

Thesis for the Degree of M. S.
MICHIGAN STATE UNIVERSITY
John Keever Greer
1960



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MAMMALS OF NORTHEASTERN DURANGO, MEXICO

By

John Keever Greer

AN ABSTRACT OF

A thesis submitted to the College of Science and Arts

Michigan State University of Agriculture and

Applied Science in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

Department of Zoology

Approved

A handwritten signature in dark ink, appearing to read "William H. Bohrer", is written over a horizontal line.

THESIS ABSTRACT

This report will contribute to our knowledge of the natural history of a poorly-known part of Durango, Mexico. The study area includes part of a large inland basin known as the Bolsón de Mapimí. Approximately 10,000 square miles in northeastern Durango are divided into three arbitrary plant-soil associations to facilitate the separation of small mammal populations. Small mammals were trapped and game were studied to determine their occurrence and relative abundance and effect of land-use on their distribution. Also, data were obtained pertaining to habitat preference and competition between related and unrelated small mammals. Some mammals were found to have narrowly restricted habitats; others were widespread. Evidence shows that increased utilization by man of previously undisturbed areas has adversely affected the status of game and locally diminished populations of many small mammals. Data on which this report chiefly is based was obtained by field parties from the Museum, Michigan State University in the summers of 1958 and 1959.

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INTRODUCTION

The northeastern part of the Mexican state of Durango is included within a large inland basin known as the Bolsón de Mapimí (see Figure 1), which also encompasses parts of Chihuahua and Coahuila. This vast area with its deserts and low mountain ranges offers an excellent opportunity for the biologist to study both restricted and wide-spread mammalian species. Although the basin is large, few biologists have studied in the area and little has been published concerning its biota. The present knowledge of the distribution of the fauna has been interpreted largely from isolated records reported in the literature.

Zoologists from Michigan State University have been studying the fauna inhabiting the deserts and mountains of Durango since 1957. Data on which this report is chiefly based were obtained by field parties from the Museum in northeastern Durango in the summers of 1958 and 1959. This report is submitted as a contribution to our knowledge of the natural history of this poorly-known part of Durango.

METHODS

Mammals in northeastern Durango were collected by various means to determine their distribution and relationship to the environment. Museum special traps as well as other collecting devices were used to sample small rodent populations; collecting guns were used to obtain larger species of mammals; and mist nets were stretched over water sources and in the mouths of caves to snare bats.

Specimens were identified with the assistance of Rollin H. Baker and deposited in the collections at The Museum, Michigan State

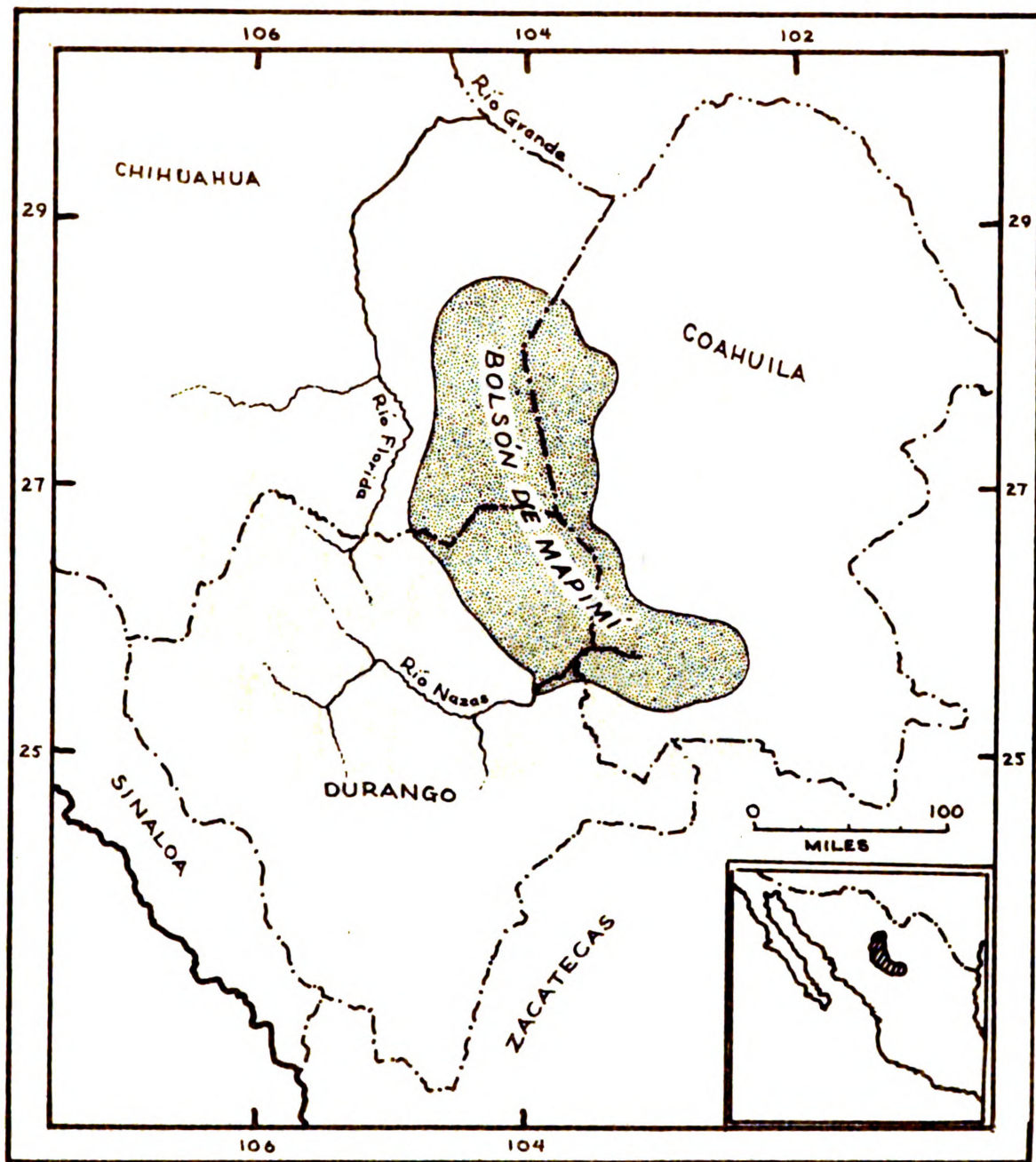


Figure 1.

Northwestern Mexico showing the
location of the Bolsón de Mapimí.

University. The arrangement of genera in this report follows that of Miller and Kellogg (1955).

Measurements given are for adults and are in millimeters; weights are given in grams. Most distances were measured by car speedometer, and elevations are listed in feet.

Notes on habitats were recorded at each collecting station, and local residents, farmers and ranchers, were questioned as to the occurrence and abundance of game and small mammals. In this account, northeastern Durango is divided into three arbitrary associations of plants and soils (see Figure 2) to facilitate the separation of mammal populations.

Maps of northeastern Durango mark highways and railroads connecting the larger villages but leave a major portion of the area, which is lightly populated, poorly charted. The names used as localities appear on one or more of the following maps: N.G-13 (Culiacan), of the American Geographical Society of New York, Scale: 1:1,000,000; Lake Santiguilla 521, of the World Aeronautical Charts of the United States Air Force Aeronautical Information Service, Scale: 1:1,000,000; the Carta Geológica de La Parte Septentrional de la República México by Phillip B. King (1947) published in collaboration with the Geological Survey, United States Department of Interior; and the map of the state of Durango prepared by the Departamento Geográfico, Oficina de Cartografía y Cálculo, México.

