

THE CHIHUAHUAN DESERT

510 The Chihuahuan Desert occurs in the United States as a band
 across west Texas (from between 102° to 103° westward),
 including the Big Bend area and the area between the cities of
 Pecos and El Paso. In New Mexico, the Chihuahuan is
 represented as four fingerlike projections. The smallest is the
 easternmost portion, which lies just west of Carlsbad and
 extends to slightly northwest of Artesia. The second finger
 includes White Sands National Monument near Alamogordo,
 and continues to north of Tularosa. The third area extends the
 farthest north, covering the valleys from Las Cruces to a point
 just north of Socorro. Each of these extensions runs from north
 to south between mountain ranges. The fourth finger,
 interrupted by mountains, extends in a northwest direction to
 Clifton, Arizona, and to areas near Benson. Several sites
 farther into Arizona have isolated patches of Chihuahuan
 Desert vegetation, especially on limestone outcrops, but
 because these sites are so remote from the main body of the
 Chihuahuan, they lack the characteristic vertebrate species
 found in areas closer to the Arizona-New Mexico border.
 Limestone outcrops in the Santa Catalina Mountains just
 outside of Tucson contain some of these vegetation patches.
 In Mexico, where the Chihuahuan Desert is much more
 extensive, it occupies considerable portions of the states of
 Chihuahua, Coahuila, Zacatecas, and San Luis Potosí. Smaller
 sections of Durango, Nuevo León, and Hidalgo are also a part
 of this desert.

The Chihuahuan Desert is an area of high elevations. The
 lowest portions, at about 1000 feet, are on the Rio Grande
 River, and the highest portions, in Mexico, may exceed 6500
 feet. A more typical limit in the United States is 5000 feet,
 and 3500- to 4200-foot elevations represent a characteristic
 range. These high elevations are related to the cool winters
 experienced in the Chihuahuan Desert, especially in the
 portions that lie in the United States, where nighttime
 temperatures drop below freezing at least one hundred times
 per year. Do not let the cool winters mislead you, however:
 Summer temperatures are high, and the climate overall is
 moderate compared to those of continental nondesert areas.
 Rainfall varies from 7.8 inches a year to nearly twelve,
 particularly at high sites. Areas with more than ten inches per
 year are often those that, while currently supporting desert
 vegetation, were desert grasslands at one time until
 overgrazing turned them into deserts. While rainfall is
 characteristically a summer phenomenon, winter rains and
 snow do occur, although snow never remains on the ground
 for long. The winter precipitation is sufficient in some areas
 for winter annuals to occur.

The Chihuahuan lies within an area surrounded by the Rocky
 Mountains, the Sierra Madre Oriental, and the Sierra Madre
 Occidental. Like other North American deserts, it consists of
 alluvial plains, bajadas, and scattered mountains. Nearly
 eighty percent of the entire area is dominated by soils that are
 derived from calcareous parent materials. Such desert areas
 may also contain volcanic materials, generally of Eocene-

Miocene derivation (58 to 13 million years ago). Where volcanism has occurred, you may observe complex mosaics of soils and their attendant vegetations.

The combination of relatively high rainfall, high-calcium soils, and cool temperatures during parts of the year promotes the establishment of grasses, yuccas, and agaves. They give the Chihuahuan Desert a different, nontropical character compared with the Sonoran Desert. In many sites, the distinction between desert and grassland is virtually impossible to draw.

Plant Life

The most prevalent lowland vegetation type in the Chihuahuan Desert is dominated by Creosote Bush (plate 21). The genetic makeup of Creosote Bush differs in each of our hot deserts, and you can sometimes recognize the origin of a particular plant by its appearance. The Chihuahuan plants are not as densely leaved as the others and they have straighter stems. Along with Creosote Bush you may encounter Tarbush, a species that is often prevalent enough to rank as a co-dominant; at some sites it may even be dominant. The distribution of Tarbush in the United States essentially outlines the Chihuahuan Desert, and it is thus often considered to be a good indicator of a true Chihuahuan habitat.

Both Tarbush and Creosote Bush prefer calcareous soils. Creosote Bush in particular requires well-drained sites and thus is associated with calcareous gravels, often underlain by a layer of caliche. Other species you are likely to see in these areas include Mariola, a very pungent-leaved shrub. On some sites you may observe Honey Mesquite, though it is usually more abundant in sandy areas along washes or fringing the edges of playas. Often, if the area has been grazed, Snakeweed may be a dominant. The presence of Snakeweed is a good indicator of land disturbance, and its dominance suggests a history of overgrazing. Similarly associated with disturbed areas is the Russian Thistle, or Tumble Weed. The globular skeletons of this species accumulate as they are caught in fences along highways, and the succulent bright green living plants line road edges in all of our deserts. Russian Thistle produces plant material with a high energy content while using very little water. Its skeletons can be pressed into fire logs.

Rounding out the rather austere set of Chihuahuan woody perennials are an occasional yucca, particularly Soap-tree Yucca, a Mormon tea (*Ephedra*), and one or two species of *Opuntia*, either a prickly pear or a cholla.

As unprepossessing as these sites appear at first glance, they may contain up to thirty species of annuals and many small perennial forbs. Among the forbs, Desert Marigold is conspicuous. This yellow-flowered species with powdery-gray leaves occurs as one of the most readily apparent plants along highway edges in all our hot deserts. Because of the water available from pavement runoff, some individuals are in bloom nearly every month of the year.

Creosote Bush
Larrea tridentata
342

Tarbush
Flourensia cernua
350

Mariola
Parthenium incanum
356

Honey Mesquite
Prosopis glandulosa
308, 321

Snakeweed
Xanthocephalum sarothrae
341

Tumble Weed
Salsola kali

Soap-tree Yucca
Yucca elata
328

Desert Marigold
Baileya multiradiata
128

Desert Zinnia
Zinnia acerosa

Little Golden Zinnia
Zinnia grandiflora
138

Fluffgrass
Erioneuron pulchellum
361

Desert Holly
Perezia nana

Buffalo Gourd
Cucurbita foetidissima
140

Banana Yucca
Yucca baccata
336

Lechuguilla
Agave lecheguilla
337

Goldeneye
Viguiera stenoloba

Feather Dalea
Dalea formosa
49

Rubber Plant
Jatropha dioica

False Agave
Hechtia texensis

Other forbs that recur include the white-flowered Desert Zinnia and the yellow-flowered *Zinnia grandiflora*. On some sites, and commonly along roads, the purple flowers of one of the species in the genus *Solanum* may be common and conspicuous. When the light is just right, small, dense tufts of silver or gold may bring to your notice a small, compact plant, Fluffgrass. Similar areas contain the holly-like leaves of Desert Holly. Also in low areas, particularly on sandy soil or less frequently along road edges, are one or two species of gourds, especially the Buffalo Gourd. This trailing vine has large, heart-shaped leaves and occurs in all of our hot deserts. As you proceed up a bajada, there is an increase in yuccas and agaves (plate 20). One yucca in particular, Soap-tree Yucca, dominates vast areas of the Chihuahuan Desert. Also occurring in the Sonoran Desert and on some grassland sites, it can reach fifteen feet in height and its tall flowering stalks, covered with creamy flowers and set off against an azure desert sky, can be an impressive sight. The Banana Yucca is also found in this habitat. Its stout leaves and blue-gray color make it easily recognizable.

A narrow-leaved agave, Lechuguilla, is often mistaken for a yucca. This species is another good indicator of the Chihuahuan Desert, although its range does not extend very far into New Mexico.

