

FOREST GUARDIANS



**In the Office of Endangered Species
U.S. Fish and Wildlife Service
United States Department of Interior**



**A Petition to List All Critically Imperiled or Imperiled Species in the Southwest
United States as Threatened or Endangered Under the Endangered Species Act,
16 U.S.C. §§ 1531 et seq.**

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Cover photo credits: Ramsey Canyon Leopard Frog (U.S. Fish & Wildlife Service), **Arkansas River Speckled Chub** (Garold W. Sneegas), **Maple-leaf Oak** (Arkansas Natural Heritage Commission), **Chihuahua Scurfpea** (U.S. Bureau of Land Management), **Arizona Striped Whiptail** (Erik Enderson).

I. Introduction

Forest Guardians hereby petitions the Secretary of the Interior, acting through the U.S. Fish and Wildlife Service (Service), to list and thereby protect under the Endangered Species Act (ESA) all full species in the Service's Southwest Region¹ ranked as G1 (critically imperiled) or G1G2 (critically imperiled or imperiled) by NatureServe. This Petition requests the listing of all G1 and G1G2 species that the Service has previously failed to list or even identify as candidates for listing under the ESA. The petitioned species are named in Tables 1 & 2.

NatureServe ranks 569 full species found in the Service's Southwest Region as G1 or G1G2. Of these 569 species, the Service has listed or identified as candidates for listing only 94. This represents only 16.5% of the species in the Southwest that the scientific community believes are critically imperiled or imperiled (Table 3). Our petition seeks protection for the remaining 475 species identified as critically imperiled or imperiled by NatureServe but ignored by the Service.

Across the shortgrass prairies, desert grasslands, red rock mesas, mountain meadows, conifer forests, cottonwood-lined riparian streams, sage-brush and shinnery oak steppe, sand dunes, and sky islands of the Southwestern U.S., there exists a dizzying array of native flora and fauna. The diversity of habitats found in the region sustain a wide range of reptiles, birds, mammals, plants, butterflies, and other species, including many found nowhere else on Earth. This tapestry of life is unraveling, with the endangerment and extinction of individual species, and the consequent crumbling of native ecosystems of which they are parts. As John Muir put it, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."² Aldo Leopold issued a similar warning: "The last word in ignorance is the man who says of an animal or plant, 'What good is it?' ...[w]ho but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering."³

Contemporary scientists describe this concept as ecosystem collapse:

If species composing a particular ecosystem begin to go extinct, at what point will the whole machine sputter and destabilize? We cannot be sure because the requisite natural history of most kinds of organisms does not exist, and experiments on ecosystem failure have been generally lacking. Yet think of how such an experiment *might* unfold. If we were to dismantle an ecosystem gradually, removing one species after another, the exact consequences at each step would be impossible to predict, but one

¹FWS's Southwest Region, Region 2, includes all of Arizona, New Mexico, Oklahoma, and Texas.

²Muir, John. 1911. "My First Summer in the Sierra" in *The Wilderness Journeys* (published in 1996 by Canongate Classics) at p. 91.

³Aldo Leopold. 1966. "The Round River," in *A Sand County Almanac* (published in 1988 by Ballantine Books) at p. 190.

general result seems certain: at some point the ecosystem would suffer a collapse.⁴

This petition seeks to safeguard the American Southwest's diverse tapestry of life, by asking the Service to extend the ESA's safety net of legal protection to hundreds of vanishing crayfish, amphipods, fairy shrimp, beetles, moths, caddisflies, grasshoppers, stoneflies, springsnails, cavesnails, woodlandsnails, mountainsnails, talussnails, scorpions, spiders, fishes, salamanders, prickly pears, scurfpeas, oaks, grasses, and yuccas, many of which are found nowhere else on earth but this region.

The Petitioner, Forest Guardians, is a non-profit conservation organization whose mission is to defend and restore the wildlands and wildlife of the greater American Southwest through fundamental reform of public policies and practices. Forest Guardians is committed to protecting flora, fauna, natural processes, and native habitats in the greater American Southwest. Forest Guardians is interested in the conservation of species that face high levels of imperilment, especially those who play important umbrella and keystone functions within their ranges. In addition, Forest Guardians strives for the restoration and preservation of *all* naturally occurring components and processes within native ecosystems.

II. ESA Listing Process

Through the ESA, Congress mandated that all threatened and endangered species and the ecosystems on which these species depend be granted federal protection.⁵ Congress clearly intends the ESA to protect both species and the ecosystems of which they are a part.⁶ The ESA reflects congressional recognition of the aesthetic, ecological, educational, historical, recreational, and scientific values of species,⁷ and the fact that our nation's wildlife and plants are becoming increasingly imperiled due to "economic growth and development untempered by adequate concern and conservation."⁸

The Supreme Court has held that the ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 180 (1978). The Supreme Court further noted that "[t]he plain intent of Congress in enacting this statute was to halt and reverse the trend towards species extinction, whatever the cost. This is reflected not only in the stated policies of the Act, but in literally every section of the statute." 437 U.S. at 184.

⁴Edward O. Wilson. 1992. *The Diversity of Life*. Belknap Press of Harvard University Press at p. 309.

⁵The sole exception is pest insects, which are defined as those "species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man." 16 U.S.C.A. 1532(6).

⁶Congress has consistently supported ecosystem protection throughout the legislative history of the ESA. Rosmarino, Nicole J. 2002. "Endangered Species Act Under Fire: Controversies, Science, Values, and the Law." Ph.D. Dissertation, University of Colorado at Boulder.

⁷16 U.S.C.A. § 1531(a)(3).

⁸16 U.S.C.A. § 1531(a)(1).

A. The ESA's Listing Process Requires Use of the Best Available Science

However, despite all its vaunted strength as a biodiversity protection statute, the ESA does nothing to protect a species unless that species is first “listed” under the Act. “Listing” is a critical first step in the ESA’s system of species protection.⁹ No matter how imperiled a species might be it does not receive any substantial protection under the ESA unless it is officially listed as threatened or endangered. *See e.g., Federation of Fly Fishers v. Daley*, 131 F.Supp.2d 1158, 1163 (N.D.Cal. 2000) (“[L]isting is critically important because it sets in motion the [ESA’s] other provisions, including the protective regulation, consultation requirements, and recovery efforts.”). As a result, Congress aptly described Section 4 of the ESA, 16 U.S.C. § 1533, the section setting forth the listing process, as “[t]he cornerstone of effective implementation of the [ESA].” S.Rep. No. 418, 97th Cong., 2d Sess. at 10; *see also* H.Rep. No. 567, 97th Cong., 2d Sess. at 10 (“The listing process under Section 4 is the keystone of the [ESA]”).

The ESA defines the term “species” broadly to include full species and “any subspecies of fish or wildlife or plant and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.” 16 U.S.C. § 1532(16). A species is “endangered” if it “is in danger of extinction throughout all or a significant portion of its range.” 16 U.S.C. § 1532(6). A species is “threatened” if it “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 16 U.S.C. § 1532(20).

To determine whether a species warrants listing as a threatened or endangered species, the Service must consider whether the species is imperiled based on “any of the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.” 16 U.S.C. § 1533(a)(1). Most importantly, in its evaluation of each of these listing factors the Service must reach its determination “solely on the basis of the best scientific and commercial data available.”¹⁰ 16 U.S.C. § 1533(b)(1)(A).

⁹Once a species is listed under the ESA, significant arrays of statutory protections apply. For example, Section 7 of the ESA requires all federal agencies to “insure” that their actions neither “jeopardize the continued existence” of any listed species nor “result in the destruction or adverse modification” of its critical habitat. 16 U.S.C. § 1536(a)(2). Section 9 prohibits, among other things, “any person” (including federal or state agencies as well as individuals) from “taking” endangered species. 16 U.S.C. § 1538(a)(1)(B). “Taking” is broadly defined to include, in addition to actions that directly harm individuals of the species, habitat modification that adversely affects the species. 16 U.S.C. § 1532(19); 50 C.F.R. § 17.3. Other provisions require the Service to designate critical habitat for listed species, 16 U.S.C. § 1533(a)(3), require the Service to “develop and implement” recovery plans for listed species, 16 U.S.C. § 1533(f), authorize the Service to acquire land for the protection of listed species, 16 U.S.C. § 1534, and make federal funds available to states to assist in their efforts to preserve and protect threatened and endangered species, 16 U.S.C. § 1535(d).

¹⁰Any interested person can begin the listing process by filing a petition to list a species with the Service. 16 U.S.C. § 1533(b)(3)(A); 50 C.F.R. § 424.14(a). Upon receipt of a petition to list a species, the Service has 90 days to the maximum extent practicable to make a finding as to whether the petition “presents substantial scientific or commercial information indicating that the petitioned action may be warranted.” 16

B. NatureServe Represents the Best Available Science

NatureServe provides the “best scientific and commercial data available” in its analyses and designations of G1 and G1G2 status to native plant and animal species. Accordingly, rather than restate the obvious, we hereby incorporate all analysis, references, and documentation provided by NatureServe in its on-line database at: <http://www.natureserve.org/explorer> into this Petition by reference, including all data and analysis underlying its conservation status classification scheme.

As of 1999, The Nature Conservancy ranked 1,385 species in the United States as G1.¹¹ This ranking is the most imperiled designation a species can receive in NatureServe’s system. In the NatureServe system, a G1 rank is defined as:

Critically Imperiled-At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.¹²

This definition is completely analogous to the ESA’s definition of “endangered,” or at a minimum “threatened” species, and the factors considered by NatureServe overlap with the ESA’s recitation of the applicable listing factors as set forth above.

