EXHIBIT D

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EXHIBIT D – BIOLOGICAL RESOURCES

As stated in R14-3-219 of the Rules of Practice and Procedure Before Power Plant and Transmission Line Siting Committee, Exhibits to Application, Exhibit D:

"List the fish, wildlife, plant life and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, the proposed facilities will have thereon."

INTRODUCTION

This exhibit includes a description of biological resources within the study area. The study area for this review is 1 mile on either side of the right-of-way (ROW) centerline of the Project (2 miles in total). This study area is consistent with the analysis area used in the Final Environmental Impact Statement (Final EIS) (see Exhibit B-1). The following summary is based on the 2015 Final EIS (Exhibit B-1), with information focused on the analysis area for the Project.

The Project is an upgrade of an existing transmission line owned and operated by Western Area Power Administration (WAPA). The 64-mile route will include the replacement of wood H-frame poles with steel monopoles in approximately 52 miles of existing transmission line ROW. The Project will also include four realignments outside the current ROW, totaling approximately 12 miles (Vail Lateral realignment [segment U4 in the Final EIS], Old Vail Road realignment [segment U3aPC in the Final EIS], Tumamoc Hill realignment [segments TH1a and TH1 Option in the Final EIS], and Marana Airport realignment [segment MA-1 in the Final EIS]).

EXISTING CONDITIONS

Physical Setting

The Project is located in the eastern edge of the Sonoran Desert Subprovince of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is a region dominated by basins filled with sediments separated by uplifted mountain blocks. Major basins include the Avra Valley and Tucson Basin (Trapp and Reynolds 1995).

Large-Scale Biotic Communities: Brown and Lowe Biotic Communities

The map of biotic communities of the Southwest described in Brown (1994) shows two communities within the study area (Figure D-1), including Arizona Upland Subdivision of Sonoran Desertscrub (663.5 acres) and Lower Colorado River Valley Subdivision of Sonoran Desertscrub

(387.6 acres), for a total of 1,788.8 acres. A description of each of these communities is provided in the following paragraphs.

Tables D-1, D-2, and D-3 (included at the end of this Exhibit) present common mammals, birds, and reptiles/ amphibians, respectively, which may occur in these desertscrub subdivisions in the study area. Though semidesert grassland is not in the study area, it is within 2-3 miles of the study area along I-10; therefore common mammals, birds, reptiles/amphibians that may occur in adjacent semidesert grasslands are also included in Tables D-1 through D-3.

The vegetation communities crossed by the Project are described below as background information and to place the finer-scale SWReGAP plant associations in a broader biogeographic context, but are not addressed in the further analysis of biotic communities.

Note that plant species names used below are based on those presented by Brown and Lowe (1980), and some of the plant names and taxonomic classifications have changed since then. Updated and current plant classifications and names are available at the Natural Resources Conservation Service (NRCS) PLANTS Database (NRCS 2016).

Sonoran Desertscrub – Arizona Upland Subdivision

The Arizona Upland Subdivision comprises large areas of the northern and eastern parts of the Sonoran Desertscrub biotic community in Arizona and Sonora, Mexico. This subdivision is a cactus-dominated community situated topographically above the Lower Colorado River Subdivision and below Semidesert Grassland (Brown 1984). As with other communities, the upper and lower elevation limits of this community vary substantially over its distribution. The lower edge of this subdivision is generally between about 1,000 and 2,100 feet, whereas the upper contact with Semidesert Grassland is generally between 2,950 and 3,300 feet. Average annual rainfall in this community ranges from 7.9 to 16.7 inches. This community is dominated by a high diversity of cacti, and most of the woody shrubs have thorns. Common cactus species include saguaro (*Carnegiea gigantea*), chollas (*Cylindropuntia* spp.) and pricklypears (*Opuntia* spp.), barrel cactus (*Ferocactus* spp.), hedgehog cactus (*Echinocereus* spp.), and pincushion cactus (*Mammillaria* spp.). Some common small trees and shrubs include paloverde (*Parkinsonia* spp.), ironwood (*Olneya tesota*), velvet mesquite (*Prosopis velutina*), acacias (*Acacia* spp.), and creosotebush (*Larrea tridentata*). In the study area, this community is limited to segment U4 and the Vail Substation expansion area. The DeMoss Petrie Substation expansion area is mapped within the community but has been previously cleared of vegetation.

