area is approximately 40 km to the southeast (Armstrong, 1972).

Plecotus townsendii.--Findley et al. (1975) observed that the presence of Townsend's big-eared bat depends on the availability of

suitable caves, rock crevices, and mines. The species reportedly flies late at night and thus may be undetected in an area (Lechleitner, 1969). Also, it is adept at avoiding capture in mist nets (Findley et al., 1975). Warren (1906) reported a specimen of *P. townsendii* from Trinidad, but since that time the species has not been found within 80 km of the wildlife area. This bat does occur on the Sangre de Cristo Mountains in northern New Mexico (Findley et al., 1975).

Euderma maculatum.--The spotted bat is known from scattered localities in western North America and is one of the rarest species in the United States. It has been reported from only one locality, Browns Park (Moffat Co.), in Colorado (Finley and Creasy, 1982). Freeman (1984a) suggested that the species may be expected to occur in the vicinity of Trinidad, 43 km SE of the wildlife area.

Antrozous pallidus.--Pallid bats appear to be restricted to broken, rocky areas in southeastern Colorado and to semiarid canyonlands on the western slope (Armstrong, 1972). The locality of record nearest the wildlife area is approximately 130 km to the southeast on Mesa de Maya in Las Animas Co. (Freeman, 1984b).

Tadarida brasiliensis.--The range of the Brazilian free-tailed bat in Colorado apparently is restricted to the southern half of the state. The northernmost known large colony of this gregarious species in the state is on the west slope of the Sangre de Cristo Mountains in the San Luis Valley, approximately 150 km from the wildlife area (Svoboda et al., 1985; Svoboda and Choate, 1987).

Tadarida macrotis.--Only four individuals of the big free-tailed bat have been documented in Colorado (Freeman, 1984c). It is not known to occur in northeastern New Mexico (Findley et al., 1975), but wanderers may be found in the region.

Sylvilagus audubonii.--Desert cottontails demonstrate a wide ecological tolerance and occur throughout most of Colorado, mainly at elevations below 2135 m although the species has been recorded from as high as 2350 m in the San Luis Valley (Armstrong, 1972). Optimal habitats include shrub and brush communities at the forest edge and in canyons. Lechleitner (1969) reported *S. audubonii* to be most abundant in mountain mahogany habitats. Although the species has not been found on the Sangre de Cristo Mountains in Colorado, localities of record exist on foothills of these mountains in northern New Mexico (Findley et al., 1975).

Thomomys talpoides.--Northern pocket gophers were singled out by Armstrong (1972) as having the broadest ecological tolerance and altitudinal range of any species of pocket gopher in Colorado. The locality of record nearest the wildlife area is only 30 km to the northwest.

Perognathus fasciatus.--The natural history and status of the olive-backed pocket mouse in Colorado are poorly known. Armstrong (1972) reported the usual altitudinal range of this species as 1525-2135 m but mentioned several specimens from the Wet Mountains at elevations of 1890-2500 m. The locality of record nearest the wildlife area is in southern Huerfano County, approximately 30 km to the northwest.

Peromyscus boylii.--The association of the brush mouse with rocky areas (Armstrong, 1972; Geluso, 1971; Lechleitner, 1969) and with shrubby vegetation dominated by oak (Baker, 1968; Findley et al., 1975; Holbrook, 1978; Svoboda et al., 1987; Wilson, 1968) is well documented. The species seemingly is most abundant on south- and west-facing slopes (Wilson, 1968). Deciduous saxicoline shrub habitats that satisfy these requirements are available on the wildlife area.

Peromyscus truei.--The pinyon mouse occurs primarily in pinyon-juniper woodland, where it nests in hollow branches of *Juniperus* and feeds, especially in winter, on juniper cones (Douglas, 1969). It is known from areas of Las Animas County east of the wildlife area and from adjacent Huerfano County (Armstrong, 1972).

Onychomys leucogaster.--In Colorado, the northern grasshopper mouse is restricted to semiarid grassland and shrubland on the Great Plains and Colorado Plateau and in the San Luis Valley and the Wyoming and associated basins (Armstrong, 1972; Riddle and Choate, 1986). It is known from lower elevations than that of the wildlife area in eastern Las Animas County and adjacent Huerfano County (Armstrong, 1972).

Neotoma cinerea.--The bushy-tailed woodrat inhabits canyons, caves, and mines in montane, intermontane, and badland regions of Colorado (Armstrong, 1972; Finley, 1958). It is abundant on the Sangre de Cristo Range (Cockerell, 1890) and may be found on the wildlife area.

Clethrionomys gapperi.--In Colorado, the southern red-backed vole inhabits boreal forests, usually at elevations higher than 2400 m (Armstrong, 1972). The species is known from mountainous areas of Huerfano County northwest of the wildlife area.

Microtus longicaudus.--The long-tailed vole is a euryecious microtine that occurs in habitats ranging from mesic meadows to forests. It is known from less than 25 km north of the wildlife area in Huerfano County (Armstrong, 1972).

Microtus montanus.--Correction of a previous misidentification resulted in deletion of the montane vole from the known mammalian fauna of the wildlife area (see account of *Microtus mexicanus*). The species inhabits moist meadows and grassy areas at elevations ranging from about 1800 m to well above timberline in western Colorado (Armstrong, 1972).

Zapus princeps.--The western jumping mouse seemingly is most abundant in association with streamside communities with an overstory of willow or aspen and an understory of lush grasses or forbs (Armstrong, 1972). The species is known to occur less than 15 km north of the wildlife area.

Urocyon cinereoargenteus.--The gray fox is most common in both Colorado and New Mexico in broken terrain and brushy woodland characterized by pygmy conifers (Armstrong, 1972; Findley et al., 1975). It occurs at least sparingly throughout the region occupied by the wildlife area.

Bassariscus astutus.--Armstrong (1972) saw no specimens of the ringtail from the eastern slope in Colorado, but literature records from Colorado (Richards, 1968) and specimens from both northern New Mexico (Findley et al., 1975) and western Kansas (Choate, unpubl. data) suggest the species is more abundant and more widely distributed in southern Colorado than previously supposed. The species is thought to occur in Colorado primarily in pinyon-juniper, scrub oak, and mountain mahogany habitats (Bissell, 1982), all of which occur on the wildlife area.

Procyon lotor.--The raccoon is abundant in settled areas and on agricultural land in Colorado. It probably will be found on the wildlife area.

Mustela erminea.--The ermine is an uncommon inhabitant of high-elevation forests in Colorado and northern New Mexico (Armstrong, 1972; Findley et al., 1975). It doubtfully occurs on the wildlife area.

Mustela frenata.--The long-tailed weasel is distributed essentially statewide in Colorado (Armstrong, 1972; Bissell, 1982) and almost certainly will be found on the wildlife area.

Taxidea taxus.--In Colorado, the badger is known from open habitats ranging from grassland and semidesert to alpine (Armstrong, 1972). The species likely occurs at least sporadically in the vicinity of the wildlife area.

Spilogale gracilis.--The western spotted skunk inhabits rocky and brushy areas in woodland, grassland, and desert (Findley et al., 1975). The species is known from areas to the north (Cary, 1911), west (Van Gelder, 1959), and east (Van Gelder, 1959) of the wildlife area.

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