Some taxa are classified as G1G2 by NatureServe because there is uncertainty about their status. As NatureServe describes:

Range Rank—A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community. A G2G3 rank would indicate that there is a roughly equal chance of G2 or G3 and other ranks are much less likely. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).¹³

U.S.C. § 1533(b)(3)(A); 50 C.F.R. § 424.14(b)(1). This threshold determination is commonly called a 90-day finding. If the Service makes a positive 90-day finding, it must promptly publish the finding in the Federal Register and commence a status review of the species. 16 U.S.C. § 1533(b)(3)(A). After issuing a positive 90-day finding, the Service has 12 months from the date it received the petition to make one of three findings: (1) the petitioned action is not warranted; (2) the petitioned action is warranted; or (3) the petitioned action is warranted but presently precluded by work on other pending proposals for listing species of higher priority. 16 U.S.C. § 1533(b)(3)(B); 50 C.F.R. § 424.14(b)(3). This second determination is commonly known as a 12-month finding. If the Service finds that listing the species is warranted, it must publish a proposed rule to list the species as endangered or threatened in the Federal Register. 16 U.S.C. § 1533(b)(5). Absent a “substantial disagreement regarding the sufficiency or accuracy of the available data,” 16 U.S.C. § 1533(b)(6)(B)(i), the Service must either publish a final rule listing the species as threatened or endangered or withdraw the proposed rule. 16 U.S.C. § 1533(b)(6)(A). A “substantial disagreement” over the “sufficiency or accuracy of the available data” affords the Service only a single 6 month extension of this deadline. 16 U.S.C. § 1533(b)(6)(B)(i).

¹¹The Nature Conservancy and Association for Biodiversity Information. 2000. *Precious Heritage: the Status of Biodiversity in the United States*. Eds. Bruce A. Stein, Lynn S. Kutner, and Jonathan S. Adams. Oxford University Press. See Table 4.4 at p. 104. An online NatureServe search (via natureserve.org/explorer) conducted on May 29, 2007, for G1 full species in the U.S. yielded 3,716 records.

¹²See <http://www.natureserve.org/explorer/ranking.htm#globalstatus>, visited May 29, 2007.

¹³*Id.*

G2 species are considered imperiled in the NatureServe system, which defines a G2 rank as:

Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.¹⁴

Again, NatureServe’s definitions, while using different terms (e.g. “imperiled” rather than “endangered” or “threatened”), are functionally identical to the ESA’s definitions.¹⁵

Importantly, the Service itself considers NatureServe to be an authoritative source for species information, representing the “best scientific and commercial data available.” On the Service’s websites for listed species, the agency includes a link to NatureServe Explorer Species Reports under “Other Resources” and states the following:

NatureServe Explorer is a source for authoritative conservation information on more than 50,000 plants, animals and ecological communities of the U.S and Canada. NatureServe Explorer provides in-depth information on rare and endangered species, but includes common plants and animals too. NatureServe Explorer is a product of NatureServe in collaboration with the Natural Heritage Network.¹⁶

By petitioning to list all G1 and G1G2 species in the Service’s Southwest Region, we are only asking the Service to act on the best available scientific information, information the Service itself already has knowledge of and endorses. Additionally, by restricting our Petition to only G1 and G1G2 species, we aim to confer timely ESA protection on those species that need it the most to avoid extinction. ESA protection is known to be effective in preventing species extinctions, yet there are only 1,312 total domestic listings.¹⁷ Listing of G1 and G1G2 species can help meaningfully address the extinction crisis in the U.S. by ushering species in need onto the legal Ark the ESA provides.

III. A Petition of this Scope is Necessary

A. The Sixth Extinction

This 475-species petition is compelled by the mass extinction event rapidly unfolding on this planet. This new extinction epoch is the sixth in the history of the earth. The current “Sixth Extinction” is occurring primarily due to human actions, including habitat destruction, exploitation, pollution, proliferation of non-native species, introduced

¹⁴*Id.*

¹⁵We have included G1 species with ranks of “G1?” as a precautionary measure. Species ranked “G1?” according to NatureServe, may be ranked G2. Those with G1Q or G1G2Q rankings have questionable taxonomy. Less than 8% (37) of the species we are petitioning are ranked G1?, G1Q, G1G2Q.

¹⁶This language is included on webpages for every listed U.S. species in the U.S. Fish and Wildlife Service’s online Threatened and Endangered Species System (TESS).

¹⁷This figure is taken directly from the Service’s “box score” posted on its website at: http://ecos.fws.gov/tess_public/Boxscore.do, visited May 29, 2007.

diseases, and a climate crisis caused by increased greenhouse gas emissions. Current extinction rates are occurring at up to 1,000 times the natural rate of extinction, and these rates are expected to continue rising.

As Harvard biologist E.O. Wilson¹⁸ puts it, "...humanity has initiated the sixth great extinction spasm, rushing to eternity a large fraction of our fellow species in a single generation."¹⁹ The first five (non-human caused) extinction "spasms" occurred in this order, according to geological period and represented in time before the present: end-Ordovician, 440 million years; late Devonian, 365 million years; end-Permian, 225-245 million years; end-Triassic, 210 million years; and end-Cretaceous, 65 million years.²⁰ During each prior extinction epoch at least 12% of the *families* of species went extinct.²¹ In each of these extinction events, at least 65% of species went extinct. In the Permian extinction, more than 95% of marine species vanished.²²

The comparison of the current extinction event to these great geological extinction epochs is chilling. In short, humanity's current impact on species diversity is comparable to that of the asteroid that wiped out the dinosaurs 66 million years ago. Future intelligent beings, should there be any, will be able to date our passing by looking at little more than fossils preserved in rock layers. The best current estimate is that unless current trends are interrupted, by the year 2020 up to 20% of all extant species will no longer exist.²³ Given that the best scientific data indicates that approximately 13 to 30 million species now exist,²⁴ this means an average extinction rate of scores if not hundreds of species per day.²⁵ For comparison, the "normal" extinction rate, measured over geologic time, is estimated to be 10 to 1000 times less.²⁶ In amending the ESA in 1978, Congress relied upon Department of Interior reports, putting the global rate of extinction at approximately

¹⁸Edward O. Wilson is Pellegrino University Professor at Harvard and Curator in Entomology at Harvard's Museum of Comparative Zoology. In addition to two Pulitzer Prizes, Wilson has won many scientific awards, including the National Medal of Science and the Craford Prize of the Royal Swedish Academy of Sciences.

¹⁹*The Diversity of Life* at p. 32.

²⁰*The Diversity of Life* at p. 29; and Leakey, Richard, and Roger Lewin. 1995. *The Sixth Extinction: Patterns of Life and the Future of Humankind*. NY, NY: Doubleday.

²¹*The Diversity of Life* at p. 30.

²²*The Sixth Extinction* at p. 44.

²³*The Diversity of Life* at p. 346. See also International Union for the Conservation of Nature, *Red List of Threatened Animals* at ii (1996) ("All known species of birds and mammals have been evaluated, with the result that 25% of mammal species and 11% of bird species are classified as being threatened with extinction. Not all reptile, amphibian, and fish species have been assessed, but of those that have been evaluated, rough estimates of the percent that are threatened are: 20% of reptiles, 25% of amphibians, and 34% of fishes...").

²⁴United Nations Environment Program, *Global Biodiversity Assessment* at 111 (1995) (estimating 13-14 million); D.Chadwick and J.Sartore, *The Company We Keep: America's Endangered Species* at 17 (Nat'l Geo. Soc'y 1996) (estimating 30 million); *The Diversity of Life* at p. 346 (estimating 10-100 million).

²⁵The current rate of extinction in the tropical rainforest alone is estimate to exceed several score per day. E. O. Wilson, *Biophilia and the Conservation Ethic*, in *The Biophilia Hypothesis*, 35, 36 (Stephen R. Kellert & E.O. Wilson, eds. 1993 (this estimate was limited to birds and mammals).

²⁶National Academy of Sciences, National Research Council, *Science and the Endangered Species Act* at 26 (1995).

30 species per year.²⁷ Today's scientists would call Interior's 1978 estimate of the yearly extinction total a low-ball estimate for even a single day. In sum, there should be no legitimate debate that our planet's biodiversity is rapidly diminishing.

There should also be little debate that the current biodiversity crisis is caused by humanity:

Human demographic success has brought the world to this crisis of biodiversity. Human beings - mammals of the 50-kilogram weight class and members of a group, the primates, otherwise noted for scarcity - have become a hundred times more numerous than any other land animal of comparable size in the history of life. By every conceivable measure, humanity is ecologically abnormal. Our species appropriates between 20 and 40 percent of the solar energy captured in organic material by land plants. There is no way that we can draw upon the resources of the planet to such a degree without drastically reducing the state of most other species.²⁸

The leading cause of imperilment of species in the U.S. is habitat destruction.²⁹ Habitat destruction and other threats to biodiversity can be curtailed by the ESA. Over 99% of the species listed under the ESA are still in existence today.³⁰ Researchers have estimated that at least 227 species would have gone extinct in the past thirty years were it not for this law.³¹ In addition, species are twice as likely to be recovering if provided with critical habitat,³² which cannot be conferred to unlisted species.

B. FWS Must Act to Remedy the Extinction Crisis

Meanwhile, as the global scientific community increasingly recognizes the need for expeditious and dramatic action to avert the Sixth Extinction, the Service has completely abandoned its obligation to list and protect endangered species. The listing of species under the Act, the keystone and threshold step to the ESA's protective scheme designed by Congress, has nearly ground to a halt. Not one species has been listed under Interior Secretary Dirk Kempthorne, who has been in office for over a year.³³ The door to the Ark

²⁷Senate Comm. on Environment and Public Works, *A Legislative History of the Endangered Species Act of 1973, as Amended in 1976, 1977, 1978, 1979, and 1980*, 97th Cong., 2d Sess. 819.

²⁸*The Diversity of Life* at p. 272.

²⁹Wilcove, David S., David Rothstein, Jason Dubow, Ali Phillips, and Elizabeth Losos. 1998. "Quantifying threats to imperiled species in the United States." *BioScience* 48(8):607-615.

³⁰The Service itself reports this figure: see <http://www.fws.gov/endangered/esb/96/chief.html>, <http://www.fws.gov/coloradoriverrecovery/Crrpesal.htm>.

³¹Scott, J. Michael, Dale D. Goble, Leona K. Svancara, and Anna Pidgorna. 2006. "By the Numbers" in *The Endangered Species Act at Thirty*. Eds. Dale D. Goble, J. Michael Scott, and Frank W. Davis. Washington: Island Press. See p. 31.

³²Suckling, Kieran F., and Martin Taylor. 2006. "Critical Habitat and Recovery" in *The Endangered Species Act at Thirty*. See p. 86.