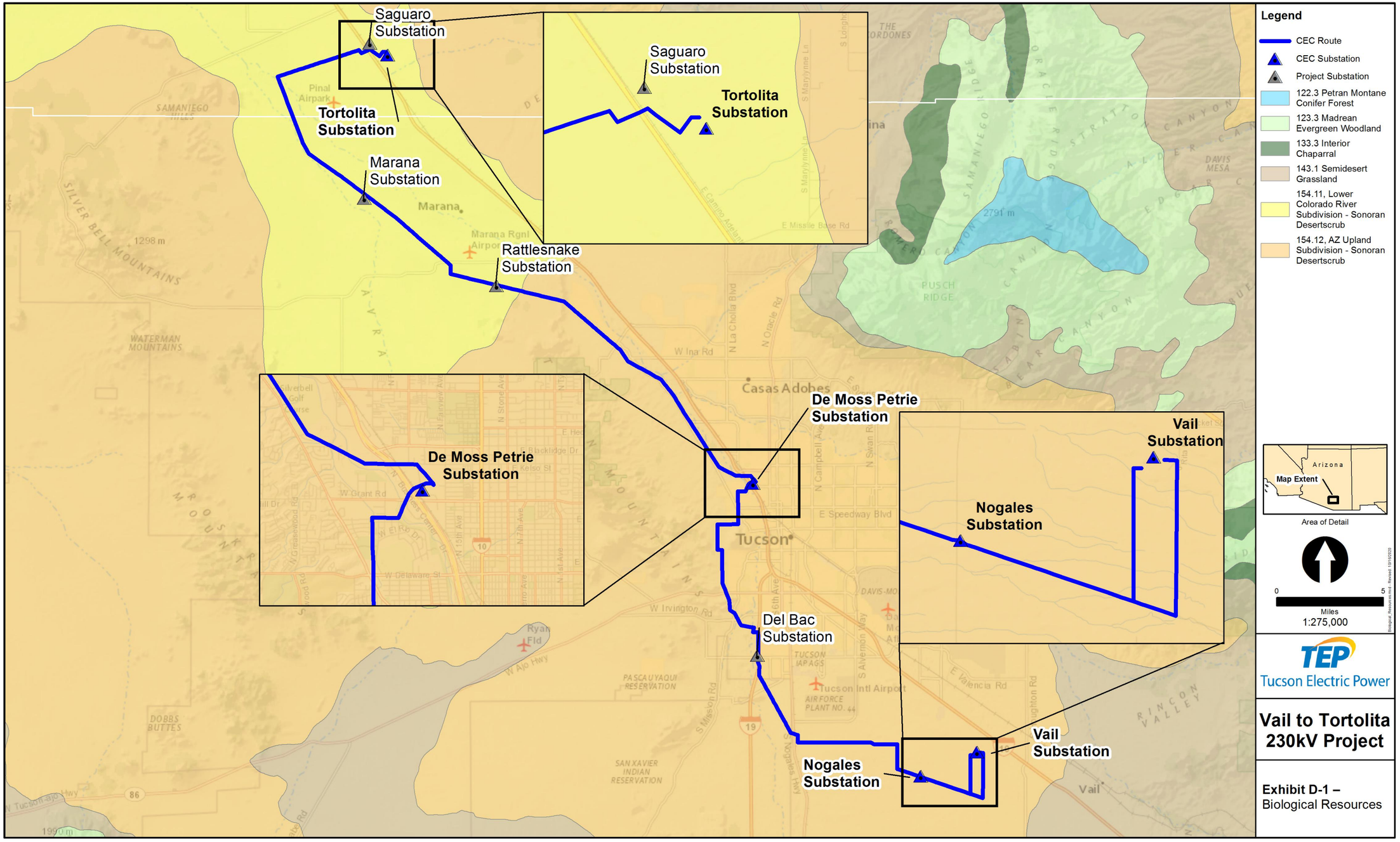

Figure D-1. Biotic communities in study area.

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Sonoran Desertscrub – Lower Colorado River Valley Subdivision

The Lower Colorado River Valley Subdivision comprises large areas of the southern and western parts of the Sonoran Desertscrub biotic community in Arizona, California, Baja California, and Sonora, Mexico. This subdivision is a shrub-dominated community situated topographically below the Arizona Upland Subdivision (Brown 1984). This community is the hottest and driest part of the Sonoran Desert, with average annual rainfall between 1.2 and 11.3 inches. Dominant shrub species include creosotebush (*Larrea tridentata)*, white bursage (*Ambrosia dumosa*), and saltbush (*Atriplex canescens*). Other shrubs and small trees are present in xeroriparian zones along small drainages. In the study area, this community is limited to the segment U3l. The adjacent Tortolita Substation expansion area is mapped within the community but has been previously cleared of vegetation.

EFFECTS OF THE PROPOSED PROJECT

Species occurrence, abundance, and distribution are strongly influenced by the topography and habitat types within and surrounding the study area. Tables D-1, D-2, and D-3 (included at the end of this Exhibit) present common mammals, birds, and reptiles/amphibians, respectively, which may occur in the study area. Special-status species are not included in the tables in this Exhibit (D); see Exhibit C for a discussion of special-status species.

The Project could have direct and indirect impacts on vegetation resources located within areas disturbed by construction activity. These potential impacts will be mitigated through implementation of Proponent Committed Environment Measures (PCEM) VEG-1, VEG-2, VEG-3, VEG-4, VEG-5, or VEG-6 (see Exhibit B-1, Final EIS Table 2-8).

Potential impacts from the Project common to all wildlife groups will include the loss, degradation, and/or fragmentation of breeding, rearing, foraging, and dispersal habitats; collisions with and crushing by construction and maintenance vehicles; loss of burrowing animals in burrows in areas where grading occurs; increased invasive and noxious weed establishment and spread; and increased noise/vibration levels.

Design features and mitigation (PCEMs) for vegetation and wildlife will apply and reduce the amount of habitat lost or degraded/fragmented during construction activities. Some of the habitat will be restored or reconstructed elsewhere after the completion of construction activities; however, restoration in arid environments is difficult and slow and may require 50 to 100 or more years. The habitat types affected are abundant in the ROW and the broader study area. However, these impacts will primarily occur within the existing WAPA ROW. As such, impacts these will not be new impacts with the replacement of transmission line structures. As noted previously, the 64-mile route will include the replacement of wood H-frame poles with

steel monopoles in approximately 52 miles of existing transmission line ROW. The project will also include four realignments outside the current ROW, totaling approximately 12 miles.

Project activities will involve the removal of vegetation during construction, resulting in the direct loss of plant communities. The primary direct and indirect impacts to vegetation during construction and operation and maintenance of the Project will be associated with the removal and/or crushing of natural, native-species dominated vegetation communities or associations from construction of transmission lines, substations, temporary work areas, and access roads; decreased plant productivity from fugitive dust; and plant community fragmentation.

Vegetation removal could have a variety of effects on vegetation communities ranging from changes in community structure and composition along the ROW to alteration of soil moisture or nutrient regimes. The degree of impact depends on the type and amount of vegetation affected, and the rate at which vegetation regenerates after construction. Ultimately, these direct and indirect effects could reduce or change the functional qualities of vegetation, including habitat and forage. Fugitive dust from construction and maintenance traffic has the potential to affect photosynthetic rates and decrease plant productivity. Potential impacts from fugitive dust caused by Project activities will be highest near the ROW and occur during construction activities. The overall impact on vegetation from fugitive dust will be localized along the ROW and will be reduced below significance once construction activities are completed. These impacts will only occur during occasional maintenance activities and will be insignificant after construction activities are complete.

