THREATENED AND ENDANGERED SPECIES

OF NEW MEXICO

2026 BIENNIAL REVIEW

November 13, 2026

New Mexico Department of Wildlife
Wildlife Management and Fisheries Management Divisions
2026 Biennial Review and Recommendations

Authority: Wildlife Conservation Act (17-2-37 through 17-2-46 NMSA 1978)

EXECUTIVE SUMMARY: Species or subspecies of mammals, birds, reptiles, amphibians, fishes, mollusks, and crustaceans native to New Mexico may be listed as threatened or endangered under the Wildlife Conservation Act (WCA). A total of 114 species and subspecies are included on the 2026 list of threatened and endangered New Mexico wildlife, the list comprising 2 crustaceans, 24 mollusks, 22 fishes, 6 amphibians, 15 reptiles, 31 birds, and 14 mammals (Tables 1 & 2).

Under the WCA, a species or subspecies is categorized as endangered if it is in jeopardy of extinction or extirpation from the state, and is considered threatened if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in New Mexico. During Biennial Review open comment periods, listed taxa may be "uplisted" from threatened to endangered, or "downlisted" from endangered to threatened on the basis of new data and other information regarding the biological and ecological status of the species. Investigations in support of new listings or removals from the list (delistings) can be undertaken at any time, but require additional statutory procedures that are outside the scope of the Biennial Review process.

The 2026 Biennial Review cycle was opened by the State Wildlife Commission on March 20, 2026. A 90-day public comment period was then announced by the Department on its website and in a statewide news release. No public comments were received during the 90-day open period. Department biologists subsequently reviewed and updated all species accounts, and the resulting draft Biennial Review was presented to the State Wildlife Commission at its August 21, 2026, meeting, at which time the Commission opened a 14-day public comment period for the draft document. Availability of the draft Biennial Review was announced in a statewide news release as well as on the Department's website. No public comments were received during the 14-day open period. The final Biennial Review document was presented to the Commission for approval at its November 13, 2026, meeting. No uplisting or downlisting of any threatened or endangered species' status was recommended in this review cycle.

The 2026 Biennial Review contains information and recommendations regarding the listing status for each of the 114 species or subspecies designated as threatened or endangered under the WCA. Species accounts also contain a summary of the distribution, current status, and known or potential threats to persistence. Species accounts contain only key references. Databases for individual species are available on the internet at: https://bison-m.org.

The Department emphasizes the need for identifying and protecting endangered wildlife in New Mexico. The State of New Mexico has lost, and continues to lose, elements of its wildlife diversity. More than 90 different taxa have been extirpated from one or more counties, including 25 that are believed to be extinct (i.e., no longer exist anywhere), and at least 15 others that have been extirpated from the state (but continue to exist elsewhere).

Table 1. Summary of review and recommendation for 2026 New Mexico threatened and endangered species list.

	Number of Species or Subspecies and 2026 Recommendations		
TAXA and 2026 STATUS	No Change	Reclassify As Endangered	Reclassify As Threatened
INVERTEBRATES			
Endangered	12	--	0
Threatened	14	0	--
FISHES			
Endangered	13	--	0
Threatened	9	0	--
AMPHIBIANS			
Endangered	4	--	0
Threatened	2	0	--
REPTILES			
Endangered	8	--	0
Threatened	7	0	--
BIRDS			
Endangered	12	--	0
Threatened	19	0	--
MAMMALS			
Endangered	6	--	0
Threatened	8	0	--
TOTAL	114	0	0

Table 2. Taxonomic summary of New Mexico threatened and endangered species. Taxa listed as subspecies under the Wildlife Conservation Act are denoted by placing subspecies name in parentheses.

MAMMALS (14 total species)

Endangered (6 species; no change):

Arizona shrew, *Sorex arizonae*
Mexican long-nosed bat, *Leptonycteris nivalis*
(Penasco) least chipmunk, *Neotamias minimus atristriatus*
meadow jumping mouse, *Zapus hudsonius*
(Arizona) montane vole, *Microtus montanus arizonensis*
gray wolf, *Canis lupus*

Threatened (8 species; no change):

North American least shrew, *Cryptotis parvus*
lesser long-nosed bat, *Leptonycteris yerbabuenae*
spotted bat, *Euderma maculatum*
western yellow bat, *Lasiurus xanthinus*
white-sided jackrabbit, *Lepus callotis*
(Organ mountains) Colorado chipmunk, *Neotamias quadrivittatus australis*
southern pocket gopher, *Thomomys umbrinus*
Pacific marten, *Martes caurina*

BIRDS (31 total species)

Endangered (12 species; no change):

brown pelican, *Pelecanus occidentalis*
aplomado falcon, *Falco femoralis*
white-tailed ptarmigan, *Lagopus leucura*
whooping crane, *Grus americana*
least tern, *Sternula antillarum*
common ground-dove, *Columbina passerina*
buff-collared nightjar, *Antrostomus ridgwayi*
elegant trogon, *Trogon elegans*
northern beardless-tyrannulet, *Camptostoma imberbe*
(southwestern) willow flycatcher, *Empidonax traillii extimus*
thick-billed kingbird, *Tyrannus crassirostris*
(Arizona) grasshopper sparrow, *Ammodramus savannarum ammolegus*

Threatened (19 species; no change):

neotropic cormorant, *Nannopterum brasilianum*
bald eagle, *Haliaeetus leucocephalus*
common black hawk, *Buteogallus anthracinus*
peregrine falcon, *Falco peregrinus*
piping plover, *Charadrius melodus*
whiskered screech-owl, *Megascops trichopsis*
boreal owl, *Aegolius funereus*
broad-billed hummingbird, *Cynanthus latirostris*
white-eared hummingbird, *Basilinna leucotis*
violet-crowned hummingbird, *Ramosomyia violiceps*
lucifer hummingbird, *Calothorax lucifer*
Costa's hummingbird, *Calypte costae*
Gila woodpecker, *Melanerpes uropygialis*
Bell's vireo, *Vireo bellii*
gray vireo, *vireo vicinior*
Abert's towhee, *Melozone aberti*

Baird's sparrow, *Centronyx bairdii*
yellow-eyed junco, *Junco phaeonotus*
varied bunting, *Passerina versicolor*

REPTILES (15 total species)

Endangered (8 species; no change):
Gila monster, *Heloderma suspectum*
dunes sagebrush lizard, *Sceloporus arenicolus*
gray-checkered whiptail *Aspidoscelis dixoni*
gray-banded kingsnake, *Lampropeltis alterna*
Mexican gartersnake, *Thamnophis eques*
narrow-headed gartersnake, *Thamnophis rufipunctatus*
plain-bellied water snake, *Nerodia erythrogaster*
(New Mexico) ridgenosed rattlesnake, *Crotalus willardi obscurus*

Threatened (7 species; no change):
western river cooter, *Pseudemys gorzugi*
Slevin's bunch grass lizard, *Sceloporus slevini*
giant spotted whiptail, *Aspidoscelis stictogramma*
mountain skink, *Plestiodon callicephallus*
green ratsnake, *Senticolis triaspis*
western ribbonsnake, *Thamnophis proximus*
(mottled) rock rattlesnake, *Crotalus lepidus*

AMPHIBIANS (6 total species)

Endangered (4 species; no change):
Jemez mountains salamander, *Plethodon neomexicanus*
lowland leopard frog, *Lithobates yavapaiensis*
boreal toad, *Anaxyrus boreas*
Western narrow-mouthed toad, *Gastrophyrne olivacea*

Threatened (2 species; no change):
Sacramento mountains salamander, *Aneides hardii*
Sonoran desert toad, *Incilius alvarius*

FISHES (22 total species)

Endangered (13 species):
Chihuahua chub, *Gila nigrescens*
roundtail chub, *Gila robusta*
Rio Grande silvery minnow, *Hybognathus amarus*
spikedace *Meda fulgia*
Arkansas River shiner, *Notropis girardi*
(Pecos) bluntnose shiner, *Notropis simus pecosensis*
southern redbelly dace, *Chrosomus erythrogaster*
Colorado pikeminnow, *Ptychocheilus lucius*
loach minnow, *Tiaroga cobitis*
(Zuni) bluehead sucker, *Catostomus discobolus yarrowi*
blue sucker, *Cycleptus elongatus*
gray redhorse, *Moxostoma congestum*
Pecos gambusia, *Gambusia nobilis*

Threatened (9 species; no change):
Gila trout, *Oncorhynchus gilae*
Mexican tetra, *Astyanax mexicanus*
peppered chub, *Macrhybopsis tetranema*

suckermouth minnow, *Phenacobius mirabilis*
Pecos pupfish, *Cyprinodon pecosensis*
White Sands pupfish, *Cyprinodon tularosa*
Gila topminnow, *Poeciliopsis occidentalis*
greenthroat darter, *Etheostoma lepidum*
bigscale logperch, *Percina macrolepida*
(**Listing exceptions:** Arkansas River shiner- excludes the population in the Pecos river drainage; bigscale logperch- excludes the population in the Canadian river drainage.)

CRUSTACEANS (2 total species)

Endangered (2 species; no change):
Socorro isopod, *Thermosphaeroma thermophilum*
Noel's amphipod, *Gammmarus desperatus*

MOLLUSKS (24 total species)

Endangered (10 species; no change):
paper pondshell, *Utterbackia imbecillis*
Texas hornshell, *Popenaias popeii*
Koster's springsnail, *Juturnia kosteri*
Alamosa springsnail, *Pseudotryonia alamosae*
Chupadera springsnail, *Pyrgulopsis chupaderae*
Socorro springsnail, *Pyrgulopsis neomexicana*
Roswell springsnail, *Pyrgulopsis roswellensis*
Pecos assiminea, *Assiminea pecos,*
wrinkled marshsnail, *Stagnicola caperata*
Florida mountainsnail, *Oreohelix florida*

Threatened (14 species; no change):
lake fingernailclam, *Musculium lacustre*
swamp fingernailclam, *Musculium partumeium*
long fingernailclam, *Musculium transversum*
Lilljeborg's peaclam, *Pisidium lilljeborgi*
Gila springsnail, *Pyrgulopsis gilae*
Pecos springsnail, *Pyrgulopsis pecosensis*
New Mexico springsnail, *Pyrgulopsis thermalis*
star gyro, *Gyraulus crista*
shortneck snaggletooth, *Gastrocopta dalliana*
ovate vertigo, *Vertigo ovata*
Hacheta Grande woodlandsnail, *Ashmunella hebardi*
Cooke's peak woodlandsnail, *Ashmunella macromphala*
Mineral creek mountainsnail, *Oreohelix pilsbryi*
Doña Ana talussnail, *Sonorella todseni*

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SPECIES ACCOUNTS

VERTEBRATES

MAMMALS

ENDANGERED

Arizona shrew, *Sorex arizonae*

Distribution: Arizona shrew is known from the Huachuca, Santa Rita, and Chiricahua Mountains of southeastern Arizona (Diersing and Hoffmeister, 1977; Hoffmeister, 1986), and portions of Chihuahua, Mexico (Caire et al., 1978). In New Mexico, it is known only from the Animas Mountains (Conway and Schmitt, 1978; Cook, 1986) where it has been verified at four sites (Simons and Maldonado, 2007). In the Animas Mountains, Arizona shrew occupies mesic woodlands dominated by Douglas fir (*Pseudotsuga menziesii*), quaking aspen *(Populus tremuloides*), and netleaf oak (*Quercus reticulata*), often near springs. In Arizona, it is associated with silver-leaf oak (*Q. hypoleucoides*), Arizona white oak (*Q. arizonica*), Arizona madrone (*Arbutus arizonica*), Chihuahua pine (*Pinus leiophylla* var. *chihuahuana*), and Arizona sycamore (*Platanus wrightii*) (Simons and Van Pelt, 1999). The known elevation range is from approximately 5170 to 8500 ft. Mature forest with ground cover, including live understory vegetation and woody debris, are important habitat features for this species (Simons and Van Pelt, 1999; Simons and Hoffmeister, 2003).

This is a terrestrial shrew that does not hibernate and forages for invertebrates in and under forest litter during alternating periods of activity during the day and night. The reproductive biology of this species is largely unknown; breeding occurs at least from late July through October (Simons and Hoffmeister, 2003).

Current Status: The New Mexico State Game Commission approved the listing of Arizona shrew as endangered in 1978 (Jones and Schmitt, 1997). It is not federally listed. Limited information on New Mexico populations has suggested that the Arizona shrew is a very rare and extremely localized species, although Maldonado et al. (2015:411) stated that the species "remains well distributed and relatively abundant within its restricted and fragmented range in Arizona and New Mexico, particularly in many riparian zones and upland areas, including some ridgelines and mountaintop saddles with sufficient moisture, vegetation, and soil development to provide cover and a food base. Surveys in 2001 documented the presence of Arizona shrew at two new locations in the Animas Mountains (Simons and Maldonado, 2007). The species appears to be reasonably abundant at several sites in southern Arizona (Simons and Van Pelt, 1999). Maldonado et al. (2015) examined genetic differentiation among populations in the Animas Mountains and in Arizona (Chiricahua, Huachuca, and Santa Rita mountains) and found that a unique mitochondrial DNA haplotype is present in the Animas Mountains population.

Threats: The apparent rarity, extremely limited distribution, and small population size in New Mexico make this species highly vulnerable to any adverse habitat alterations. Destruction of mature riparian forest communities and associated under story vegetation and woody debris, such as by wildfire, is the primary threat to the Arizona shrew in New Mexico. The Adobe Fire in the Animas Mountains during May-June 2006 burned through at least one known location for this species. Surveys are needed to assess the impact of fire on habitat for Arizona shrew.

Recommendations: No change in the listing status of Arizona shrew is recommended. Periodic surveys (approximately once every 5 years) of distribution and population status in the Animas Mountains are warranted but depend on landowner permitting for access. Other possibly suitable habitats in the Peloncillo Mountains should be surveyed for presence. Assessment of the relationships between New Mexico and other populations (Ortega et al., 2005) should be continued.

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Mexican long-nosed bat, *Leptonycteris nivalis*

Distribution: Mexican long-nosed bats are known to occur at higher elevations (1550 to 9300 ft) in at least 15 states in Mexico (Arita and Humphrey, 1988). In the United States, the species is only found in southwest Texas (Borell and Bryant, 1942; Easterla, 1972; Mollhagen, 1973) and southwestern New Mexico (Arita and Humphrey, 1988; Hensley and Wilkins, 1988; Hoyt et al., 1994). Two bats collected in 1963 and 1967 in Hidalgo County, New Mexico and identified as lesser long-nosed bats (*L. yerbabuenae*) were later identified as *L. nivalis* (Arita and Humphrey, 1988), and the presence of this species in southern Hidalgo County was re-confirmed in 1992 (Hoyt et al., 1994) and during 2003-2005 (Bogan et al., 2006a-b, 2017). Lewis (2001) reported a specimen from the Gila Lower Box in northern Hidalgo Co., although the specimen was not retained and potentially could have been the similar *L. yerbabuenae*. Primary areas of occurrence in New Mexico are the Animas, Peloncillo, and Big Hatchet mountain ranges and the valleys between these ranges (Bogan et al., 2006a-b, 2017). The species apparently uses many of the same areas and resources (e.g., roost sites and food sources) in New Mexico as the similar lesser long- nosed bat, a state threatened species. A species distribution model for migratory nectar-feeding bats suggested that suitable habitat for *L. nivalis* potentially could also occur in the Guadalupe Mountains of southeastern New Mexico (Burke et al. 2019).

Mexican long-nosed bats inhabiting southwestern New Mexico represent summer migrants from Mexico (Hoyt et al., 1994), and they are present only from mid-July to mid-September (Bogan et al., 2006a-b, 2017). In New Mexico, Mexican long-nosed bats inhabit upper desert scrub and pine-oak woodlands in or near mountainous areas. Characteristic vegetation in these areas includes agave (*Agave* spp.), juniper (*Juniperus* spp.), oak (*Quercus* spp.), and Mexican piñon (*Pinus cembroides*). Roosting habitats of this species in New Mexico have been recently studied, and all known day roosts are in caves and rock fissures, and an abandoned building near the Animas Mountains is used as a night roost between feeding forays (Bogan et al., 2006a-b, 2017; Cryan, 2007; Goodbar, 2007). They roost in caves, mines, hollow trees, and man-made structures in other portions of their range (Hall and Dalquest, 1963; Novick, 1963; Hensley and Wilkins, 1988).

Information on the reproductive biology of this species is very limited. Easterla (1973) speculated that young are born in Mexico before their arrival to Big Bend National Park, Texas during summer. Mexican long-nosed bats are active at night, when they leave day roost sites to search for night-blooming food plants, principally agaves and various cacti (Hall and Dalquest, 1963; Easterla, 1972; 1973; Gardner, 1977; Hensley and Wilkins, 1988). These bats primarily feed upon nectar and pollen, but may also eat some soft fruits and insects associated with flowering plants. Dense stands of agaves (*Agave* spp.) are apparently a strong predictor of suitable habitat for this species (Burke et al. 2019). Individuals forage long distances, often across valleys

separating mountain ranges, between their day roosts and areas where food plants are available.

Current Status: The Mexican long-nosed bat was listed as endangered by the U. S. Fish and Wildlife Service in 1988, and a 1994 federal recovery plan has been updated (USFWS, 2022) following completion of a species status assessment and 5-year review (USFWS, 2018, 2019). The New Mexico State Game Commission approved listing the species as endangered under the Wildlife Conservation Act in 1990; it was also listed during 1975-1978, apparently based on the species nomenclature in use at the time for long-nosed bats (Jones and Schmitt, 1997). In 2016, a binational multi-agency team (collectively called the Nivalis Conservation Network) was formed to identify conservation needs of this species in the United States and Mexico, with the goal of developing a conservation action plan and a revised federal recovery plan. Population sizes, migratory habits and distribution in New Mexico are not fully understood, in part because various passive monitoring techniques such as audio detection and exit counts at day roosts cannot distinguish between this species and the similar lesser long-nosed bat which occurs in the same area. Hoyt et al. (1994) conservatively estimated that they netted 150 to 200 individuals of *Leptonycteris* in the proportion of two lesser long-nosed bats for every one Mexican long-nosed bat in the Animas Mountains. A study by Bogan et al. (2006a-b; 2017) identified night roost sites in the Animas, Peloncillo, and Big Hatchet mountains; numbers of long-nosed bats (both species) at these roosts ranged from 4 to a few thousand individuals and varied during the summer. Studies of *Leptonycteris* bats at a roost site in the Big Hatchet Mountains by K. Stoner and colleagues are currently ongoing, with a focus on seasonal occurrence, the availability of food sources, and diet (Stoner et al. 2022).

Threats: The species was federally listed as a result of identified population declines and the lack of formal protection for the species' habitat, particularly food plants such as agave. Disturbance of roost sites, including maternal colonies, has also been identified as a threat to this species in both the United States and Mexico.

Recommendations: No change in the current listing status of Mexican long-nosed bat is recommended. Identification and protection of roost sites and maintenance of viable populations of food plants (particularly agave) are necessary to conserve this species in New Mexico. Studies of both long-nosed bat species have been conducted in southern Hidalgo County (e.g., Bogan et al., 2006a-b, 2017; Cryan, 2007; Goodbar, 2007) and have provided a more thorough understanding of this bat's population status, movements, and habitat use in New Mexico. More recent studies by Stoner et al. (2022) of seasonal occurrence and diet of long-nosed bats in the Big Hatchet Mountains are ongoing and are consistent with the goals of a draft post-delisting monitoring plan developed by U.S. Fish and Wildlife Service for the co-occurring lesser long-nosed bat. Coordination with the U.S Fish and Wildlife Service and relevant land management agencies to address action items in the federal recovery plan to conserve this species in its limited New Mexico range is recommended.

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(Peñasco) least chipmunk, *Neotamias minimus atristriatus*

Distribution: The least chipmunk (*Neotamias minimus*, formerly *Tamias minimus*) occurs from central Yukon to western Quebec, south to California and New Mexico, and northeast to Wisconsin (Hall, 1981). In New Mexico, least chipmunks inhabit the northern mountain ranges (Chuska, San Juan, Jemez, Sangre de Cristo, and Sandia). In addition, disjunct and isolated populations assigned to the subspecies *N. minimus atristriatus* (Peñasco least chipmunk) occur in portions of the Sacramento Mountains (including the Sacramento and White mountains subranges) in southcentral New Mexico, including James Canyon and Sierra Blanca Peak (Findley et al., 1975; Sullivan and Petersen, 1988; Frey et al. 2009).

Historically, Peñasco least chipmunks occupied two distinctly different habitats. Habitat in the Sacramento subrange was characterized by mesic meadows and herbaceous riparian communities adjacent to agricultural fields, ponderosa pine (*Pinus ponderosa*) forest, and juniper *(Juniperus monosperma*) woodlands. In contrast, habitat in the White Mountains, such as at Sierra Blanca, is more typical for least chipmunks from other localities, and includes high elevation talus slopes and glacial cirques surrounded by Engelman spruce (*Picea engelmanni*), quaking aspen (*Populus tremuloides*), corkbark fir (*Abies lasiocarpa*), and Douglas fir (*Pseudotsuga menziesii*) (Conley, 1970; Sullivan, 1985; Sullivan and Petersen, 1988; Frey and Boykin, 2007). This chipmunk was recently detected at Lookout Mountain, north of Sierra Blanca Peak, on grassy/shrubby slopes, at about 11,000 ft elevation (Frey, 2016; Frey and Hays, 2017) and at Nogal Peak, north of Sierra Blanca Peak, in habitat dominated by deciduous shrubs at about 9,400 feet elevation (McKibben and Frey, 2020).

Foods of the Peñasco least chipmunk include a variety of nuts, seeds, and fruits such as those from sunflowers (*Helianthus* spp.), gooseberry (*Ribes* spp.), wild strawberry (*Fragaria ovalis*), piñon (*Pinus edulis*), and Gambel's oak (*Quercus gambelii*), as well as a variety of flowers, leaves, and insects (Bailey, 1932). Young are born mid- summer, and juveniles have been observed in early September (Bailey, 1932).

Current Status: The subspecies was approved for listing as threatened by the New Mexico State Game Commission in 1983 (Jones and Schmitt, 1997) and subsequently uplisted to endangered. This chipmunk has not been confirmed in the Sacramento subrange of the Sacramento Mountains (e.g., James Canyon or Peñasco Canyon) since the 1960s (Conley, 1970) despite intensive capture efforts in 1981-1982 (Yates, 1982) and camera trap surveys in 2020 (Jacobson et al. 2021). Given habitat changes in these areas, it is likely that these southern populations have been extirpated. The subspecies' status on the Mescalero Apache Indian Reservation is unknown (Frey and Boykin, 2007). The remaining known populations of Peñasco least chipmunk are restricted to high elevation areas including grasslands and the edges of talus slopes in the Sierra Blanca area (White Mountains). A survey conducted on Sierra Blanca in 1981-1982 suggested the population may have been only 15-20 individuals. Surveys by Hope and Frey (2000) found Peñasco least chipmunks in high elevation talus slopes in the White Mountains and verified its presence on Buck Peak as reported by Ortiz (1999) and Ortiz et al. (1998). Surveys during 2016, 2018, and 2019 indicated that this chipmunk occurs at and around Lookout Mountain just north of Sierra Blanca Peak, and at Nogal Peak on the northern end of the White Mountains subrange on the Lincoln National Forest, Lincoln Co (Frey, 2016; Frey and Hays, 2017; McKibben and Frey, 2020). Studies of the population in the White Mountains by J. Frey and students at New Mexico State University are ongoing to better define the status, natural history, and habitat requirements of this subspecies in its limited range (Frey and Hays, 2017; Frey and McKibben, 2018; McKibben and Frey, 2020, 2021).

In 2011, the U.S. Fish and Wildlife Service (USFWS) was petitioned to list the Peñasco least chipmunk under the U.S. Endangered Species Act (WildEarth Guardians, 2011). The USFWS designated the subspecies as a Candidate for listing the following year and indicated that threats to this animal are of high magnitude but not imminent (USFWS, 2012). A species status assessment was completed (USFWS 2018) and the subspecies is presently considered as Proposed for federal listing. Although the distinctness of this subspecies of the least chipmunk was challenged by Puckett et al. (2021) based on a genomics study, we follow Hope and Frey (2022) in continuing to recognize the Peñasco subspecies as a valid taxon. As of 2024, studies of the subspecies' distribution, status, and natural history are being conducted by Dr. Jennifer K. Frey and students at New Mexico State University (NMSU). In September 2024, biologists from USFWS, NMDOW, USDA Forest Service and NMSU were able to collect ear clips to cryogenically preserve cell lines. The biobanking effort resulted in a single male viable cell line stored at the San Diego Zoo. Effective January 9th, 2025, the chipmunk was officially Endangered Status.

Threats: Historical habitat of Peñasco least chipmunk in the Sacramento subrange (i.e., excluding the White Mountains subrange) has been significantly altered by grazing and agricultural activities. These areas appear to no longer support populations of Peñasco least chipmunk. Known populations are restricted to small patches of high elevation habitat and montane meadows adjacent to forest, and the species is sensitive to any natural or human-induced changes to these habitats. Long-term drought, wildfire, and forest fuels reduction pose threats to habitat where this subspecies may persist. In the Lookout Mountain area north of Sierra Blanca Peak, the subspecies persists in sparse stands of large old growth spruce trees, which are susceptible to wildfire and disease (McKibben and Frey, 2020). There is indication that shrubby plants provide habitat for this chipmunk and so the impacts of grazing by cattle, elk and feral horses may represent a threat to the species (McKibben and Frey, 2020). Additionally, the species is possibly threatened by competition from the closely related gray-footed chipmunk, which appears to have replaced Peñasco least chipmunk in several areas of former occurrence (Frey and Boykin 2007; Frey, 2010). It is unknown if this replacement is due to direct competition, habitat changes that have favored one species over the other (such as increased density of mixed-conifer forest), or a combination of both. Another possible threat to the subspecies is sylvatic plague which is present within the range of this chipmunk (Goldberg et al. 2022).

Recommendations: No change in the current listing status of Peñasco least chipmunk is recommended. Although this species has been included in the genus *Tamias* in some recent references (e.g., Thorington and Hoffmann, 2005; Bradley et al. 2014), we recommend adopting *Neotamias* for all western North American chipmunks following the most recent taxonomic revision by Patterson and Norris (2016). Protection of known habitats in the Sacramento and White mountains (including the Sierra Blanca Peak vicinity) and additional survey work to better define current distribution, population size, and habitat requirements are needed. Studies

are currently underway to address questions about the subspecies' status and habitat needs (Frey and McKibben, 2018; McKibben and Frey, 2020). Forest management actions that encourage the development of open ponderosa pine stands interspersed with areas of shrubs, forbs, and bunchgrasses to provide food sources would benefit this species (Frey and Boykin, 2007). At high elevation sites, maintaining stands of sparse old growth spruce trees and limiting the impacts of grazing by cattle, elk, and feral horses on shrubby understory plants may provide additional benefit for this species (McKibben and Frey, 2020).As of 2025, a Recovery outline to benefit this chipmunk is being carried out by a cooperative effort among several resource management agencies, including Lincoln National Forest, Mescalero Apache Indian Reservation, NMDOW, and USFWS (Sullivan and Nagorsen, 1998; Frey and Boykin, 2007, Horner, 2025)). The close similarity in appearance between this species and the gray-footed chipmunk, which occurs in the same area, can complicate identification in the field and must be taken into consideration when conducting survey efforts (Frey, 2010; McKibben and Frey 2021); thus, it is important that surveys of this subspecies be conducted by individuals knowledgeable in distinguishing the two forms.

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Meadow jumping mouse, *Zapus hudsonius*

Distribution: The meadow jumping mouse (*Zapus hudsonius*, as recognized in the broad definition of this taxon; see Malaney et al. 2017 and below*)*, occurs from Alaska, southward through British Columbia to the southwest United States, and southeastward to Georgia (Hafner et al., 1981; Hall, 1981). The subspecies *Z. h. luteus* (New Mexico meadow jumping mouse) is endemic to New Mexico, southern Colorado, and Arizona (Hafner et al., 1981). Hafner et al. (1981) reported this subspecies at 14 localities in New Mexico in the San Juan, Sangre de Cristo, Jemez, and Sacramento Mountains, and in the Rio Grande Valley between Española and Bosque del Apache National Wildlife Refuge. Morrison (1992) subsequently verified the presence of meadow jumping mouse in most New Mexico localities reported by Hafner et al. (1981), and located new populations in the Jemez Mountains (8 localities in the upper Guadalupe River drainage), the Rio Grande Valley (2 new localities near Española and Isleta), the Rio Chama (1 new locality), and in the Sacramento

Mountains (13 different sites along tributaries of the Rio Peñasco). One historic locality in the Sangre de Cristo Mountains was not reconfirmed in 2006 however, the species was found at two new sites at Sugarite Canyon State Park and on Coyote Creek (J. K. Frey, personal communication, 2006). A closely-related species, the western jumping mouse (*Zapus princeps*), also occurs in the Sangre de Cristo range; the two species have been confused by previous researchers and can be difficult to tell apart (Frey, 2005a, 2008). In 2018, the species was discovered in the Blue River drainage in western Catron Co., which represents an eastward extension of the known range in eastern Arizona (Malaney et al. 2023). In 2022, a new population was discovered along the Mora River on the Rio Mora National Wildlife Refuge (M. Brennan, USFWS, pers. comm.). Additional undiscovered and disjunct populations may yet be discovered in unsurveyed drainage systems in the Southwest U.S. (Malaney et al. 2023).

In New Mexico, the species is currently known to occur in the following regions: Canadian River watershed including the Raton Plateau and the eastern slope and adjacent plains of the Sangre de Cristo Mountains (Colfax and Mora counties); Jemez Mountains (Sandoval Co.), Sacramento Mountains (Otero Co,), middle Rio Grande (Socorro Co.), and Blue River watershed (Catron Co.). Historical records indicate its distribution also included most of the Rio Grande watershed (Taos, Rio Arriba, Santa Fe, Bernalillo, Valencia counties; Frey 2008). It eventually may be found in the San Juan River watershed in New Mexico (San Juan Co.) based on its occurrence in adjacent areas of Colorado, and in the other regions of the Pecos and San Francisco watersheds (Malaney et al. 2023). In the Sacramento Mountains, soil moisture, vegetative cover characteristics and composition, and proximity of permanent water were similar to other meadow jumping mouse habitat in New Mexico (Morrison, 1990). Typical plant species associated with meadow jumping mouse habitat include spikerush (*Eleocharis macrostachya*), sedges (*Carex* spp.), rushes (*Juncus* spp.), and numerous species of grasses (e.g., *Agrostis*, *Poa*, *Agropyron*, and *Bromus*), forbs, and willows.

The extremely short activity season of this rodent is limited to June-October in montane areas and May-October in the Rio Grande Valley (Frey, 2015). At Bosque del Apache National Wildlife Refuge, juveniles have been confirmed to be active into late October, although adults enter hibernation a month earlier (Wright and Frey, 2011). Surveys must therefore be conducted during mid to late summer, otherwise the species is not likely to be detected during small mammal trapping efforts. The diet is comprised of a diversity of grass and forb seeds, with fungi, plants, and invertebrates also consumed, and varies throughout the activity season (Sanchez et al. 2024). Due to the short activity season, only a single litter is produced each year.

Current Status: The meadow jumping mouse was listed as threatened under the New Mexico Wildlife Conservation Act by the New Mexico Game Commission in 1983 (Jones and Schmitt, 1997) and was uplisted to endangered in 2006. In 2007, the U.S. Fish and Wildlife Service (USFWS) designated the New Mexico meadow jumping mouse (*Z. h. luteus*, which includes all New Mexico populations) a Candidate for federal listing under the U.S. Endangered Species Act (ESA). In 2008, NMDOW developed a joint recovery plan for both the meadow jumping mouse and Arizona montane vole, but the plan was not approved by the State Game Commission. In 2013, the USFWS proposed the New Mexico meadow jumping mouse be listed as Endangered under the ESA throughout its range in New Mexico, Colorado, and Arizona (USFWS, 2013a) and that critical habitat be designated where populations are known or likely to be still extant (USFWS, 2013b). A species status assessment report (USFWS, 2014a) was prepared concurrently which summarized the available information on this subspecies. The New Mexico meadow jumping mouse was listed as federal Endangered in 2014 and critical habitat was designated in portions of New Mexico, Colorado, and Arizona in 2016 (USFWS, 2014b, 2016). A 5-year review of the federal listing status of the New Mexico meadow jumping mouse was initiated in 2018 (USFWS, 2018). A revised and updated Species Status Assessment was recently prepared by the U.S. Fish and Wildlife Service (USFWS 2020) along with a draft federal recovery plan that was prepared during 2021-2022.

Recent life history studies of this species have been conducted on the small population at Bosque del Apache National Wildlife Refuge (Frey, 2015; Wright and Frey, 2014, 2015) which is the only location in the Rio Grande Valley where the species has been recently detected. Zwank et al. (1997) captured meadow jumping mice in all habitats that they surveyed at Bosque del Apache. Other extant populations in the Rio Grande and Rio Chama valleys were surveyed in the late 1980s (Morrison, 1992) and the species was found at four of seven historical localities. These localities appear to represent relicts of a formerly more extensive range in this river valley. Recent surveys at Bosque del Apache indicate that the species persists, but only along canals that support moist-soil conditions and herbaceous riparian vegetation; water manipulation and canal maintenance at the refuge can either enhance or degrade microhabitat, depending on timing and location (Frey, 2012a; Wright,

2012). The species is currently less abundant and more restricted in its distribution at Bosque del Apache than it was in the early 1990s (Wright, 2012), but a small population is still present as of 2018 as determined via the use of camera trap surveys (M. Goyette, pers. comm., 2018). Surveys conducted in 2012 at a historic locality on NMDOW-managed land at Casa Colorada, Valencia Co., failed to detect it although a small area of suitable habitat is still present (Frey, 2012b). Its current status elsewhere in the Rio Grande and Chama River valleys, where suitable habitat has been largely eliminated, is not known (Frey, 2012a).

Surveys for this species were conducted in the Jemez and Sacramento mountains during 2005 (Frey, 2005b; Frey and Malaney, 2009) and the results indicated a significant decline in presence and suitable habitat for these montane populations than was reported by Morrison (1992) based on her surveys in the late 1980s. Frey (2005b) found that the species and its habitat were found at only 2 of 12 historic sites in the Jemez Mountains and 2 of 11 historic sites in the Sacramento Mountains. Frey (2005b) found that herbaceous vegetation, particularly sedges, with a vertical height of at least 24 inches was a significant predictor of meadow jumping mouse presence at survey sites in the Sacramento and Jemez Mountains. In all cases where meadow jumping mice were found, livestock were currently excluded (Frey, 2005b). Drought conditions and loss of dense herbaceous vegetation and moist soil conditions along streams due to excessive grazing pressure were identified as the primary reasons for the significant loss of habitat in these two ranges. Subsequently, surveys in 2006 in the Sangre de Cristo Mountains found this species at 2 of 3 historic localities, and persisting at two other previously unknown locations within that range (J. K. Frey, pers. comm., 2006). The species was absent at the only known historic site in the San Juan Mountains. As of 2022, studies of distribution and natural history in the Jemez Mountains by Northern Arizona University are ongoing (C. Chambers, pers comm).

Despite the presence of this species in eastern Arizona (Frey, 2011), the meadow jumping mouse was never detected in western and southwestern New Mexico and was thought to have been extirpated from this region. However, the species was detected in the Blue River drainage system just east of the Arizona-New Mexico state line in 2018, a small eastward extension of the range in the White Mountains of Arizona (NMDOW, unpubl. data). Holocene fossils are available from the Plains of San Agustin, indicating the species once had a more widespread distribution in New Mexico (Malaney et al. 2012).

Many of the montane sites where the species persists are very small, only a few acres in size, and are widely separated from other occupied sites. The presence of beaver dams and/or human-made impoundments and the exclusion of livestock from riparian areas have been identified as the most important factors for the presence of suitable habitat for this species in montane parts of its range.

The taxonomy of *Zapus hudsonius*, as long recognized, has been revised in recent years. Malaney et al. (2017) proposed a taxonomic revision of the *Zapus hudsonius* species complex and assigned all populations currently recognized as *Zapus hudsonius luteus* to the taxon *Zapus luteus luteus*. This taxonomic revision more accurately reflects the evolutionary relationships within the genus *Zapus*, although based on the current federal listing as *Z. h. luteus* we have continued to use that name for the time being.

Threats: As a result of the species' reliance on mesic and densely-grassed habitats in proximity to water, primary threats to the meadow jumping mouse in New Mexico include habitat degradation due to development, conversion of mesic areas to agricultural crop production, excessive grazing pressure from livestock, removal of beavers and their dams, down-cutting of streams, wildfire, drought, and water diversions. The drastic reduction in herbaceous vegetation along streams in many areas of historic occurrence due to drought and excessive grazing poses the most immediate threat to this species. Major wildfires, such as during 2011 (the Track Fire near Raton and the Wallow Fire in eastern Arizona), have impacted riparian areas known to be occupied by this species; habitat surveys of these burned areas in 2013 indicated persistence but also loss of habitat due to post-fire runoff. The highly fragmented nature of its distribution in the U.S. Southwest states is also a major contributor to the vulnerability of this species in New Mexico and increases the likelihood of very small, isolated populations being extirpated. Even if suitable habitat exists (or is restored) in some locations, the likelihood of recolonization from other populations without reintroduction efforts is extremely limited.

Recommendations: No change in the current listing status of the meadow jumping mouse is recommended. We have not followed the taxonomic revision proposed by Malaney et al. (2017), although the recognition of Southwestern populations as specifically distinct from *Z. hudsonius* is warranted. Our continued use of *Zapus hudsonius luteus* for New Mexico populations conforms with the name currently used for its listing under the Endangered Species Act. The NMDOW should continue to work with the U.S. Fish and Wildlife Service to

address research and conservation needs for populations of this species in New Mexico, consistent with the goals of the federal recovery plan (USFWS 2023).

Additional information on the status and ecology of this species in New Mexico was compiled by Frey (2012a, 2016) and by USWFS (2014a). Based on available information, NMDOW determined that immediate efforts to protect and, where appropriate, enhance herbaceous moist-soil habitat for this species in montane areas of its range should be implemented, through construction of new habitat enclosures or improvement of existing enclosures to create a series of refugial habitat areas, such as in the Sacramento and Jemez mountains. Longer-term habitat improvement efforts that are needed to maintain this species in montane areas include: 1) implementation of grazing management practices that enhance and maintain herbaceous riparian wetlands with required habitat components, including adequate vertical cover as provided by sedges, grasses, and forbs; 2) restoration of suitable habitat in montane riparian areas where the species has been extirpated, such as by willow planting, check-dam construction, and erosion protection features; and 3) re-establishment of beaver in montane streams where channel downcutting and loss of riparian and wet meadow vegetation has occurred. NMDOW, in coordination with USFWS and land management agencies, should implement a regular monitoring program of all known populations and locations where habitat restoration has been achieved, possibly once per every 2-3 years, and should continue surveys to document other potential extant populations, such as in the Rio Grande, San Juan River, and Chama River valleys; in stream valleys draining the east slope of the Sangre de Cristo Mountains; and possibly elsewhere in southwestern New Mexico. A draft survey protocol for the New Mexico meadow jumping mouse has been developed to assist resource managers in assessing the presence or likelihood of presence of this species on lands where habitat-disturbing activities are proposed (Frey, 2013). Additional research on specimens of *Zapus* historically collected in New Mexico is also needed, especially collections from the Sangre de Cristo Mountains, given the extreme similarity between this species and the closely-related western jumping mouse found in northern New Mexico (Frey, 2005a).

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(Arizona) montane vole, *Microtus montanus arizonensis*

Distribution: The montane vole (*Microtus montanus*) occurs from British Columbia south to east-central California, Arizona, and New Mexico (Hall, 1981; Sera and Early, 2003). The Arizona subspecies, *Microtus*

montanus arizonensis, is restricted to the White Mountains of eastern Arizona (Hoffmeister, 1986; Frey, 2011) and adjacent portions of the Gila National Forest in New Mexico and is the southernmost and most geographically isolated of montane vole subspecies (Hubbard et al., 1983; Frey et al., 1995; Frey, 2005). In New Mexico, Arizona montane voles are known only from Catron County where they have been documented at Centerfire Bog, Jenkins Creek, Flanagan Spring, Romero Creek, SA Creek, and the upper San Francisco River (Hubbard et al., 1983; Frey et al., 1995; Frey, 2005, 2010). Preliminary trapping efforts in 2020 found the species at one historical site on Romero Creek and at new sites on Jenkins Creek, in Flanagan Cienega, and at Trap Spring; however, the overall results of the effort indicated a decline in the species presence and suitable habitat within the historical range (Frey, 2020). The subspecies has been suspected of also occurring along the Tularosa River, although recently examined vole specimens from this tributary of the San Francisco are not Arizona montane vole (Frey, 2010). Using specimens collected in the White Mountains of Arizona, Frey (2009) provided evidence derived from allozyme and mtDNA data that supported continued recognition of *M. m. arizonensis* as a subspecies distinct from other allopatric populations of montane vole in the southwestern U.S.

Arizona montane vole habitat in New Mexico consists of mesic sedge and grass meadows bordering small creeks and marshes at elevations around 6800 ft. Sedge and grass cover used by this vole is typically 9 or more inches in height (Frey, 2005). The sympatric Mexican vole (*M. mexicanus*) also occurs in these areas, but generally prefers drier habitats. Arizona montane voles construct distinct runways and build houses among grasses and matted sedges. Their diet consists primarily of grasses and sedges.

Current Status: The New Mexico State Game Commission approved listing the Arizona montane vole as endangered in 1979 (Jones and Schmitt, 1997). In 2008, NMDOW developed a joint recovery plan for both this species and meadow jumping mouse, although the plan was not approved. Current information suggests that the New Mexico populations are small and isolated; however, vole populations are known to fluctuate dramatically in response to habitat changes (Findley et al., 1975). Surveys conducted along Jenkins Creek by the Department in 1998 and 2000 reconfirmed the presence of this species in this locality. Surveys in 2004 found Arizona montane vole still persists at the Jenkins Creek locality and documented four new localities on the Gila National Forest, all within the San Francisco River drainage system (Frey, 2005).

Threats: The combination of small, isolated populations and limited habitat increases the vulnerability of the Arizona montane vole to any adverse habitat alterations due to natural climatic changes and human activities such as livestock grazing, water diversion, and wetland conversion. Catastrophic wildfires due to extreme drought also pose a major threat to habitat. Although much of the known habitat occurs on the Gila National Forest, other historic sites that may persist are on private land.

Recommendations: No change in the current listing status of Arizona montane vole is recommended at this time. The most recent data from surveys in 2020 indicate an overall decline in occupied sites and suitable habitat within its range in New Mexico, indicating that actions are needed to improve habitat conditions (Frey, 2021). Efforts should be made to protect or restore sensitive mesic meadow habitat on both public and private lands in the areas of known occurrence and other high-elevation riparian areas in the San Francisco River watershed of west- central New Mexico. Maintenance of habitat enclosures and addition of new enclosures to protect areas of occurrence from overgrazing would benefit this vole. Cooperative projects between NMDOW and the U.S. Forest Service to enhance stream and riparian habitat and restore cienegas on the Gila National Forest would benefit this subspecies. Translocation of voles to new or restored locations should be investigated as a possible means to restore populations. Funding and implementation for such projects is needed to improve the habitat and population status for this vole.

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Gray wolf, *Canis lupus*

Distribution: The historic distribution of the gray wolf included much of North America extending from northern tundra regions southward to Durango, Mexico (Hall, 1981). In the north-central portion of the United States, gray wolves occur in Michigan, Wisconsin, and Minnesota, while in the Northern Rocky Mountain region, gray wolves are presently found in Wyoming, Idaho, Montana, Oregon, Washington, and northern California. Past research on the taxonomy of gray wolves by Young and Goldman (1944) and Hall (1981) revealed 24 subspecies of gray wolf in North America, five of which occurred in the Southwest and Mexico: *C. l. baileyi*, *C. l. mogollonensis*, *C. l. monstrabilis*, *C. l. nubulis*, and *C. l. youngi*. Taxonomic revisions of Southwestern wolves by Bogan and Mehlhop (1983) lumped *C. l. mogollonensis* and *C. l. monstrabilis* into *C. l. baileyi.* More recently, Nowak (1995) proposed reducing the original 24 subspecies of North American gray wolves into five, of which the Mexican wolf (*C. l. baileyi*) is one. Taxonomic classifications by Young and Goldman (1944), Hall (1981), Bogan and Mehlhop (1983), and Nowak (1995) were based on comparisons of morphological characteristics, relying heavily on skull measurements. They concluded that *C. l. baileyi* is a morphologically distinct subspecies of gray wolf. More recently, molecular genetic (DNA) analyses have identified distinct genetic attributes in Mexican wolves (García- Moreno et al., 1996; Hedrick, 1995; Wayne, et al., 1992). Chambers et al. (2012) re-evaluated the current taxonomy of wolves in North America based on morphology and genetics but continued to recognize the Mexican wolf as a distinct entity. A recent review of wolf taxonomy in the Southwest was provided by Oakleaf et al. (2023).

The U. S. Fish and Wildlife Service concluded that a realistic delineation of the original range of the Mexican wolf should include the restricted range of *C. l. baileyi* as described by Young and Goldman (1944), Hall (1981), and Nowak (1995); much of the expanded range resulted from consolidation of subspecies by Bogan and Mehlhop (1983) and expansion of *C. l. baileyi* into ranges of exterminated subspecies of wolves described by Nowak (1995). This estimated range is consistent with the dispersal capability of gray wolves (Fritts, 1983). The range of the Mexican wolf for purposes of reintroduction includes portions of central and north Mexico, southern New Mexico, and central and southwest Arizona (Parsons, 1996) and formerly included west Texas.). Territories of wolves in North America can be highly variable and range from 25 to over 5,000 square miles (Mech, 1970; Fuller et al, 1992).