³³Dirk Kempthorne was confirmed as Interior Secretary by the U.S. Senate on May 26, 2006. See Associated Press. 2006. "Senate Confirms Kempthorne for Interior," May 26, 2006.

is functionally closed. The current administration has listed only 8 species per year, in contrast to 62 per year under President Bill Clinton and 56 per year under President George H.W. Bush. Dozens of candidate species have gone extinct while awaiting ESA listing, and the Service has held others in limbo as candidates for over 25 years.³⁴ Nearly 300 species are currently awaiting listing on the candidate list, including some species scientists fear would go extinct even if immediately listed. An example is the Sand Dune Lizard, which has the second most geographically restricted range among North American lizards, and which continues to decline due to oil and gas extraction and herbicide applications.³⁵

Given the Service's intransigence and the formidable listing bottleneck, this Petition is necessary to prevent extinction of individual species, and to preserve the native ecosystems in which these species play highly interactive parts or serve in indicator, keystone, or umbrella roles.³⁶

The glacial pace of the Service's listing program is startling not only because of the backlog of candidate and proposed species, but because of the thousands of at-risk species that are not even in the queue for federal protection. Approximately 6,000-9,000 U.S. species are likely imperiled,³⁷ roughly four to seven times more than the current ESA list.

While Forest Guardians has previously submitted lengthy listing petitions for individual species, primarily based on federal and state government data, the Service has demonstrated a consistent refusal to list species in need. The Service is now, in some cases, re-writing the findings of its own biologists in order to avoid listing species, in violation of the ESA's requirement that listing determinations be based solely on the best scientific data available. In particular, the Service has refused to list imperiled species whose protection could safeguard whole ecosystems. Examples include prairie dog and grouse species. The listing of these imperiled proxy species would help address the extinction crisis.³⁸

While listing the species included in this Petition would increase the current total number of listed domestic species by 38%, this Petition is nonetheless conservative. The Petitioners are requesting only the listing of full species and deliberately did not include subspecies to avoid taxonomic disputes. Petitioners did not include G2 and G3 species,

³⁴Greenwald, D. Noah. 2007 "Politicizing Extinction: the Bush Administration's Dangerous Approach to Endangered Wildlife." Report by the Center for Biological Diversity, issued May 2007.

³⁵U.S. Fish and Wildlife Service Candidate Assessment Form for the Sand Dune Lizard, dated August 2005. Online at: http://ecos.fws.gov/docs/candforms_pdf/r2/C03J_V01.pdf.

³⁶Miller, Brian, Richard Reading, Jim Stritholt, Carlos Carroll, Reed Noss, Michael Soule, Oscar Sanchez, John Terborgh, Donald Brightsmith, Ted Cheeseman, and Dave Foreman. 1998/99. "Using focal species in the design of nature reserve networks." *Wild Earth* Winter 1998/99. Pp. 81 – 92. Soulé, Michael E., James A. Estes, Brian Miller, and Douglas L. Honnold. 2005. "Strongly Interactive Species: Conservation, Policy, Management, and Ethics." *BioScience* 55(2): 168-176.

³⁷Scott et al. 2006, *The Endangered Species Act at Thirty*, at p. 22.

³⁸Rosmarino 2002. See also Rosmarino, Nicole J. 2007. "Political Interference in Endangered Species Act Findings for Prairie Dogs." Memo submitted to House Resources Committee Chairman Nick Rahall, January 24, 2007.

although NatureServe considers these species to be imperiled or vulnerable. Petitioners also did not include G4 and G5 species, although some of these species may also merit ESA listing given population declines, significant range shrinkage, and low prospects for long-term persistence.

Additionally, this Petition requests the listing of only those species occurring in the Service's Southwest Region, where the majority of Forest Guardians' members reside, because we believe each Region of the Service should conduct investigations into the status of at-risk species occurring in their Region.³⁹ We have also focused on the Service's Southwest Region because it has done a particularly poor job in listing species. The Southwest Region has completed only three final listing rules from 2002-2007, despite 30 candidates awaiting listing in the region. The likely explanation is the state of scientific censorship and repression of biologists in the Southwest office of the Service, which is the worst in the nation.⁴⁰

This petition seeks to regain lost ground. At several times in the past the Service has purged large numbers of species from the lists of species in the queue for ESA protection. In 1979, FWS withdrew proposals to list 1,876 species.⁴¹ In 1996, FWS removed over 2,000 species from the candidate list.⁴² The current domestic list of 1,312 species should therefore be regarded as stunted. Thousands more species are known to be imperiled and should be expeditiously listed under the ESA, given its proven efficacy in preventing extinction.

Finally, this petition is not unprecedented but is modeled on historical examples. In 1975, the Smithsonian Institution petitioned for the listing of 3,187 plants.⁴³ Yet, only 744 plants are currently listed under the ESA, and most of the Smithsonian nominees were dropped from the candidate list in 1996. In May 1984, FWS added 1,000 invertebrates to the candidate list.⁴⁴ Most of these were also dropped from the candidate list in 1996. In 2004, the Center for Biological Diversity, scientists, and others petitioned for the listing of 225 plant and animal species.

³⁹Greenwald et al. 2006 advocate that listing rules be prepared by an independent scientific body for all species ranked critically imperiled and imperiled species by NatureServe. See Greenwald, D. Noah, Kieran F. Suckling, and Martin Taylor. 2006. "The Listing Record" in *The Endangered Species Act at Thirty* at p. 67.

⁴⁰This is according to a poll of Service biologists, conducted by the Union of Concerned Scientists and Public Employees for Environmental Responsibility. See http://www.ucsusa.org/scientific_integrity/interference/us-fish-wildlife-service-survey.html.

⁴¹Scott, J. Michael, Dale D. Goble, and Frank W. Davis. 2006. "Introduction" in *The Endangered Species Act at Thirty*. See p. 9.

⁴²FWS deleted the C-2 and C-3 categories from the candidate list, which respectively comprised 2,001 and 424 taxa in 1994. The total number of candidates included in the 1994 Candidate Notice of Review was 2,563 taxa, in contrast to 420 in the 1996 Candidate Notice of Review. See 59 Fed. Reg. 58982 and 61 Fed. Reg. 7958.

⁴³The Smithsonian report was submitted to Congress on January 9, 1975 (House Document No. 94-51, Serial No. 94-A, 94th Congress, 1st Session, Government Printing Office, 200 pages). It was treated by the Service as a listing petition.

⁴⁴See <http://www.fws.gov/news/historic/1984/19840424b.pdf>.

In addition to addressing the problem of the vast majority of critically imperiled species in the Southwest lacking ESA protection, this Petition helps address the taxonomic disparities in the current ESA list. Invertebrates are underrepresented under the current list: they comprise 37% of the critically imperiled or imperiled species in the NatureServe system, yet make up only 16% of the ESA list.⁴⁵ As we describe below, these socially undervalued species can often play inordinately important ecological roles.

C. Need to Increase the ESA Listing Budget

To truly address the Sixth Extinction we should use this nation's most effective species protection statute, the ESA. To effectively do so a substantial increase in the Service's budget for ESA implementation, especially the listing budget, is necessary. The listing budget (including critical habitat designation) has averaged approximately \$15 million per year since 1992, yet a 1990 Inspector General report estimated \$144 million was needed to address the listing backlog.⁴⁶ The Service recently increased the estimate of what is required to \$153 million.⁴⁷ The Service must begin requesting from Congress adequate funds to address the listing backlog, as well as to meet statutory deadlines for this petition and future listing needs.

Indeed, a paradigm shift is required in the Endangered Species Act's budget to stem the extinction crisis. President George W. Bush's proposed 2008 budget would fund the law at only \$146.5 million,⁴⁸ despite calculations that \$470 million is needed to adequately fund this law in 2008, and that the budget should increase to \$693 million over the next five years.⁴⁹ Scientists have estimated that the ESA is being funded at 20% of what is required for endangered species protection. They compare it to "starving hospital patients...and then grilling the doctors about why more patients are not recovering."⁵⁰ In the case of listing, given the tremendous backlog of both unlisted candidates and G1 species not yet in the queue for listing, the listing budget needs to increase by at least one order of magnitude.

IV. The Value of Biodiversity

Native plants and wildlife, and the ecosystems they sustain and of which they are a part, hold incalculable worth to humans. Rep. Evans of Delaware captured this in 1982 on the House Floor:

⁴⁵Greenwald et al. 2006 in *The Endangered Species Act at Thirty* at p. 66.

⁴⁶U.S. Department of Interior Inspector General. 1990. Report no. 90-98. Washington, DC.

⁴⁷The U.S. Fish and Wildlife Service estimated that approximately \$153 million would be needed to address the current backlog of listing and critical habitat obligations. Secretary of Interior, Gale Norton and U.S. Fish and Wildlife Service Director, Steven Williams, defendants' responses to interrogatories in *Defenders of Wildlife et al. v. Gale Norton and Steven Williams* (CIV 02-00163-M DWM), page 4. See also Greenwald et al. 2006 at p. 64.

⁴⁸See 2008 proposed U.S. Fish and Wildlife Service budget at:

<http://www.fws.gov/budget/2008/2008%20GB/08%20Greenbook.pdf>.

⁴⁹See National Wildlife Federation. 2007. Fair Funding for Wildlife. Online at:

<http://www.nwf.org/endangered/pdfs/FairFundingForWildlifeFullReport.pdf> at p. 2.

⁵⁰Miller, Julie K, J. Michael Scott, Craig R. Miller, and Lisette P. Waits. 2002. "The Endangered Species Act: Dollars and Sense?" *Bioscience* 52: 163-168.

[I]t is important to understand that the contribution of wild species to the welfare of mankind in agriculture, medicine, industry, and science have been of incalculable value. These contributions will continue only if we protect our storehouse of biological diversity . . . [O]ur wild plants and animals are not only uplifting to the human spirit, but they are absolutely essential -- as a practical matter -- to our continued healthy existence.⁵¹

The majority of species included in this petition are plants and invertebrates. While they may be socially undervalued, often their ecological and economic importance can be enormous.⁵²

So important are insects and other land-dwelling arthropods that if all were to disappear, humanity probably could not last more than a few months. Most of the amphibians, reptiles, birds, and mammals would crash to extinction about the same time. Next would go the bulk of the flowering plants and with them the physical structure of most forests and other terrestrial habitats of the world. The land surface would literally rot.⁵³

The broad array of values possessed by native species includes utilitarian, ecological, aesthetic, symbolic, recreational, spiritual, ethical, and scientific. First, utilitarian values include foods, medicines, clothing, and other products that are derived from animals and plants.⁵⁴ On a global scale, 25 to 40% of pharmaceutical products come from wild plants and animals.⁵⁵ Moreover, 70% of pharmaceutical products are modeled on a native species, despite only 0.1% of plant species having been examined for their medicinal value. Of the top ten prescription drugs in the United States, nine are based on natural plants. The market value for drugs from tropical and temperate rainforest plants in the US

⁵¹128 Cong. Rec. 26,189 (1982), statement of Rep. Evans.

