

**WILDLIFE OF SPECIAL CONCERN IN ARIZONA**

Draft: March 16, 1996

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(Effective March 16, 1996, this draft list of *WSCA* is to be used in lieu of the previous list of *Threatened Native Wildlife in Arizona* (AGFD 1988), until the final *WSCA* list is approved by the Arizona Game and Fish Commission)

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### INTRODUCTION

All wildlife requires habitat--a place in which to live; a place in which to seek food, water and shelter; a place in which to reproduce. Arizona's varied topography, climate and geologic and evolutionary history have created a vast array of habitats. More than 200 major types of plant communities and aquatic features occur in Arizona. Our natural heritage now includes more than 800 species of vertebrate wildlife, reflecting that diversity of habitat types. This list of **Wildlife of Special Concern in Arizona** (WSCA) includes 116 taxa (species or subspecies). Most are listed because of significant habitat losses and threats. Many are also Federally listed as Threatened or Endangered.

Human-caused habitat fragmentation, degradation and destruction have long since replaced "natural" factors as the major causes of declines in the numbers of kinds and individuals of wild animals. Habitat and wildlife population losses inevitably occur as human demands on natural resources expand. Species less tolerant of such impacts become increasingly rare, some to the point of extinction. Extinct species are gone forever.

To ensure the continued presence of all the kinds of wildlife native to Arizona, we must act wisely, at times forcefully, to protect their habitats. We must especially conserve the habitats occupied by species that are threatened with extinction. As their habitats recover, so too will some of their populations.

**A History of Arizona's WSCA List.** The Department first developed a list of "threatened" wildlife in 1975, under authorities implicit in Arizona Revised Statute 17. The list was revised in 1976 and 1978, but its philosophical underpinnings were not completely consistent with its purpose. We did not require documentation or even suspicion of habitat or other threats before listing a species. Some were listed solely because they had very limited distributions in Arizona. We called them "unique" species.

Nevertheless, then, as now, our list identified the wildlife of greatest concern to us from an "endangered species" perspective. The list was and is especially intended to tell land management agencies which species we want to see emphasized in habitat management. However, including "unique" species sometimes led agencies to allocate resources to them simply because they were "State listed," not because their biological status merited priority management attention. It also caused unnecessary work on projects being developed and reviewed within the environmental

review process, under the National Environmental Policy Act, the Endangered Species Act and other Federal laws.

The emphasis of the Department's list changed considerably when it was revised in 1982. Its focus became, as it is now, the degree to which habitats or populations are threatened and the probability of extirpation of a taxon from Arizona. Limited distribution per se no longer justifies listing a species. Known threats and documented population declines are the most important factors considered, although potential threats and perceived declines also come into play. When no data exist, we depend largely on professional inference and informed opinion to determine whether a species or subspecies should be listed.

**Species or Subspecies?** The **WSCA** list includes both species and subspecies. When an animal is represented in Arizona by more than one subspecies (or possibly is), only one of which is threatened, only the threatened subspecies is listed. Conversely, when only one form is present in the State, the taxon listed is the species as a whole, regardless of how many subspecies occur elsewhere. Most exceptions to this convention result from Federal listing of an Arizona subspecies of a polymorphic species.

**Categories on the WSCA List.** There are four categories on the **WSCA** list: extinct, endangered, threatened and candidate species. Extinct forms are already gone forever. None exist anywhere; recovery is impossible. "Endangered" species will likely be gone from Arizona very soon, too, if recovery efforts are not undertaken. The continued presence of "threatened" species in Arizona could also be in jeopardy in the near future. Most are seriously threatened by habitat destruction or other factors. Their populations are known or suspected to have declined.

Still others, the "candidate species" are on the edge. Most occupy habitats that are sufficiently limited and potentially threatened to make population declines seem imminent. They are good candidates for threatened or endangered status. By drawing attention to them, we hope to stimulate actions that will protect their habitats and populations now, rather than later, when it might be too late.

The **WSCA** list includes both extinct and extirpated animals. Extirpated species, such as the black-footed ferret, are those known or suspected to have been eliminated from Arizona but which still exist elsewhere. Their existence gives hope that we might someday reintroduce them successfully and restore them to our natural heritage. For some extirpated species, such as the Colorado squawfish and the thick-billed parrot, reintroduction efforts have already begun. But, not enough time has passed to know whether they will be successful in the long term. For other extirpated species, there is less cause for optimism. Perhaps the

landscape and its uses have already changed so drastically those animals can never be brought back. Appendix 1 (pp.27-32) lists by taxonomic group species included on the **WSCA** list and their corresponding status under the Endangered Species Act.

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 Number of species and subspecies listed in **WCSA** categories

	<u>Extinct</u>	<u>Endangered</u>	<u>Threatened</u>	<u>Candidate</u>	<u>Total</u>
Fish	1	17	7	2	27
Amphibians	1	4	1	4	10
Reptiles	0	2	1	7	10
Birds	0	11	11	20	42
Mammals	3	14	4	6	27
Totals	5	48	24	39	116

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**Why are some "protected" species not on this list?**--Sometimes people ask, "Why protect some wildlife by making it illegal to hunt or fish for them, yet not list them as threatened wildlife?" The answer lies in the focus of the **WCSA** list. Some animals seem especially susceptible to over-harvest. Some of them are also highly prized in the black-market pet trade. But, perhaps their statewide population and their habitats do not seem sufficiently threatened otherwise to justify including them on the **WCSA** list. Making it illegal to take them under auspices of a hunting or fishing license will ensure that pressure from lawful take will not jeopardize their continued presence in Arizona.

Only when a species is **both** subject to excessive take **and** has significant threats or declining populations is it **both** protected from take **and** included on the **WCSA** list. The Arizona ridge-nosed rattlesnake is an example. In contrast, the rock rattlesnake cannot be hunted (see Commission Order 43), but it is not on the **WCSA** list. Both species are highly prized in the pet trade. The main difference between the two relative to listing has to do with habitat: the rock rattler's habitats are more extensive and less threatened than are those of the ridgenose.

**Revision of the WCSA list.**--We based the 1988 version of the **WCSA** list on a review of information from many sources. We discussed the proposed list and our listing criteria in a public session of the Arizona Game and Fish Commission before the Commission approved it. This list reflects the best biological information available, as well as the best consensus of our cooperators.

Unfortunately, many species are still poorly known. Some listing decisions have to be made on the basis of informed opinion alone. As better information becomes available, we will again revise the list. So please send information on listed species, or on those you believe merit listing, to our Endangered Species Coordinator (c/o Nongame Branch, 2222 West Greenway Road, Phoenix, Arizona,



85023-4399). We will use it to improve our efforts to manage Arizona's native wildlife. Keeping current on so many species is difficult at best. Your help is always very much appreciated.