The following is a list of place-names in northeastern Durango used in recording localities from which mammals were collected in the summers of 1958 and 1959 or which is concerned with the distribution

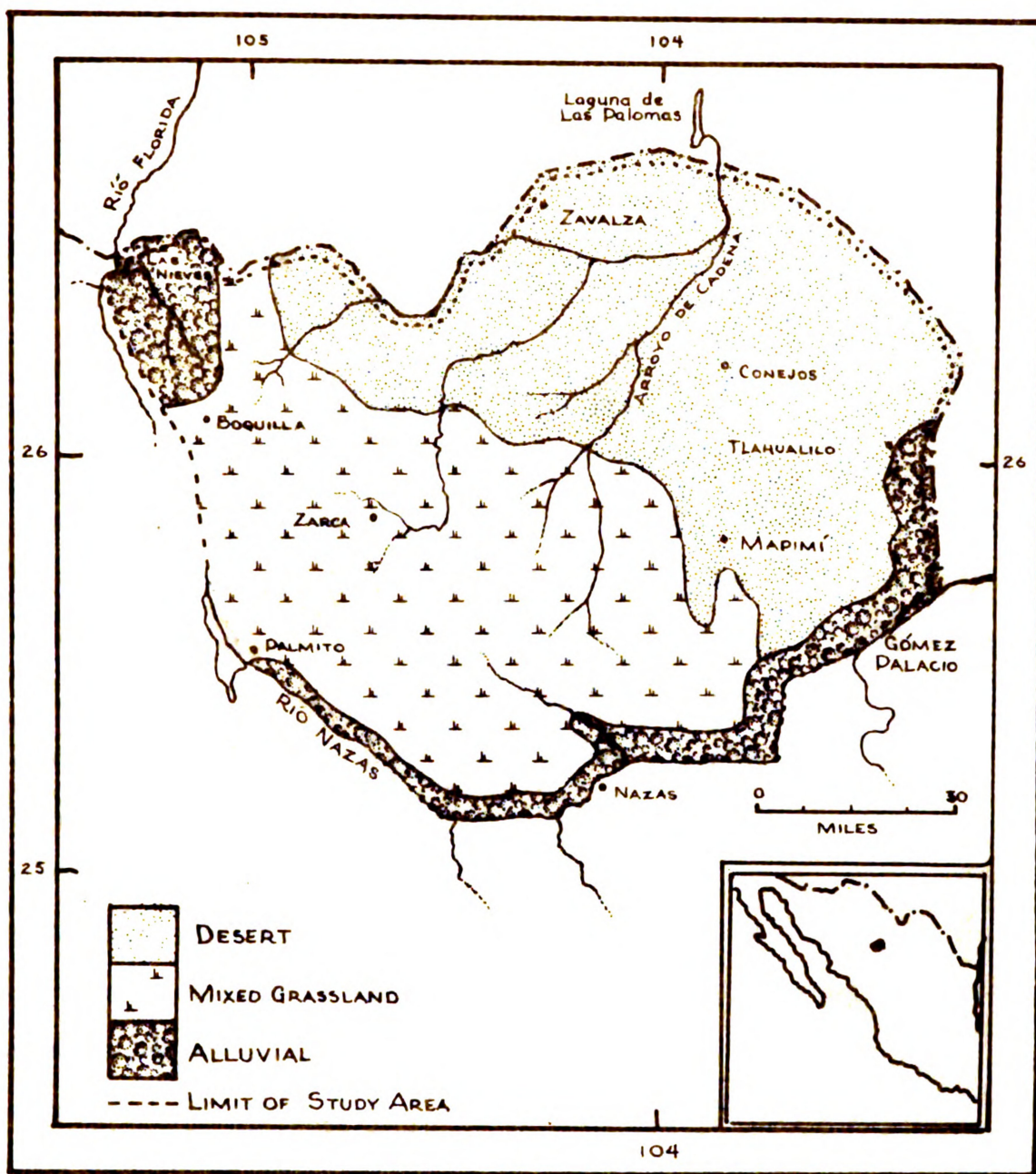


Figure 2.
Plant-soil Associations in Northeastern Durango

pattern of mammals. Each name-place is followed by its elevation in feet.

LOCALITIES IN NORTHEASTERN DURANGO

Localities	Longitude	Latitude	Elevation
Zavalza	104°16'	26°37'	5150
Villa Ocampo	105°30'	26°29'	
Yermo	104°03'	26°23'	3900
Las Nieves	105°20'	26°22'	5400
Conejos	103°53'	26°13'	4000
Bermejillo	103°30'	25°50'	
Boquilla	105°10'	26°09'	5400
Campana	104°30'	26°08'	3750
Tlahualilo	103°27'	26°05'	
Gregio García	103°27'	25°45'	
Rancho Tres Hermanos	104°28'	25°57'	5500
Indé	105°15'	25°55'	
Rancho Guitarra	104°43'	25°48'	
Zarca	104°43'	25°48'	6000
Mapimí	103°50'	25°47'	4100
Dinamita	103°38'	25°42'	
Cadena	103°32'	25°41'	4100
Gómez Palacio	104°30'	25°32'	
Palmito	104°58'	25°28'	4850
Nazas	104°10'	25°12'	4100

TOPOGRAPHY

The study area, shown in Figure 2, includes approximately 10,000 square miles in northeastern Durango, north and northeast of the Río Nazas and east of the Río Florida. Two undrained basins containing extensive playas (generally dry like beds) occur in this area. One is the Laguna de las Palomas to the northeast at the Chihuahuan boundary. The Arroyo de Cadena, an intermittent stream that drains much of the central part of the study area, enters this Laguna. The other is the Laguna de Tlahualilo in the extreme eastern part of the area. The Río Nazas drains the southern and southwestern parts of the area. This river flowed, before the advent of extensive irrigation projects, chiefly into the Laguna de Mayran in southwestern Coahuila. The Río Florida drains a portion of the northwestern part of the study area. This stream flows northward and eventually into the Gulf of Mexico by way of the Río Conchos and the Río Grande. The lake beds contain deposits of soft, deep, alkaline soils. Both these soils and the alluvial soils along rivers and arroyos have a pronounced effect on the distribution and abundance of both vegetation and animals.

Monotonous desert flats are interrupted by occasional isolated mountains. These are generally low in elevation (less than 1000 feet above the plain) and consist usually of massive limestone, dissected by deep cut arroyos. To the westward the land gradually rises in elevation toward the Meseta de Zarca, which marks the beginning of the foothills of the Sierra Madre Occidental. Gradual changes in vegetation and animal life occur as a result of this change in elevation.

CLIMATE

The climate of the Bolsón de Mapimí is determined largely by the prevailing westerly winds. These pass over the Sierra Madre Oriental (where much moisture is precipitated) and hot desert country to the eastward before reaching the Bolsón de Mapimí. Consequently, northeastern Durango is characterized by extreme aridity.

In the Bolsón de Mapimí, the small amount of rain received usually falls in summer with June through September having 64 to 75 percent of the annual precipitation (Shreve, 1942:193). Most of the rains drain into arroyos rather than being absorbed by the packed ground. As a result, extensive weathering of topography due to infrequent, but heavy, rains is evident. In desert areas, arroyos may be broad and shallow or deep and heavily eroded. Steep canyons are characteristic of mountainous areas. Disturbed patches of soil along these arroyos encourage the growth of various floras which form cover and provide food for many mammals.

High temperatures, continuous wind and scarcity of water are elements of nature to which all species of the Bolsón de Mapimí must adapt before becoming permanent members of the desert community. Cover, in the form of plants and underground burrows protect mammals from the sun and wind. Water, when not available in the free state, is often obtained by animals from succulent plants or the bodies of other animals and metabolic synthesis of water is characteristic of some desert rodents.

LAND USE

Irrigation of crops has played an important part in the exploitation of northeastern Durango. Cultivation centers around the Laguna de Tlahualilo, the Laguna de las Palomas, and farmlands in the valley of the Río Nazas where the river water can be channeled into irrigation canals, or where water from shallow wells is readily available. Cotton, wheat, alfalfa and grapes are the chief crops in northeastern Durango.

Industry and agriculture have flourished simultaneously. Cotton seed oil refineries, alfalfa drying-plants, wineries, tractor and implement manufacturing companies, and other industries have kept pace with the growing needs of the expanding agriculture.

Cultivation makes areas uninhabitable to most mammals by destroying the natural food supply and proper cover. Also, the use of insecticides in combating insect pests has probably affected adversely the abundance of mammals in areas adjacent to the cultivated fields.