Agaves have long been used by man. Evidence taken from sites in Mexico reveal that agave fibers were used more than 9000 years ago. Fibers from Lechuguilla can be made into nets, baskets, mats, ropes, and sandals. Its stems yield a soap substitute, and its pulp has been used as a spot remover. Certain compounds in Lechuguilla are poisonous, and the Tarahumara Indians in Mexico once used these compounds on their arrows and in water to poison fish. Livestock can die from eating the leaves during a drought when the succulent Lechuguilla leaves become the forage of last resort.

On the mainland areas of North America, not counting Baja California, there are some 136 species of agaves. Nine occur in the Chihuahuan Desert, five in the United States portions. Various species are used to produce drinks such as the fermented aguamil or pulque, or the fermented and distilled mescal or tequila. Desert species of agaves are generally not used to produce these beverages.

Remaining on the slopes, you might encounter the Goldeneye or the more showy Feather Dalea, whose range includes oak woodlands, where it provides food for deer.

The Rubber Plant also grows in such areas, although its distribution is spotty. Rubber Plants form colonies of highly flexible, reddish-brown stems, leafless for long periods. When a stem is injured, a yellowish watery substance, which may turn red in color, is exuded. The species has a variety of medicinal uses. The roots, for example, were chewed to relieve toothaches. It occurs as far North as the Guadalupe Mountains, but is a much more common species in the Big Bend area. In some sites in west Texas the hillsides may foster a mixture of Lechuguilla and its look-alike, False Agave, a

- Ocotillo
Fouquieria splendens
335
- Candelilla
Euphorbia antisiphilitica
- Ratany
Krameria parvifolia
56
- Texas Silverleaf
Leucophyllum frutescens
47
- Parry's Century Plant
Agave parryi
339
- Harvard Agave
Agave harvardiana
- Bear Grass
Nolina microcarpa
- Sacahuista
Nolina texana
- Sotol
Dasyliirion wheeleri
338
- Prickly Pear Cactus
Opuntia phaeacantha
- Texas Prickly Pear
Opuntia lindheimeri
- Tree Cholla
Opuntia imbricata
333
- plant with spiny, reddish leaves that belongs to the same family as the pineapple, Bromeliaceae. Ascending further, the numbers of Ocotillo increase. The spiny branches of this species are sometimes planted as cuttings, which root to create an impenetrable living fence. Also present in such areas, but primarily from the Big Bend southward, are eye-catching clusters of the rod-like branches of Candelilla. This species is often pirated from Big Bend National Park because its juices can be used to produce candles, shoe polish, and a variety of other products. In Mexico it is alleged to be a treatment for venereal disease—hence its species name *antisiphilitica*. Ratany is frequently found on Chihuahuan Desert slopes, but its distribution includes all our hot deserts. The purple flowers of Ratany, while quite showy, are upstaged by an even more handsome plant found in the Texas portions of the Chihuahuan Desert, Texas Silverleaf. It and its smaller cousin, *Leucophyllum minus*, have soft gray leaves. They are covered with lavender flowers following rains, a habit from which they derive their other common name, Barometer Bush. As you further ascend the bajada, you note more grassland or a combination of desert and grassland elements (plate 19). Here there are more species of yucca and more agaves. Large-leaved agaves like Parry's Century Plant in New Mexico and Texas and the Harvard Agave in Texas become abundant, and their flowering stalks, new and old, dot the horizon. Also in this zone are two unusual members of the lily family. The first comprises a small group of species that look like large bunch-grasses—the bear grasses, or nolinias. Bear Grass occurs in Arizona and New Mexico, but in Texas it is replaced by Sacahuista. The fact that these plants are not grasses becomes obvious when they put up their flowering stalks, tall structures somewhat like yucca stalks but more intricate and covered with numerous small flowers. Mixed in with the nolinias are the sotols (*Dasyliirion*). In New Mexico, *D. wheeleri* predominates, while in Texas, *D. leiophyllum* replaces it. These species have numerous prickles along the margins of their leaves, and their leaf bases are expanded to form a spoonlike structure. Sotols have a wide distribution and can also be found in the Sonoran Desert/grassland transition. Of course, this upper elevational aspect of the Chihuahuan Desert is marked by the presence of numerous grasses. Up to this point I have not mentioned the Chihuahuan Desert cacti. It is difficult to know where to begin—there are so many interesting species that might catch your eye. By far the most conspicuous prickly pear is *Opuntia phaeacantha*. To naturalists, this is a complex species composed of numerous varieties, some of which are found in the same place and interbreed. A somewhat similar species is the Texas Prickly Pear. A horticultural variety of the prickly pear that has long narrow tongue-like pads is called the Cow's Tongue. It is often grown around houses in the towns of arid areas. One of the largest, most noticeable chollas is the Tree Cholla,

- Desert Christmas Cactus
Opuntia leptocaulis
162
- Clavellina
Opuntia schottii
- Turk's Head
Echinocactus horizonthalonius
- Horse Crippler
Echinocactus texensis
- Peyote
Lophophora williamsii
37
- Whitethorn
Acacia neovernicosa
- Sandpaper Bush
Mortonia scabrella
- Little Leaf Desert Sumac
Rhus microphylla
- Apache Plume
Fallugia paradoxa
96
- Crucifixion Thorn
Koeberlinia spinosa
- a species whose dark green branches have a purple or reddish cast. Usually its spines are red or pink, but a variety in the Big Bend has silver spines. The smaller, but generally more common, Desert Christmas Cactus is abundant throughout the desert. A clump or mat-forming cholla, Clavellina, occurs in western Texas. These plants may form mats that are up to ten feet in diameter, but are only about four inches high. Several species of hedgehog cacti occur in the Chihuahuan Desert. Their cylindrical stems branch near the ground; they form tight groups, with up to five hundred stems in a patch. Small barrel-like cacti of the genus *Echinocactus* are represented throughout the Chihuahuan by the Turk's Head and by the Horse Crippler. Perhaps the most notorious of the Chihuahuan Desert cacti is the Peyote. This species has a very limited distribution in the Big Bend area, where it occurs on the limestone soils of both hills and flats. Its gray color and low profile make it very difficult to find. It has been so thoroughly collected that it is no longer common anywhere you are likely to travel. The small, attractive cacti of the genus *Mammillaria* are relatively abundant, but there is very little agreement among specialists as to how many species exist anywhere, particularly in the Chihuahuan Desert. A recent analysis of the entire United States lists thirteen species, but some popular works list fourteen species in the Big Bend area alone. Suffice it to say, these pincushions, fishhooks, or cob cacti are abundant, especially beneath shrubs. There are many other cacti to see in the Chihuahuan. Good luck in trying to identify them. You'll need it! Variants of the vegetation types we have discussed also occur in the Chihuahuan. In fairly extensive areas, Creosote Bush is associated with Whitethorn. This acacia, identified by its white thorns arising from reddish-brown stems, is common in many areas on limestone slopes and along washes, including the outlying Chihuahuan Desert sites in Arizona, especially near Tombstone. As a dominant vegetation, Whitethorn is most common in Texas. Associated with Whitethorn is Sandpaper Bush. In some places this shrub, with its small, rough, yellowish-green leaves curled against the stem, can comprise all the plant cover, especially on limestone sites. Another form of Sandpaper Bush occurs in the Mojave Desert, even into the Virgin River highway gorge (I-15), on the Utah-Arizona border. Other plants that may catch your attention include Little Leaf Desert Sumac. This species occurs throughout the Chihuahuan on sandy and gravelly soils, often along washes, where it may mix at cooler sites with Apache Plume. The purplish, feathery fruit of Apache Plume makes it an easy species to recognize. A rather ominous looking plant found on the sandy soils of the Creosote Bush plains is the Crucifixion Thorn. Crucifixion Thorn resembles a pile of stout, dark green thorns (actually branches), which are not brightened up much by its black fruits. Its distribution rather closely follows the Chihuahuan Desert limits into Mexico.