Prior to research on reintroduced Mexican wolves, the natural history of this subspecies was based largely on anecdotal observations of northern wolf populations. Mexican wolves were virtually eliminated before in-depth studies of their biology could be undertaken. Most Mexican wolves were taken in pine-oak woodlands, piñon-juniper woodlands, and grasslands interspersed between these areas, generally above 4500 ft. (Brown, 1983). The combination of prey availability, cover, and water found in montane woodlands appear to have been preferred by Mexican wolves. Diets of Mexican wolves were poorly documented; however, they probably preyed on larger mammals such as mule deer (*Odocoileus hemionus*), white- tailed deer (*O. virginianus*), elk (*Cervus canadensis*), collared peccaries (*Pecari tajacu*), beavers (*Castor canadensis*), cottontails (*Sylvilagus* spp.), and jackrabbits (*Lepus* spp.) (Bailey, 1932; Leopold, 1959; Parsons, 1996). For Mexican wolves released

in Arizona since 1998, approximately 80% of wild prey has been identified as elk with lesser numbers of mule deer, white-tailed deer, and domestic livestock also confirmed as wolf kills (USFWS, unpublished data; Oakleaf et al. 2023). Wolves generally capture their prey by chasing, often in groups pursuing prey for long distances. Family groups (packs) form the basic social unit of wolves that typically consist of a breeding pair and yearling offspring (Mech, 1970).

Control activities aimed at elimination of wolves undoubtedly affected the structure of these social animals (Parsons, 1996). Precise data on pack sizes and social structure were not documented before these animals were extirpated although studies of reintroduced Mexican wolves has provided insights on social behavior in this subspecies. Most older information gathered on wild Mexican wolves came from trappers, who generally targeted lone animals. Most information on the productivity of wild Mexican wolves was obtained by persons engaged in digging in wolf dens to kill the young (Brown, 1983). A sample of eight dens from Mexico had litter sizes of 4 to 8 pups (McBride, 1980). A sample of 86 litters of captive Mexican wolves ranged from one to nine, with a mean of 4.6 (Siminski, 1996). Captive females come into estrous between mid-February and mid-March, gestation periods average 63 days, and parturition occurs in April and May (Parsons, 1996).

A thorough review of the status and biology of wolves in New Mexico, including current research on and management of the reintroduced Mexican wolf population, was provided by Oakleaf et al. (2023).

Current Status: The gray wolf within the southwestern United States and Mexico is federally listed as endangered by the U. S. Fish and Wildlife Service (USFWS) under the U.S. Endangered Species Act. However, based in part on recent changes in the understanding of wolf taxonomy (Chambers et al., 2012), the USFWS (2013) listed the Mexican wolf (*C. l. baileyi*) as an endangered subspecies, this action did not change the status of wolves that occur in New Mexico as all known wolves in the Southwestern U.S. are of the subspecies *C. l. baileyi*.

The New Mexico State Game Commission approved a state listing of the wolf (*Canis lupus*) as endangered in 1975 (Jones and Schmitt, 1997). In 1978, McBride (1980) estimated that fewer than 50 wolves existed in the Mexican States of Chihuahua and Durango. Subsequent surveys in Mexico failed to detect any wolves in the wild (Carrera, 1994). Intensive investigation of reports of wolves along the U. S./Mexico border areas of New Mexico and Arizona failed to provide any clear evidence of Mexican wolves in any of these areas. In 1982, a federal recovery plan for the Mexican wolf was prepared with the goal to re-establish at least 100 wolves in 5,000 mi2 of the subspecies historic range (USFWS, 1982). In 2017, the USFWS issued a biological report on the status of the subspecies (USFWS, 2017a) and a revised federal recovery plan (USFWS 2017b). The current recovery strategy for the Mexican wolf is to establish and maintain at least two resilient and genetically diverse populations in the range of the subspecies in the U.S. and Mexico. A 5-year status review of the Mexican wolf was initiated by the USFWS in 2018 (USFWS, 2018). In 2022, the USFWS published the second revision to the Mexican Wolf Recovery Plan. Among other criteria, this iteration proposed that the Mexican wolf will be considered for downlisting when the United States population average over a 4-year period is greater than or equal to 320 Mexican wolves, and gene diversity available from the captive population has been incorporated in the United States population through the scheduled releases of wolves surviving to breeding age as identified in delisting criteria.

In March 1997, the Secretary of the Department of the Interior authorized the reintroduction of Mexican wolves to the Southwest. This decision included selection of the preferred alternative as described in the Final Environmental Impact Statement. Beginning in March 1998, captive-reared Mexican wolves were released into the Blue Range Wolf Recovery Area in the Apache National Forest in eastern Arizona. Initial releases occurred at 6 different locations within Arizona. The Final Rule for the experimental population of Mexican wolves allowed for the translocation of wolves throughout the recovery zone, and for wolves from the initial releases to naturally disperse onto public lands in Arizona and adjacent New Mexico on the Gila National Forest.

Reintroduced Mexican gray wolves have been present continuously in New Mexico since about 2000. Wolves naturally dispersed to New Mexico after being released in Arizona, and other wolves were translocated to remote sites in the Gila Wilderness. The 2007 end-of-year count yielded a minimum of 52 free-ranging Mexican wolves associated with known groups within the recovery area, with two pups killed by vehicles in Arizona shortly after the count. Of these wolves, 6 packs, as well as a few single animals, were in New Mexico. One of these NM packs was confirmed as a successful breeding pair in 2007. As of 2009, there were a minimum of 42 wolves in both Arizona and New Mexico, and a minimum of 15 are in New Mexico. Thirty-

one pups were born in 2009 (all in Arizona) although only 7 survived to year's end. The 2011 population surveys indicated a minimum of 58 wolves were present in both states, an increase from 50 in 2010. Of these 58 known wolves, 26 (in six packs) were present in New Mexico (USFWS, 2012). The minimum population estimate at the end of 2013 was 83 wolves with five breeding pairs. The minimum estimate increased to 109 individuals at the end of 2014 and decreased to 97 (including 23 wild-born pups) at the end of 2015. Roughly half of the 97 wolves counted in the two states in 2015 occurred in New Mexico. The end of year count for 2017 indicated a minimum estimated population of 114 in both states, an increase of one from the previous year. That number had increased to 163 individuals in both states at the end of 2019, including 87 in New Mexico. In June 2020, there were 21 named wolf packs in New Mexico and in the 2021 end-of-year minimum count, there were 196 individuals in both states with 112 wolves and 28 packs in New Mexico. End-of-the-year minimum count in 2022 was 242 individuals in both states with 137 in New Mexico; in 2023, it was 257 individuals with 144 in New Mexico; in 2024, it was 286 individuals with 162 in New Mexico; in 2025, it was 317 with 178 in New Mexico.

In 2011, the New Mexico State Game Commission directed NMDOW to suspend its participation in the Mexican Wolf Reintroduction Program except for activities required under the Wildlife Conservation Act. This action became effective on 30 June 2011. Also in 2011, the U.S. Fish and Wildlife Service convened a Mexican Wolf Recovery Team with its cooperators with the goal of revising and updating the 1982 recovery plan for the Mexican gray wolf (USFWS, 2012). However, recovery planning efforts were put on hold in 2013 to revise the 10(J) rule associated with the federal listing. NMDOW became a cooperating agency in the development of an Environmental Impact Statement for the *Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (Canis lupus baileyi* (2014) and participated in the development of the 2017 biological report and revised recovery plan. In 2019, the NMDOW formally rejoined the federal recovery effort.

Mexico also has conducted releases of the Mexican wolf just south of the U.S.-Mexico border. In October 2011, five wolves were released in the Sierra San Luis, Sonora. As of early 2012, four of these animals had been killed by poisoning. After the initial failed attempt in Mexico the reintroduction area was moved farther south into the mountains outside of Nuevo Casas Grandes, Chihuahua. At the end of 2015 there were approximately 20 wolves in the wild in Mexico. As of early 2018, that number increased to 37 and at the end of 2021, that minimum was 40. As of the end of 2022, the estimated number in Mexico was 20. In 2026, the United States and Mexico arranged for additional Mexican wolves to be captured in the New Mexico and Arizona, and released into the Mexican states of Durango and Chihuahua.

Threats: The principal cause of the decline and apparent extirpation of the wolf in New Mexico was a highly efficient and persistent predator control program, the goal of which was to eradicate the species. Causes of death for reintroduced wolves released since 1998 have been primarily management actions, shooting, and collisions with vehicles, but have also included mountain lions, rattlesnake bites, and diseases.

Recommendations: No change in the listing status of the gray wolf is recommended. NMDOW is continuing to participate in management of this species as a member of the recovery program and as mandated by the Wildlife Conservation Act (WCA). Authorized activities under the WCA include evaluation of its state status through the Biennial Review process and law enforcement actions pertaining to protection of wolves in the state. In addition, the NMDOW will remain involved in conservation actions benefiting the subspecies, its habitat, and its prey base as outlined in the revised recovery plan (USFWS, 2022).

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THREATENED

North American least shrew, *Cryptotis parvus*

Distribution: The North American least shrew is the northernmost of several species of least shrew, a primarily tropical group of mammals (Galfano et al. 2025). The species occurs from extreme southeastern Canada south to the Gulf Coast, westward into Colorado and New Mexico, and southward into Mexico (Hall, 1981; Fitzgerald et al., 1994; Hutterer, 2005). Eastern New Mexico represents the westernmost extent of the species' distribution. The least shrew was first discovered in the state at Tucumcari in 1981 (Hoditschek et al., 1985). This species is currently known from several areas in eastern New Mexico and surveys conducted by NMDOW in recent years have discovered it at multiple new sites. As of 2026, it is has been verified from the following sites and nearby areas: 1) the Tucumcari area, including Tucumcari Lake (Quay County); 2) Salt Lake on Grulla National Wildlife Refuge near Arch and also in the vicinity of Portales (Roosevelt County); 3) the Pecos River Valley and associated wetlands at Bitter Lake National Wildlife Refuge, Bottomless Lakes State Park, the BLM Overflow Wetlands near the park, and at Dexter (Chaves County); 4) Rock Lake Fish Hatchery at Santa Rosa (Guadalupe Co.); 5) Bosque Redondo near Fort Sumner (De Baca Co.); 6) the Pecos Valley, south-southeast of Artesia (Eddy Co.); 7) the Kiowa National Grasslands and Clayton Lake State Park (Union Co.); 8) Wagon Mound Wildlife Management Area (Mora Co.); 9) Springer Lake (Colfax Co.); and 10) southeast of Clovis (Curry Co.) (Hoditschek et al., 1985; Owen and Hamilton, 1986; Frey, 2005; NMDOW, unpubl. data). However, many potentially suitable areas in the Pecos Valley and on the eastern plains have not yet been adequately surveyed for the species.

The least shrew in New Mexico was formerly believed to consist of two subspecies, *C. p. parvus* on the eastern plains and *C. p. berlandieri* in the Pecos River Valley (Hafner and Shuster, 1996). However, a recent phylogenomic investigation by Galfano et al. (2025) has proposed that the population in the Pecos River Valley near Roswell represents a unique genetic lineage assignable to a new subspecies, *C. p. neomexicanus*. The populations in the Pecos River Valley are likely relicts of a more widespread distribution that have become isolated since the Pleistocene by climatic changes.

The North American least shrew occupies a variety of habitats within the western portion of its range. The species inhabits riparian woodlands in southeastern Colorado (Choate and Reed, 1988) and short grass prairie and mesic meadows in northeastern Colorado (Fitzgerald et al., 1994). Mesic areas with dense grass cover appear to represent primary habitat for this species in New Mexico. They occupy mesic meadows with willows (*Salix gooddingii*) and cattails (*Typha angustifolia*) along the edge of Tucumcari Lake (Cully, 1983; Hoditschek et al., 1985). At Grulla National Wildlife Refuge, they were found in communities of alkali sacaton (*Sporobolus airoides*), grama (*Bouteloua* sp.), and various forbs (Owen and Hamilton, 1986). Frey (2005) found this species associated with saltgrass (*Distichlis stricta*) meadows and cattail/bulrush (*Scirpus* spp.) marshes, but also in mesic areas dominated by non-native grasses.

Food habits of the North American least shrew are similar to other shrew species, and include insects, arthropods, and earthworms (Fitzgerald et al., 1994). Gestation takes 21 to 23 days, young are born blind and hairless, and weaning occurs about 21-23 days after birth (Fitzgerald et al., 1994).

Current Status: The North American least shrew was approved for listing as threatened by the New Mexico State Game Commission in 1985 (Jones and Schmitt, 1997). Known distribution in New Mexico is limited to the eastern one-third of the state. Surveys by Frey (2005) found that the species persists at all historic sites in New Mexico and occurs elsewhere in the Tucumcari area and the Pecos River Valley, including at Bitter Lake National Wildlife Refuge and in the BLM Overflow Wetlands near Bottomless Lakes State Park. A saltcedar removal and wetlands restoration project was completed in 2010 on BLM land between Bottomless Lakes State Park and the Overflow Wetlands that should benefit the species. Recent survey efforts in eastern New Mexico indicate that this shrew is more common and widespread than previously known (Frey, 2005; Bulger and Stuart 2021; NMDOW, unpubl data). It is expected the species occurs in other unsurveyed areas of eastern New Mexico where suitable habitat exists.

Threats: Because of its reliance on mesic grasslands and wetlands, this species is vulnerable to habitat loss and degradation resulting from climatic variation (i.e., drought) and human activities such as water diversion, agriculture, and intensive livestock grazing (Bulger and Stuart 2021).

Recommendations: No change in the current listing status of the North American least shrew is recommended. A state recovery plan for this species has been prepared (Bulger and Stuart 2021) and outlines various tasks that are expected to benefit this species. Additional surveys in the vicinity of known localities and in other parts of

eastern New Mexico with suitable habitat should be conducted to better ascertain the species distribution and population status in the state. Conservation projects that maintain suitable mesic habitat and continuity between these habitats in eastern New Mexico would benefit this species. The genetically unique population in the Pecos River Valley potentially warrants further study to assess its relationship to other shrew populations in the state (Galifano et al. 2025).

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Lesser long-nosed bat, *Leptonycteris yerbabuenae*

Distribution: The lesser long-nosed bat occurs from Central America north through Mexico to southern Arizona, southern California, and southwestern New Mexico; populations in the United States represent the northern extent of the species' range (Findley et al., 1975; Hall, 1981; Hoffmeister, 1986; Simmons, 2005; Cole and Wilson 2006).). In New Mexico, this bat is known from the Animas, Peloncillo, and Big Hatchet mountains and adjacent valleys in southern Hidalgo County (Findley et al., 1975; Baltosser, 1980; Hoyt et al., 1994; Bogan et al., 2006a-b, 2017). There are recent observations of this species from Grant Co. (Ramsey and Whiteman 2011; Geluso and Geluso 2021) and of *Leptonycteris* bats (likely this species) in southwestern Catron Co. (Laws et al. 2023). It is likely that the migratory area for this species in southern New Mexico is larger than previously understood (see e.g., Burke et al. 2019). Similar to the Mexican long-nosed bat (*L. nivalis*), the lesser long-nosed bat is a migratory species that is found in the United States only during summer months (Hayward and Cockrum, 1971; Findley et al., 1975; Wilson, 1985). Bogan et al. (2006a-b, 2017) reported occurrence in New Mexico from mid-July to mid-September. Habitats utilized by the lesser long-nosed bat include forested canyons and adjacent desert grassland and shrub lands (Findley et al., 1975;

Hoffmeister, 1986). The diet consists of nectar, pollen, and soft fruits of agaves (*Agave* spp.) and various cacti, with insects being taken incidentally. In Arizona, migrant females are pregnant when they arrive from Mexico and subsequently give birth and rear their young in maternal colonies (Hoffmeister, 1986). Caves and rock fissures are the only known day roost sites in New Mexico (Bogan et al., 2006a-b, 2017), but the species is also known to roost in trees, mines, culverts, and buildings elsewhere in its range. An abandoned building near the Animas Mountains is a known night roost used by long-nosed bats between feeding forays (Bogan et al., 2006a-b).

Current Status: The lesser long-nosed bat was formerly listed as federal endangered (as the subspecies *L. curasoae yerbabuenae*) by the U. S. Fish and Wildlife Service, and a federal recovery plan was prepared (USFWS,1995). A federal 5-year review of the species was completed in 2007 (USFWS, 2007) and included a recommendation that the species be downlisted to threatened. The USFWS (2013) formally proposed that the species be reclassified as federally threatened based on survey data, mainly from Arizona, that indicates that the population trend in the Southwest is stable to increasing (USFWS, 2007). However, following completion of a species status assessment that indicated the species was more secure within its range than previously understood (USFWS, 2016), the lesser long-nosed bat was removed from the federal Endangered Species Act list in 2018 (USFWS, 2018).

The New Mexico State Game Commission approved the addition of this species (as *Leptonycteris curasoae*) to the state threatened list in 1975 (Jones and Schmitt, 1997). Until recently, few studies have been conducted on this bat in New Mexico, and its ecology and population size and trends are not fully understood. Hoyt et al. (1994) conservatively estimated that they netted 150 to 200 individuals of *Leptonycteris* in the proportion of two lesser long-nosed bats for every one Mexican long-nosed bat in the Animas Mountains. More recent studies by Bogan et al. (2006a-b, 2017), Cryan (2007), and Goodbar (2007) identified and characterized roost sites in the Animas, Peloncillo, and Big Hatchet mountains; numbers of long-nosed bats (both species) at day roosts ranged from 4 to a few thousand individuals and varied during the summer. Studies of the Big Hatchet Mountains roost site are ongoing (K. Stoner, pers. comm.).

The taxonomy of *Leptonycteris* bats has been a subject of debate, and various scientific and common names have been applied to populations of long-nosed bats that occur in the United States. Simmons (2005) and Cole and Wilson (2006) considered the subspecies *L. curasoae yerbabuenae* (lesser long-nosed bat), the form found in the southwestern U.S. and Mexico, to be specifically distinct from *L. curasoae* of South America. Populations in the United States also were formerly placed in the species *L. sanborni* (e.g., Hayward and Cockrum, 1971) The species is very similar to the Mexican long-nosed bat, which also occurs in southwestern New Mexico, and this similarity complicates monitoring efforts that do not involve capture and identification of the bats in hand.

Threats: Current threats are thought to include a lack of formal protection for the species' habitat, disturbance of both day and night roost sites and maternity colonies, and degradation of food resources (agave and cacti) within its limited range in New Mexico.

Recommendations: No change in the current listing status of this species is recommended due to the limited distribution and small number of identified roost sites in New Mexico. Identification and protection of roost sites and maintenance of viable populations of food plants (particularly agave) are necessary to conserve this species in New Mexico. Additional surveys for lesser long-nosed bat in Grant Co., where it has been detected using hummingbird feeders and agaves as food sources (Ramsey and Whiteman 2011; Geluso and Geluso 2021; Rachel Burke, BLM, pers. comm.), and perhaps elsewhere in southern New Mexico are warranted. Studies of both long-nosed bat species and their habitats in southern Hidalgo County (Bogan et al., 2006a-b, 2017; Cryan, 2007; Goodbar, 2007) provided a more thorough understanding of this bat's population status, movements, and habitat use in this part of New Mexico; future monitoring efforts should be conducted in this area where the species is apparently most abundant. Ongoing studies of a roost site in the Big Hatchet Mountains by K. Stoner and colleagues have provided useful information for the management and conservation of both long-nosed bat species in New Mexico. The U. S. Fish and Wildlife Service has requested that NMDOW implement post-delisting monitoring of this species in New Mexico which would also provide information that would assist the NMDOW in developing state-level recovery actions. Recent and ongoing studies by Stoner et al. (2022) of seasonal occurrence and diet of long-nosed bats in the Big Hatchet Mountains are consistent with the goals of a draft post-delisting monitoring plan developed by U.S. Fish and Wildlife Service for the lesser long-nosed bat and should be conducted on a regular basis, in accord with the plan once it

is finalized.

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Spotted bat, *Euderma maculatum*

Distribution: The spotted bat is widely distributed across western North America, occurring locally from central California and southern British Columbia, and southward through the Big Bend region of Texas to central Mexico (Hall, 1981; Fenton et al., 1983, 1987). Nowhere within this range is the species considered to be abundant. In New Mexico, spotted bats have been documented from numerous localities throughout the western two-thirds of the state including Albuquerque (Bernalillo Co.), Mount Taylor (Cibola Co.), the Jemez Mountains (Sandoval Co.), the Mogollon Mountains (Catron Co.), the San Mateo Mountains (Socorro Co.), the Sacramento Mountains (Otero Co.), White Sands Missile Range (Otero Co.), Mesilla Park (Doña Ana Co.), Lake Roberts (Grant Co.), Ghost Ranch (Rio Arriba Co.), Nambe (Santa Fe Co.), and Aztec (San Juan Co.) (NMDOW, Wildlife Management Division files; Geluso, 2017)). During 2014-2016, the species was detected by its distinct audible calls at multiple sites along the Gila River in Grant Co. (Geluso, 2016). Distribution information for New Mexico was provided by Perry et al. (1997), Chung-MacCoubrey (2000), and Geluso (2006, 2008, 2016, 2017).

This species has been recorded in a wide variety of habitats, including riparian communities, piñon-juniper woodlands, and ponderosa pine and spruce-fir forests (Findley et al., 1975), and in burned areas of ponderosa pine forest (Ellison et al., 2005). In New Mexico, the spotted bat occurs in forested areas between 3,900 and 10,600 ft elevation. Spotted bats may summer in forested areas at higher elevations and migrate through lower elevations during other seasons (Hoffmeister, 1986). Most New Mexico records of spotted bats are from warmer months (April - September), but Sherwin and Gannon (2005) documented winter roosting in Albuquerque buildings. Ruffner et al. (1979) captured several specimens in Utah in January and February. Moths represent the principal food source of the spotted bat (Ross, 1967; Easterla, 1973) although beetles are taken also (Geluso, 2017). Young may be born in early summer based on captures of lactating females in late June to mid-July (Findley et al., 1975). Spotted bats use cliff faces and rock crevices for roosting, and such rocky areas are an essential habitat component for this species (Easterla, 1973). Luce and Keinath (2007) reviewed the available information for this species whereas the most recent review of information for New Mexico populations was by Geluso (2017).

Current Status: The spotted bat was approved for listing as threatened by the New Mexico State Game Commission in 1988 (Jones and Schmitt, 1997). Surveys in New Mexico and other states documented population declines throughout the species' historic range in 1983. Recent spotted bat surveys in New Mexico have relied upon both listening for audible echolocation sounds, use of acoustic detectors, and some use of mist-netting at watering sites. Geluso (2006, 2017) documented the persistence of this species at most historic sites of occurrence in New Mexico and at several new sites. The species persists and reproduces in the vicinity of Mount Taylor (Geluso, 2008). Geluso (2017) concluded that the species has not noticeably declined in the state over a 40-year period.

Threats: Threats and limiting factors are largely unknown, but the species is likely adversely affected by pesticides, disturbance of foraging habitats, and disturbance to roosting sites. This bat is relatively rare throughout its range, thus its scarcity in New Mexico may be a function of its biology rather than due to any impacts.

Recommendations: No change in the current listing status of the spotted bat is recommended. NMDOW should continue to encourage land management agencies to protect known foraging and roosting habitats. Periodic surveys, particularly those based on standardized acoustic methods and direct observations, are needed to better identify the species' distribution, population trends, and potential threats in New Mexico.

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Western yellow bat, *Lasiurus xanthinus*

Distribution : The western yellow bat occurs from southern California eastward through Arizona and southern New Mexico and south into Baja California and western and central Mexico (Simmons, 2005). It also has been reported from Big Bend National Park and elsewhere in Trans-Pecos Texas (Higginbotham et al., 1999; Schmidly and Bradley, 2016). In New Mexico, the western yellow bat has been documented in Guadalupe Canyon and the Animas Mountains in southern Hidalgo County (Mumford and Zimmerman, 1963; Findley et al., 1975; Baltosser, 1980; Cook, 1981, 1986) and more recently at Las Cruces, Doña Ana County (Zabriskie et al. 2019).

This species is associated with riparian woodlands, and has been most frequently captured over water (Findley et al., 1975; Baltosser, 1980; Cook, 1981, 1986). In Guadalupe Canyon, western yellow bat habitat includes riparian woodlands with cottonwoods (*Populus fremontii*), Arizona sycamores (*Platanus wrightii*), and Arizona white oaks (*Quercus arizonica*). Similar to the closely related southern yellow bat, western yellow bats

probably roost in trees and other large vegetation. Elsewhere in its range, it has been reported to use the dead fronds of palms and yucca as roost sites, and has been documented once in New Mexico roosting in the fronds of a palm tree (Zabriskie et al., 2019). The species occurs in New Mexico in late spring and summer months (May-September) and has been documented once in winter (Zabriskie et al., 2019), suggesting at least some individuals might be present in the state year-round. The diet includes arthropods, particularly flying insects. Pregnant females have been taken in May and June and lactating females in August (Mumford and Zimmerman, 1963; Cook, 1981, 1986), suggesting that young are born in mid-summer. Pregnant specimens of this species examined from New Mexico contained two embryos (Barbour and Davis, 1969).

Current Status: This species was approved for listing as threatened by the New Mexico State Game Commission in 1975 (Jones and Schmitt, 1997). The New Mexico population is likely peripheral and believed to be of low density, although limited access to areas where previously detected has prevented surveys to determine its current status in the state. Formerly considered to be a subspecies of the southern yellow bat (*Lasiurus ega*), genetic studies resulted in the designation of *L. xanthinus* as a distinct species (Baker, et al., 1988; Morales and Bickham, 1995; Baird et al., 2015). Baird et al. (2015) assigned this species and other yellow bats to the genus *Dasypterus*, although this proposed taxonomic arrangement has not yet been fully evaluated or accepted by other mammalogists.

Threats: Loss or alteration of riparian broadleaf forest habitats is perhaps the major threat to this peripheral species in the southwestern part of New Mexico. Evidence from Las Cruces suggests that ornamental palm trees provide roost habitat in this part of New Mexico, as it does elsewhere in the species' range (e.g., in Arizona and California), and trimming of dead fronds or removal of these trees potentially could impact habitat for this bat.

Recommendations: No change in the current listing status of western yellow bat is recommended. The recent discovery of this species in Doña Ana County suggests its range is more extensive in southern New Mexico than previously known. Protection and enhancement of riparian broadleaf woodlands and limited stands of ornamental palms in southern New Mexico should be encouraged and would benefit this species. Population surveys and ecological studies of the species should be encouraged although, due to the rarity of this bat, such studies would probably best be done as part of a multi-species survey effort for bats in southern New Mexico. The few records of this species in Chihuahuan Desert habitat in New Mexico (Zabriskie et al. 2019) and Trans-Pecos Texas (Higginbotham et al., 1999; Schmidly and Bradley, 2016) suggest additional surveys in this habitat are warranted.

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White-sided jackrabbit, *Lepus callotis*

Distribution: The white-sided jackrabbit (*Lepus callotis)* is a species almost entirely confined to Mexico, which represents the core distribution for this species. The subspecies *L. c. gaillardi* occurs throughout the Mexican Plateau, from Jalisco north to southwestern New Mexico (Findley et al., 1975; Hall, 1981). In New Mexico, it is known only from the Animas Valley and very limited parts of the Playas Valley in southern Hidalgo County; these two valleys constitute the entire range in the United States (Findley et al., 1975; Bednarz, 1977; Bednarz and Cook, 1984). Brown et al. (2018) reviewed the available records of this species from both the U.S. and Mexico.

This elusive hare was reported only a few times after its discovery along the U.S.-Mexico border in 1892 (Mearns, 1896). Two were collected in the Playas Valley in 1931 (Anderson and Gaunt, 1962). Bogan and Jones (1975) obtained a single specimen in 1974. Systematic surveys for this species in New Mexico were initiated in the 1980s, and spotlighting from a vehicle at night was found to be an effective survey method.

White-sided jackrabbits tend to form male-female pairs, which is most evident during the breeding season (at least mid-April to mid-August) but may persist year-round. Pregnant females have been found March through October. Males with mates defend territories from intruder males. This species rests in shelter forms in dense grass and rarely uses underground burrows (Best, 1999).

Studies by Bednarz and Cook (1984), Conway (1975), and Conley and Brown (1977) confirmed that the white-sided jackrabbit is a desert grassland specialist. Plants species associated with white-sided jackrabbit habitat in the Animas and Playa Valleys include blue grama *(Bouteloua gracilis)*, black grama (*B. eriopoda*), tobosa (*Hilaria mutica*), buffalograss *(Buchloe dactyloides*), wolftail (*Lycurus pheloides*), flatsedge (*Cyperus* spp.), snakeweed (*Gutierrizia sarothrae*), soaptree yucca (*Yucca elata*), and honey mesquite (*Prosopis glandulosa*). Traphagen (2002) found that presence of buffalograss is an important indicator of white-sided jackrabbit presence, whereas shrub cover was negatively correlated with presence. Most observations (97%) of this species have been recorded in pure grasslands, with the remaining 3% recorded in grasslands with very limited forb and shrub components (Bednarz and Cook, 1984).

Current Status: This species was approved for listing as threatened by the New Mexico State Game Commission in 1975 (Jones and Schmitt, 1997). Spotlight censuses conducted in the Animas Valley between May and August 1976 revealed a mean of 15 individuals (range: 5-25) per census, and resulted in a population estimate of 250 to 300 individuals (Bednarz, 1977). During eight censuses conducted in 1981, Cook counted a mean of 7.5 individuals per census (Cook, 1981a; 1981b). Cook also noted that numbers of black-tailed jackrabbits (*L. californicus*) increased 22 times and desert cottontail (*Sylvilagus auduboni*) increased approximately four times, while white-sided jackrabbit sightings decreased by 50% compared to the findings of Bednarz (1977). Bednarz and Cook (1984) postulated that the decrease of white-sided jackrabbit and increase of black-tailed jackrabbit and desert cottontail was associated with a decrease in the density and vigor of grasses and concomitant increase in forb and shrub cover.

During five surveys in the Animas Valley in 1990, only 3.2 individuals were observed per census (Mehlhop, 1995). During 1994 and 1995, seven surveys conducted in the same general areas surveyed by Bednarz and Cook revealed a mean of 1.1 individuals per census and a total of eight individuals (Mehlhop, 1995). While different sampling efforts by Mehlhop (1995) and Bednarz and Cook preclude statistical comparison, these data strongly suggest a significant decrease in the population from 1976 to 1995. Whether these surveys accurately reflected the overall New Mexico population of white-sided jackrabbit is unknown.

Data from NMDOW surveys conducted between 1997 and 2002 indicated more individuals detected per survey than were reported by Mehlhop (1995). Variation in survey methodology may have influenced results conducted by different biologists over this time period. No observations of this species have been made in the Playas Valley during recent surveys, and the status of white-sided jackrabbit in this area remains uncertain, although increased shrub growth in the valley may have eliminated suitable habitat. While the overall status of the species remains unclear, the Animas Valley population appears to be persisting whereas the Playas Valley population is likely extirpated. The species remains present in the Janos area of Chihuahua, Mexico (south of the New Mexico border) as of 2008 (M. Watson, pers. comm.).

Traphagen (2011) conducted nighttime visual surveys of this species in the Animas and Playas valleys in 2010-2011 using a methodology similar to that of Bednarz's (1977). A total of 73 white-sided jackrabbits were detected (64% of the sightings were of pairs) in the Animas Valley and none were detected in the Playas Valley. Shrub encroachment into suitable grassland habitat, increased borderland vehicle traffic, and isolation of the Animas Valley population appear to pose the greatest threats to the species in New Mexico (Traphagen, 2011).

In 2008, the U.S. Fish and Wildlife Service (USFWS) was petitioned to list this species under the U.S. Endangered Species Act (WildEarth Guardians 2008). A 12-month finding by USFWS on this petition concluded that listing of either the species (*L. callotis*) or the subspecies which occurs in New Mexico (*L. c. gaillardi*) was "not warranted at this time" (USFWS 2010).

Threats: Loss and degradation of grassland habitats in the Animas Valley through drought, shrub encroachment, and changes in grass species composition represent the primary threats to the white-sided jackrabbit in New Mexico. In Zacatecas, Mexico, overgrazing and shrub encroachment are thought to have encouraged expansion of the range of black-tailed jackrabbit and the exclusion of white-sided jackrabbit (Matson and Baker, 1986); similar patterns of habitat use between these two hares have been observed in Chihuahua, Mexico (Desmond, 2004). Baker (1977) noted that excessive grazing might be one of the factors contributing to the decline of white-sided jackrabbit and apparent replacement by black-tailed jackrabbit. Although vehicle impacts have been considered a minor threat in the past (N. Moore-Craig, personal communication, 1992), the pronounced increase in illegal activity and traffic along the U.S.-Mexico border in recent years may be affecting this species, and plans to develop improved fencing on the border may have adverse effects to the habitat of this hare in the southern Animas Valley. Indiscriminate shooting of white-sided jackrabbits could threaten this species; however, Bednarz (1977) found no evidence of shooting during his study.

Recommendations: No change in the current listing status for white-sided jackrabbit is recommended. NMDOW should re-initiate regular surveys to assess population status and trends using a standardized protocol based on earlier efforts, if access permission can be obtained from landowners in the Animas and Playas valleys. Private landowners are encouraged to employ non-detrimental livestock grazing practices within white-sided jackrabbit habitat and to employ shrub control where appropriate to maintain the grassland habitat needed by this species. A completed Habitat Conservation Plan (HCP) for range management on private lands in the Animas Valley, among other areas, includes consideration of this species in New Mexico. NMDOW supports management efforts proposed in the HCP that are expected to improve grassland conditions in the southern Animas Valley and thereby benefit this species.

Coordination with U.S. Department of Homeland Security, particularly in relation to any future border fence development, is also needed to address concerns related to this and other wildlife species. The relationship between U.S. and Mexican populations of the species and population status in other portions of its range should be investigated.

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(Organ Mountains) Colorado chipmunk, *Neotamias quadrivittatus australis* (including Oscura Mountains population)

Distribution: The Colorado chipmunk (*Neotamias quadrivittatus*, formerly *Tamias quadrivittatus*) is widely distributed across five western states, including southern Colorado, eastern Utah, northeastern Arizona, the extreme western portion of the Oklahoma Panhandle, and northern and central New Mexico (Durrant, 1952;

Findley et al., 1975; Hall, 1981; Hoffmeister, 1986; Caire et al., 1989; Fitzgerald et al., 1994). In New Mexico, the Colorado chipmunk is known to inhabit the Chuska, Zuni, San Mateo, Jemez, Gallinas, Sangre de Cristo, Sandia, and Manzano mountain ranges. The species also occurs in piñon -juniper woodlands from Johnson Mesa to the Canadian River Canyon (Findley et al., 1975). Southern populations in New Mexico (Organ and Oscura mountains) are isolated from populations in the northern half of the state, and from each other, and are currently recognized as two distinct subspecies: Organ Mountains chipmunk (*N. q. australis*) and Oscura Mountains chipmunk (*N. q. oscuraensis*).

Chipmunks were discovered in the Organ Mountains in 1903 by O. B. Metcalf (Bailey, 1932), and were initially regarded as a subspecies of gray-collared chipmunk, *Neotamias cinereicollis cinereus* by Howell (1929) and Bailey (1932). Findley et al. (1975) regarded chipmunks from the Organ Mountains to be gray-collared chipmunks (*T. cinereicollis*). A morphological study indicated a close phyletic relationship between the Organ Mountains chipmunks and northern populations of *N. q. quadrivittatus* (Patterson, 1980). As a result of this work, the Organ Mountains chipmunk was described as the subspecies *N. q. australis* (Patterson, 1980). Chipmunks were discovered in the Oscura Mountains in 1977 (Patterson, 1980) and, although considered a form of Colorado chipmunk, were not formally described as a new subspecies for almost 20 years (Sullivan, 1996).

The distribution of the Organ Mountains chipmunk is limited to the Organ Mountains in southern New Mexico (Patterson, 1980; Frey, 2012). Most habitat for this subspecies is found on the north-facing slopes in the vicinity of Aguirre Springs, and is characterized by ponderosa pine (*Pinus ponderosa*), oaks (*Quercus* spp.), junipers (*Juniperus* spp.), Apache plume (*Fallugia paradoxa*), and sumac (*Rhus* spp.) at elevations between 6000 and 7300 ft (Patterson 1980). A habitat suitability model has been developed for this subspecies in the Organ Mountains (Frey and Kopp, 2013) which indicated that chipmunks are primarily associated with lower montane riparian habitat and landcover types characterized by conifer trees. A recent radiotelemetry study implemented in the Organ Mountains to evaluate habitat selection found support for the association with lower montane landcover but found avoidance of landcover types containing conifer trees and riparian vegetation (Schweiger and Frey, 2020). Chipmunks were found to be strongly associated with arroyos that exhibited steep-sided slopes, a greater amount of rock cover, and more robust vegetation cover and that provided important microhabitat (Schweiger and Frey, 2020, 2021).

The distribution of the Oscura Mountains chipmunk is limited to the Oscura Mountains at the northern end of the Tularosa Basin on White Sands Missile Range in south-central New Mexico (Sullivan, 1996). Habitat for this species is restricted to northwest-facing limestone cliff edges in piñon-juniper-oak communities, which are characterized by piñon (*Pinus edulis*), one-seed juniper (*J. monosperma*), mountain mahogany (*Cercocarpus montanus*), antelope brush (*Pursia tridentata*), four-wing salt bush (*Atriplex canescens*), and oaks (*Quercus* spp.). The Oscura Mountains subspecies has been characterized as a specialist in using old-growth pinyon-juniper woodlands (O'Connell and Frey 2024). Open areas are variously covered with side-oats grama (*Bouteloua curtipendula*), black grama (*B. eriopoda*), blue grama (*B. gracilis*), Chihuahuan love-grass (*Eragrostis erosa*), and soaptree yucca (*Yucca elata*) (Sullivan, 1996). Piñon woodlands, which provide a primary food source, and proximity to an escarpment or in otherwise rugged, rocky terrain are important predictors of suitable habitat for this subspecies (Perkins-Taylor 2017; Perkins-Taylor and Frey, 2018, 2020).

Colorado chipmunks from more northerly locales generally breed in late spring (Bailey, 1932; Patterson, 1980); however, Oscura Mountains chipmunks appear to breed in early spring (Sullivan, 1996). Lactating females and juvenile animals were observed in mid-September, and females with embryos were collected in early April. The Oscura Mountains chipmunk appears to have a reproductive pattern intermediate between the Colorado chipmunk in northern New Mexico and the Organ Mountains chipmunk (Patterson, 1980; Sullivan, 1996). The early spring conception pattern of the Oscura Mountains chipmunk (Sullivan, 1996) is similar to that reported for the Organ Mountains chipmunk (Patterson, 1980) and appears to coincide with periods of reduced water stress and increased food production.

Both subspecies, similar to other chipmunks, are adept tree climbers but spend much of their time in and on brushy vegetation, limestone ledges, cliffs, woody debris, and rockpiles. They tend to be most active in early morning and late afternoon, especially during the hotter months of the year.

Current Status: The Organ Mountains chipmunk was approved for listing as threatened by the New Mexico State Game Commission in 1983 (Jones and Schmitt, 1997). In 1987, NMDOW proposed the addition of the

Oscura Mountains population of Colorado chipmunks based on a study by Sullivan and Yates (1987) that indicated the Oscura Mountains chipmunks were most closely related to chipmunks in the Organ Mountains. The Oscura Mountains population was included within the listing of the Organ Mountains subspecies in 1988 (Jones and Schmitt, 1997) as an undescribed subspecies under the Organ Mountains chipmunk. The Oscura Mountains population was later described as a new subspecies, *N. q. oscuraensis,* by Sullivan (1996).

The Organ Mountains population of chipmunks was approximated at 1,000 to 2,000 by Patterson (1980) although this figure was not derived from any scientific method. No estimates have been attempted for the Oscura Mountains population, but periodic surveys conducted since 2004 suggest a small population that might be more widely distributed in this mountain range than previously believed (T. Griffin, pers. comm., 2005; D. Burkett, pers. comm., 2010). Surveys of both populations were conducted by Rivieccio et al. (2003) using primarily visual detection. Informal visual surveys conducted in both mountain ranges since 2005 indicate continued persistence of these chipmunks at historic sites (NMDOW files). Recent studies by Schweiger (2021), Schweiger and Frey (2021), and Schweiger et al. (2021) provided detailed information on the distribution, activity patterns, and habitat requirements of the Organ Mountains population. The most comprehensive studies of the Oscura Mountains population were conducted by Perkins-Taylor (2017) and Perkins-Taylor and Frey (2018, 2020) and focused on occupancy patterns and habitat use of chipmunks using camera traps. Jacobson (2024) provided the most recent assessment of the status of the Organ Mountains population.

Threats: These small, isolated chipmunk populations are extremely vulnerable to habitat loss or alteration. Climate change may cause loss of necessary microhabitat environments and alter seasonal and daily activity cycles for these southern populations (Schweiger and Frey 2021; Schweiger et al. 2021). A study by Jacobson (2024) indicates the Organ Mountains population has undergone widespread reduction in both abundance and occupied range within the past 30 years, presumably due to climate change effects on habitat. Disease (i.e., sylvatic plague) may also pose threats to these populations. The mosaic of piñon-juniper-oak woodland habitats of the Oscura Mountains chipmunk and the broken topography with limestone cliffs and ledges has a patchy distribution and is largely restricted to the west and northwest cliffs in the Oscura Mountains (Sullivan, 1996). Because of the localized and patchy distribution of this habitat, the most immediate threat to this subspecies is destruction of natural habitat by human activities and wildfire.

Recommendations: No change in the listing status of the Organ Mountains Colorado chipmunk (considered here to also include the Oscura Mountains population) is recommended at this time. However, we note the findings of Jacobson (2024) which indicate that the Organ Mountains population has experienced a substantial range retraction and that this taxon might warrant uplisting to Endangered, whereas Threatened status would remain appropriate for the Oscura Mountains population. This action would require the initiation re-listing the two subspecies separately under New Mexico Administrative Code 19.33.6, an action falls outside the scope and authority of the Biennial Review process as detailed in the WCA. Although the Colorado chipmunk has been included in the genus *Tamias* in some recent references (e.g., Thorington and Hoffmann, 2005; Bradley et al. 2014), we have adopted *Neotamias* for all western North American chipmunks following the most recent taxonomic revision by Patterson and Norris (2016). Frey (2011, 2012) and Frey and Kopp (2013) developed monitoring recommendations for populations in the Organ Mountains that include use of an occupancy model approach and non-invasive techniques (e.g., camera trap detection). Protection of existing old-growth pinyon-juniper woodlands in the Oscura Mountains is necessary for conservation of the population in that mountain range. Coordination with the U.S. Bureau of Land Management, White Sands Missile Range, and Fort Bliss Military Reservation for continued monitoring of the Organ Mountains populations should be maintained.

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Southern pocket gopher, *Thomomys umbrinus*

Distribution: The known distribution of the southern pocket gopher in the United States is restricted to a few mountain ranges in southeastern Arizona and the Animas Mountains in New Mexico; most of the species' range is in Mexico (Findley et al., 1975; Hinesley and Thaeler, 1977; Cook, 1982, 1986; Hoffmeister, 1986; Mathis et al., 2014). In New Mexico, the species has been found mostly at elevations above 7200 ft in the Animas Mountains as well as at lower elevations along creeks in that area (Hinesley and Thaeler, 1977; Cook, 1982, 1986). The Animas Mountains population was formerly recognized as a distinct and isolated subspecies (*T. u. emotus*), but was re- assigned to the more widespread geographic race, *T. u. intermedius*, by Mathis et al. (2014). A survey for this species or other pocket gophers in the Big Hatchet Mountains, east of the Animas Mountains, was unsuccessful in detecting southern pocket gophers (Geluso, 2006). The species potentially occurs in the Peloncillo and Burro mountains of southwestern New Mexico although targeted surveys in these areas have not been conducted.

Pocket gophers are fossorial (i.e., live primarily underground) and eat roots of various plant species that are encountered as they dig their burrow systems. The presence of pocket gophers is typically evidenced by mounds of fresh soil which are pushed out of their burrows. They are generally not social, and the only time that individuals coexist in the same burrow system occurs when females are caring for their young. They are polygamous and breeding may occur more than two times in a year (Hall, 1981). Cook (1982, 1986) found pregnant females between mid-March and early April, with 2-3 embryos in each specimen.

Current Status: The New Mexico State Game Commission approved the listing of the southern pocket gopher as endangered in 1975 (Jones and Schmitt, 1997). The primary reasons for listing the species were endemism and its very restricted distribution in New Mexico. The species is difficult to survey because of its fossorial nature, the relative inaccessibility of its habitat, and its co-occurrence with a closely-related species (Botta's pocket gopher, *Thomomys bottae*) in parts of its range. Part of its range in the Animas Mountains was affected by the Adobe Fire in May-June 2006, although active burrow mounds in partially burned areas and in post-fire debris flows were noted in October 2006 (J. Stuart, pers. observ.). There are no population estimates for this species in New Mexico.

Threats: The species is restricted to a remote area of private land and is not threatened by habitat development or other human activities. Wildfire likely poses the greatest threat to persistence in the Animas Mountains, although the species is likely resilient in this regard. At present, the area of occurrence in New Mexico appears to be secure.

Recommendations: No change in the current listing status of the southern pocket gopher is recommended. With landowner permission, periodic surveys (every 5-10 years) are warranted in the Animas Mountains to determine distribution and population status. Additional surveys in the Peloncillo, Burro, and Big Hatchet mountains also may be warranted to determine if the species is more widespread than currently known.

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Pacific marten, *Martes caurina*

Distribution: The Pacific marten, formerly included in the species American marten (*Martes americana*) and also commonly known as pine marten, is widely distributed in western North America from Alaska to California and New Mexico (Hall, 1981). In New Mexico, the species is known only from the north-central mountains including the San Juan and Sangre de Cristo ranges (Stuart and Long, 2023). Reports of martens in the Jemez Mountains have not been substantiated, despite recent efforts including the use of camera traps (Long et al. 2015; Stuart and Long, 2023). Habitat in New Mexico includes mature, high elevation spruce-fir (*Picea-Abies*) forests (Bailey, 1932; Findley et al., 1975). Mature/old-growth spruce-fir forests with greater than 30% canopy cover and abundant coarse woody debris (i.e., snags, down fall, etc.) have been identified as preferred marten habitat throughout the range of the species (Clark and Stromberg, 1987). A GIS model for New Mexico indicates that elevation, topographic ruggedness, the availability of voles (important prey), and forest height are the most important variables in predicting suitable marten habitat, especially combined with snow depth (Menke and Perry, 2009). Martens may avoid large clearings such as clear cuts or burned areas (Koehler and Hornocker, 1977; Soutiere, 1979).

The summer diet of martens is varied and includes small mammals, birds, eggs, insects, some plant fruits, and occasionally carrion (Buskirk and Ruggiero, 1994). Soft mast and berries are eaten in the fall, and small mammals, including voles (*Microtus* spp., *Myodes* sp., *Phenacomys* sp.), golden-mantled ground squirrels (*Callospermophilus lateralis*), and red squirrels (*Tamiasciurus* spp.) comprise the majority of their winter diet (Buskirk and Ruggiero, 1994). Female martens reach sexual maturity at about 15 months and produce a single litter of 3-4 in spring (Clark and Stromberg, 1987). The gestation period of 8-9 months is long due to delayed implantation.