Indirectly, removal of vegetation could cause increased soil desiccation, and will also expose soil to potential wind and water erosion. This could result in further loss of soil and vegetation, as well as increased sediment input to water resources. This impact will occur in areas of disturbance, localized in the ROW; however, as the Project will occur in an area with an arid climate and large existing areas with low vegetation density the impacts from soil desiccation will be localized and minimal. Increased potential for erosion will occur but will be minimized through PCEMs to limit erosion.

There will also be indirect effects resulting from the fragmentation of connected vegetation types and creation of edge areas. Edge areas have different microclimatic conditions and structure, which could lead to different species composition than in interior areas. In areas where there is higher vegetation density the potential impacts from habitat fragmentation and edge effects will be greatest. However, portions of the Project will occur in areas with low vegetation density. In these areas impacts from fragmentation and edge effects will be minimal. The introduction and colonization of disturbed areas by invasive exotic plant species also will lead to changes in

vegetation communities, including the possible shift to more wildfire-prone vegetation that favors invasive exotic species over native species.

The Project could have direct and indirect impacts on vegetation resources located within areas disturbed by construction activity. These potential impacts will be mitigated through implementation of the required PCEMs VEG-1, VEG-2, VEG-3, VEG-4, VEG-5, or VEG-6 (see Exhibit B-1, Final EIS Table 2-8).

Routine operation and maintenance activities could increase long-term chances for invasive weed and wildfire threats to vegetation communities. Application of mitigation measures (PCEMs) will be used to mitigate these impacts, particularly PCEM VEG-1: Minimize Vegetation Impacts, PCEM VEG-2: Reclamation, Vegetation, and Monitoring Plan, and PCEM VEG-4: Vegetation Clearing. Adherence to these measures will result in short-term, minor impacts to vegetation communities. Please note that as the current WAPA transmission line exists, routine operation and maintenance is an ongoing activity and will not be a new impact.

Application of PCEMs to reduce the transfer of invasive species on construction vehicles (as directed under PCEM VEG-5: Noxious Weed Management Plan and PCEM VEG-6 regarding equipment washing) should also mitigate most direct and indirect impacts associated with the spread of noxious weeds during construction. Adherence to PCEMs will result in short-term, minor impact to vegetation and wildlife.

Reclamation activities will utilize plant species that are reflective of the local ecosystem and habitat types. Compensatory mitigation planning will be developed as part of the Plant and Wildlife Species Conservation Measures Plan. Compensatory mitigation planning will address residual impacts anticipated following application of the Reclamation, Vegetation, and Monitoring Plan.

CONCLUSION

The vegetation communities and wildlife habitat types found in the study area are generally common and widespread in southern Arizona. The area to be impacted by the Project is a small portion of the vegetation communities and habitat present in the Project vicinity. Additionally, the 64-mile route will include the replacement of wood H-frame poles with steel monopoles in approximately 52 miles of existing transmission line ROW and the realignment of 12 miles. Construction activities will disturb general vegetation and wildlife habitat in the whole project ROW. Specific areas of biological wealth and the particular impacts to those protected species are discussed in Exhibit C of this application. The WAPA ROW is an existing ROW that already has ongoing operation and maintenance activities, so there will not be new operation and maintenance impacts. Given that areas to be disturbed will be a small portion of the vegetation

communities and wildlife habitat in the Project vicinity and with the implementation of PCEMs, impacts to vegetation and wildlife are not expected to be significant.

Table D-1. Mammal Species with the Potential to Occur in the Vicinity of the Study Area.

Scientific Name	Common Name	Habitat
Ammospermophilus harrisii	Harris's antelope squirrel	Rocky areas of creosote bush/saltbush/bursage
Ammospermophilus leucurus	White-tailed antelope squirrel	Desertscrub with rocky areas for shelter
Antrozous pallidus	Pallid bat	Desertscrub with caves, mine, cliffs, bridges, or other structures for roosts
Canis latrans	Coyote	Cosmopolitan, from spruce forest to low desert
Chartodipus baileyi	Bailey pocket mouse	Flats and lower slope of desertscrub
Chaetodipus formosus	Long-tailed pocket mouse	Areas with rocky or stony groundcover in desertscrub
Chartodipus intermedius	Rock pocket mouse	Rocky areas of desertscrub
Choeronycteris mexicana	Mexican long-tongued bat	Mesic areas of mixed oak-conifer communities and desert grasslands. Roosts in caves and abandoned mines.
Corynorhinus townsendii pallescens	Pale Townsend's big-eared bat	Xeric habitats including sagebrush, desertscrub, chaparral, deciduous forests, and coniferous forests. Roosts in caves and abandoned mines.
Cynomys ludovicianus	Black-tailed prairie dog	Sparsely vegetated grasslands
Dipodomys deserti	Desert kangaroo rat	Sonoran desertscrub
Erethizon dorsatum	Porcupine	Generally distributed
Dipodomys merriami	Merriam's kangaroo rat	Sandy areas of desertscrub
Dipodomys spectabilis	Banner-tailed kangaroo rat	Semidesert grassland
Dicotyles tajacu	Peccary, Javelina	Semidesert grassland, Sonoran desertscrub
Euderma maculatum	Spotted bat	Inhabits desertscrub, riparian, pinyon-juniper woodlands, and coniferous forests. Roosts in crevices and high cliff walls.
Erethizon dorsatum	Ord's kangaroo rat	Semidesert grassland
Eptesicus fuscus	Big brown bat	Wooded areas, desertscrub
Euderma maculatum	Spotted bat	Rocky cliffs near riparian areas
Eumops perotis californicus	Greater western mastiff bat	Lower and upper Sonoran Desertscrub near cliffs. Roosts in crevices within high cliff walls.