⁵²E.O. Wilson stated, "Why should we care? What difference does it make if some species are extinguished, if even half of all the species on earth disappear? Let me count the ways. New sources of scientific information will be lost. Vast potential biological wealth will be destroyed. Still undeveloped medicines, crops, pharmaceuticals, timber, fibers, pulp, soil-restoring vegetation, petroleum substitutes, and other products and amenities will never come to light. . . . In amnesiac reverie it is also easy to overlook the services that ecosystems provide humanity. They enrich the soil and create the very air we breathe. Without these amenities, the remaining tenure of the human race would be nasty and brief. The life-sustaining matrix is built of green plants with legions of microorganisms and mostly small, obscure animals - in other words, weeds and bugs." *The Diversity of Life* at pp. 346-47.

⁵³*The Diversity of Life* at p. 133.

⁵⁴Dobson, Andrew P. 1996. *Conservation and biodiversity*. NY, NY: Scientific American Library; Kellert, Stephen R. 1996. *The Value of Life: Biological Diversity and Human Society*. Washington, DC: Island Press; Abramovitz, Janet N. "Valuing nature's services." In *State of the World 1997*. Worldwatch Institute Report on Progress Toward a Sustainable Society. New York: W.W. Norton & Co.; Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, J. Paruelo, R.G. Gaskin, P. Sutton, and M. van den Belt. 1997. "The value of the world's ecosystem services and natural capital." *Nature* 387:253-260; and Pimentel, David, Christa Wilson, Christine McCullum, Rachel Huang, Paulette Dwen, Jessica Flack, Quynh Tran, Tamara Saltman, and Barbara Cliff. 1997. "Economic and environmental benefits of biodiversity." *BioScience* 47(11):747-757.

⁵⁵Kellert 1996 (*The Value of Life*).

alone is placed at \$200 million dollars per year.⁵⁶ In addition, some wild plant species may be instrumental in thwarting blight in agricultural crops.⁵⁷ Conversely, the extinction of wild flora and the simplification of natural systems to monocultures can increase susceptibility of crops to disease, pests, fires, and pollution.⁵⁸

Second, the ecological value of species amplifies the utilitarian values discussed above because the extinction of one species may trigger the extinction of multiple species within an ecosystem. The ecological value of flora and fauna is recognized in literature on the value of ecosystem services to human welfare.⁵⁹ Ecosystem services include maintenance of the atmosphere's gaseous composition by intact natural systems. Other benefits provided by healthy natural systems and their components include maintaining and generating soils; nourishing agricultural plants and trees by microorganisms; decomposing organic matter; waste disposal; nitrogen fixation and nutrient cycling; bioremediation of chemicals; biocontrol of species that attack crops, forests and domesticated animals; pollination by birds, bees, butterflies, bats and others; perennial cereal grains; and biotechnology.⁶⁰

Benefits provided from biodiversity and ecosystem services in the US are estimated at \$300 billion annually and global ecosystem services are valued at \$33 trillion annually.⁶¹ These estimates are conservative, though, as the values of biodiversity are immeasurable and global ecosystems provide infinite value because without them humans could not survive.⁶² Moreover, most of these services are so intricate and are provided on such a massive scale that it is not feasible to replicate them, even where scientists possess the knowledge to do so.⁶³ The tremendous value of ecosystem services will decline if the erosion of biodiversity continues.⁶⁴ Further, there may be a global explosion of pests and pathogens, as they are released by degraded natural controls.⁶⁵ The environmental and economic costs of exotic species in the U.S. are estimated at \$137 billion per year.⁶⁶

Invertebrate pollinators can play especially important ecological roles. Recent research indicates that many bee and butterfly pollinators are at risk in the United States. Among these is the Manfreda Giant-skipper (*Stallingsia maculosus*), a Texas butterfly that is

⁵⁶Dobson 1996.

⁵⁷*The Value of Life*.

⁵⁸Abramovitz 1997.

⁵⁹Ehrlich, Paul R., and E.O. Wilson. 1991. "Biodiversity studies: science and policy." *Science* 253:758-62; and Pimentel et al. 1997.

⁶⁰Ehrlich and Wilson 1991; and Pimentel et al. 1997.

⁶¹Pimentel et al. 1997; and Costanza et al. 1997.

⁶²*The Sixth Extinction*; Bulte, Erwin, and G.C. Van Kooten. 2000. "Economic science, endangered species, and biodiversity loss." *Conservation Biology* 14(1):113-119; and Gatto, Marino and Giulio A. De Leo.

2000. "Pricing biodiversity and ecosystem services: the never-ending story." *BioScience* 50(4):347-355.

⁶³Ehrlich and Wilson 1991.

⁶⁴*Id.*

⁶⁵Morris, D.W. and L. Heidinga. 1997. "Balancing the books on biodiversity." *Conservation Biology* 11:287-289.

⁶⁶Pimentel, David, Lori Lach, Rodolfo Zuniga, and Doug Morrison. 2000. "Environmental and economic costs of nonindigenous species in the United States." *BioScience* 50(1):53-62.

among the species we are petitioning.⁶⁷ The loss of pollinators threatens ecological and economic systems across the country.⁶⁸

Third, the aesthetic and symbolic values of plants and wildlife also provide a rationale for protecting species. The beauty of unspoiled vistas, rugged terrain, wildflowers, butterflies, migrating birds, open spaces, charismatic megafauna, and other aspects of nature resonate with, and inform, human aesthetics. In fact, there is a consistent preference among humans for natural patterns and designs.⁶⁹ Symbolic values of wildlife are manifest in human language and cognition. Natural differentiations enable people to categorize disparate information and construct metaphors, thereby enhancing human cognition. Diversity in nature provides a greater range of categories that is especially pertinent for early childhood development.⁷⁰ The importance of this dynamic is underscored by the finding that upwards of 90% of characters in preschool books on counting and language are animals or natural objects. Animals and nature are ubiquitous in fairy tales and stories, which inform social codes of conduct. Continued destructiveness toward nature may consequently impact human cognition and social relations.⁷¹ Aesthetic and symbolic values toward wildlife segue into their naturalistic value, as our enjoyment of the beauty and meaning of nature inspires us to experience it directly.

Fourth, the recreational value of wildlife involves a variety of activities, including bird- and wildlife-watching, fishing, hunting, eco-tourism, and hiking. These activities are very popular.⁷² Non-tangible benefits deriving from the naturalistic value of the wild include decreased stress levels, physical exercise, and the intellectual value of direct experience with nature.⁷³ The economic value of wildlife-related recreation is significant: the Service has conducted surveys of wildlife-related recreation demonstrating extensive outdoor recreation in the U.S. The agency determined in its most recent report in 2001 that seventy-seven million adult Americans, or 40% of the adult population, spent \$100 billion in the course of wildlife-related recreation. Their expenditures supported hundreds

⁶⁷Xerces Society Red List of Pollinators of North America,

http://www.xerces.org/Pollinator_Red_List/Table_Lepidoptera.htm, visited May 29, 2007.

⁶⁸Committee on the Status of Pollinators in North America, National Research Council. 2006. *Status of Pollinators in North America*. Washington, DC: National Academies Press.

⁶⁹*The Value of Life*; Kellert, Stephen R. and Edward O. Wilson, Eds. 1993. *The Biophilia Hypothesis*. Washington, DC: Island Press.

⁷⁰*The Value of Life*; Bekoff, Marc. 1998b. "Deep ethology, animal rights, and the Great Ape/Animal Project: resisting speciesism and expanding the community of equals." *Journal of Agricultural and Environmental Ethics* 10: 269-296.

⁷¹*The Value of Life*. If this case seems overstated, one might consider the brevity of human experience with industrialization. Some 99% of human history took place in hunter-gatherer lifestyles where experience with nature was direct and inescapable (Kellert and Wilson 1993). In E.O. Wilson's words, "The more we know of other forms of life, the more we enjoy and respect ourselves. Humanity is exalted not because we are so far above other living creatures, but because knowing them well elevates the very concept of life." Wilson, Edward O. 1984. *Biophilia: The Human Bond with Other Species*. Cambridge: Harvard University Press at p. 115.

⁷²Ehrlich and Wilson 1991; Dobson 1996; and *The Value of Life*.

⁷³*The Value of Life*.

of thousands of jobs.⁷⁴

Fifth, ethical and moral values are a basis for endangered species protection. The inherent value of species and duty of existing humans to future generations of humans are ethical reasons to protect species from extinction. These ethics intersect with religious or spiritual reasons for preventing extinction. The kinship of all life – given similar cell structure, genetic makeup, and human existence as a byproduct of terrestrial evolution – is also a basis for prescribing strong ethical duties toward nature.⁷⁵ Moralistic values toward wildlife therefore intersect with ecologicistic values, as the web of life finds humans as a part of nature, just as the moralistic view on wild animals as kin derives from our common ancestry and human evolution within nature.

Sixth, flora and fauna possess scientific value. Scientific research on the natural processes and the behavior of individual species provides knowledge to humans on anatomy, biology, psychology, genetics, and other scientific disciplines.⁷⁶ Scientific findings serve both educational and applied functions. Recently, scientists have advocated a “conservation medicine” approach in conservation biology that examines the ways in which human, animal, and ecosystem health inter-relate.⁷⁷ Scientific knowledge gained from biodiversity studies provides a basis for improving human and animal health.

Finally, humans hold humanistic values toward wildlife.⁷⁸ Humans feel bonds of affection and love toward companion and wild animals, plants, and natural areas. This corresponds with notions of “biophilia” – or intrinsic emotional affiliation of humans to non-human beings.⁷⁹ While biophilia derives from and is manifest in the multiple values toward wildlife described above,⁸⁰ its expression is particularly apparent in humanistic expressions toward wildlife.