Current Status: The Pacific marten (as American marten) was approved for listing as threatened by the New Mexico State Game Commission in 1975 (Jones and Schmitt, 1997). Martens reach the southern limit of their geographic distribution in New Mexico, where they are considered to be an uncommon resident species. The presence of this species in the Sangre de Cristo Range in Taos County and San Juan Mountains in Rio Arriba County was reconfirmed in the 1990s through the collection of road-killed specimens; the species was also reported from the Taos Ski Valley during 1997-1999 (NMDOW, unpublished data). Surveys conducted since 1999 have found marten in the Sangre de Cristo Range in the vicinity of Taos and Pecos, and in the San Juan Mountains near Chama (Long, 1999, 2001, 2002, 2009). In 2003, Department personnel captured and radio-collared several martens in the vicinity of Taos Ski Valley (Long, 2003). Results from monitoring efforts suggest that there is a small resident population in this area, but it remains unclear as to whether this population is isolated from other populations in the Sangre de Cristos. In this study, radio-collared martens used mature spruce-fir forest and talus slopes at elevations between 10,000 and 11,500 ft in elevation. Surveys in the Sangre de Cristo and Jemez mountains during 2015 (Long et al., 2015), along with verified reports from the public since 2014 (NMDOW, unpublished data), indicate that martens persist in several areas of the Sangre de Cristos, including some historic localities, but have not yet been verified in the Jemez (Stuart and Long, 2023). The distribution and range limits in the San Juan Mountains of New Mexico, where the species may not be as widespread as in the Sangre de Cristos, is not fully known (Stuart and Long, 2023).

A camera trap survey for martens in suitable habitat within the Sangre de Cristo Mountains of New Mexico was carried out by the Department during 2019-2020. The results of this study did not significantly change current understanding of the species' distribution in this mountain range.

Threats: Pacific martens in New Mexico are vulnerable to habitat degradation or fragmentation through timber harvesting in mature/old-growth forests, removal of downed timber as part of fuels reduction projects or as firewood, and catastrophic wildfire within the species' range. Catastrophic wildfire and old-growth timber removal are likely to pose the greatest threats under present conditions in the state. Marten are also very susceptible to trapping, although there is currently no open season for this furbearer in New Mexico. Illegal take of marten may pose a minor threat in some areas. Marten have been killed by vehicle impacts in New Mexico, but this is likely a minor threat in most areas of occurrence.

Recommendations: No change in the current listing status of the Pacific marten is recommended. The results from a recently concluded camera-trap study in the Sangre de Cristo Mountains provided some additional information on the species' current distribution in that part of New Mexico but also demonstrated the difficulties in monitoring this elusive species. Other studies to better assess habitat use, population status, and population isolation in New Mexico are needed to inform forest management practices and other actions that might affect the species. An assessment of the impact of the 2022 Calf Canyon/Hermit Peak wildfire on high-elevation habitat for this species in the Sangre de Cristo Mountains should be undertaken.

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BIRDS

ENDANGERED

Brown Pelican, *Pelecanus occidentalis*

Distribution: This coastal marine and estuarine species breeds from California and the mid-Atlantic states southward to South America (AOU 1998). Brown Pelicans are rare/accidental visitors inland to New Mexico; they can occur during all seasons, but are most frequently observed during summer through fall. Most reports are from large lakes/reservoirs or along major rivers, including the San Juan, Rio Grande, Canadian, Gila, and Pecos drainages. Most Brown Pelicans that occur in New Mexico are the Pacific subspecies, *P. o. californicus*, although the eastern *P. o. carolinenis* may also occur.

Current Status: The Brown Pelican was listed as federally endangered throughout its range under the precursor of the Endangered Species Act (ESA) in 1970 (United States Code of Federal Regulations 1970). Another success story of the ESA, Brown Pelicans in Florida and Alabama and in coastal states along the Atlantic Coast were removed from the Federal List of Endangered and Threatened Wildlife in 1985 (USFWS 1985). The Brown Pelican has similarly recovered throughout the remainder of its range in North, Central, and South America and in the Caribbean, and all populations within the United States were removed from the Federal List of Endangered and Threatened Wildlife in 2009 (USFWS 2009). In New Mexico, the Brown Pelican was listed first as threatened in 1983 and then was reclassified as endangered in 1990 as the extent of its occurrence in New Mexico became better understood. From 2003 – 2024, with the exceptions of 2006 and 2019, at least one individual has been reported in New Mexico annually (eBird 2024).

Threats: An important factor in the decline of the species was pesticide contamination of its prey base (fish), leading to impaired reproduction and direct mortality (USFWS 1985, Johnsgard 1993, Shields 2002). Current threats include loss of breeding areas (e.g., due to oil spills and tropical storm events), ocean conditions/prey species abundance, illegal killing, and competition with commercial fisheries. Current threats are not amenable to management actions in New Mexico due to the general lack of appropriate habitat/geographic range of this species. As a federally recovered rare/accidental inland visitor, there are no ongoing or future management plans to specifically benefit Brown Pelicans in New Mexico.

Recommendations: Brown Pelicans are federally protected under the Migratory Bird Treaty Act (MBTA) of 1918 16 U.S.C. 703-712; Ch. 128; July 3, 1918; 40 Stat. 755), as amended; strict enforcement of laws against harming and disturbing all Brown Pelicans is essential in protecting the few individuals that occur in New Mexico. No change in status is recommended.

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Aplomado Falcon, *Falco femoralis*

Distribution: This grassland raptor occurs from the southwestern United States to southern South America

(AOU 1998, Keddy-Hector et al. 2020). The historical range in New Mexico included desert grasslands across the southern one- third of the state and across the central region north to Socorro County (Hector 1987, Keddy-Hector et al. 2020, Meyer and Williams 2005). The species requires extensive, contiguous desert grasslands characterized by relatively tall, dense grass cover and scattered yucca (*Yucca* spp.) and mesquite (*Prosopis glandulosa*) (Montoya et al. 1997, Young et al. 2002, Macias-Duarte et al. 2021).

Current Status: The northern subspecies, *F. f. septentrionalis*, is federally-listed as endangered (USFWS 1986) with a nonessential experimental population designation for all populations in New Mexico and Arizona (USFWS 2006). The subspecies was listed by New Mexico as endangered in 1990. Following a documented nesting in southern New Mexico in 1952 (Ligon 1961), the subspecies was very rarely reported in the state from the 1960s through the 1980s (Meyer and Williams 2005). Coincident with the 1992 discovery of thriving populations in nearby Chihuahua, Mexico (Montoya et al. 1997), an increased presence of Aplomado Falcons in New Mexico became apparent by the early 1990s, which raised hopes that natural recolonization of the historical range was underway (Williams 1997). Extensive surveys and studies in adjacent Chihuahua, Mexico better clarified the extent of the distribution there, and indicated that falcons in northern Chihuahua and southern New Mexico should be considered a single interacting population (Young et al. 2004). Overall, the decade 1990-1999 produced 24 credible reports involving 26-31 falcons in southern New Mexico (Meyer and Williams 2005). That trend continued into 2006, with multiple reports throughout the historical New Mexico range, including observations of pairs. One pair occupied a territory for at least two years (2001 and 2002) and fledged young, which was the first successful nesting by native Aplomado Falcons in the United States in half a century (Meyer and Williams 2005).

Between 2006 and 2012, The Peregrine Fund released 337 captive-bred Aplomado Falcon fledglings of tropical southern Mexico origin at five New Mexico hack sites in an attempt to reestablish a breeding population. Eleven captive-bred birds were released in 2006, 39 birds were released in 2007, 70 birds were released in 2008, 70 birds were released in 2009, 67 were released in 2010, 46 were released in 2011, and 32 were released in 2012 (Hunt et al. 2013). In contrast to previous years, no naturally-occurring Aplomado Falcons were reported in 2007. Although unmarked birds were observed in 2008, 2009, and 2011, their origin could not be determined owing to the dispersal of unbanded progeny of Aplomado Falcons released into New Mexico since 2006. Based on the small numbers of individuals remaining at the release sites during the following years, it appears that the majority of released Aplomados either dispersed to unknown areas or perished, mostly due to predation. Surveys in 2011 revealed only one surviving pair that fledged three young, and a 2012 survey revealed only one adult. In 2013 surveys, one individual was found on the Armendaris Ranch, and one pair was unsuccessful in a nesting attempt in southwestern New Mexico. Because of low survival attributed to persistent drought, reduction in prey densities, and high mortality of released falcons, the Peregrine Fund announced it was discontinuing release efforts in New Mexico and West Texas in 2013 (Hunt et al. 2013). Recovery efforts are now focused in coastal Texas (Mutch 2013, USFWS 2025) Natural recolonization from the Chihuahuan population appears less likely due to population declines (Marcias-Durante et al. 2016. USFWS 2025). Intermittent surveys have occurred within the historic range in southwestern New Mexico since the 1990s, and breeding has occurred in most years at one territory in Luna County since 2013 (LTEC 2022, USFWS 2025). A 5-Year Status Review was initiated by the USFWS in 2022 (USFWS 2022), and the Species Status Assessment was completed in 2025 (USFWS 2025).

Threats: The primary causes for decline of the Northern Aplomado Falcon are climate change, loss and degradation (e.g., shrub encroachment and loss of grass cover) of required grassland habitat from excessive grazing, control of range fires, conversion of grasslands to agricultural lands, and reductions in prey species densities (Hector 1987; USFWS 1986, 1990, 2025). There is also evidence of continued contamination of the Aplomado Falcon's prey by organochlorine pesticides and toxic heavy metals such as mercury and lead (Keddy-Hector 2000, USFWS 2025).

Recommendations: No change in status is recommended. All agencies and organizations should continue to work cooperatively to protect native Aplomado Falcons and encourage continued natural recolonization by maintaining and improving grassland habitat. The USFWS designation of New Mexico as a nonessential experimental population area reduced land-use restrictions associated with the ESA, so these cooperative efforts are particularly important for the Aplomado Falcon.

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White-tailed Ptarmigan, *Lagopus leucura*

Distribution: This alpine grouse occurs from Alaska and the Yukon south through the Rocky Mountains, reaching its southernmost limits in New Mexico (AOU 1998, Martin et al. 2020). In New Mexico, the species occurred historically in unknown numbers on high peaks (above treeline) of the Sangre de Cristo Mountains, from the vicinities of Lake Peak and Pecos Baldy northward to the Colorado state line (Bailey 1928, Ligon 1961, Braun and Williams 2015).

Current Status: The U.S. Fish and Wildlife Service undertook a Species Status Assessment of the Southern White-tailed Ptarmigan (*L. l. altipetens*) in response to a petition to list it as threatened under the U.S. Endangered Species Act (CBD 2010, USFWS 2015), and issued a finding that the proposed listing was unwarranted (USFWS 2020). The species was state-listed as endangered by New Mexico in 1975, and the Department completed a recovery plan in 2017 (Bulger 2017). By the mid-1900s, much of its habitat had

become degraded from sheep grazing, and it was thought to be restricted to only a few peaks in the northernmost portions of its former range in New Mexico (Ligon 1961, Braun and Williams 2015). In 1981, 43 ptarmigan from central Colorado were translocated to Santa Barbara Ridge, Pecos Wilderness Area, in an attempt to substantially augment or re-establish the population at the southern extent of its range. Surveys undertaken by Wolfe (2011, 2014), Braun (Braun and Williams 2015), and NMDOW (2016-2019) documented the presence of small populations of White-tailed Ptarmigan in Pecos Wilderness, Wheeler Peak Wilderness, and the Culebra Mountains. Other alpine areas in the Sangre de Cristo Mountains apparently lack sufficient habitat to support breeding populations (Wolfe and Larsson 2018). These sites, which may be seasonally occupied by a few individuals or used as stopover points by dispersing birds, include the Latir Peak Wilderness, Little Costilla Peak, Gold Hill, and portions of the high alpine zone of the Pecos Wilderness from Truchas Peaks south to Pecos Baldy and Lake/Deception Peak. Surveys conducted by NMDOW from 2016-2019 indicated that fewer than 20 adult White-tailed Ptarmigan remained in New Mexico. In response to this finding, NMDOW translocated 24 adult ptarmigan from Colorado to the Pecos Wilderness Area in September 2021, and an additional 23 adults in September 2023. The Department is closely monitoring survival, reproduction, and habitat use of this population.

Threats: Presumed population declines in the early 1900s were attributed to habitat degradation from intensive grazing, particularly by domestic sheep, combined with unrestricted hunting by sheepherders and miners (Bailey 1928, Ligon 1961, Lee 1967, Hubbard 1970). Localized threats to persistence of the state's remnant ptarmigan populations may include heavy recreational use of alpine meadows, unleashed dogs accompanying hikers, and ski area development (Hoffman 2006, Wolfe et al. 2011, Martin et al. 2020). Climate change in particular has significant potential to negatively impact this species in New Mexico, as ptarmigan are highly intolerant to heat stress and are dependent on alpine vegetation and remnant snowfields in summer, and on soft snow for roosting in winter (Hoffman 2006, Martin et al. 2020).

Recommendations: No change in status is recommended. NMDOW should work with land managers to protect alpine and timberline habitats for this species, and should continue monitoring survival and reproduction of the Pecos Wilderness Area population.

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Whooping Crane, *Grus americana*

Distribution: Formerly widespread in North America, the species declined to a single flock of about 16 individuals migrating between Canada and coastal Texas by 1941 (Urbanic & Lewis 2020). Natural occurrence of the species in New Mexico is unproven; unverified sightings from the Hatch and Portales areas in the 1850s and 1930s, respectively, might have been of this species (Allen 1952). Until 2002, Whooping Cranes were infrequently reported wintering in the middle Rio Grande Valley of New Mexico; these birds were members of an experimental population from a 1975-1989 recovery effort in Idaho which used Sandhill Cranes (*G. canadensis*) as foster parents for young Whooping Cranes. More recent records have not been confirmed, and are thus unreliable.

Current Status: The Whooping Crane was federally listed as endangered under the precursor of the Endangered Species Act in 1967 with a non-essential, experimental population designation in New Mexico in 1997 (USFWS 1997). In New Mexico, it was first listed as threatened in 1975 and then reclassified as endangered in 1990. After being on the brink of extinction, the species is now an enduring symbol of national and international efforts to recover endangered species as recovery efforts appear to be achieving some success range-wide. According to the United States Fish and Wildlife Service, there were 329 individuals in the only naturally occurring wild flock of whooping cranes in 2016 (Harrell et al. 2016). This population has a long-term increasing trend of approximately 4% per year. The estimated abundance during winter surveys in 2016-2017 was 431 Whooping Cranes; researchers noted that the significant increase in the population was primarily due to improved visibility with a switch in survey aircraft (Butler and Harrel 2017). Because of high mortality rates and lack of pairing and reproduction, all efforts to establish a viable Rocky Mountain flock were terminated in the West, with the remaining birds in the wild being reclassified as “experimental, nonessential” and all critical habitat designations within New Mexico being removed (USFWS 1997). Two captive-bred Whooping Cranes wintered in New Mexico in 2000-2001; one, an 18-year-old individual, survived to winter here in 2001-2002. After migrating north from New Mexico in spring 2002, it was never seen again and presumably died, thereby signaling the end of this experimental population. Unconfirmed reports from Roosevelt County, New Mexico suggest that migrants might reoccur in this area as the wild flock that migrates between Canada and Texas continues to recover (Williams 2007). The U.S. Fish and Wildlife Service initiated a 5-year status review of Whooping Crane in January 2024 (USFWS 2024).

Threats: Overall declines in the species are attributed to anthropogenic habitat loss and degradation from draining of freshwater wetlands, fencing, and destruction of tall- and mixed- grass prairie. Once reduced in numbers, populations are more vulnerable to losses from killing, disease, and collision with human-made objects, such as power lines (Urbanek & Lewis 2020). Other threats include limited genetic diversity of the population, loss and degradation of migration stopover habitat, degradation of coastal ecosystems, and threats of chemical and oil spills in Texas (CWS and USFWS 2007).

Recommendations: Whooping Cranes are federally protected under the Migratory Bird Treaty Act (MBTA) of 1918 16 U.S.C. 703-712; Ch. 128; July 3, 1918; 40 Stat. 755), as amended; strict enforcement of laws against harming and disturbing all Whooping Cranes remains essential in protecting those few individuals that might occur in New Mexico.

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Least Tern, *Sternula antillarum*

Distribution: The Least Tern breeds from California, the Dakotas, and Maine south to southern Mexico and the Caribbean; the Interior Least Tern (*S. a. athalassos*) subspecies breeds and nests along interior rivers and other water bodies across the Great Plains and Lower Mississippi Valley (Sidle et al. 1988, AOU 1998). In New Mexico, this summer resident is an occasional visitor to wetlands in at least 18 New Mexico counties, but is only known to breed at Bitter Lake National Wildlife Refuge (NWR) in Chaves County and farther south in the Pecos Valley at Brantley Reservoir in Eddy County. For many years, the only known nesting site in the state was Bitter Lake NWR (Hubbard 1978), but Least Terns have been found summering at Brantley Reservoir starting in 2002.

Current Status: The Interior Least Tern was federally listed as endangered in 1985 (USFWS 1985). In New Mexico, this subspecies was listed as endangered in 1976. The state's breeding population is quite small, and reproductive success has typically been poor. During the 10-year period from 1990 to 1999, the annual breeding population averaged only about 6 pairs, with productivity averaging less than 0.6 fledged young produced per pair. In the six-year period from 2000-2005, the population at Bitter Lake increased steadily to 14 pairs by 2005, and remarkably high productivity was achieved, averaging 1.17 young fledged per pair. After a very poor reproductive year in 2006, when only 2 birds were successfully produced from nesting attempts of 12 pairs, 11 pairs fledged 11 young in 2007. From 2008-2010, the annual breeding population hovered around 7 pairs with annual productivity of approximately 1 young fledged per pair. 2011 was once again a poor reproductive year, with only a single successful chick observed from a total of 5-6 nesting pairs. In 2013, approximately 7 pairs hatched 7 chicks, of which 3 were observed as fledglings. The years 2014 and 2015 were poor in terms of production; in 2014, five pairs made eight nesting attempts that resulted in only one fledgling, and in 2015, five pairs made six nesting attempts that resulted in zero fledglings. Two nesting pairs initiated two nesting attempts in both 2016 and 2017 (nest fates not reported; USBOR 2017). Nesting attempts at Brantley Reservoir were first documented in 2004, with conflicting reports of seven to eleven pairs, six or seven nests, and two successful nests with six fledged chicks. In 2006, the Bureau of Reclamation, under a Biological Opinion issued by the United States Fish and Wildlife Service, began to implement actions to order to promote successful nesting at Brantley Reservoir. These actions included the creation of tern nesting and brood-rearing habitats through clearing of exotic vegetation along the shoreline of the reservoir, finely raking some cleared areas to simulate nesting substrate, and leaving other cleared areas with mix of woody debris and sparse vegetation to serve as brood-rearing habitat. In addition, the Bureau of Reclamation worked with NMDOW and United States Fish and Wildlife Service to contract the construction of a floating nesting platform that was launched on 23 June 2009 on Brantley Reservoir, but was damaged by strong winds and resultant waves on the reservoir in 2010. As of 2016, nesting terns had not used these created habitats at Brantley Reservoir; no monitoring of created habitats occurred in 2017. Between 2005 and 2017, there were 16 nesting attempts at Brantley Reservoir; 13 nests were inundated, one was depredated, and two were abandoned. Two eggs were transferred to the Desert Willow Wildlife Rehabilitation Center in 2016 due to imminent inundation of the nest, and 2 hand-reared fledglings were released

at Bitter Lake NWR in September; two single eggs from two nests were transferred to the rehabilitation facility in 2017, but these efforts were unsuccessful. A protocol for Least Tern monitoring and egg salvage at Brantley Reservoir was established in 2017. Under this protocol, the BOR will complete surveys for Least Terns, report observations to the USFWS, monitor nests and potential threats, and establish a 400-meter disturbance buffer at active nests; under certain conditions, nests may be relocated to a safer location, and as a last resort (imminent inundation or natural abandonment) eggs may be collected and transported to a rehabilitator (USFWS 2017).

In 2013, the U.S. Fish and Wildlife Service conducted a 5-year review of the Interior Least Tern and found range-wide population persistence and exceedance of numerical recovery goals for 18 years. Based on this status review, the USFWS recommended that the interior population of Least Terns be delisted due to recovery, however, initiation of a delisting proposal was not recommended until: (1) the range-wide population model could be completed and reviewed to confirm status and trends assessments, (2) conservation agreements were in place to maintain management, and (3) a range-wide monitoring strategy and plan was prepared (USFWS 2013). A draft post-delisting monitoring plan (PDM) was released in December 2017 (USFWS 2017b); in January 2021, the USFWS published a final rule removing the Interior Least Tern from the federal list of threatened and endangered wildlife (USFWS 2021).

Threats: The Interior Least Tern has been threatened by human disturbance at nesting beaches and flats, chemical contamination of the prey base, and loss and degradation of riverine habitats from altered flow regimes and channelization (USFWS 1990, Thompson et al. 2020). The Bitter Lake NWR population might be jeopardized by oil and gas development, lowered water tables, contamination, and predation (e.g., by coyotes). The struggling Brantley Reservoir population is threatened by ill-timed changes to water levels and by human disturbance to the limited sand flat habitat.

Recommendations: No change in status is recommended. NMDOW should continue to cooperate with the USFWS, the United States Bureau of Reclamation, and other agencies to monitor the known nesting populations and manage habitat to benefit this species.

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Common Ground Dove, *Columbina passerina*

Distribution: This small dove occurs from the southernmost United States, including southern New Mexico, south into Latin America (AOU 1998, Bowman 2020). Within New Mexico, it occurs primarily across the southern counties that border Mexico. This low elevation species prefers brushy, well-watered valleys and frequents riparian woodlands and shrublands, especially mesquite thickets along streams and canyon bottoms.

Current Status: This species was listed by New Mexico as endangered in 1983. It was formerly considered an uncommon year-round resident in southern New Mexico (Ligon 1961), but was only a rare visitor by the 1980s. During the 10-year period from 1990 to 1999, an average of less than 5 birds per year were reported in New Mexico, with no documented nesting. Documented occurrences increased from 2000 to 2012, averaging about 15 birds per year, with birds reported in 11 counties, primarily in the southwestern counties of Doña Ana, Grant, Hidalgo, and Luna. Since 2012, occasional observations occur most years; the species has been most consistently reported from Hidalgo County, with observations as far north as Santa Fe (eBird 2026).

Threats: Declines in this species are likely in response to loss and degradation of native shrublands in lowland riparian areas, through clearing, burning, excessive grazing, and land conversion.

Recommendations: No change in listing status is recommended. Protection and enhancement of shrubby riparian habitats and provision of surface water in such habitats should be encouraged.

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Buff-collared Nightjar, *Antrostomus ridgwayi*

Distribution: This crepuscular and nocturnal species occurs primarily from western and southern Mexico south into Nicaragua. It reaches its northernmost geographic limits in southeastern Arizona and southwestern New Mexico (AOU 1998), where it summers in low-elevation desert canyons characterized by thickets of mesquite, acacia, hackberry, and other brush with scattered junipers on adjacent slopes. Most New Mexico reports are from Guadalupe Canyon, Hidalgo County, with single reports from Doña Ana and Grant counties.

Current Status: This species was listed by New Mexico as endangered in 1975. It was first discovered in the United States in Guadalupe Canyon, Hidalgo County (Johnson and Hardy 1959), but it has not been reported there since 1985; NMDOW surveys for listed bird species failed to detect this species from 1987 to 2004, and no birds were detected during NMDOW play-back surveys conducted in 2008 (Walker 2009). There has been only a single report of the species in the state since 1985: an unconfirmed occurrence of one heard at Redrock, Grant County on 30 May 1999 (Williams 1999). This species is rare, but regular in occurrence in southern Arizona (Corman and Wise-Gervais 2005, Bowers and Dunning 2020).

Threats: Loss of native habitat in brushy desert canyons, through vegetation clearing, burning, overgrazing, or water table reduction threatens this species at the northern fringe of its range. Human disturbance, including birdwatchers, could likewise jeopardize small populations by disrupting breeding activity.

Recommendations: No change in listing status is recommended. NMDOW should continue to work with public and private land managers to protect and enhance Guadalupe Canyon and similar habitats for native species such as this nightjar.

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Elegant Trogon, *Trogon elegans*

Distribution: This primarily Mexican species reaches the northern limit of its range in southeastern Arizona and southwestern New Mexico (AOU 1998, Kunzmann et al. 2020), where it is a rare summer resident of riparian habitats in montane canyons (Hall and Karubian 1996). In New Mexico, it most regularly occurs in the Peloncillo Mountains in Hidalgo County. Non-breeding vagrants rarely occur elsewhere in other mountain ranges of southern Hidalgo County (9 May 2009), and in Doña Ana (the first and only on 13 February 2011), Catron, Grant, Otero, and Sierra counties.

Current Status: The species is listed by the United States Fish and Wildlife Service as a species of special concern (USFWS 2002), and it was listed as endangered by New Mexico in 1975. It became one of the first non-game birds in the United States to receive special protection when it was protected from all forms of collecting by Arizona in about 1940. The Elegant Trogon was only known to breed in New Mexico in a single canyon in the Peloncillo Mountains, where NMDOW and cooperators had documented one to two pairs annually from 1991 through 2006. In July 2006, a second breeding site in another canyon of the Peloncillo Mountains was discovered. The pair again nested in the newly-discovered breeding site in 2007, but nesting has not been documented at either locale in subsequent years. Surveys in the primary nesting site have been limited in recent years due to restricted access, but a recent fire in the canyon might have significantly reduced habitat availability. The Elegant Trogon was not detected during surveys conducted for the species in 2008 (Walker 2009), but there was an unconfirmed report of a male at the second breeding site on the morning of 5 July 2008. In 2009, trogons were not found at either of the previously known breeding sites, but one Elegant Trogon was vocal in a new Peloncillo Mountains locale on 9 May 2009. A single male was seen and heard on 2 July 2010 in the second breeding site, but no nesting was documented in that year. Nesting was not documented in 2011, but interestingly, two wintering birds were reported: one from the Organ Mountains in Doña Ana County on 13 February 2011 and another from Guadalupe Canyon, Hidalgo County on 20 February 2011. Birdwatchers did not report any sightings from 2012 to 2015, and official surveys were not conducted during 2012-2024. In May 2022, birdwatchers recorded vocalizations of a single bird in Clanton Canyon, Peloncillo Mountains, and a lone female was observed in Guadalupe Canyon in March-April 2024 (eBird 2024).

Threats: The species is threatened by loss of limited breeding habitat (including large trees with suitable nesting cavities) and foraging habitat (including fruiting shrubs) from fire, wood-cutting, excessive grazing, lowering of water tables, road construction, and other development. Disturbance of nesting birds by humans (including photographers and birdwatchers using recorded vocalizations to attract birds) is also a threat.

Recommendations: No change in status is recommended. Preservation of mid-elevation montane riparian habitats in the Peloncillo Mountains and similar ranges is necessary, including maintaining water tables in canyons sufficient to support woodlands that contain large deciduous and coniferous trees. Protection of

breeding territories and nesting birds from human disturbance is also a priority.

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Northern Beardless-Tyrannulet, *Camptostoma imberbe*

Distribution: This Neotropical flycatcher occurs from Costa Rica north through Mexico, reaching its northernmost geographic limits in southern Texas, southeastern Arizona, and southwestern New Mexico (Tenney 2020). In New Mexico, it summers regularly only in Guadalupe Canyon, Hidalgo County (AOU 1998). This is a low-elevation riparian species that prefers dense thickets of mesquite, acacia, hackberry, and similar vegetation, typically along stream courses (Phillips et al. 1964, Oberholser 1974).

Current Status: The species was listed as endangered by New Mexico in 1975. It is also listed as threatened in Texas. This small flycatcher was detected on NMDOW surveys of New Mexico's Guadalupe Canyon each year from 1987 to 2004 and again in 2008 and 2009, with nesting documented in 2002, 2003, 2008, and 2009. This species is consistently recorded in Guadalupe Canyon, and a few detections have occurred farther north along the Gila River near Nichol's Canyon (eBird 2024).

Threats: The very small and localized New Mexico population is vulnerable to loss of required habitat from burning, clearing for border wall construction, and lowering of water tables.

Recommendations: No change in status is recommended. The preservation or enhancement of native riparian and associated habitats in Guadalupe Canyon and elsewhere in southwestern New Mexico are essential for maintaining this species in the state.

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(Southwestern) Willow Flycatcher, *Empidonax traillii extimus*

Distribution: *Empidonax traillii* breeds from southern Canada to the southern United States, and winters from southern Mexico to Panama (AOU 1998). The southwestern subspecies, *E. t. extimus* (Phillips 1948), breeds

primarily in New Mexico, Arizona, and southern California (Hubbard 1987, Unitt 1987); it is restricted to dense streamside vegetation that is typically comprised of mid-seral willows (*Salix* spp.) and/or tamarisk (*Tamarix ramosissima*). Within New Mexico, significant populations occur along the Rio Grande and Gila River drainages, with much smaller populations at isolated locales in the San Juan, upper Canadian, Zuni, San Francisco, Mimbres, and Pecos River drainages (USFWS 2014, Durst 2017).

Current Status: Due primarily to habitat loss and modification over much of its range, the Southwestern Willow Flycatcher was federally listed as endangered in 1995 (USFWS 1995, 2002, 2013). In New Mexico, it was initially listed as threatened under the Wildlife Conservation Act in 1988 and was then reclassified as endangered in 1996. Estimated numbers of Southwestern Willow Flycatcher territories detected (defined by a singing male present during the breeding season) has increased significantly since standardized statewide surveys were initiated in 1993 (n = 32) to 2012 (n = 702), due both to increased survey effort and increases in population numbers, particularly along the Gila and middle Rio Grande rivers (Durst 2017, Moore and Ahlers 2017). The majority (89%) of the state's known population is currently found at three sites – the Cliff-Gila Valley, the Lower Gila Box, and the Rio Grande River upstream of Elephant Butte Reservoir, while the remaining 11% of the population is spread out among approximately 27 sites, the majority of which are small, averaging fewer than 5 territories each (Durst 2107). Along surveyed areas of the Rio Grande in 2019, approximately 67% (n = 294 territories) were within the San Marcial and Elephant Butte Reservoir area; nest success was 42% in the Middle Rio Grande, which was up from the low of 25% in 2017, and average compared to rates since 1999 (USFWS 2020). The Lower Rio Grande population continued to increase; 48% nest success at Caballo Reservoir and 58% nest success south of Caballo was reported for 100 territories in 2019 (USFWS 2020). The Bureau of Reclamation (USBR) continues intensive survey efforts along the Middle and Lower Rio Grande annually (E. Duvuvuei, NMDOW, personal communication). USBR, Tetra Tech Inc., and RJH Consultants, Inc. conducted surveys and nest monitoring along approximately 99 Rio Grande river miles in 2024; 792 residents/368 pairs/424 territories/56 unpaired males were documented (USBR 2025). Overall nest success for the Middle Rio Grande was 49%, with the San Marcail Reach continuing to lead productivity along the Middle Rio Grande (365 nests/348 fledglings; USBR 2025). In 2017, the USFWS 12-month finding on a petition to delist this species was found not warranted (USFWS 2017); a Five-Year Status Review was completed in 2025, concluding that southwestern willow flycatcher remains endangered/no changes needed (USFWS 2025).

Threats: Despite the documentation of increasing numbers of breeding territories in some areas, several ongoing threats have been identified as contributing to the continued endangered status of the Southwestern Willow Flycatcher (USFWS 2014, 2017). These threats, which are often interrelated, include: habitat alteration, fragmentation, or loss; water manipulation activities (diversion, impoundment, pumping, and flood control); excessive livestock grazing; climate change; catastrophic fire in bosque areas; localized brood parasitism by Brown-headed Cowbirds (*Molothrus ater*); and localized high nest predation rates. The continuing invasion of the tamarisk leaf beetle (*Diorhabda* spp. into New Mexico may also further threaten the state's flycatcher populations, due to the beetle's ability to defoliate large stands of tamarisk during the flycatcher's breeding season. From 2007-2025, *Diorhabda* spp. were detected nearly statewide, including the Gila River; annual presence and absence data are available through the interactive River's Edge West map (River's Edge West 2025). Because tamarisk beetles are well-documented throughout the region, the 2025 presence/absence map is the final annual map (River's Edge West 2025). Efforts to eradicate tamarisk and other exotic plants that do not involve concurrent restoration of native vegetation also jeopardize this flycatcher.

Recommendations: No change in listing status is recommended. Uncertainties with regard to future water management activities on the Rio Grande (Moore and Ahlers 2017) and Gila (Bureau of Reclamation 2018) rivers combined with potential climate change effects and the continued spread of the leaf beetle dictate that the Department maintains a conservative outlook regarding near-term prospects for the flycatcher's recovery in the state.

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Thick-billed Kingbird, *Tyrannus crassirostris*

Distribution: This Neotropical flycatcher of western Mexico and Guatemala reaches its northern geographic limits in southeastern Arizona, southwestern New Mexico, and the Big Bend region of western Texas (AOU 1998). In New Mexico, it summers regularly only in Guadalupe Canyon, Hidalgo County. It was first discovered in Guadalupe Canyon in 1958 (Levy 1959) and nesting was documented in New Mexico in 1959 (Zimmerman 1960). In New Mexico, the species requires native broadleaf riparian habitats characterized by mature cottonwoods and sycamores; to date, all New Mexico nests have been located in tall sycamores.

Current Status: The species was listed by New Mexico as threatened in 1975 and then was reclassified as endangered in 1990. The species is listed by Texas as threatened. NMDOW surveys along a two-mile transect in Guadalupe Canyon documented an annual average of 2.4 territories from 1987 to 2001. However, only one territory was found during surveys in both 2002 and 2003, and none was found in 2004, 2006, and 2008 (Walker 2009). Only a single bird was reported (incidental to surveys) in both 2005 and 2007. In 2009, the species was again found nesting in the New Mexico portion of the canyon, with a pair and their nest discovered on 8 July (NMDOW unpubl. data). A pair was observed at Double Adobe Creek, in the Animas Mountain foothills in June 1994 (NMDGF 1996.) Birdwatchers have reported sightings in most years since 2009, primarily from Guadalupe Hidalgo County (eBird 2026).

Threats: The small and localized New Mexico population is threatened primarily by loss of mature broadleaf riparian woodlands, from fire (prescribed or otherwise), lowering of water tables, and tree cutting.

Recommendations: No change in status is recommended. NMDOW should encourage public and private land managers to protect and enhance native broadleaf riparian habitats in Guadalupe Canyon and elsewhere in

southwestern New Mexico. In particular, fires in riparian areas that kill large trees should be discouraged, as should activities that result in lowered water tables.

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(Arizona) Grasshopper Sparrow, *Ammodramus savannarum ammolegus*

Distribution: This unique, local subspecies of the widespread Grasshopper Sparrow is restricted to grasslands in southeastern Arizona, extreme southwestern New Mexico, and immediately adjacent areas of northern Sonora and Chihuahua, Mexico. The known range in New Mexico is limited to two breeding populations in southern Hidalgo County in the Animas and Playas Valleys (Williams 1991, 2006, 2007). It is unknown whether this subspecies remains in New Mexico during the winter months or migrates out of the state. This sparrow requires extensive, well developed desert grasslands characterized by grama and other bunchgrasses and generally lacking woody vegetation; abundant thatch and dry grasses are needed for cover.

Current Status: The subspecies was listed as threatened by New Mexico in 1990 and then uplisted to endangered in 2006. NMDOW breeding bird surveys were initiated in June 1987 in the Animas Valley specifically for this sparrow. In June 1992, the Animas Valley transect was expanded and a new transect was established in the Playas Valley. Data were consistently gathered along both transects for 15 years (1992-2006); numbers recorded on each transect have shown year-to-year variation (Williams 1997), which might be in response to precipitation, local fire events, or grazing practices. No data were collected in 2007, and only a subset (19 of 46) of transect points in the Animas Valley were sampled from 2008-2011. In 1992, 109 sparrows were detected on the Animas transect and 41 were detected on the Playas transect. Both transects showed persistent, statistically significant long-term declines over the 15-year survey period. By 2004, the Animas transect had declined 88% (to 21 sparrows), while the Playas transect declined 100% (to 0 sparrows). In 2005, both transects yielded slight increases from 2004 – the total birds detected went up from 21 to 26 on the Animas route and from 0 to 2 birds on the Playas route (Williams 2006). Similarly, the Animas Valley transect showed continued improvement in 2006, with 47 sparrows detected (Williams 2007), as well as in 2008 and 2009 when only a portion of the transect was surveyed, with 40 and 65 sparrows detected, respectively. However, numbers were down again in subsequent years, with only 21 and 27 birds detected in 2010 and 2011, respectively. The Playas transect showed no improvement in 2006, as no sparrows were detected (Williams 2007), indicating that the Playas population was at or near extirpation. However, the current status of the Playas population is unknown as no recent surveys have been completed due to restricted access to private lands; no surveys were conducted in any of the population areas from 2012 to 2026.

Threats: The main threat to this subspecies' continued survival in southern Hidalgo County is loss, degradation, and fragmentation of its native grassland habitat, primarily from excessive grazing that leads to reduced grass cover and increased brush encroachment particularly in the Playas Valley. Fires, especially those occurring during late spring-early summer), can severely depress recruitment. Nest survival research in southeastern Arizona reported negative relationships between daily survival rates and overall nest success with higher precipitation levels during the previous growing season and large rain events during preceding days; the authors note potential climatic tradeoffs for this species in regards to predicted climate change effects, with increased nest success due to reduced seasonal precipitation, and reduced nest success due to extreme precipitation events (Ruth and Skagen 2018).

Recommendations: No change in status is recommended. NMDOW should encourage grazing management

practices and burning programs that perpetuate suitable grasslands for this subspecies.

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THREATENED

Neotropic Cormorant, *Nannopterum brasilianum*

Distribution: This widespread waterbird of Central and South America reaches its northernmost geographic limits in New Mexico (AOU 1998), where it is known only to nest in the middle Rio Grande Valley. Non-breeders wander north to Bernalillo County, west to Hidalgo County and the Gila Valley in Grant County, and east to the Tularosa Basin and middle and lower Pecos Valley, northwest to San Juan County, and northeast to Colfax and Union counties. Nesting cormorants require stands of trees or shrubs in or near water that are free from human disturbance. Prior to the 1970s, all known breeding colonies were coastal, and the breeding range is expanding northward in the United States (Telfair II and Morrison 2020).

Current Status: The species was listed by New Mexico as threatened in 1975. It occurs in varying but typically small numbers primarily at Elephant Butte and Caballo reservoirs and at the Bosque del Apache National Wildlife Refuge (NWR), where it is outnumbered by (and often confused with) the larger Double-crested Cormorant (*P. auritus*). Although the species has been reported in New Mexico annually by birdwatchers, documentation of nesting has been less consistent. The species was first documented nesting in New Mexico at Elephant Butte Reservoir in 1972 (Hundertmark 1974) and since then, no more than 50 nests have been found in any year. Nesting was not documented anywhere in New Mexico from 1998 to 2006. In 2007, a NMDOW-contracted waterbird study in the middle and lower Rio Grande of New Mexico resulted in the discovery of 4 Neotropic Cormorant nests in Quates Marsh (near San Marcial, Socorro County) and 1 at Elephant Butte Reservoir (Stahlecker 2007). This number is comparable to reports from 1975. However, the lack of consistent, long-term data for this species has impeded attempts to assess population trends. Department staff have reported an active colony at Tingley Beach in Albuquerque since 2020; the species now seems to be a year-round resident in the Albuquerque area. An Atlas of breeding colonial waterbirds in the interior United States, including New Mexico, was conducted by the USFWS from 2009 to 2011. Unfortunately, most cormorant sightings in New Mexico were not identified to species, so the Atlas did not adequately census the Neotropic Cormorant population (Cavitt et al. 2014). A minimum of 75 active Neotropic Cormorant nests were observed at Elephant Butte Reservoir on 06/07/24 in a colony which also included Double-crested Cormorant, Great Blue Heron, Great Egret, Snowy Egret, Cattle Egret, and Black-crowned Night Heron (E. Duvuvuei, NMDOW, personal communication).

Threats: Loss and degradation of limited breeding sites, disturbance of breeding colonies, fluctuations in food supply, contamination, and persecution are among the main threats to this fish-eating species (Telfair II and Morrison 2020).

Recommendations: No change in status is recommended. There are no ongoing or future management plans to specifically benefit Neotropic Cormorant in New Mexico.

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Bald Eagle, *Haliaeetus leucocephalus*

Distribution: The species is widespread in North America, occurring from Alaska and Newfoundland south to northern Mexico and the Gulf Coast (Buehler 2020). It migrates and winters in suitable habitat throughout New Mexico (Hubbard 1978). Beginning in the late 1980s, Bald Eagles were found nesting at four sites in two counties: three sites in Colfax and one in Sierra (Williams 2000). A pair nested in a new site in Rio Arriba County in 2006 and 2007, and a second breeding site in that county was confirmed in 2008. A new nesting site was discovered in Union County in 2012, bringing the total number of known breeding sites to 9. Although only two territories were occupied in 2007, one in Colfax County and one in Rio Arriba County, 5 territories were occupied in both 2009 and 2010, and a record 7 territories were occupied in April 2012. In New Mexico, nests are placed in large cottonwoods or ponderosa pines, typically in the vicinity of water and often also in close proximity to concentrations of small mammals such as prairie dogs (Williams 2000).

Current Status: An ongoing conservation success story, breeding pairs throughout the lower 48 states have been steadily increasing (417 in 1963, 5,750 in 1998, and an estimated 72,434 in 2009, USFWS 2016) since the species was listed on the precursor of the Endangered Species Act in 1967. Recovery of the species first led to the federal reclassification of the Bald Eagle from endangered to threatened in 1995 (USFWS 1995) and then to the removal of the species from the List of Endangered and Threatened Wildlife in 2007 (USFWS 2007). NMDOW supported the federal delisting of the species (Maracchini 1999), but the species was listed as threatened by New Mexico in 1975 and remains in need of conservation action in the state, primarily due to small breeding populations. The nesting population consisted of 2 active territories in 2007, 4 active in 2008, 5 active in both 2009 and 2010, and 7 active in 2012. Territories have not been monitored since 2012. Bald Eagles are federally protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712; Ch. 128; July 3, 1918; 40 Stat. 755) and the Bald and Golden Eagle Protection Act (16 USC 668-668c), both as amended.

Threats: The principal threats to Bald Eagles in New Mexico are human disturbance (especially to nesting pairs, but also to wintering birds), loss and degradation of breeding and wintering habitats (including declines in prey and in nest and roost site availability), environmental contamination, electrocution, and illegal killing (including both shooting and poisoning).

Recommendations: No change in status is recommended.

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Common Black Hawk, *Buteogallus anthracinus*

Distribution: This Neotropical raptor reaches its northern geographic limits in the southwestern United States, where it is an uncommon but regular summer resident in New Mexico. Historically, this species was largely restricted to the San Francisco, Gila, and Mimbres drainages; however, there are now regular observations in the middle Rio Grande Valley, Hondo Valley, and Pecos River Valley, as well as periodic sightings and nesting along the Canadian River. Breeding birds require mature, well-developed riparian forest stands (e.g., cottonwood bosques) located near permanent streams where principal prey species (fish, amphibians, and reptiles) are available (Schnell 1994, Sadoti 2012).

Current Status: The species declined in abundance as its riparian habitat was reduced, and was listed by New Mexico as threatened in 1975. It is also state listed by Texas and Arizona. In 1994 and 1995, R. W. Skaggs (1996) intensively surveyed the San Francisco, Gila, and Mimbres basins, and estimated a population of up to 80 pairs. Twenty-seven active territories were located in the Gila Watershed (primarily the Gila and San Francisco rivers) in 2011 during HawkWatch International surveys contracted by NMDOW. By 2010, the statewide population was speculatively estimated to include more than 100 pairs (Sadoti 2010), and likely exceeds this number at present.

Threats: Loss of southwestern riparian habitat, particularly cottonwood bosques and free-flowing streams, is the principal threat to this riparian-obligate species (Hubbard 1965, Oberholser 1974, Schnell 1994). Human modifications limit natural river system dynamics and reduce natural riparian rejuvenation (Sadoti 2008), and livestock grazing within riparian areas can reduce or eliminate seedling regeneration (Schnell 2020). This species is sensitive to human disturbance at nest sites (Schnell 2020), and illegal shooting may also be a threat.

Recommendations: No change in status is recommended. NMDOW should continue to encourage the preservation and enhancement of riparian habitats, including beneficial water management practices, in order to promote and maintain suitable breeding season habitat with abundant prey availability.

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Peregrine Falcon, *Falco peregrinus*

Distribution: The species occurs almost worldwide (Brown and Amadon 1968). New Mexico supports both breeding and migratory populations of Peregrines. Breeding Peregrines in New Mexico are of the American subspecies *F. p. anatum* and utilize mountains and river canyons (Skaggs et al. 1988). *En route* migrants are either the American subspecies, which can be found essentially statewide, or the rarer tundra subspecies *F. p. tundrius*.

Current Status: The *anatum* subspecies was federally delisted in 1999 (USFWS 1999); based on available data, NMDOW argued that federal downlisting from endangered to threatened was warranted, but that delisting was not (Maracchini 1998). The subspecies was first listed by New Mexico in 1975 and then, in response to encouraging observations of gradually increasing occupancy of breeding sites after 1980, it was downlisted from endangered to threatened in 1996. Results of recent investigations of the current population status and demography in New Mexico (Gedir et al. 2019, Johnson 2025) indicate that retention of threatened status for the *anatum* subspecies remains warranted. USFWS released an updated status assessment to inform possible changes to falconry take in 2023 (USFWS 2023), and in 2026 prepared a Draft Environmental Assessment of take of peregrines in the wild from falconry (USFWS 2026).

Threats: Chemical contamination of the environment remains a threat as old compounds continue to be used in parts of the species' range, and especially as new compounds are developed and applied to the land (Johnson 2025, Johnson and Williams 2006). In New Mexico, declining prey populations and disturbance to nesting pairs are also likely threats (Johnson and Williams 2006).

Recommendations: No change in status is recommended.