Scientific Name	Common Name	Habitat
Felis concolor	Mountain lion	Generally distributed
Felis rufus	Bobcat	Desertscrub, especially thickets along creeks and streambeds
Idionycteris phyllotis	Allen's big-eared bat	Caves in mountainous pine forests and desertscrub near permanent water
Lepus alleni	Antelope jackrabbit	Desertscrub and grasslands
Lepus californicus	Black-tailed jackrabbit	Desertscrub and other areas with open ground cover
Lasionycteris noctivagans	Silver-haired bat	Areas with rivers, ponds, canals, or other permanent water
Lasiurus blossevillii	Western red bat	Riparian corridors among oaks, sycamores, and cottonwoods in central and southeastern Arizona.
Lasiurus xanthinus	Western yellow bat	Habitat consists of riparian and wooded areas, typically roosts in cottonwood trees
Leptonycteris curasoae yerbabuenae	Lesser long-nosed bat	Desertscrub habitat with agave and columnar cacti present as food source. Roosts in caves and abandoned mines.
Leptonycteris nivalis	Mexican long-nosed bat	Caves and mines near ocotillo, yucca, agave, manzanita, oaks, and juniper
Macrotus californicus	California leaf-nosed bat	Desertscrub
Mephitis macroura	Hooded skunk	Desertscrub, especially along creeks and streambeds or rocky ledges of canyons
Mephitis mephitis	Striped skunk	From spruce/fir belt to sea level, usually near permanent water
Microtus longicaudus	Long-tailed vole	Desertscrub, especially along creeks and streambeds
Mustela frenata	Long-tailed weasel	Wooded areas in desertscrub and woodlands
Myotis auriculus	Southwestern myotis	Desertscrub with rock faces containing crevices, occasionally caves and mines
Myotis californicus	California myotis	Desertscrub with rock faces containing crevices, occasionally caves and mines
Myotis thysanodes	Fringed myotis	Open, coniferous, middle-elevation forests
Myotis velifer	Cave myotis	Desertscrub with caves, mines, or bridges and water nearby

Scientific Name	Common Name	Habitat
Myotis yumanensis	Yuma myotis	Areas with rivers, ponds, canals, or other permanent water
Nasua narica	Coati	Medium elevation woodland and shrubby grassland, may migrate or wander through desert areas
Neotoma albigula	White-throated wood rat	Areas below the conifer belt, especially with *Opuntia* or paloverde
Neotoma lepida	Desert woodrat	Desertscrub
Neotoma micropus	Southern plains woodrat	Semidesert grassland
Notiosorex crawfordi	Crawford's gray shrew	Desertscrub
Notiosorex cockrumi	Cockrum's desert shrew	Desertscrub
Nyctinomops femorosaccus	Pocketed free-tailed bat	In Arizona, forages in riparian corridors dominated by sycamore and mesquite and bounded by large cliffs. Roosts in cliffs and tall, rocky outcrops.
Odocoileus hemionus	Mule deer	Pine forest, oak woodland, chaparral, upland desert
Onychomys leucogaster	Northern grasshopper mouse	Grasslands or open brushlands in desertscrub
Odocoileus virginianus	White-tailed deer	Generally distributed
Ovis Canadensis	Bighorn sheep	Areas with rocky outcroppings
Perognathus amplus	Arizona pocket mouse	Desertscrub and grasslands
Perognathus apache	Apache pocket mouse	Sandy areas in desertscrub
Perognathus baileyi	Bailey's pocket mouse	Sonoran desertscrub
Peromyscus boylii	Brush mouse	Medium to high densities of shrubs and tree cover in desertscrub
Peromyscus crinitus	Canyon mouse	Rocky outcroppings
Peromyscus eremicus	Cactus mouse	Desertscrub, rocky areas, chaparral
Perognathus flavus	Silky pocket mouse	Desertscrub and juniper woodlands
Perognathus hispidus	Hispid pocket mouse	Semidesert grassland
Perognathus longimembris	Little pocket mouse	Desertscrub and grasslands in western and southwestern Arizona.
Peromyscus maniculatus	Deer mouse	Creek beds and canals in Sonoran desertscrub

Scientific Name	Common Name	Habitat
Peromyscus merriami	Merriam's mesquite mouse	Once common in mesquite bosques, it has also been found in dense brush in the low desert, associated with mesquite.
Perognathus parvus	Great Basin pocket mouse	Desertscrub
Perognathus pencillatus	Desert pocket mouse	Sonoran desertscrub
Peromyscus truei	Pinyon mouse	Rocky areas in juniper woodlands
Perognathus spp.	Pocket mouse	Semidesert grassland
Plecotus townsendii	Townsend's big-eared bat	Coniferous forests with caves, mines, or bridges and water nearby
Procyon lotor	Raccoon	Areas with permanent water
Reithrodontomys megalotis	Western harvest mouse	Desertscrub or chaparral
Sigmodon fulviventer	Tawny-bellied cotton rat	Semidesert grassland
Sigmodon hispidus	Hispid cotton rat	Semidesert grassland
Spermophilus spilosoma	Spotted ground squirrel	Sandy soils with sparse vegetation in desertscrub
Spilogale putorius	Spotted skunk	Low and middle elevations, often in rocky areas or around human habitation
Sylvilagus audubonii	Desert cottontail	Desertscrub, semi-desert grassland
Sylvilagus floridanus	Eastern cottontail	Open grassy areas in desertscrub
Taxidea taxus	Badger	Generally distributed
Thomomys bottae	Botta's pocket gopher	Any area with soil suitable for digging burrows
Thomomys umbrinus	Southern pocket gopher	High altitude grassland and shrubland
Urocyon cinereoargenteus	Gray fox	Open desertscrub, chaparral, lower-elevation woodland
Vulpes macrotis	Kit fox	Desertscrub and desert grassland with sandy or softer clay soils

Source: Hoffmeister 1986; Bat Conservation International BCI 2020; Arizona Game and Fish Department (AGFD) 2020.