CONSERVATION OF MAMMALS

The abundance and distribution of game animals in northeastern Durango is interpreted chiefly from reports by residents, who are well-acquainted with the areas involved in this study. Cowboys and goatherds in various localities related interesting accounts of local animals; these reports have been edited and used when considered pertinent.

Modern highways and the development of irrigation have enticed

farmers and ranchers to move onto formerly uninhabited lands during recent years. The increased hunting pressures, the large areas for cultivated crops, and competition for available grazing lands have altered the distribution and abundance of game animals. Thirty years ago, the pronghorn (Antilocapra americana) ranged over much of the eastern half of Durango, but today these animals are almost extinct. Panfilo Sanchez, a well-known hunter and sportsman from Torreón, Coahuila, recounts stories of his hunts when game, such as the pronghorn, was abundant near Gómez Palacio in open areas which today are in cultivation. Mule deer (Odocoileus hemionus) also roamed the Bolsón de Mapimí in Durango (Leopold, 1959:507), but have not been seen in recent years. White-tailed deer (Odocoileus virginianus) and collared peccaries (Pecari tajacu) still occur in northeastern Durango, but seemingly in reduced numbers and in limited areas. Probably the number of small mammals has diminished similarly, although there is evidence of an increase in some. For example, pocket gophers seemingly thrive where irrigation canal dikes present ideal localities for underground tunnels, while jackrabbits reportedly are a nuisance in some areas of extensive agriculture.

The status of game in northeastern Durango is similar to the situation which existed in the arid southwestern United States before strict enforcement of conservation laws made possible the reestablishment of game populations. Baker (1956:155-156) has suggested methods of conservation to preserve the diminishing game in northern Mexico which could apply in northeastern Durango as well. The enforcement of existing laws to limit the kill of game, the limiting of herds of domestic

animals in overgrazed areas, and the setting aside of special areas designated as game preserves would materially increase and insure survival of game.

PLANT-SOIL ASSOCIATIONS

The Bolsón de Mapimí lies within the limits of the Chihuahuan Biotic Province of Dice (1943). Goldman and Moore (1945:349) list this area as part of the Chihuahua-Zacatecas Biotic Province, a natural grouping of plants and animals. Leopold's (1952:437-448) vegetational zones of Mexico classify this area (at lower elevations) as Mesquite-Grassland and Desert. Merriam (1898:1-79) proposed that areas such as the Bolsón de Mapimí be classified in Lower Sonoran Life Zone. Shreve (1942:196) lists flora which are found in the Bolsón de Mapimí according to arbitrary divisions of the Chihuahua Desert Vegetation-type flora.

To my knowledge, no detailed studies of plant species or soil types of northeastern Durango have been published; consequently, this report attempts merely to use conspicuous plants and soil types to assist in distinguishing distributional patterns of non-flying mammals. Field studies indicate that there are three major plant-soil associations in northeastern Durango (see Figure 2). Each of these is discussed below. Characteristic mammals are listed; those taken from traplines are followed by percentages which indicate their relative frequency in the total catch in any one association.

DESERT ASSOCIATION: The Desert Association includes the broad, relatively flat, lowest part (3900 feet to 4500 feet) in the

northeastern half of the study area (see Figure 2) and lies within an annual isotherm of from 68 degrees (F) to 77 degrees (F).

Within the association, several limestone mountainous areas emerge, two of which are prominent: the Sierra de la Bandera and the Sierra de Campana.

Except for sand dunes extending in a narrow belt across the desert 30 miles north of Gómez Palacio, chernozem soils occur throughout this association at lower elevations. Field observation indicates that the Laguna de las Palomas at the northern edge of the association is centered within a playa of soft, alkaline soils, whereas soils in the southern parts of the association, where reportedly there is more rain, are hardpacked.

Thorny shrubs and cactus with some scattered grasses characterize the desert. Larrea, with Acacia and Prosopis are prominent on the desert flats and Agave, Yucca, Opuntia, Euphorbia and Dasyliiron occur on the slopes of rocky hillocks. Grasses (mostly Hilaria) are of minor importance in the vegetational character of the association. Plate 1 illustrates typical vegetation and physiognomy in this association.

Mammals present are adapted for the arid habitats where ground cover is scant. Characteristic large mammals include coyote (Canis latrans), and probably gray fox (Urocyon cinereoargenteus), kit fox (Vulpes macrotis), hooded skunk (Mephitis macroura), bobcat (Lynx rufus) and collared peccary (Pecari tajacu).

Characteristic small mammals:

Lepus californicus

Sylvilagus audubonii

Ammospermophilus interpres



Plate 1. The Desert Association.

Vegetation is spotty and the soil is hard-packed. Dust-devils are caused by thermal updrafts and erratic wind direction and carry dust and debris high above the desert flats.



Plate 2. "La Cueva de los Indios"

This limestone cave contained few bats in July but large guano deposits indicate that many bats may occur there, perhaps in winter.

<u>Spermophilus variegatus</u>	
<u>Spermophilus spilosoma</u>	
<u>Thomomys umbrinus</u>	
<u>Perognathus flavus</u>	1 percent
<u>Perognathus nelsoni</u>	16 "
<u>Perognathus penicillatus</u>	19 "
<u>Dipodomys ordii</u>	5 "
<u>Dipodomys merriami</u>	12 "
<u>Dipodomys nelsoni</u>	4 "
<u>Peromyscus maniculatus</u>	20 "
<u>Peromyscus eremicus</u>	17 "
<u>Peromyscus pectoralis</u>	2 "
<u>Neotoma albigula</u>	2 "
<u>Mus musculus</u>	1 "
<u>Sigmodon hispidus</u>	1 "

MIXED GRASSLAND ASSOCIATION: The Mixed Grassland Association consists of higher plains and adjacent mountains westward of the Desert Association (see Figure 2). Typical habitat is grassland with associated thorn shrub, (such as Agave, Yucca, Larrea, Acacia and Prosopis). There is no clear cut separation between the desert and the higher grassland plain, but a gradual transition between the two associations occurs over an extensive area. Grasslands with juniper, oak and some piñon pine occur at higher elevations. Intermontane valleys in the Meseta de Zarca display extensive grasslands with scattered shrubby, thorny legumes. Plates 3 and 4 illustrate typical vegetational forms in this association.



Plate 3. The Mixed Grassland Association.

Grasslands on the summit of the Meseta de Zarca are interspersed with juniper and scrub oak.



Plate 4. The Mixed Grassland Association.

Grassy areas near La Zarca are interspersed with clumps of Larrea and Prosopis. This heterogenous vegetation supports numerous mammals.

Mammals in this association are characteristic of semi-arid habitats where ground cover is heavier than in low desert areas. Large mammals include coyote (Canis latrans), kit fox (Vulpes macrotis), hooded skunk (Mephitis macroura), bobcat (Lynx rufus), collared pecary (Pecari tajacu), and white-tailed deer (Odocoileus virginianus), and probably gray fox (Urocyon cinereoargenteus), striped skunk (Mephitis mephitis), mountain lion (Felis concolor) and pronghorn (Antilocapra americana).

Characteristic small mammals:

<u>Lepus californicus</u>	
<u>Sylvilagus audubonii</u>	
<u>Spermophilus spilosoma</u>	
<u>Spermophilus variegatus</u>	
<u>Thomomys umbrinus</u>	
<u>Cratogeomys castanops</u>	
<u>Perognathus flavus</u>	14 percent
<u>Perognathus nelsoni</u>	11 "
<u>Perognathus penicillatus</u>	18 "
<u>Dipodomys ordii</u>	22 "
<u>Dipodomys merriami</u>	13 "
<u>Dipodomys nelsoni</u>	4 "
<u>Reithrodontomys megalotis</u>	1 "
<u>Peromyscus maniculatus</u>	6 "
<u>Peromyscus eremicus</u>	1 "
<u>Peromyscus pectoralis</u>	3 "
<u>Peromyscus leucopus</u>	1 "
<u>Neotoma albigula</u>	7 "
<u>Mus musculus</u>	1 "

ALLUVIAL ASSOCIATION: The Alluvial Association includes the valleys of the Río Nazas and the Río Florida where deep alluvial soils are characteristic (see Figure 2). Elevations in this association are from 5000 feet at the Presa Palmito to 3750 feet at the Laguna de Tlahualilo. Much of the valley of the Río Nazas lies within an annual isotherm of from 68 degrees (F) to 77 degrees (F).