## FISH

NOTE: The status annotations below refer only to Arizona. Most of the fishes listed also occur elsewhere, where they may be more (or less) threatened. With few exceptions, the common names and sequencing are as published in Protected fishes of the United States and Canada (James E. Johnson. 1987. American Fisheries Society, Bethesda, Maryland). \*Denotes that Federal listing under the Endangered Species Act includes Arizona.

**Extinct Species: those species or subspecies that are no longer extant in the wild or in captivity, anywhere.**

**Monkey Springs Pupfish** (Cyprinodon sp.). Known only from Monkey Springs (Santa Cruz Co.). Eliminated in 1971 by human-caused habitat alterations and predation by introduced largemouth bass (Micropterus salmoides). Though never officially described, this species clearly differed from other pupfish in body proportions and in breeding color.

**Endangered Species: those species or subspecies (a) extirpated from Arizona since the mid-1800s and/or (b) for which extinction or extirpation is highly probable unless conservation efforts are undertaken soon.**

\***Gila Trout** (Salmo gilae). Extirpated, but reintroduced in 1974 into Gap Creek (Verde River drainage, Yavapai Co.), where it is reproducing and appears to be stable. Formerly throughout the upper Verde drainage and possibly in Eagle Creek (Greenlee Co.). Threatened by hybridization with rainbow trout (S. gairdneri) and by predaceous, nonnative fishes. More reintroductions will occur when stock is available from New Mexico, where recovery efforts are nearing a successful completion. Federal status: Endangered.

**Arizona Stoneroller** (Campostoma ornatum pricei). Known only from Cochise Co.: Rucker Canyon, Chiricahua Mountains; and Black Draw, San Bernardino National Wildlife Refuge. Persists in small numbers despite extreme habitat modification. Threats include drought and unlawful introduction of nonnative fishes.

\***Humpback Chub** (Gila cypha). Formerly widespread in the Colorado River and its larger tributaries. Now occurs only in the Grand Canyon portion of the mainstream Colorado and (mainly) in the lower reach of the Little Colorado River. Threatened by habitat alteration (especially impacts of dams) and predation by nonnative fishes. Federal status: Endangered.

\***Sonora Chub** (*Gila ditaenia*). Occurs only in the Rio de la Concepción drainage in Sycamore and Peñasco creeks, Atascosa Mountains (Santa Cruz Co.). Threatened by habitat destruction, predation by nonnative fishes and, in Mexico, hybridization with the Yaqui chub (*Gila purpurea*). Federal status: Threatened; Critical Habitat designated in Sycamore and Peñasco creeks.

\***Bonytail Chub** (*Gila elegans*). Formerly throughout the Colorado River and its major tributaries. The last natural population is in Lake Mohave (Mohave Co.), where there is no evidence of reproduction or recruitment. Threatened by habitat alteration and predation by nonnative fishes. Hatchery-produced stock is being stocked in Lake Mohave, and may soon provide for reintroductions in the Salt or Gila rivers. Federal status: Endangered.

\***Yaqui Chub** (*Gila purpurea*). Occurred in Cochise Co. in a few tributaries of the Rio Yaqui and (in the Willcox Playa drainage) in Turkey Creek. Extirpated by habitat degradation and nonnative fishes by the mid-1900s. Populations re-established in Leslie Canyon (Swisshelm Mountains; in 1967), on San Bernardino NWR (in 1979) and in a pond on Turkey Creek (in 1986). Federal status: Endangered; Critical Habitat designated on San Bernardino NWR.

**Virgin Roundtail Chub** (*Gila robusta seminuda*). Restricted to the Virgin River drainage in extreme northwestern Arizona (Mohave Co.). Population abundance and stability greatly reduced from historic levels. Threatened by habitat destruction, parasites and nonnative fishes. Proposed for Federal listing as Endangered, with Critical Habitat in portions of the Virgin River.

**Virgin Spinedace** (*Lepidomeda mollispinis mollispinis*). Occurs only in the Virgin River drainage in extreme northwestern Arizona (Mohave Co.). Range and abundance have decreased dramatically since 1960. Threatened by habitat destruction, parasites and nonnative fishes.

\***Yaqui Shiner** (*Notropis formosus mearnsi*). Extirpated. Occurred only in the Rio Yaqui drainage (Cochise Co.). Fairly common before 1968, but not seen after 1970. Extirpated by habitat degradation. Reintroductions planned for San Bernardino NWR. Federal status: Threatened (listed as the Beautiful Shiner, *N. formosus*); Critical Habitat designated on San Bernardino NWR.

\***Woundfin** (*Plagopterus argentissimus*). Occurred, apparently widely, in the larger streams and rivers of the lower Colorado River Basin. Range and abundance decreased dramatically after the 1800s. Now restricted to the Virgin River in extreme northwestern Arizona (Mohave Co.). Threatened by habitat loss, parasites and

predation by nonnative fishes. Reintroductions will occur in the Gila River drainage when captive propagation problems have been overcome. Federal status: Endangered.

**\*Colorado Squawfish** (Ptychocheilus lucius). Extirpated, but reintroductions are underway. Occurred throughout the large rivers of the Colorado River system, including the Salt, Gila, Verde and San Pedro. Eliminated before the mid-1960s, probably by habitat alteration (especially construction of dams), competition with and predation by nonnative fish and over-harvest. Captive propagation is underway; reintroductions into the Salt and Verde drainages began in 1985. Federal status: Endangered.

**Yaqui Sucker** (Catostomus bernaldini). Extirpated. Occurred only in the Rio Yaqui drainage (Cochise Co.). Last seen in Astin Spring, and extirpated when the spring was destroyed in 1967. Reintroductions proposed for San Bernardino National Wildlife Refuge.

**Razorback Sucker** (Xyrauchen texanus). Formerly occurred in all major rivers and larger streams of the Colorado River drainage. Natural populations have largely been reduced to a non-recruiting population in Lake Mohave (Mohave Co.), although a few adults recovered from Lake Mead, Lake Havasu, the Central Arizona Canal and the lower Colorado River area apparently represent other small, remnant natural populations. The long-term success of massive reintroductions into the Gila, Verde and Salt rivers (beginning in 1981) is still unknown. Threatened by habitat alteration and predation by nonnative fishes.

**\*Yaqui Catfish** (Ictalurus pricei). Extirpated. Believed to have occurred only in San Bernardino Creek (Cochise Co.) and to have been eliminated by habitat degradation. An introduced population in a pond at Monkey Springs (Santa Cruz Co.) was destroyed when the pond was drained. Reintroductions planned for San Bernardino National Wildlife Refuge. Federal status: Threatened; Critical Habitat designated on San Bernardino NWR.