Table D-2. Bird Species with the Potential to Occur in the Vicinity of the Study Area.

Scientific Name	Common Name	Habitat
Accipiter cooperii	Cooper's hawk	Broken woodlands or streamside groves
Accipiter striatus	Sharp-shinned hawk	Generally distributed

Scientific Name	Common Name	Habitat
Actitis macularia	Spotted sandpiper	Lakes, ponds, streams, and flooded areas
Aeronautes saxatalis	White-throated swift	Hilly and mountainous areas
Agelaius phoeniceus	Red-winged blackbird	Riparian areas, irrigated fields, marshes, and feedlots
Aimophila botterii arizonae	Arizona grasshopper sparrow	Grasslands, prairies, hayfields, and open pastures with little to no scrub cover
Aimophila cassinii	Cassin's sparrow	Semidesert grassland
Aimophila ruficeps	Rufous-crowned sparrow	Dry, open grasslands with scattered shrubs
Ammodramus savannarum	Western grasshopper sparrow	Grasslands, prairies, hayfields, and open pastures with little to no scrub cover
Amphispiza bilineata	Black-throated sparrow	Sonoran desertscrub
Anas diazi	Mexican duck	Wetlands, ponds, and rivers
Anas platyrhynchos	Mallard	Lakes, ponds, streams, canals
Antrostomus ridgwayi	Buff collared nightjar	Desert drainages with dense vegetation.
Aphelocoma californica	Western scrub-jay	Open areas in pinyon-juniper woodlands
Aquila chrysaetos	Golden eagle	Open coniferous forests in hilly and mountainous regions
Archilochus alexandri	Black-chinned hummingbird	Open woodlands
Ardea herodias	Great blue heron	Lakes, ponds, streams, marshes, and canals
Asio flammeus	Short-eared owl	Open areas such as grasslands and prairies
Asio otus	Long-eared owl	Open woodlands, forest edges, riparian strips along rivers, wooded ravines and gullies, and juniper thickets
Athene cunicularia	Burrowing owl	Open grasslands and agricultural areas, golf courses, airports
Auriparus flaviceps	Verdin	Semidesert grassland, Sonoran desertscrub
Baeolophus griseus	Juniper titmouse	Open areas such as grasslands and prairies, associated with burrowing animals
Botaurus lentiginosus	American bittern	Managed wetlands; dry grasslands
Bubo virginianus	Great horned owl	Common in a wide variety of habitats
Buteo albonotatus	Zone-tailed hawk	Open areas with scattered trees and riparian areas
Buteo jamaicensis	Red-tailed hawk	Plains, prairie groves, desert

Scientific Name	Common Name	Habitat
Buteo regalis	Ferruginous hawk	Dry, open country
Buteo swainsoni	Swainson's hawk	Fields and desert
Buteogallus anthracinus	Common black hawk	Lowlands and middle elevations near water
Butorides virescens	Green heron	Coastal and inland wetlands
Calypte anna	Anna's hummingbird	Urban and suburban settings; Open woodlands
Calypte costae	Costa's hummingbird	Sonoran desertscrub
Campylorhynchus brunneicapillus	Cactus wren	Sonoran desertscrub
Caracara cheriway	Crested caracara	Sonoran desertscrub, pastures, and cultivated areas.
Cardinalis cardinalis	Northern cardinal	Dense shrub
Cardinalis sinuatus	Pyrrhuloxia	Sonoran desertscrub
Carpodacus mexicanus	House finch	Riparian and suburban areas, farmland, desert
Cathartes atratus	Black vulture	Open deserts
Cathartes aura	Turkey vulture	Open country, woodlands, farmlands
Catharus guttatus	Hermit thrush	Lowland woodlands and suburban areas
Catherpes mexicanus	Canyon wren	Steep, rocky landscapes
Chondestes grammacus	Lark sparrow	Brushy, weedy areas, riparian areas, and field edges
Chordeiles acutipennis	Lesser nighthawk	Sonoran desertscrub
Chordeiles minor	Common nighthawk	Dry, open country, scrubland, desert
Circus cyaneus	Northern harrier	Open areas including grasslands and prairies
Colaptes auratus	Northern flicker	Open woodlands, suburban areas
Colaptes chrysoides	Gilded flicker	Sonoran desertscrub
Columbina inca	Inca dove	Urban and suburban areas
Columba livia	Rock dove	Parks, fields, urban settings
Columbina passerina	Common ground-dove	Irrigated farm fields; Urban areas; Arid, young, open woodlands
Contopus cooperi	Olive-sided flycatcher	Near openings, burns, ponds, and bogs in boreal spruce and fir forests
Contopus sordidulus	Western wood-pewee	Riparian areas, wooded habitats, including suburban areas