Cottonwood, willow and cypress trees grow near the banks of the rivers and Acacia, Larrea, Prosopis and Opuntia are common plants in uncultivated areas. In these river valleys there are concentrations of human inhabitants utilizing the rivers' water for irrigating crops. Ideal conditions exist for growing crops such as corn and squash.

Plates 5 and 6 illustrate typical vegetational forms in this association.

Mammals in this association prefer the succulent vegetation which grows in river valleys. Larger mammals include the ring-tailed cat (Bassariscus astutus) and long-tailed weasel (Mustela frenata) and probably the opossum (Didelphis marsupialis), hooded skunk (Mephitis macroura), coyote (Canis latrans), bobcat (Lynx rufus), white-tailed deer (Odocoileus virginianus), and pronghorn (Antilocapra americana).

Characteristic small mammals:

Lepus californicus

Sylvilagus audubonii

Spermophilus pilosoma

Spermophilus variegatus



Plate 5. The Alluvial Association.

Lands adjacent to the Río Nazas south of Palmito have been cultivated. Cypress trees grow on the banks of the river and mesquite trees grow on the lands nearby.



Plate 6. The Alluvial Association.

Squash and corn are planted on the flood plains of the Río Nazas near Nazas and cottonwood trees grow well on the banks of the river.

Thomomys baileyiCratogeomys castanops

<u>Perognathus flavus</u>	3	percent
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<u>Perognathus nelsoni</u>	30	"
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<u>Perognathus penicillatus</u>	3	"
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<u>Dipodomys ordii</u>	6	"
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<u>Reithrodontomys fulvescens</u>	2	"
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<u>Peromyscus maniculatus</u>	10	"
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<u>Peromyscus eremicus</u>	11	"
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<u>Peromyscus pectoralis</u>	2	"
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<u>Peromyscus leucopus</u>	8	"
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<u>Neotoma albigula</u>	6	"
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<u>Mus musculus</u>	12	"
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<u>Sigmodon hispidus</u>	7	"
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MAMMAL HABITAT RELATIONSHIPS

The mammals in the study area either show preference to a specific habitat, or occur widely. Most of the larger mammals occur in all of the associations and due to the absence of major barriers and the relatively small size of the study area, this fact seems understandable. On the other hand, several small mammals show a tendency to be restricted to certain soil and plant types. For example, the antelope ground squirrel (Ammospermophilus interpres) inhabits only rocky outcroppings in the Desert Association; the Bailey pocket gopher (Thomomys baileyi) lives only in deep alluvial soils along streams; and the harvest mice (Reithrodontomys fulvescens and R. megalotis) occur only in grassy

areas. Some small mammals are well-distributed throughout north-eastern Durango, but differ in local habitat preference. For example, the Nelson pocket mouse (Perognathus nelsoni) chiefly lives in rocky areas in the Desert Association and in the Mixed Grassland Association, but in the latter the species occurs on flats of coarse soils as well. The hispid cotton rat (Sigmodon hispidus) in the Alluvial Association is the most abundant species trapped in areas of succulent vegetation near the banks of the Río Nazas, but in the Desert Association this mammal is found infrequently in coarse grasses and other xeric vegetation.

The relative percentages of mammals trapped show that there are dominant species in each association. Notable, also, is the relationships between groups of allied mammals. The relative percentages of species of Peromyscus trapped in each association shows that, generally, the deer mouse (Peromyscus maniculatus) and the cactus mouse (Peromyscus eremicus) are probably in direct competition for habitat, especially near the junction of the Desert Association and the Mixed Grassland Association. The deer mouse is better adapted to the environment of the Mixed Grassland Association, whereas the cactus mouse occurs more abundantly in the open habitat of the Desert Association. The Nelson pocket mouse (Perognathus nelsoni) and the desert pocket mouse (P. penicillatus) occur together, but differ locally in their relative abundance. Probably these species are not in direct competition for survival as they are found in different micro-habitats.

CHECK-LIST OF EXTANT MAMMALS OF NORTHEASTERN DURANGO

Order Chiroptera - bats

Family Vespertilionidae - common bats

Pipistrellus hesperus australis Miller - western pipistrelle

Eptesicus fuscus pallidus Young - big brown bat

Dasypterus ega zanthinus Thomas - southern yellow bat

Plecotus townsendii australis (Handley) - lump-nosed bat

Anthrozops pallidus pallidus (LeConte) - pallid bat

Order Lagomorpha - hares, rabbits and pikas

Family Leporidae - hares and rabbits

Lepus californicus texianus Waterhouse - black-tailed jackrabbit

Sylvilagus auduboni minor (Mearns) - desert cottontail

Order Rodentia - rodents

Family Sciuridae - squirrels

Spermophilus spilosoma spilosoma (Bennett) - spotted ground squirrel

Spermophilus spilosoma paescens (A.H. Howell) - spotted ground squirrel

Spermophilus variegatus repestis J.A. Allen - rock squirrel

Ammospermophilus interpres (Merriam) - antelope ground squirrel

Family Geomyidae - pocket gophers

Thomomys umbrinus goldmani - pigmy pocket gopher

Thomomys baileyi nelsoni Merriam - Bailey pocket gopher

Cratogeomys castanops excelsus Nelson and Goldman - plateau pocket
gopher

Cratogeomys castanops consitus Nelson and Goldman - plateau pocket
gopher

Family Heteromyidae - pocket mice and kangaroo rats

Perognathus flavus pallescens Baker - silky pocket mouse

Perognathus penicillatus eremicus Mearns - desert pocket mouse

Perognathus nelsoni nelsoni Merriam - Merriam pocket mouse

Perognathus nelsoni canescens Merriam - Nelson pocket mouse

Dipodomys nelsoni Merriam - Nelson kangaroo rat

Dipodomys merriami merriami Mearns - Merriam kangaroo rat

Dipodomys ordii obscurus (J.A. Allen) - ord kangaroo rat

Dipodomys ordii idoneus Setzer - ord kangaroo rat

Family Cricetidae - native rats and mice

Reithrodontomys megalotis megalotis (Baird) - fulvus harvest mouse

Reithrodontomys fulvescens canus Benson - fulvus harvest mouse

Peromyscus pectoralis eremicoides Osgood - white-ankled mouse

Peromyscus eremicus eremicus (Baird) - cactus mouse

Peromyscus maniculatus blandus Osgood - deer mouse

Peromyscus leucopus tornillo Mearns - wood mouse

Sigmodon hispidus berlandieri Baird - hispid cotton rat

Neotoma albigula albigula Hartley - white-throated woodrat

Neotoma albigula durangae J.A. Allen - white-throated woodrat

Neotoma goldmani Merriam - pigmy woodrat

Family Muridae - introduced rats and mice

Mus musculus brevirostris Waterhouse - house mouse

Order Carnivora - carnivores

Family Canidae

Canis latrans mearnsi Merriam - coyote

Vulpes macrotis zinseri Benson - kit fox

Family Procyonidae - racoons and allies

Bassariscus astutus flavus Rhodes - ring-tailed cat

Family Mustelidae - skunks and allies

Mustela frenata neomexicana Barber and Cockerell - ling-tailed weasel

Mephitis macroura milleri Mearns - hooded skunk

Family Felidae - cats

Lynx rufus baileyi Merriam - bobcat

Order Artiodactyla - even-toed ungulates

Family Tayassuidae - peccaries

Pecari tajacu angulatus (Cope) - collared peccary

Family Cervidae - deer

Odocoileus virginianus carminis Goldman and Kellogg - white-tailed

deer

ACCOUNTS OF SPECIES AND SUBSPECIES

Pipistrellus hesperus - western pipistrelle

This bat was observed, or taken, on the desert plains and in the low ranges of mountains where surface water was available. This species is usually the first bat seen in the evening, sometimes as early as 30 minutes before sunset. The specimens from near Mapimí are lighter brown than those collected near Las Nieves; however, all seem to be referable to the subspecies, P. h. australis Miller.