**\*Desert Pupfish** (Cyprinodon macularius macularius). Extirpated, but reintroduced in 1983 into four localities, one of which (Peeples Canyon, Mohave Co.) is outside historic range. Formerly throughout the lower Gila River Basin. Eliminated by habitat destruction and competition with or predation by nonnative fishes. More reintroductions are planned for the Gila River drainage but must await Federal rule-makings pursuant to the experimental population sections of the Endangered Species Act. Federal status: Endangered (listed as C. macularius); Critical Habitat designated in Arizona only at Quitobaquito, and that population was subsequently named as a separate subspecies (see next account).

**\*Quitobaquito Pupfish** (Cyprinodon macularius eremus). The only known natural population is in Quitobaquito Springs and Pond, Organ Pipe Cactus National Monument (Pima Co.). Threatened by water table draw-down and possibly by wind-drift of pesticides from Sonora, Mexico. Federal status: Endangered (listed as the Desert Pupfish, C. macularius; see above); Critical Habitat designated at Quitobaquito, Organ Pipe Cactus National Monument.

**\*Yaqui Topminnow** (Poeciliopsis occidentalis sonoriensis). Known only from the Rio Yaqui drainage (Cochise Co.). Now restricted to San Bernardino National Wildlife Refuge and an introduced population in Leslie Canyon (Swisshelm Mountains). Population declines primarily resulted from habitat destruction and interactions with the nonnative mosquitofish (Gambusia affinis). Federal status: Endangered (listed as the Gila Topminnow, P. occidentalis).

**Threatened:** those species or subspecies whose continued presence in Arizona could be in jeopardy in the near future. Serious threats have been identified and populations are (a) lower than they were historically or (b) extremely local and small.

**\*Apache Trout** (Salmo apache). Restricted to streams of the upper Salt, Gila, Blue and Little Colorado drainages in the White Mountains. Principal threats are hybridization and competition with rainbow trout and habitat degradation resulting from some grazing and forestry practices. Recovery efforts are well underway, and include reintroductions from hatchery stock and renovations of streams and lakes. Federal status: Threatened.

**Gila Chub** (Gila intermedia). Formerly may have occurred throughout the Gila River system in central and southern Arizona. Now in fewer than 15 streams in central and southern Arizona, and apparently declining. Threatened by habitat destruction and by introduction of nonnative fishes.

**Colorado Roundtail Chub** (Gila robusta robusta). Occurs in many streams across central Arizona, but populations are declining because of habitat destruction and impacts of nonnative fishes. Recent studies indicate that the formerly recognized subspecies G. r. grahami is not distinct from G. r. robusta.

**\*Little Colorado Spinedace** (Lepidomeda vittata). Known only from higher elevations on the Mogollon Plateau, in tributaries of the Little Colorado River. Threatened by habitat destruction and introduction of nonnative fishes. Federal status: Threatened; Critical Habitat designated in portions of East Clear Creek,

Chevelon Creek and Nutrioso Creek.

\***Spikedace** (Meda fulgida). Formerly in several streams in the Gila River drainage. Now known only from the upper Verde River, Eagle Creek and Aravaipa Creek. Abundance at any one site is extremely variable from year to year. Threatened by habitat destruction and competition with or predation by nonnative fishes, especially the red shiner (Notropis lutrensis). Federal status: Threatened; Critical Habitat proposed for portions of Aravaipa Creek, the Verde River, Sycamore Creek (Coconino Co.) and the upper Gila River.

\***Loach Minnow** (Tiaroga cobitis). Formerly in streams throughout the Gila River system. Now restricted to the San Francisco River, Blue River, North Fork of the White River and Aravaipa Creek. Threatened by habitat destruction and competition with or predation by nonnative fishes. Federal status: Threatened; Critical Habitat proposed in Arizona for portions of Aravaipa Creek and the Blue, San Francisco and upper Gila rivers.

\***Gila Topminnow** (Poeciliopsis occidentalis occidentalis). Once abundant in low to mid-elevation streams throughout the Gila River system. By 1987, natural populations had been reduced to 10 sites in Santa Cruz and Graham counties. Seven natural sites are on private land and are not fully protected by the Endangered Species Act. Threatened by habitat destruction and competition with or predation by nonnative fishes, especially mosquitofish. Six natural sites have been contaminated with mosquitofish, which have been widely introduced to control mosquitoes. Of 191 known Gila topminnow reintroductions within historic range since the latter 1970s, 35 still persisted in 1987. Twenty-nine of those 35 "successful" sites were first stocked in 1982, when intensive recovery efforts began. Federal status: Endangered (listed as Gila Topminnow, P. occidentalis).

**Candidate Species:** those species or subspecies for which threats are known or suspected but for which substantial population declines from historical levels have not been documented (though they appear likely to have occurred).

**Little Colorado Sucker** (Catostomus sp.). Electrophoretic studies have confirmed this taxon as distinct at the species level, but it has not yet been formally described. Known only from the middle Little Colorado River drainage. Threatened by habitat destruction and nonnative fishes.

**Zuni Mountain Sucker** (Catostomus discobolus ssp.). Distinct race not yet formally described. Known only from the eastern Little Colorado River drainage. Threatened by habitat destruction and



nonnative fishes.

## AMPHIBIANS

NOTE: The status annotations below refer only to Arizona. Most of the amphibians listed also occur elsewhere, where they may be more (or less) threatened. With few exceptions, the common names and sequencing are as published in A field guide to western reptiles and amphibians (Robert C. Stebbins. 1985. Houghton-Mifflin Company, Boston). No amphibians have been Federally listed yet for Arizona under the Endangered Species Act.

**Extinct Species:** those species or subspecies that are no longer extant in the wild or in captivity, anywhere.

**Relict Leopard Frog** (Rana onca [includes the **Vegas Valley Leopard Frog**, R. fisheri]). Extinct; may have occurred in the Virgin River drainage of extreme northwestern Arizona (Mohave Co.). However, all specimens from there have been identified as Lowland Leopard Frogs (R. yavapaiensis; see Jennings, Mark R. 1988. Rana onca. SSAR Cat. Amer. Amphibians and Reptiles Account 417.1).

**Endangered Species:** those species or subspecies (a) extirpated from Arizona since the mid-1800s and/or (b) for which extinction or extirpation is highly probable unless conservation efforts are undertaken soon.

**Huachuca Tiger Salamander** (Ambystoma tigrinum stebbinsi). Occurs in several ponds in the San Rafael Valley (Santa Cruz and Cochise counties). May have occurred more widely historically, when marshes were more extensive in southeastern Arizona. Threats include genetic swamping by introduced, bait-stock salamanders (Ambystoma spp.) and predation by nonnative fishes.

**Barking Frog** (Hylactophryne augusti). Only two museum specimens are known: from the Pajarito and Santa Rita mountains (Santa Cruz Co.). Vocalizations occasionally reported from Cochise, Pima and Santa Cruz counties, but no specimens have been taken since 1965. Found in crevices in limestone outcrops. Threats include road expansion and development of recreation or administrative sites.