IV. Conclusion

We humans and the ecosystems that support us are in the midst of an extinction crisis unparalleled in the last 65 million years of geologic time. As more and more of us crowd this planet and convert its biological resources to our own ends, we impoverish the lives and the very existence of countless other species. Eventually, we will end up impoverishing ourselves. Irreplaceable species are being lost daily at alarming and

⁷⁴U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

⁷⁵*The Biophilia Hypothesis; The Sixth Extinction; and The Value of Life*.

⁷⁶*The Value of Life*; Bekoff, Marc. 1998a. “Deep ethology.” In *Kinship With the Animals*. Eds. Michael Tobias and Kate Solisti-Mattelon. Hillsboro, OR: Beyond Words Publishing; and Wilson, E.O. 1987. “The little things that run the world.” *Conservation Biology* 1:344-346.

⁷⁷Meffe, Gary K. 1999. “Conservation medicine.” *Conservation Biology* 13: 953-954, Norris, Scott. 2001. “A new voice in conservation.” *BioScience* 51(1): 7-12, and Spear, John R. 2000. “Conservation medicine: the changing view of biodiversity.” *Conservation Biology* 14(6): 1913-1917.

⁷⁸*The Value of Life*.

⁷⁹*The Biophilia Hypothesis*.

⁸⁰*The Value of Life*.

increasing rates. Unquantifiable economic and other harm is occurring. We have a big problem. We need a big solution.

This is not an alarmist position. Congress recognized the scope of the extinction crisis and the incalculable damage we are doing to the very fabric of the natural world that supports our civilization over 30 years ago. Congress' solution to this problem was the ESA: a strong and precautionary law to prevent looming ecological disaster. It is time to use this law as it was intended and extend a safety net to the species we have driven to the edge of extinction.

This Petition is only a modest proposal. Forest Guardians seeks to force the Service to act upon information the Service already recognizes and endorses. By using the citizen petition process of the ESA to protect 475 species in the Service's Southwest Region we are attempting to unlock the gates to the legal Ark, the ESA, that Congress designed to save these species from extinction. For reasons of its own, but anticipated by Congress when it included the citizen petition process in the ESA, the Service has kept the door to the Ark nearly shut. This is inappropriate and illegal. The ESA requires the Service to list, and thereby extend legal protection to, all species whenever the best scientific and commercial information available indicates that these species are likely to go extinct in the foreseeable future. In this case, there is a widespread scientific consensus documented in the NatureServe system, a system the Service itself recognizes as authoritative, that each of the 475 species included in this Petition faces extinction unless it is promptly protected. This Petition is intended to give the Service the opportunity to act on this scientific consensus and in accordance with the law as Congress intended when it set out to "halt and reverse the trend toward species extinction, whatever the cost." *TVA v. Hill*, 437 U.S. 153, 184 (1978).

Requested Designation

Forest Guardians hereby petitions the U.S. Fish and Wildlife Service under the Department of Interior to list the 475 species that are critically imperiled or imperiled in the southwest as Endangered or Threatened species pursuant to the Endangered Species Act. The petitioned species are named at Tables 1 & 2. This listing action is warranted, given the critically imperiled and imperiled biological status of these species. In addition to considering whether to list the 475 petitioned species, we request that FWS consider emergency listing of those species among these 475 determined to be at imminent risk of extinction. We further request that listing rules for each of the 475 species include critical habitat designation, given the efficacy of critical habitat in promoting species recovery,⁸¹ and the fact that the leading threat to imperiled species is habitat destruction.⁸²

⁸¹Suckling, Kieran F., and Martin Taylor. 2006. "Critical Habitat and Recovery" in *The Endangered Species Act at Thirty*. See p. 86.

⁸²Wilcove et al. 1998.

Table 1. All G1 Species in AZ, NM, OK, & TX not yet listed, candidates, or proposed for listing under the Endangered Species Act (N=268). Source: NatureServe.

Scientific name	Common Name	NatureServe Rank	ESA Status	Range	NatureServe notes
<i>Gammarus pecos</i>	Pecos Amphipod	G1		TX	Incomplete distribution data
<i>Hyalella texana</i>	Clear Creek Amphipod	G1		TX	Incomplete distribution data
<i>Orconectes saxatilis</i>	Kiamichi Crayfish	G1		OK	
<i>Procambarus brazoriensis</i>	Brazoria Crayfish	G1		TX	
<i>Procambarus nueces</i>	Nueces Crayfish	G1		TX	
<i>Procambarus texanus</i>	Bastrop Crayfish	G1		TX	
<i>Haideoporus texanus</i>	Edwards Aquifer Diving Beetle	G1		TX	
<i>Cicindela theatina</i>	Colorado Tiger Beetle	G1		CO,NM	
<i>Agapema galbina</i>	Tamaulipan Agapema	G1		TX	
<i>Sphingicampa blanchardi</i>	A Royal Moth	G1		TX	
<i>Afilia sp. 1</i>	A Notodontid Moth	G1		TX	
<i>Astylis sp. 1</i>	A Notodontid Moth	G1		AZ	

<i>Adhemarius blanchardorum</i>	Blanchard's Sphinx Moth	G1		TX	
<i>Sphinx smithi</i>	A Sphinx Moth	G1		AZ	
<i>Agylla septentrionalis</i>		G1		AZ	
<i>Sonorarctia fervida</i>		G1		AZ	
<i>Ceratopsyche vanaca</i>	A Caddisfly	G1		NM	Incomplete distribution data
<i>Hydroptila abbotti</i>	A Caddisfly	G1		TX	Incomplete distribution data
<i>Limnephilus adapus</i>	A Caddisfly	G1		TX	Incomplete distribution data
<i>Neotrichia juani</i>	A Caddisfly	G1		TX	Incomplete distribution data
<i>Neotrichia sonora</i>	A Caddisfly	G1		TX	Incomplete distribution data
<i>Protoptila arca</i>	San Marcos Saddle-case Caddisfly	G1		TX	Incomplete distribution data
<i>Melanoplus chiricahuae</i>	A Spur-throat Grasshopper	G1		AZ	
<i>Melanoplus pinaleno</i>	A Spur-throat Grasshopper	G1		AZ	

<i>Lachlania dencyannae</i>	A Mayfly	G1		NM	
<i>Agathon arizonicus</i>		G1		AZ	Incomplete distribution data
<i>Anacroneuria wipukupa</i>	A Stonefly	G1		AZ	
<i>Isoperla jewetti</i>	A Stonefly	G1		CO,NM,TX	
<i>Isoperla sagittata</i>	A Stonefly	G1		TX	
<i>Taeniopteryx starki</i>	Texas Willowfly	G1		TX	
<i>Disconaias salinasensis</i>	Salina Mucket	G1		TX	
<i>Lampsilis bracteata</i>	Texas Fatmucket	G1		TX	
<i>Potamilus metnecktayi</i>	Salina Mucket	G1		TX	
<i>Quadrula aurea</i>	Golden Orb	G1		TX	
<i>Toxolasma corvunculus</i>	Southern Purple Lilliput	G1		AL,GA,OK	
<i>Juturnia tularosae</i>	Tularosa Juturnia	G1		NM	
<i>Marstonia comalensis</i>	Comal Siltsnail	G1		TX	
<i>Phreatodrobia conica</i>	Hueco Cavesnail	G1		TX	
<i>Phreatodrobia imitata</i>	Mimic Cavesnail	G1		TX	

<i>Pyrgulopsis bacchus</i>	Grand Wash Springsnail	G1		AZ,NM	
<i>Pyrgulopsis bernardina</i>	San Bernadino Springsnail	G1		AZ,NM	
<i>Pyrgulopsis conica</i>	Kingman Springsnail	G1		AZ,NM	
<i>Pyrgulopsis davisii</i>	Limpia Creek Springsnail	G1		TX	
<i>Pyrgulopsis glandulosa</i>	Verde Rim Springsnail	G1		AZ,NM	
<i>Pyrgulopsis metcalfi</i>	Naegele Springsnail	G1		NM, TX	Extirpated in NM
<i>Pyrgulopsis montezumensis</i>	Montezuma Well Springsnail	G1		AZ,NM	
<i>Pyrgulopsis pecosensis</i>	Pecos Springsnail	G1		NM	
<i>Pyrgulopsis sola</i>	Brown Springsnail	G1		AZ,NM	
<i>Pyrgulopsis sp. 2</i>	Mimbres Springsnail	G1		NM	
<i>Stygopyrgus bartonensis</i>	Barton Cavesnail	G1		TX	
<i>Texapyrgus longleyi</i>	Striated Hydrobe	G1		TX	
<i>Tryonia brunei</i>	Brune Spring Snail	G1		TX	
<i>Tryonia diaboli</i>	Devil Tryonia	G1		TX	
<i>Tryonia gilae</i>	Gilae Tryonia	G1		AZ,NM	

<i>Ashmunella animasensis</i>	Animas Peak Woodlandsnail	G1		NM	
<i>Ashmunella ashmuni</i>	Jemez Woodlandsnail	G1		NM	
<i>Ashmunella bequaerti</i>	Goat Cave Woodlandsnail	G1		TX	
<i>Ashmunella binneyi</i>	Silver Creek Woodlandsnail	G1		NM	
<i>Ashmunella carlsbadensis</i>	Guadalupe Woodlandsnail	G1		NM, TX	
<i>Ashmunella danielsi</i>	Whitewater Creek Woodlandsnail	G1		NM	
<i>Ashmunella edithae</i>	Mckittrick Woodlandsnail	G1		TX	
<i>Ashmunella ferrissi</i>	Reed's Mountain Woodlandsnail	G1		AZ	
<i>Ashmunella harrisi</i>	Goat Mountain Woodlandsnail	G1		NM	