Specimens examined: Four from 3 mi. E Las Nieves, 5400 feet; one from 3 mi. E Conejos, 4000 feet; one from 12 mi. SSW Mapimí, 5000 feet; one from 2 mi. S Palmito, 4850 feet; one from 1½ mi. NE Nazas, 4100 feet.

Eptesicus fuscus - big brown bat

This large bat occurs in and near mountains and on the plains in northeastern Durango. Two specimens were snared, along with two other kinds of bats, in a mist net stretched over a shallow pool of water in a mountain canyon near Mapimí. On geographic grounds specimens from the study area are referred to the subspecies E. f. pallidus Young.

Specimens examined: two from 12 mi. SSW Mapimí, 5500 feet.

Other records: ten mi. WSW Lerdo (Univ. Mich.).

Dasypterus ega - southern yellow bat

One male was snared on a rainy evening after dark, but before 9:00 P.M., in a mist net stretched across a shallow pool of murky water in a narrow mountain canyon in the Sierra de Mapimí.

Heretofore, the only known records of the southern yellow bat in close proximity to the state of Durango, to my knowledge, are listed by Hall and Kelson (1959:194) from Coahuila, Zacatecas and Sinaloa. The present record, considered as belonging to the subspecies D. e. xanthinus Thomas, extends the known range of this species to northeastern Durango. This bat probably also occurs uncommonly in other parts of central Mexico.

Measurements for this specimen (MSU no. 3287) are: total length, 109; length of tail vertebrae, 49; length of hind foot, 10; height of ear from notch, 14; weight 13.7 grams; length of forearm, 43.7; condylobasal length of skull, 16.5; zygomatic breadth, 9; breadth of brain case, 8.4; length of maxillary tooth row, 5.7; breadth across upper canines, 5.8; breadth across upper molars, 7.4.

Specimens examined: one from 12 mi. SSW Mapimí, 5500 feet.

Plecotus townsendii - lump-nosed bat

Four bats were seen in one of the chambers of a cave north of Campana known locally as "La Cueva de los Indios" in late July. Three lump-nosed bats, assigned to the subspecies australis (Handley), along with a pallid bat (Anthrozous pallidus) were snared in a mist net stretched across the entrance. This entrance at 100 yards from the base of a mountain is at the edge of a shelf of limestone (see Plate 2). Guano is reported by residents to be collected each year from this cave. The presence of sizable quantities of guano, but only a few bats in July, may mean that the cave is attractive to bats only at other seasons, perhaps in winter.

Specimens examined: three from 6 mi. N Campana, 3750 feet.

Records in the literature: 12 mi. W Lerdo (Handley, 1959:141).

Antrozous pallidus - pallid bat

This large-eared bat occurs commonly in northeastern Durango where there are suitable daytime retreats. Specimens were taken from caves, adobe houses, trees and in nets stretched over water sources. A mesquite tree was the daytime roost of one pallid bat obtained on the Tres Hermanos ranch. Two pregnant females also were taken there in a mist net stretched over a watering tank on June 26. Four others were shot with a .22 pistol as they flew through the entrance of an abandoned sulfur mine near Conejos. Antrozous was taken at all places in association with either Eptesicus, Pipistrellus, Dasypterus, or Corynorhinus. Durangan specimens are assigned to the subspecies A. p. pallidus (Le Conte).

Specimens examined: five from 3 mi. E Conejos, 4000 feet; 6 from 35 mi. W Mapimí, 5500 feet; one from 6 mi. N Campana, 3750 feet.

Lepus californicus - black-tailed jackrabbit

This jackrabbit is the most conspicuous mammal of the deserts and plains. The jackrabbit is locally variable in numbers; areas where grain is cultivated seemingly support a larger population than areas which are grazed or where cotton is the principal crop. The jackrabbit reportedly was a nuisance and was hunted constantly on the San Javier wheat farm near Mapimí; more than 200 animals were killed there in 1959. On the other hand, field studies indicated that there were few rabbits near Zavalza where cotton was grown. A female taken near

Boquilla on July 12 had three embryos, the largest being 100 millimeters in length. A lactating female was collected near Mapimí in June. The subspecies found in northeastern Durango is L. c. texianus Waterhouse.

Specimens examined: three from 4 mi. NNW Boquilla, 5400 feet; one from 3 mi. E Conejos, 4000 feet; one from 4 mi. W Bermejillo; 4 from 7 mi. NNW La Zarca, 6000 feet; 2 from 35 mi. W Mapimí, 5500 feet.

Sylvilagus audubonii - desert cottontail

Records of this cottontail reported in the literature from northern Durango, as well as records included here, show that this animal is well-established in the Bolson de Mapimí. This rabbit favors desert country where ample cover exists along arroyos and at the bases of low mountains. Cactus and tender growing parts of grasses probably supply the animals' need for moisture in areas where surface water is scarce. Local residents prefer eating the meat of the cottontail, "conejo", to that of the jackrabbit, "liebre". All females collected in 1958 were pregnant; these were taken between June 1 and 18. According to Hall and Kelson (1959:266), the subspecies S. a. minor (Mearns) occurs in the study area.

Specimens examined: one from 4 mi. NNE Boquilla, 5400 feet; one from 35 mi. W Mapimí, 5500 feet; three from 7 mi. NNW La Zarca, 6000 feet.

Other records: ten mi. WSW Lerdo (Univ. Mich).

Spermophilus spilosoma - spotted ground squirrel

This ground squirrel is characteristic of both grassy plains and arid desert in northeastern Durango. These pale-colored animals are active even during the hottest part of the day. They seemingly prefer the open lands where there is sparse grass or brush for cover. Specimens collected in the Mixed Grassland Association were paler in color than those examined from the Desert Association.

Specimens examined: Spermophilus g. pallescens (Bennett): one from 4 mi. NNE Boquilla, 5400 feet; one from 2½ mi. SE Campana, 4100 feet; 4 from 7 mi. NW La Zarca, 6000 feet; one from 35 mi. W Mapimí, 5500 feet. Records in the literature: Río Ocampo (Allen, 1904:209).

Spermophilus variegatus - rock squirrel

The subspecies, rupestris (J.A. Allen), is well-distributed in northeastern Durango. Man-made structures, such as rock fences, have contributed to extensions, locally, of the habitat of the species. Animals were observed among rocks where white-throated wood rats (Neotoma albigula) were ensnared in traps primarily set for rock squirrels. This species is considered a choice, edible animal by ranchers and farmers. Squirrels taken in July and August were in molt.

Specimens examined: one from 3 mi. E Las Nieves, 5400 feet; one from 4 mi. NNE Boquilla, 5400 feet.

Other records: ten mi. WSW Lerdo (Univ. Mich.).

Ammospermophilus interpres - antelope ground squirrel

This ground squirrel, Ammospermophilus interpres (Merriam), lives in arid, rocky areas in the Desert Association. Specimens were collected near Lerdo (Baker, 1954:209) on rocky slopes of low hills similar to areas in the Sierra de Campana where this ground squirrel occurred in association with the rock squirrel (Spermophilus variegatus). One live Ammospermophilus brought into camp by two cowboys, had been trapped in a rocky habitat containing cover of lechuguilla and candelilla. Numerous nematodes of the family Oxyuridae (identified by David Clark of the Department of Microbiology and Public Health at Michigan State University) were found in the caecum of this specimen.

Specimens examined: one from 6 mi. N Campana, 3750 feet.

Other records: four mi. WSW Lerdo, 3800 feet (Univ. Kans.); and 3 mi. SW Lerdo (Univ. Kans.).