**Tarahumara Frog** (Rana tarahumarae). Extirpated. Formerly occurred along permanent streams in oak woodland in Santa Cruz Co. (Santa Rita Mountains and Atascosa-Pajarito-Tumacacori complex). Numbers declined seriously in the late 1970s; the last individual in Arizona was found dead in the Santa Ritas in 1983. Cause of decline unknown, but may be related to heavy metal toxicity.

**Plains Leopard Frog** (Rana blairi). Occurs only in low elevation wetlands in the Sulphur Springs Valley (Cochise Co.). Threatened by habitat destruction and predation by bullfrogs.

**Threatened:** those species or subspecies whose continued presence in Arizona could be in jeopardy in the near future. Serious threats have been identified and populations are (a) lower than they were historically or (b) extremely local and small.

**Chiricahua Leopard Frog** (Rana chiricahuensis). Occurs locally in central and southeastern Arizona. Population status very poorly known. Found primarily in rocky streams, but also in other wetlands, many of which are threatened by destruction, pollution and introduction of bullfrogs (R. catesbeiana).

**Candidate Species:** those species or subspecies for which threats are known or suspected but for which substantial population declines from historical levels have not been documented (though they appear likely to have occurred).

**Northern Casque-headed Frog** (Pternohyla fodiens). Occurs only in desert scrub and desert grassland in southwestern Pima Co. Appears threatened by vegetation clearing, livestock grazing, draw-down of water tables and road development.

**Northern Leopard Frog** (Rana pipiens). Occurs in the northeastern quarter of Arizona, usually in montane streams and wetlands that have aquatic vegetation but also in wet meadows at higher elevations. Although some populations have declined, and a few have been lost entirely, no specific causes have yet been identified.

**Lowland Leopard Frog** (Rana yavapaiensis). Occurs in southcentral, central, westcentral and extreme northwestern Arizona, primarily below 3000 ft elev. Generally restricted to permanent waters. Some die-offs have been noted, but no specific causes have yet been identified. It is threatened by innumerable human uses of its aquatic habitats, as well as by introduced predaceous fishes and bullfrogs.

**Great Plains Narrow-mouthed Toad** (Gastrophryne olivacea). Occurs primarily in seasonally or permanently wet areas of dense grass within semidesert grassland and oak woodland in Maricopa, Pima and Pinal counties. Known or suspected threats include habitat destruction caused by stream and river modification, water table draw-down, livestock grazing and road development.

## REPTILES

NOTE: The status annotations below refer only to Arizona. Most of the reptiles listed also occur elsewhere, where they may be more (or less) threatened. With few exceptions, the common names and sequencing are as published in A field guide to western reptiles and amphibians (Robert C. Stebbins. 1985. Houghton-Mifflin Company, Boston). No reptiles have been Federally listed yet for Arizona under the Endangered Species Act.

**Extinct Species:** those species or subspecies that are no longer extant in the wild or in captivity, anywhere.

None listed.

**Endangered Species:** those species or subspecies (a) extirpated from Arizona since the mid-1800s and/or (b) for which extinction or extirpation is highly probable unless conservation efforts are undertaken soon.

**Arizona Skink** (Eumeces gilberti arizonensis). Distribution largely uncertain; currently documented only from riparian habitats along the perennial reaches of the Hassayampa River and its tributaries below Wickenburg (Maricopa Co.). Threatened by water diversion and habitat destruction, including loss of flood-deposited debris it uses as cover sites.

**Massasauga** (Sistrurus catenatus). Known from only a few, very local populations in the grasslands of extreme southeastern Cochise Co. Agricultural development has already eliminated some populations and threatens another. Automobiles may be impacting the remnant population in the San Bernardino Valley significantly. Road-kills occur relatively frequently as the snakes move across a major highway during periods of more extensive summer surface-activity and while they move from or to hibernacula, especially in the spring.

**Threatened:** those species or subspecies whose continued presence in Arizona could be in jeopardy in the near future. Serious threats have been identified and populations are (a) lower than they were historically or (b) extremely local and small.

**Flat-tailed Horned Lizard** (Phrynosoma mcallii). Occurs in the sandy desert south and east of Yuma and west of the Gila and Tinajas Altas mountains (Yuma Co.). Threatened by habitat

conversion for agricultural and urban development and by pesticide use and off-road vehicles.

**Candidate Species:** those species or subspecies for which threats are known or suspected but for which substantial population declines from historical levels have not been documented (though they appear likely to have occurred).

**Desert Tortoise** (Xerobates agassizii). Occurs across much of southwestern Arizona's Sonoran Desert, principally in rocky foothills and less often on lower bajadas and in semidesert grassland. The Mohave Desert populations north and west of the Colorado River tend more toward flatlands, are genetically distinct, have declined drastically and are highly threatened. Sonoran Desert populations in the Tucson and Phoenix areas have also declined. The status of non-urban Sonoran Desert populations is somewhat controversial, but there is no evidence of declines. The major threats rangewide are: habitat fragmentation; habitat degradation from urban development and genetic contamination by escaped captives. Grazing and off-road vehicles are principally threats in Mohave Desert flatlands. Federal status: the Utah portion of the Beaver Dam Slope population is listed as Threatened. A petition to list the desert tortoise Federally as Endangered throughout its range has been determined by the U.S. Fish and Wildlife Service to be "warranted but precluded" by pending listings for other, higher priority species. AGFD does not believe Federal listing is justified for the population south and east of the Colorado River in Arizona.

**Colorado Desert Fringe-toed Lizard** (Uma notata). Occurs mainly on fine, wind-blown sands in and near the Mohawk and Yuma dunes (Yuma Co.). Threatened by agriculture (cropland conversion and wind-drift of pesticides), urbanization and off-road vehicles.

**Mohave Fringe-toed Lizard** (Uma scoparia). Occurs near Quartzsite and Parker (La Paz Co.), principally on fine, wind-blown sands in and near the Bouse Dunes and Cactus Plains and along the Colorado River but also on coarser sands. Threatened by agriculture (cropland conversion and wind-drift of pesticides) along the Colorado and elsewhere by off-road vehicles, mining and grazing.

**Mexican Garter Snake** (Thamnophis eques). Occurs primarily in permanent marshes and streams at middle elevations in central, south-central and southeastern Arizona. Threatened by habitat degradation and destruction and predation by bullfrogs.

**Narrow-headed Garter Snake** (Thamnophis rufipunctatus). Known primarily from permanent streams draining the Mogollon Rim. Some populations have declined, but the status of most is not well known. Stream alteration and the introduction of predatory, nonnative fishes appear to be the greatest threats.

**Brown Vine Snake** (Oxybelis aeneus). Occurs in dense vegetation on hillsides and along stream bottoms in southcentral Pima and western Santa Cruz counties. Threatened by livestock browsing, brush clearing and wood cutting.