Graythorn
Ziziphus obtusifolia

Tobosa
Hilaria mutica

Burrograss
Scleropogon brevifolius

Four-wing Saltbush
Atriplex canescens
352

Gypsum Grama
Bouteloua brevisetata

Another thorny plant, but one with much less robust branches and small leaves, is Graythorn, a species most frequently found on slopes. Here its fruits are eaten by birds.

A few other local habitats should be mentioned. In swales, a different group of plants exists. The most obvious is a coarse grass, Tobosa. It is often joined by Burrograss and the familiar Four-wing Saltbush.

A common group of species that occurs on gypsum soils includes Soap-tree and Little Leaf Desert Sumac. These are often joined on such sites by a matted plant spreading from a woody taproot, *Tequilia (Coldenia) hispidissima*, and by Gypsum Grama, as well as a host of lesser species.

One more striking scene in the portion of the Chihuahuan Desert that lies in the United States becomes starkly evident as the traveler motors between Las Cruces and Lordsburg, New Mexico on I-10 or east of El Paso, Texas, also along I-10. Here much of the landscape is dotted by tall mounds of sand, each capped by a low-growing shrub. You may well be surprised to find that this strange, apparently unfamiliar, species is actually our old friend the Honey Mesquite. About one hundred years ago, the loss of the original grass cover in these areas permitted the rapid entry of mesquite, which can sprout when covered by sand. Under these conditions, it assumes a prostrate form that stabilizes the areas of soil beneath its canopy. Wind erosion between the shrubs creates the mound-depression aspect of the landscape. It is theorized that the changes in vegetation that occurred in native grasslands resulted from overgrazing, perhaps in concert with a subtle change in climate and by changes in the animal populations.

The portions of the Chihuahuan Desert in Mexico contain many more species than do those in the United States. In part this is due to the greater size of the area, but the more southern distribution is important as well. Large columnar cacti reminiscent of those in the Sonoran Desert occur in great abundance. A plethora of cactus species of every form, color, and habit can be found on the hillslopes. Several treelike yuccas are common. Despite this diversity, many of the dominants are still species familiar in the United States, and even with the greater variety of species, most areas do not surpass in appeal the vistas of the Big Bend area in Texas.

Animal Life

The Chihuahuan Desert supports numerous animal species, ranging from tiny insects and arthropods to large mammals, such as the Bobcat. Even the briefest visit to this area can be rich in wildlife discoveries.

Invertebrates

Like other deserts, the Chihuahuan is home to thousands and thousands of invertebrates. Many of these species are conspicuous, and even the most casual visitor is likely to encounter them. Others are not so obvious, but they are no less interesting. The invertebrates of two areas of the United States portion of the Chihuahuan Desert are especially well

Desert Millipede
Orthoporus ornatus
393

Giant Vinegarone
Mastigoproctus giganteus
398

Pallid-winged
Grasshopper
Trimerotropis pallidipennis
369

Creosote Bush
Grasshopper
Boottettix argentatus
368

known. In Texas, the Big Bend National Park has been surveyed by biologists investigating everything from snails to grasshoppers. Being a border area, Big Bend contains many species whose range barely reaches the United States.

Although rather exhaustive lists of invertebrate species known to inhabit the Big Bend are available in scientific journals, surprisingly few studies have been conducted on the roles these species play in nature. By contrast, areas near Las Cruces, New Mexico, have been the sites for studies of the interaction between plants and animals as they influence the dynamics of Chihuahuan Desert ecosystems. These studies, conducted by Dr. Walter Whitford and his colleagues at New Mexico State University, have especially emphasized the biological roles of the invertebrates, which may be quite significant in deserts.

As with amphibians, there is nothing like a good rain to make desert invertebrates move. Following rains in the Big Bend, you may see a conical, creamy white snail, *Rhabdotus schiedeanus*, moving on the ground or on the vegetation. This snail attaches itself to plants with a mucous secretion and goes into a resting state during dry periods. In many desert areas, you may encounter the large Desert Millipede. This species feeds on organic matter lying on the ground surface.

At night, or turning over a flat rock, you may also encounter a large centipede, *Scolopendra heros*. Beware! Unlike millipedes, these animals are active and voracious predators and can inflict a very painful bite. As in other deserts, the same pattern of searching with a black light may uncover any one of a dozen or so fairly common scorpions. None of the Chihuahuan Desert species are known to be deadly, but care is still advised because people vary in their individual responses to stings.

You can also find various wind or sunscorpions, the solpugids. Another nocturnal species you might meet—and one that would certainly command your attention—is the Giant Vinegarone. These animals are dark in color, about five inches in length, and have prominent pincers and a whiplike tail. I usually see them only at the upper elevations of the deserts, at points of transition with other vegetation types; some people, however, find them along rocky ravines well into the desert. Vinegarones are commonly seen on the roads at night; during the day, they remain hidden under debris or rocks.

Many spiders occur in the Chihuahuan Desert; nearly any site contains at least twenty or so species. The list usually includes at least one large but harmless tarantula, such as *Dugesia echina*.

Of the insects, the grasshoppers are still among the most conspicuous: A dozen species may be found at any one place. The Pallid-winged Grasshopper is likely to be among the most abundant species anywhere you look in scattered open shrublands, as it has been in each of the other three deserts. The Creosote Bush Grasshopper is again to be found in the foliage of *Larrea*.

Two large grasshoppers may also be encountered in late summer or early fall—both in desert-grassland transitional

Bobcat
Felis rufus
517, 520

Horse Lubber
Grasshopper
Taeniopoda eques
371

sites and in the typical Chihuahuan Desert habitat. The more beautiful of the two is the Horse Lubber, a black grasshopper with yellow markings on the head and pronotum (back). It has beautiful rose-colored wings, although you will probably not see it fly too far. When handled, the Horse Lubber produces a hissing, bubbling sound by forcing air and liquid through the breathing pores, or spiracles, on the sides of its body. This froth is foul-tasting to predators and thus acts as a deterrent. The Horse Lubber occurs in the Sonoran Desert across southern Arizona and into the Chihuahuan, across southern New Mexico and into the Big Bend of Texas.

The other large species you are likely to see occurs in all these areas, but also extends up into the Great Plains nearly to Canada. This large, brown, short-winged species, which is often splashed with greenish patches, is simply called the Lubber Grasshopper. While it is a typical grassland species, it is also found on creosote-tarbrush flats, and is particularly common around mesquites.

Another group of grasshoppers to watch for are the slant-faces of the subfamily Gomphocerinae. Many of these species have curiously slanted faces and present a bizarre appearance. This group is generally more attracted to grass-dominated areas and as a result is often a common component of the Chihuahuan. Other orthopterans—including praying mantids ranging from small, ground-dwelling species of the genus *Litanoura* to large species of the genus *Stagmomantis*—may be common but are difficult to see because of their cryptic coloration. Similarly hidden are at least three species of walkingsticks, including one, *Diaperomera covilleae*, that occurs mainly in association with Creosote Bush. Often in the fall I have found *Diaperomera* or the gray walkingstick *Pseudosermyle straminea* to be abundant on shrubs where dozens can be observed in just a few hours; most often they appear in a pair—one male and one female—on a particular shrub.