Thomomys umbrinus - southern pocket gopher

The subspecies, T. u. goldmani Merriam, is probably restricted to the Bolsón de Mapimí. No specimens were obtained, but mounds of earth, presumed to have been made by this species, were observed on the dike of an irrigation canal on a farm west of Mapimí. Farmers complain that pocket gophers, locally called "topo", cause much damage each year to the dikes. Near Lerdo, specimens were trapped in sandy-loam soils in 1953 by a field party from the University of Kansas.

Records in the literature: one mi. WSW Mapimí, 3000 feet (Univ. Kans.); 4 mi. WSW Lerdo, 3800 feet (Univ. Kans.); Mapimí (Bailey, 1915:95).

Thomomys baileyi - Bailey pocket gopher

This pocket gopher occurs chiefly in loose sandy soils on stream banks. The subspecies, T. b. nelsoni Merriam, ranges northward into Chihuahua along the river valleys. Burrows in Durango often extended to a depth of two feet and were found always within 50 feet of stream banks. Two males and one female were obtained in a narrow ledge of soft earth between a rocky hill and the Río Florida near Las Nieves.

Specimens examined: three from 3 mi. E Las Nieves, 5400 feet; one from 2 mi. S Palmito, 4850 feet.

Cratogeomys castanops - plateau pocket gopher

Easily trapped (and utilized for food by the natives), this large gopher is found in most plains localities in eastern and north-central Durango. The subspecies C. c. consitus (Nelson and Goldman) was collected in the Mixed-Grassland Association where soils were generally deep and sandy and in broad intermontane valleys of the Meseta de Zarca. The subspecies, C. c. excelsus (Nelson and Goldman) has been reported in the literature to occur in the extreme northern part of Durango. The two subspecies seem separated by shallow soils having sparse vegetation. Irrigation ditches near the highway north of Gómez Palacio display typical Cratogeomys burrows in deep, soft soils. Man has probably been a factor affecting the local distribution of this mammal by constructing these artificial habitats. A snake (Pituophis sp.) was found living in the burrow of a gopher near La Zarca.

Specimens examined: Cratogeomys c. consitus: three from 3 mi. E Boquilla, 5400 feet; five from 7 mi. NW La Zarca, 6000 feet.

Other records: Cratogeomys c. excelsus (Nelson and Goldman): 4 mi. WSW Lerdo (Univ. Kans.), 10 mi. WSW Lerdo, 3800 feet (Univ. Mich.).
Reported in the literature: Tlahualilo (Nelson and Goldman, 1934:144).

Perognathus flavus - silky pocket mouse

This small pocket mouse was trapped in all associations. It is difficult to estimate the abundance of this animal due to difficulty in obtaining it. Seemingly, it prefers open areas with grass or bushy plants as cover. This species was found well-established in an over grazed pasture in central Durango by a field party from the University of Kansas in 1955. Specimens collected at La Zarca and near Boquilla in the Mixed Grassland Association were darker across the upper parts than those trapped in light, sandy soils in the Desert Association. However, all specimens are assignable to P. f. pallescens Baker.

Specimens examined: six from 3 mi. NNW Boquilla, 5400 feet; one from 7 mi. N Campana, 4100 feet; 5 from 7 mi. NNW La Zarca, 6000 feet; 5 from 35 mi. W Mapimí, 5500 feet; 3 from 1½ mi. NW Nazas, 4100 feet.

Other records: one mi. WSW Mapimí, 3800 feet (Univ. Kans.). Reported in the literature: 4 mi. WSW Lerdo, 3800 feet (Baker, 1954:346).

Perognathus penicillatus - desert pocket mouse

The desert pocket mouse and the Nelson pocket mouse often occur together where soils are suitable. The desert pocket mouse prefers open areas with scattered shrubs, and avoids coarse, rocky soils. The subspecies, eremicus Mearns, was found to be as common in the Desert Association (19 percent of all small mammals trapped) as in the Mixed Grassland Association (18 percent of all small mammals trapped).

Specimens examined: five from 6 mi. E Zavalza, 5150 feet; 7 from 7 mi. NW Yermo, 3900 feet; 5 from 7 mi. NW Conejos; 2 from 7 mi. N Campana, 3750 feet; 12 from 7 mi. NW La Zarca, 6000 feet; 8 from 35 mi. W Mapimí; 3 from 1½ mi. NW Nazas, 4100 feet; 2 from 13 mi. N Gómez Palacio; one from 2 mi. W Mapimí; one from 7 mi. W Mapimí.

Other records: 10 mi. WSW Lerdo, 3800 feet (Univ. Mich.). Records in the literature: Mapimí (Osgood, 1900:49).

Perognathus nelsoni - Nelson pocket mouse

Inhabiting coarse soils with spotty vegetation adjacent to rocky areas, the Nelson pocket mouse is a characteristic small mammal in all associations. Perognathus n. nelsoni Merriam is found in the Mixed Grassland Association and the Alluvial Association, and P. n. canescens Merriam, on the other hand, is found where light soils prevail in the Desert Association. Where P. nelsoni and P. pencillatus occurred in the same general locality, pencillatus usually was trapped at a somewhat lower elevation.

Specimens examined: three from 6 mi. E Zavalza, 5150 feet; one from 7 mi. NW Yermo, 3900 feet; one from 7 mi. NW La Zarca, 6000 feet; 3 from 35 mi. W Mapimí, 5500 feet.

Other records: one mi. WSW Mapimí (Univ. Kans.).

Dipodomys merriami - Merriam kangaroo rat

The Merriam kangaroo rat, assigned to the subspecies merriami Mearns, is confined to sandy and coarse soils where vegetation is sparse

in the study area. Grassy slopes at higher elevations in the western part of the Mixed Grasslands Association seemingly are unoccupied by this species, whereas this mammal was easily trapped at lower elevations in the Mixed Grassland Association and in the Desert Association. The Merriam kangaroo rat was taken in association with D. nelsoni and D. ordii.

Specimens examined: four from 6 mi. E Zavalza, 5150 feet; 3 from 7 mi. NW Yermo, 3900 feet; one from 7 mi. NNW Conejos; 3 from 3 mi. E Conejos, 4000 feet; 5 from 7 mi. NW La Zarca, 6000 feet; 9 from 35 mi. W Mapimí, 5500 feet; one from 7 mi. SW Cadena, 4100 feet.

Dipodomys ordii - Ord kangaroo rat

The subspecies obscurus (J.A. Allen) inhabits grassy areas in the Mixed Grassland Association and slightly differs morphologically (Setzer, 1949:547) from D. o. idoneus Setzer which is found at lower elevations in the Mixed Grassland Association and in the Desert Association. The Ord kangaroo rat and Merriam kangaroo rat occur together in the study area with more ordii than merriami being trapped. Since Baker (1956:246) and Dalquest (1953:114) have suggested that ordii are less likely to be attracted to traps than merriami, the high number of ordii trapped in the study area might indicate a relatively high population.

Dale (1939:730) points out environmental factors which influence the abundance and distribution of kangaroo rats in general; viz, arid or semi-arid climate, proper drainage, any combination of soil and climatic factors to provide an abundance of seed plants with light ground cover, provision for shelter and available dusting places for a part

of the year. The Bolsón de Mapimí provides ideal environment for the kangaroo rat, "tusa", shown by the abundance of burrows found throughout the area.

Specimens examined: Dipodomys o. idoneus: five from 6 mi. E Zavalza, 5150 feet; 13 from 35 mi. W Mapimí, 5500 feet; 2 from 1½ mi. NW Nazas, 4100 feet; and reported in the literature: one mi. WSW Mapimí and 5 mi. SE Lerdo (Hall and Kelson, 1959:514); 12 mi. SSW Lerdo (Univ. Mich.). Dipodomys ordii obscurus: four from 3 mi. E Las Nieves, 5400 feet; 4 from 4 mi. NNE Boquilla, 5400 feet; 8 from 7 mi. NW La Zarca, 6000 feet.

Reithrodontomys fulvescens - fulvous harvest mouse

The fulvous harvest mouse, assigned to the subspecies canus Benson, is found in heavy or sparse grass, principally along arroyos where there is cover of shrubby vegetation, and may be found in association with Peromyscus leucopus. This widely ranging species is probably found in most localities in the Mixed Grassland and Alluvial Associations.