**Arizona Ridge-nosed Rattlesnake** (Crotalus willardi willardi). Occurs in the Huachuca, Patagonia and Santa Rita mountains in Cochise and Santa Cruz counties. Most common in moist canyons in coniferous forest to pine and pine-oak woodland, but also occurs in adjacent, more arid woodland and ecotonal grassland habitats. Threatened by mining, woodcutting, road development and illegal collecting. A subspecies (C. w. obscurus) occurring in extreme southwestern New Mexico (Animas Mountains, Hidalgo County) and adjacent Mexico is Federally listed as Endangered. Ridgenoses have been reported from the Chiricahua Mountains several times, but whether it is the obscurus form that occurs there (if indeed any ridgenose does) remains to be confirmed by specimens or detailed photographs. The single purported specimen, from the Chiricahua National Monument, is unavailable for examination and has thus not been accepted as a bona fide record.



## BIRDS

NOTE: The status annotations below refer only to Arizona, and largely to breeding or wintering habitats. Most of the birds listed also occur elsewhere, where they may be more (or less) threatened. With few exceptions, the common names and sequencing are as published in the Field guide to the birds of North America (National Geographic Society, 1987, Second edition, National Geographic Society, Washington, D.C.). \*Denotes that Federal listing under the Endangered Species Act includes Arizona.

**Extinct Species:** those species or subspecies that are no longer extant in the wild or in captivity, anywhere.

None listed.

**Endangered Species:** those species or subspecies (a) extirpated from Arizona since the mid-1800s and/or (b) for which extinction or extirpation is highly probable unless conservation efforts are undertaken soon.

**Great Egret** (Casmerodius albus). Breeding colonies very local, and largely restricted to the Colorado River below Bullhead City (Mohave Co.). Threatened by channelization, some recreation activities, draining of marshlands and loss of riparian forest.

**California Condor** (Gymnogyps californianus). Extirpated. Sight records for much of Arizona through the late 1800s; the latest report was about 1924, near Williams. Unpetrified bones have been found in the Grand Canyon, but how regularly (or in what seasons) California Condors occurred in Arizona in recent history is unknown. Federal status: Endangered, but listed only for California and Oregon.

**\*Bald Eagle** (Haliaeetus leucocephalus). Nests primarily along the Salt, Verde and Bill Williams rivers on cliff ledges and in live trees or snags. The number of known nests has increased in recent years, but that may reflect increased search effort rather than population expansion. Long term data are lacking. Usually 200 to 250 bald eagles winter in Arizona, many in the White Mountains and along the Mogollon Rim. Threats include: ingestion of lead-poisoned waterfowl; timber harvest degradation of winter roosts; shooting; disturbance at nests; and loss of foraging perches (snags, especially) and riparian and aquatic habitats essential to foraging and nest placement. Federal status: Endangered.

**\*Northern Aplomado Falcon** (Falco femoralis septentrionalis). Extirpated. Occurred in the open grasslands of southeastern Arizona (Cochise Co.) prior to 1890. The last records were from the Sulphur Springs Valley (1939) and near Saint David (1940). Though frequently reported since then, no sighting has been confirmed. Possible factors contributing to extirpation were: control of range fires, brush invasion, overcollecting of eggs and falcons and (now) continued use of pesticides in Mexico. Federal status: Endangered.

**\*Masked Bobwhite** (Colinus virginianus ridgwayi). Extirpated, probably before or soon after 1900. Occurred in the bottomlands of the Altar and Santa Cruz River valleys, in Pima and Santa Cruz counties. Habitat restoration efforts and reintroductions that had been halted in the late 1970s and early 1980s were started again on Buenos Aires National Wildlife Refuge in 1985. Federal status: Endangered.

**Black Rail** (Laterallus jamaicensis). Nests very locally in marshes along the Colorado River. Threatened by river channelization, wildfires and phreatophyte control.

**Thick-billed Parrot** (Rhynchopsitta pachyrhyncha). Extirpated. Prior to the 1900s, occurred irregularly locally and possibly bred in the pine-covered mountains of southeastern Arizona. Probably eliminated by logging, shooting and perhaps shifts in climate and food crop cycles. A release program was initiated in 1986 in the Chiricahua Mountains (Cochise Co.), using birds confiscated from smugglers and some captive-reared birds. Federal status: Endangered, but listed only for Mexico.

**Ferruginous Pygmy-Owl** (Glaucidium brasilianum). Probably formerly nested throughout central and southern Arizona. Populations have declined substantially since 1950, likely due to loss of riparian forests and woodlands and perhaps competition for nesting cavities with the nonnative starling (Sturnus vulgaris). Areas of recent occupancy include xeric riparian washes in Organ Pipe Cactus National Monument, riparian forests of the lower San Pedro River and saguaro forests near Tucson.

**Willow Flycatcher** (Empidonax traillii). Nests very locally in wooded, swampy situations within Sonoran zones statewide and possibly also at higher elevations in the White Mountains. Known to breed also in the Grand Canyon segment of the Colorado River and along the San Pedro River. Extirpated from the lower Gila and lower Colorado rivers. Threatened by loss of habitat through stream diversions and channel clearing.

**Buff-breasted Flycatcher** (Empidonax fulvifrons). Formerly nested from the mountains in southeastern Arizona north to Fort Apache and Prescott. Population declined sharply after about 1920. Now limited primarily to the Huachuca Mountains. Causes of the declines are not known, but probably are related to changes in forest stand densities and control of forest fires.

**Bobolink** (Dolichonyx oryzivorus). Has bred very locally in grasslands or meadows of southern Apache and Navajo counties. Current breeding status unknown. Potential threats include agricultural and real estate development and (perhaps) grazing.

**Threatened:** those species or subspecies whose continued presence in Arizona could be in jeopardy in the near future. Serious threats have been identified and populations are (a) lower than they were historically or (b) extremely local and small.

**Snowy Egret** (Egretta thula). Breeding colonies are principally restricted to a few sites along the Colorado River (below Bullhead City). Nesting sites are threatened by channelization, drying of marshes and some recreational activities.

**Osprey** (Pandion haliaetus). Found primarily in coniferous-forests at lakes in the White Mountains and across the Mogollon Plateau. A few occur year-round at lower elevations along the Salt and Gila rivers, but no desert nest sites have yet been documented. Threatened by loss of nesting habitat and foraging perch sites.

**Gray Hawk** (Buteo nitidus). Occurs in riparian deciduous forests and woodlands of the Santa Cruz and San Pedro drainages. Threats include loss of nesting habitat to urbanization and conversion for agricultural.

**Ferruginous Hawk** (Buteo regalis). Breeds sparsely in grasslands in northern and west-central Arizona. Threats include prairie dog control programs and human disturbance near nests.