Beetles are abundant, conspicuous, and often colorful, especially darkling beetles at night, and blister beetles during the day. The large, bizarre blister beetle *Megetra cancellata* grows up to three inches in length and looks like an inflated, oblong balloon of black marked with red with a head attached. It can be so abundant along roadways between El Paso and Carlsbad that cars stop to see what that strange animal is.

Butterflies can be quite common, too, especially during the months when their host plants are available for egg-laying. Even day-flying moths such as the black-blue members of the genus *Ctenucha* may catch your eye; they have metallic-colored wings that are often striped with yellow, and yellow-orange heads. These moths apparently mimic wasps as they feed sitting on flowers.

Ants, wasps—particularly tarantula hawks—and bees are numerous, and many bees are handsome indeed. One family of wasps, the mutilids, or velvet-ants, can be quite common. These insects have a scruffy or furry appearance, and are usually red or white. One of the white species often rests on

Rough Harvester Ant
Pogonomyrmex rugosus
387

Creosote Bush, where, to my eye at least, it looks much like the fuzzy grayish fruit of this plant. Velvet-ants, while attractive, can deliver a painful sting.

Ten or so species of ants may coexist on a single Chihuahuan Desert site. Often these will include five or six seed-foragers, such as the harvesting ants of the genera *Pogonomyrmex* and *Pheidole*. Also included may be two or three arthropod feeders and an omnivore. The seed-foragers vary greatly in their habits, even within the same genus. For example, the Rough Harvester Ant forages in columns, while *Pogonomyrmex imberbiculus* is an independent forager. Some species collect only the cleaned seeds of plants, while closely related species collect the seed and its associated structures (the chaff), which they discard later. It is possible to sit and watch ants for a few hours and to see a diversity of biological strategies that are so complex that they even astonish biologists.

Not as noticeable as the ants are the large numbers of termites that inhabit the Chihuahuan Desert, as well as the Sonoran. Two species, *Gnathitermes tubiformans* and *Amitermes wheeleri*, are subterranean. Both decompose animal feces, especially cattle dung, as well as the dead leaves, branches, and roots of many plants. In a single autumn, they can consume fifty percent of the biomass of Creosote Bush leaves lying on the soil surface. This process releases important chemicals, such as nitrogen, into the soil where plant roots can obtain them for further growth.

In many areas in the Chihuahuan and Sonoran deserts, you can see the surface activities of these or other termite species as they build mudlike tubes over dead wood and on some plants. Some termites damage buildings in desert areas, and termite control is often a big business in our arid-zone cities. Because of their influences on nutrient cycling, termites, as well as a host of other insects, nematodes, and soil microorganisms, are in part responsible for the marvelous array of plants you see as you stroll the Chihuahuan Desert. Try digging around in the soil a little, particularly where there is dead plant material, and inspect the soil with a hand lens: A remarkable world exists down there awaiting your inspection.

Fish

While more species of pupfish (*Cyprinodon*) occur in the general area of the Chihuahuan Desert than in any other desert, few of these live under truly desert conditions. The exceptions are the White Sands Pupfish, which occurs in pools and creeks associated with Malpais Spring, Otero County, New Mexico, and some populations of the Pecos River Pupfish, a much more widely distributed species traversing nearly the whole of the Pecos River of New Mexico and Texas. Many populations of this species occur in gypsum sinkholes or desert streams, in highly saline water. In the cartail marshes near Boquillas Spring in the Big Bend area of Texas, there occurs an endemic mosquito fish, the Big Bend Gambusia. While many large stream or river fish occur in the Chihuahuan, they are beyond the purview of our coverage.

Lubber Grasshopper
Brachystola magna
370

White Sands Pupfish
Cyprinodon tularosa

Pecos River Pupfish
Cyprinodon pecosensis

Big Bend Gambusia
Gambusia gaigei

Tiger Salamander
Ambystoma tigrinum
289, 290, 291

Couch's Spadefoot
Scaphiopus couchi
274

Western Spadefoot
Scaphiopus hammondi
276

Plains Spadefoot
Scaphiopus bombifrons
275

Woodhouse's Toad
Bufo woodhousei

Great Plains Toad
Bufo cognatus
283

Red-spotted Toad
Bufo punctatus
278

Great Plains
Narrowmouth Toad
Gastrophryne olivacea
282

Rio Grande Leopard Frog
Rana berlandieri
285

Spiny Softshell
Trionyx spiniferus
174

Slider
Pseudemys scripta
172

Yellow Mud Turtle
Kinosternon flavescens
170

Western Box Turtle
Terrapene ornata
173

Texas Banded Gecko
Coleonyx brevis
177, 178

Big Bend Gecko
Coleonyx reticulatus

Amphibians and Reptiles

If you want to see a salamander in a desert, your best chance would be in the Chihuahuan, where you could watch adult Tiger Salamanders crossing the road during a rainfall, or see their larvae in cattle tanks. On rainy nights, you might also find one of three desert spadefoots. Couch's Spadefoot is the most common and thus most likely to be seen. It may be accompanied by the Western Spadefoot in playas and in all but the most extreme desert sites. On grassland-desert transition sites, you might see the Plains Spadefoot. In these same areas, you may also hear the trills of toads. Woodhouse's Toad can be common along streams and can even be seen in some towns under lights, where it catches insects. The Great Plains Toad is more abundant and more characteristic of desert sites, although it can be found near irrigation ditches and in riparian situations. In sandy soils, especially where there are mesquites, you might encounter a robust but nondescript species, the Texas Toad. Where there is persistent water, the Red-spotted Toad can be locally common. In moist habitats, all of these toads may be found hopping about during the day. The Green Toad is encountered only following heavy summer rains, when it can be heard calling around the edges of temporary ponds. A call that has been likened to that of a bleating sheep signifies the presence of the small, odd-shaped Great Plains Narrowmouth Toad. This species has a pointed snout and is an ant-eater. It often hides in the burrows of other animals, including tarantulas, both in the Chihuahuan and in the extreme southern portions of the Sonoran Desert. It should be pointed out that while none of our North American desert frogs are dangerous, several species can cause alarm if you get their skin secretions in your mouth or eyes. Spadefoots can make you sneeze and cry, and Narrowmouths can cause a sharp, alarming pain in your eyes, as can some toads. Wash your hands after handling any amphibian. In permanent-water situations, such as riparian areas, you may see the Rio Grande Leopard Frog, a very common species in some places. Along the rivers of the Chihuahuan, you might spot a swimming Spiny Softshell, and along the Rio Grande you might see a Slider, a turtle formerly sold in pet shops (plate 3). In cattle tanks or streams you may find the lumbering Yellow Mud Turtle. There is no desert tortoise in the Chihuahuan. The only terrestrial turtle you are likely to encounter is the Western Box Turtle. A host of lizards inhabit the Chihuahuan Desert. Many, including the Side-blotched, Longnose Leopard, Collared, Western Whiptail, Tree, and Desert Spiny, also occur in the Sonoran and Mojave, and all but the Desert Spiny Lizard occur in the Great Basin Desert. Less widely distributed species include the nocturnal Texas Banded Gecko, which can be seen on the roads at night. The Big Bend Gecko is much rarer and, indeed, was not discovered until the mid-1950s. Two horned lizards, the Texas Horned Lizard and the Roundtail Horned Lizard, can be

Chihuahuan Spotted Whiptail
Cnemidophorus exsanguis
210

Desert Grassland Whiptail
Cnemidophorus uniparens
209

New Mexico Whiptail
Cnemidophorus neomexicanus
211

Colorado Checkered Whiptail
Cnemidophorus tessellatus
207

Little Striped Whiptail
Cnemidophorus inornatus
208

Crevice Spiny Lizard
Sceloporus poinsetti
198

Eastern Fence Lizard
Sceloporus undulatus

Great Plains Skink
Umeces obsoletus
213

Lesser Earless Lizard
Holbrookia maculata
192

Greater Earless Lizard
Cophosaurus texanus
204

Glossy Snake
Arizona elegans
268

Longnose Snake
Rhinocbeilus lecontei
238, 247

Common Kingsnake
Lampropeltis getulus
234, 246

Night Snake
Hypsiglena torquata
267

Trans-Pecos Rat Snake
Elaphe subocularis
214

found abroad on warm sunny days. The Texas Horned Lizard is much more common and active than the Roundtail and is thus more often encountered, though the Roundtail is by no means rare.