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Piping Plover, *Charadrius melodus*

Distribution: This small, migratory shorebird breeds in the northern Great Plains, Great Lakes region, and Atlantic coastal areas (Elliptt-Smith and Haig 2020.). It occurs irregularly as a very rare migrant in New Mexico, where it has been reported at wetlands in Colfax, Guadalupe, Socorro, Chaves, and Eddy counties.

Current Status: The Great Lakes watershed population of Piping Plover is listed as endangered, and the Atlantic coast and northern Great Plains populations are listed as threatened (USFWS 1985). In New Mexico, Piping Plover was first listed as threatened in 1988, reclassified as endangered in 1990, and then downlisted back to threatened in 2006. It is also listed as threatened by Colorado. Although Piping Plovers nest in southeastern Colorado (Kingery 1998), the species has been reported in New Mexico on fewer than 15 occasions. No known breeding pairs were documented in Colorado from 1949 – 2002, but in 2003, 24 breeding pairs were located during surveys of southeastern Colorado reservoirs completed by the United States Army Corps of Engineers. Because the occurrence of Piping Plovers within the state is dependent upon status and conditions of breeding populations elsewhere, the number of Piping Plovers migrating through New Mexico should increase if Piping Plover numbers increase in Colorado (see USFWS 2016). A 5-Year Status Review was initiated by the USFWS in 2024 (USFWS 2024).

Threats: The major threats to this species are loss and degradation of nesting and wintering habitats from urbanization, vehicular traffic, human disturbance, and water impoundments and regulation (USFWS 1985, Ryan et al. 1993).

Recommendations: No change in status is recommended. Protection of mudflat and sandbar habitats at New Mexico wetlands will benefit this species as well as other migrating shorebirds. The species will also benefit from recommended recovery actions put forth in the Piping Plover Atlantic Coast Population Revised Recovery Plan (ACPPRT 1996) and the 2016 Revised Recovery Plans.

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Whiskered Screech-Owl, *Megascops trichopsis*

Distribution: This primarily Mexican and Central American species occurs from the southwestern United States south to Nicaragua. In New Mexico, it occurs only in Hidalgo County, where it is found regularly in several canyons (e.g., Skeleton, Whitmire, Cottonwood, and Clanton) in the Peloncillo Mountains and, occasionally, in the Animas Mountains (e.g., in the vicinity of Indian Creek Canyon). In New Mexico, the species appears to favor oak and pine riparian areas in mountain canyons, and dense oak-pinyon-juniper woodlands on adjacent north-facing slopes (Marshall 1957, NMDOW files).

Current Status: Whiskered Screech-Owl was first detected in the state in 1974 (Ligon and Brenowitz 1976), and was listed as threatened by NMDOW in 1990, as the status of the population in the Peloncillo Mountains became somewhat better understood (Williams and Hubbard 1990). During the 1990s, NMDOW surveyed portions of four canyons in the Peloncillo Mountains, and recorded 15 occupied territories (Williams 2000).

Individuals have been also reported from three sites in the Animas Mountains, most recently in May 2016. Owls abandoned one Peloncillo Mountain canyon for two years after a prescribed fire in 1997, but they reoccupied the canyon in 2000. Nine territories were located in Skeleton Canyon in the Peloncillo Mountains in 2006 (Williams 2006), and 7 territories were located there in 2008 (Walker 2009). Nineteen individuals (at 12 survey points) responded to an informal playback survey of Clanton Canyon adjacent to Geronimo Trail in March 2017 (eBird; Wally Egelhoff). Birdwatchers report sightings nearly every year in the Peloncillo Mountains, primarily from Clanton Canyon. In 2024, NMDOW initiated a broadscale multi-year survey effort to better determine distribution and abundance of Whiskered Screech-Owl in the Peloncillo Mountains.

Threats: Loss of pine-oak and oak woodlands in the Peloncillo and Animas mountains, especially in canyon bottoms, through vegetation removal or fire (natural or prescribed) is the principal threat to this species. Cavity trees (snags, etc.) are especially vulnerable to fire. Human disturbance, particularly excessive playback of its vocalizations by birdwatchers, could negatively impact New Mexico's small populations.

Recommendations: No change in status is recommended. NMDOW should encourage public and private land managers to protect pine-oak and oak woodlands in Hidalgo County, especially riparian canyons.

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Boreal Owl, *Aegolius funereus*

Distribution: This northern species occurs in boreal forests of the Old and New Worlds. In North America, it reaches its southernmost geographic limits in the mountains of northern New Mexico, where it was first detected in 1987 (Stahlecker and Rawinski 1990). In New Mexico, NMDOW-assisted surveys found the species to be resident in undisturbed spruce-fir and similar forests in the San Juan, Sangre de Cristo, and Jemez mountains (Stahlecker and Duncan 1996).

Current Status: Boreal Owl was listed as threatened in New Mexico in 1990. Intensive surveys in the state found that the species occurred in very small numbers at 10 specific sites in eight general areas in the Carson and Santa Fe National Forests (Stahlecker and Duncan 1996). Broadcast surveys were conducted during late-July through mid-October 2012 at seven of nine locations where Boreal Owls were documented between 1987-1993 and at four new sites within 10-15km of previous detections; Boreal Owls were confirmed at four locations in the Sangre de Cristos and at two locations each in the Jemez and San Juan Mountains (Stahlecker et al. 2014). A minimum of 12 individuals (6 adults and 6 juveniles) were detected at/near six of the historical locations, and at least three adults were detected at two of the new sites (Stahlecker et al. 2014).

Threats: New Mexico's small and highly fragmented Boreal Owl populations are vulnerable and would be negatively impacted by losses of their specialized and limited subalpine habitats. Timber harvest in such habitats could eliminate nesting cavities, reduce prey populations, and remove forest structure necessary for nesting, foraging, and roosting; the slowness of forest succession in high elevation stands implies disturbed habitats would remain unsuitable for one-two centuries (Hayward and Hayward 1993, Hayward and Verner 1994, Hayward 1997). Additionally, subalpine habitat is threatened by climate change, bark beetle infestation, and catastrophic fire (Stahlecker et al. 2014).

Recommendations: No change in status is recommended. Conservation of the Boreal Owl in New Mexico depends on maintenance of its specialized habitat – high elevation stands of mature and older spruce-fir forests in the San Juan, Sangre de Cristo, and Jemez mountains. Protective measures should include the identification and conservation of areas of occupancy. Forest management should focus on maintaining the distribution and abundance of spruce-fir forests, whether occupied by Boreal Owls or not, with emphasis on retaining these

vegetation types in their natural states. Even-aged timber management on a broad scale should be eliminated in high elevation areas, while management based on simple snag retention in clearcut areas should be recognized as having little ecological value.

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Broad-billed Hummingbird, *Cynanthus latirostris*

Distribution: This widespread Mexican species reaches its northern geographic limits in the borderlands region of the southwestern United States (AOU 1998), where it inhabits low to mid-elevation riparian woodlands. In New Mexico, the species is a regular summer resident in Guadalupe Canyon, Hidalgo County, where it tends to nest in hackberry thickets and similar vegetation (Baltosser 1986, 1989). In 1998, breeding was confirmed in Skeleton Canyon in the central Peloncillo Mountains, the first recorded breeding away from Guadalupe Canyon (Williams 1998). In addition, there have been reports from several additional New Mexico counties, including confirmed records for Bernalillo, Doña Ana, Eddy, Grant, Otero, San Miguel, and Valencia counties, but breeding has not been documented outside Hidalgo County.

Current Status: The species was listed as threatened in New Mexico in 1975. The small population in Guadalupe Canyon and immediately adjacent side canyons was estimated at about 18-25 individuals in 2009 and appears to have been relatively stable (Walker 2009). NMDOW surveys and cooperator reports indicate another 10-15 individuals might summer regularly in three additional canyons farther north in the Peloncillo Mountains; no surveys have occurred in recent years. In addition, records from Eddy County (Carlsbad), Grant County (Silver City), and Doña Ana County (Radium Springs and Las Cruces) indicate that a few birds occasionally overwinter in the state (Williams 2006, 2009a,b).

Threats: The principal threat is loss of riparian woodlands in Guadalupe Canyon and similar canyons in the Peloncillo Mountains from clearing (brush removal, tree cutting), burning, and lowering of water tables.

Recommendations: No change in status is recommended. The protection and enhancement of riparian woodlands and adjacent xeric habitats in Guadalupe Canyon and similar canyons in southwestern New Mexico should be encouraged.

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White-eared Hummingbird, *Basilinna leucotis*

Distribution: This species of Mexican and Central American highlands reaches its northernmost geographic limits in the mountains of southeastern Arizona and southwestern New Mexico (AOU 1998). This hummingbird prefers relatively moist montane forests and forested canyons, and is found most commonly in the pine and pine-oak zones (Howell and Webb 1995). White-eared Hummingbirds were first found summering in New Mexico in the Animas Mountains in the mid-1970s (Hubbard 1978) and have continued to be occasionally documented there, most recently in 2001 and 2003. There are additional reports from elsewhere in southwestern New Mexico: the species has been reported in the Peloncillo Mountains (most recently in 2001), the Pinos Altos mountains (in 1993, 1994, and 2009), and the Mogollon Mountains (in 2000 and 2005). Vagrants also have strayed farther north and east to the Manzanita Mountains in 1994 and 1995, to two sites in the Sangre de Cristo Mountains in 1993, and to the Sacramento Mountains in 2005. The most recent records are from October 2023 at a Dripping Springs Visitor Center feeder in the Organ Mountains (eBird 2026).

Current Status: White-eared Hummingbird was listed as threatened in New Mexico in 1978. The species is only irregularly recorded in the state.

Threats: This species is restricted to moist mountain canyons and adjacent forested slopes, and is vulnerable to loss of its required habitats from fire, mining, lumbering, road-building, and excessive grazing.

Recommendations: No change in status is recommended.

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Violet-crowned Hummingbird, *Ramosomyia violiceps*

Distribution: This hummingbird of the Mexican highlands reaches its northernmost geographic limits in southeastern Arizona and southwestern New Mexico. In New Mexico, it summers regularly only in broadleaf riparian woodlands of sycamore, cottonwood, hackberry, and oak in Guadalupe Canyon, Hidalgo County, where it nests exclusively in sycamores (Zimmerman and Levy 1960; Baltosser 1986, 1989; Williams 2002). The species also has been found in the summer months in Clanton, Skeleton, and Post Office canyons in the Peloncillo Mountains and along the Double Adobe Creek in the Animas Mountains. Single individuals documented in Anthony from November 2001 to February 2002 and in Las Cruces in February 2002 (both in Doña Ana County) were the first known to winter in New Mexico. Presumed overwintering individuals have subsequently been detected periodically in the vicinity of Las Cruces.

Current Status: The species was listed as threatened in New Mexico in 1975. New Mexico's population is small: it has rarely numbered more than about 12 individuals since the mid-1980s, distributed among 2 to 5, rarely 7, locations within the New Mexico portion of Guadalupe Canyon (Williams 2002, Walker 2009). To date, no breeding or consistent summering has been documented away from Guadalupe Canyon, where the species has been documented in most years since 2014 (eBird 2026).

Threats: This hummingbird is threatened by loss of low elevation broadleaf riparian and adjacent xeric

habitats in Guadalupe Canyon and similar canyons in southwestern New Mexico, resulting from fire, clearing, excessive grazing, and lowering of water tables. Fire poses a significant threat if riparian areas supporting mature trees are burned or if nectar source plants such as agaves are destroyed by fire. Grazing in canyon bottoms might remove necessary dense understory vegetation and impede regeneration of riparian trees.

Recommendations: No change in status is recommended. NMDOW should encourage public and private land managers to preserve low-elevation broadleaf riparian woodlands in Guadalupe Canyon and elsewhere in southwestern New Mexico.

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Lucifer Hummingbird, *Calothorax lucifer*

Distribution: This primarily Mexican highland species reaches the United States only in southeastern Arizona, southwestern New Mexico, and Trans-Pecos Texas (Scott 2020). New Mexico's breeding population of this migratory species is found primarily in the Peloncillo Mountains in Hidalgo County, where it occurs in several mid-elevation canyons including Post Office, Skeleton, Cottonwood, Clanton and Guadalupe canyons (eBird 2026). Away from the Peloncillo Mountains, single vagrants have strayed north and east to Grant, Sierra, Luna, and Eddy counties. This species uses rugged canyons, slopes in dry mountain ranges (especially rocky hillsides and talus slopes), and dry washes vegetated with desert scrub, such as shrubby trees (juniper, piñon, oak), cactus, yucca, ocotillo, and agave.

Current Status: This hummingbird was listed as threatened in New Mexico in 1985. The Peloncillo Mountains population is small, and surveys from 1990 through 2006 detected about 20 breeding females annually; no surveys have occurred in recent years.

Threats: Loss of native dry canyon/hillside habitats, including loss of native food plants from burning or excessive grazing, is the principal threat to the small New Mexico breeding population.

Recommendations: No change in status is recommended. NMDOW should support protection of dry canyon/hillside habitat.

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Costa's Hummingbird, *Calypte costae*

Distribution: The distribution of this arid-land species is centered on the Sonoran Desert region of the southwestern United States and northwestern Mexico. Within New Mexico, it occurs primarily in the southwest,

where it is a warm season migrant and occasional breeder (Baltosser 1989, Baltosser and Scott 1996). All documented or suspected breeding has been in Hidalgo, Grant, and Doña Ana counties; the species is most regular in Guadalupe Canyon in Hidalgo County, where breeding has been documented, less regular along the lower Gila River in Grant and Hidalgo counties, and occasional east to the San Andres and Organ mountains in Doña Ana County. Migrants have been recorded at several sites in Hidalgo, Grant, and Doña Ana counties, and at single sites in McKinley, Sandoval, and Sierra counties.

Current Status: The species was listed by New Mexico as threatened in 1983; occurrence has been irregular. In 1993, up to 7 individuals occupied Guadalupe Canyon from late-March to mid-June, and breeding was suspected (Williams 1993). The species staged an impressive invasion in 1995, with reports from 4 sites in 3 counties (Williams 1995), including reports of 2 males in the San Andres Mountains (Weisenberger and Howe 1996). Displaying males were observed at 2 sites near Redrock in 1997, an individual bird was observed near Virden in 1998, and individual birds were observed in Silver City and in the Peloncillo Mountains in 1999. One to five birds were reported annually in southwestern New Mexico from 2000-2010, but there was no evidence of breeding (Williams 2006; 2007a, b; 2008; 2009; 2010), with sporadic occurrence since then. The first individual to be found wintering in New Mexico was documented in Placitas, Sandoval County from January to February 2002 (Williams 2002), and an overwintering adult male was seen in Las Cruces, Dona Ana County from 29 November 2005 - 2 January 2006 (Williams 2006).

Threats: The long-term persistence of the species in the state is threatened by loss (from fire, excessive grazing, or clearing) of native xeric hillside vegetation and adjacent riparian vegetation in the Peloncillo Mountains, the lower Gila Valley, and elsewhere in southwestern New Mexico.

Recommendations: No change in status is recommended. NMDOW should continue to work with public and private land managers to identify, preserve, and restore riparian areas and associated xeric hillside vegetation in southwestern New Mexico, including in Guadalupe Canyon and other canyons in the Peloncillo Mountains, and in the lower Gila Valley, particularly in the Middle Box and Lower Box.

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Gila Woodpecker, *Melanerpes uropygialis*

Distribution: This species of the southwestern United States and western Mexico is found only in southwestern New Mexico, where it is a resident in southern Hidalgo County and the lower Gila Valley in Hidalgo and Grant counties. Within the state, Gila Woodpeckers require well-developed broadleaf riparian woodlands characterized by extensive groves of mature cottonwoods and/or sycamores.

Current Status: Gila Woodpecker was listed as threatened by New Mexico in 1975. The species is listed as endangered by California, where loss of native riparian habitats in the lower Colorado River Valley has reduced populations (Rosenberg et al. 1991). NMDOW surveys conducted annually from 1987-2004 and 2008-2009 documented 5-8 pairs in Guadalupe Canyon in Hidalgo County (Walker 2009), and reports from additional southern Hidalgo County sites (including nesting in the Animas Valley) were encouraging.

Birdwatchers reported counting up to 14 Gila Woodpeckers in Guadalupe Canyon in May 2022. Observations (1996-2005) on the east side of the Animas Mountains represent the species' first documentation east of the Continental Divide. During avian surveys of the Gila watershed, Gila Woodpeckers were documented at 33.3% and 25% of 24 "downstream" (elevation 4,000-5,000 feet) sites in Grant County in 2006 and 2007, respectively (Kindscher et al. 2008). Shook (2008) compiled historical records and conducted surveys and documented Gila Woodpeckers in Grant and Hidalgo counties in the spring of 2008.

Threats: The principal threats to the species in the state are habitat destruction, especially tree cutting or other destructive clearing (burning, inundation) of cottonwood and sycamore stands, and lowering of water tables. Habitat fragmentation also threatens the species, as mature but isolated cottonwood groves smaller than 20 ha (50 acres) tend to be avoided by Gila Woodpeckers (Rosenberg et al. 1991). Presence of European Starlings and competition for nest cavities is a concern in some areas (Edwards and Schnell 2020).

Recommendations: No change in status is recommended. NMDOW should continue to encourage land managers, including public and private water managers, to preserve and restore extensive riparian woodlands, particularly mature groves of cottonwoods and sycamores. Prescribed fires that can kill large trees should be avoided in riparian areas.

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Bell's Vireo, *Vireo bellii*

Distribution: This small, insectivorous Neotropical migrant breeds in the central and southwestern United States and northern Mexico (Kus et al. 2020, Klicka et al. 2016). Within New Mexico, Bell's Vireo is locally distributed across the southern third of the state (Hubbard 1978). It breeds in riparian areas, typically nesting in low, shrubby vegetation such as willow, mesquite, and tamarisk (Parody and Parker 2002, Kus et al. 2020).

Current Status: Bell's Vireo experienced significant declines in portions of its continental range in the mid- to late 1900s (Kus et al. 2020), most notably in the lower Colorado River Valley (Rosenberg et al. 1991) and in central and coastal California (Goldwasser 1980, Franzreb 1987), where the California subspecies is federally listed as endangered (USFWS 1986). Population declines or loss of local populations were also noted in Arizona (Phillips et al. 1964) and suspected in New Mexico (Hubbard 1978). The species was listed by New Mexico as threatened in 1975. In 1998, Parody (2001) documented 44 breeding territories in the Lower Gila River Box, Grant and Hidalgo counties. Upstream from Lower Gila Box, significant numbers of singing males have also been documented at the nearby Red Rock Wildlife Management Area, Gila Middle Box, and the Cliff-Gila Valley (Shook 2015, 2017a). Bell's Vireos were recorded incidentally at 120 locations during surveys conducted by the BOR for Southwestern Willow Flycatcher on the Rio Grande River from Belen to El Passo in 2022 (David Moore, pers. comm.). A population in the vicinity of Rattlesnake Springs, Eddy County generally numbers about 10-20 pairs. An average of 11.5 territories were detected in Guadalupe Canyon from 2008-2009 on a subset (7 of 10) of transect points (Walker 2009), and reports since that time from birdwatchers indicated about the same. An 11.3%

increase in detections of Bell's Vireo was reported within the Gila River Bird Habitat Management Unit from 1997-2016 (Shook 2017b). Shook (2017b) noted that Bell's Vireo selected moist riparian willow habitat during some survey years and drier upland habitats in others. A genomic assessment of the species in New Mexico indicated that birds west of the Rio Grande are of the *V. b. arizonae* subspecies, while those occupying the Pecos River are assignable to *V. b. medius*, and the Rio Grande populations are of mixed ancestry (Johnson et al. 2020).

Threats: The species is primarily threatened by loss and fragmentation of dense shrubby/woody riparian habitats from urbanization, land conversion to agriculture, excessive grazing, burning, brush removal, flood control, and water management activities. Brood parasitism by cowbirds may negatively affect some of the smaller New Mexico's breeding populations (Parody 2001, Kus et al. 2020).

Recommendations: No change in status is recommended. NMDOW should continue to encourage land managers to preserve and restore riparian and adjacent shrubby habitats along lowland streams. Restoration projects elsewhere that have employed local information have proved successful in increasing Bell's Vireo populations (Kus 1998). If warranted, cowbird control can be useful in very localized areas, but it is only successful when completed in conjunction with other habitat-related conservation measures (Franzreb 1989, Kus et al. 2020).

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Gray Vireo, *Vireo vicinior*

Distribution: This widespread Neotropical migrant breeds in the Four Corners states, southern California, and western Texas, and winters in northwestern Mexico (AOU 1998). In New Mexico, it is most often found in arid juniper woodlands on foothills and mesas, sometimes associated with oaks or piñons, and often in areas with a well-developed grass component. Within the state, the species has been found summering/breeding in most counties west of the Great Plains.

Current Status: Gray Vireo was listed by New Mexico as threatened in 1983. Based on its restricted range, and small overall population size, this species is listed by Partners in Flight as a North American priority species, and by the United States Fish and Wildlife Service as a national species of conservation concern (USFWS 2002). In the state, breeding populations have disappeared from some historical habitats, but persisted at others. Some new areas with unexpected numbers of Gray Vireos have been discovered. Since the mid-1990s, surveys by NMDOW and other agencies and organizations (e.g., Bureau of Land Management, National Park Service, United States Fish and Wildlife Service, Hawks Aloft, New Mexico Natural Heritage Program, Kirtland Air Force Base) have documented territories at a number of sites, including: Bernalillo County (the Manzano Mountains); Doña Ana County (San Andres and Organ mountains); Eddy County (Guadalupe Mountains); Luna County (Cooke's Peak Range); Otero County (McGregor Range and Sacramento mountains); Rio Arriba County; San Juan County; Santa Fe County (the Caja del Rio area); and Socorro County (at multiple sites, including in the Los Pinos and Oscura mountains). In addition, several substantial populations have been reported from tribal lands along the Middle Rio Grande. A summary of this species' distribution, abundance, habitat associations, and breeding success throughout New Mexico was completed by NMDOW in 2006 (DeLong and Williams 2006), and proceedings were published in 2009 (Walker and Doster 2009); this included expanded abstracts of oral papers presented at the New Mexico Department of Game and Fish and the New Mexico Ornithological Society co-sponsored Gray Vireo Symposium, on the topics:
1) population status and trends; 2) habitats utilized at multiple scales; and 3) research and management needs. Gray Vireos selected taller and denser trees for nesting, and greater than 75% of Gray Vireo detections and nests were within juniper-dominated woodlands or savanna with less than 25% piñon trees at the landscape scale (Wickersham et al. 2016). Harris et al. (2020) found that nest trees and territories contained taller and wider trees with higher foliage density, and at the 100-m scale, these breeding areas had less pinyon pine.

Threats: Threats include loss and degradation of quality juniper-grassland habitat from burning, clearing, excessive grazing, and oil and gas development. High brood parasitism by Brown-headed Cowbirds (*Molothrus ater*) also reduces New Mexico's breeding populations. Decreased juvenile survival was reported during drought conditions, which may increase susceptibility to dehydration and starvation, as well as exposure (Fischer et al. 2021).

Recovery Plan Status: This species has a state Recovery Plan, accepted by the New Mexico Game Commission in 2007. Major recovery efforts since 2010 Review were to begin monitoring response of species to habitat restoration in central New Mexico and surveys on U.S. Department of Defense properties to determine tree and landscape structures favored by the species (e.g., Johnson et al. 2014; Harris et al. 2020, 2021). This data will assist with development of statewide guidelines for preferred habitat and to better refine Recovery Plan management unit boundaries.

Recommendations: No change in status is recommended. A state recovery plan has been developed for the Gray Vireo (Pierce 2007), and NMDOW should work with other agencies and organizations to accomplish management strategies outlined in the plan. In particular, implementation of a standardized survey protocol (Walker and Doster 2009) and development of recommended guidelines for habitat management practices is

required to effectively quantify population trends and to coordinate management of the Gray Vireo with juniper thinning projects. Identifying and maintaining quality juniper savannah and other occupied habitats are also priorities, and land managers should consider the needs of this species when undertaking activities in quality Gray Vireo habitats, such as clearing or burning of juniper woodland for fuel reduction, grazing enhancement, bighorn sheep habitat improvement, and oil and gas exploration and drilling. Mature and old-growth juniper habitat should be retained (Wickersham et al. 2016, Harris et al. 2020).

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Abert's Towhee, *Melozone aberti*

Distribution: This is primarily a species of the lowlands of central and southwest Arizona and adjacent areas, where it is a resident along desert rivers and streams (Tweit and Finch 2020). It is found in New Mexico only in Grant and Hidalgo counties, primarily in the Gila Valley, where it inhabits riparian thickets and similar native habitats.

Current Status: The species was listed by New Mexico in 1983. Small numbers (up to 12; Williams 1993) formerly inhabited San Simon Cienega prior to loss of habitat due to depletion of groundwater. In the Gila Valley, incidental observations suggest that numbers are reduced from 25 years ago. At Redrock, 50 birds were counted in 1969, and 55 were counted in 1981, but only 14 were found in 1994 (Williams 1994); numbers continued to decline through 2005. A small population persisted upstream in the Cliff- Gila Valley, where 11 nests were documented in 2000, but only 5 pairs were reported in 2003. During avian surveys of the Gila watershed, Abert's Towhees were documented at 8.3% and 21% of 24 "downstream" (elevation 4,000-5,000 feet) sites in Grant County in 2006 and 2007, respectively (Kindscher et al. 2008). Shook (2008) compiled historical records and conducted surveys and documented Abert's Towhee in Grant and Hidalgo counties in the spring of 2008.

Threats: The species is threatened by loss and degradation of native riparian habitats, particularly due to excessive grazing, within its restricted New Mexico range. Rea (1983) observed that extensive loss of cottonwood-willow and brushy mesquite habitat along the Gila River in Arizona reduced this species' density. After removal of livestock from the San Pedro Riparian National Conservation Area in Arizona, Abert's Towhee densities in cottonwood-willow habitat more than doubled over five years (Krueper et al. 2003).

Recommendations: No change in status is recommended. NMDOW should continue to work with land and water managers to protect and restore native riparian habitats in the Gila Valley.

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Baird's Sparrow, *Centronyx bairdii*

Distribution: This grassland sparrow breeds in the northern Great Plains from the Canadian prairie provinces south to Montana, the Dakotas, and western Minnesota (AOU 1998, Green et al. 2020). Southward expansion of the breeding range was documented in 2018 in central Colorado (Youngberg et al. 2020). It winters in southeastern Arizona and southwestern Texas south into north-central Mexico (AOU 1998, Green et al. 2002). Birds in New Mexico are primarily migrants moving through the eastern plains and southern lowlands, but wintering birds occur locally in southern grasslands, particularly in Otero, Luna, and Hidalgo counties.

Current Status: The status of this migratory species is of international concern, including Canada (Gossen et al. 1993) and the United States where it is listed by Partners in Flight as a North American priority species and by the United States Fish and Wildlife Service as a species of conservation concern (USFWS 2008). In 2017, Baird's Sparrow was listed as a species of "Special Concern" in Canada under the Species at Risk Act (SARA; Somershoe 2018). It was listed by New Mexico as threatened in 1975. The species was previously relatively numerous and widespread in New Mexico (Hubbard 1978), but is very rarely reported in recent years. Surveys by NMDOW cooperators from 2000 to 2005 identified Otero Mesa grasslands as especially important to migrating Baird's Sparrows.

Threats: The decline throughout the species' range is attributed to loss of native grassland habitat owing to unsustainable range management practices, conversion to cropland, exotic plant invasion, and shrub encroachment (Phillips et al. 1964, Oberholser 1974, Gossen et al. 1993, Green et al. 2020). In New Mexico, loss, degradation, and fragmentation of grasslands from excessive grazing, as well as oil and gas development, are of particular concern.

Recommendations: No change in status is recommended. Little is known about migration and winter demographics and habitat preferences of this species; NMDOW should work with public and private land managers to identify, describe, and protect migration and overwintering habitats.

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Yellow-eyed Junco, *Junco phaeonotus*

Distribution: This sparrow of the higher mountains of Mexico and Guatemala reaches its northern geographic limits in the sky island mountain ranges of southeastern Arizona and southwestern New Mexico (AOU 1998, Sullivan 2020). In New Mexico, it was historically only known to occur in the Animas Mountains, Hidalgo County, where it was largely confined, at least in the nesting season, to coniferous forest. A second population was discovered in the Big Burro Mountains, Grant County in 2003 (Williams 2004) and nesting was documented there in 2004 and 2005 (DeLong 2004, 2005a) and again in 2008-2010 (Griffin 2009, 2010a, 2011a). The resident species undertakes altitudinal migration in Arizona (Moore 1972, Horvath and Sullivan 1988) and presumably does so in New Mexico as well, which might explain post-breeding and winter sightings in the Big Hatchet, Burro, Mogollon, Peloncillo, and Pinos Altos mountains and on Mount Withington (Griffin 2010b; 2011a, b).

Current Status: The species was listed by New Mexico as threatened in 1975. It was reported as "common" in the Animas Mountains in early years (Bailey 1928), but precise data are lacking. Surveys of suitable habitat in the Animas Mountains in 1992 and 1995-1997 found fewer than 30 adults each year. However, informal surveys found only 2 birds there in 2000, none in 2001, 5 singing males in 2002, and none in 2003. In 2005, NMDOW surveys of available habitat in the Animas Mountains documented only 9 territories, with successful reproduction in at least 2 territories (DeLong 2005b). Due to limited access, little information exists regarding the impacts of the Adobe Fire (a lightening-ignited fire that burned an estimated 23,500 to 26,460 acres in the Animas Mountains over a two-week period in late May 2006) on the Animas Yellow-eyed Junco population. No birds were reported in the Animas Mountains in May 2006 (Williams 2007c) and 2008 (Williams 2008), but a nest was found in 2007. In the Big Burro Mountains population, 4-6 territories were detected in 2004 (DeLong 2004), 7 territories were documented in 2005 (DeLong 2005a), at least 5 territories were documented in 2006 (Williams 2007a, b), and at least 4 territories were documented in 2007 (Williams 2007c) with nesting confirmed in most years. A total of 16 pairs and 2 unpaired individuals were detected in 2008 in the Burro Mountains (Griffin 2009), and a total of 11 pairs and 4 unpaired males were detected in 2009, which suggests that the population may have been increasing (Griffin 2010). However, apparent hybrids between Yellow-eyed Juncos and its closely-related congener, the Gray-headed "Red-backed" (*J. hyemalis dorsalis*) subspecies of Dark-eyed Juncos, in Burro Mountains (Griffin 2009, 2010; SORA 2009) might be complicating the population and conservation status of the Yellow-eyed Junco. It is also unknown whether Dark- eyed Juncos (*J. hyemalis*) are now nesting in the Animas Mountains and possibly hybridizing with the Yellow-eyed Juncos; prior to the discovery of nesting Gray-headed Juncos in the Burro Mountains, it was thought that they did not breed sympatrically with the Yellow-eyed junco (Sullivan 1999).

Threats: The very small and restricted New Mexico populations are vulnerable to loss and degradation of their limited coniferous forest habitat from burning, catastrophic fire, cutting, and excessive grazing. Grazing pressure has been shown to be especially detrimental to the Yellow-eyed Junco's closely-related congener, the

Dark-eyed Junco, in Arizona, where cattle grazing was responsible for a dramatic 75% reduction in nest success (Walsberg 2005). In addition, productivity can suffer in years when dry conditions suppress breeding. Hybridization with the Dark-eyed Junco might also be diluting the genetic integrity of New Mexico's small Yellow-eyed Junco population in the Burro Mountains.

Recommendations: No change in status is recommended. Private and public land managers are encouraged to protect this junco's limited New Mexico habitat.

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Varied Bunting, *Passerina versicolor*

Distribution: This is primarily a Mexican species that enters the United States only along the Mexican border in

Arizona, New Mexico, and Texas during the breeding season (AOU 1998, Groschupf and Thompson 2020). In New Mexico, this Neotropical migrant summers regularly in small numbers in Hidalgo, Doña Ana, and Eddy counties (Walker 2009a), where it prefers dense, shrubby vegetation associated with relatively arid canyons, desert washes, and riparian edges.

Current Status: The species was listed as threatened in New Mexico in 1975. Surveys and reports by NMDOW personnel and cooperators from 1987 to 2011 indicate that this species persists as a summer resident in local areas of Hidalgo, Doña Ana, and Eddy counties. In addition, there are also reports of vagrants in Grant, Luna, Socorro, Sierra, and Otero counties. New Mexico's populations remain small, however, and are estimated at about 45 breeding pairs total. In Guadalupe Canyon, Hidalgo County, 0 - 4 territories were found from 1987 – 2004, and 7 territories were documented in 2008; no surveys were conducted in 1999 or from 2005-2007 (Walker 2009b). Surveys in the vicinity of Carlsbad Caverns National Park in 2003, 2009, and 2010 detected this species in six canyons and estimated the Park's population to be around 30 territories (Williams 2004, West 2010, NMDOW unpubl. data), suggesting larger numbers in Eddy County than previously known and that the area might support the state's largest 'concentration' of the species. In addition, 2011 surveys on the San Andres National Wildlife Refuge indicate that it supports at least 3 breeding pairs (NMDOW unpubl. data).

Threats: This species is threatened primarily by habitat loss, particularly the loss of dense, shrubby, riparian habitat, resulting from burning, clearing, excessive grazing, and lowering of water tables.

Recommendations: No change in status is recommended. NMDOW should encourage land managers to preserve and restore dense shrubby (e.g., mesquite) habitat in areas where this species occurs.

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Jemez Mountains Salamander, *Plethodon neomexicanus*

Distribution and Biology: *Plethodon neomexicanus* is endemic to north-central New Mexico where it is found only in the Jemez Mountains in Sandoval, Rio Arriba, and Los Alamos counties. It occurs from 7,200-11,256 ft elevation in mixed conifer habitat with abundant rotted logs and surface rocks. This habitat is dominated by Douglas fir, blue spruce, Engelmann spruce, ponderosa pine, and white fir with occasional aspen, Rocky Mountain maple, New Mexico locust, oceanspray, and various shrubby oaks (Degenhardt et al. 1996; Hathcock 2008; Whitford 1976; Williams 1973). In a modeling analysis, geology type and maximum winter temperature were important variables in predicting the distribution of this species (Bartlow et al. 2022). *Plethodon neomexicanus* is rarely observed on the surface or encountered under surface litter or aspen logs. It is most often encountered under and inside well-rotted Douglas-fir logs or under rocks. Researchers from the University of Rhode Island, USFWS, USFS, the US National Park Service, and the Department have studied the species, with a particular emphasis on occupancy and

demography. The increased attention in recent years has led to improved detection but fewer than 50 individuals have been observed in a single year in spite of intensive surveys by experts (NMDOW Files).

Current Status: A New Mexico Endemic Salamander Team was created to advise land managers how to conserve the species and to complete the Jemez Mountains Salamander Management Plan. This plan was approved and signed by NMDOW, USFWS, and USFS during January 2000, and was designed to provide guidance for management of the Jemez Mountains salamander on USFS lands. In 2013, *Plethodon neomexicanus* is listed as endangered by the USFWS, with critical habitat (USFWS 2013 a & b). The New Mexico Endemic Salamander Team was re-started in 2019 to provide advice and collaboration toward the conservation of this species and the state-threatened Sacramento Mountains Salamander (see below). The USFWS is continuing the process to develop a recovery plan for the species.

Threats: Because there is so much inherent variability in monitoring secretive species where only an unknown percentage is surface active at any given time, as in *P. neomexicanus*, hard data is lacking to definitively conclude whether the species is declining throughout its known range. However, antidotal evidence strongly suggests this is the case. For example, *P. neomexicanus* were found at only 6 (44%) of 14 historically occupied sites surveyed during 2007. Based on numerous recent surveys, *P. neomexicanus* appear to be extinct at the type locality where numerous early investigators found the species to be very abundant, and Cummer et al. (2003, 2004) reported the absence of *P. neomexicanus* at a site on the Valles Caldera National Preserve where the species was also once abundant (Whitford 1976).

There is a continued threat of additional negative impacts to populations of *P. neomexicanus* from natural wildfire and management-ignited fire (Cummer and Painter 2007). Salamander populations are known to be susceptible to fire-related effects, including decreased forest humidity, desiccation of habitat, loss of microhabitat (such as downed logs and litter), erosion, and filling of subterranean habitat utilized by salamanders via siltation during post-fire runoff. Post-fire management actions that have negatively impacted Jemez Mountains Salamanders and their habitat include the mulching and reseeding of occupied habitat with soil-binding, non-native grasses. The cumulative effects of the Dome (1996), Cerro Grande (2000), and Los Conchas (2011) fires within the habitat of the *P. neomexicanus* has had devastating impacts on populations of this species (USFWS 2013a). In addition, while this species clearly has survived wildfire in the region the recent density of high severity fires may have severely impacted the species' ability to acquire food at the surface, known to be vital in the life history of other lungless salamanders of this family (N. Karraker, U. Rhode Island, *pers. comm*.).

Disease has been implicated in the decline of many amphibians, and it is an unknown, but credible threat to *P. neomexicanus*. Cummer et al. (2005) reported the chytridiomycete fungus (*Batrachochytrium dendrobatidis*) from an individual *P. neomexicanus* from Sierra Toledo on the Valles Caldera in Sandoval County. Since then other individuals have tested positive for *B. dendrobatidis* (Christman and Jennings 2019, NMDOW files). Another chytridiomycete fungus (*B. salamandrivorans*) is also of concern. The fungus was identified in 2013 and is known to harm salamander populations throughout Europe. A national task force has been organized in the United States to prepare for the arrival of this fungus (www.salamanderfungus.org).

Roads and other development (residential, recreational, or commercial) would have negative effects on *P. neomexicanus* if constructed in their habitat, via direct take, habitat loss, population fragmentation and soil compaction. The widening and realignment of NM Hwy 126 just north of the town of Seven Springs likely caused population fragmentation and resulted in the direct take of salamanders (USFWS 2013a).

Historically, the effects of logging were considered to be a major threat to *P. neomexicanus*, however, the recent reduction of timber harvesting in the Jemez Mountains has somewhat diminished that concern. Silvicultural activity today in the habitat of *P. neomexicanus* is generally restricted to post-fire salvage logging and tree thinning in the urban-forest interface zones.

Recommendations: *Plethodon neomexicanus* should maintain its listing as endangered. NMDOW should continue monitoring *P. neomexicanus* within burned areas. Cummer and Painter (2007) recommended that surveys are valuable for determining presence-absence, but alone are ineffective and not appropriate for monitoring or measuring populations after a disturbance. Given the challenge of monitoring this animal without negatively impacting its habitat, the Department should continue to explore less invasive survey methods. Investigations of the population on the Valles Caldera and elsewhere for the presence of the *Batrachochytrium dendrobatidis* should be continued. A monitoring program for *B. salamandrivorans* should be developed following the recent release of

monitoring guidelines (Grant et al. 2015). NMDOW should continue to support the New Mexico Endemic Salamander Team through active participation.

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Lowland Leopard Frog, *Lithobates yavapaiensis*

Distribution and Biology: In New Mexico, *L. yavapaiensis* is known from 3700-5575 ft elevation in western Catron, Hidalgo, and Grant counties (Degenhardt et al. 1996, Sredl 2005). This is a frog of permanent and semi-permanent streams and ponds; most populations occupy small streams and rivers, springs, and associated pools at low elevations in desert scrub localities. *Lithobates yavapaiensis* reaches the extreme eastern edge of its range in southwest New Mexico (Platz 1988; Sredl 2005). The species is abundant in select tributaries of Canon Bonito in Sonora, Mexico. Yuan et al. (2016) have proposed reclassifying the species within the genus *Rana*.

Current Status: *Lithobates yavapaiensis* is listed as a Species of Concern by USFWS (USFWS 2008), and is listed as a species of wildlife of special concern in Arizona (AGFD 1996). The species is subject to protection in Mexico (SEMARNAT 2010). Herpetologists in Arizona have documented the extinction of several populations and viable populations at all known historic localities in New Mexico no longer exist (Jennings 1987, 1995). During August 2000, a single individual was observed in the New Mexico portion of Guadalupe Canyon in extreme southwest Hidalgo County approximately 1.1 air miles upstream of the NM/AZ border. This remains the first and only specimen reported from New Mexico since April 1985 (Degenhardt et al. 1996). No reproduction of this species, i.e., egg

masses or tadpoles, have been reported from New Mexico. Researchers continue to sample potential sites for this species via environmental DNA (eDNA) techniques in the hope of detecting an extant population (NMDOW files).

Threats: The likely causative agent for the decline in this species is a chytridiomycete fungus, *Batrachochytrium dendrobatidis*, which has been implicated in dieoffs of Lowland Leopard Frogs in southeast Arizona (Bradley et al. 2002, Sredl 2005, Savage et al. 2011) and is known to be present in New Mexico populations of leopard frogs (Christman and Jennings 2019). Rosen et al. (1995) reported a strong negative co-occurrence between the Lowland Leopard Frog and American Bullfrog (*Lithobates catesbeianus*) as well. Jennings and Hayes (1994) reviewed the decline of *L. yavapaiensis* in the desert southwest.

Recommendations: *Lithobates yavapaiensis* should maintain its current listing as endangered. Landowner permission should be requested to routinely monitor the suitability of habitat at the single site where the species was last known to occur in New Mexico. Translocation of the species from Arizona to proper habitat within New Mexico should be considered.

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Boreal Toad, *Anaxyrus boreas*

Distribution and Biology: In New Mexico, *A. boreas* is known only from north-central Rio Arriba County between 9100-10,500 ft elevation in the San Juan Mountains at Canjilon Lakes, Trout Lakes, and Lagunitas Lakes (Stuart and Painter 1994). It lives in high mountain ponds, slow-moving streams, or low wet meadows. Dominant vegetation where *A. boreas* occurs in New Mexico includes corkbark fir, Engelmann spruce, aspen, willows, and various grasses and sedges. The species reaches its southern edge of its range in northcentral New Mexico

(Degenhardt et al. 1996; Muths and Nanjappa 2005; NMDGF 2006).

Current Status: The Southern Rocky Mountain form of *Anaxyrus boreas* was classified as a "warranted but precluded" candidate species for federal listing (USFWS 2001). USFWS (2005) reversed this decision and found the species "not warranted" for federal listing based on the lack of sufficient genetic evidence to designate this form as a distinct population segment. However, USFWS initiated a review of the status of the Eastern Population of *A. boreas* (which included the former Southern Rocky Mountain form) to determine if listing it as a distinct population segment was warranted (USFWS 2012), and determined that listing was not warranted given that the species was well distributed across its range and continued to retain adaptive capacity (USFWS 2017). The USFS lists the species as Sensitive (USFS 2007). *Anaxyrus boreas* is listed as endangered in Colorado (Goettl 1997; Hammerson 1999), and as a species of special concern in Utah (UDWR 1997). While estimation of abundance is challenging due to the life history of the species and the remoteness of its habitat, *A. boreas* has shown significant declines across its range for the past 30 years (Crockett 2023). Although not reported from New Mexico until June 1966 (Campbell and Degenhardt 1971), the native population of *A. boreas* is currently thought to be extinct in New Mexico (Carey 1993). Jones (1978) estimated a population of 327 toads occurred at Upper Lagunitas Lake during 1978 whereas Woodward and Mitchell (1985) surveyed 139 ponds in known or expected *A. boreas* habitat in Rio Arriba County and located adults or tadpoles in only two ponds. During July-August, 1993, J.P. Hubbard and J.N. Stuart (*pers. comm*.) visited known localities and were unable to confirm the continued existence of *A. boreas* in New Mexico. In September 1996 retired USFWS personnel reported an unconfirmed sighting of *A. boreas* from Bobo Lake, a site ca 7 mi. ESE of Chama. Visits to this site in 1997 and 1998 failed to locate *A. boreas*. Surveys conducted during 2002 and 2006 at historic sites in New Mexico were also negative (Christman 2006), as were surveys of potential habitat in the Cruces Basin Wilderness.

From June 2008 through July 2024 NMDOW released approximately over 20,000 *A. boreas* tadpoles and metamorphs provided by Colorado Division of Wildlife into Trout Lakes (NMDGF 2008; 2010a; 2010b; 2012a,b; 2013, 2014). Adults from Colorado were released in 2020 and several were observed during surveys in 2021. The success of these releases has been regularly monitored and various age classes, including adults, have been observed and photographed, although no breeding has been detected (NMDOW Files). Several specimens have been found to be infected with the chytrid fungus, *Batrochytrium dendrobatidis*, each year since 2009 (NMDOW files; Voyles 2015). Therefore, the long-term results of this repatriation are somewhat problematic.

From 2014 to 2015 representatives from various agencies worked to develop a Structured Decision Model for how to best conserve the Southern Rocky Mountain population of *A. boreas*, with the model completed in 2016 (Converse et al. 2016, Gerber et al. 2016). The model is central to the revision of the conservation plan for the Southern Rocky Mountain population (Crockett 2023). In addition, the Structured Decision Model has been revised to include current climate change models for improved forecasting

Threats: Several factors have potentially contributed to the decline of *A. boreas* and other montane amphibians in western North America, including the damaging effects of increased ultraviolet (UV-B) light on embryos; acidification and heavy-metal contamination of water, habitat destruction and degradation, such as may result from water, minerals, and livestock management, road construction, timber and fire management, and recreation; disease; climate change; predation, and life history characteristics (Hammerson 1999; Carey 2005). However, while a combination of these factors is likely involved in dieoffs of the Boreal Toad, the chytridiomycete fungus (*Batrachochytrium dendrobatidis*) has been implicated in mass dieoffs and significant population declines of the species in Colorado (Muths et al. 2003) and is the chief concern within New Mexico. Christman (2006) reported the presence of *B. dendrobatidis* in the Chorus Frog, (*Pseudacris maculata*) at Canjilon Lakes, a site historically occupied by *A. boreas*. A subsequent study found *P. maculata* subject to infection by the fungus within the region (Voyles 2015, Christman and Jennings 2019). Additionally, any resource management activities that degrade alpine wetlands will negatively affect breeding habitat for Boreal Toads. Crockett et al. (2021) determined the presence of cutthroat trout to have little effect on tadpoles of this species in Colorado.

Recovery Plan Status: This species has a state Recovery Plan, accepted by the New Mexico Game Commission in 2006. Major recovery efforts have been to repatriate tadpoles each year to a northern New Mexico locality. The site is also monitored for the status of toads that metamorphed from those and previous tadpole cohorts and samples were collected for the chytrid fungus. Future recovery efforts will include monitoring for breeding by repatriated toads, geospatial modeling to determine ponds least likely to have the chytrid fungus, and determining a second site for repatriation. No new methods or strategies have been developed and no revision to plan is called for at this time. Revision of the Southern Rocky Mountain Boreal Toad Recovery Team Conservation Plan remains underway and in

the future the state Recovery Plan should reflect this.