**\*Yuma Clapper Rail** (Rallus longirostris yumanensis). Occurs along the Colorado River, from Topock Marsh (Mohave Co.) to the Mexican border; on the Gila and Salt rivers upstream to the area of the Verde confluence (Maricopa Co.); and at Picacho Reservoir (Pinal Co.). Threatened by habitat destruction, primarily due to stream channelization and drying and flooding of marshes. Federal status: Endangered.

**Yellow-billed Cuckoo** (Coccyzus americanus). Nests along wooded streams, primarily in central and southern parts of the State. Extirpated from most Lower Sonoran localities, especially the Colorado River valley, by unmitigated destruction of riparian gallery forests. Threats to the remaining populations in central and southern Arizona include modification and loss of habitat from vegetation clearing, stream diversions, water management, agriculture and urbanization.

**Spotted Owl** (Strix occidentalis). Breeds locally in steep, wooded canyons of mountains and high mesas, principally in the northeastern half of Arizona. Requires a cool microclimate and possibly a permanent, local water source. Threatened by logging of old growth forests. Possibly some competition problems from great horned owls in forests that have been thinned.

**Veery** (Catharus fuscescens). Breeds only along the Little Colorado River near Greer (Apache Co.). Its restricted riparian habitat (willow-dogwood association) is threatened by housing development, recreation and grazing.

**Gray Catbird** (Dumetella carolinensis). Nests only in dense riparian brush-willow along the upper Little Colorado River (Apache Co.). Habitat threatened by housing development, recreation and grazing.

**American Redstart** (Setophaga ruticilla). Breeds mainly along the upper Little Colorado River, near Greer (Apache Co.). Its riparian habitat is threatened by development and grazing.

**Baird's Sparrow** (Ammodramus bairdii). Now winters in southeastern Arizona in grasslands near Sonoita and near Douglas, but was more widely distributed historically. Its habitat is now threatened by grazing and urban development, but the Arizona population may well be limited by problems on this species' north-central Great Plains breeding grounds.

**Candidate Species:** those species or subspecies for which threats are known or suspected but for which substantial population declines from historical levels have not been documented (though they appear likely to have occurred).

**Clark's Grebe** (Aechmophorus clarki). Breeding colonies restricted to two locations on the Colorado River, in Havasu National Wildlife Refuge. Requires secluded, marsh-bordered channels for nesting. Threatened by seasonal recreational use (especially water skiing) of backwaters and coves.

**American Bittern** (*Botaurus lentiginosus*). Statewide status not well known. Secretive, generally a solitary nester. Arizona breeding habitat includes marshes along the lower Colorado River and possibly a few sites on the Mogollon Plateau. Habitat threatened by marsh desiccation, fires and grazing.

**Least Bittern** (*Ixobrychus exilis*). Statewide status very poorly known. Apparently breeds only in dense cattail marshes along the lower Colorado River, at a few localities along the Salt and Gila rivers and at Picacho Reservoir. Habitat threatened by channelization and dredging, stream diversions, flood control clearing and draining of marshes.

**Black-bellied Whistling-Duck** (*Dendrocygna autumnalis*). Formerly more common in the wooded marshes in central and southeastern Arizona. Now breeds only in south-central Arizona, often using man-made ponds and sewage treatment facilities. Threatened by continued loss of riparian habitat and increasing recreational activities.

**Mississippi Kite** (*Ictinia mississippiensis*). A natural immigrant, arriving after the late 1960s. Has established a relatively stable nesting population along the lower San Pedro and middle Gila rivers. Other breeding areas include the middle and lower Verde River, the Big Sandy River and pecan groves along the Santa Cruz River. Threatened by destruction of riparian deciduous forests and woodlands.

**Northern Goshawk** (*Accipiter gentilis*). Nests locally in coniferous forests of the mountains and high mesas in the northeastern half of Arizona. Declines in breeding populations from the White Mountains north across the Colorado Plateau have been attributed to timber management. A small nesting population also occurs in the limited coniferous forests of the isolated mountains in southeastern Arizona.

**Common Black-Hawk** (*Buteogallus anthracinus*). Nests along perennial streams with mature riparian deciduous forests, primarily in the drainages of the Gila, Salt, Verde, Bill Williams and San Pedro rivers. Threatened by loss of riparian habitat, lack of tree regeneration due to livestock grazing and by reduction of stream flows due to water diversions and channelization.

**Crested Caracara** (*Polyborus plancus*). Fewer than 10 nesting pairs, all on the Tohono O'Odham Nation (Pima Co.). Human disturbances have caused recent nest failures.

**\*Peregrine Falcon** (Falco peregrinus). The subspecies anatum and perhaps tundrius occur statewide as migrant, transient and/or (rarely) wintering individuals. Only anatum breeds here, on selected isolated cliff ledges statewide. Nationwide population declines in the 1950s and 1960s seem to have reversed in recent years. Apparent population increases have been noted in Arizona since at least 1980. The effects of pesticides appear to have decreased north of Mexico, and there are few threats to much of the peregrine's remote, cliff-face habitat. Federal status: anatum--Endangered; tundrius--Threatened.

**Snowy Plover** (Charadrius alexandrinus). Breeds only in the Willcox Playa (Cochise Co.) and at Painted Rock Reservoir (Pinal Co.). May occasionally nest along temporary lakes on sandy playas. Potentially threatened by urban encroachment, ground water withdrawal and off-road vehicle activities.

**Violet-crowned Hummingbird** (Amazilia violiceps). Breeds in riparian habitats in Cochise Co.: Ramsey Canyon (Huachuca Mountains), Dixie Canyon (Mule Mountains), Cave Creek (Chiricahua Mountains) and Guadalupe Canyon (Peloncillo Mountains). Threatened by urban development and grazing.

**Elegant Trogon** (Trogon elegans). Nests only in a few high-quality riparian habitats in several mountain ranges in Cochise and Santa Cruz counties. Threats include wood-cutting, grazing, recreation (especially by use of tape recorders for attracting them) and road construction.

**Belted Kingfisher** (Ceryle alcyon). Nests very locally but seems likely to be more widespread than is known now. Restricted to habitats with permanent, fish-inhabited waters, primarily the Verde River drainage in central Arizona and possibly the Black River in eastern Arizona and the Grand Canyon segment of the Colorado River. Probable threats include diversion of stream flows and general loss of riparian habitat.

**Tropical Kingbird** (Tyrannus melancholicus). Nests in riparian forests of the Santa Cruz and San Pedro river drainages (Pima, Pinal and Santa Cruz counties). Riparian habitats threatened by wood-cutting and agricultural and urban development.

**Thick-billed Kingbird** (Tyrannus crassirostris). Breeds mainly in the Santa Cruz River drainage (Santa Cruz Co.), but also in Guadalupe Canyon (Cochise County). Habitat threatened by grazing, woodcutting, urbanization and groundwater depletion.

**Rose-throated Becard** (Pachyramphus aglaiae). Breeds in wooded

riparian habitats in southern Pima and Santa Cruz counties. Threatened by habitat destruction by grazing, urban development and groundwater depletion.