In the other North American deserts, the principal whiptail lizard is the Western Whiptail. Whiptails have evolved more abundantly in disturbed grasslands and desert/grassland transition areas. As a result, the Chihuahuan is an ideal place to see a greater variety of these animals. The Chihuahuan Spotted Whiptail inhabits disturbed areas, such as overgrazed grasslands that have been invaded by shrubs, or washes subject to the disturbance of flooding. All Chihuahuan Spotted Whiptails are females and thus reproduction is by asexual means. A lizard with similar habits, but a slightly different distribution, the Desert Grassland Whiptail is also an all-female species. Of even more limited distribution, and found in disturbed areas of floodplains, is yet another all-female species, the New Mexico Whiptail. Associated with rocks, and occurring as a series of isolated populations, is our largest whiptail, the Colorado Checkered Whiptail. This lizard frequently inhabits floodplains and can be found along the Rio Grande in Big Bend National Park. In more open plains and on desert sites, the blue head and tail of the Little Striped Whiptail are a distinctive sign of this species, one that contains both genders.

Of the spiny lizards, the Crevice Spiny Lizard is often the most noticeable but the hardest to capture. This large lizard has a dark neck band and occurs in rocky areas. When frightened, it wedges itself into crevices, where it resists capture effectively. Among the yuccas and shrubs you may spot a smaller spiny lizard, one of the forms of the Eastern Fence Lizard.

Two diurnal skinks—sleek, shiny lizards—can be found in the Chihuahuan Desert, but only the large Great Plains Skink is abundant. This secretive animal is hard to find without turning over rocks, especially along riparian areas. Two other lizards deserve mention. The Lesser Earless Lizard occurs in grassy areas and on bajadas with sandy soils. A very light, almost white, form occurs on the dunes of White Sands National Monument in New Mexico. Usually more common in desert shrub areas is the fast and elusive Greater Earless Lizard. This speedster occurs in rocky flats and along washes; it is often seen crossing the road in the daytime. Most of the Chihuahuan snakes are similar to those encountered in other North American deserts. The common species you might see during the day include the Gopher Snake, Western Patchnose Snake, and Coachwhip. At night the Glossy Snake, Longnose Snake, Common Kingsnake, and Night Snake are common and widespread. Nighttime wanderings may also reveal some Chihuahuan Desert specialties. Two of these are among the most beautiful snakes in North America. The Trans-Pecos Rat Snake has H-shaped black markings against a yellowish background. These snakes are partial to rocky areas on desert slopes but are

Mexican Kingsnake
Lampropeltis mexicana
242, 243

Lyre Snake
Trimorphodon biscutatus
262, 270

Texas Blind Snake
Leptotyphlops dulcis
225

Western Blind Snake
Leptotyphlops humilis
226

Western Hooknose Snake
Gyalopion canum
266

Western Hognose Snake
Heterodon nasicus
261

Western Diamondback
Rattlesnake
Crotalus atrox
256

Prairie Rattlesnake
Crotalus viridis viridis
258, 260

Blacktail Rattlesnake
Crotalus molossus
248

Mojave Rattlesnake
Crotalus scutulatus
259

Rock Rattlesnake
Crotalus lepidus
250, 257

Massasauga
Sistrurus catenatus
264

Trans-Pecos Copperhead
Agkistrodon contortrix pictigaster
244

often seen on the road at night. A snake with less subtle coloration is the Mexican Kingsnake. This species is quite variable in appearance, with different combinations of gray, black, and orange crossbands in varying hues and intensities. A distinct form of the mildly poisonous Lyre Snake, a rear-fanged species, occurs in areas with limestone outcrops and rocks. Two species of blind snakes occur in the Chihuahuan Desert. The Texas Blind Snake and the Western Blind Snake both have specialized feeding habits, eating ants and termites at all stages of development, and are seldom seen except following rains or when digging.

Two snakes with conspicuously upturned noses can be encountered in grassland-desert transition areas. The small Western Hooknose Snake is usually less than a foot in length. The Western Hognose Snake is typically twice this size and is more often found in desert areas than the Hooknose. This Hognose has enlarged rear teeth with which it punctures toads that have inflated themselves to prevent being eaten. Several venomous snakes occur in the Chihuahuan Desert. Of the rattlesnakes, the largest is the Western Diamondback, a species common throughout the desert. A form of the Western Rattlesnake, the Prairie Rattlesnake, can be found along with the Diamondback in many areas, particularly in New Mexico. The attractive Blacktail is usually found on slopes, particularly at higher elevations. The highly toxic Mojave Rattlesnake occurs on Creosote Bush flats. Occasionally, you may come upon a small, darkly banded rattlesnake whose base coloration varies from near purple, through browns and blues to whites. This is the Rock Rattlesnake, a reptile common on talus slopes in pine-oak forests, but that also occurs in arroyos on desert flats, among rocks on limestone outcrops, and among boulders on the upper portions of bajadas.

Finally, two types of venomous snake that do not occur in our other deserts can be seen in isolated areas of the Chihuahuan. In the grassland/desert transition areas all the way to the Arizona/New Mexico border, you may encounter a rather uncommon rattlesnake, the Massasauga. There is one section of Creosote Bush flat in New Mexico where, at least once a week for short periods in the summer, I would see one on the road at night, or killed the next morning. This is a spottily distributed, retiring species.

A form of Copperhead, the Trans-Pecos, is sometimes found in the desert areas of the Big Bend of Texas. More likely, however, you would see it in riparian situations, such as the cane bottoms along the Rio Grande in Big Bend National Park.

As in the other hot deserts, reptiles abound in number and diversity in the Chihuahuan. Patience, care, and a sharp eye can enable even the rank amateur to see ten or more species of these fascinating creatures in the course of a few days of desert trekking.

Birds

As is the case in the Sonoran, the avifauna of the Chihuahuan

Turkey Vulture
Cathartes aura
530

Red-tailed Hawk
Buteo jamaicensis
536, 537

Common Raven
Corvus corax
582

Chihuahuan Raven
Corvus cryptoleucus
581

Loggerhead Shrike
Lanius ludovicianus
596

Northern Mockingbird
Mimus polyglottos
590

Crissal Thrasher
Toxostoma dorsale

Gambel's Quail
Callipepla gambelii
547

Scaled Quail
Callipepla squamata
546

Green-tailed Towhee
Pipilo chlorurus
605

Ash-throated Flycatcher
Myiarchus cinerascens
573

Vermilion Flycatcher
Pyrocephalus rubinus
572

American Kestrel
Falco sparverius
542

Swainson's Hawk
Buteo swainsoni
534, 535

Harris' Hawk
Parabuteo unicinctus
533

Zone-tailed Hawk
Buteo albonotatus

Desert is limited in richness. Breeding species number roughly thirty across the United States portion of the desert, twenty to twenty-five in any one good area, but ordinarily ten to twelve species in the more extreme desert areas. Densities are not high. There may be seventy breeding pairs per one hundred acres, a figure a bit lower than averages in the Sonoran. In the more extreme sites, the species list is virtually the same as in similar areas of the Sonoran Desert. Birds you are likely to see soaring overhead are the Turkey Vulture, the Red-tailed Hawk, and the Common Raven. In some places you actually may be confusing the Common Raven for the Chihuahuan Raven. The two are very difficult to differentiate, but the Chihuahuan is a somewhat smaller and more social bird. It is a bit more common in desert grasslands than in more extreme desert environments. The Mourning Dove is common, much more so than the White-winged Dove, which has a limited distribution in the Chihuahuan. In scrub areas, two domed-nest builders, the Verdin and the raucous Cactus Wren, can be found nesting in tall shrubs and chollas. A bright flash of gray, black, and white might draw your eye to either the silent, voracious predator, the Loggerhead Shrike, or to the noisy Northern Mockingbird. Two small, abundant birds are the desert-specializing Black-throated Sparrow, a species found in the harshest areas of all four North American deserts, and the Black-tailed Gnatcatcher, a hot-desert specialist most often associated with washes or riparian situations.