Recommendations: *Anaxyrus boreas* should maintain its current listing as endangered. NMDOW should continue work with the Boreal Toad Recovery Team, Colorado Division of Wildlife, USFS, and private landowners to continue to translocate Boreal Toads into historic habitat. NMDOW should continue to work with the Recovery Team to implement the new conservation plan (Crockett 2023). All efforts should be made to control the spread of the chytrid fungus, *B. dendrobatidis*, and monitoring of all species of amphibians occurring at historic sites of the Boreal Toad for the presence of *B. dendrobatidis* should be continued. Additional surveys that concentrate on locating eggs, tadpoles, and new metamorphs should be carried out by people experienced with the ongoing repatriation efforts of the Trout Lakes population of Boreal Toads.

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Western Narrow-mouthed Toad, *Gastrophryne olivacea*

Distribution and Biology: In New Mexico, populations of this small, toad-like frog are mostly known from two highly disjunct localities: 1) southwestern New Mexico along NM Hwy 9 near Hermanas in southern Luna County near the U.S.-Mexican border (Degenhardt 1986, Stuart and Painter 1996), and 2) northeastern New Mexico in the Kiowa National Grasslands just north of Clayton, Union County (Moriarty et al. 2000). Other reports have placed the animal in Union County in the Black Mesa area and down near Carlsbad and Carlsbad Caverns in Eddy County (NMDOW files). The distribution of this animal is poorly understood for the state. All specimens known from New Mexico have been collected in low-lying, flooded roadside ditches in desert scrub habitat dominated by mesquite, creosotebush, and various arid-land grasses or in flooded grasslands. The Western Narrow-mouthed Toad is active above ground only after torrential rains when it is easily detected by its distinctive call. Ants are the primary prey (Fitch 1956). During the first week of August 2006, numerous breeding adults were observed in flooded roadside ditches at the NM Hwy 9 locality near Hermanas.

Current Status: *Gastrophryne olivacea* is a wildlife species of special concern in Arizona (AGFD 1996). The Republic of Mexico lists this species as rare (SEMARNAT 2010). Populations in Colorado are small and geographically limited, although they appear secure (Hammerson 1999). The species was not discovered in New Mexico until June 1986 (Degenhardt 1986). During 2011-2012 researchers studied habitat suitability in Union County for the species but were unable to find any individuals, in all likelihood due to the surveys being conducted during drought years (Griffis-Kyle 2011, 2012).

Threats: Overgrazing and other habitat modifications (i.e., draining or filling low-lying areas) are the primary threats to this species. Pesticide application in the adjacent agricultural regions is a potential threat, due to toxicity to eggs and larvae and impacts on adult food sources. Roadway mortality as a result of increased borderland security traffic may be a significant threat in southwest New Mexico as the only population known is in a flooded roadside ditch. Drought conditions, as has been the case in recent years, only exacerbates these threats (Griffis-Kyle 2011, 2012). The chytridiomycete fungus (*Batrachochytrium dendrobatidis*), which has been implicated in mass dieoffs and significant population declines of other state-listed amphibians, has been detected on this species in southern Oklahoma (Marhanka et al. 2017), and therefore is of concern in New Mexico.

Recommendations: *Gastrophryne olivacea* should maintain its current listing as endangered. Habitat of the few known populations in New Mexico should be routinely monitored for any changes due to overgrazing or other anthropogenic modifications. Additional suitable habitat in Lea and Union counties should be surveyed for the presence of this species during summer monsoon rains. The distribution and status of this animal in the state of New

Mexico warrants further work; all individual specimens should be sampled for the presence of the chytrid fungus.

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THREATENED

Sacramento Mountain Salamander, *Aneides hardii*

Distribution and Biology: *Aneides hardii* is endemic to south-central New Mexico where it is found only in the Capitan, White, and Sacramento mountains in Otero and Lincoln counties. *Aneides hardii* is generally associated with Douglas fir and spruce at elevations from 7850-11,700 ft elevation, where it is found under large woody debris or rocks (Degenhardt et al. 1996; Ramotnik 1997). Dominant overstory includes Douglas fir and white fir with lesser amounts of Engelmann spruce and southwestern white pine. Rocky Mountain maple, gooseberry, and oceanspray share the understory with seedling conifers and downed logs in various stages of decay. There are usually limestone rocks and boulders exposed on the surface (Scott and Ramotnik 1992). *Aneides hardii* may be locally abundant where essential microhabitat characteristics are available.

Osborne et al. (2017) collected mitochondrial and nuclear DNA samples from the three populations. The Capitan Mountain population had high genetic diversity with deeper divergence between haplotypes; the White Mountain population had very low genetic diversity; and the Sacramento Mountain population had high genetic diversity with low divergence between haplotypes.

Current Status: The Sacramento Mountain Salamander is listed as Sensitive by the USFS (USFS 2007) and as a Species of Concern by USFWS (USFWS 2008). Researchers from the University of Rhode Island in collaboration with USFS and USGS continue occupancy and demography studies of this salamander. In the past a New Mexico Endemic Salamander Team was formed to address concerns over potential need for federal protection of the other endemic salamander in New Mexico, Jemez Mountains Salamander, and the Team often would address issues with *A. hardii*. In recent years, the New Mexico Endemic Salamander Team was re-started to provide advice and collaboration toward the conservation of this species and the Jemez Mountains Salamander. A small population continues to be maintained at the Albuquerque BioPark where researchers are exploring better husbandry techniques and another population is now kept at the Sedgwick County Zoo in Wichita, Kansas (J. Butler, City of Albuquerque, and N. Nelson, Sedwick County, KS, *pers. comm*., DGF files).

Threats: Ramotnik and Scott (1988) suggested that intensive logging, slash removal, and burning may reduce or eliminate populations of *A. hardii*. Ramotnik (1996) reported that smaller, presumably juvenile, salamanders comprise 47% of the total salamanders collected on unlogged plots while only 30% of the total on logged plots. Reasons for this difference may include lower reproductive rates or lower survival rates of eggs, hatchlings, or juveniles on logged plots and may indicate that logged plots represent less than optimal habitat. Borg (2001) found that Sacramento Mountain salamanders were more limited by the availability of cool microhabitats in logged sites than in forested sites and that juvenile salamanders on logged sites had significantly poorer body condition than those on unlogged sites.

Disturbances that cause desiccation of the habitat remain the primary threat to *A. hardii*. These salamanders survived the historic, low-intensity fires in the Sacramento Mountains but recent fire suppression has created the inevitable possibility of "stand-replacing" fires. The intensity of these fires compared to the more frequent, historic fires makes it difficult to predict how *A. hardii* will respond (Ramotnik 2005). In a five-year study of such a fire in the Sacramento Mountains, Ramotnik (2007) found that counts of *A. hardii* declined sharply during the first year post fire and remained low for 5 years. She suggested that salamanders either moved off of the site or retreated below ground to avoid desiccation, and that recolonization of the site will be possible only after canopy cover develops, depth of litter increases, and large natural cover objects become suitable habitat. Soil pH increased sharply on the burned sites immediately after the fire but after 3 years pH began to decrease due to the dilution effect caused by precipitation. Organic matter content and water-holding capacity are significantly lower on burned sites than on unburned sites. These soil characteristics are important because they are associated with soil moisture and can influence the ability of salamanders to repopulate burned sites. The relative proportion of prey items (primarily ants, springtails, harvestman spiders, and dipteran flies) to non-prey items is highest on the low-burn and unburned sites. The response of arthropods to fire, however, can be expected to change seasonally and annually as a function of climatic variation, recovery rate of the vegetation and forest floor, and differences in life history patterns of individual arthropods. As part of the research by University of Rhode Island and collaborators, researchers have resurveyed the Ramotnik (2007) sites and initial results suggest the species has not rebounded from the fires there (N. Karraker, U. Rhode Island, *pers. comm.*). Additionally, the researchers are working to advise forest managers on the impact of slash pile burning given the potential that salamanders may make use of those piles (Loehman and Karraker 2025).

The possible effects of pesticide application (Ramotnik 1997) and ORV use on populations of Sacramento Mountain Salamanders need investigation.

The chytridomycete fungus, *Batrachochytrium dendrobatitis*, has not been detected for this species (Christman and Jennings 2019) but monitoring is ongoing. Another chytridiomycete fungus (*B. salamandrivorans*) is also of concern. The fungus was identified in 2013 and is known to harm salamander populations throughout Europe. A national task force has been organized in the United States to prepare for the arrival of this fungus (www.salamanderfungus.org). In 2020, researchers with the University of Tennessee determined the Sacramento Mountain Salamander to be highly susceptible to *B. salamandrivorans*. USGS and other members of the national task force collaborated with NMDOW, USFS, and NM State Land Office to develop management strategies to minimize the impact of *B. salamandrivorans* should the fungus arrive in New Mexico, and, as of this review, are in preparation for publication.

Recommendations: This species should maintain its current listing as threatened. All logging and other ground disturbing silvicultural activities within occupied or potential sites where *A. hardii* occur should be minimized. Slash piles should be burned within 1 – 2 years to prevent salamanders from moving under and occupying the piles (Loehman and Karraker 2025). A Management Plan should be drafted and implemented to guide the management of this species. A monitoring program for *B. salamandrivorans* should be developed following the recent release of monitoring guidelines (Grant et al. 2015). NMDOW should continue to support the New Mexico Endemic Salamander Team in its efforts to conserve this species of salamander.

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Sonoran Desert Toad, *Incilius alvarius*

Distribution and Biology: In New Mexico, *I. alvarius* is an uncommon species that occurs mainly in southwest Hidalgo County in the vicinity of Rodeo and in scattered localities in the adjacent Peloncillo Mountains at elevations of 4100-4950 ft (Degenhardt et al. 1996). The species has also been observed in Grant County (Nicholoson 2022). It reaches the extreme eastern limit of its range in southwest New Mexico. *Incilius alvarius* was not detected in New Mexico until the summer of 1961 (Cole 1962). Habitat includes mesquite-creosotebush lowlands, arid grasslands, rocky riparian zones with sycamore and cottonwood, and oak-walnut woodlands in mountain canyons (Fouquette et al. 2005, and citations therein). This large toad spends most of the summer months in rodent holes and generally emerges only during the summer rains to breed. Breeding usually occurs during a single night, 2-3 days following a major rainfall event of more than 25 mm (Sullivan and Malmos 1994). Average clutch size is 7,500 – 8,000 eggs that are deposited in shallow waters of seasonal and permanent pools (Fouquette et al. 2005).

Current Status: *Incilius alvarius* does not receive formal protection elsewhere. Fouquette (1970) characterized this species as one of the least known of all American toads.

Threats: Habitat modification and overcollecting are possible threats to this species in southwest New Mexico. Draining or filling in of cattle watering tanks poses a threat to the species, as does the diversion of roadside silt and runoff into known breeding ponds. The conversion of mesquite-creosotebush lowlands and arid grasslands to agriculture or development eliminates habitat. Roadway mortality as a result of increased borderland security traffic has been observed in southwest New Mexico. In addition, bufotoxins found in the parotoid glands of *I. alvarius* may be collected into crystal form to then be smoked and the species has been collected for recreational drug use in the past (NMDOW files). Interest in collection of the bufotoxin has resumed for medical and perhaps religious purposes, even though a synthetic form of the toxin can be readily developed. Sonoran Desert Toad is known to ingest unnatural objects, such as shell casings (Luccioni and Wyman 2021) but the effect on the species is undetermined.

Recommendations: *Incilius alvarius* should maintain its current listing as threatened. Regular monitoring of the habitat known to be occupied by this toad should occur. Additionally, surveys in suitable habitat should be conducted during the summer breeding season to locate new occupied sites and to monitor for poaching. The Department should work with private landowners to maintain or create water catchments to serve as breeding habitat.

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REPTILES

ENDANGERED

Gila Monster, *Heloderma suspectum*

Distribution and Biology: *Heloderma suspectum* reaches the eastern edge of its range in southwest New Mexico where there are only a few isolated records from Hidalgo, Grant, Luna, and perhaps Doña Ana counties at elevations of 6100-6400 ft elevation (Degenhardt et al. 1996). It was first reported from New Mexico in 1950 (Shaw 1950) and is known to be common only at Redrock Wildlife Area in Grant County (Beck 1994, 2005) and at Granite Gap in Hidalgo County. Surveys funded by the Department's Share with Wildlife program in 2017 detected the species in the Lower Box of the Gila River, Antelope Pass, Granite Gap, and in the BLM's Peloncillo Mountains Wilderness Study Area (Giermakowski et al. 2018). Recent efforts to collect samples for genomic research have detected the species in Granite Gap, Antelope Pass, and the Redrock Wildlife Area (Pawlicki 2025). Records of historical occurrence in Luna and Doña Ana counties may represent displaced, released, or escaped captive individuals (Degenhardt et al. 1996). However, individual Gila Monsters were observed near the Mimbres River south of Faywood in 2016, and on the west and south sides of the Little Hatchet Mountains in 2017 (NMDOW files), suggesting that our understanding of the species' distribution in New Mexico is incomplete. Although contractors with NMDOW failed to detect the species near the Little Hatchet Mountains in 2020 and 2021, the authors reported other sightings in the region during that timeframe (Pawlicki and Goode 2021).

Heloderma suspectum is the largest lizard native to the United States and the only venomous one. The seasonal activity period extends from March-November although *H. suspectum* spends as much as 96% of its time in sub-surface refugia (Beck and Lowe 1994). Davis and DeNardo (2010) determined that Gila monsters are capable of enduring drought conditions through behavioral and physiological adjustments, allowing them to persist under intense environmental conditions. Beck and Jennings (2003) investigated shelter use in Gila monsters in southwest New Mexico for six years. Their results suggest that the availability of suitable refugia played an important role in habitat selection by Gila monsters and thus influenced the pattern of local dispersal. Age at sexual maturity is 2-3 years with ca. 85% adult survivorship, which is considerably higher than expected. Longevity may exceed 20 years, and adult females may lay a mean clutch of 6 eggs every 2nd to 3rd year. Beck (2005) provided a thorough review of

the species' natural history throughout its range.

Current Status: *Heloderma s. suspectum* is listed as threatened by the Republic of Mexico (SEMARNAT 2010). The USFS (2007) lists the Gila monster as Sensitive. The population in New Mexico appears stable, although the species is commercially valuable and therefore susceptible to illegal collecting. The Department completed a recovery plan for this species in 2017 (Bulger 2017).

Threats: Threats to *H. suspectum* are largely from habitat loss and fragmentation, including alteration of refugia (see above), and illegal collection. Individuals are often killed by lay public who believe they are dangerous and represent a hazard. Roadway mortality has been observed in southwest New Mexico. Although Gila monsters are adapted for living under harsh conditions (Beck 2005, Davis and DeNardo 2010), climatic projections suggest an additional threat may be climate change through increased, chronic thermal stress and deteriorating habitat suitability (Giermakowski and Snell 2011, Giermakowki et al. 2018).

Recommendations: *Heloderma suspectum* should maintain its current listing as endangered. Habitat known to be occupied by Gila monsters should be regularly monitored and any loss or fragmentation should be investigated to determine impacts on local populations. Given the importance of the Red Rock Wildlife Area to the species in New Mexico a management plan for *H. suspectum* should be developed for the property as part of the overall state recovery plan. Information on identification and legal status should be distributed to the public within the range of the Gila monster in New Mexico. Protection from illegal collecting should be strictly enforced.

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Dunes Sagebrush Lizard, *Sceloporus arenicolus*

Distribution and Biology: *Sceloporus arenicolus* is endemic to southeast New Mexico and a small area of adjacent Texas. In New Mexico, it occurs only in portions of Chaves, Eddy, Lea, and southern Roosevelt counties (Degenhardt et al. 1996). The species inhabits one of the smallest ranges of any North American endemic lizard (Conant and Collins 1991). *Sceloporus arenicolus* is a habitat specialist and is confined to areas of shinnery oak - sand dunes and their peripheries, where the uneven sandy terrain and wind-created blowouts are essential habitat requirements. Individuals show a strong preference for large, deep blowouts with intermediate sand grain coarseness and little vegetation (Fitzgerald et al. 1995, 1997).

Current Status: A candidate for federal listing as early as 1982, *Sceloporus arenicolus* was proposed for federal listing as Endangered by the USFWS in 2010 but subsequently that proposal was withdrawn (USFWS 2012), the Service citing that threats were no longer as significant as believed at the time of the original proposal. This was in part because of a Candidate Conservation Agreement/Candidate Conservation Agreement with Assurances in New Mexico (CCA/CCAA) and a Conservation Plan in Texas, both seeking to provide protection through voluntary cooperative agreements between landowners and the USFWS. However, citing primarily concerns with frack-sand mining and with the Texas Conservation Plan, the Center for Biological Diversity and the Defenders of Wildlife filed a petition to protect the species under the US Endangered Species Act (CBD and DOW, 2018). In 2020, the USFWS issued a 90-day finding that stated sufficient information had been provided in the petition to warrant a review of the species (USFWS 2020). In 2023, upon review of a Species Status Assessment of the lizard, USFWS proposed protection for the species as endangered (USFWS 2023 a,b). On May 20, 2024, USFWS listed the species as endangered (USFWS 2024). As of this review, critical habitat has not been designated. The New Mexico conservation agreement is applicable to this species and lesser prairie-chicken, *Tympanachus pallidicinctus*, and requires the permit holder of the conservation agreement to develop, coordinate, and implement conservation actions that reduce and/or eliminate known threats to both species in New Mexico on federal, state and private properties; to support ongoing efforts to re-establish and maintain viable populations of both species in currently occupied and suitable habitats; and to encourage development and protection of suitable habitat by giving participating cooperators incentives to implement specific conservation measures. Though both the prairie-chicken and this species have been finalized and proposed for protection under the US Endangered Species Act, respectively, work to benefit both species by the permit holder continues (Center of Excellence in Hazardous Materials Management 2022; CEHMM). Monitoring of the demographic status of the species continues via pitfall trapping arrays and occupancy monitoring was initiated in 2020 to determine current localities of the species across the range in New Mexico (E. Wirth, CEHMM, *pers. comm*.). *Sceloporus arenicolus* receives no formal protection in Texas, where the distribution and abundance of populations are declining (USFWS 2023b). Fitzgerald (2007) reported finding *S. arenicolus* at only 3 of 27 (11%) sites in potential habitat surveyed in Texas, and other research suggests the species is declining in New Mexico as well (Leavitt et al. 2011).

Threats: *Sceloporus arenicolus* continues to be found in its specialized habitat, shinnery-oak blowouts, when the habitat is undisturbed (CEHMM 2021). However, when the blowouts have been disturbed, the future of lizard populations is less certain with the primary threat to this narrowly endemic lizard being community disassembly through fragmentation, specifically through habitat loss (Leavitt and Fitzgerald 2013, USFWS 2023b). Elimination and modification of shinnery oak-dune habitat resulting from chemical brush control programs has been a significant threat to the persistence of populations of *S. arenicolus* (Gorum 1995; Snell et al. 1993, 1994). An additional significant threat, again through fragmentation of the lizard communities from habitat loss, includes oil and gas exploration and extraction, as well as mining of sand for frack-sand operations. Data collected in the oil field near Maljamar and Loco Hills, Lea/Eddy counties, NM unquestionably demonstrate that statistically significant differences exist in lizard communities among fragmented and non-fragmented sites (i.e., fragmented by oil and gas development activities). Non-fragmented sites had significantly greater lizard diversity and a higher average number of captures for *S. arenicolus*. These data indicate that differences in lizard diversity exist where land management practices differ. Study areas in fragmented treatments contained fewer species, including fewer *S. arenicolus*. As a result of this, fragmented study areas have lower lizard diversity than those that are non-fragmented (Leavitt et al. 2011, Walkup et al. 2012). Sand grain size is particularly important for this species and restoration of such a self-organizing habitat as the shinnery-oak blowouts presents a significant challenge (Ryberg and Fitzgerald 2014, Ryberg et al. 2014). Encroachment of Mesquite, especially under warming conditions due to climate change, may also impact this species. Moreover, Pilliod et al. (2024), through climate-niche space modeling, suggest that, under certain climate change scenarios, the species may lose up to 100% of its habitat by 2070 – 2100.

Recommendations: *Sceloporus arenicolus* should maintain its listing in New Mexico as Endangered. Chan et al. (2009) recognized three distinct groups of *S. arenicolus* corresponding to northern, central, and southern portions of the species' range. The authors recommended conservation efforts should focus not only on preservation of the sand

dune complex but also preservation of these complexes within each of these geographic areas and the Department should support such conservation efforts. Given the primary concerns toward this species involve habitat loss and the significant challenge of restoring the habitat in such a way as to support the lizard, NMDOW should support working with private companies and individuals to prevent disturbance of the remaining habitat. NMDOW should closely monitor activities in the range of *S. arenicolus* and recommend to all land management agencies and private consumptive industry (oil/gas development and ranchers) that the collaborative conservation strategies for *S. arenicolus* in New Mexico are strictly adhered to.

Sceloporus arenicolus can easily be mistaken for another, more common species of the same genus, the prairie lizard, *S. consobrinus*; therefore, personnel in land management agencies who conduct surveys for dunes sagebrush lizard occupancy must be thoroughly trained in field identification of the species. The Department should support a monitoring program across the range of the species (New Mexico and Texas) in addition to current conservation efforts.

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Gray Checkered Whiptail, *Aspidoscelis dixoni*

Distribution and Biology: *Aspidoscelis dixoni* is a diploid unisexual species that normally reproduces by parthenogenetic cloning. This asexually reproducing lizard is known from only two areas; a small area in Trans-Pecos Texas and in the vicinity of Antelope Pass in Hidalgo County, New Mexico (Painter 2009; Scudday 1973). The total range of *Aspidoscelis dixoni* in New Mexico is only 3 x 5 miles, where populations are fragmented by patches of unsuitable habitat. In New Mexico, *A. dixoni* is found on creosotebush flats with little or no shrubby undergrowth on sandy to gravelly soils. It has not been found in the sandy arroyo bottoms of Antelope Pass or in the surrounding desert grasslands. These grasslands likely serve as barriers to dispersal and result in a range of only a few square miles. Overall, *A. dixoni* is a rare lizard in New Mexico, although it may be locally common at elevations of 4265-4760 ft where suitable habitat occurs (Painter 1991, 1992). From 1987-1993, NMDOW biologists conducted mark-recapture trapping for this species throughout its range at Antelope Pass. During 417,366 trap days and 8,288 lizard captures, only 409 (ca. 5%) were *A. dixoni* (Sias and Painter 2001).

Current Status: *Aspidoscelis dixoni* is listed as a Species of Concern by USFWS (USFWS 2008). The species receives no formal protection in Texas. Based on reproductive traits and morphometrics, Walker et al. (1994) suggested that the New Mexico population of *A. dixoni* is distinct from those in Trans-Pecos, Texas. Additionally, current studies of this species by the American Museum of Natural History also suggest the form at Antelope Pass may be genetically distinct from that in Trans-Pecos, Texas (C.J. Cole, Adjunct Curator of Herpetology, American Museum of Natural History, *pers. comm*. 2000).

The taxonomic status of this animal is problematic. de Queiroz, K., and L. M. Chan (2025) determined that *Aspidoscelis dixoni* is synonymous with the common checkered whiptail, *A. tesselata*. However, other evidence suggests that while the population in Trans-Pecos, Texas is *A. tesselata*, the population in New Mexico is distinct and is likely a different species (Cordes and Walker 2006, Cole et al. 2007, M. Ryan, UNM, pers. comm.). As of this Review, the current nomenclature of gray-checkered whiptail, *Aspidoscelis dixoni* is retained.

Threats: Potential threats to this species include overgrazing, habitat alteration, chemical brush control, mining, and unregulated overcollecting. Cole et al. (2007) suggested that destabilizing hybridization and interspecific competition with the Western Whiptail, *Aspidoscelis tigris*, is causing significant population declines of *A. dixoni* near Antelope Pass.

Recommendations: This species should maintain its current listing as endangered. Habitat of the species in Hidalgo County should be regularly monitored for fragmentation and degradation through anthropogenic causes. Population monitoring should be conducted in the range of *A. dixoni* in New Mexico. Recent data and unverified observations suggest the species has declined since an extensive status review was conducted during 1987-1993 (Cole et al. 2007*;* Tomberlin *pers comm*.). Collecting of any type should be strictly controlled. A review of the current taxonomic status of the species should be undertaken.

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Gray-banded Kingsnake, *Lampropeltis alterna*

Distribution and Biology: *Lampropeltis alterna* is a medium-sized colubrid snake found in the United States from the Balcones Escarpment of the Edward's Plateau in central Texas westward through the Trans-Pecos to the Hueco Mountains in El Paso County, Texas (Miller 1979; Merker and Merker 2005). In New Mexico, *L. alterna* is known only from Otero and Eddy counties where it occurs in the southern end of the Guadalupe Mountains (Degenhardt et al. 1996; Hakkila 1994, NMDOW files). Painter et al. (1992) first reported the species from New Mexico.

Lampropeltis alterna is a secretive and nocturnal inhabitant of the Chihuahuan Desert. It occurs on desert hills and dry mountain slopes in rocky limestone areas associated with various xeric-adapted plants including sotol, lechugulla, acacia, mesquite, ocotillo, creosotebush, and various cacti. Elevation in these areas range from 1460 – 5850 feet (Merker and Merker 2005). Small rodents and lizards are the primary prey, although small treefrogs (*Hyla arenicolor*) have also been reported in the diet. Very little is known regarding reproduction in the wild; clutch size of captive females averages eight and varies from 3-13 eggs; neonates average ca. 10 inches total length. The species is very commonly seen in the pet trade (Fitzgerald et al. 2004).

Current Status: Collection of *L. alterna* is allowed in the state of Texas with a valid hunting license, dealer permit, or collection permit. The species is listed as threatened by the Republic of Mexico (SEMARNAT 2010).

Threats: Due to the presumed very small population size, the primary threat to this species in New Mexico is over collecting. It is believed that the removal of even a small number of females from a population could significantly affect the population size. However, Hansen and Salmon (2017) suggest otherwise, citing how scarce the species is above ground and how relatively few roads occur within the range of *L. alterna*. At present no new information is available on any populations of the species not associated with roads within the state.

Recovery Plan Status: This species has a state Recovery Plan, accepted by New Mexico Game Commission in 2002 (Painter et al. 2002). Major recovery efforts in period since 2010 Review were surveys in Carlsbad Region and development of geospatial models of habitat for the species. No specimens were found in surveys, but this may

be more indicative of the rarity of the animal than any possible decline or extirpation of the local population. Future recovery efforts will be to continue surveys for the species, particularly on Carlsbad Caverns National Park following fires in 2011. No new methods or strategies have been made available so therefore no revision is called for the recovery plan at this time.

Recommendations: *Lampropeltis alterna* should maintain its current listing as endangered. NMDOW should monitor the effectiveness of the conservation recovery actions in the NMDOW Recovery Plan. Areas known to be occupied by *L. alterna* should be regularly patrolled for illegal collecting activities.

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Mexican Gartersnake, *Thamnophis eques*

Distribution and Biology: *Thamnophis eques* is a widespread and variable species with 7 subspecies recognized throughout its extensive range (Rossman et al. 1996; Conant 2003, Jones et al. 2020). The species ranges from the southwestern United States in southeast Arizona and southwest New Mexico, and south into southern Mexico (Tipton 2005). In New Mexico, *Thamnophis eques* likely occurred at scattered sites throughout the Gila and San Francisco watersheds from 3690-5420 ft elevation in western Grant and Hidalgo counties and likely occurred the length of the Gila (Degenhardt et al. 1996, Jones et al. 2020). This species is often associated with stream systems, but the structure of the riparian habitat varies considerably and can be associated with stock tanks and fish hatchery ponds (Jones et al. 2020). Documented localities include single localities at and near Mule Creek and along the Gila River near Virden (Fitzgerald 1986). There is a single, century-old record from Duck Creek in Grant County near Cliff and from roadkill specimens near Gila, NM (Degenhardt et al. 1996, NMDOW files). The species is known from adjacent Arizona (Cochise County at San Bernardino NWR), although populations at that site have declined significantly (Rosen and Schwalbe 1988, Schwalbe and Rosen 1988). During August 2002 a single individual was observed and photographed along the Gila River near Riverside, Grant County. In June 2013, 4 males and 2 females were found along the Gila River in Grant County (Albuquerque BioPark, *pers. comm.*). Surveys at various sites in Grant County have not detected the species, including through the use of environmental DNA (eDNA) techniques (Christman and Tecca 2023, 2024, 2025, Kuschel and Davis, 2025). The subspecies, *T. e. megalops*, occurs in New Mexico.

Current Status: *Thamnophis eques* is a species of wildlife of special concern in Arizona (AGFD 1996) and is listed as threatened by the Republic of Mexico (SEMARNAT 2010). The subspecies *T. eques megalops* was petitioned for federal listing by the Center for Biological Diversity (2003), and the USFWS initiated a status review to determine if listing this species was warranted (USFWS 2006a). The basis of this petition was cited as documented population declines, decreased range, and local extinction. Despite that fact that USFWS biologists concluded that *T. eques megalops* has declined from 85-90% of its US range, USFWS (2006b) found this petition not warranted based on a

lack of information throughout the species range in Mexico. However, this finding was questioned by the Center for Biological Diversity who petitioned USFWS to overturn the agency's decision. The species, along with Narrow-headed Gartersnake (*T. rufipunctatus*) has now been listed by USFWS for federal protection as threatened under the U.S. Endangered Species Act (USFWS 2014). As of this Review, a federal Species Status Assessment, the first step in the development of a federal recovery plan, is being developed (NMDOW files). In April 2021, final critical habitat was designated for the species (USFWS 2021) but has since been legally challenged. Specimens from a population on private property continue to be maintained at the Albuquerque BioPark (S. Sekscienski, City of Albuquerque, *pers. comm*.).

Threats: Threats throughout the range of this subspecies include loss of wetlands, urbanization, habitat alteration, pollution, livestock grazing, loss of native prey species, exotic species predation (particularly non-native crayfish and potentially non-native predatory fishes as well), and possibly overcollecting (USFWS 2014). The effect of non-native bullfrogs is complex, as small bullfrogs are taken as prey by *T. eques* but large bullfrogs likely take the gartersnake as prey (M. Ryan, AZDGF, *pers. comm.*). Lastly, recent genomic work suggests most sites in the Colorado River basin, including New Mexico and Arizona, have low genetic diversity and the effective population sizes at those sites are below what is required for adaptive potential (Wood et al. 2018).

Recommendations: *Thamnophis eques* should maintain its current listing as endangered, and permits for collection should be limited to research that aids in conservation of the species or wetlands where they occur. The status of a population detected in 2013 should be updated. Individuals should be kept for captive rearing for potential repatriation to previously known localities. Permission to conduct surveys on private lands should be applied for and further surveys should be conducted at historic localities. Research projects designed for conservation of the species and reestablishment of wetlands within the historic range of the species should be initiated. Projects directed at the removal of non-native predators, restoration of the natural stream flow, and restoration of native riparian vegetation should be designed and implemented. Holycross et al. (2006) suggested that until these recommendations are implemented on a broad scale the general pattern of decline in the US populations will continue.

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Narrow-headed Gartersnake, *Thamnophis rufipunctatus*

Distribution and Biology: The Narrow-headed Gartersnake, *Thamnophis rufipunctatus*, ranges from north-central Arizona southeastward to southwestern New Mexico. Elevation ranges from 701-2430 m (Rossman et al. 1996). In New Mexico, the species is confined to Catron, Grant, and Hidalgo counties where it reaches the northern and eastern edge of its overall distribution. It is a habitat specialist, occurring only in shallow, swift-flowing, rocky rivers and streams of the San Francisco and Gila River drainages within New Mexico (Fitzgerald 1986; Degenhardt et al. 1996). Extensive surveys (Holycross et al. 2006; Hibbitts et al. 2009) suggest a disappearance of the species from the area of the San Francisco Hot Springs in Catron County near Glenwood, the site of a previously robust population. Recent work suggests the species may still exist within the San Francisco River drainage at low levels but the high density of non-native crayfish in the drainage makes the viability of that population unlikely (Jennings et al. 2020 and 2021, J. Monzingo, USFS, *pers. comm.*). During 2009, populations of *T. rufipunctatus* under investigation at the Heart Bar Wildlife Management Area, Catron Co. NM, and the Gila River Bird Area near Cliff, Grant Co., NM were found to be extirpated or at very low density. Gartersnakes continue to be observed or detected through environmental DNA (eDNA) techniques (USNPS, pers. comm., NMDOW files) but no narrow-headed gartersnakes were detected in 2019 or 2023 during surveys at the Gila Bird Area (Jennings et al. 2020, Christman et al. 2023).

Thamnophis rufipunctatus are aquatic specialists that feed almost exclusively on fish, having evolved several mechanisms for increased underwater visual and foraging capabilities, hunting in clear, rock-boulder strewn streams (Fleharty 1967; Schaeffel and de Queiroz 1990; Alfaro 2002; Hibbitts and Fitzgerald 2005). The species also displays very low dispersal capacity. Given these specializations and life history characteristics, *T. rufipunctatus* is likely to be highly susceptible to environmental change, especially climate change (Wood et al. 2011). Because of its specialized diet, a salvage operation was conducted in 2012 following the Whitewater-Baldy fire to move as many *T. rufipunctatus* as possible out of the Middle Fork of the Gila River and from Whitewater Creek to Saliz Creek before post-fire flooding scoured the creek of all fish. Snakes have been recaptured at Saliz Creek since 2015, including over 2024 Wood et al. 2025). This includes juveniles, indicative of reproduction (Jennings et al. 2021). No snakes or fish were caught in Whitewater Creek in 2015 or 2021 (Christman and Jennings 2015, Jennings et al. 2021) and that population of *T. rufipunctatus* likely was extirpated (R. Jennings, WNMU, E. Nowak, NAU, *pers. comm.*). Native fish have been restored to the Whitewater Creek (NMDOW files) and in 2025 restoration of *T. rufipunctatus* was initiated (Christman and Jennings 2025). A second site, in Black Creek Canyon, has also been a

site for supplementation of the local population (Christman and Jennings 2024, 2025). Two individual snakes were detected in Dry Blue Creek near the Arizona border in Catron County in 2018, but no snakes were detected in 2019 (Jennings et al. 2018, 2020). Two historical sites were impacted by the post-fire floods of 2022, after the Black Fire, and one of those sites is likely extirpated for the species (Christman et al. 2023). Knowledge of captive rearing is improving, with breeding having occurred both at the Phoenix Zoo and at a facility at Northern Arizona University in Flagstaff, AZ (Blais et al. 2022, 2023). Disease at breeding facilities is a concern.

Current Status: Wood et al. 2011 reported that three separate species actually exist within the *T. rufipunctatus* complex, thus elevating the subspecies *T. r. rufipunctatus* in New Mexico to full species, separate from those in the Sierra Madre of Mexico. *Thamnophis rufipunctatus* was listed as a Species of Concern by USFWS (USFWS 2008). The species, along with the northern Mexican gartersnake (*T. eques*) has now been listed by USFWS for federal protection as threatened under the U.S. Endangered Species Act, with critical habitat finalized in 2021 (USFWS 2014 and 2021). The designation of critical habitat has since been legally challenged. It is a species of wildlife of special concern in Arizona (AGFD 1996). As of this Report, USFWS has begun the process of assessing the status of the species in preparation for a recovery plan (USFWS, *pers. comm.*). The pre- and post-monsoon seasonal habitat use of this species in the Tularosa River, Catron County, NM continues to be investigated.

Threats: Major threats to this species are non-native crayfish, wildfire, post-fire flooding impacts on prey base, changes in water-use practices and overgrazing of streamside vegetation that result in alteration of habitat, including heavy siltation, stream channelization, and the elimination of undercut banks (see Holycross et al. 2020). Hibbitts et al. (2009) suggested that siltation, which causes impaction of streambed rocks and eliminates habitat, played a role in the disappearance of a robust population of the species at San Francisco Hot Springs. Post-fire flooding is known to have extirpated a population at Whitewater Creek due to loss of the native fish species there and 2021 saw post-fire floods full of ash strike a known population at Turkey Creek. There is indirect evidence suggesting the introduction of American Bullfrog (*Rana catesbeiana*) negatively impacted *T. rufipunctatus* in some areas, e.g., Wall Lake in Catron County, NM (Fleharty 1967; Schwalbe and Rosen 1988; Jennings and Christman 2009). Invasive crayfish pose a significant threat to this animal, through direct predation on neonate snakes, predation on the fish species the snake uses for prey, and alteration of habitat (USFWS 2014, R. Jennings, E. Nowak, B. Christman, and G. Hamilton, *pers. comm*.). Nowak and Santana-Bendix (2002; 2003a, 2003b) reported declines of this species in central Arizona based on the presence of non-native "spiny-rayed" fishes (i.e., the sunfishes *Micropterus* and *Lepomis*, family Centrarchidae), habitat destruction and modification due to increased recreation and siltation, and localized mortality due to channel-altering flood events, direct predation by humans, and roadkills. Disease may be a concern, and the USFWS has funded collection of samples for disease testing (M. Christman, USFWS, *pers. comm.*). In addition, Snake Fungal Disease, caused by a fungal pathogen, *Ophidiomyces ophidiicola*, was detected in a *T. rufipuncatus* in Arizona in 2019 (E. Nowak, Northern Arizona University, *pers. comm.*). To date the pathogen has not been detected in New Mexico.

Given the small size of populations, their apparent isolation from each other and the rapidity with which populations are disappearing, *T. rufipunctatus* appears to be highly vulnerable to extinction (Wood et al. 2011, 2018). The urgency of this crisis and the vulnerability of populations is exemplified by the rapid (<10 years) disappearance of one of the most robust U.S. populations, along the San Francisco River, New Mexico (Hibbitts et al. 2009). Although the primary causes of range-wide declines are attributed to the introduction of non-native species and habitat alteration, additional pressures may be due to intrinsic negative genetic effects.

Recovery Plan Status: This species has a state Recovery Plan, accepted by the New Mexico Game Commission in 2007. Major recovery efforts since 2012 Review included a Share With Wildlife project to continue study habitat use by the species, another Share With Wildlife project to aid in captive rearing of the species, collaboration with an Arizona-New Mexico gartersnake working group, and public outreach. Future recovery efforts will focus on securing funding for research as presently not enough is understood about the biology of the species, the top priority in the state Recovery Plan. No new methods or strategies have been developed toward the recovery of the species and therefore no revision to the state Plan is called for at this time.

Recommendations: *Thamnophis rufipunctatus* should retain its current status as endangered. Surveys by experts under contract with the Department since 2017 have only detected the species at a limited number of known historical localities, of which only two, within the Tularosa River, and the Upper Middle Fork of the Gila River, might be considered robust (Christman and Jennings 2025). Further, even as populations might be rediscovered, such as Blue Creek in 2018 and along the San Francisco River in 2019, given the overall pattern of genetic isolation of the species those populations are very likely to be below necessary adaptive potential (Wood et al. 2018).

NMDOW should continue funding to complete a study of the current status of this species in southwest New Mexico, as well as any necessary translocation efforts, up to and including radio tracking translocated individual snakes. NMDOW and its partners should continue translocations to reduce the threat of genetic isolation. Although the population at San Francisco Hot Springs is considered to be extirpated, survey efforts should continue at nearby sites along the San Francisco River to obtain specimens that might be used to repopulate the Hot Springs area once the habitat and fish populations are suitable for the gartersnake. Microhabitat characteristics of the San Francisco Hot Springs site should be compared to those collected during earlier studies at the same site. Given the detection of Snake Fungal Disease in this species in nearby Arizona, monitoring for the fungal pathogen should be continued, and a plan developed for prevention of spread of the pathogen should it be detected in New Mexico. In addition, strict regulations regarding collecting should continue to be enforced.

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Plain-bellied Watersnake, *Nerodia erythrogaster*

Distribution and Biology: *Nerodia erythrogaster* is a wide ranging, variable species that occurs from the central and southern United States and then south to the central Mexican Plateau. In New Mexico, it is confined to the lower Pecos River drainage, including along the Black and Delaware rivers. However, there is a verified record of adults and juveniles of the species from a stock tank near Nara Visa, Quay County, NM (Brown 2009, Painter et al. 2011). This population is likely an extension of the species' range from nearby known localities in northwest Texas (Dixon 2000). In New Mexico the species is a rare, nocturnal, and little observed species that seems to prefer permanent, shallow, flowing water with rocky retreats and foraging areas where it forages for fish and frogs.

Christman and Kamees (2007) examined 41 wild caught individuals and 128 museum specimens and found only fish, tadpoles, and frogs in the diet. *Nerodia erythrogaster* reaches the extreme western extent of its range in southeast New Mexico (Degenhardt et al. 1996). Being at the western limits of its range in New Mexico, populations of *N. erythrogaster* are less dense and perhaps more likely to be fragmented through habitat loss (Christman and Kamees 2007). Despite numerous surveys along the lower Pecos River drainage since 1988, fewer than 10

individuals of this species were located (Painter 1991, 1993). However, Christman and Kamees (2007) reported finding 40 individuals (20 males, 20 females) on the Pecos and Delaware rivers in Eddy County during 1205 trap days and 45 hours of active searching. Fifteen of the 40 snake captures occurred along the Pecos River between the NM Hwy 31 crossing and 10-Mile Dam. The lack of recaptured snakes in this river reach suggests a robust population (Christman and Kamees 2007). In recent years the species has been observed along the Black River with some regularity by researchers from Eastern New Mexico University and North Carolina State University (I. Mali, North Carolina State University, *pers. comm.*). As of this review, researchers from Eastern New Mexico University are updating the status via various survey techniques, including environmental DNA (eDNA), and have detected the species in various places within Eddy County (Kuschel and Davis 2025). The subspecies *N. e. transversa* occurs in New Mexico (Boundy et al. 2025).

Current Status: No protection is afforded this species in Texas. It is listed as threatened by the Republic of Mexico (SDS 1994). Populations in Mexico are rapidly declining due to alteration of aquatic habitat (Conant 1977, Scudday 1977).

Threats: Primary threats are from direct take and alteration of current water use practices. Populations that exist in areas of high human impact, e.g., 6-Mile Dam, 10-Mile Dam, and the acequia on the north edge of Carlsbad are particularly susceptible to take (NMDOW files). It is often killed by uninformed fishermen who believe it to be venomous and injurious to game fish populations (West 1992). *Nerodia erythrogaster* is not venomous. A potential concern is the establishment of other species of *Nerodia* through unintentional release of pets, as has happened in California and Arizona (Rose et al. 2013, AZDGF, pers. comm.).

Recommendations: *Nerodia erythrogaster* should retain its current status as endangered. An educational program designed to provide public information (especially to the anglers along the lower Pecos River) on the natural history, status, and distribution of this species should be initiated. A research program using radio telemetry and designed to investigate population trends and habitat utilization should also be initiated. Suitable habitat in the New Mexico eastern tier of counties of should be searched for unknown populations of this species, and monitoring should be conducted within the range of the species for other, non-native species of *Nerodia*.

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New Mexico Ridgenosed Rattlesnake, *Crotalus willardi obscurus*

Distribution and Biology: The total known range of this federally threatened subspecies of *C. willardi* includes the high elevations of the Animas Mountains (5970-8500') and Peloncillo Mountains (5600-6200') in southwest Hidalgo County, New Mexico, and the northern Sierra San Luis (extreme NE Sonora and NW Chihuahua, Mexico; Barker 1991). The species was not reported from the Peloncillo Mountains in Arizona until 1997 (Holycross and Smith 1997). Genetic data demonstrate that the three mountain ranges harbor isolated populations that should be regarded as Evolutionarily Significant Units (i.e., Distinct Population Segments) under the Endangered Species Act. Multiple lines of evidence suggest an exceptionally small population occurs in the Peloncillo Mountains, and the Peloncillo population tested positive for genetic bottlenecks (Holycross and Douglas 2007). Recent surveys have shown the population in the Animas Mountains to still exist, but efforts to find the species in the Peloncillo Mountains have been challenging (NMDOW Files).

Crotalus willardi obscurus is a montane generalist, found in rocky hillsides, canyon bottoms, and talus slopes. Dominant vegetation in the habitat of *C. willardi obscurus* in New Mexico includes various oaks, Apache and Chihuahua pine, alligator bark juniper, manzanita, and various grasses (Degenhardt et al. 1996). A large wildfire in the Animas Mountains during 1996 destroyed at least 75% of the Critical Habitat (USFWS 1985) of the species, although recent investigations of the population status in the burned area suggest population trends in the short-term may be stable. The adult diet is composed mostly of rodents (brush mouse, *Peromyscus boylii*), although birds are occasionally taken. The juvenile diet is made up of mostly lizards (Yarrow's spiny lizard, *Sceloporus jarrovii*) and centipedes (*Scolopendra* sp.; Holycross et al. 2002)

Current Status: *Crotalus willardi obscurus* is listed as threatened by the USFWS (USDI 1991) and as a species of special concern in Arizona. A federal recovery plan was approved in 1985 (USFWS 1985). NMDOW was among other stakeholders invited to be on a formal federal recovery team in 2025. A Federal Recovery Challenge Grant led to captive populations of the subspecies at various zoological institutions within the United States, using specimens from Mexico (USFWS, *pers. comm.*). The overall species is subject to protection in Mexico (SEMARNAT 2010). The Animas Mountains population is protected by private land ownership and appears fairly secure (Holycross 1995), although there is the continued threat of catastrophic wildfire. In the Peloncillo Mountains an estimate is lacking for the population, but it is likely to be very low, with only around 30 reliable observations having been made (Holycross and Goode 2020).

Threats: The most prominent threat to *Crotalus willardi obscurus* is habitat loss (i.e., type conversion of woodland habitat) and direct take resulting from wildfire or prescribed management-ignited fires. Additionally, changes in land ownership or land use practices that result in habitat modification could negatively affect populations. Prescribed fire may pose a threat to marginal and fragmented habitat for this species in the Peloncillo Mountains. Seasonal variation of the threat imposed by fire deserves additional research. This subspecies, because of very small population numbers and low genetic diversity, appears to be at significant risk of extinction from habitat alteration due to climate change, particularly within the lower-elevation Peloncillo Mountains (Goode and Parker 2013, Holycross and Goode 2020, Pilliod et al. 2024).

The species is commercially valuable and sought after by private herpetoculturists. While investigating the status of

C. willardi in the Animas Mountains, Harris and Simmons (1975) reported encountering 15 collectors from 6 states during late August 1974, and they felt that the species could not withstand such overexploitation. However, all of the habitat in the Animas Mountains of New Mexico is on private land and access is strictly prohibited. Habitat in the Peloncillo Mountains is under authority of the USFS and state/federal permits are required for take for this species.