<i>Ashmunella hebardi</i>	Hacheta Grande Woodlandsnail	G1		NM	
<i>Ashmunella kochii</i>	San Andreas Woodlandsnail	G1		NM	
<i>Ashmunella lenticula</i>	Horseshoe Canyon Woodlandsnail	G1		AZ	
<i>Ashmunella macromphala</i>	Cook's Peak Woodlandsnail	G1		NM	
<i>Ashmunella mearnsii</i>	Big Hatchet Woodlandsnail	G1		NM	
<i>Ashmunella mendax</i>	Iron Creek Woodlandsnail	G1		NM	
<i>Ashmunella mogollonensis</i>	Mogollon Woodlandsnail	G1		AZ,NM	
<i>Ashmunella mudgei</i>	Sawtooth Mountain Woodlandsnail	G1		TX	
<i>Ashmunella pilsbryana</i>	Blue Mountain Woodlandsnail	G1		AZ	

<i>Ashmunella pseudodonta</i>	Capitan Woodlandsnail	G1		NM	
<i>Ashmunella rileyensis</i>	Mount Riley Woodlandsnail	G1		NM	
<i>Ashmunella salinasensis</i>	Salinas Peak Woodlandsnail	G1		NM	
<i>Ashmunella todseni</i>	Maple Canyon Woodlandsnail	G1		NM	
<i>Ashmunella walkeri</i>	Florida Mountain Woodlandsnail	G1		NM	
<i>Coelostemma pyrgonasta</i>	Bishop Cap Tubesnail	G1		NM	
<i>Daedalochila hippocrepis</i>	Horseshoe Liptooth	G1		TX	
<i>Daedalochila scintilla</i>		G1		TX	
<i>Gastrocopta prototypus</i>	Sonoran Snaggletooth	G1		AZ,NM	
<i>Gastrocopta ruidosensis</i>	Ruidoso Snaggletooth	G1		KS, NE, NM, OK, TX	
<i>Holospira cockerelli</i>	Cockerell Holospira	G1		NM	
<i>Holospira hamiltoni</i>	Hamilton Holospira	G1		TX	
<i>Holospira mesolia</i>	Widemouth Holospira	G1		TX	

<i>Holospira metcalfi</i>	Metcalf Holospira	G1		NM	
<i>Holospira oritis</i>	Mountain Holospira	G1		TX	
<i>Holospira pasonis</i>	Robust Holospira	G1		TX	
<i>Holospira pityis</i>	Pinecone Holospira	G1		TX	
<i>Holospira riograndensis</i>	Rio Grand Holospira	G1		TX	
<i>Holospira sherbrookei</i>	Silver Creek Holospira	G1		AZ	
<i>Holospira yucatanensis</i>	Bartsch Holospira	G1		TX	
<i>Humboldtiana agavophila</i>	Agave Threeband	G1		TX	
<i>Humboldtiana chisosensis</i>	Chisos Threeband	G1		TX	
<i>Humboldtiana edithae</i>	Boulder Slide Threeband	G1		TX	
<i>Humboldtiana fullingtoni</i>	Capote Threeband	G1		TX	
<i>Maricopella allynsmithi</i>	Squaw Park Talusnail	G1		AZ,NM	
<i>Naesiotus christenseni</i>	Santa Rita Rabdotus	G1		AZ	
<i>Nesovitrea suzannae</i>	Live Oak Glass	G1		TX	
<i>Oreohelix barbata</i>	Bearded Mountainsnail	G1		AZ,NM	
<i>Oreohelix confragosa</i>	Pinos Altos Mountainsnail	G1		NM	

<i>Oreohelix houghi</i>	Diablo Mountainsnail	G1		AZ,NM	
<i>Oreohelix litoralis</i>	San Agustin Mountainsnail	G1		NM	
<i>Oreohelix magdalenae</i>	Magdalena Mountainsnail	G1		NM	
<i>Oreohelix pilsbryi</i>	Mineral Creek Mountainsnail	G1		NM,WY	
<i>Oreohelix swopei</i>	Morgan Creek Mountainsnail	G1		NM,WY	
<i>Pallifera tournescalis</i>	Ouachita Mantleslug	G1		OK	
<i>Paravitrea alethia</i>	Goddess Supercoil	G1		TN,TX	
<i>Patera leatherwoodi</i>	Pedernales Oval	G1		TX	
<i>Philomycus batchi</i>	Dusky Mantleslug	G1		OK	
<i>Philomycus bisdodus</i>	Grayfoot Mantleslug	G1		OK	
<i>Pseudosubulina cheatumi</i>	Chisos Foxsnail	G1		TX	
<i>Radiocentrum ferrissi</i>	Fringed Mountainsnail	G1		NM,TX	
<i>Sonorella anchana</i>	Sierra Ancha Talussnail	G1		AZ	
<i>Sonorella animasensis</i>	Animas Talussnail	G1		NM	
<i>Sonorella apache</i>	Apache Talussnail	G1		AZ	
<i>Sonorella bagnarai</i>	Rincon Talussnail	G1		AZ	

<i>Sonorella bartschi</i>	Escabrosa Talussnail	G1		AZ	
<i>Sonorella binneyi</i>	Horseshoe Canyon Talussnail	G1		AZ	
<i>Sonorella bowiensis</i>	Quartzite Hill Talussnail	G1		AZ,CA	
<i>Sonorella bradshaveana</i>	Bradshaw Talussnail	G1		AZ	
<i>Sonorella christenseni</i>	Clark Peak Talussnail	G1		AZ,NM	
<i>Sonorella clappi</i>	Madera Talussnail	G1		AZ	
<i>Sonorella coltoniana</i>	Walnut Canyon Talussnail	G1		AZ	
<i>Sonorella compar</i>	Oak Creek Talussnail	G1		AZ	
<i>Sonorella dalli</i>	Garden Canyon Talussnail	G1		AZ	
<i>Sonorella delicata</i>	Tollhouse Canyon Talussnail	G1		AZ	
<i>Sonorella dragoonensis</i>	Stronghold Canyon Talussnail	G1		AZ	
<i>Sonorella eremita</i>	San Xavier Talussnail	G1		AZ	
<i>Sonorella ferrissi</i>	Dragoon Talussnail	G1		AZ	

<i>Sonorella grahamensis</i>	Pinaleno Talussnail	G1		AZ,NM	
<i>Sonorella imperatrix</i>	Total Wreck Talussnail	G1		AZ	
<i>Sonorella imperialis</i>	Empire Mountain Talussnail	G1		AZ	
<i>Sonorella insignis</i>	Whetstone Talussnail	G1		AZ	
<i>Sonorella macrophallus</i>	Wet Canyon Talussnail	G1		AZ,NM	
<i>Sonorella meadi</i>	Aqua Dulce Talussnail	G1		AZ	
<i>Sonorella micromphala</i>	Milk Ranch Talussnail	G1		AZ	
<i>Sonorella papagorum</i>	Black Mountain Talussnail	G1		AZ,NM	
<i>Sonorella reederi</i>	Rampart Talussnail	G1		AZ	
<i>Sonorella russelli</i>	Black Mesa Talussnail	G1		AZ	
<i>Sonorella sp. 1</i>	A Terrestrial Snail	G1		NM	
<i>Sonorella todseni</i>	Dona Ana Talussnail	G1		NM	
<i>Sonorella tryoniana</i>	Sanford Talussnail	G1		AZ	
<i>Sonorella vespertina</i>	Evening Talussnail	G1		AZ	

<i>Sonorella waltoni</i>	Doubtful Canyon Talussnail	G1		AZ	
<i>Vertigo berryi</i>	Rotund Vertigo	G1		AZ,CA	
<i>Vertigo binneyana</i>	Cylindrical Vertigo	G1		CAN: BC, MB, ON; USA: IA, KS, MT, NM	
<i>Macrhybopsis tetranema</i>	Arkansas River Speckled Chub	G1		CO, KS, NM, OK, TX	Extirpated in CO
<i>Menidia clarkhubbsi</i>	Texas Silverside	G1		TX	Incomplete distribution data
<i>Cyprinodon eremus</i>	Quitobaquito Pupfish	G1		AZ	
<i>Cyprinodon pecosensis</i>	Pecos Pupfish	G1		NM, TX	
<i>Cyprinodon tularosa</i>	White Sands Pupfish	G1		NM	
<i>Gambusia clarkhubbsi</i>	San Felipe Gambusia	G1		TX	
<i>Syngnathus affinis</i>	Texas Pipefish	G1		TX	Incomplete distribution data
<i>Eurycea neotenes</i>	Texas Salamander	G1		TX	
<i>Eurycea sp. 6</i>	Pedernales River Springs Salamander	G1		TX	

<i>Eurycea tonkawae</i>	Jollyville Plateau Salamander	G1		TX	
<i>Eurycea tridentifera</i>	Comal Blind Salamander	G1		TX	
<i>Notophthalmus meridionalis</i>	Black-spotted Newt	G1		TX	
<i>Catapyrenium granulatum</i>		G1		NM	Incomplete distribution data
<i>Omphalora arizonica</i>		G1		AZ,CO,NM	Incomplete distribution data
<i>Donrichardsia macroneuron</i>		G1		TX	Incomplete distribution data
<i>Grimmia americana</i>		G1		NV, TX	Incomplete distribution data
<i>Aconitum infectum</i>	Arizona Monkshood	G1		AZ	
<i>Agalinis calycina</i>	Leoncita False Foxglove	G1		TX	
<i>Agalinis navasotensis</i>	Navasota False Foxglove	G1		TX	
<i>Amoreuxia gonzalezii</i>	Santa Rita Yellowshow	G1		AZ	
<i>Amsonia tharpii</i>	Tharp's Blue-star	G1		NM, TX	
<i>Arenaria livermorensis</i>	Livermore Sandwort	G1		TX	

<i>Argemone arizonica</i>	Arizona Prickle-poppy	G1		AZ	
<i>Arida matturneri</i>		G1		TX	
<i>Astragalus hypoxylus</i>	Huachuca Milk-vetch	G1		AZ	
<i>Batesimalva violacea</i>	Purple Gay-mallow	G1		TX	
<i>Bonamia ovalifolia</i>	Bigpod Bonamia	G1		TX	
<i>Camissonia exilis</i>	Cottonwood Spring Suncup	G1		AZ,UT	
<i>Castilleja ornata</i>	Glowing Indian-paintbrush	G1		NM	
<i>Centaurium blumbergianum</i>	Blumberg Rosita	G1		TX	
<i>Crataegus nananixonii</i>	Nixon's Hawthorn	G1		TX	
<i>Cymopterus beckii</i>	Pinnate Spring-parsley	G1		AZ,UT	
<i>Dalea bartonii</i>	Cox's Dalea	G1		TX	
<i>Dalea tentaculoides</i>	Gentry's Indigobush	G1		AZ	
<i>Echeandia texensis</i>		G1		TX	
<i>Eleocharis brachycarpa</i>	Short-fruited Spikerush	G1		TX	
<i>Eleocharis cylindrica</i>	Cylinder Spikerush	G1		NM,TX	