Specimens examined: two from 3 mi. E Las Nieves, 5400 feet.

Reported in the literature: 14 mi. E Zarca (Hooper 1952:98).

Reithrodontomys megalotis - western harvest mouse

This harvest mouse is found in habitats similar to those used by R. fulvescens and the two species have been collected together at the same locality (see Hooper, 1952:98). These mice seemingly are

restricted to grassy areas in plains and intermontane valleys in higher elevations of the Mixed Grassland Association. On geographic grounds, the subspecies megalotis Baird is the assignment of this specimen.

Specimens examined: one from 4 mi. NNE Boquilla, 6300 feet.

Reported in the literature: 14 mi. E La Zarca (Hooper, 1952:55).

Peromyscus eremicus - cactus mouse

The cactus mouse, assigned to the subspecies eremicus (Baird) was taken in all associations in northeastern Durango. Generally the species occurred where vegetation was scarce on both rocky and fine soils under cover of Opuntia, Acacia and Yucca. Reports in the literature, as well as locality records from the study area, show that this species is widely distributed in northeastern Durango, but prefers the desert-type habitat. Probably the animal gradually becomes less common in the higher grasslands to the westward. Three pregnant females and one lactating female were trapped in late June and early July.

Specimens examined: four from 6 mi. E Zavalza, 4150 feet; 5 from 7 mi. NW Yermo, 3900 feet; 4 from 7 mi. N Campana, 3750 feet; 6 from 3 mi. E Las Nieves, 5400 feet; 4 from 3 mi. E Conejos, 4000 feet; one from 4 mi. W Mapimí; one from 7 mi. NW La Zarca, 6000 feet; 3 from 2 mi. S Palmito, 4850 feet.

Other records: 2 mi. ENE Mapimí, 3800 feet (Univ. Kans.); one mi. WSW Mapimí, 3800 feet (Univ. Kans.); 4 mi. WSW Lerdo, 3800 feet (Univ. Kans.); 5 mi. SE Lerdo, 3800 feet (Univ. Kans.). Reported in the literature: Lerdo and Indé (Osgood, 1909:242).

Peromyscus pectoralis - white-ankled mouse

The white-ankled mouse was trapped in rocky areas by clumps of lechguilla, candalilla, and prickly pear in the Desert Association, whereas they were taken on flats below rocky areas in the Grassland Association and in the higher elevations of the Alluvial Association. The species occupied local habitats where, seemingly, other Peromyscus (maniculatus, eremicus and leucopus) did not occur; similar relationships have been reported by Dalquest (1953:145) and Baker (1956:269). This specimen has been assigned to the subspecies eremicoides Osgood on geographic grounds.

Specimens examined: two from 3 mi. E Las Nieves, 5400 feet; one from 4 mi. NNE Boquilla, 5400 feet; one from 3 mi. E Conejos, 4100 feet; one from 35 mi. W Mapimí, 5500 feet; one from 12 mi. SSW Mapimí, 4850 feet; one from 4½ mi. W, ½ mi. S Cadena.

Peromyscus maniculatus - deer mouse

The distribution of the deer mouse, P. m. blandus Osgood, is spotty, but there is a greater population where there is a greater cover of grass, with shrubs, such as lechuguilla, prickly pear, mesquite and shrubby catclaw. The distribution of P. maniculatus coincides in this area with that of P. eremicus, and the pale color of P. maniculatus resembles that of P. eremicus. Three females trapped in August were pregnant.

Specimens examined: 6 from 6 mi. E Zavalza, 4150 feet; 14 from 7 mi. NW Yermo, 3900 feet; one from 4 mi. NNE Boquilla, 5400 feet; one from 7 mi. NW La Zarca, 6000 feet; 6 from 35 mi. W Mapimí, 5500 feet;

8 from 2 mi. S Palmito, 4850 feet.

Reported in the literature: Indé, Villa Ocampo (Osgood, 1909:86).

Peromyscus leucopus - white-footed mouse

The white-footed mouse P. l. tornillo Mearns, prefers lowlands in the Mixed Grasslands and Alluvial Associations where there is grassy or bushy cover along streams or near the bases of mountains. This subspecies seemingly reaches the southern edge of its range in northern Durango. The white-footed mouse and the fulvous harvest mouse (Reithrodontomys fulvescens) were taken together in the same habitat near Las Nieves.

Specimens examined: two from 3 mi. E Las Nieves, 5400 feet; five from 1½ mi. NW Nazas, 4100 feet.

Reported in the literature: Rosario, (Osgood, 1909:26).

Sigmodon hispidus - hispid cotton rat

The widely distributed cotton rat, assigned to the subspecies berlandieri Baird, occurs commonly along the valley of the Río Nazas where vegetation is thick and succulent; seemingly, it was the most abundant species in and around agricultural areas near Nazas. The rodent also occurred in an arid situation in the Desert Association (near Yermo) under cover of mesquite in sparse, dried grass. Baker (1956:276) reports that the cotton rat was collected in Coahuila in similar arid habitat in clumps of grass under cover of prickly pear.

Specimens examined: six from 1½ mi. NW Nazas, 4100 feet; one from 7 mi. NW Yermo, 3900 feet. Other records: from 10 mi. WSW Lerdo,

3800 feet (Univ. Mich.).

Neotoma albigula - white-throated wood rat

The white-throated wood rat was trapped where soils were coarse and the vegetation diverse, generally, but rocky outcroppings and man-made structures, such as fences constructed of rocks, are ideal habitats. The subspecies, durangae J.A. Allen, is a typical mammal of higher elevations in the Mixed Grassland Association, but it also occurs in river valleys of the Alluvial Association. Neotoma a. albigula Hartley is probably restricted to the Desert Association and to arid parts of the Alluvial Association.

Specimens examined: Neotoma a. durangae: one from 3 mi. E Las Nieves, 5400 feet; 2 from 4 mi. NNE Boquilla, 5400 feet; 6 from 7 mi. NW La Zarca, 6000 feet; reported in the literature: Indé (Goldman, 1910:38). Neotoma a. albigula: one from 6 mi. E Zavalza, 5150 feet; one from 7 mi. NW Conejos, 4100 feet; 4 from 2 mi. S Palmito, 4850 feet; other records from 10 mi. WSW Lerdo (Univ. Mich.); recorded in the literature from Mapimí (Goldman, 1910:33).

Neotoma goldmani Merriam - Goldman's wood rat

Records in the literature indicate that this wood rat is restricted to arid situations in the Bolsón de Mapimí. It probably occurs uncommonly in the intermontane valleys into the Grassland Association.

Records: one mi. SSE Mapimí, 4100 feet (Univ. Kans.).

Reported in the literature: four mi. WSW Lerdo, and 5 mi. SSW Lerdo (Rainey and Baker, 1955:623).

Murid rodents

The house mouse (Mus musculus) and probably the Norway rat (Rattus norvegicus) occur in all areas inhabited by Man. No special attempt was made to collect these introduced species, although a number of house mice were collected in the summers of 1958 and 1959. In the valley of the Río Nazas, the house mouse was trapped in thick stands of vegetation adjacent to fields of squash and corn.

Specimens of Mus musculus examined: one from 3 mi. E Conejos, 4100 feet; one from 4 mi. NNE Boquilla, 5400 feet; 10 from 1½ mi. NW Nazas, 4100 feet.

Reported in the literature: Boquilla (Allen, 1903:598).

Canis latrans - coyote

The coyote, Canis latrans mearnsi Merriam, is widespread in northeastern Durango and is found on some occasions far from water. Reportedly, the coyote is a nuisance in some localities; Frederico Hermosillo reports that coyotes killed goats and sheep on his ranch. One ranch hand was assigned the job of killing the coyote whenever possible, and since then (three years ago) there has been a decline in the number of coyotes seen, and also an increase in the number of jack-rabbits seen. Reportedly, more than two hundred rabbits were killed within a half mile of the ranch house in 1959. More than a score of

coyotes had been trapped during the spring and summer of 1958 on the Guitarra ranch north of Zarca; the foreman of the ranch reported that the coyote harasses the cattle. Traps, mostly, are used by the hunter to take coyotes, and a bounty is usually paid by the owner of the ranch or farm to which the carcass is brought.