Scientific Name	Common Name	Habitat
Corvus brachyrhynchos	American crow	Fields, open woodlands, and forests
Corvus corax	Common raven	Mountains, deserts, coastal areas
Cynanthus latirostris	Broad-billed hummingbird	Any habitat types, from lowland thorn forests and wetter tropical deciduous forests up into mountain canyons
Dendrocygna autumnalis	Black-bellied whistling-duck	Fields, lawns, and shallow, freshwater ponds
Dendroica coronata	Yellow-rumped warbler	Riparian and suburban areas
Dendroica graciae	Grace's warbler	Open forest with tall pines
Elanus leucurus	White-tailed kite	Grasslands and open woodlands
Empidonax oberholseri	Dusky flycatcher	Open, dry, coniferous forests with a shrubby understory
Empidonax traillii extimus	Southwestern willow flycatcher	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.
Empidonax wrightii	Gray flycatcher	Open woodland with bare understory
Eremophila alpestris	Horned lark	Dirt fields, gravel ridges, shores
Euphagus cyanocephalus	Brewer's blackbird	Fields, farmyards, feedlots, ponds, and riparian areas
Falco mexicanus	Prairie falcon	Dry, open country, prairies
Falco peregrinus	Peregrine falcon	Generally distributed
Falco sparverius	American kestrel	Open country, cities
Fulica americana	American coot	Freshwater wetlands ranging from suburban parks to swamps and marshes
Geococcyx californianus	Roadrunner	Sonoran desertscrub
Glaucidium gnoma	Northern pygmy-owl	Pine and pine-oak forests
Glaucidium brasilianum cactorum	Cactus ferruginous pygmy-owl	Sonoran desertscrub and occasionally in riparian drainages and woodlands within semidesert grassland communities
Haliaeetus leucocephalus	Bald eagle	Areas near large areas of open water
Himantopus mexicanus	Black-necked stilt	Mudflats, saltmarshes, flooded fields, or salt pans
Hirundo rustica	Barn swallow	Streams, ponds, lakes, and agricultural areas
Icterus bullockii	Bullock's oriole	Riparian or streamside woodlands
Icterus cucullatus	Hooded oriole	Desert oases with tall trees; Suburban areas

Scientific Name	Common Name	Habitat
Icterus pustulatus	Streak-backed oriole	Woodland, grasslands, and shrublands
Ictinia mississippiensis	Mississippi Kite	Shortgrass and mixed prairie, oak and mesquite savannah, and cottonwoods and salt cedars lining rivers
Junco hyemalis	Dark-eyed junco	Desertscrub
Lanius ludovicianus	Loggerhead shrike	Semidesert grassland
Lophortyx gambelii	Gambel's quail	Semidesert grassland, Sonoran desertscrub
Melanerpes uropygialis uropygialis	Gila woodpecker	Sonoran desert uplands with large saguaros.
Melanerpes uropygialis	Gila woodpecker	Sonoran desertscrub
Melospiza lincolnii	Lincoln's Sparrow	Wet meadows with dense patches of willows, alders, and sedges
Melospiza melodia	Song sparrow	Open habitats ranging from tidal marches to suburb areas
Micrathene whitneyi	Elf owl	Sonoran desertscrub
Mimus polyglottos	Northern mockingbird	Variety of habitats
Molothrus aeneus	Bronzed cowbird	Pastures, farm fields, golf courses, and scrubby grasslands
Molothrus ater	Brown-headed cowbird	Suburbs and agricultural areas
Myiarchus cinerascens	Ash-throated flycatcher	Wide variety of habitats
Myiarchus tyrannulus	Wied's crested flycatcher	Sonoran desertscrub
Nycticorax nycticorax	Black-crowned night-heron	Saltmarshes, freshwater marshes, swamps, streams, rivers, lakes, ponds, lagoons, tidal mudflats, canals, reservoirs, and wet agricultural fields
Otus kennicottii	Western screech owl	Open woodlands, streamside groves, deserts, suburban areas
Oxyura jamaicensis	Ruddy duck	Variety of wetland habitats
Pandion haliaetus	Osprey	Lakes, ponds, streams, marshes, and canals
Parabuteo unicinctus	Harris' hawk	Sonoran desertscrub
Passer domesticus	House sparrow	Urban and suburban areas
Passerculus sandwichensis	Savannah sparrow	Grasslands with few trees

Scientific Name	Common Name	Habitat
Passerina caerulea	Blue grosbeak	Old fields, forest edges, transmission-line corridors, hedgerows, stream edges, deserts, mesquite savannas, saltcedar forests, and southern pine forests
Passerina versicolor	Varied bunting	Scrubby clearings
Petrochelidon pyrrhonota	Cliff swallow	Wide variety of habitats, ranging from urban areas to canyons and foothills
Peucaea carpalis	Rufous-winged sparrow	Arid grasslands
Phainopepla nitens	Phainopepla	Riparian areas, especially in trees with mistletoe
Phalaenoptilus nuttallii	Common poor-will	Semidesert grassland
Pheucticus melanocephalus	Black-headed grosbeak	Transient in lowlands
Picoides scalaris	Ladder-backed woodpecker	Semidesert grassland, Sonoran desertscrub
Picoides villosus	Hairy woodpecker	Generally distributed
Pipilo aberti	Abert's towhee	Lower Colorado River and Gila River watersheds
Pipilo fuscus	Canyon towhee	Sonoran desertscrub
Pipilo maculatus	Spotted towhee	Brushy areas, riparian and suburban areas
Piranga ludoviciana	Western tanager	Transient in lowlands
Podilymbus podiceps	Pied-billed grebe	Large ponds and lakes with emergent vegetation
Polioptila caerulea	Blue-gray gnatcatcher	Broadleaf forests and scrublands
Polioptila melanura	Black-tailed gnatcatcher	Semidesert grassland, Sonoran desertscrub
Progne subis	Purple martin	Urban and suburban areas
Psaltriparus minimus	Bushtit	Woodlands, edges, and park or neighborhood vegetation
Pyrocephalus rubinus	Vermilion flycatcher	Open areas along wetlands or streams
Quiscalus mexicanus	Great-tailed grackle	Riparian areas, irrigated fields, marshes, and feedlots
Recurvirostra americana	American avocet	Shallow water or on mud flats
Salpinctes obsoletus	Rock wren	Open arid to semiarid habitats
Sayornis nigricans	Black Phoebe	Woodlands, parks, suburbs, prefers to nest near water
Sayornis saya	Say's phoebe	Dry, open areas, canyons, cliffs