Recommendations: *Crotalus willardi obscurus* should maintain its current state-listing as state endangered. NMDOW should continue to cooperate with USFWS on the formal recovery team, and should collaborate to redraft the Recovery Plan (USFWS 1985), which is outdated. Staff biologists from NMDOW, USFWS, and USFS should work together to design a program of prescribed fire that benefits this species (Holycross and Goode 2020). The primary goal should be to develop a fire management program which emphasizes the need for cool-season, low-intensity fires to reduce the buildup of woody fuels and thus the chance for catastrophic wildfire within the montane habitat of *C. willardi obscurus*.

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THREATENED

Western River Cooter, *Pseudemys gorzugi*

Distribution and Biology: In New Mexico, *P. gorzugi* is confined to the Pecos River drainage, including the Pecos, Black, and Delaware rivers below Brantley Dam and in Rocky Arroyo in Eddy County (Degenhardt et al. 1996; Christman and Kamees 2007, Mali et al. 2021). The historic record of *P. gorzugi* from Bitter Lake NWR in Chaves County (Bundy 1951) is questionable (Painter 1991), although the dried shell of a recently-predated large adult was discovered there during late summer 2008 (Giermakowski and Pierce 2016). Christman and Kamees (2007) trapped 56 individuals at 11 of 24 sites surveyed in southeastern New Mexico. During these surveys, *P. gorzugi* was most commonly encountered in the Black River. Researchers from Eastern New Mexico University and North Carolina State University, partially funded through the Department, have conducted a survey program to update the status of the species and to learn more about its biology. More than 600 new captures of *P. gorzugi* were made 2016 - 2023, as well as recaptures, including captures of juveniles. Researchers from the University of New Mexico were unable to find the species in the Delaware River in 2016 and 2017, whereas the researchers from Eastern New Mexico University did catch one specimen in late 2019 (NMDOW files, I. Mali, Eastern New Mexico University, *pers. comm*.). Over recent years the researchers from Eastern New Mexico University have found a very small population in a tributary near Roswell, NM. In addition, the Albuquerque BioPark is actively working on propagation techniques for the species (Suriyamongkol et al. 2020, K. Crow, City of Albuquerque, *pers. comm*, Letter et al. 2017), and Mali and Duarte (2024) developed a population model to aid in management of populations on the Black River.

Pseudemys gorzugi is often an abundant turtle within its limited habitat, preferring river systems with deep pools and generally avoiding shallow riffles (Degenhardt et al. 1996). The species appears to be opportunistic in its dietary habits, using what is available, and is often trapped with sardines as bait (Letter et al. 2019).

Current Status: *Pseudemys gorzugi* is one of the ten least-known freshwater turtles in North America (Lovich and Ennen 2013, Ernst 1995, Ernst et al. 1994), and Ernst and Lovich (2009) suggest an ecological study of the species is much needed, currently being addressed by the researchers from Eastern New Mexico University and North Carolina State University. Populations of *P. gorzugi* in Texas are declining, due primarily to take for the pet trade (M. Forstner 2001 *in. litt*. NMDOW files), and habitat loss and degradation (Scudday 1974). It is listed as Rare by the Republic of Mexico (SEMARNAT 2010). In July 2012, the USFWS was petitioned by the Center of Biological Diversity to consider this species for protection under the U.S. Endangered Species Act (CBD 2012). In March 2022, USFWS announced that listing under the Endangered Species Act was not warranted (USFWS 2022). However, as of this review that finding has been challenged in Court (CBD vs USFWS 2026).

Threats: A primary threat to *P. gorzugi* is from weekend recreationists who use this turtle for target practice, as numerous dried shells with obvious bullet holes have been found along the Delaware River (Painter 1991; Christman and Kamees 2007, Bailey et al. 2008, Mali and Forstner 2017). Fishermen often take it on trotlines set for catfish or while fishing for other species with live or dead animal bait and several specimens have been recently caught having a fishing hook in its throat or mouth (Waldon et al. 2017, Mali et al. 2019). Wildfire along the riparian habitat of the Delaware has also resulted in numerous take of the species, including a human-caused wildfire at the Cottonwood Day Use area in Eddy County in March 2021 (NMDOW files *unpubl. Data,* Mali et al. 2021). Cooter turtles of the genus *Pseudemys*, including *P. gorzugi*, are popular turtles in the commercial pet trade, making overcollection a concern (Fitzgerald et al. 2004, Schlaepfer et al. 2005, Bailey et al. 2014). Runoff pollution from oil and gas wells are likely a factor in the decline of this species in select reaches of the Pecos River (Ward 1984). Flooding, such as seen in September 2014, and drawdown of water, particularly on the Delaware River, may also be of concern (Mali and Forstner 2017, Mali 2017). Salinity also plays a role in the distribution of this rare turtle, with areas of high conductivity (a measure of salinity) being areas of low occupancy by the Western River Cooter (Mahan et al. 2022). Further, recent work indicates that the population in the Black River have slower growth rates than elsewhere within the species' range or in comparison to other members of the genus *Pseudemys* (Suriyamongkol et al. 2024); the cause is currently undetermined, but slow growth rates correlate with late maturity and low resiliency to other mortality sources.

Recommendations: *Pseudemys gorzugi* should maintain its current listing as threatened. Attempts to obtain permission to investigate sites on private land at Willow Lake and Blue Spring should be made. Research on the demography and biology of this poorly studied species should continue to be supported, including the research toward captive propagation. A program of public awareness should be initiated, and informative signs should be posted around the commonly used fishing areas in the lower Pecos River drainage.

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Slevin's Bunchgrass lizard, *Sceloporus slevini*

Distribution and Biology: *Sceloporus slevini* in New Mexico is known only from extreme southwest Hidalgo County, where it occurs in the grasslands and adjacent foothills in the southern end of the Animas Valley at elevations of 5100-5300 ft (Degenhardt et al. 1996; Painter 2009). Dixon and Medica (1965) first reported the species from New Mexico. As the common name suggests, *S. slevini* occurs in areas of dense bunch grass, usually on hillsides within the ponderosa pine zone. The specimens from New Mexico are enigmatic because of their grassland origin, although research suggests this was once a widespread grassland species that has only recently retreated to the mountain slopes to escape the destruction of the grasslands brought about by overgrazing (Bock et al. 1990). The species is primarily diurnal although it may be active any time of the day on hot, sunny days. Eggs are laid in mid-late summer, and hatchlings appear in August or September. The diet of *S. slevini* consists of true bugs, ants, beetles, and grasshoppers.

Current Status: Other than in New Mexico, *S. slevini* receives no formal protection anywhere throughout its range. Within its limited habitat in southeast Arizona, many populations are suffering significant declines because of severe overgrazing (Congdon 1994). Prior to 1994, *S. slevini* had not been collected in New Mexico since 1967 when it was known from only 6 specimens. During 1994-97 however, trapping efforts in suitable habitat in the Animas Valley have shown *S. slevini* to be more abundant and widespread than previously known.

Threats: The primary threat to *S. slevini* is overgrazing which has been linked to severe declines in populations of the species. Maintenance of the bunchgrass microhabitat is a priority for the conservation of this species because of its importance for cover and thermoregulation during winter months (Painter 2009). Pilliod et al (2024) suggest that over 50 % of habitat for the species could be lost under certain climate change scenarios. Unregulated excessive collecting may cause localized reductions in populations.

Recommendations: *Sceloporus slevini* should retain its status as threatened. The current status of the small New Mexico population in the Animas Valley should be investigated to ensure that grazing practices and wildfires, especially in times of severe drought, do not cause declines. In addition, strict regulations regarding collecting should continue to be enforced.

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Giant Spotted Whiptail, *Aspidoscelis stictogramma*

Distribution and Biology: The range of this large whiptail lizard extends southward into Mexico to northwestern Sinaloa (Rosen 2009). It reaches the extreme eastern and northern edge of its range in southwest New Mexico. In New Mexico, it occurs only in Guadalupe Canyon in southwest Hidalgo County where it is common in its limited habitat at 4330-4520 ft (Degenhardt et al. 1996). Records from the Peloncillo Mountains along Geronimo Trail and from the Alamo Hueco Mountains (Hayward et al. 1977) are questionable and have not been verified. In New Mexico, *A. stictogramma* is only known in riparian woodland habitat although elsewhere in its range in the United States it is known from in thorn scrub environments in mountain canyons in semi-desert grassland, the Arizona Upland portion of the Sonoran Desert, and the lower Madrean oak woodlands (Rosen 2009). This is the largest member of the genus *Aspidoscelis* in North America, reaching 140 mm body length and 468 mm total length (Rosen 2009). It is an active diurnal species that depends upon a mosaic of open spaces and cover where it forages for insects, its primary prey. The species is quick to retreat into dense underbrush when threatened.

Current Status: *Aspidoscelis stictogramma* receives no formal protection in Arizona or Mexico.

Threats: Habitat alteration and overcollecting are the only major perceived threats to this species in New Mexico. Populations of *A. stictogramma* in Guadalupe Canyon are healthy and stable (Painter and Tomberlin 1996) although they could be negatively impacted by uncontrolled wildfire or by overgrazing of the riparian vegetation in their limited habitat. Rosen (2009) suggests that competition with unisexual parthenogenetic hybrid whiptails in the *Aspidocelis inornatus* complex may be responsible in part for the limited range of this species; *A. stictogramma* is one of the parental species for that complex.

Recommendations: *Aspidoscelis stictogramma* should be retained as threatened. NMDOW biologists should coordinate with private landowners and USFS within the habitat of *A. stictogramma* to help design a program of prescribed fire to benefit this species. The primary goal should be to develop a fire management program which emphasizes the need for cool-season, low-intensity fires to reduce the buildup of woody fuels and thus the chance for catastrophic wildfire within the habitat of *A. stictogramma*. The current status of the small New Mexico population in Guadalupe Canyon should be investigated to ensure that grazing practices and wildfires, especially in times of severe drought, do not cause declines. In addition, strict regulations regarding collecting should continue to be enforced.

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Mountain Skink, *Plestiodon callicephalus*

Distribution and Biology: In New Mexico, *Plestiodon callicephalus* occurs only in the southern Peloncillo Mountains of southwest Hidalgo County. It is known from 4300-6400 ft in Guadalupe Canyon and along Geronimo Trail, where it is uncommon in its limited habitat (Degenhardt et al. 1996). *Plestiodon callicephalus* requires abundant and well-rotted leaf litter for forage areas and sites for egg-laying. The species feeds on spiders, terrestrial beetles, and a variety of insects. It is secretive and rarely observed, although it is easily captured using pitfall traps. The species is found in Madrean Evergreen Woodland and the associated riparian habitats. It is most often found under rocks, logs, and other surface cover in moist areas such as riparian corridors, rocky canyon bottoms, and grassy hillsides.

Plestiodon callicephalus is a medium sized skink, reaching a maximum length of only 79 mm SVL. Little information is available on reproduction in this species. Females lay clutches of 3-6 eggs and the females are known to guard the eggs, and guarding of hatchlings has also been reported. Reports of the young being born alive are available from Arizona. Hatchlings appear as early as 23 July in New Mexico and are 20-25 mm SVL (Swann et al. 2009).

Current Status: No protection is afforded *P. callicephalus* in Arizona or Mexico.

Threats: Habitat alteration and overcollecting are the only perceived threats to this species in New Mexico. Populations of *P. callicephalus* in Guadalupe Canyon are healthy and stable (Painter and Tomberlin 1996) although the species could be impacted by uncontrolled wildfire or by overgrazing of the riparian vegetation in its limited habitat.

Recommendations: This species should maintain its current listing as threatened. NMDOW should coordinate with private landowners and federal land management agencies within the habitat of *P. callicephalus* to help design a program of prescribed fire to benefit this species. The primary goal should be to develop a fire management program which emphasizes the need for cool-season, low-intensity fires to reduce the buildup of woody fuels and thus the chance for catastrophic wildfire within the riparian habitat of *P. callicephalus*. The current status of the small New Mexico population, especially those in Guadalupe Canyon, should be investigated to ensure that grazing practices and wildfires, especially in times of severe drought, do not cause declines. In addition, strict regulations regarding collecting should continue to be enforced. The status of this species in New Mexico needs to be updated.

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Green Ratsnake, *Senticolis triaspis*

Distribution and Biology: *Senticolis triaspis* ranges from southwest New Mexico, southern Arizona, and southern Tamaulipas in Mexico, southward into Costa Rica (Tipton 2005). The species reaches the extreme eastern edge of its range in southwest New Mexico where it is very rare and seldom encountered. In New Mexico, it is known from only 3 museum specimens (Degenhardt et al. 1996, Garrett and Painter 1992, Painter and Tomberlin 1996) and a very small number of reported observations (NMDOW Files) in southwest Hidalgo County (e.g., Guadalupe Canyon, Post Office Canyon). Sherbrooke (2006) reported the species is mostly terrestrial and spends little time in the canopies of trees. He suggested the species spends much of its time underground with most subterranean retreats under large boulders. The Northern Green Ratsnake, *S. t. intermedia*, occurs in New Mexico, though Roth-Monzon et al (2021) suggest more work on this taxonomy of the overall species complex is needed.

Current Status: *Senticolis triaspis* receives no formal protection in Mexico. It is protected from unregulated take in Arizona (AGFD 1996).

Threats: This beautiful species is very desirable and valuable in the pet trade and is therefore potentially threatened by overcollecting (Fitzgerald et al. 2004). Habitat alteration through uncontrolled wildfire or increased livestock grazing is also a threat. Specimens of individuals killed on roads are reported as well (Radke 2020). Pilliod et al (2024) suggest that over 20 % of habitat for the species could be lost under certain climate change scenarios.

Recommendations: *Senticolis triaspis* should maintain its current listing as threatened. NMDOW should coordinate with federal land management agencies and private landowners within the habitat of *S. triaspis* to help design a program of prescribed fire to benefit this species. The primary goal should be to develop a fire management program which emphasizes the need for cool-season, low-intensity fires to reduce the buildup of woody fuels and thus the chance for catastrophic wildfire within the riparian habitat of *S. triaspis*. Routine monitoring of the habitat that supports the small New Mexico population should be implemented to ensure that grazing practices, especially in times of severe drought, do not cause declines. In addition, strict regulations regarding collecting should continue to

be enforced.

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Western Ribbonsnake, *Thamnophis proximus*

Distribution and Biology: In New Mexico, *Thamnophis proximus* occurs as isolated and disjunct populations mostly east of the Pecos River. The species reaches the western limit of its range in eastern New Mexico and is one of the least-known and little-studied snakes in the state (Degenhardt et al. 1996; Rossman et al. 1996). The subspecies, the Arid Land Ribbonsnake, *T. p. diabolicus*, occurs in New Mexico. The species is strongly associated with brushy habitats in close proximity to aquatic situations. The species feeds mainly on amphibians and occasionally small fish. It is generally uncommon where it occurs in New Mexico, with the possible exception of Bitter Lake National Wildlife Refuge near Roswell.

Current Status: *Thamnophis proximus* does not receive formal protection in Texas, although it is listed as threatened by the Republic of Mexico (SEMARNAT 2010). Rossman et al. (1996) suggest that there is no information on population status of this species outside of the United States and state that the ecology of Mexican populations remain essentially unstudied. A mark-recapture study of this species initiated at Bitter Lake NWR during 1997 has shown the species to be more abundant on the refuge than previously thought (G. Warrick, Refuge Biologist data files; NMDOW files). Work by researchers from Eastern New Mexico University in 2024 and 2025 detected the species in the Canadian and Pecos River drainages but not at other historic localities (Summo and Davis, ENMU, *in prep.*).

Threats: Major threats to *T. proximus* are changes in water use practices that could result in alteration of habitat. Illegal take may be of concern in the Spring River population near metropolitan Roswell and at 10-mile Dam along the Pecos River east of Loving. Road-killed individuals are occasionally encountered on the tour loop roads at Bitter Lake NWR.

Recommendations: *Thamnophis proximus* should maintain its current listing as threatened. A public awareness program should be initiated at Bitter Lake NWR to alert people of the presence of this species and the potential of the species to be encountered on the roadways. Additional state-wide surveys should be initiated to determine the extent and status of the population at historic sites and in additional potential habitat, and more information on the ecology of this subspecies would benefit its recovery. In addition, strict regulations regarding collecting should continue to be enforced.

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Mottled Rock Rattlesnake, *Crotalus lepidus*

Distribution and Biology: In New Mexico, this montane rattlesnake is known only from the Guadalupe Mountains in Eddy County and extreme eastern Otero County where it reaches the northern edge of its range (Degenhardt et al. 1966; Price 2009). *Crotalus l. lepidus* is a localized inhabitant of the Guadalupe Mountains, rarely found away from rocky canyons or hillsides (Swinford 1992). Two subspecies of Rock Rattlesnake, *C. l. lepidus* and *C. l. klauberi*, occur in New Mexico; only *C. l. lepidus* is protected. A zone of intergradation between these poorly diagnosed subspecies may occur in the San Andres Mountains on White Sands Missile Range in Sierra and Doña Ana counties. Morphological traits generally used to distinguish *C. l. lepidus* from *C. l. klauberi* include the presence of mottling, the presence of a postocular stripe, paired nuchal blotches, and faded anterior bands.

Current Status: *Crotalus l. lepidus* does not receive formal protection in Texas, although it is a Species Subject to Special Protection in the Republic of Mexico (SEMARNAT 2010).

Threats: Much of the habitat for *C. l. lepidus* in New Mexico occurs in Carlsbad Caverns National Park, therefore it appears to be secure except for illegal take and road mortality within the Park. Outside of the Park, the steep, rocky habitat is generally unsuitable for livestock grazing, oil and gas exploration, or other development. Mining may have localized effects. Pilliod et al (2024) suggest that over 50 % of habitat for the overall species could be lost under certain climate change scenarios. Overcollecting, e.g., at Sitting Bull Falls, may reduce populations in areas well known to snake collectors, especially given the information that has appeared in the popular herpetocultural literature (e.g., Swinford 1989, 1990, Fitzgerald et al. 2004).

Recommendations: *Crotalus l. lepidus* should maintain its current listing as threatened. Populations of *C. l. lepidus* at Sitting Bull Falls should be closely monitored for any evidence of illegal take or overcollecting.

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Chihuahua chub, *Gila nigrescens*

Distribution: Chihuahua chub is native to the Mimbres, Guzmán, and Bustillos basins of southwest New Mexico and northwest Chihuahua, Mexico (Smith and Miller 1986; Miller 2006). It generally occurs in stream and ciénega habitats and almost always occurs in deep pool habitats associated with instream cover such as uprooted trees (Propst and Stefferud 1994). In New Mexico, Chihuahua chub was limited mainly to a 15 km reach of the Mimbres River and associated spring habitats (Propst 1999). Recent surveys indicate Chihuahua chub range is expanding, both upstream and downstream, of previously occupied reaches (NMDOW files).

Current Status: Chihuahua chub was state listed as endangered in New Mexico in 1976 and was federally listed as threatened in 1983 (USFWS 1983). A federal recovery plan for the species has been approved (USFWS 1986). Chihuahua chub has declined significantly throughout its native range (Propst and Stefferud 1994). In Chihuahua, it was found mainly in remote stream reaches where there was little or no modification of habitat by human activities and nonnative predatory fishes were absent. Stream reaches in the Guzmán Basin in the early 1990s are now void of the species (R.L. Mayden, pers. com.). Ash-laden flows from the 1995 Pigeon Fire reduced Chihuahua chub abundance in the Mimbres River substantially. Non-native predatory fish, including brown trout, rainbow trout, and largemouth bass, were eradicated from the river by flooding and ash flows resulting from the Silver Fire in 2013. Rainbow trout were captured again in the river in low numbers between 2020 and 2022, before the Black Fire and subsequent flooding and ash flows. These post-fire effects appear to have eradicated rainbow trout from the Mimbres River.

A spring system associated with the Mimbres River previously supported the largest wild population (ca. 300) of the species in the U.S., and individuals have been taken from this population to maintain a brood and refuge stock at the Southwestern Native Aquatic Resources and Recovery Center (SNARRC). However, in early 2010, fewer than 60 individuals were captured in the spring, and most were <100 mm total length. In 2015, the USFWS led an effort to improve chub habitat in the spring system. The chub in Mimbres River springs periodically have heavy infestations of yellow grub (*Clinostomum marginatum*) (J.J. Landye, pers. comm.), and this ectoparasite may occasionally cause elevated mortality of spring inhabitants. Invasion of springs by largemouth bass (*Micropterus salmoides*) necessitated several efforts to remove these nonnative predators. Recent surveys continue to indicate lower numbers of chub occupy the spring complex (NMDOW files).

The Nature Conservancy (TNC) and New Mexico Department of Wildlife have properties on the Mimbres River that are managed, in part, to provide habitat for Chihuahua chub. In 2016 the Department engineered and constructed habitat improvements for Chihuahua chub across the entirety of the river on the property, and in 2017 similar habitat work was completed on TNC property. The Department engineered and constructed an off channel refugia pond in 2021 for Chihuahua chub on the Department's River Ranch property. The refugia pond was stocked in 2021, 2022, and 2023. McKnight Creek above the barrier was stocked with Chihuahua chub in 2018 and 2019. The Mimbres River population has been augmented in most years since 1999 with fish reared at Southwestern Native Aquatic Resources and Recovery Center. Current stocking efforts are directed at range expansion rather than augmentation. The New Mexico population in the Mimbres drainage does contain unique genetic information not found in Mexico populations (Osborne et al. 2012).

Overall, Chihuahua chub were negatively impacted throughout the river by the 2013 Silver Fire and subsequent flooding, apparently persisting only in Moreno Springs. The 2022 Black Fire prompted a salvage effort during which 49 Chihuahua chub were moved from the Mimbres River to the off channel refugia pond on the Department's River Ranch property. The salvage occurred in June before monsoon rains began, in anticipation of potential post-wildfire debris flows. Chihuahua chub have subsequently been captured in the river in lower numbers, but 2025 abundance estimates suggested a rebound in the population. Habitat improvement in the springs and on the Department's and TNC's properties, ongoing stocking efforts from the broodstock at SNARRC, the eradication of non-native predatory fish, and recent discovery of post-fire recolonization in other parts of the river make future population growth likely. Previous surveys documented occupancy from Monument Canyon downstream to Faywood, NM (M. Zeigler, pers. com.). Annual monitoring to inform population trends is ongoing and additional habitat restoration is planned to help bolster habitat structures damaged by post-fire flooding.

NMDOW participated in the five-year status review for Chihuahua Chub which concluded in 2023. The Department provided information on the status of Chihuahua Chub in the Mimbres River basin and presented on recent recovery efforts in the basin during the USFWS Recommendation Meeting. The final 5-year review for Chihuahua Chub resulted in the USFWS's recommendation that the species be uplisted from threatened to endangered.

Threats: Modification and destruction of riverine habitats (dewatering, channelizing, and removal of woody riparian vegetation) are impediments to recovery of Chihuahua chub in the Mimbres River. Nonnative fishes, particularly rainbow trout (*Oncorhynchus mykiss*), usurp Chihuahua chub habitat and prey upon them. However, this potential threat appears to have been negated in the Mimbres River since the 2013 Silver Fire. Longfin dace (*Agosia chrysogaster*) may displace young Chihuahua chub from shoreline habitats. Escapement of nonnative fishes (e.g., largemouth bass) from Bear Canyon Reservoir is a potential threat to spring and riverine Chihuahua chub populations, but installation of a fish screen at outflow of the reservoir has diminished this threat and bass have not been recorded in the river in recent years. The yellow grub infestation of chub in spring habitats may present a health risk to this population.

Recommendations: Cooperative efforts with The Nature Conservancy, U.S. Fish and Wildlife Service, and U.S. Forest Service to improve status of the species should continue. The NMDOW Mimbres Property should continue to be managed for benefit of Chihuahua chub. Lands having suitable or potential Chihuahua chub habitat and water rights in Mimbres Valley should be obtained from willing sellers. The fish barrier at Bear Canyon Reservoir should be maintained to ensure there is no escapement of nonnative fishes, particularly centrarchids, from Bear Canyon Reservoir. Cooperative efforts among The Nature Conservancy, U.S. Forest Service, and NMDOW to protect and conserve aquatic habitats of the Mimbres River catchment should continue. The U.S. Fish and Wildlife Service should be encouraged to continue maintenance of captive population and brood stock at SNARRC. Regulations regarding use of bait fishes should be strictly enforced.

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Roundtail chub, *Gila robusta*

Distribution: In 2016 the American Fisheries Society and American Society of Ichthyologists and Herpetologists (AFS/ASIH) Joint Committee on the Names of Fishes determined roundtail chub, Gila chub, and headwater chub to be the same species (Page et al. 2016). In previous biennial reviews these three species are separated, but have now been combined to recognize them all as one species, the roundtail chub. Roundtail chub formerly occupied the Colorado River and its tributaries from Wyoming south to the confluence of the Little Colorado River (Arizona), tributaries of the Colorado River downstream of the Little Colorado River, and headwaters of the Río San Pedro in northwestern Mexico (Minckley 1973; Hendrickson et al. 1981; Tyus et al. 1982; Hendrickson 1983; Mueller and Marsh 2002; Miller 2006). Throughout much of its range, the species

was historically common (Minckley 1973; Holden and Stalnaker 1975). In New Mexico, roundtail chub occurred in the San Juan, Zuni (a Little Colorado River tributary), San Francisco, and Gila River drainages (Baird and Girard 1853; Koster 1957; Bestgen and Propst 1989; Platania 1990). In these streams, the species was most common in moderate to slow-velocity areas near vegetated shorelines and debris piles.

Current Status: Roundtail chub was listed as state threatened in New Mexico in 1975 and uplisted to state endangered in 1996. The Navajo Nation lists roundtail chub as endangered (Mikesic et al. 2005). Although roundtail chub remains comparatively common in portions of the upper Colorado River drainage (Tyus et al. 1982), it has declined considerably in the lower portion of the Colorado River drainage (Bestgen and Propst 1989; Rinne and Minckley 1991; Mueller and Marsh 2002; Minckley and Marsh 2009). In New Mexico, the species is very rare in the San Juan River (Paroz et al. 2007; Barkalow and Zeigler, 2024) and extirpated from the Zuni River drainage (Propst et al. 2001). The species exists in the Gila River basin of New Mexico in Turkey Creek, as well as the West, East, and Middle Forks of the Gila River (Carman 2006; Paroz et al. 2006; Paroz et al. 2007). An assessment of remote sites in the West Fork Gila River showed a decrease in the number of roundtail chub captured during 2021–2022 sampling as compared to 2006–2007 sampling at the same sites (Johnson et al. 2022). Historically the East Fork Gila River maintained robust populations with a variety of size classes, but adults have been absent or rare in these locations in the last 20 years (Paroz et al. 2006; Paroz and Propst 2007). The species has also been repatriated into Mule Creek, a San Francisco River tributary, from the population in Harden Cienega, Arizona. In 2009, the USFWS proposed roundtail chub in the Lower Colorado River Basin as a Distinct Population Segment as a candidate for listing (USFWS 2009). The USFWS completed a species status review for the distinct population segment of roundtail chub in Lower Colorado River Basin in 2015 and proposed that it be listed as threatened under the U.S. Endangered Species Act (USFWS 2015; U.S. Office of the Federal Register 2015). The listing determination for roundtail chub in the Lower Colorado River Basin was withdrawn in 2017 after the AFS/ASIH Joint Committee on Names of Fishes considered *Gila intermedia*, headwater *Gila nigra*, and roundtail chubs to be a single species, *Gila robusta* (U.S. Office of the Federal Register 2017). The USFWS began working on an updated species status assessment for the Lower Colorado River Basin distinct population segment of roundtail chub in 2021. They determined that listing of the Lower Colorado Basin distinct population segment was not warranted in 2022 (U.S. Office of the Federal Resister 2022). In 2025, the USFWS proposed removal of Gila chub from the Endangered Species List based on determination that it is not a valid taxonomic entity

Threats: Habitat modification (channelization, dams, removal of woody riparian vegetation, discharge manipulation, and seasonal stream desiccation), and establishment of nonnative predators and competitors are the primary factors contributing to the imperiled status of the species.

Recovery Plan Status: The roundtail chub is included in the Colorado River Basin Chubs recovery plan (previously separated as three species) approved by the New Mexico Game Commission in 2006. A Monitoring Plan for The Three Species, which includes roundtail chub, in the San Juan River Basin was finalized in 2023. Monitoring of the species occurs annually in the San Juan River basin and Gila River forks. Repatriation of roundtail chub to Mule Creek was completed in 2014 and surveys in 2018 indicated a self-sustaining chub population was established. In the Upper Gila River, roundtail chub were salvaged from Turkey Creek following fires in 2011 and 2021. The fish were housed at hatcheries until they could be returned to the stream. The Roundtail Chub Repatriation Plan in the San Juan River Basin was completed in 2024, with initial actions now in progress (Barkalow 2024). Initial roundtail chub repatriation efforts for the San Juan River basin in 2025 included establishing natural brood ponds and releasing age-1 chub in the Animas River. Roundtail chub repatriation efforts in the San Juan Basin are ongoing. The Roundtail Chub Repatriation Plan in the Gila River basin was completed in 2026 with plans to begin implementation in the fall of 2026 with an initial focus on repatriation efforts in the San Francisco River drainage.

Recommendations: Implementation of the Colorado River Basin Chubs Recovery Plan should continue. Strategies such as removal of nonnative species and habitat protection and restoration are priorities for conservation of current populations. San Juan River basin monitoring and repatriation efforts should continue in accordance with the recently developed plans (Barkalow 2023, 2024). The recently completed repatriation plan for roundtail chub in the Gila River Basin will guide future management actions.

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Rio Grande silvery minnow, *Hybognathus amarus*

Distribution: Rio Grande silvery minnow formerly occupied mainstem habitats of the Rio Grande from near its confluence with the Rio Chama in northern New Mexico downstream to the Gulf of Mexico and the Pecos River from near Santa Rosa downstream to its confluence with the Rio Grande (Bestgen and Platania 1991). In New Mexico, the species was most common in the Rio Grande between Cochiti Pueblo and Elephant Butte Reservoir and in the Pecos River between Fort Sumner and Carlsbad (Bestgen and Platania 1991). Within these stream reaches, it was most commonly found in main channel run habitats over sand substrates and seasonally in low-velocity areas such as backwaters and embayments.

Current Status: Rio Grande silvery minnow was state listed as endangered in New Mexico in 1979 and federally listed as endangered in 1994 (USFWS 1994). A recovery plan for the species was approved in 1999 (USFWS 1999) and a revision was completed in 2010 (USFWS 2010). A five-year status review was conducted in 2023 (USFWS 2023). The species currently occupies about 5% of its historical range in New Mexico. It was extirpated from the Pecos River (Bestgen et al. 1989) and from the Rio Grande upstream of Cochiti Dam and downstream from the upper extent of Elephant Butte Reservoir (Edwards and Contreras-Balderas 1991; Bestgen and Propst 1996). In its current range between Algodones and Elephant Butte Reservoir, it is typically most common between San Acacia and Elephant Butte Reservoir, in part because the canal system and diversion dams at San Acacia, Isleta, and Angostura allow downstream movement but prevent upstream passage (Platania and Dudley 2003; Dudley and Platania 2007). However, the San Acacia reach is also most susceptible to bouts of channel drying that cause extensive mortality (Caldwell et al. 2009). Rio Grande silvery minnow is typically rare between Albuquerque and Isleta and uncommon between Isleta and San Acacia, although its abundance varies considerably seasonally and annually (Dudley and Platania 2008). Since 2001, Rio Grande silvery minnows have been salvaged from drying river reaches, however the survival rate of these relocated fish is low (Archdeacon et al. 2020). Stocking efforts in the Albuquerque reach since 2000 have augmented the population and natural recruitment has been noted when conditions were favorable (Osborne et al. 2006, Osborne et al. 2018). Considerable effort has been expended on behalf of the species by the Middle Rio Grande Endangered Species Collaborative Program (MRGESCP). The Rio Grande silvery minnow typically lives one year and if multiple years of poor recruitment exists, genetic diversity loss and extinction is possible (Horwitz et al. 2018) with reductions of densities by order of magnitudes (Dudley et al. 2024). Loss of genetic diversity has been slowed through augmentation but not completely preventing it (Osborne et al. 2023). Preserving rare haplotypes that exist naturally can be retained in augmentation if collected in the captive population (Osborne et al. 2024). However, drought and extended seasonal drying of substantial reaches of the river have challenged efforts of the MRGESCP and survival of Rio Grande silvery minnow in the wild is low in most years. The occurrence and density of Rio Grande silvery minnows have varied substantially from the early 1990s to 2017 (Dudley et al. 2018), largely explained by seasonal differences in river flows annually (Archdeacon 2016).

Threats: Habitat modification (channelization, channel incision, stream desiccation, modified thermal regimes,

and impoundments), barriers to movement (i.e., diversion dams), and loss of natural flow regimes are the primary factors threatening the persistence of Rio Grande silvery minnow. Long-term forecasts predict decreased quantity and increasing demand on Rio Grande water (Agency Technical Workgroup 2005), exacerbated in the near term by new consumptive withdrawals by the cities of Albuquerque and Santa Fe. Nonnative fishes (predators and competitors) may also negatively impact surviving Rio Grande silvery minnow populations, particularly when habitat becomes constricted. Interspecific competition from plains minnow *Hybognathus placitus*, introduced from the Canadian and Red rivers in Oklahoma via bait bucket transfer, likely contributed to extinction of Rio Grande silvery minnow from the Pecos River (Moyer et al. 2005; Hoagstrom et al. 2010).

Recommendations: No change in listing status is recommended. NMDOW should continue to actively participate with the U.S. Fish and Wildlife Service and other entities to implement the Rio Grande Silvery Minnow Recovery Plan (USFWS 2010). The primary focus of the revised plan is to prevent extinction of the species. Surface flows should be maintained permanently in the Rio Grande from Angostura Diversion to Elephant Butte Reservoir. Augmentation of extant wild populations with hatchery-reared Rio Grande silvery minnow should be continued, and hatchery stocks should be managed to ensure sufficient genetic diversity to support augmentation and establishment of wild populations for recovery. Fish passage projects that promote habitat connectivity should be supported. Status of Rio Grande silvery minnow should be closely monitored. Regulations regarding use of bait fishes should be strictly enforced for the Rio Grande.

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Arkansas River shiner, *Notropis girardi*

Distribution: The historical range of the Arkansas River shiner included plains streams of the Arkansas River drainage in Arkansas, Kansas, New Mexico, Oklahoma, and Texas (Cross and Collins 1975; Gilbert 1980; Matthews and Hill 1980). In New Mexico, the species occurred in the Canadian River drainage from the vicinity of Sabinoso downstream to the Texas border (Sublette et al. 1990; Pittenger and Schiffmiller 1997). Arkansas River shiners occupy stream reaches characterized by extremes in discharge and are commonly found in main channel shallow habitats with slow velocity and shifting sand and small gravel substrates (Bonner 2000; SWCA 2004).

Current Status: Arkansas River shiner was listed as state endangered in New Mexico in 1976. It was listed as federally threatened by the U.S. Fish and Wildlife Service in 1998 (USFWS, 1998). Critical habitat, including 51.8 km of the Canadian River in New Mexico, was designated for the species in 2001 (U.S. Office of the Federal Register 2001). In 2005, the Canadian River in New Mexico was excluded as critical habitat after the completion of a Cooperative Management Plan for the species within this portion of critical habitat (U.S. Office of the Federal Register 2005). Arkansas River shiner is absent or declining across much of its historical range (Cross et al. 1983; Larson 1988). In New Mexico, the species is currently found only in Revuelto Creek and the Canadian River downstream of Ute Dam in its native range, but is relatively abundant within these reaches (Dudley et al. 2012, NMDOW files). The Department assisted USFWS in the five-year status review and development of a federal recovery plan, which was published in 2024 (USFWS 2024). Arkansas River shiner was established in the Pecos River in the late 1970s, probably via bait bucket transfer, and is moderately common in the river between Fort Sumner and Brantley Reservoir (Bestgen et al. 1989, Platania et al. 2005). The population of Arkansas River shiner in the Pecos River is not protected by the Department or by the U.S. Fish and Wildlife Service.

Threats: Desiccation of occupied habitat and loss of peak flows are probably the major threats to the species.

Degradation of water quality also presents a threat to the species.

Recommendations: No change in listing status is recommended. Baitfish regulations should be strictly enforced in the Canadian River basin. Programs to protect flows in the Canadian River where Arkansas River shiner currently and historically occurred should be enforced (Canadian River Municipal Water Authority 2005). The Department should continue involvement in the USFWS recovery program.

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Southern redbelly dace, *Chrosomus erythrogaster*

Distribution: The southern redbelly dace is native to the upper and middle Mississippi River drainage, Great

Lakes drainages, and Ohio River drainage (Becker 1983). Isolated native populations, likely remnants of a wider Pleistocene distribution, occur in Arkansas, Colorado, Kansas, New Mexico, and Oklahoma (Miller and Robison 1973; Cross and Collins 1975; Woodling 1985; Robison and Buchanan 1988; Sublette et al. 1990). In New Mexico, the species occurs in the Canadian River, primarily in spring habitats associated with the upper Mora River, Coyote Creek, and tributaries to Black Lake (Sublette et al. 1990; Platania et al. 2007). The disjunct and widely separated distribution of remaining populations of redbelly dace is likely the result of post-Pleistocene warming (Platania et al. 2007). The species prefers spring-fed systems and small streams with cool clear water and dense aquatic vegetation (Pfleiger 1971; Boschung and Mayden 2004).

Current status: Southern redbelly dace was listed as state endangered in New Mexico in 1975. The species appears to be stable in Coyote Creek, but populations within the Mora River appear to have declined (Platania et al. 2007; Dudley et al. 2012). Viable populations of southern redbelly dace still presumably occupy several small tributaries that feed into Black Lake (Sublette et al. 1990; Dudley et al. 2012).

Threats: Excessive grazing probably impacted the historical range of this species. Modifications of spring systems for water development, sedimentation, and introduction of nonnative predators, particularly brown trout *Salmo trutta*, are currently the primary threats to southern redbelly dace in New Mexico.

Recommendations: No change in listing is recommended. Research to characterize the status of fishes in the Canadian River drainage provided an accurate and relatively current assessment of the status of southern redbelly dace in New Mexico (Platania et al. 2007; Dudley et al. 2012). In addition, a New Mexico Share with Wildlife funded study (Platania et al. 2007) to characterize the life history of southern redbelly dace was conducted and offers information to guide management and conservation of the species. Regulations regarding use of bait fishes should be strictly enforced in the Canadian River basin.

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Colorado pikeminnow, *Ptychocheilus lucius*

Distribution: Colorado pikeminnow formerly inhabited the Colorado River system from its mouth in Baja California upstream to Wyoming (Minckley et al. 1986; Mueller and Marsh 2002). Seasonal migrations of the species have been documented (Tyus and McAda 1984). A large-bodied fish, growing to lengths greater than 1.5 m, it was the largest native predator in the system. Historically, it was moderately common to abundant in much of the Colorado River system (Minckley 1973; Minckley and Marsh 2010). In New Mexico, its native range included at least the San Juan River (Koster 1960; Platania et al. 1991) and perhaps the Gila River (LaBounty and Minckley 1972).

Current Status: Colorado pikeminnow was state-listed as endangered in New Mexico in 1975 and as endangered by U.S. Fish and Wildlife Service in 1967. The Navajo Nation lists Colorado pikeminnow as endangered (Mikesic et al. 2005). Currently, Colorado pikeminnow persists mainly in the Green River in Utah

(Holden and Stalnaker 1975) and Yampa, Gunnison, and Colorado rivers in Colorado (Tyus and Karp 1989; Osmundson and Kaeting 1989). A small population of the species persists in the San Juan River in New Mexico and Utah (Platania et al. 1991). In 1996 through 1999, age-0 Colorado pikeminnow were stocked in the San Juan River and survival of these individuals were documented for several months (Trammell 2000). After a 2-year hiatus, stocking of age-0 Colorado pikeminnow resumed in 2002 and continued through 2018 (Furr 2019). Older fish (age-1 through age-5) have also been stocked opportunistically. Individuals from these stockings have survived at least 1 year (Golden and Holden 2005; Ryden 2007), but it is uncertain how successfully they will recruit into the adult population. Current recommendations for Colorado pikeminnow augmentation have shifted to annually stock only age-1+ Colorado pikeminnow. The shift from stocking age-0 fish is because age-1 fish are large enough (>130mm) to receive a passive integrated transponder (PIT) tag and thus are more reliably distinguished from fish produced in the wild. Relative abundance of Colorado pikeminnow in the San Juan River increased until 2011, but a decreasing trend has been occurring since (Durst 2016). Although the number of fish in the San Juan River has recently shown a decreasing trend, low numbers of larval Colorado pikeminnow have been collected in the San Juan River in all 10 of the past 10 years (Farrington et al. 2024), indicating that reproduction is occurring in the system. Further young-of-year (YOY) Colorado pikeminnow were also captured in 2016, 2017, 2019, 2020, and 2023 (Barkalow and Zeigler 2024). The density of YOY Colorado pikeminnow detected during 2023 annual monitoring was above the recently updated recovery goal for age-0 juvenile Colorado pikeminnow in the San Juan River. The recently revised recovery plan for the species has been approved (USFWS 2023) and recovery efforts in the San Juan River are accomplished under the auspices of the San Juan River Basin Recovery Implementation Program (SJRRIP).

Threats: Fragmentation of range, water depletion, modification of natural flows, contaminants, competition and predation by nonnative fishes, and loss of prey base are the primary threats to Colorado pikeminnow.

Recommendations: No change in listing status is recommended. The Department should continue to work through the SJRRIP to support and implement actions to recover Colorado pikeminnow. Efforts to remove or suppress nonnative fish populations in the San Juan River drainage, focusing on those that prey upon Colorado pikeminnow, should continue. Augmentation of the Colorado Pikeminnow population in the San Juan River should continue.

Roundtail chub *Gila robusta* was likely an important prey of Colorado pikeminnow and efforts to restore them to San Juan River have been reinitiated by NMDOW. Studies to determine reasons for low survivorship of stocked Colorado pikeminnow should be undertaken. Strict regulations regarding use of bait fishes and stocking of nonnative fishes should be adopted and implemented in the San Juan River basin.

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Loach minnow, *Tiaroga cobitis*

Distribution: Loach minnow is endemic to the Gila River drainage of southwest New Mexico, southeast and east-central Arizona, and northeast Sonora (Miller and Winn, 1951; Minckley, 1973; Miller, 2006, Minckley and Marsh 2010). In New Mexico, loach minnow was historically found throughout warmwater reaches of the San Francisco and Gila rivers, and their major tributaries (Koster 1957; Propst et al. 1988; Paroz and Propst 2007). Loach minnow is found almost exclusively among cobble in riffle habitats where water velocity is rapid (Propst and Bestgen 1991).

Current Status: Loach minnow was state-listed as threatened in 1975 and uplisted to endangered in 2010. Loach minnow was federally listed as threatened in 1986 and uplisted to endangered in 2012 (USFWS 2012). Critical habitat, including much of the currently occupied habitat in New Mexico, was designated for the species in 2007 and updated in 2012 (USFWS 2012). A federal recovery plan for the species was finalized in 1991 (USFWS 1991). Loach minnow has been eliminated from Sonora and much of its historical range in Arizona (Minckley 1973; Marsh et al. 1990; Rinne and Minckley 1991; Olden and Poff 2005; Miller 2006; Minckley and Marsh 2010). In New Mexico, the species' range in the Gila and San Francisco drainages is fragmented and negatively impacted by wildfires (Propst et al. 1988; Paroz and Propst 2007). Loach Minnow has been restocked since the fire and was captured there annually from 2015 to 2020. Loach minnow was stocked into Saliz Canyon, a tributary to the San Francisco River, in 2016, 2017, and 2019. Subsequent surveys indicated that the species was only established in areas near the original stocking location and additional stockings were initiated in 2023 to increase the distribution in Saliz Canyon and will continue through 2026 (Johnson et al. 2024). Large populations persist in an 8 km reach of the lowermost section of the West Fork Gila River, in the lower reaches of the Middle Fork Gila River, and in the Gila River within the lower half of the Cliff-Gila Valley (NMDOW files). Predation by nonnative yellow bullhead *Ameiurus natalis* and smallmouth bass *Micropterus dolomieu*, as well as drought and habitat degradation, have contributed to loach minnow abundance declines over time (Propst, et al., 2008).

Threats: Range fragmentation, stream desiccation by diversion or pumping, loss of natural flow regime,

habitat degradation (channelization and sedimentation), and nonnative fishes (e.g., channel catfish *Ictalurus punctatus*, yellow bullhead, smallmouth bass, and red shiner *Cyprinella lutrensis*) are primary threats to the species (Propst et al. 2008, Stefferud et al. 2011). Elevated sediment loads, caused by extensive wildfires in uplands, likely contributed to local declines (particularly West Fork Gila River and lower San Francisco River) occasionally since the late 1990s.

Recommendations: The natural flow regime of the Gila River (including the tributary of the San Francisco River) should be maintained; additional water depletions or diversions within occupied or historical loach minnow habitat should be minimized. Nonnative fishes should be removed or abundances suppressed. Nonnative warmwater fishes should not be stocked in or near occupied habitats. Cooperative efforts with Arizona Game and Fish Department, The Nature Conservancy, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and U.S. Forest Service, to conserve loach minnow should continue. Regulations regarding use of bait fishes should be strictly enforced by NMDOW.

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Zuni bluehead sucker, *Catostomus discobolus yarrowi*

Distribution: Zuni bluehead sucker historically occupied headwater streams of the Little Colorado River in east-central Arizona and west-central New Mexico (Smith et al. 1983; Crabtree and Buth 1987). In New Mexico, the sucker currently is limited to the headwaters of the Zuni River drainage. The species most

frequently occurs in streams reaches with cobble and bedrock substrates with slow-to-moderate-velocity water (Propst et al., 2001).

Current Status: Zuni bluehead sucker was listed as state endangered in New Mexico in 1975. A state-sponsored recovery plan for the species was approved by New Mexico State Game Commission in December 2004 (Carman 2004). Currently, the species is limited to a few areas in headwater tributaries and springs of the Zuni River basin in New Mexico (Hanson 1980; Propst et al. 2001; Carman 2007). Recent genetic studies indicate that the subspecies is sufficiently distinct from other populations of bluehead sucker and that remaining populations in the Zuni River drainage should be recognized as a separate management unit (Douglas et al. 2013). In 2014, Zuni bluehead sucker was federally listed as endangered under the Endangered Species Act, and critical habitat for the species was designated in 2016 (U.S. Office of the Federal Register 2014, 2016).