The Crissal Thrasher, the Curve-billed Thrasher, and the Sage Thrasher may be seen, sometimes even together, during a warm winter. The Crissal Thrasher is most often sighted. In many areas, you may see or hear the very loud call of Gambel's Quail, but the most characteristic quail of the Chihuahuan Desert and the surrounding grasslands is the Scaled Quail. Its blue-gray, scaled appearance makes it easy to identify. In shrubby areas or places where mesquites abound, you can see the Greater Roadrunner, perhaps carrying a whiptail lizard in its mouth. In such areas you might also spot one or both elusive towhees. The Green-tailed actually prefers higher elevations or more northern sites. It is common in the Great Basin, but winters in the Chihuahuan Desert area. The Brown Towhee is more common but is a rather drab, retiring bird and is easily overlooked.

In riparian areas, the Ash-throated Flycatcher can be seen, as can Say's Phoebe. In some areas, such as Big Bend National Park, you might even see the spectacular scarlet and black Vermilion Flycatcher.

Hawks and owls of the Chihuahuan include the American Kestrel, often seen sitting on power or telephone lines; Swainson's Hawk, a dark-breasted species that "cruises" the plains; and the attractive but much less common Harris' Hawk. Occasionally you can spot a Zone-tailed Hawk, a species that generally prefers canyons, flying over desert rivers. At dusk the Lesser Nighthawk takes to the sky. Later you may hear the call of the Elf Owl, although you'll probably have to

Black-chinned
Hummingbird
Archilochus alexandri
563

Sage Sparrow
Amphispiza belli
611

House Finch
Carpodacus mexicanus
617, 618

Horned Lark
Eremophila alpestris
576

Northern Cardinal
Cardinalis cardinalis
600, 601

Pyrrhuloxia
Cardinalis sinuatus
602, 603

Scott's Oriole
Icterus parisorum
616

Hooded Oriole
Icterus cucullatus
614, 615

Blue Grosbeak
Guiraca caerulea
604

Varied Bunting
Passerina versicolor

Ladder-backed
Woodpecker
Picoides scalaris
567

Black-tailed Jack Rabbit
Lepus californicus
509

Coyote
Canis latrans
523, 524

be near a tree, such as those that grow in the riparian zones. The hummingbird most likely to be seen is the Black-chinned. A short trip into the mountains in places like Big Bend National Park could yield an additional ten species.

The Sage Sparrow is locally common at upper elevations, as is the House Finch. In grassy areas, Horned Larks, moving in active flocks, can be quite numerous.

Finally, there is a group of rather striking birds, hard to miss when present. They may have limited distributions, however, or small population sizes, and you may not see them. These include the Northern Cardinal and its cousin the Pyrrhuloxia. Both birds are most apt to be seen where large trees occur, such as along streams. The same is true for the orioles that occur in desert areas. The most common of this group is Scott's Oriole, whose lemon-yellow body and black head and chest distinguish it from the more spottily distributed Hooded Oriole. Two other eye-catching birds are the Blue Grosbeak and the less common Varied Bunting.

You might also see one of several woodpeckers, also colorful birds. The most likely candidate is the Ladder-backed Woodpecker, a species typically found in areas with mesquite, and one that favors Century Plants, which it uses for nesting sites and where it feeds on the larvae of the Agave Beetle.

Winter or spring birding in the Chihuahuan Desert can be quite rewarding. Midsummer can be disappointing, but some careful searching at the right times will produce numerous species to add to your life list.

Mammals

The mammals of the Chihuahuan Desert are diverse, and to me they have always seemed more conspicuous than the mammals of the other deserts. To be sure, there is still a strong nocturnal component that is difficult to observe; nonetheless, several large mammals reach fairly high population densities and are easily seen. This probably has something to do with the relative abundance of vegetation and its annual productivity in the Chihuahuan compared with other deserts. The direct result of more available plant matter, especially grasses, is the presence of a greater number of plant-eaters (herbivores); in turn, these herbivores are available as food for more carnivores.

Daytime desert strolls reveal some of the same species encountered in other deserts. As in other deserts, Black-tailed Jack Rabbits are usually the most obvious species. This is not always the case, however. In some years you might not be able to find a single individual, because their numbers seem to vary in a somewhat cyclic fashion, as do those of their main predator, the Coyote. These population fluctuations are not as predictable as those described for the same species in the Great Basin. Coyotes and jack rabbits both range over a variety of habitats, especially the Coyote, but they are most abundant in desert and desert/grassland areas of the Chihuahuan.

Desert Cottontail
Sylvilagus audubonii
508

Spotted Ground Squirrel
Spermophilus spilosoma
503

Mexican Ground Squirrel
Spermophilus mexicanus
502

Texas Antelope Squirrel
Ammodramus leucurus
500

Rock Squirrel
Spermophilus variegatus
505, 506

Mule Deer
Odocoileus hemionus
528

Pronghorn
Antilocapra americana
527

Collared Peccary
Dicotyles tajacu
525

Badger
Taxidea taxus
514

Kit Fox
Vulpes macrotis
521

Gray Fox
Urocyon cinereoargenteus
522

Ringtail
Bassariscus astutus
511

The Desert Cottontail may also be seen during the day, though both cottontails and jack rabbits are much more apt to be spotted at dawn or dusk, or in the lights of your car.

A number of diurnal ground squirrels might also be observed. Two of these have spotted backs. The Spotted Ground Squirrel is characterized by small, irregular spots on a reddish-brown background. This squirrel ranges widely through the Chihuahuan Desert and arid grasslands of North America. In desert areas, it can be associated with mesquites, ephedras, and yuccas, but it occurs in Creosote Bush-dominated areas as well. The Mexican Ground Squirrel, a considerably larger animal, actually has larger, more conspicuous spots that are arranged in nine rows. It does not cover the same extremes of habitat as the Spotted and it has a more restricted geographic range; however, it is common around farms, and in areas near the Rio Grande in Big Bend National Park.

The Texas Antelope Squirrel, a striped rodent, prefers rocky areas, particularly in middle elevations, but it also occurs with chollas and Creosote Bush at lower elevations. The Rock Squirrel is found in rocky areas ranging from Creosote Bush-Lechuguilla habitats up into the mountains.

Mule Deer might be seen in the cool of winter, but you have a greater prospect of seeing—usually at a considerable distance—the unusual and elegant Pronghorn. Pronghorns are most common in areas with a good cover of grasses and forbs, and thus are found regularly only in the grassland/desert transitions.