**Black-billed Magpie** (Pica pica). Breeds only in extreme northeastern Arizona (Navajo Co.), as far south as Chinle Wash and Many Farms. Threatened by destruction of riparian habitats, its primary nesting habitat.

**Black-capped Gnatcatcher** (Polioptila nigriceps). Only known to have nested along Sonoita Creek (Santa Cruz Co.) and in Chino Canyon (Pima and Santa Cruz counties), Santa Rita Mountains. Threatened by recreational development and grazing.

**Sprague's Pipit** (Anthus spragueii). Winters mainly in the Sonoita and San Rafael grasslands (Cochise and Santa Cruz counties). Threatened by heavy grazing of tall grasses, and agricultural and urban development.

**Pine Grosbeak** (Pinicola enucleator). Only known to have nested on the slopes of Mount Baldy in the White Mountains but may also breed in other boreal forest habitats. Possibly threatened by timber harvest, but status largely unknown.



## MAMMALS

NOTE: The status annotations below refer only to Arizona. Most of the mammals listed also occur elsewhere, where they may be more (or less) threatened. With few exceptions, the common names and sequencing are as published in Mammals of Arizona (Donald F. Hoffmeister. 1986. University of Arizona Press, Tucson). \*Denotes that Federal listing under the Endangered Species Act includes Arizona.

**Extinct Species: those species or subspecies that are no longer extant in the wild or in captivity, anywhere.**

**Camp Verde Cotton Rat** (*Sigmodon arizonae arizonae*). Known only from a few specimens collected in the vicinity of Camp Verde (Yavapai Co.). There have been no records since 1932. Cause(s) of extinction unknown.

**\*Intermountain Wolf** (*Canis lupus youngi*). One of two subspecies of the gray wolf that occurred in Arizona historically. This one ranged across the northern half of the State, primarily in coniferous forests, woodlands and adjacent grasslands. Whether or not the wolves historically present in central Arizona belonged to this subspecies is unknown. Arizona's resident population of youngi probably was extirpated before the mid-1930s. Although a specimen was supposedly taken by a hunter on the Paria Plateau in the 1970s, the kill was never confirmed. There are no known survivors of the youngi lineage, even in captivity. It was eliminated because of real conflicts with the livestock industry and perceived conflicts with humans. Federal status: Endangered, listed as the Gray Wolf (*C. lupus*).

**Merriam's Elk** (*Cervus elaphus merriami*). Arizona's native elk occurred in coniferous forests and meadows at higher elevations across the east-central part of the State. Its numbers were greatly reduced by 1900. The last reported sighting was in 1923, high in the White Mountains. Extinction was caused by unregulated subsistence hunting. The Rocky Mountain elk (*C. e. nelsoni*), from Yellowstone National Park, was successfully introduced on the Mogollon Rim in 1913. Subsequently nelsoni from several sources were released at many other sites, from the Pinaleño Mountains to the Hualapais. They are now abundant in some areas.

**Endangered Species:** those species or subspecies (a) extirpated from Arizona since the mid-1800s and/or (b) for which extinction or extirpation is highly probable unless conservation efforts are successfully completed or at least underway soon.

**Water Shrew** (Sorex palustris). Known only from four locations along streams in the White Mountains and the Blue Range (Apache and Greenlee counties). Current population status unknown, but only one population has been verified in the last 20 years, despite numerous surveys of all four sites of past occurrence. Grazing and timber harvest threaten its semi-aquatic habitats.

**\*Sanborn's Long-nosed Bat** (Leptonycteris sanborni). Summer resident of central and southeastern Arizona. Both the number of occupied roost sites and the number of individuals per colony have declined drastically recently. Feeds mainly on agave and saguaro flower nectar and pollen. Threatened by agave harvests (especially in Mexico, for the liquor industry) and by human disturbance of roosting colonies. Federal status: Endangered.

**Black-tailed Prairie Dog** (Cynomys ludovicianus). Extirpated. Formerly occurred in the plains grasslands of southeastern Arizona. Extirpated largely before 1940, for disease prevention and because of conflicts with livestock and ranchers.

**\*Mount Graham Red Squirrel** (Tamiasciurus hudsonicus grahamensis). Restricted primarily to spruce-fir and old growth Douglas-fir forests at higher elevations of the Pinaleño (Graham) Mountains. Population seriously threatened by cumulative effects of approximately 100 years of human-related activities, including timber harvest, recreational development and possibly competition from tassel-eared squirrels (Sciurus aberti) introduced from northern Arizona. The proposed development of an astrophysical complex currently poses additional threats. Federal status: Endangered; Critical Habitat proposed for high elevations in the Pinaleño Mountains.

**New Mexican Banner-tailed Kangaroo Rat** (Dipodomys spectabilis baileyi). Extirpated. Formerly in northeastern Arizona (Apache and Coconino counties), presumably in Great Basin desertscrub. Not reported there since the 1930s. Cause(s) of extirpation unknown, but possibly habitat degradation from livestock grazing.

**\*Hualapai Mexican Vole** (Microtus mexicanus hualpaiensis). Known only from very restricted areas around a few isolated springs in upper elevation ponderosa pine and mixed conifer forests in the Hualapai Mountains. May also occur at a few sites in northwestern Arizona south of the Colorado River (e.g. the Music Mountains).

Habitat severely damaged by livestock grazing, and scouring and siltation due to erosion. Federal status: Endangered.

**\*Mexican Gray Wolf** (Canis lupus baileyi). Extirpated. One of two subspecies of the gray wolf that occurred in Arizona. This one ranged throughout southeastern Arizona in Upper Sonoran woodlands and grasslands. Whether or not the wolves historically present in central Arizona belonged to this subspecies is unknown. Arizona's resident population of baileyi probably was extirpated before the 1970s. It was extirpated by humans, primarily because of real conflicts with the livestock industry and perceived threats to humans. Some 35 are now in zoos that are participating in a captive-breeding program for the U.S. Fish and Wildlife Service. Recent reports of Mexican wolves from southern Arizona, if not of feral dogs or wolf hybrids, are likely of transients from the seriously declining population in north and north-central Mexico. Federal status: Endangered, listed as the Gray Wolf (C. lupus).

**\*Grizzly Bear** (Ursus arctos). Extirpated. Ranged through most montane habitats, adjacent grasslands and along the major rivers and streams in extreme northeastern Arizona, the Mogollon Rim, the Kaibab Plateau and southeastern Arizona. Forced by an ever encroaching human population to retreat from lower, more open habitats to less accessible areas of rugged chaparral and dense forest. The last confirmed Arizona record was of one killed in the summer of 1939 on the slopes of Mount Baldy (Apache Co.). Extirpated by humans, primarily because of conflicts with humans and the livestock industry. Federal status: Threatened.