Threats: Habitat degradation, mainly excessive siltation of streams, and loss of wetted habitat are the primary threats to the species. While efforts are ongoing to restore the Zuni River watershed, increased development in the area may exacerbate these threats. Recent work (Frus et al. 2020) demonstrated that stream flow in spring fed habitats occupied by Zuni Bluehead Sucker is dependent on relatively recent (70-year-old) groundwater that is recharged from rain and snow events. Increasing aridity and decreased water availability as a result of climate change threatens the perennial stretches of occupied habitat (MacDonald 2010). Nonnative fishes, such as green sunfish *Lepomis cyanellus*, also limit opportunities to expand the range and abundance of Zuni bluehead sucker. The presence of nonnative crayfish in the basin might further reduce habitat suitability for Zuni bluehead sucker.

Recovery Plan Status: The Zuni bluehead sucker recovery plan was approved by the Commission in 2004 (Carman 2004). Major recovery actions have included annual monitoring of existing populations and rearing Zuni bluehead sucker at the City of Albuquerque BioPark's Aquatic Conservation Facility. The Zuni Pueblo tribal council has prohibited electrofishing in Pueblo lands. As a result, recent population status on pueblo lands is uncertain though their presence was confirmed by visual surveys. No revision to the plan is called for at this time.

Recommendations: No change in listing status is recommended. The Zuni Bluehead Sucker Recovery Plan, per guidelines of New Mexico Wildlife Conservation Act, was developed with participation of various stakeholders (e.g., Pueblo of Zuni, U.S. Forest Service, The Nature Conservancy, and private landowners) and implementation should continue (Carman 2004;2007). Collaborative conservation efforts should be formalized through development of a cooperative agreement. Efforts should be made to improve Zuni River watershed conditions and to provide long-term security for Zuni bluehead sucker habitats. The effects of groundwater pumping on surface flows in Zuni River drainage needs elucidation. Nonnative fishes should be removed from historical Zuni bluehead sucker habitats. Monitoring and protection of extant populations should continue.

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Blue sucker, *Cycleptus elongatus*

Distribution: Blue sucker occurs in larger rivers throughout much of the Mississippi-Missouri River and Gulf Coastal drainages (Gilbert 1980). The historical range of the species in New Mexico was the Pecos River from north of Carlsbad downstream to the New Mexico/Texas border and the lower reaches of the Black River (Sublette et al. 1990). Archaeological evidence suggests that the species also occupied the Rio Grande in New Mexico (Gehlbach and Miller 1961), but no specimens exist to confirm its presence there. There is evidence of genetic and physical differentiation in blue suckers in the Rio Grande Basin (including the Black River), but the Rio Grande strain has not yet been formally described as its own species (Buth and Mayden 2001; Bessert 2006). Blue sucker is most common in rivers with moderately fast flowing water and deep pools, and prefers hard and smooth substrates such as cobble, gravel, boulder, and bedrock (Moss et al. 1983, Bio-West 2007).

Current Status: Blue sucker was state listed as endangered in New Mexico in 1976. The species has declined throughout much of its native range (Moss et al., 1983; NatureServe 2007). They are listed as either species of greatest conservation need, threatened, endangered, or presumed extirpated in 19 of the 23 states that contain their historical distribution (Steffensen et al. 2015; Acre et al. 2021). In recent decades in New Mexico, it was regularly found in the Pecos River only between Brantley Dam and Avalon Reservoir, a 15-km river reach, whereas it was rare in the Black River and the Pecos River downstream of Avalon Dam (Zymonas and Propst 2008). Populations of blue sucker have drastically declined since 2002 as a result of recurring outbreaks of toxic golden algae *Prymnesium parvum* downstream from Brantley Lake. Blue sucker is likely extirpated from the Pecos River, and it is unknown if individuals in the Black River comprise a self-sustaining population. Mechanical sampling in 2012, 2013, 2020, 2023, and 2025 and environmental eDNA sampling in 2024 suggest that the Black River population persists in extremely low densities (Caldwell 2013, Hatt 2021, Thompson 2024, Thompson 2025, Thompson 2026).

Threats: Range fragmentation by dams preventing spawning migrations, loss of high-velocity habitats, poor water quality, stranding in canals, lack of consistent flow, and toxic conditions caused by golden algae are the primary threats to the species in New Mexico. Pecos River fish kills attributed to golden algae occurred below Malaga, NM by 1988 (Rhodes and Hubbs 1992) and from Brantley Lake downstream beginning in 2002. Toxic conditions have recurred sporadically throughout this reach as recently as June 2021. (S. Denny, NMDOW, personal communication). Intensified oil and gas development represents an increasing threat to water quality and quantity in the Black River drainage.

Recommendations: No change in listing status is recommended. Permanent flows in the Pecos River between Brantley Dam and Avalon Reservoir should be maintained. In recent years, the river has been dried for weeks at a time between Brantley Dam and Avalon Reservoir (J. Hatt, NMDOW, personal communication). The causes of golden algae blooms in the lower Pecos River system need to be determined and efforts made to preclude such conditions from occurring in the future. The Black River above the CID canal generally has better water quality than the lower Pecos River, especially in the Pecos River below Malaga where salinity reaches toxic levels for the Texas hornshell mussel, which is a native mussel that uses blue suckers as host fish (Carman 2007, Zymonas and Propst 2008, Levine et. al. 2012). The water quality of the Pecos River likely limits suitability for fishes (Zymonas and Propst 2008). Following cessation of irrigation releases, blue suckers in canals of the Carlsbad Irrigation District should be rescued and stocked in the Black River. A captive propagation effort or identifying wild source populations to facilitate conservation and recovery of blue sucker in New Mexico should be supported. Actions to protect the water quality and quantity of the Black River should be promoted. Further study on available and adequate habitat in the Black River for all life stages of blue suckers should be conducted to find ideal repatriation locations. A state recovery plan should be completed to coordinate and identify actions needed to restore populations.

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Gray redhorse, *Moxostoma congestum*

Distribution: The historical range of gray redhorse included Gulf Coastal drainages of central and west Texas and northwestern Mexico, the Pecos River and Rio Grande in southern New Mexico and Texas, and Mexican tributaries to the Rio Grande (Jenkins 1980; Miller 2006). In New Mexico, it historically occurred in the Rio Grande downstream of Socorro and in the Pecos River drainage (including the Black River) from about Roswell downstream to the Texas/New Mexico border (Sublette et al. 1990). In addition to riverine habitats, gray redhorse also occupied several lower Pecos River impoundments (e.g., Six Mile and Ten Mile reservoirs). Gray redhorse is most commonly found in deep, slow-velocity water over a variety of substrates.

Current Status: Gray redhorse was state listed as threatened in New Mexico in 1976 and uplisted to endangered in 2008. Prior to 2003, gray redhorse occurred only in the Pecos River downstream of Brantley Lake and in the lower reaches of the Black River in New Mexico (Cowley and Sublette 1987; Sublette et al. 1990). Fish kills caused by recurring outbreaks of golden algae *Prymnesium parvum* since 2002 have drastically diminished the status of gray redhorse in the Pecos River and it is no longer found upstream of Bataan Dam in Carlsbad (Zymonas and Propst 2008). It remained common in the reach between Carlsbad and Six Mile Dam after 2002, but extensive mortality occurred there during golden algae outbreaks in 2007, restricting the population to the small reservoir at Six Mile Dam. Recently, gray redhorses were also detected via

environmental DNA sampling just downstream of Bataan Recreation Area (Hatt 2023). Thus, the only viable historical populations in New Mexico occur in the lower Black River from Blue Spring to the Pecos River confluence and Six Mile Reservoir up to Bataan Dam. This represents a contraction to roughly 30% of the species' occupied range within New Mexico since 2002, and to 10% of historically occupied stream length in the New Mexico portion of the Pecos River drainage. Presence of dams, habitat desiccation, and golden algae blooms prevent natural recolonization of formerly occupied Pecos River reaches. The Black River population appears stable and has documented smaller size classes, indicating continued recruitment (Thompson 2024, Thompson 2025, Thompson 2026). From 2012 to 2018, individuals from the Black River were released yearly into the Delaware River as part of a reintroduction project. In 2016 and 2018, multiple juveniles were detected in the Delaware River indicating that transplanted individuals were successfully reproducing. In 2019 and 2020, multiple long-term drydowns of the Delaware River occurred. Surveys conducted in 2020 and 2021 did not yield any captures, but surveys in 2022-2025 detected several gray redhorse, indicating that either the population has persisted in some way or has been recolonized (Hatt 2022, Thompson 2024, Thompson 2025, Thompson 2026).

Threats: Range fragmentation by dams, habitat desiccation, modified flow regimes, contaminants, stranding in canals, and toxic conditions caused by golden algae are the primary threats to the species in New Mexico. Pecos River fish kills attributed to golden algae occurred below Malaga, NM by 1988 (Rhodes and Hubbs 1992) and from Brantley Lake downstream beginning in 2002. Toxic conditions have recurred sporadically throughout this reach and as recently as June 2021 (S. Denny, NMDOW, personal communication). Intensified oil and gas development represents an increasing threat to water quality and water quantity in the Black and Delaware river drainages.

Recommendations: No change in listing status is recommended. Permanent flows in the Pecos River between Brantley Dam and Avalon Reservoir and in the Delaware River should be maintained. Causes of golden algae blooms in the lower Pecos River system should be determined, and measures to prevent, or limit, their outbreaks in future should be undertaken. Effects of water quality on recruitment and survival of gray redhorse should be determined, and if deleterious constituents found, their effects ameliorated or eliminated. Actions to protect the water quality and quantity of the Black and Delaware rivers should be promoted. Further research into recruitment is needed, including new methods to capture larval suckers and identification of spawning locations and habitat to help better protect and conserve all life stages.

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Pecos gambusia, *Gambusia nobilis*

Distribution: Pecos gambusia is endemic to springs and spring systems of the Pecos River valley of southeast New Mexico and Trans-Pecos Texas (Hubbs and Springer 1957). Springs and gypsum sinkholes on Bitter Lake National Wildlife Refuge and Blue Spring and its outflow are the only documented areas of historical occurrence in New Mexico (Bednarz 1979; Echelle and Echelle 1980). Pecos gambusia occurs almost exclusively in springs and spring-run habitats with lithic or vegetative cover (Echelle et al. 1989).

Current Status: Pecos gambusia was federally listed as endangered in 1970. It was state-listed as endangered in New Mexico in 1975. A recovery plan for the species was finalized in 1983 (USFWS 1983), and the USFWS completed five-year status reviews in 2018 and 2023 (USFWS 2018; USFWS 2025). These reviews updated biology and life history information. Additionally, the reviews stated that the abundance of Pecos Gambusia is declining across its range, and concerns over habitat loss and alteration make the species even more vulnerable to greater population loss (USFWS 2018; USFWS 2025). The range of Pecos gambusia has diminished in Texas (Echelle and Echelle 1980), but it still occupies its documented historical New Mexico range. Pecos Gambusia was recently split into 3 species, with Pecos Gambusia occupying the Leon Springs watershed in Texas (Portnoy et. al. 2025). The remaining Texas populations were designated as *Gambusia pyrros*, and the populations in Bitter Lake National Wildlife Refuge were described as *Gambusia echelleorum*. It is currently unknown under which species name the Blue Spring population belongs.

Threats: Groundwater mining, habitat modification and loss and nonnative predators present the greatest threats to Pecos gambusia. Hybridization with nonnative mosquitofish such as the western mosquitofish *Gambusia affinis* is also a threat (Swenton and Kodric-Brown 2007; USFWS 2025).

Recommendations: No change in listing status is recommended. Investigations into habitat preferences and hybridization with western mosquitofish should continue. Potential sites for establishing additional populations should be evaluated and, if suitable, stocked with Pecos gambusia or *Gambusia echelleorum*, conditional on NMDOW recognizing the name change. Further investigation into the species split is needed to better understand how to manage the New Mexico population and if the name change needs to be updated in this document.

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Spikedace, *Meda fulgida*

Distribution: Spikedace is endemic to the Gila River drainage of southwest New Mexico, southeast and central Arizona, and perhaps northern-most Sonora (Koster 1957; Minckley 1973; Miller and Winn 1951; Miller 2006; Minckley and Marsh 2010). It is found in low- to moderate-gradient warmwater streams in shallow runs with moderate-velocity water over sand and small gravel substrates (Minckley 1973; Propst et al.

1986). In preferred habitats, it is occasionally found in large aggregations.

Current Status: Spikedace was state-listed as a threatened species in 1975 and uplisted to endangered in 2006. Spikedace was federally listed as threatened in 1986 and uplisted as endangered in 2012 (USFWS 2012). A federal recovery plan for spikedace was finalized in 1991 (USFWS 1991). Critical habitat was designated for the species in much of its occupied habitat in New Mexico (USFWS 2012). In New Mexico, spikedace were eliminated from the San Francisco River drainage (Anderson 1978; Propst et al. 1986), but coincident with repatriation efforts spikedace were captured in 2017, 2019, and 2020 surveys (Ferguson and Zeigler 2021). Surveys in the San Francisco River indicate that the species is established and present throughout most of the river above Pleasanton, NM (Ferguson and Zeigler 2021). An inventory of the San Francisco River below the Pleasanton Diversion in 2023 showed an absence of spikedace at all 7 sites sampled (Johnson et al. 2024). The range of the species elsewhere in the Gila River drainage in New Mexico is fragmented but stable; it is currently found mainly in the lower portions of the Cliff-Gila Valley reach of the Gila River and lower reaches of West Fork Gila River (Paroz and Propst 2007). Recent surveys failed to find it in East Fork Gila River (Paroz et al. 2006; Ferguson and Zeigler 2020; Johnson et al. 2024). It was once thought to have been eliminated from Middle Fork Gila River, but was captured again in 2007. The species was captured in the Middle Fork Gila River intermittently through 2017, but has not been captured there since then. Spikedace was frequently found near the mouth of the Middle Box upstream of Redrock (Propst et al. 1986; Paroz et al. 2006; Paroz and Propst 2007), but it has not been found there since 2010 (NMDOW files). Efforts to stock Spikdace in the Tularosa River, which is a tributary of the San Francisco River, began in 2025 and are planned through 2027 to help increase the spatial distribution of the species.

Threats: Dewatering of riverine habitats by diversion or pumping, ash and sediment flows associated with wildfires, modification of occupied habitats (channelization and removal of woody debris), range fragmentation, and nonnative predators are the primary threats to the species (Paroz and Propst 2007; Stefferud et al. 2011). Range fragmentation (by artificial barriers and stream desiccation) limits the ability of the species to repopulate areas adversely modified by human activity. From 1998 through 2006, drought exacerbated intensity of aforementioned human-caused threats.

Recommendations: No change in listing status is recommended. A natural flow regime in Gila River should be maintained and additional depletions or diversion of the Gila River within occupied or potential spikedace habitats should not occur. Removal of nonnative fishes, particularly predators, should be conducted within currently occupied and potential habitats of spikedace. Stocking of nonnative warmwater fishes should not occur in streams in the Gila River drainage. Efforts to expand spikedace range within the Gila River drainage should continue. Cooperative efforts with the Arizona Game and Fish Department and The Nature Conservancy, as well as U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and U.S. Forest Service, to conserve spikedace should continue. Regulations regarding use of bait fishes should be strictly enforced by NMDOW.

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Pecos bluntnose shiner, *Notropis simus pecosensis*

Distribution: Pecos bluntnose shiner formerly inhabited the Pecos River from near Santa Rosa downstream to Major Johnson Springs near Carlsbad (Hatch et al. 1985). Historical occurrence of persistent populations in the Texas portion of the Pecos River is doubtful (Platania 1995). The species mainly occurs in pool-and-run mesohabitats within wide, shallow, sand-bed river reaches (Hoagstrom et al. 2008).

Current Status: Pecos bluntnose shiner was federally listed as threatened in 1987. It was state-listed as threatened in New Mexico in 1976 and uplisted to endangered in 2006. The species has an approved recovery plan (USFWS 1992). Currently, Pecos bluntnose shiner is found in the Pecos River from near Old Fort State Park (near Fort Sumner) downstream to the inflow area of Brantley Reservoir near Carlsbad (Hoagstrom et al. 2008). Within this river reach, the fish tends to be most common upstream of Roswell. Systematic monitoring efforts indicated diminishing numbers beginning in 2002, associated with drought and desiccation of the Pecos River upstream of Roswell. Despite recovery efforts, abundance declined to historically low levels by 2005 (Davenport

2006). Pecos bluntnose shiner abundance increased after 2005, likely a consequence of maintenance of continuous flow from Sumner Dam to Brantley Lake (avoidance of intermittency) and increased summer rainfall (NMDOW and USFWS files). Beginning in 2011, abundance again declined and approached historically low levels. The decline was likely due to drought conditions and river drying precluding successful spawning and recruitment (Davenport 2012). Following continuous river surface flows since 2014, the population appears to be recovering (Davenport 2021). A five-year status review of Pecos bluntnose shiner was completed in 2020 (USFWS 2020).

Threats: Primary threats to Pecos bluntnose shiner include large-volume, extended-duration block releases from reservoirs during the summer reproductive season, seasonal dewatering, artificially depressed river flows, channelization, diminished habitat diversity, non-point pollution from agricultural sources, and range fragmentation. High-volume reservoir releases during the summer spawning season displace large numbers of eggs and larvae into unsuitable habitats (Dudley and Platania 2007; Hoagstrom et al. 2008). The reduction in off-channel, low-velocity habitats to mitigate downstream displacement also presents a concern for long-term persistence. Finally, forecasted warmer and drier climatic conditions (Agency Technical Workgroup 2005) threaten to exacerbate stress from habitat constriction.

Recommendations: Based on repetitive declines in abundance and anticipated increased threats to habitat because of drought and other factors (mainly river drying), no change in status is recommended. Multi-agency efforts to manage flows in the Pecos River to meet irrigation needs without imperiling surviving populations of Pecos bluntnose shiner should incorporate restoration or mimicry of natural flows. Permanent surface flows should be maintained throughout the currently occupied range of Pecos bluntnose shiner and additional water acquisition options should be identified. Short-term, emergency actions such as rescue, salvage, and re-release of fish to the river following drying events should be considered to prevent extirpation of the species in the wild. The possibility of establishing off-channel, low velocity habitats in the lower Pecos River valley, especially on NMDOW lands, should be investigated. Strict enforcement of baitfish regulations should be followed throughout the Pecos River drainage.

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THREATENED

Gila Trout, *Oncorhynchus gilae*

Distribution: Historically, Gila trout inhabited cool and coldwater reaches of the Agua Fria, Gila, San Francisco, and Verde river drainages in southwest New Mexico and eastern and central Arizona (Miller 1950; Minckley 1973; Behnke 1992; Behnke 2002). In New Mexico, Gila trout formerly occurred in the Gila River from its confluence with Mogollon Creek upstream through its headwaters and in tributaries of the San Francisco River (Propst et al. 1992). Although Gila trout historically inhabited a variety of stream habitats, it now occurs mainly in small headwater streams (Propst et al. 1992); in such streams availability of pool habitat appears to be critical to abundance (Rinne and Medina 1988; Propst and Stefferud 1997).

Current Status: Gila trout was listed as endangered by U.S. Fish and Wildlife Service in 1967, but was downlisted to threatened in 2006 (USFWS 2006). Gila trout was listed as endangered in 1975 by New Mexico and was downlisted to threatened in 1988. The Gila Trout Recovery Plan (USFWS 20022) provides details on what must be accomplished for delisting the species. Gila trout currently occupies 42.1 km of its historical Arizona range and currently occurs in about 136.3 km of stream in New Mexico. Abundance in occupied habitats is variable, ranging from fewer than 100 adults in the smallest to several thousand adults in the largest (Propst and Stefferud 1997).

Threats: Hybridization with nonnative rainbow trout, competition with nonnative salmonids, population and habitat loss as a result of wildfire, and habitat degradation are the primary threats to the species.

Recommendations: No change in listing status is recommended. Cooperative efforts with Arizona Game and Fish Department, U.S. Fish and Wildlife Service, and U.S. Forest Service to restore the species to its historical range should continue. A fish barrier should be constructed on the West Fork Gila River and removal of nonnative salmonids from the Upper West Fork Gila River drainage, Cow, Turkey, Rain, and West Fork Mogollon creeks should be initiated. As soon as nonnative trout are completely removed from each stream, Gila Trout should be repatriated. Because of limited distribution and abundance, all reasonable efforts should be undertaken to protect extant Gila trout populations from effects of wildfire and fire-induced ash flows. As additional populations are established, each should be evaluated for sport fishing potential and, if appropriate, be opened to angling.

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Mexican tetra, *Astyanax mexicanus*

Distribution: The native range of Mexican tetra extends from Gulf Coastal drainages of eastern and central Mexico northward to the Nueces River of Texas (Birkhead 1980). It occurs in the Rio Grande from its mouth upstream to the Big Bend region and in the Pecos River upstream to Dexter (Koster 1957; Sublette et al. 1990). Mexican tetra tends to be more common in low-velocity pool habitats in small streams and spring

systems.

Current Status: Mexican tetra was state listed as threatened in New Mexico in 1976. It is locally common in small streams and springs along the Pecos River near Roswell and also at Blue Spring. Mexican tetra is regularly captured during annual Pecos pupfish monitoring at Bitter Lake National Wildlife Refuge, as recently as 2025 (NMDOW files). Recent sampling indicates continued persistence in Blue Spring, although catch rates were low (NMDOW files). Mexican tetra is rare in the mainstem Pecos River, Black River, and Delaware River (NMDOW files; T. Frey, BLM, personal communication).

Threats: Loss of habitat by groundwater mining, diversion of flows from small streams, and outbreaks of toxic golden algae appear to be the main threats to the species in New Mexico.

Recommendations: No change in listing status is recommended. Surveys to document the current distribution and status of the species in New Mexico should be undertaken. The causes of golden algae blooms in lower Pecos River system need to be determined and efforts made to preclude such conditions from occurring in the future. Baitfish use regulations should be strictly enforced in the entire Pecos River drainage.

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Peppered chub, *Macrhybopsis tetranema*

Distribution: Peppered chub is native to the Arkansas River drainage of Arkansas, Colorado, Kansas, New Mexico, Oklahoma, and Texas (Wallace 1980). In New Mexico, it historically occurred in the Canadian River drainage downstream of the confluence of Ute Creek and in Ute Creek itself (Sublette et al. 1990; Pittenger and Schiffmiller 1997). Peppered chub are found mainly in shallow, permanently flowing plains streams in moderate-velocity habitats with clean sand and small gravel substrate (Miller and Robison 1973; Cross and Collins 1975).

Current Status: In New Mexico, the peppered chub was listed as state threatened in 1978 and federally listed as endangered in 2022. As of 1999, the species had disappeared from approximately 90% of its historical range-wide distribution and were believed to persist as only two geographically isolated populations (Luttrell et al. 1999). Peppered chub is now extirpated from Colorado and Oklahoma and either extirpated or has declined below detection in Kansas (Pennock et al. 2017). In New Mexico, peppered chub are currently restricted to the Canadian River downstream of Ute Dam and Revuelto Creek, where they are widely distributed at low densities (Dudley et al. 2012, NMDOW files). NMDOW monitors this population annually and reports this information to the USFWS. NMDOW and NMISC have entered into an agreement to fund annual monitoring and provide more opportunities for research and conservation actions. The New Mexico population exhibits large annual variability but appears relatively stable since 2012. Though habitat degradation and drought still threaten the species, the USFWS, NMDOW, and NMISC have been engaged in maintaining adequate flows from Ute Dam to ensure long-term persistence. A draft federal recovery plan was published in the federal register in 2025 (USFWS 2025), and NMDOW provided comments.

Threats: Desiccation of occupied habitat and loss of peak flows are the primary threats to the peppered chub. Water quality during low flows, particularly high temperatures and elevated conductivity, may also affect survival and recruitment.

Recommendations: No change in listing status is recommended. Permanent flows in the Canadian River downstream of Ute Dam should be maintained and these flows should minimally attempt to mimic a natural hydrograph. Investigations into the causes of changes to water quality in the Canadian River should be

conducted. Regulations regarding use of baitfishes should be strictly enforced in the Canadian River basin. A captive propagation effort to facilitate conservation and recovery of peppered chub should be supported.

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Suckermouth minnow, *Phenacobius mirabilis*

Distribution: Suckermouth minnow occurs throughout much of the central and lower Mississippi River system, including the Missouri and Ohio rivers drainages as well as tributary rivers to the Gulf of Mexico in Texas (Becker 1983; Hubbs et al. 1991). In New Mexico, the species' historical range includes only the Canadian and Dry Cimarron rivers (Sublette et al. 1990), although it has been introduced, probably via baitbucket, to the Pecos River near Fort Sumner (J.E. Brooks, U.S. Fish and Wildlife Service, personal communication). Suckermouth minnow most commonly occupies shallow, moderate-velocity runs over sand and pea gravel bottoms (Minckley 1959; Deacon 1961; Jenkins and Burkhead 1994).

Current Status: Suckermouth minnow was listed as state threatened in New Mexico in 1976. Although the species is apparently relatively common in the central portion of its range, it has declined considerably on the periphery of its range (Cross et al. 1985; T.P. Nesler, Colorado Parks and Wildlife, personal communication). In New Mexico, suckermouth minnows currently occupy the mainstem Canadian River above Conchas Reservoir and the lower Cimarron and Vermejo rivers and populations in these reaches appear to be stable (Dudley et al. 2012). The species was not found during surveys in the Dry Cimarron River and may be extirpated (S.P. Platania, American Southwest Ichthyological Researchers, personal communication).

Threats: The primary threats to suckermouth minnow are likely excessive sedimentation of run habitats, habitat desiccation, and habitat fragmentation from diversions (Bestgen et al, 2003).

Recommendations: No change in listing status is recommended. Baitfish regulations should be strictly enforced in the Canadian River basin.

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Pecos pupfish, *Cyprinodon pecosensis*

Distribution: Pecos pupfish formerly occupied the Pecos River and associated floodplain habitats from Bitter Lake National Wildlife Refuge in New Mexico downstream to the confluence of Independence Creek in Texas (Echelle and Echelle 1978; Hoagstrom and Brooks 1999). The species is tolerant of saline conditions and is usually associated with low- to moderate-velocity run and pool habitats (including backwaters) in streams and floodplain gypsum sinkholes (Echelle and Echelle 1978; Hoagstrom and Brooks 1999; Hoagstrom 2009).

Current Status: Pecos pupfish was previously proposed for federal listing as endangered (USFWS 1994). However, the proposal was withdrawn and a conservation agreement for Pecos pupfish was adopted and implemented. The species was state-listed as threatened in 1988 in New Mexico. A Conservation Strategy is currently underway. Pecos pupfish was designated as proposed threatened by the USFWS in 2024 (USFWS 2024a), but no official designation has yet been published in the federal register. Strict baitfish regulations were adopted by the State Game Commission in 1998 and a public information brochure on these regulations was published and disseminated in 1999. The Fisheries Rule was updated in 2026 to further restrict baitfish regulations. Pecos pupfish has been eliminated from all of its Texas range except Salt Creek and a captive population at the Fort Worth Zoo (Wilde and Echelle 1992; Hoagstrom 2003; Melissa Cesarez, TPWD, pers. comm.). Reintroduction efforts in 2017 resulted in an additional population established in the wild in Texas at some private ponds (Megan Bean and Melissa Cesarez, TPWD, pers. comm.). The distribution Pecos Pupfish in New Mexico is largely unchanged from its historical distribution. This distribution includes naturally fragmented habitats where the species thrives. It currently occurs in appropriate habitats on Bitter Lake National Wildlife Refuge, Bottomless Lakes State Park (Hoagstrom and Brooks 1999; Hoagstrom 2003) and the BLM Overflow Wetlands. It is irregularly found in the mainstem Pecos River (S.R. Davenport, USFWS FWCO, pers. Comm; USFWS 2024b). A Monitoring Plan was developed and finalized in 2010, and monitoring of New Mexico populations began in 2011 (Pittenger 2010). Catch rates have fluctuated year to year, but generally appear to be stable (NMDOW files).

Threats: Nonnative sheepshead minnow, which hybridizes with Pecos pupfish, is the primary threat to the species. Sheepshead minnow was probably established in the Pecos River by bait introduction. This nonnative is largely responsible for the elimination of the species from much of its Texas range (Echelle and Conner 1989; Echelle et al. 2006) and has become established in the Pecos River of New Mexico downstream of Brantley Reservoir (Echelle et al. 1997; Echelle and Echelle 2007). Hybridization in New Mexico occurs in Eddy County, but the populations in Chavez County (Bitter Lake National Wildlife Refuge, Bottomless Lakes State Park, BLM Overflow Wetlands) show no evidence of hybridization (Echelle et al. 2006; Echelle and Echelle 2007; Carson 2015; Whiteley 2023). Currently, much occupied Pecos pupfish habitat is threatened by golden alga *Prymnesium parvum*. Large-scale fish kills attributed to toxins produced by this alga have occurred in the Pecos River in New Mexico and Texas (Rhodes and Hubbs 1992; Denny 2006; Barkoh and Fries 2010). Although no Pecos pupfish kills have been reported, fish kills in nearby habitats, including Cottonwood and Devil's Inkwell lakes at Bottomless Lakes State Park, have occurred (S. Denny, NMDOW, pers. comm.). Toxic golden alga blooms in occupied off-channel Pecos pupfish habitats would be detrimental to surviving

populations. Modification of off-channel habitats, groundwater depletion, seasonal stream dewatering, and contaminants from oil and gas extraction activities also threaten the persistence of the species.

Recommendations: No change in listing status is recommended. Continuation of the Pecos Pupfish Conservation Agreement is necessary, under which a Conservation Strategy document is currently being developed. Baitfish regulations for Pecos River need to be rigorously enforced to prevent the further spread of sheepshead minnow and other nonnative fish species. Habitat restoration projects (e.g., fish barriers) that prevent the spread of sheepshead minnow should be considered where needed. Monitoring the spread of sheepshead minnow and hybridization with Pecos pupfish should continue. Effects of groundwater pumping on sinkhole habitats of Pecos pupfish need to be determined and evaluated. Proposed oil and gas development activities in vicinity of Pecos pupfish habitat should be carefully scrutinized and modified, if necessary, to avoid introduction of contaminants to occupied or potential Pecos pupfish habitats. Neither native nor nonnative sportfish should be stocked in habitats supporting Pecos pupfish. Additional populations of Pecos pupfish should be established in suitable, secure habitats.

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White Sands pupfish, *Cyprinodon tularosa*

Distribution: White Sands pupfish is endemic to the endorheic Tularosa Basin of south-central New Mexico (Miller and Echelle 1975). Although it was formerly believed to have naturally occurred in Mound Spring and possibly Lost River (Miller and Echelle 1975; Jester and Suminski 1982), it is only known to be native to Malpais Spring (and associated playa habitats) and Salt Creek (Pittenger and Springer 1999). White Sands Pupfish has been introduced to three isolated habitats in the Mound Spring complex and the Lost River.

Current Status: White Sands pupfish was originally state listed in 1975 as an endangered species in New Mexico before being downlisted to its current state status as threatened. White Sands pupfish occupies its entire, but limited, historical range in the Tularosa Basin. Additional populations were established in Main Mound Spring and Lost River, also in the Tularosa Basin (Pittenger and Springer 1999) and recently in North and South Mound Springs. A Cooperative Agreement for the Conservation of White Sands Pupfish (2020) provides for the protection and monitoring of its status. New Mexico Department of Game and Fish, USFWS, White Sands Missile Range (WSMR), Holloman Air Force Base (HAFB), and White Sands National Park are signatories to the Agreement. Monitoring data collected under this Agreement indicate that the species is generally stable (Carman 2010; Pittenger 2024; Pittenger 2025). The White Sands Pupfish Conservation Plan (WSMR and HAFB 2015) was completed in 2015 and outlines conservation actions to be carried out over the course of the next several years, including salt cedar removal and the creation of replicate populations. Within occupied habitats, White Sands pupfish is common (Pittenger and Springer 1996; Carman 2004; Carman 2010; Pittenger 2024). The Malpais Spring and Salt Creek populations are variable year to year, but have shown stable trends over the long term (Pittenger 2024; Pittinger 2025). All relict populations presently have at least one replicate, and all populations are monitored annually and appear to be stable.

Threats: Habitat loss through diminished discharge from springs and salt cedar encroachment, habitat degradation by military activities and weapons testing, and introduction of crayfish and nonnative fishes (particularly predators) are the primary threats to the species (WSMR and HAFB 2015). However, habitat degradation by military activities and weapons testing is addressed in the Cooperative Agreement. Previously, feral horses degraded habitats of White Sands pupfish, but these have been removed from White Sands Missile Range.

Recommendations: No change in listing status is recommended. Management activities under the Cooperative Agreement for the Conservation of White Sands pupfish should continue. While two replicate populations exist for Malpais Spring and Salt Creek, additional replicate opportunities should be investigated, and salt cedar removal should continue. Identification of potential reintroduction sites and establishment of new White Sands pupfish populations should consider the genetic makeup of the species within each evolutionary significant unit.

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Gila topminnow, *Poeciliopsis occidentalis*

Distribution: Gila topminnow was historically one of the most common and widespread fishes in lower elevation streams of the Gila River drainage in Arizona (Hubbs and Miller 1941; Minckley 1973; Minckley and Marsh 2010). The only documented historical location of Gila topminnow in New Mexico was a series of stenothermal warm springs along the San Francisco River near Pleasanton (Koster, 1957), but it is likely the species occurred elsewhere in suitable habitats in and along the Gila and San Francisco rivers. Gila topminnow typically occupied low velocity, vegetated shoreline habitats of streams, springs, and spring runs (Minckley et al. 1977).

Current Status: Gila topminnow was federally listed as endangered in 1967. It was state-listed as a threatened species in New Mexico in 1990. In 2018, the Arizona Game and Fish Department petitioned to downlist the classification of Gila Topminnow from endangered to threatened, which was supported by the New Mexico Department of Wildlife (USFWS 2019). This petition notes that as of 2017, 67 repatriated populations exist, 51 of which have persisted for 3 or more years. In response to this petition, the U.S. Fish and Wildlife Service found that downlisting to "threatened" may be warranted for the Gila topminnow due to the reduction or mitigation of threats associated with habitat destruction/modification, predation, competition with nonnative aquatic species, and the synergistic effects of these threats. Furthermore, Gila topminnow's ESA listing status was corrected from "Where Listed" to "Wherever Found" in 2023 (USFWS 2023). In New Mexico, the San Francisco River population was eliminated by drought or floods during the 1950s. In 2008, NMDOW and a private landowner established a population of Gila topminnow in a cienega restored by the landowner. Based on sampling conducted in 2023 and 2024, the population appears to have declined or disappeared entirely, as no Gila topminnow were captured in the ponds sampled. Investigations of feasibility of establishing additional populations in New Mexico are ongoing.

Threats: Habitat loss by groundwater mining, stream channelization, stream desiccation, removal of shoreline vegetation, competition with nonnative western mosquitofish (*Gambusia affinis*), and nonnative predation are the primary threats to Gila topminnow.

Recommendations: No change in listing status is recommended. Other suitable sites for repatriation of the species should be located.

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Greenthroat darter, *Etheostoma lepidum*

Distribution: Greenthroat darter occurs in two disjunct areas: the Edwards Plateau of south-central Texas and the lower Pecos River drainage of New Mexico (Echelle et al. 1984). In New Mexico, the species occurred in mainstream and tributary habitats in the Pecos River valley from Bitter Lake National Wildlife Refuge (BLNWR) downstream to the Texas/New Mexico border (Sublette et al. 1990). Greenthroat darter is found mainly in small stream and spring habitats having clear water, dense aquatic vegetation, and clean gravel and cobble substrates (Page 1983).

Current Status: Greenthroat darter was state listed as threatened in New Mexico in 1975. Although the species remains relatively common in preferred habitats in Texas, its overall range there has declined (Anderson et al. 1995). In New Mexico, greenthroat darter persists primarily in four separate areas: Blue Spring, Rattlesnake Spring, Rio Peñasco, and some springs, spring runs, and impoundments on the middle tract of the BLNWR. The Rattlesnake Spring population was established in the late 1980s as a joint effort of the National Park Service, U.S. Fish and Wildlife Service, and NMDOW, and sampling in 2007 indicated persistence of this population (Archdeacon and Davenport 2008). The species was captured during surveys of the Rio Peñasco in 2018 and during surveys of Blue Spring in 2025 (NMDOW files). Additionally, greenthroat darters are captured during annual Pecos pupfish monitoring in the Unit 5 and Hunter Marsh spring ditches on the BLNWR, as recently as 2022 (NMDOW files).

Threats: Pumping that lowers groundwater levels, diversion of spring runs, and elevated sediments are the primary threats to greenthroat darter.

Recommendations: No change in listing status is recommended. Systematic surveys to document current status of the species in New Mexico should be completed. The life history of this species in New Mexico needs documentation.

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Bigscale logperch, *Percina macrolepida*

Distribution: The historical range of bigscale logperch consisted of Texas Gulf Coastal drainages, the Red River of Texas and Oklahoma, and the Pecos River of Texas and New Mexico (Kuehne and Barbour 1983). In New Mexico, the native range of the species was the Pecos River from the vicinity of Santa Rosa to Fort Sumner, the Pecos River near Carlsbad, and the Black River (Sublette et al. 1990). Bigscale logperch are most commonly found in fast-flowing, non-turbulent, moderately deep water with large cobble substrata (Stevenson 1971).

Current status: Bigscale logperch was state listed as threatened in New Mexico in 1975. The species likely occupies much of its historical New Mexico range, but its abundance has apparently declined. It also inhabits Santa Rosa, Sumner, and Brantley reservoirs and has been introduced (probably via baitbucket transfer) to Ute Reservoir on the Canadian River (the Canadian population is not protected). A study conducted in 2007 and 2008 found the species primarily at the Black River sites and from nearshore habitats in Santa Rosa and Sumner Reservoirs; only one individual was captured from the mainstem Pecos River downstream of Fort Sumner (Archdeacon and Davenport 2010). Bigscale logperch are collected in low densities from the mainstem Pecos River between Fort Sumner and Brantley during monitoring efforts for Pecos bluntnose shiner (USFWS files). Additionally, they are captured during annual monitoring of the Black River, as recently as 2021 (NMDOW

files).

Threats: Reduced flows, loss of moderate- to high-velocity reaches by diversion, and reduced water quality are probably the primary threats to bigscale logperch. Toxic blooms of golden algae threaten populations downstream of Brantley Lake in the Pecos River.

Recommendations: No change in listing status is recommended. Systematic surveys to document the current status of the species in New Mexico should be completed. The life history of this species in New Mexico needs documentation.

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INVERTEBRATES

CRUSTACEA

ENDANGERED

Socorro isopod, *Thermosphaeroma thermophilum*

Distribution: The Socorro isopod is endemic to a small thermal spring located southwest of Socorro, New Mexico (Richardson 1897, Shuster 1981). A captive population exists at the Socorro Isopod Propagation Facility (SIPF) near Socorro, and a refuge population is maintained at the Albuquerque BioPark Aquatic Conservation Facility.

Current Status: The Socorro isopod was listed as a state (NMDGF Reg. 563) and federal (USFWS 1982) endangered species in 1978. In August 1988, *T. thermophilum* was extirpated in the wild when diminished discharge of the native spring resulted in habitat desiccation. Spring flow was reestablished in September 1988, which likely flushed isopods from the underground plumbing system into the native spring. The native population was augmented a month later from a captive population housed at the Department of Biology, University of New Mexico. This near extinction event prompted resource agencies to build the Socorro Isopod Propagation Facility (SIPF) near the native habitat. Construction of this facility (1990) expanded the total area occupied by the Socorro isopod which provided opportunity for captive propagation, genetic, and life history studies (Lang et al. 2006, Shuster et al. 2005). Regular population and habitat monitoring at the native spring and SIPF has occurred since November 1994. Habitat augmentation at the SIPF to protect against cannibalization of smaller size classes occurred in 2022, and the isopods seem to be responding well. (Trujillo 2023, Thompson 2024). Captive populations are stable. Recent genetic evidence suggests populations from the native spring, the SIPF and BioPark are closely related, but genetic augmentation is needed for the BioPark population to reduce the chances of genetic drift (Trujillo 2022, 2023).

Threats: Primary threats include habitat vandalism, modification of spring flows, dragonfly predation at the SIPF, and potential disruption of thermal ground water discharge from aquifer pumping and surface/sub-surface explosive tests on lands situated west of the Socorro and Magdalena mountains (Lang 2001). Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW is actively implementing

conservation activities detailed in the federal recovery plan (USFWS 1982), as amended in 2019, which identifies goals and actions to achieve recovery and delisting of the species. Conservation efforts are coordinated with the U. S. Fish and Wildlife Service, Albuquerque Biological Park, and the private land owner.

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Noel's amphipod, *Gammarus desperatus*

Distribution: Noel (1954) and Cole (1981, 1985, 1988a, 1988b) reported this amphipod from three Chaves County sites near Roswell: Lander Springbrook, North Spring (type locality), and Bitter Lake National Wildlife Refuge (BLNWR). Noel's amphipod currently occurs on BLNWR (Bitter Creek, Sago Spring, Unit 6 and 7 spring-ditch, Hunter Marsh, Lower Tract ["Farm"], and Rio Hondo) and on municipal land adjacent to Hunter Marsh (USFWS 2005; Lang 2007, 2010).

Current Status: The Lander Springbrook population was extirpated during the period 1951-1957, whereas loss of the North Spring population occurred during the period 1978-1988 (Cole 1981, 1985, 1988a, 1988b). Extirpation at the type locality prompted the 1990 uplisting from state threatened to endangered. Gammarid amphipods are apparently extirpated from North Spring (Mehlhop 1992, 1993; Lang 2005). Populations on BLNWR have been monitored routinely since 1995. NMDGF (2005) implemented a conservation plan for four state-listed macroinvertebrate species of Chaves County, including *G. desperatus*. The USFWS (2005) listed this species as endangered under the Endangered Species Act. A federal recovery plan was published in 2019. Acquisition of federal water rights for BLNWR (USDJ 1996, Balleau Groundwater, Inc. 1997) may serve to impart habitat protection for this species. Genetic studies imply the presence of cryptic species of gammarid amphipods on BLNWR (i.e., Hunter Marsh; Gervasio et al. 2004; Seidel et al., 2009; Moore 2012). Deposition of post-fire ash, laden with polycyclic aromatic hydrocarbons resulting from the March 2000 Sandhill Fire at BLNWR, may account for the overall decline of macroinvertebrate populations observed in Bitter Creek at Dragonfly Spring; especially affected was Noel's amphipod (Lang 2005, 2008). Morphologic and genetic studies are ongoing to assess intra- and inter-specific relationships among amphipods of the *Gammarus pecos* species

complex (Lang 2008). Monitoring of the Rio Hondo population (lower tract of BLNWR) and the Middle Tract populations is ongoing. In 2015, restoration of the Rio Hondo occurred on the lower tract of BLNWR. An earthen berm was used to redirect the Rio Hondo into its historic channel, allowing the ditch that the river previously occupied to be filled only with groundwater produced by naturally occurring spring vents. A backflow preventer was installed at the downstream terminus of the ditch to prevent effluent water from filling the ditch during periods of high flows. The hydrology of the springs is being monitored by the USFWS and monitoring of *G. desperatus* population is conducted seasonally in the restored channel. Overall, populations of *G. desperatus* are currently stable on BLNWR (BLNWR unpublished data).

Threats: Regional ground water depletion, habitat alterations (e.g., artesian spring source diversion, dewatering, capping), ground and surface water contaminants, and oil and gas development are the major threats to this species.

Recommendations: No change in listing status is recommended. In collaboration with the U. S. Fish and Wildlife Service, NMDOW should continue to monitor the aquatic macroinvertebrates and riparian corridor of Bitter Creek. NMDOW and cooperators should continue implementing strategies of the state and federal recovery plans to alleviate threats and achieve recovery of this species.

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MOLLUSCA

BIVALVIA

ENDANGERED

Paper pondshell, *Utterbackia imbecillis*

Distribution: The paper pondshell is one of the most widely distributed freshwater mussels in North America (Taylor 1983; Williams et al. 1993; Howells et al. 1996), occurring in reservoirs, lakes, rivers, and streams (Gordon and Layzer 1989). An extant population in New Mexico was documented by shells from Conchas Lake, San Miguel County (Taylor 1983); hundreds of miles from the nearest known occurrences in adjacent states (Howells et al. 1996) and northern México (Río Conchos; Johnson 1999). Lang and Mehlhop (1996) documented only one fresh valve of an immature paper pondshell from Ute Creek near Ute Reservoir, Harding County. While this record represents an eastward range extension in New Mexico, the species was not found in Conchas Lake, as reported by Taylor (1983).

Current Status: The paper pondshell was listed as state endangered in 1983 (NMDOW Reg. 624). Historic populations in the Conchas River (i.e.,Variadero, San Miguel Co., NM), are apparently extirpated (Lang and Mehlhop 1996), and may represent the source of the Conchas Lake population (Taylor 1983). This mussel has many larval fish hosts, and consequently has been introduced to impounded waters throughout the United States by fish stocking and bait bucket introductions (Howells et al. 1996). In 2007, several live *U. imbecillis* were collected from the middle Rio Grande near Rio Rancho, Sandoval Co., NM (NMDOW files), thus representing an introduction beyond native range. The North American genus *Anodonta* is taxonomically complex (subgenera include: *Anodonta*, *Pyganodon*, and *Utterbackia*) with many outstanding questions regarding the phylogenetic status of putative species (Hoeh 1993). Human-mediated dispersal poses questions regarding the exact origin and native status of this species in the lower Canadian River drainage of New Mexico.

Threats: Holocene climate change and habitat modification (stream channelization, dewatering, poor watershed management, and manipulation of natural flows) was likely responsible for loss of native riverine populations (Lang and Mehlhop 1996). Contaminants and the potential for introduction of aquatic invasive species (e.g., Zebra and/or Quagga mussels) represent threats to populations of paper pondshell in Canadian River mainstem impoundments (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005, Burgmer et al. 2007).

Recommendations: No change recommended in listing status. Surveys should be undertaken to document the current status of the species in New Mexico. State and federal agencies should take preventative measures to prevent the introduction of Zebra and/or Quagga mussels and other aquatic invasive species to New Mexico's surface waters.