Specimens examined: fifteen (M.S.U. nos. 3546-3560) from 7 mi. NW La Zarca, 6000 feet; one from 4 mi. NNE Boquilla, 5400 feet.

Vulpes macrotis - kit fox

This small, pale-colored mammal prefers the desert plains of the Bolsón de Mapimí to less arid conditions at higher elevations. Ranchers in northeastern Durango report that the kit fox is rarely seen and that it was more abundant in previous years. This species is referable to V. m. zinseri Benson.

Measurements of one skull (M.S.U. no. 3563) are: condylobasal length, 112.4; alveolar length of maxillary tooth row, 52.4.

Specimens examined: one from 7 mi. NW La Zarca, 6000 feet.

Other records: 8 mi. S and 11 mi. W Lerdo (Baker, 1956:296).

Bassaricus astutus - ring-tailed cat

The ring-tailed cat, B. a. flavus Rhodes, occurs in rocky areas in the valley of the Río Nazas and where permanent water is available in the Mixed Grassland Association. According to farmers near Nazas, ring-tailed cats cross the river each year to feed on crops such as squash and corn, and live in the trees instead of their regular rocky

retreats higher in the hills. A ring-tailed cat was observed at night while it climbed easily over the limbs of the cottonwood trees, appearing quite distinct amid the leaves.

Specimens were acquired from a lad who had dislodged two immature male ring-tailed cats from a small cottonwood tree at dusk. The lad's donkey, nearly hit by the falling creatures, was frightened and killed both animals with its hooves. The specimens were not badly damaged and the boy planned to sell them in the town market where each hide would be worth up to 14 pesos (about \$1.16). Women use the pelts for trim on coats, he reported. Plate 6 illustrates the habitat from where these specimens were collected.

Specimens examined: two (M.S.U. nos. 4105, 4106) from $1\frac{1}{2}$ mi. NW Nazas, 4100 feet.

Mustela frenata - long-tailed weasel

The long-tailed weasel, M. f. neomexicana Barber and Cockerell, is known well by the inhabitants of villages between Lerdo and Tlahualilo where the weasel, known locally as "onza", is abundant along irrigation canals adjacent to the cultivated fields. A specimen collected in August was shot as it crossed the highway at noontime; a first shotgun blast, a near miss, did not affect the small carnivore which presumably was preoccupied with the hunting of ground squirrels which were seen in the brush by the side of the road.

Measurements: total length, 420; length of tail, 162; length of hind foot, 41; height of ear from notch, 24; weight, 2505 grams.

Specimens examined: one (M.S.U. no. 4107) from 1½ mi. W Gregorio Garcia, 3750 feet.

Mephitis macroura - hooded skunk

Three hooded skunks, M. m. milleri Mearns, were taken with steel traps set primarily for coyotes, along arroyos where vegetation was thick. Ranchers in northeastern Durango report that the skunk, known to residents as "zorillo", is not a nuisance, although most cowboys kill them whenever possible.

Specimens examined: three from 7 mi. NW La Zarca, 6000 feet.

Lynx rufus - bobcat

The bobcat, assigned to the subspecies L. r. baileyi Merriam, is found chiefly in the thick brush in the Grassland and Alluvial Associations, but is also reported by residents to occur in brushy areas in isolated mountains throughout the Desert Association. The bobcat, known to Mexicans as "gato montez", rarely preys on domestic stock, but occasionally one will be trapped in a steel set placed for a coyote.

Specimens examined: one from 7 mi. NW La Zarca, 6000 feet.

Pecari tajacu - collared peccary

The collared peccary, P. t. angulatus (Cope), is reported by the local herdsmen as numerous in intermontane valleys near Mapimí. The arid plains south of the Pelayo Ranch support numerous peccaries,

according to Mr. N.B. Honeycutt, rancher and owner of the Pelayo. Hoof prints of the peccary, known as "jabali" to residents, were observed in the mud near a dirty pool of water in a mountain canyon south of Mapimí. Peccaries are taken for their meat whenever possible, but seldom hunted for sport in northeastern Durango because of the inaccessibility of the area to sportsmen.

Odocoileus virginianus - white-tailed deer

Panfilo Sanchez of Torreón, Coahuila, whose office is adorned with trophy heads taken from nearby Durango, pointed out areas in the Bolsón de Mapimí in northeastern Durango where he had killed white-tailed deer and pronghorn in years past, but remarked that the white-tailed deer may be missing from these areas today. Reports from local residents indicate that deer still are there, but at higher elevations. Probably this mammal, referred to the subspecies carminus Goldman and Kellogg, occurs throughout the Mixed Grassland Association and at higher elevations in the Alluvial Association and Desert Association.

HYPOTHETICAL LIST OF ADDITIONAL MAMMALS

The opossum, cave myotis, free-tailed bat, ^{white-sided} ~~Gaillards~~ jackrabbit, mule deer, gray fox, mountain lion and pronghorn are omitted from accounts of species due to insufficient evidence of their recent occurrence in northeastern Durango, but should be mentioned as possible inhabitants.

Didelphis marsupialis - Virginia opossum

Residents in the valley of the Río Nazas claim that the opossum, known as "talcuache", is a common mammal in areas adjacent to the river valley. Probably it occurs uncommonly in cultivated areas between the valley of the Río Nazas and Tlahualilo.

Myotis velifer - cave myotis

The cave myotis probably occurs throughout northeastern Durango, where suitable daytime retreats exist. Baker (1956:178) reports a cave myotis from the Río Aguanaval in southwestern Coahuila. Hall and Kelson (1959:165-166) map the range of velifer as including the Bolsón de Mapimí.

Tadarida brasiliensis - Mexican free-tailed bat

Baker (1956:191) reports several free-tailed bats collected from the valley of the Río Aguanaval; bats would likewise be expected to occur in the valley of the Río Nazas.

Lepus mexicanus - white-sided jackrabbit

This large jackrabbit occurs where grasslands are interspersed with pine and oak, possible in the Mixed Grassland Association at higher elevations.

Urocyon cinereoargenteus - gray fox

This animal occurs in open desert and plains, as well as in mountains. Residents in northeastern Durango have reported this mammal as occurring near the base of the Meseta de Zarca.

Felis concolor - mountain lion

Lewis Wheless reported that the mountain lion had been troublesome on the Cortijo Ranch by killing cattle and horses. An arroyo where a female and cub were killed several years ago was inspected for sign, but none was seen. The hides of these lions had been taken to the local market place and sold, according to Mr. Wheless.

Odocoileus hemionus - mule deer

Panfilo Sanchez of Torreón reports that there still may be mule deer in the Sierra Mojada in southeastern Chihuahua and in the Sierra Tlahualilo in southwestern Coahuila. The mule deer had been hunted near Gómez Palacio in years past, reported Sanchez. Outdoor Life Magazine (Feb. 1955, 15(2): 58-59, 71-72) reports the mule deer near Gómez Palacio.

Antilocapra americana - pronghorn antelope

Leopold (1947:438) reports that the range of the pronghorn includes parts of Durango. Panfilo Sanchez reported hunting the pronghorn, known as "berenda", near Gómez Palacio in years past. Peter Barboglio relates

that a small herd of pronghorn stays in the vicinity of his ranch northwest of Zarca, and that during the past few years the size of the herd has visibly diminished.

SUMMARY

Forty-two kinds of mammals, occurring in northeastern Durango, were studied to determine their distribution, relative abundance, and the effect of land use on their distribution. Three arbitrary plant-soil associations were delineated to facilitate the separation of small mammal populations. The relative trapping percentages provide information concerning the preference of habitat and competition between both closely related and unrelated mammals. Evidence obtained during two summers of study shows that increased utilization by man of previously undisturbed areas has adversely affected the status of game and locally diminished populations of many small mammals. Effective limitations should be imposed on land use measures if natural floral and faunal populations are expected to survive.

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