Scientific Name	Common Name	Habitat
Selasphorus platycercus	Broad-tail hummingbird	Open woodland, especially pinyon-juniper and pine-oak association
Setophaga petechia	Yellow warbler	Disturbed forests near wetlands and streams
Sialia mexicana	Western bluebird	Woodlands, farmlands, orchards, deserts, especially in mesquite-mistletoe groves
Sitta carolinensis	White-breasted nuthatch	Open mixed forest
Spatula cyanoptera	Cinnamon teal	Large, permanent marshes
Spinus psaltria	Lesser goldfinch	Scrubby oak, cottonwood, and willow habitats
Spizella passerina	Chipping sparrow	Brushy edges and riparian areas
Stelgidopteryx serripennis	Northern rough-winged swallow	Open areas near lakes, ponds, and streams
Strix occidentalis	Spotted owl	Dense, dark, old-growth coniferous or mixed forest
Sturnella magna	Eastern Meadowlark	Semidesert grassland
Sturnella neglecta	Western meadowlark	Semidesert grassland
Sturnus vulgaris	European starling	Generally distributed
Tachybaptus dominicus	Least grebe	Shallow freshwater or brackish ponds
Tachycineta bicolor	Tree swallow	Streams, ponds, lakes
Tachycineta thalassina	Violet-green swallow	Riparian areas, streams, ponds, and lakes
Thryomanes bewickii	Bewick's wren	Wooded riparian areas
Toxostoma bendirei	Bendire's thrasher	Sonoran desertscrub
Toxostoma curvirostra	Curve-billed thrasher	Sonoran desertscrub
Troglodytes aedon	House wren	Dense, brushy areas
Turdus migratorius	American robin	Riparian and suburban areas, desertscrub
Tyrannus melancholicus	Tropical kingbird	Rural areas near ponds and reservoirs
Tyrannus verticalis	Western kingbird	Semidesert grassland
Tyrannus vociferans	Cassin's kingbird	Varied habitats
Tyto alba	Barn owl	Dark cavities in city and farm buildings, cliffs, trees
Vermivora virginiae	Virginia's warbler	Low brushy areas on dry mountain sides
Vireo bellii	Bell's vireo	Scrub
Zenaida asiatica	White-winged dove	Sonoran desertscrub

Scientific Name	Common Name	Habitat
Zenaida macroura	Mourning dove	Wide variety of habitats

Source: Corman and Wise-Gervais 2005 and Glinski 1998; AGFD 2020; Cornell Lab of Ornithology (2016); eBird 2020.

Table D-3. Reptile and Amphibian Species with the Potential to Occur in the Vicinity of the Study Area.

Scientific Name	Common Name	Habitat
Arizona elegans	Glossy snake	Sonoran desertscrub
Arizona elegans eburnata	Desert glossy snake	Sonoran desertscrub
Arizona elegans noctivaga	Arizona glossy snake	Sonoran desertscrub
Arizona elegans philipi	Painted desert glossy snake	Below 6,000 feet in sparsely vegetated woodland, chaparral, grassland, or desertscrub with loose soil
Aspidoscelis arizonae	Arizona striped whiptail	Semidesert grassland
Aspidoscelis burti	Canyon spotted whiptail	Semidesert Grassland and Madrean Evergreen Woodland communities and in drainages in Sonoran desertscrub.
Aspidoscelis uniparens	Desert grassland whiptail	Low valleys, mesquite-lined riparian corridors, floodplains, and moderate slopes in semidesert grassland into interior chaparral and woodland communities
Bufo cognatus	Great Plains toad	Creosote bush, mesquite deserts and desert scrub in association with temporary ponds, wetlands, and irrigation ponds and ditches
Bufo debilis insidior	Western green toad	Semidesert grassland
Bufo punctatus	Red-spotted toad	Rocky desert streams, pools in rocky arroyos, cattle tanks, grassland, oak woodland, scrubland, and river floodplains
Bufo retiformis	Sonoran green toad	Sonoran desertscrub, near rain pools, wash bottoms, and areas near water
Bufo woodhousii woodhousii	Rocky Mountain toad	Irrigation ditches, temporary pools, moist meadows, grasslands, ponds, lakes, reservoirs, sagebrush flats, woods, desert streams, farms, river floodplains, irrigation canals, irrigated fields, and golf courses
Callisaurus cinctus	Banded sand snake	Sonoran desertscrub

Scientific Name	Common Name	Habitat
Callisaurus draconoides	Zebratail lizard	Sonoran desertscrub
Callisaurus occipitalis	Western shovelnose snake	Sonoran desertscrub
Chilomeniscus stramineus	Variable sandsnake	Sonoran desertscrub
Cnemidophorus hyperythrus	Orangethroat lizard	Sonoran desertscrub
Cnemidophorus inornatus heptagrammus	Trans-Pecos striped whiptail	Inhabits deserts and semiarid habitats, usually where plants are sparse, also found in woodland, streamside growth, and in the warmer, drier parts of forests
Cnemidophorus tigris gracilis	Southern whiptail	Sonoran desertscrub
Cnemidophorus tigris multiscutatus	Coastal whiptail	Sonoran desertscrub
Cnemidophorus tigris tigris	Western whiptail	Sonoran desertscrub
Cnemidophorus uniparens	Desert grassland whiptail	Semidesert grassland
Coleonyx brevis	Texas banded gecko	Sonoran desertscrub
Coleonyx reticulatus	Reticulated gecko	Sonoran desertscrub
Coluber bilineatus	Sonoran whipsnake	Desertscrub, semidesert grassland, Madrean evergreen woodland and into Great Basin conifer woodland
Cophosaurus texanus	Greater earless lizard	Sonoran desertscrub
Crotalus atrox	Western diamondback rattlesnake	Wide variety of habitats below 7,000 feet
Crotalus molossus molossus	Black-tailed rattlesnake	Upland desert to pine-oak woodland
Crotalus ruber	Red diamondback rattlesnake	Sonoran desertscrub
Crotalus scutulatus scutulatus	Mojave rattlesnake	Mostly in upland desert and lower mountain slopes
Crotalus tigris	Tiger rattlesnake	Desertscrub, interior chaparral, and Madrean evergreen woodland
Crotalus viridis	Prairie rattlesnake	Dry regions with sparse vegetation and a rocky component
Crotaphytus nebrius	Sonoran collared lizard	Sonoran desertscrub
Dipsosaurus dorsalis	Desert iguana	Sonoran desertscrub