<i>Erigeron bistiensis</i>	Bisti Fleabane	G1		NM,NN	
<i>Erigeron heliographis</i>	Heliograph Peak Fleabane	G1		AZ	
<i>Erigeron hessii</i>	Hess' Fleabane	G1		NM	
<i>Erigeron kuschei</i>	Chiricahua Fleabane	G1		AZ	
<i>Erigeron piscaticus</i>	Fish Creek Fleabane	G1		AZ	
<i>Eriogonum mortonianum</i>	Morton's Wild Buckwheat	G1		AZ	
<i>Eriogonum terrenatum</i>	San Pedro River Wild Buckwheat	G1		AZ	
<i>Escobaria guadalupensis</i>	Guadalupe Pincushion Cactus	G1		NM, TX	
<i>Euphorbia aaron-rossii</i>	Marble Canyon Spurge	G1		AZ, NN	
<i>Fryxellia pygmaea</i>	Fryxell's Pygmy Mallow	G1		TX	
<i>Genistidium dumosum</i>	Brush-pea	G1		TX	
<i>Glossopetalon texense</i>	Texas Grease Bush	G1		TX	
<i>Hedyotis butterwickiae</i>	Mary's Bluet	G1		TX	
<i>Houstonia correllii</i>	Correll's Bluet	G1		TX	

<i>Kallstroemia perennans</i>	Perennial Caltrop	G1		TX	
<i>Machaeranthera gypsitherma</i>	Gypsum Hotspring Aster	G1		NM, TX	
<i>Matelea texensis</i>	Trans Pecos Matelea	G1		TX	
<i>Mentzelia memorabilis</i>	September 11 Stickleaf	G1		AZ	
<i>Opuntia martiniana</i>	Seashore Cactus	G1		AZ	
<i>Panicum mohavense</i>	Mojave Panicgrass	G1		AZ, NM	
<i>Paronychia congesta</i>	Bushy Whitlow-wort	G1		TX	
<i>Paronychia lundelliorum</i>	Lundell's Nailwort	G1		TX	
<i>Paronychia maccartii</i>	Mccart's Whitlow-wort	G1		TX	
<i>Pediomelum humile</i>	Rydberg's Scurfpea	G1		TX	
<i>Pediomelum pentaphyllum</i>	Chihuahua Scurfpea	G1		AZ, NM, TX	
<i>Perityle ajoensis</i>	Ajo Rockdaisy	G1		AZ	
<i>Perityle ambrosiifolia</i>	Lace-leaf Rockdaisy	G1		AZ	
<i>Perityle fosteri</i>	Foster's Rockdaisy	G1		TX	
<i>Perityle huecoensis</i>	Hueco Mountains Rockdaisy	G1		TX	

<i>Perityle saxicola</i>	Fish Creek Rock Daisy	G1		AZ	
<i>Perityle vitreomontana</i>	Glass Mountains Rockdaisy	G1		TX	
<i>Perityle warnockii</i>	River Rockdaisy	G1		TX	
<i>Physalis latiphysa</i>	Broad-leaf Ground-cherry	G1		AZ	
<i>Proboscidea spicata</i>	Many-flowered Unicorn-plant	G1		TX	
<i>Pseudoclapia watsonii</i>	Watson's False-clappia	G1		TX	
<i>Quercus acerifolia</i>	Mapleleaf Oak	G1		AR,OK	
<i>Quercus boyntonii</i>	Boynton's Sand Post Oak	G1		AL,TX	
<i>Quercus graciliformis</i>	Slender Oak	G1		TX	
<i>Quercus tardifolia</i>	Chisos Mountains Oak	G1		TX	
<i>Salvia pentstemonoides</i>	Big Red Sage	G1		TX	
<i>Sclerocactus sileri</i>	Siler's Fishhook Cactus	G1		AZ	
<i>Scutellaria laevis</i>	Smooth-stem Skullcap	G1		TX	

<i>Selinocarpus maloneanus</i>	Malone Mountains Moonpod	G1		TX	
<i>Senecio quaylei</i>	Quayle's Ragwort	G1		TX	
<i>Senna ripleyana</i>	Ripley's Senna	G1		TX	
<i>Silene rectiramea</i>	Grand Canyon Catchfly	G1		AZ	
<i>Sophora gypsophila</i>	Gypsum Necklace	G1		NM, TX	
<i>Sphaeralcea gierischii</i>		G1		AZ, UT	
<i>Stellaria porsildii</i>	Porsild's Starwort	G1		AZ, NM	
<i>Tetraneuris verdiensis</i>		G1		AZ	
<i>Townsendia smithii</i>	Black Rock Ground-daisy	G1		AZ	
<i>Viola guadalupensis</i>	Guadalupe Mountains Violet	G1		TX	
<i>Yucca cernua</i>		G1		TX	
<i>Comaldessus stygius</i>	Comal Springs Diving Beetle	G1?		TX	Incomplete distribution data
<i>Fissidens littlei</i>		G1?		NM	Incomplete distribution data
<i>Adenophyllum wrightii</i>	Wright's Dogweed	G1?		AZ, NM	

<i>Arabis tricornuta</i>	Rincon Mountain Rockcress	G1?		AZ	
<i>Camissonia gouldii</i>	Diamond Valley Suncup	G1?		AZ,UT	
<i>Cryptantha semiglabra</i>	Pipe Springs Cryptantha	G1?		AZ,UT	
<i>Lesquerella navajoensis</i>		G1?		AZ,NM,NN,UT	
<i>Cyperus cephalanthus</i>	Cryptic Flatsedge	G1?Q		LA,TX	
<i>Lesquerella lata</i>	Lincoln County Bladderpod	G1?Q		NM	
<i>Automeris patagoniensis</i>	Patagonia Eyed Silkmoth	G1Q		AZ	
<i>Cisthene conjuncta</i>		G1Q		TX	
<i>Fusconaia lananensis</i>	Triangle Pigtoe	G1Q		TX	
<i>Pisidium sanguinichristi</i>	Sangre de Cristo Peaclam	G1Q		CO,NM	
<i>Catinella texana</i>		G1Q		LA,TX	
<i>Rana subaquavocalis</i>	Ramsey Canyon Leopard Frog	G1Q		AZ	
<i>Eurycea robusta</i>	Blanco Blind Salamander	G1Q		TX	
<i>Eurycea sp. 10</i>	Dolan Falls Salamander	G1Q		TX	

<i>Eurycea sp. 8</i>	Comal Springs Salamander	G1Q		TX	
<i>Geomys streckeri</i>	Strecker's Pocket Gopher	G1Q		TX	
<i>Dryopteris rossii</i>	Ros's Woodfern	G1Q		AZ	
<i>Agave arizonica</i>	Arizona Agave	G1Q		AZ	
<i>Bouteloua kayi</i>	Kay Gramma	G1Q		TX	
<i>Camissonia confertiflora</i>	Bunch Flower Evening Primrose	G1Q		AZ	
<i>Hedyotis pooleana</i>	Jackie's Bluet	G1Q		TX	
<i>Lechea mensalis</i>	Chisos Pinweed	G1Q		TX	
<i>Opuntia aureispina</i>	Golden-spined Prickly-pear	G1Q		TX	
<i>Opuntia densispina</i>	Big Bend Prickly-pear	G1Q		TX	
<i>Quercus robusta</i>	Robust Oak	G1Q		TX	
<i>Rhododon angulatus</i>	Lonestar Sand-mint	G1Q		TX	
<i>Talinum gooddingii</i>	Goodding's Flameflower	G1Q		AZ	
<i>Thelypodium tenue</i>	Fresno Creek Thelypody	G1Q		TX	

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Table 2. All G1G2 Species in AZ, NM, OK, & TX not yet listed, candidates, or proposed for listing under the Endangered Species Act (N=207). Source: NatureServe.

Scientific name	Common Name	NatureServe Rank	ESA Status	Range	NatureServe notes
<i>Amergoniscus centralis</i>	A Cave Obligate Isopod	G1G2		OK	
<i>Amergoniscus gipsocolus</i>	A Cave Obligate Isopod	G1G2		TX	
<i>Artesia subterranea</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Artesia welbourni</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Caecidotea adenta</i>	A Cave Obligate Isopod	G1G2		OK	
<i>Caecidotea bisetus</i>	A Cave Obligate Isopod	G1G2		TX	
<i>Cambarus subterraneus</i>	Delaware County Cave Crayfish	G1G2		OK	
<i>Cambarus tartarus</i>	Oklahoma Cave Crayfish	G1G2		OK	

<i>Hemigrapsus oregonensis</i>	Yellow Shore Crab	G1G2		TX	Incomplete distribution data, exotic
<i>Holsingerius samacos</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Holsingerius smaragdinus</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Lirceolus smithii</i>	Texas Troglotic Water Slater	G1G2		TX	
<i>Palaemonetes holthuisi</i>	A Cave Obligate Decapod	G1G2		TX	
<i>Paramexiweckelia ruffoi</i>	Ruffo's Cave Amphipod	G1G2		TX	
<i>Procambarus nechesae</i>	Neches Crayfish	G1G2		TX	
<i>Procambarus nigrocinctus</i>	Blackbelted Crayfish	G1G2		TX	
<i>Procambarus steigmani</i>	Parkhill Prairie Crayfish	G1G2		TX	
<i>Seborgia hershleri</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Sphaeromicola moria</i>	A Cave Obligate Shrimp	G1G2		TX	
<i>Streptocephalus moorei</i>	Spinythumb Fairy Shrimp	G1G2		NM	