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Texas hornshell, *Popenaias popeii*

Distribution: Texas hornshell is known from Western Gulf and Mexican Gulf coastal drainages of the Rio Grande Basin south to the northern state of Vera Cruz, México (Johnson 1999). In the United States, this mussel occurred in the Rio Grande drainage from North Spring River (Roswell, Chaves County; Cockerell 1902), throughout the lower Pecos River and Rio Grande, downstream to Brownsville, Cameron County, Texas (Metcalf 1982; Neck and Metcalf 1988; Howells et al. 1996). *Popenaias popeii* has declined notably throughout the United States. In New Mexico, this species currently occupies about 12% of its historic range, where an extant population is confined to a 14 km reach of the Black River, Eddy County (Lang 2001). In Texas, *P. popeii* is known from three extant populations (Howells 2004; Strenth et al. 2004; Burlakova and Karatayev 2010): Rio Grande near Laredo (Webb County), Rio Grande below Big Bend National Park (near John's Marina), and Devils River (Val Verde County). An additional population exists in the Rio San Diego, Coahuila, Mexico (Hein et al. 2018).

Current Status: The sporadic occurrence of *P. popeii* in Texas led Strecker (1931) to regard this species as "scarce." The dearth of information in historic and contemporaneous collection records prompted listing this mussel in New Mexico as endangered in 1983. Texas hornshell was federally listed as endangered in 2018. NMDOW implemented a recovery plan for this species (Carman 2007). Research has focused on the distribution and abundance, population trends, habitat affinities, life history, reproductive periodicity, salinity tolerances, thermal tolerance, and genetics of the Black River population (Lang 2001, 2009; Smith 2003; Hoeh 2009; Levine 2009; Inoue et. al. 2015; Rangaswami et. al. 2023). Genetic research (Hoeh 2009, Inuoe et. al. 2012) showed low levels of mtDNA (*COI*) divergence among New Mexico and Texas populations. Ongoing conservation efforts include population monitoring, habitat studies, propagation techniques, early life history research (reproductive ecology), molecular genetic study, and riparian habitat restoration (erosion control, fencing). A population survey completed in 2024 estimates the total population of the Black River to be 31,428 (95% CI 26,081-36,707), with approximately 54% of the population in riffle habitat (Inoshita, 2024). This estimate was obtained from a new zero-inflated Bayesian modeling approach that increased the precision of population estimates by 80% compared to previous methods (Inoshita, 2024). The 2024 population estimate is lower than a previous estimate (Inoue et. al. 2014) of 48,006 (95% CI 28,848-74,127), and also lower than the 2017-2018 estimate (NMDGF 2021) of 34,390 (95% CI 14,068-48,458). It should be noted that confidence intervals overlap between these estimates. A population trajectory (λ) calculated from the 2017-2018 and 2023-2024 censuses indicates the population has a slight negative trend with λ=0.985 per year (approximately -1.49% annually), suggesting that the population could halve in size within approximately 46 years if current trends continue (Inoshita, 2024). Population surveys should continue in order to assess the long-term trends of this population.

A total of 44 Texas hornshell were reintroduced to the Delaware River (historic native habitat) in May 2013. The habitat that mussels were relocated to was destroyed in a flood in 2014. These individuals are assumed to have been displaced. However, in 2015, 66 individuals were translocated to alternative relocation sites in the Delaware River. These individuals have survived through June 2016 and the production of glochidia in translocated females suggests that reproductive success is likely. Due to drying of the Delaware River in NM, all

known individuals have been removed from the river and reintroduction efforts have been suspended.

The USFWS, in conjunction with other stakeholders, has developed a Candidate Conservation Agreement (CCA) for Texas hornshell. The CCA provides a mechanism for participants to continue actions that may impact Texas hornshell without undergoing formal consultation with the USFWS by agreeing to carry out conservation actions prior to the listing decision. The Center for Excellence (CHEMM) in Carlsbad is the permit holder and administers the CCA.

Threats:
Major threats to Texas hornshell include habitat fragmentation, unsuitable water quality, habitat loss, ground and surface water depletions, ground and surface water contamination. Transit of heavy trucks carrying toxic chemicals and petroleum-derived products across streams could result in surface water contamination from traffic accidents. Fish kills in the lower Pecos River (2002-2007) from Lake Brantley downstream to the Black River confluence have been attributed to toxins produced by golden alga, *Prymnesium parvum.* While there are no known instances of golden alga blooms within the occupied range of Texas hornshell, such a catastrophic event could decimate the species in New Mexico.

Recommendations: No change in listing status is recommended. NMDOW and cooperators should continue to implement strategies of the state conservation plan to alleviate threats and to achieve recovery of Texas hornshell. Protection of habitat is critical for conservation of this mussel. Actions required to protect the species include: (a) collaborative efforts by all stakeholders to address outstanding issues of transportation routes across the Black River; (b) increased communication and coordination among state and federal agencies that regulate extractive resource use (ground water, oil and gas) in the Black River basin; (d) restoration of perennial water in the Delaware River so that reintroduction to the river can be conducted (e) population/habitat monitoring.

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GASTROPODA

ENDANGERED

Koster's springsnail, *Juturnia kosteri*

Distribution: Taylor (1987) described this springsnail from Sago Spring, Bitter Lake National Wildlife Refuge (BLNWR). Additional populations on BLNWR include Lake St. Francis, Bitter Creek, Sago Spring wetland complex, western perimeter of Unit 3, spring-ditch of units 5-7, and the northwest corner of Hunter Marsh (Lang 2002, 2005, 2010; USFWS 2005). The western limit of the species range was from North Spring, Roswell Country Club, where the population has been extirpated (Taylor 1987; Lang 2005).

Current Status: Koster's springsnail was listed as state threatened in 1983, and uplisted to endangered based on threats posed by impoverished habitat conditions following the March 2000 Sandhill Fire in Bitter Creek (NMDGF 2000). This species is listed as endangered under the Endangered Species Act USFWS (2005). Populations on BLNWR have been routinely monitored since 1995. Acquisition of federal water rights for BLNWR (USDJ 1996, Balleau Groundwater, Inc. 1997) may serve to impart habitat protection for this species. NMDGF (2005) implemented a conservation plan for four state-listed invertebrates of Chaves County, including *J. kosteri.*

Using genetic (i.e., mtDNA genes COI and ND1) and shell morphometrics, Morningstar et. al., (2013) found through phylogenetic analysis that this species formed a monophyletic clade with each isolated population containing low genetic diversity. Also, molecular variance among populations of *J. kosteri* showed significant variation and low variation in shell morphology.

In 2015, restoration of the Rio Hondo occurred on the lower tract of BLNWR. An earthen berm was used to redirect the Rio Hondo into its historic channel, allowing the ditch to be filled only with groundwater produced by naturally occurring spring vents. A backflow preventer was installed at the downstream terminus of the ditch to prevent effluent water from filling the ditch during periods of high flows. Several rock bars were added to the main channel to act as substrate for springsnails. In December 2015, *J. kosteri* were translocated from two sources on the middle tract of BLNWR. The hydrology of the springs is being monitored by the USFWS

and monitoring of the *J. kosteri* population is conducted seasonally in the restored channel. The population appears to be thriving in the restored channel (BLNWR unpublished data). The populations in Bitter Creek and Sago Spring are showing stable trends (BLNWR unpublished data). A captive rearing program at the Albuquerque BioPark in partnership with the USFWS for Koster's Springsnail and Roswell Springsnail is in progress, and NMDOW will advise on the project. Habitat construction and translocations are scheduled to start in 2024.

Threats:

Major threats to Koster's springsnail include regional groundwater pumping, surface water depletion, ground and surface water contamination, and invasive aquatic species.

Recommendations: No change in listing status is recommended. In collaboration with the U. S. Fish and Wildlife Service, NMDOW should continue monitoring aquatic macroinvertebrates and the riparian corridor of Bitter Creek. NMDOW and cooperators should continue to implement strategies of the state conservation plan to alleviate threats and achieve recovery of this species.

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Alamosa springsnail, *Pseudotryonia alamosae*

Distribution: This endemic springsnail is known only from thermal spring sources forming the perennial headwaters of Alamosa Creek above the Monticello Box, Socorro County (Taylor 1983, 1987).

Current Status: *Pseudotryonia alamosae* was listed as state threatened in 1983, and was uplisted to state endangered based on threats posed by an open pit beryllium mine within the immediate watershed of Alamosa Creek (NMDGF 2000). The Alamosa springsnail is a federal endangered species (USFWS 1991). *Pseudotryonia alamosae* occurs in spring sources and spring- fed tributaries along the north riverbank of Alamosa Creek downstream to approximately 30 meters above the Monticello Box (Lang 2001, 2008). Within this available habitat, the species is most abundant in the lowest velocity, warmest and most stenothermic microhabitats associated with thermal spring vents situated in the upper reach of this perennial spring-fed system. Private land use practices, including salt cedar removal, currently favor persistence of this species in Alamosa Creek.

Threats: Primary threats include local/regional ground water depletion, ground and surface water contamination, direct habitat alteration (stream diversion and impoundment), mineral exploration/mining, and poor watershed management (Taylor 1983; NMDGF 1988; Lang 2001, 2008). Introduction of aquatic invasive species could result in elimination of springsnail populations by predation or habitat degradation (e.g., non-native crayfish; Fernandez and Rosen 1996; NMDGF 2008) or by direct competition for food sources (i.e., New Zealand mudsnail; http://www.esg.montana.edu/aim/mollusca/nzms/nzmsbib.html). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007). In November 2017, a flood drastically altered habitat at Eastern Ojo Caliente. The population was nearly extirpated; however, a survey in December 2021 indicated that the population may be recovering. A timed- search produced more than 300 snails in five minutes. Additional visual surveys and a timed search in 2023 indicated that the population is indeed recovering in the springhead and has started to move down the spring run (Thompson 2024).

Recommendations: No change in listing status is recommended. Resource agencies should pursue opportunities to acquire private lands, including mineral and ground water rights, where future beryllium ore exploration or mining may adversely affect ground water aquifers that supply surface waters and spring-fed wetlands of Alamosa Creek.

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Chupadera springsnail, *Pyrgulopsis chupaderae*

Distribution: The Chupadera springsnail is known from two hillside seeps situated along the western flank of the Chupadera Mountains, southeast Socorro County (Taylor 1983, 1987). This species is endemic to Willow Spring (type locality), and once occurred in an unnamed spring located about 0.25 mile north of the type

locality.

Current Status: *Pyrgulopsis chupaderae* was listed as state threatened in 1983, and uplisted to endangered (NMDGF 1996) due to habitat overgrazing by cattle which resulted in the apparent extirpation of the species at the unnamed spring. USFWS (2012) designated Chupadera springsnail as endangered along with designation of critical habitat. Despite intensive long-term land use practices at Willow Spring (grazing, spring source diversion, spring run impoundment), the Chupadera springsnail has persisted at the type locality (Taylor 1983; Lang 2002). The landowner did not allow access to NMDOW from 1996 to 2020; however, Turner Endangered Species Fund (TESF) has access and NMDOW assists them with the annual monitoring. Abundance of the species appears to be similar to that of collections prior to 1999 (TESF, NMDOW unpublished data) A refugium tank for a replicate population has been constructed at the Ladder Ranch on TEI property and translocations will start in 2024

Threats: Imminent threats include local/regional ground water depletion, diversion or impoundment of spring flow, loss of riparian vegetation, and overgrazing of the watershed during extended drought (Taylor 1983; NMDGF 1988; Lang 2001b, Lang 2002). These threats could be exacerbated by subdivision development on range lands surrounding Willow Spring. Introduction of aquatic invasive species can result in elimination of springsnail populations by predation or habitat degradation (e.g., non-native crayfish; Fernandez and Rosen 1996, NMDGF 2008) or by direct competition for food sources (i.e., New Zealand mudsnail). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005, Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. Continuation of monitoring efforts to track breeding timing, and the development of a captive propagation program are warranted actions. In addition, continuing to partner on these efforts with TESF, the landowner, Albuquerque BioPark, and the USFWS is vital.

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Socorro springsnail, *Pyrgulopsis neomexicana*

Distribution: Although this species was evidently described by Pilsbry (1916) from one of three springs of the Socorro Thermal Area (Summers 1976), no empty shells or live specimens have ever been collected from this area, which is located three miles west of Socorro (Landye 1981; Taylor 1983, 1987). Prior to 1971, significant

water development and habitat alterations likely resulted in extirpation of the species at the type locality (Landye 1981; Taylor 1987). Taylor (1987) provided a morphological description of this species from a thermal spring located on the southeastern flank of the Magdalena Mountains, Socorro County, while noting uncertainty of taxonomic affinities of this population with those from the Socorro Thermal Area. Taylor (1987) estimated the total population at about 5000 individuals.

Current Status: *Pyrgulopsis neomexicana* was listed as state endangered in 1983. This snail is federally listed as endangered (USFWS 1991). Lang (2001) last visited Torreon Springs in 1996, and noted that the spring source had been capped by a windmill; at that time live *P. neomexicana* were observed in the spring outflow channel (~2.0*l* x 0.5*w* x 0.1*d* m). The private landowner has since denied site access to monitor and study *P. neomexicana*. Current population status remains unknown.

Threats: Regional/local ground water depletion, spring run dewatering, contamination, and riparian habitat degradation represent principal threats to the population (NMDGF 1988; Lang 2001). Natural stochastic events such as drought could adversely impact this population by reducing spring discharge. Introduction of aquatic invasive species can result in elimination of springsnail populations by predation or habitat degradation (e.g., non- native crayfish; Fernandez and Rosen 1996; NMDGF 2008) or by direct competition for food sources (i.e., New Zealand mudsnail). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendation: No change in listing status is recommended. The remnant population merits resurvey to determine current status. A refuge population should be established at the Albuquerque Biological Park.

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Roswell springsnail, *Pyrgulopsis roswellensis*

Distribution: Taylor (1987) reported three populations of *P. roswellensis* on Bitter Lake National Wildlife Refuge (BLNWR) and a population in North Spring, Roswell Country Club. The trend in species range reduction by extirpation of once widely distributed, but localized, populations is supported by the Pleistocene

fossil record and reinventory of known site occurrences (Noel 1954; Taylor 1987; USFWS 2005).

Current Status: Roswell springsnail was listed as state endangered in 1983. This species is endangered under the federal Endangered Species Act (USFWS 2005). Extant populations on BLNWR occur in: Bitter Creek, Sago Spring, and the Unit 7 "spring ditch." This species is apparently extirpated from North Spring (Lang 2005). Populations on BLNWR have been routinely monitored since 1995. Acquisition of federal water rights for BLNWR (USDJ 1996; Balleau Groundwater, Inc. 1997) may serve to impart habitat protection for this species. NMDGF (2005) implemented a recovery and conservation plan for a suite of four state-listed invertebrates of Chaves County, including *P. roswellensis*.

Using genetic (i.e., mtDNA genes COI and ND1) and shell morphometric analyses, Morningstar et. al. (2013) found through phylogenetic data that this species formed a monophyletic clade, with each isolated population containing low genetic diversity. Also, molecular variance among populations showed significant variation but low variation in shell morphology.

In 2015, restoration of the Rio Hondo occurred on the lower tract of BLNWR. An earthen berm was used to redirect the Rio Hondo into its historic channel, allowing the ditch that the river previously occupied to be filled only with groundwater produced by naturally occurring spring vents. A backflow preventer was installed at the downstream terminus of the ditch to prevent effluent water from filling the ditch during periods of high flows. Several rock bars were added to the main channel to act as substrate for springsnails. In December 2015, *P. roswellensis* were translocated from one source on the middle tract of BLNWR. The hydrology of the springs is being monitored by the USFWS and monitoring of the *P. roswellensis* population is conducted seasonally in the restored channel. The population appears to be thriving in the restored channel (BLNWR unpublished data). The populations in Bitter Creek and Sago Spring are showing stable trends (BLNWR unpublished data). A captive rearing program at the Albuquerque BioPark in partnership with the USFWS for Koster's Springsnail and Roswell Springsnail is in process, and NMDOW will advise on the project. Habitat construction and translocations are scheduled to start in 2024.

Threats: Major threats to Roswell springsnail include regional groundwater pumping, surface water depletion, ground and surface water contamination, and invasive aquatic species.

Recommendations: No change in listing status is recommended. In collaboration with the U. S. Fish and Wildlife Service, NMDOW should continue monitoring populations on BLNWR. NMDOW and cooperators should continue to implement strategies of the state recovery and conservation plan to alleviate threats and achieve recovery of this species.

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Pecos assiminea, *Assiminea pecos*

Distribution: This amphibious snail occurred historically in isolated populations in New Mexico (Bitter Lake National Wildlife Refuge [BLNWR] and North Spring, Roswell County Club, Chaves County), Texas (Diamond Y Preserve, Pecos County), and sporadically throughout the Bolsón de Cuarto Cíenegas, Coahuila, México (Taylor 1983, 1987). The species shows a pattern of localized extinctions throughout its historic range. Taylor (1987) reported extirpation of *A. pecos* from North Spring and at the type locality (Unit 7) on BLNWR. Extant populations on BLWNR occur in marsh habitats along Bitter Creek, Sago Spring wetland complex near Sinkhole #31, and the "spring ditch" of units 7 and 15 (USFWS 2005). Additional populations were located at East Sandia Spring, Reeves County, Texas (Lang 2002), and in Hunter Marsh, BLWNR (Lang 2010).

Current Status: Pecos assiminea was listed as state endangered in 1983. This species is considered as endangered under the Endangered Species Act (USFWS 2005). Populations on BLNWR have been routinely monitored since 1995. In Texas, populations of *A. pecos* occur on lands (Diamond Y Spring Preserve, East Sandia Spring) under stewardship of The Nature Conservancy. Acquisition of federal water rights for BLNWR (USDJ 1996; Balleau Groundwater, Inc. 1997) may serve to impart habitat protection for this species. NMDGF (2005) implemented a recovery and conservation plan for a suite of four state-listed invertebrates of Chaves County, including *A. pecos*.

Molecular genetic and morphometric studies of the *A. pecos* species complex retained the binomial for all populations in the United States and described the Mexican population as a new species, *Assiminea cienegensis* (Hershler et al. 2007). Staff of BLNWR are currently monitoring all known populations on the Refuge.

Threats: Major threats to Pecos assiminea include regional groundwater pumping, surface water depletion, ground and surface water contamination, and invasive aquatic species.

Recommendations: No change in listing status is recommended. In collaboration with the U. S. Fish and Wildlife Service, NMDOW should continue monitoring populations on BLNWR. NMDOW and cooperators should continue to implement strategies of the state recovery and conservation plan to alleviate threats and achieve recovery of this species.

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Wrinkled marshsnail, *Stagnicola caperata*

Distribution: While this widespread species is stable over much its North American range, populations are disjunct in New Mexico, Texas, and higher elevations of some western states where declines or local extinctions have been documented (Bequaert and Miller 1973; Taylor 1983a, 1983b). Extirpation of the BLNWR population between 1983-1985 was attributed to extensive wetland habitat loss, alteration, and sewage contamination from the Roswell wastewater treatment plant (Taylor 1983a; NMDGF 1988). However, surveys have reconfirmed the presence of this species at BLNWR and at localities in the Jemez Mountains (i.e., Valles Caldera National Preserve, Vermejo Park Ranch) in New Mexico.

Current Status: The wrinkled marshsnail was listed as state endangered in 1983. Lang (2005, 2010) reported this species from live specimens in: Hunter Marsh, BLNWR (including municipal land adjacent to the west); vernal grassland pools, Valle Grande, Valles Caldera National Preserve; and in high-elevation snowmelt pools near Big Costilla Peak, Taos County. Collections (2005) have occurred from the type locality, New Harmony, IN, but this collection occurred during a dried pool and may not serve well for genetic comparisons between NM/TX populations versus more eastern populations based on shell morphology. Genetic and morphometric analysis showed that the Big Costilla Peak population is actually a separate species (Morningstar 2018).

Genetic analysis (mt.DNA: 16S rRNA [16S], cytochrome COI, and NADH dehydrogenase I (ND1) indicate that low-elevation populations in NM and Texas were significantly different when compared to high-elevation populations in NM (Morningstar 2012). A later study showed that there are relatively similar levels of genetic diversity between the high elevation and low elevation population within New Mexico, but all populations within New Mexico contain lower diversity than the type locality (Morningstar 2018). The lower genetic diversity and genetic isolation implies a greater risk to extirpation in the southwest United States, which is consistent with the conservation status of *S. caperata* within New Mexico.

Threats: Water contamination from sewage effluent and habitat modification, including wetland desiccation and removal of wetland vegetation (e.g., wildland fire, prescribed burning, cutting, excessive grazing pressure) represent primary threats (Taylor 1983a; NMDGF 1988). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. Efforts to conserve habitats and maintain or improve the genetic diversity of New Mexico populations is recommended. .

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11:1557- 1564.

Florida mountainsnail, *Oreohelix florida*

Distribution: *Oreohelix florida* is endemic to the Florida Mountains, Luna County, NM (Metcalf and Smartt 1997). Pilsbry (1915) first reported this species as "*Oreohelix strigosa* var." from two fossil specimens. In his species description, Pilsbry (1939) considered it a subspecies of *O. metcalfei*. Metcalf (1974) elevated *florida* to full species rank based on unique shell characteristics. Additional state records from the Santa Rita and Tres Hermanas mountains, Cooke Peak, and Apache Hills are also of fossil specimens (Metcalf and Smartt 1997).

Current Status: The Florida mountainsnail was listed as state endangered in 1990. This species is known only from fossil shells; no live snails were found despite numerous malacological explorations during the late 1900's (Metcalf and Smartt 1997; Lang 2000). The apparent extinction of *O. florida*, and other primitive oreohelicids in southern and eastern New Mexico, might be attributed to climatic deterioration during the Holocene or natural extinction processes on small "montane islands" (MacArthur 1972; Metcalf and Smartt 1997).

Threats: Threats are not easily identified because an extant population has not been documented. However, land snails occupying high-elevation limestone outcrops are at risk from climate change, natural catastrophe (e.g., rockslides, wildfires), prescribed burning, and soil disturbance from mining and logging (NMDGF 1988; Sullivan 1997; Lang 2000).

Recommendations: Inventory of high-elevation limestone outcrops is recommended on "montane islands" along the international border of New Mexico and México. In the unlikely event an extant population is discovered, then habitat protection would be paramount.

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BIVALVIA

THREATENED

Lake fingernailclam, *Musculium lacustre*

Distribution: *Musculium lacustre* is known from Central and South America, Hawaii, Japan, Australasia, and Europe (Herrington 1962, Mackie 2007). Populations in North America occur most frequently in high-elevation,

deep-water marshes from Canada and Alaska south to the Sierra Nevada of California, and in the Rock Mountains of southern Utah (Burch 1975). In New Mexico, the lake fingernailclam is reported from Upper Cieneguilla Creek, Colfax County, near Angel Fire Recreation Area (Taylor 1983). One specimen was found in the Conchas River (Lang and Mehlhop 1996).

Current Status: The lake fingernailclam was listed as state threatened in 1983. The only known New Mexico population occurs on private land managed for recreational uses. The current status of *M. lacustre* in New Mexico is unknown.

Threats: Threats include contaminants from forest fire retardants (McDonald and Hamilton 1995) and habitat modification due to land development (NMDGF 1988). Poor watershed management could increase sedimentation of the wetland complex (Taylor 1983, NMDGF1988). Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDGF should continue aquatic surveys to determine the statewide distribution of sphaeriid clams.

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Swamp fingernailclam, *Musculium partumeium*

Distribution: The swamp fingernailclam is widespread throughout southern Canada and the United States, south to Nuevo Leon, México (Herrington 1962; Burch 1975; Mackie 2007). In New Mexico, this species is known only from private land in Road Canyon Creek, Union County (Taylor 1983; NMDGF 1988).

Current Status: *Musculium partumeium* was listed as state threatened in 1983. The current status of this species in New Mexico is unknown.

Threats: Primary threats to species persistence include poor watershed management, stream modification (channelization, diversion, dewatering), and water pollution (NMDGF 1988). Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and

macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDGF should continue aquatic surveys to determine the statewide distribution of sphaeriid clams.

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Long fingernailclam, *Musculium transversum*

Distribution: Native range includes most of temperate and subtropical North America, from Labrador west to the Northwest Territories, south to central México (Herrington 1962; Burch 1975; Mackie 2007). New Mexico populations are known from sites within the Canadian River Basin (Conchas River, Cabra Springs, Ute Creek near Gladstone) and Dry Cimarron River Basin (Clayton Lake, Road Canyon Creek; Taylor 1983; NMDGF 1988). The largest known population in New Mexico was extirpated from the Pecos River below Carlsbad (Taylor 1983).

Current Status: The long fingernailclam was listed as state threatened in 1983. While the statewide status of this species is unknown, an extant population occurs in the Black River (Lang 2005).

Threats: Taylor (1983) attributed extirpation of the Pecos River population to irrigation water diversions. Additional threats could include stream modification (channelization, dewatering), water pollution, and poor watershed stewardship (NMDGF 1988). Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should continue aquatic surveys to determine the statewide distribution of sphaeriid clams.

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Lilljeborg's peaclam, *Pisidium lilljeborgi*

Distribution: In North America, this circumboreal species occurs in lakes and rivers from the Arctic south across the northern United States (Herrington 1962; Burch 1975; Mackie 2007). *Pisidium lilljeborgi* is found in high- elevation lakes of California (Trinity Alps), Utah (Uinta Mountains), and New Mexico (Sangre de Cristo Mountains, Nambe Lake, Santa Fe County; Taylor 1983). The New Mexico population represents the most southern and highest elevational occurrence in either North America or Eurasia (Taylor 1983, NMDGF 1988). Nambe Lake is a glacial cirque located in the Santa Fe National Forest and is managed as a water reservoir for the City of Santa Fe.

Current Status: Lilljeborg's peaclam was listed as state threatened in 1983. The current status of this species is unknown in New Mexico.

Threats: Due to its restricted distribution, the Nambe Lake population is vulnerable to contaminants from fire suppressant chemicals and natural stochastic events (fire, sedimentation) (Taylor 1983; NMDGF 1988; McDonald and Hamilton 1995). Reservoir drawdown practices and drought conditions could affect the Nambe Lake population. Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should continue surveys of high-elevation, aquatic habitats to determine the statewide distribution of sphaeriid clams.

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11:1557- 1564.

GASTROPODA

THREATENED

Gila springsnail, *Pyrgulopsis gilae*

Distribution: The Gila springsnail is endemic to springs of variable temperature regimes in the Gila River basin, Grant County (Taylor 1983, 1987). Previously, *Pyrgulopsis gilae* was known from ten populations throughout this drainage (Taylor 1983, 1987; Mehlhop 1993; Lang 2002; NMDGF 2008a). Field surveys conducted in 2008 and 2009 expanded on this species distribution. Currently, *P. gilae* occurs in 43 populations scattered throughout the East Fork Gila River and Middle Fork Gila River (Catron and Grant counties), including one site (Alum Spring, Grant County) on the Gila River mainstem (Lang 2010).

Current Status: This springsnail was listed as state threatened in 1985 (NMDGF Regulation 624). Based on recent discovery of many previously unknown populations (Lang 2010) and of lack of threats to these populations (USFWS 2011), this species was removed as a candidate for listing under the Endangered Species Act. All known populations occur on U. S. Forest Service lands and private inholdings within the Gila National Forest and in the Gila Wilderness. Hershler and Liu (2010) suggested continuance of morphologic and genetic studies of this species throughout its currently understood range to address further possibilities of taxonomic revisions for three, geographically distinct "sub-groups."

Recent study comparing among-population genetic divergence (mtDNA) suggests that *P. gilae* populations in the upper East Fork Gila River and those occurring in the Middle Fork Gila River are genetically distinct from populations in the lower East Fork Gila River and the Gila River mainstem. The upper East Fork Gila River and Middle Fork Gila River populations may merit unique species level recognition (Hershler and Liu 2010).

Threats: Based on surveys conducted since 2001, all indications are that populations of Gila springsnail are stable. While no direct threats can be currently identified (USFWS 2011), possible environmental stressors could include: natural stochastic events (drought, forest fire, sedimentation, flooding), wetland habitat degradation from recreational bathing, poor watershed management, and water contamination from recreational bathing and fire suppressant chemicals (Taylor 1983, 1987; NMDGF 1988; Mehlhop 1993; McDonald and Hamilton 1995; Lang 2002, 2010). Introduction of non-native crayfish and the New Zealand mudsnail can adversely impact springsnails and aquatic habitats (Fernandez and Rosen 1996; NMDGF 2008b). Long-term persistence of this species is contingent upon protection of spring sources, their outflows, and the riparian corridor immediately adjacent to these habitats.
Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should monitor extant populations and expand aquatic surveys to include unexplored reaches within the Gila River basin. Recommend allocation of funding to continue taxonomic assessment of *P. gilae* among geographically isolated populations throughout the Gila River basin. Any significant genetic and/or morphologic divergence may warrant taxonomic re-evaluation of the species, which may confer specific management recommendations particular to genetically distinct populations relative to current ownership and land-use practices.

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Pecos springsnail, *Pyrgulopsis pecosensis*

Distribution: *Pyrgulopsis pecosensis* is endemic to two perennial tributaries of the Black River, Eddy County, New Mexico: Blue Spring (type locality) and Castle Spring (Taylor 1987).

Current Status: The Pecos springsnail was listed as state threatened in 1983. Acquisition of Blue Spring surface water rights (72-5-28 NMSA 1995) and the "...lack of oil and gas reserves in the area..." prompted reclassification of *P. pecosensis* as a federal candidate for listing under the Endangered Species Act to a species of concern (USFWS 1996). This acquisition of surface water rights from Blue Spring was a temporary state lease. Contrary to this reclassification, the Black River valley has experienced repeated problems of ground water depletion and contamination. Water levels of domestic and agricultural/range wells in this watershed have lowered and even dried-up (residents of Black River Village and environs, *pers. com.*). Pecos springsnail is apparently extirpated from Castle Spring (Landye 1981, NMDGF 1988, Mehlhop 1992). Lang (2002, 2004) reported persistence of *P. pecosensis* in Blue Spring from springhead sources downstream through the middle reach of the spring run. As of 2021, this distribution remains unchanged. Individuals were monitored in 2021 at the springhead and another site approximately 150 meters downstream from the springhead (NMDGF 2021). Recent genetic analysis showed that the genetic effective population size is low and there are two different genetic groups from the upper and lower sections of the spring (Trujillo 2023). Abundance fluctuated at all sites, and recruitment seems to be low (Trujillo 2023). *P. pecosensis* and Blue Spring are afforded protections in the CCAA developed for Texas hornshell and other covered species (USFWS 2017). This CCAA was developed by USFWS in conjunction with many stakeholders, including NMDOW, private landowners, and representatives from the oil and gas industry.

Threats: Taylor (1983) identified ground water depletion as the primary threat to extant populations of *P. pecosensis*. Other threats include ground and surface water contamination, and introduction of invasive species.

Recommendations: No change in listing status is recommended. NMDOW should develop a state recovery plan for this species. Continue working with partners through the CCAA to protect habitat and conserve populations. Continue annual habitat and population monitoring of *P. pecosensis* in Blue Spring. Investigations into captive propagation or refugium habitat should be considered. The feasibility of returning Pecos Springsnail

to Castle Spring should also be considered. Age and growth as well as age-specific fecundity studies would greatly help to understand life history and recruitment of *P. pecosensis*.

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New Mexico springsnail, *Pyrgulopsis thermalis*

Distribution: *Pyrgulopsis thermalis* is endemic to 13 thermal springs along the lower East Fork Gila River, and also occurs in Alum Spring (type locality), Gila River mainstem, Grant County (Taylor 1983, 1987; Mehlhop 1993; Lang 2010). This species prefers thermal spring waters with temperatures ranging from 33 to 39º C (Taylor 1987), but has been found in lower abundance at 19.5º C (Lang 2010).

Current Status: The New Mexico springsnail was listed as state threatened in 1983. Based on discovery of many previously unknown populations (Lang 2010), the lack of threats to these populations prompted the USFWS (2011) to remove this species as a candidate for listing under the Endangered Species Act. Stable populations have been reported consistently over past 18 years (Mehlhop 1992, 1993; Lang 2010). All known populations occur on U. S. Forest Service lands and private inholdings within the Gila National Forest. Due to genetic evidence of low mtDNA sequence divergence (COI = 1.6-3.0%) and lack of sufficient morphologic differences among populations of *P. thermalis*, Hershler and Liu (2010) recommended that populations of this species be treated as "conservation units".

Threats: Routine monitoring in the early 2000s indicated that populations of New Mexico springsnail are stable. While no direct threats can be currently identified, possible stressors could include natural stochastic events (drought, forest fire, sedimentation, flooding), wetland habitat degradation from recreational bathing, poor watershed management, and water contamination from recreational bathing and fire suppressant chemicals (Taylor 1983, 1987; NMDGF 1988; Mehlhop 1993; McDonald and Hamilton 1995; Lang 2002, 2010). Introduction of non-native crayfish and the invasive New Zealand mudsnail can adversely impact springsnails and aquatic habitats (Fernandez and Rosen 1996; NMDGF 2008;). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should monitor extant populations

and expand surveys to malacologically unexplored reaches within the Gila River Basin. Efforts to control the use of personal hygiene detergents (e.g., soap, shampoo, etc.) by bathers could protect habitat for *P. thermalis* in downstream reaches of Alum Spring. Signage that prohibits use of cleansing agents would still allow for recreational use of the spring.

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Star gyro, *Gyraulus crista*

Distribution: This species is widespread throughout northern North America, ranging south into northern New Mexico, where it occurs in emergent wetlands associated with Black Lake and Coyote Creek, Colfax County (Taylor 1983, NMDGF 1988).

Current Status: The star gyro was listed as state threatened in 1983. The status of this species is currently unknown in New Mexico.

Threats: Habitat modification due to any alteration of the wetland complex, pollution, dewatering, or land development within the proximate watershed (Taylor 1983; NMDGF 1988). Aquatic invasive species pose a threat to all native aquatic biota and ecosystems in New Mexico (NMDGF 2008). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should resurvey known site occurrences and conduct statewide surveys to determine the distribution of this species.

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Shortneck snaggletooth, *Gastrocopta dalliana*

Distribution: *Gastrocopta dalliana* is widespread in Arizona (central, southern, and western), and has been documented throughout northern México (Chihuahua and Sonora) south to Baja California (Bequaert and Miller 1973). In New Mexico, shortneck snaggletooth appears restricted to geographically disparate populations in the Upper Sonoran Life Zone of the Animas (Indian Creek Canyon), Big Hatchet, San Luis (Lang Canyon) and Peloncillo mountains (Coronado National Forest lands) of Hidalgo County (Metcalf and Smartt 1997; Lang 2000). Fossil records reported by Branson et al. (1966) near Santa Rosa from drift along the Pecos River are questionable.

Current Status: The shortneck snaggletooth was listed as state endangered in 1990, and was downlisted to threatened during the 2008 Biennial Review. In New Mexico, *G. d. dalliana* is more widespread than previously thought. This species occurs in a diversity of low-elevation plant communities of southwestern Hidalgo County: densely wooded, mesic habitat of Indian Creek Canyon, Animas Mountains (Lang 2000); along the riparian corridor of Guadalupe Canyon (Dr. Artie L. Metcalf, UTEP, unpub. data); and sparse juniper-oak forest (Dr. J. Nekola, UNM, unpub. data). It also occurs sporadically on exposed dry slopes in the Big Hatchet and San Luis mountains (Lang 2000). Habitat vital to *G. d. dalliana* in the Animas and San Luis mountains is under stewardship of the private landowner. The population in the Big Hatchet Mountains occurs on BLM land.

Threats: Habitat modification from logging, mining, and wildland fire represent primary threats to localized populations (NMDGF 1988, Lang 2000).

Recommendations: NMDOW should continue land snail surveys to refine the range of this species in southwestern New Mexico, and work with land managers to ensure that habitat management promotes persistence of the species.

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Ovate vertigo, *Vertigo ovata*

Distribution: The historic range of *Vertigo ovata* included northern North America, ranging south over most of the United States to México. The occurrence of *V. ovata* in the Western Molluscan Province is sporadic, especially in the Rocky Mountain States (Bequaert and Miller 1973). Fossil specimens of *V. ovata* from spring-related Pleistocene and Holocene deposits chronicle the extirpation of localized populations throughout Arizona, New Mexico, and western Texas (Metcalf 1967; Bequaert and Miller 1973; Metcalf and Smartt 1997). In New Mexico, extant populations are known from mesic habitats of Blue Spring, Eddy County, and from the riparian corridor associated with Alamosa Creek immediately upstream of the Monticello Box, Socorro County (Lang 2001a).

Current Status: The ovate vertigo was listed as state threatened in 1991 (NMDGF Regulation 682). Populations at Blue Spring (Eddy County) and Alamosa Creek (Socorro County) appear stable under current land use practices, with evidence of successful reproduction and recruitment of immature snails into the adult population (Lang 2001a). In 2010, this species was found extant in a marsh system located adjacent to the middle Rio Grande south of Cochiti Dam (B. Lang, biologist, NMDGF, pers. obs.).

Threats: In the Desert Southwest, reduction in habitat suitability for this species is attributable to natural stochastic events (e.g., Holocene warming, arroyo entrenchment; Haynes, 1968) exacerbated by human-related land use activities (e.g., wetland [marsh] drainage and development, stream diversion, grazing; Metcalf and Smartt 1997). Beryllium ore exploration and mining within the immediate watershed of Alamosa Creek have posed threats to this species (Lang 2001b, 2003, 2009). Extant populations at Blue Spring are threatened by ground water extraction and oil and gas industry operations which can result in local/regional aquifer depletion (Hennighausen 1969; Quarles 1983), diminution of spring flows (NMDGF 1988), and surface and ground water contamination (Jercinovic 1982, 1984; Longmire 1983; Quarles 1983; Boyer 1986; Eisler 1987; Green and Trett 1989). Poor watershed stewardship and natural stochastic events, such as prolonged drought, could adversely impact habitat conditions at all three known sites by reducing hydrologic discharge through wetland systems, thereby desiccating riparian plant communities and increasing grazing pressure in these areas (Taylor 1983; NMDGF 1988; Mehlhop 1992). Aquatic ecosystems and macroinvertebrates are likely to show strong responses to global climate change (Xenopoulos et al. 2005; Burgmer et al. 2007).

Recommendations: No change in listing status is recommended. NMDOW should continue statewide surveys of marsh habitats while monitoring extant populations. Resource agencies should pursue opportunities to acquire private lands, including mineral and ground water rights, where future beryllium ore exploration or mining may adversely affect aquifers that supply spring-fed wetlands of Alamosa Creek upstream of the Monticello Box.

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Hacheta Grande woodlandsnail, *Ashmunella hebardi*

Distribution: *Ashmunella hebardi* is narrowly restricted to dense pine cover along the south wall of Chaney Canyon (6600-7400 ft) on the west-central flank of the Big Hatchet Mountains west of Big Hatchet Peak, Hidalgo County (Metcalf and Smartt 1997; Lang 2005). The species may occur at higher elevations on vertical limestone faces immediately west-northwest of Big Hatchet Peak above 7400 ft.; sampling in this area is limited by access.

Current Status: *Ashmunella hebardi* was listed as state threatened in 1990 and is considered a federal species of concern (USFWS 1994). A 90-day finding by U.S. Fish and Wildlife Service (USFWS) stated that federal listing was not warranted due to lack of substantial information (USFWS 2009). The Hacheta Grande woodlandsnail occurs most commonly at the base of limestone outcrops beneath large rock fragments and rubble piles where litter-soil mold collects. The Bureau of Land Management (BLM) conducted a prescribed burn in the north-central range of the Big Hatchet Mountains (Thompson Canyon northward to Zeller Peak) in 2005 that did not impact this species. Recent surveys indicate that live individuals are probably rare (Wallace 2022).

Threats: Any form of soil disturbance (e.g., mineral mining) or vegetation removal (e.g. logging, prescribed burn, or grazing) could result in adverse impacts to edaphic conditions and direct habitat loss in areas where this species occurs. Habitat modification from wildland fire, deciduous woody plant diseases, insect pests, and climate change could impact extant populations (Sullivan 1997; Lang 2001, 2005).

Recommendations: No change in listing status is recommended. Population monitoring should continue. NMDOW should consult with the BLM and USFWS to initiate a conservation plan for this species. Consultation with BLM is recommended when developing any management plan for the range where this species resides, specifically related to further prescribed burns (Wallace 2022). Further taxonomic studies are needed to determine if the Hacheta Grande woodlandsnail and Big Hatchet woodlandsnail are separate species (Wallace 2022).

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Cooke's Peak woodlandsnail, *Ashmunella macromphala*

Distribution: This species was known only from the precipitous north slope of Cooke's Peak, Cooke's Range, Luna County (Vagvolgyi 1974; Metcalf and Smartt 1997). Surveys south of Cooke's Peak documented a single isolated population of *Ashmunella macromphala* on a north-facing, igneous, scree slope in OK Canyon (Lang 2001). While no live snails were observed at this site, recent shell material implies that a viable population may exist there. Live snails were not observed in 2021 either, and shells were fairly uncommon (Wallace 2022). Oak-talus interface habitats appear to be very important for this species (Wallace 2022).

Current Status: Cooke's Peak woodlandsnail was listed as state threatened in 1990. A 90-day finding by the U.S. Fish and Wildlife Service determined that Cooke's Peak woodlandsnail had substantial information to warrant listing (USFWS 2009), and the species is currently under review (Wallace 2022). Both known populations of *A. macromphala* occur on BLM land.

Threats: Land snails occupying high-elevation outcrops and talus sprawls may be at risk from climate change, natural catastrophe (rockslide, wildfire), prescribed burning, and soil disturbance from mining and logging (NMDGF 1988; Sullivan 1997; Lang 2001, 2004). Surveys in May 2000 documented significant sign of cattle grazing throughout the unnamed canyon leading up to the base of the type locality (Lang 2001). While cattle will likely not venture onto or across a talus slope, intense browsing of deciduous woody vegetation around the perimeter of a scree slope can potentially decrease leaf litter available as food for snails, significantly alter seral succession, and affect plant community composition. Vagvolgyi (1974) discussed the importance of deciduous leaf litter for this species. Controlled burn along oak-talus interfaces are a major threat, as many burnt shells were observed (Wallace 2022).

Recommendations: No change in listing status is recommended. NMDOW should monitor extant populations and expand malacological surveys for this species to include potentially suitable habitats in southwestern areas of the Cooke's Range. NMDOW should pursue development of a state recovery plan. Future fire management

practices should consider the impacts of fire for this species (Wallace 2022).

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Mineral Creek mountainsnail, *Oreohelix pilsbryi*

Distribution: *Oreohelix pilsbryi* is endemic to the Black Range, Sierra County (Pilsbry 1939), where it has been reported from two localities on U. S. Forest Service land near "Oliver's Mine" along Mineral Creek, about 5.5 miles west of Chloride (Metcalf and Smartt 1997). This species was previously known from a 30 m section of limestone outcrop along Mineral Creek (type locality), and from similar habitat located 50 m upslope (NMDGF 1988; Metcalf and Smartt 1997).

Current Status: Mineral Creek mountainsnail was listed as state threatened in 1990. A 90-day finding by the U.S. Fish and Wildlife Service determined that Mineral Creek mountainsnail had substantial information to warrant listing (USFWS 2009), and the species is currently under review (Wallace 2022). Lang (2001) found *O. pilsbryi* abundant throughout an approximate 0.3-mile reach of stream that constricts Mineral Creek to a narrow, sinuous channel lined by limestone outcrops; several small shells (5-10 mm *w*) confirmed a reproducing population. No empty shells or fragments were observed downstream from this site. Surveys in 2021 also indicated high local abundance and a population exhibiting strong recruitment (Wallace 2022). New locations were discovered, almost doubling the known reported area of occurrence within the canyon (Wallace 2022).

Threats: Considering this species apparent affinity for moist soils on well-shaded, north- and east-facing slopes, any form of canopy removal, whether by cutting or forest fire, would likely dry the forest floor and potentially render edaphic condition unsuitable to *O. pilsbryi.* This species is vulnerable to any form of soil disturbance or mining activity within the immediate vicinity of occupied habitat. While cattle may not graze regularly at the type locality, cows do travel the narrow stream corridor and rest along shaded canyon walls. Soil disturbance from such foot traffic and trampling could adversely affect *O. pilsbryi* if downstream grazing intensity increases so as to push cattle into marginal habitats upstream in search of forage (NMDGF 1988; Lang 2001).

Recommendations: No change in listing status is recommended. NMDOW should continue to monitor extant populations and survey for new populations. Fencing of the type locality would serve to protect this species' limited habitat. NMDOW should pursue development of a state recovery plan. NMDOW should start surveys to determine effect of the Black Fire of 2022.

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Doña Ana talussnail, *Sonorella todseni*

Distribution: The Doña Ana talussnail is endemic to Doña Ana Mountains, Doña Ana County (Miller 1976). *Sonorella todseni* can arguably be considered the most geographically restricted of all known species of *Sonorella* in New Mexico (Metcalf and Smartt 1997).

Current Status: *Sonorella todseni* was listed as state threatened in 1990. A 90-day finding by the U.S. Fish and Wildlife Service determined that Doña Ana talussnail had substantial information to warrant listing (USFWS 2009), and the species is currently under review (Wallace 2022). Lang (2001) reported live *S. todseni* in rivulet-like accumulations of dark, rhyolitic talus on the north and east slope of Doña Ana Peak. The total population size appears very small, probably occupying <1.0 acre, collectively (Sullivan 1997). No live snails were detected in 2021, but several shells were found of both adults and juveniles (Wallace 2022).

Threats: Habitat protection is paramount for the conservation of this species, which is vulnerable due to its restricted range, fragile habitat, and easy public land access (NMDGF 1988; Lang 2001). The extant population is susceptible to any form of soil disturbance or mining activity in the general vicinity of talus slopes. Surveys revealed signs of shrub removal by digging and a plastic tag tie from a local gardening center (Lang 2001). Removal of woody vegetation not only disturbs talus slopes, but also results in loss of food and cover for snails (Vagvolgyi 1974), increases the potential for slope erosion, and effectively reduces water retention capacity of the soil. Cumulative effects of these activities can have irrevocable impacts, exacerbating habitat desiccation and increasing substrate temperatures, which can dry-out developing egg masses deposited in talus just below the ground surface. Climate change, natural perturbations (fire, rockslides), mining, and related substrate disturbance activities represent threats to this species (NMDGF 1988; Sullivan 1997; Lang 2001).

Recommendations: No change in listing status is recommended. NMDOW should continue efforts with the Bureau of Land Management to monitor extant populations and to secure occupied habitat through a state recovery plan.

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