Scientific Name	Common Name	Habitat
Eumeces gaigeae	Variable skink	Rocky grassy slopes in forested areas with ponderosa pine, edges of rocky canyons, pinyon-juniper woodland, and mountain streamsides
Gambelia wislizenii wislizenii	Long-nosed leopard lizard	Arid and semiarid plains grown to bunch grass, alkali bush, sagebrush, creosote bush, or other scattered low plants; ground may be hardpan, gravel, or sand
Gastrophryne olivacea	Great Plains narrow-mouthed toad	Found near streams, springs, and rain pools in Sonoran desertscrub, semidesert grasslands, and oak woodlands
Gopherus agassizi	Desert tortoise	Sonoran desertscrub
H. suspectum	Gila monster	Sonoran desertscrub
H. suspectum suspectum	Reticulated Gila monster	Sonoran desertscrub
Heterodon nasicus kennerlyi	Mexican hognose snake	Semidesert grassland
Holbrookia maculata approximans	Speckled earless lizard	Sandy soil areas in grassy prairie, cultivated fields, dry streambeds, and desert grasslands
Holbrookia texana scitula	Southwestern earless lizard	Semidesert grassland
Hyla arenicolor	Canyon tree frog	Huddles in niches on sides of boulders or stream banks, favors intermittent or permanent streams with quiet pools that have a hard rocky bottom, frequents arroyos in semi-arid grassland, streams in pinyon-juniper and pine-oak woodlands, and tropical scrub forest
Hypsiglena torquata	Night snake	Various upland and desert habitats used
Incilius alvarius	Colorado River toad (aka Sonoran desert toad)	Sonoran desertscrub, semi-desert grasslands, pine-oak woodlands, and aquatic features as rivers, streams, and agricultural fields
Kinosternon sonoriense sonoriense	Sonora mud turtle	Creeks, streams, and rivers as well as ditches, ponds, and cattle tanks in Lower Colorado River desertscrub through woodlands
Lithobates blairi	Plains leopard frog	Streams, ponds, reservoirs, marshes, or irrigation ditches in prairie and desert grasslands, but also in oak, oak-pine woodland, and farmland

Scientific Name	Common Name	Habitat
Lithobates yavapaiensis	Lowland leopard frog	Desert grasslands to pinyon-juniper forests near water. Habitat generalists. Central and southeastern Arizona with the majority found below the Mogollon Rim. Elevations below 6,200 feet.
Masticophis taeniatus	Striped whipsnake	Open brushy areas in desertscrub, often along edges of rivers or ponds
Micruroides euryxanthus	Arizona (Sonora) coral snake	Desertscrub to semidesert grassland
Pituophis catenifer affinis	Sonoran gopher snake	Variety of habitats including desert flats, agricultural land, and riparian areas
Phrynosoma douglasii hernandesi	Mountain Short-horned lizard	Open, shrubby, or openly wooded areas with sparse vegetation at ground level
Phrynosoma goodie	Goode's horned lizard	Lower Colorado River Valley Subdivision of Sonoran desertscrub
Phrynosoma m'calli	Flat-headed horned lizard	Sonoran desertscrub
Phrynosoma platyrhinos calidiarum	Southern desert horned lizard	Sonoran desertscrub
Phrynosoma solare	Regal horned lizard	Sonoran desertscrub
Phyllorhynchus browni	Saddled leaf-nosed snake	Sonoran desertscrub
Phyllorhynchus decurtatus	Spotted leaf-nose snake	Sonoran desertscrub
Pseudacris triseriata triseriata	Western chorus frog	Wet meadows, marshes, and woodlands
Rhinocheilus lecontei	Longnose snake	Arid and semi-arid deserts, grasslands, shrublands, and prairies
Salvadora hexlepis	Western patchnose snake	Sonoran desertscrub
Sauromalus obesus	Chuckwalla	Sonoran desertscrub
Sceloporus graciosus graciosus	Sagebrush lizard	Sagebrush, pine or fie forests, brushland, and pinyon-juniper woodland
Sceloporus occidentalis	Western fence lizard	Grassland, broken chaparral, sagebrush, woodland, and coniferous forest
Sonora semiannulata	Ground snake	Areas with surface cover and some moisture including grasslands, river bottoms, deserts flats, ranchland, sand hummocks, open rocky hillsides with loose soil, sandy washes, dry streambeds, and riparian thickets

Scientific Name	Common Name	Habitat
Spea multiplicata	New Mexico spadefoot	Wide range of arid and semi-arid habitat types where soil is sandy or gravelly
Tantilla hobartsmithi	Southwestern blackhead snake	In loose soil or plant litter in desert grassland and woodland habitats
Thamnophis elegans vagrans	Wandering garter snake	Variety of habitats
Terrapene ornata	Ornate box turtle	Semi-arid regions with plains, grasslands, and pastures. Often associated with prairie dog towns.
Terrapene ornata luteola	Desert box turtle	Semidesert grassland
Trimorphodon biscutatus	Western lyre snake	From oak and juniper woodland to higher elevation desert and grasslands, particularly in rocky areas
Uma notata	Fringe-toed lizard	Sonoran desertscrub
Urosaurus graciosus	Brush lizard	Sonoran desertscrub
Urosaurus microscutatus	Small-scaled lizard	Sonoran desertscrub
Urosaurus ornatus	Western tree lizard	Frequents mesquite, oak, pine, juniper, alder, cottonwood, and non-native trees such as tamarisk and rough-bark eucalyptus, but also may occur in treeless areas, especially attracted to river courses

Source: Stebbins 2003; AGFD 2020.

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