Another large animal to look for is the Collared Peccary, or Javelina. Peccaries are usually social, forming small herds of five to ten individuals. In the winter, they occur on desert bajadas, where breeding takes place from November to February. From March to June they spend more time in the cooler washes and they drop their young from May to July. Peccaries eat a great number of plants, but Lechuguilla constitutes between eleven and forty-one percent of their diets. They eat mainly the roots and center core, discarding the tough outer leaves. The pads of prickly pear are often included in their diets, but not as often as in the Sonoran Desert. Occasionally you may also spot a Bobcat bounding up a boulder-strewn slope or in riparian areas, where they hunt for rodents and rabbits. In more open areas, you may sight a Badger in search of lizards or rodents. This is a good animal to leave alone: Badgers can be aggressive.

To see other carnivores, take a nighttime stroll armed with a flashlight. As you walk, particularly in winter, you may hear Coyotes and see the quick movements of one of two foxes. The more "deserty" fox is the Kit Fox. In moister, cooler sites you might see the Gray Fox. The two are easily distinguished by the size of their bodies and ears and by the black stripe that runs down the top of the Gray Fox's tail. (The only black on the Kit Fox's tail is at the tip.) Both species are omnivorous. Also likely to be seen at night are a series of striped, or banded, medium-size mammals. The graceful Ringtail is usually seen near areas with large rocks or boulders; it

- Raccoon
Procyon lotor
512
- Western Spotted Skunk
Spilogale gracilis
- Hooded Skunk
Mephitis macroura
- Striped Skunk
Mephitis mephitis
515
- Hog-nosed Skunk
Conepatus mesoleucas
516
- Merriam's Kangaroo Rat
Dipodomys merriami
485
- Ord's Kangaroo Rat
Dipodomys ordii
480
- Banner-tailed Kangaroo Rat
Dipodomys spectabilis
483
- Silky Pocket Mouse
Perognathus flavus
471
- Desert Pocket Mouse
Perognathus penicillatus
477
- Rock Pocket Mouse
Perognathus intermedius
- Nelson's Pocket Mouse
Perognathus nelsoni
- Plains Harvest Mouse
Reithrodontomys montanus
- Hispid Cotton Rat
Sigmodon hispidus
- Northern Grasshopper Mouse
Onychomys leucogaster
491
- Southern Grasshopper Mouse
Onychomys torridus
488
- generally does not occur on the flats, but can be common on rocky slopes, covered with desert vegetation, that are dissected by washes or canyons. The Raccoon can be found virtually anywhere there is permanent water.
- The black-and-white pattern seen in the beam of your light signals the presence of a skunk and is always a warning to proceed cautiously. Four skunks occur in the Chihuahuan Desert and are frequently seen as road kills. All are associated with moist situations, such as ravines, riparian zones, and high elevations. The smallest and most distinctive is the Western Spotted Skunk. The Hooded Skunk, a typical striped species, is much less common and has a limited distribution. The distinctive hood of long hairs on its neck is usually white. The two more frequently encountered skunks are the Striped, a very common species that can be a pest around campgrounds, and the Hog-nosed. The Hog-nosed Skunk has a single wide white stripe extending from its head through its nearly all-white tail. This large, strong skunk has a long, broad nose and long claws that are adapted for digging.
- The nocturnal mouse brigade is quite diverse. Depending on where you are, you could see one or two of four Chihuahuan kangaroo rats (*Dipodomys*), as well as perhaps five pocket mice (*Perognathus*). In most places, regardless of soil type, you will encounter Merriam's Kangaroo Rat. Like other kangaroo rats, Merriam's are seed-eaters, but supplement their diets with insects and leaves. Roughly the same size, but with five hind toes rather than four, and living predominantly in sandy areas, is Ord's Kangaroo Rat. The Banner-tailed Kangaroo Rat is much larger in size and has a striking white tuft on its tail. This animal prefers grass habitats more than the other two, but may also be found in many areas containing Creosote Bush. Like all kangaroo rats, these giants—the largest in their genus—are gentle, except to one another—the males can be quite quarrelsome.
- Of the pocket mice the small, soft Silky Pocket Mouse or the medium-sized Desert Pocket Mouse are most likely to be seen. They often occur together, though the desert pocket mouse is less often found in gravel- or rock-dominated soils. The Rock Pocket Mouse can occur with these other two, especially in New Mexico and extreme western Texas, though it is more characteristically found, as its name implies, in rocky areas. To the east and south of the Rock Pocket Mouse, in areas such as the Big Bend of Texas, Nelson's Pocket Mouse dominates the rocky areas.
- The grass component of Chihuahuan Desert communities permits several mammals more characteristic of grasslands to occur. Two harvest mice are occasionally found. Very rarely, you might see the Plains Harvest Mouse. You have a better chance of seeing the Western Harvest Mouse in grassy areas, such as the edges of playas on sandy soils. The Hispid Cotton Rat is also associated with grassy sites, such as tobosa swales and riparian situations. This is a large rodent, the size of a house rat, and can be seen in its runways, even during the day. Either the Northern or Southern Grasshopper Mouse

- Cactus Mouse
Peromyscus eremicus
492
- Deer Mouse
Peromyscus maniculatus
489
- White-ankled Mouse
Peromyscus pectoralis
- Botta's Pocket Gopher
Thomomys bottae
469
- Desert Pocket Gopher
Geomys arenarius
- Yellow-faced Pocket Gopher
Pappogeomys castanops
- Southern Plains Woodrat
Neotoma micropus
- White-throated Woodrat
Neotoma albigula
494
- Beaver
Castor canadensis
- Porcupine
Erethizon dorsatum
507
- Spotted Bat
Enderma maculatum
462
- Brazilian Free-tailed Bat
Tadarida brasiliensis
465
- Pallid Bat
Antrozous pallidus
464

could be seen in extreme western Texas, near El Paso, and in New Mexico. The Northern is most common in sandy areas, while the Southern is more often found on gravelly sites. Only the Southern Grasshopper Mouse extends into the Big Bend area.

The Cactus Mouse and the Deer Mouse occur in habitats similar to those in which they are found in the Sonoran. The Cactus Mouse is a true desert form occurring even in quite arid sites, while the Deer Mouse is tied to much less arid areas. In the rocky upper elevations of the desert/grassland transition, you might see the White-ankled Mouse, a species not met with elsewhere.

Pocket gopher mounds dot the Chihuahuan Desert landscape. Botta's Pocket Gopher can be found throughout, while the Desert Pocket Gopher is confined to the El Paso area and to New Mexico. On dry sites with more than eight inches of soil, a third species, the Yellow-faced Pocket Gopher may abound. On your walks you may see the homes of two woodrats. In the open desert scrub areas, usually in patches of cactus or dense thorny shrubs, you may spot the home of a large steel-gray species, the Southern Plains Woodrat. Sometimes in the same type of habitat, especially in New Mexico and the northern portions of the Chihuahuan Desert in Texas, you will see the White-throated Woodrat. This is a buff-colored species that, while found in deserts in the north, is typically associated with rocky areas and higher elevations in the south, particularly in the Big Bend country.

The largest rodent in desert areas is the Beaver, a species found only in riparian habitats with permanent water; today it is much less common in desert streams and rivers than it was in presettlement times. Another large rodent you might see is the Porcupine. While some people doubt that this is a desert species, it is often seen in areas dominated by Creosote Bush, but also where other plant species are common. I have seen dozens of dead Porcupines between El Paso and Carlsbad and also south into the Big Bend. They also occur in certain areas of the Sonoran Desert, where I once watched one level a Creosote Bush.