**\*Black-footed Ferret** (Mustela nigripes). Possibly extirpated. Occurred in prairie dog towns in Apache, Coconino and Navajo counties. Several recent reports, but none verified yet. If extirpated, its loss was caused by prairie dog control programs to promote the livestock industry and public health. Escaped, nonnative ferrets (Mustela putorius) may pose a threat to reintroduction efforts, if they are effective vectors of canine distemper. Federal status: Endangered.

**Southwestern River Otter** (Lutra canadensis sonora). Occurred in the Colorado and Gila rivers and their major tributaries, but current distribution uncertain. The evidence suggests that a few populations persisted at least into the 1960s and likely to the present. Unconfirmed reports continue to be received from several localities, but recent, extensive surveys in several key areas have been unproductive. Channelization, bank-armoring, marshland draining and other kinds of habitat destruction were major factors in the population declines. A Louisiana subspecies (L. c. lataxina) was successfully introduced into central Arizona during 1981-1983 and may eventually cause genetic swamping of the native form, if any still exist.

**Jaguar** (Felis onca). Extirpated as a resident species. Likely occurred as such only in southeastern Arizona, but historic records extend north to the Grand Canyon. Recent reports (e.g. 1987 and 1988) are undoubtedly of transients from Mexico. Extirpated by humans, primarily due to conflicts with livestock. Federal status: Endangered, but listed only for historic range south of the United States.

\***Ocelot** (Felis pardalis). Extirpated. The few confirmed records indicate ocelots occurred in the southeastern corner of the State, and possibly into central Arizona. However, neither the historical nor the current population status is clear. Highly secretive, this species apparently prefers dense desertscrub along watercourses. Cause(s) of extirpation unknown. Federal status: Endangered.

**Yuma Puma** (Felis concolor browni). Although recognized by many taxonomists, the validity of this subspecies is controversial because of the few specimens available for study. It occurs or once did along the Colorado River and in the desert mountains of extreme western Arizona. Past and present population status poorly known, but numbers are low at best. Threats include habitat destruction (which caused deer populations along the Colorado River to decrease tremendously after the early 1900s) and conflicts with humans and livestock.

\***Sonoran Pronghorn** (Antilocapra americana sonoriensis). A small, remnant population persists in the extremely arid flatlands of southwestern Arizona and adjacent Mexico. Historical population declines seem to have been largely the result of unregulated or unlawful subsistence hunting, loss of habitat to livestock grazing, agricultural development and human habitation. Poaching remains a significant threat, especially in Sonora (Mexico). Federal status: Endangered.

**Threatened:** those species or subspecies whose continued presence in Arizona could be in jeopardy in the near future. Serious threats have been identified and populations are (a) lower than they were historically or (b) extremely local and small.

**Mexican Long-tongued Bat** (Choeronycteris mexicana). A summer resident of southeastern Arizona. May also occur in extreme western Arizona. Roosts in small groups, usually in caves but also often in relatively exposed locations. Biology and population status poorly known, but a decline in numbers is evident. Threats not well known, but human disturbance of roost sites seems likely to be quite an important factor. Agave harvests in Mexico may also be affecting this species, since it probably feeds heavily on the

nectar and pollen of agave and saguaro flowers.

**Navajo Mexican Vole** (Microtus mexicanus navaho). Status unclear because of taxonomic questions, a lack of population data and uncertain habitat relationships and distribution patterns. Occurs in dry grass, grass-forb and shrub habitats in lower coniferous forests in northeastern Arizona. The Navajo Mountain (Navajo Co.) population has declined as its habitats have been degraded by livestock grazing during a cycle of erratic, low precipitation. Recent taxonomic revisions suggest that several other isolated populations in northern Arizona also belong to this subspecies. Most of them are threatened by mining, recreation development and over-grazing by livestock.

**Meadow Jumping Mouse** (Zapus hudsonius). Known only from moist, tall grass-willow meadows in scattered localities in the White Mountains. Apparently intolerant of all but very light grazing. Threatened by urban encroachment and over-grazing by livestock.

**Chihuahuan Pronghorn** (Antilocapra americana mexicana). Extirpated, but reintroductions underway. Historically occurred in grass-shrub valleys and grasslands throughout southeastern and south-central Arizona. Much reduced by 1900, and not reported after the 1920s. Extirpation was probably caused by uncontrolled subsistence hunting and changing land-use patterns. Stock from Texas was reintroduced in 1981 and from 1985 through 1987 in several areas within historic range. A northern subspecies of pronghorn, A. a. americana, was also successfully introduced into southeastern Arizona, in the 1940s and 1950s. The americana introductions have been discontinued, as they might pose threats to the genetic integrity and range expansion of the not-yet stabilized populations of mexicana.

**Candidate Species:** those species or subspecies for which threats are known or suspected but for which substantial population declines from historical levels have not been documented (though they appear likely to have occurred).

**Arizona Shrew** (Sorex arizonae). Known only from the Chiricahua, Huachuca and Santa Rita mountains (Cochise and Santa Cruz counties). Apparently very narrow habitat requirements; found primarily in riparian edges in pine-oak forests. Populations small and isolated; trends unknown. Possibly threatened by livestock grazing and development of recreation sites.

**California Leaf-nosed Bat** (Macrotus californicus). A year-round resident in desertscrub habitats of southern and western Arizona. Roosts colonially in mines, caves. Requires relatively warm winter roosts because it does not hibernate and cannot tolerate

temperatures in the 40s or 50s (°F) for more than a few hours. Threatened by susceptibility to low temperatures, apparently limited winter roosts and vandalism at roosts.



**Red Bat** (Lasiurus borealis). Occurs primarily along riparian corridors among oaks, sycamores and cottonwoods in central and southeastern Arizona. Population trends unknown, but potentially threatened by habitat loss.

**Southern Yellow Bat** (Lasiurus ega). Presumed to be a year-round resident in scattered areas across southern Arizona. Primarily associated with palm trees, apparently preferring the native California fan palm (Washingtonia filifera). Population status essentially unknown. Possible threats include vandalism (burning of native palms) and pruning of urban palms.

**Spotted Bat** (Euderma maculatum). Rarely and unpredictably encountered in a variety of habitats in scattered localities throughout Arizona, but especially in extreme northwestern Mohave Co. Little is known about this bat, including possible threats to its populations and habitat. Riparian habitats seem important, and those in northwestern Arizona along the Virgin River are extremely threatened.

**Houserock Valley Chisel-toothed Kangaroo Rat** (Dipodomys microps leucotis). Known only from the Houserock Valley area (Coconino Co.), west and north of the Colorado River. Once reported from east of the river at the Navajo Bridge, but not found there in recent surveys. Apparently restricted to Great Basin Desertscrub communities dominated by shrubs. Possibly threatened by excessive concentration of browsing livestock. Feral and free-ranging cats (Felis catus) may also be a local problem in developed areas near Glen Canyon Recreation Area.