Finally, at dusk you may see any one of a dozen bat species, especially along riparian zones. Even though bats can fly in from elsewhere and could thus be found in virtually any vegetation type, several species are desert specialists. Included is the attractive Spotted Bat, named for the three large white spots on its black back. Its very conspicuous ears can be seen even at night. Two more common species, with wider habitat distributions, are the Brazilian Free-tailed Bat, famous for its great numbers in "guano caves," and the most abundant bat of all, the large pale, Pallid Bat.

With its rich and diverse animal life, the Chihuahuan Desert offers the visitor countless opportunities to learn much about desert wildlife, both day and night.

THE CHIHUAHUAN DESERT: PLANTS AND ANIMALS

- Wildflowers**
 Angel Trumpets 104
 Apache Plume 96
 Arizona Blue-Eyes 69
 Arizona Jewel Flower 107
 Blackfoot Daisy 92
 Buffalo Gourd 140
 Chia 64
 Chihuahua Flax 149
 Claret Cup Cactus 42
 Climbing Milkweed 83
 Coulter's Lupine 72
 Crescent Milkvetch 50
 Cushion Cactus 40
 Desert Anemone 91
 Desert Christmas Cactus 162
 Desert Four O'Clock 52
 Desert Gold 145
 Desert Marigold 128
 Desert Poppy 155
 Desert Rosemallow 151
 Desert Tobacco 103
 Devil's Claw 117
 Fairy Duster 48
 Feather Dalea 49
 Fendler's Bladderpod 146
 Filaree 57
 Freckled Milkvetch 163
 Golden Prince's Plume 109
 Indian Blanket 60
 Jackass Clover 110
 Little Golden Zinnia 138
 Little Snapdragon Vine 74
 Melon Loco 141
 Mexican Gold Poppy 148
 Night-blooming Cereus 87
 Pale Trumpets 66
 Paleface 45
 Peyote 37
 Plains Pricklypear 121
 Puncture Vine 143
 Rainbow Cactus 123
 Ratany 56
 Rattlesnake Weed 102
 Rough Menodora 142
 Scalloped Phacelia 65
 Spreading Fleabane 89
 Spectacle Pod 79
 Spike Broomrape 76
 Sweet-scented Heliotrope 101
- Tahoka Daisy 62
 Texas Silverleaf 47
 Trailing Four O'Clock 59
 Tree Tobacco 114
 Trixis 106
 Western Peppergrass 78
 White Horsenettle 73
 Yellow Spiny Daisy 131
- Reptiles**
 Blacktail Rattlesnake 248
 Chihuahuan Spotted Whiptail 210
 Coachwhip 223, 229, 230, 233
 Collared Lizard 200, 201
 Colorado Checkered Whiptail 207
 Common Kingsnake 234, 246
 Copperhead 244
 Crevice Spiny Lizard 198
 Desert Grassland Whiptail 209
 Desert Spiny Lizard 199
 Glossy Snake 268
 Gopher Snake 263
 Great Plains Skink 213
 Greater Earless Lizard 204
 Little Striped Whiptail 208
 Longnose Leopard Lizard 191
 Longnose Snake 238, 247
 Lyre Snake 262, 270
 Massasauga 264
 Mexican Kingsnake 242, 243
 Mojave Rattlesnake 259
 New Mexico Whiptail 211
 Night Snake 267
 Rock Rattlesnake 250, 257
 Roundtail Horned Lizard 193
 Side-blotched Lizard 202
 Slider 172
 Spiny Softshell 174
 Texas Banded Gecko 177, 178
 Texas Blind Snake 231
 Texas Horned Lizard 196
 Trans-Pecos Rat Snake 214
 Tree Lizard 205
- Western Blind Snake 226
 Western Box Turtle 173
 Western Diamond Rattlesnake 256
 Western Hognose Snake 261
 Western Hooknose Snake 266
 Western Rattlesnake 258, 260
 Western Whiptail 206
 Yellow Mud Turtle 170
- Amphibians**
 Great Plains Toad 283
 Green Toad 287
 Plains Spadefoot 275
 Red-spotted Toad 278
 Rio Grande Leopard Frog 285
 Texas Toad 280
 Western Spadefoot 276
- Trees, Shrubs, Cacti, and Grasses**
 Arrow Weed 314
 Banana Yucca 306
 Creosote Bush 312
 Fluffgrass 331
 Four-wing Saltbush 322
 Gregg Catclaw 303, 317
 Honey Mesquite 308, 321
 Indian Ricegrass 332
 Lechuguilla 307
 Mariola 326
 Mexican Palo Verde 307
 Mormon Tea 334
 Ocotillo 305
 Rabbit Brush 310
 Screwbean Mesquite 302
 Snakeweed 311
 Soaptree Yucca 328
 Sotol 308
 Tamarisk 304, 324
 Tarbush 320
 Torrey Yucca 330
 Tree Cholla 303
 Winter Fat 324
- Insects and Spiders**
 Creosote Bush Grasshopper 368
 Desert Tarantula 399
 Giant Vinegarone 398
- Lubber Grasshopper 370
 Pallid-winged Grasshopper 369
 Rough Harvester Ant 387
- Mammals**
 Badger 514
 Banner-tailed Kangaroo Rat 483
 Black-tailed Jack Rabbit 509
 Bobcat 517, 520
 Botta's Pocket Gopher 469
 Bat 465
 Cactus Mouse 492
 Collared Peccary 525
 Coyote 523
 Deer Mouse 489
 Desert Cottontail 508
 Desert Pocket Mouse 477
 Fulvous Harvest Mouse 487
 Ghost-faced Bat 451
 Gray Fox 522
 Hog-nosed Skunk 516
 Merriam's Kangaroo Rat 485
 Mexican Ground Squirrel 502
 Mule Deer 528
 Northern Grasshopper Mouse 491
 Ord's Kangaroo Rat 480
 Pallid Bat 464
 Porcupine 507
 Pronghorn 527
 Raccoon 512
 Ringtail 511
 Rock Squirrel 505
 Spotted Bat 462
 Spotted Ground Squirrel 503
 Striped Skunk 515
 Texas Antelope Squirrel 500
 Western Harvest Mouse 486
 White-throated Woodrat 494
- Birds**
 Ash-throated Flycatcher 573
- Bewick's Wren 587
 Black-chinned Hummingbird 563
 Black Phoebe 570
 Black-tailed Gnatcatcher 588
 Black-throated Sparrow 610
 Black Vulture 529
 Brown-headed Cowbird 613
 Brown Towhee 607
 Burrowing Owl 559
 Cactus Wren 584
 Canyon Wren 586
 Common Nighthawk 560
 Common Poorwill 562
 Curve-billed Thrasher 593
 Elf Owl 558
 Gambel's Quail 547
 Golden Eagle 540
 Golden-fronted Woodpecker 566
 Great Horned Owl 556
 Greater Roadrunner 554
 Ground Dove 553
 Harris' Hawk 533
 Hooded Oriole 614
 Horned Lark 576
 House Finch 617
 Inca Dove 552
 Ladder-backed Woodpecker 567
 Lesser Nighthawk 560
 Loggerhead Shrike 596
 Mourning Dove 551
 Northern Cardinal 600
 Northern Flicker 568
 Northern Mockingbird 590
 Pyrrhuloxia 602
 Red-tailed Hawk 536
 Rock Wren 585
 Sage Thrasher 591
 Say's Phoebe 571
 Scaled Quail 546
 Scott's Oriole 616
 Swainson's Hawk 534
 Turkey Vulture 530
 Verdin 583
 Vermillion Flycatcher 572
 Western Kingbird 575
 White-necked Raven 581
 White-winged Dove 550