<i>Streptocephalus thomasbowmani</i>	Bowman's Fairy Shrimp	G1G2		NM	
<i>Stygobromus blinni</i>	Blinn's Amphipod	G1G2		AZ	
<i>Stygobromus boultoni</i>	Boulton's Amphipod	G1G2		AZ	
<i>Stygobromus bowmani</i>	Bowman's Cave Amphipod	G1G2		OK	
<i>Stygobromus curroae</i>	Curro's Amphipod	G1G2		NM	
<i>Stygobromus dejectus</i>	Cascade Cave Amphipod	G1G2		TX	
<i>Stygobromus hadenoecus</i>	Devil's Sinkhole Amphipod	G1G2		TX	
<i>Stygobromus jemezensis</i>	Jemez Mountains Amphipod	G1G2		NM	
<i>Stygobromus limbus</i>	Border Cave Amphipod	G1G2		TX	
<i>Stygobromus reddelli</i>	Reddell's Cave Amphipod	G1G2		TX	
<i>Texiweckelia relict</i>	A Cave Obligate Amphipod	G1G2		TX	
<i>Oncopodura prietoi</i>	A Cave Obligate Springtail	G1G2		NM	

<i>Pseudosinella vita</i>	A Cave Obligate Springtail	G1G2		NM	
<i>Tomocerus grahami</i>	A Cave Obligate Springtail	G1G2		NM	
<i>Microdynerus arenicolus</i>	Antioch Potter Wasp	G1G2		AZ,CA,NV	Incomplete distribution data
<i>Batrisodes grubbsi</i>	A Beetle	G1G2		TX	
<i>Cylloepus parkeri</i>	Parker's Cylloepus Riffle Beetle	G1G2		AZ	Incomplete distribution data
<i>Ptomaphagus cocytus</i>	A Cave Obligate Beetle	G1G2		AZ	
<i>Rhadine austinica</i>	A Cave Obligate Beetle	G1G2		TX	
<i>Rhadine insolita</i>	A Cave Obligate Beetle	G1G2		TX	
<i>Rhadine noctivaga</i>	A Cave Obligate Beetle	G1G2		TX	
<i>Rhadine russelli</i>	A Cave Obligate Beetle	G1G2		TX	
<i>Apodemia chisosensis</i>	Chisos Metalmark	G1G2		TX	

<i>Lycaena ferrisi</i>	Ferris's Copper	G1G2		AZ	
<i>Stallingsia maculosus</i>	Manfreda Giant-skipper	G1G2		TX	
<i>Sphingicampa raspa</i>	A Royal Moth	G1G2		AZ, TX	
<i>Euhyarpax rosea</i>	A Notodontid Moth	G1G2		AZ, CO, NM	
<i>Heterocampa sp. 1 nr. amanda</i>	A Notodontid Moth	G1G2		AZ	
<i>Litodonta sp. 1 nr. alpina</i>	A Notodontid Moth	G1G2		AZ	
<i>Ursia furtiva</i>	A Notodontid Moth	G1G2		TX	
<i>Ursia sp. 1</i>	A Notodontid Moth	G1G2		TX	
<i>Papaipema eryngii</i>	Rattlesnake-master Borer Moth	G1G2		AR, IA, IL, IN, KY, NC, OK	Extirpated in IN
<i>Sphinx eremitoides</i>	Sage Sphinx	G1G2		KS, MO, TX	
<i>Alexicles aspersa</i>		G1G2		AZ, NM	
<i>Apatania arizona</i>	A Caddisfly	G1G2		AZ	Incomplete distribution data
<i>Chimarra holzenthali</i>	A Caddisfly	G1G2		LA, TX	Incomplete distribution data
<i>Chimarra primula</i>	A Caddisfly	G1G2		AZ	Incomplete distribution data

<i>Culoptila kimminsi</i>	A Caddisfly	G1G2		AZ	Incomplete distribution data
<i>Culoptila moselyi</i>	A Caddisfly	G1G2		AZ	Incomplete distribution data
<i>Hydroptila ouachita</i>	A Purse Casemaker Caddisfly	G1G2		LA, TX	Incomplete distribution data
<i>Hydroptila protera</i>	A Caddisfly	G1G2		OK, TX	Incomplete distribution data
<i>Lepidostoma ozarkense</i>	A Caddisfly	G1G2		AR, OK	Incomplete distribution data
<i>Neotrichia mobilensis</i>	A Caddisfly	G1G2		AL, TX	Incomplete distribution data
<i>Ochrotrichia guadalupensis</i>	A Caddisfly	G1G2		TX	Incomplete distribution data
<i>Ochrotrichia weddleae</i>	A Caddisfly	G1G2		AR, OK	Incomplete distribution data
<i>Phylocentropus harrisi</i>	A Caddisfly	G1G2		AL, FL, TX	Incomplete distribution data
<i>Argia sabino</i>	Sabino Dancer	G1G2		AZ	
<i>Melanoplus alexanderi</i>		G1G2		TX	

<i>Melanoplus magdalenae</i>	A Spur-throat Grasshopper	G1G2		AZ,NM	
<i>Melanoplus sp. 22</i>		G1G2		TX	
<i>Melanoplus sp. 26</i>		G1G2		TX	
<i>Melanoplus sp. 36</i>		G1G2		TX	
<i>Melanoplus sp. 48</i>		G1G2		NM	
<i>Melanoplus sp. 52</i>		G1G2		AZ	
<i>Melanoplus sp. 62</i>		G1G2		TX	
<i>Melanoplus sp. 9</i>		G1G2		TX	
<i>Baetodes alleni</i>	A Mayfly	G1G2		TX	
<i>Fallceon eatoni</i>	A Mayfly	G1G2		AZ	
<i>Thalkethops grallatrix</i>	A Cave Obligate Centipede	G1G2		NM	
<i>Pleurobema riddellii</i>	Louisiana Pigtoe	G1G2		LA, TX	
<i>Potamilus amphichaenus</i>	Texas Heelsplitter	G1G2		LA, OK, TX	
<i>Balconorbis uvaldensis</i>	Balcones Ghostsnail	G1G2		TX	
<i>Phreatoceras taylori</i>	Nymph Trumpet	G1G2		TX	
<i>Phreatodrobia coronae</i>	A Cavesnail	G1G2		TX	
<i>Phreatodrobia rotunda</i>	Beaked Cavesnail	G1G2		TX	
<i>Pyrgulopsis arizonae</i>	Bylas Springsnail	G1G2		AZ, NM	
<i>Pyrgulopsis simplex</i>	Fossil Springsnail	G1G2		AZ, NM	
<i>Tryonia quitobaquita</i>	Quitobaquito Tryonia	G1G2		AZ, NM	

<i>Ashmunella chiricahuana</i>	Cave Creek Woodlandsnail	G1G2		AZ	
<i>Ashmunella esuritor</i>	Barfoot Woodlandsnail	G1G2		AZ	
<i>Ashmunella lepiderma</i>	Whitetail Woodlandsnail	G1G2		AZ	
<i>Ashmunella levettei</i>	Huachuca Woodlandsnail	G1G2		AZ,NM	
<i>Ashmunella rhyssa</i>	Sierra Blanca Woodlandsnail	G1G2		NM	
<i>Deroceras heterura</i>	Marsh Slug	G1G2		NM	
<i>Euglandina texasiana</i>	Glossy Wolfsnail	G1G2		TX	
<i>Helicodiscus nummus</i>	Wax Coil	G1G2		AR, KY, OK, TX	
<i>Holospira animasensis</i>	Animas Mountains Tubeshell	G1G2		NM	
<i>Holospira tantalus</i>	Teasing Holospira	G1G2		AZ	
<i>Holospira whetstonensis</i>	Whetstone Holospira	G1G2		AZ	
<i>Neohelix lioderma</i>	Tulsa Whitelip	G1G2		OK	
<i>Sonorella caerulifluminis</i>	Blue Talussnail	G1G2		AZ	

<i>Sonorella huecoensis</i>	Hueco Mountains Talus Snail	G1G2			TX
<i>Sonorella micra</i>	Pygmy Sonorella	G1G2			AZ
<i>Sonorella neglecta</i>	Portal Talus Snail	G1G2			AZ
<i>Sonorella pedregosensis</i>	Leslie Canyon Talus Snail	G1G2			AZ
<i>Albiorix anophthalmus</i>	A Cave Obligate Pseudoscorpion	G1G2			AZ
<i>Aphrastochthonius pachysetus</i>	A Cave Obligate Pseudoscorpion	G1G2			NM
<i>Apocheiridium reddelli</i>	A Cave Obligate Pseudoscorpion	G1G2			TX
<i>Archeolarca cavicola</i>	Grand Canyon Cave Scorpion	G1G2			AZ
<i>Archeolarca guadalupensis</i>	Guadalupe Cave Pseudoscorpion	G1G2			TX
<i>Archeolarca welbourni</i>	A Cave Obligate Pseudoscorpion	G1G2			AZ

<i>Ceuthothrombium cavaticum</i>	A Cave Obligate Mite	G1G2		NM	
<i>Cheiridium reyesi</i>	A Cave Obligate Pseudoscorpion	G1G2		TX	
<i>Chitrella elliotti</i>	A Cave Obligate Pseudoscorpion	G1G2		TX	
<i>Chitrella major</i>	A Cave Obligate Pseudoscorpion	G1G2		TX	
<i>Chitrella welbourni</i>	A Cave Obligate Pseudoscorpion	G1G2		NM	
<i>Chitrellina chiricahuae</i>	A Cave Obligate Pseudoscorpion	G1G2		AZ	
<i>Cicurina bandida</i>	Bandit Cave Spider	G1G2		TX	
<i>Cicurina barri</i>	A Cave Obligate Spider	G1G2		TX	
<i>Cicurina browni</i>	A Cave Obligate Spider	G1G2		TX	

<i>Neallochernes incertus</i>	A Cave Obligate Pseudoscorpion	G1G2		NM	
<i>Neoleptoneta anopica</i>	A Cave Obligate Spider	G1G2		TX	
<i>Neoleptoneta concinna</i>	A Cave Obligate Spider	G1G2		TX	
<i>Neoleptoneta devia</i>	A Cave Obligate Spider	G1G2		TX	
<i>Neoleptoneta valverde</i>	A Cave Obligate Spider	G1G2		TX	
<i>Pseudogarypus hypogeus</i>	A Cave Obligate Pseudoscorpion	G1G2		AZ	
<i>Tartarocreagris intermedia</i>	A Cave Obligate Pseudoscorpion	G1G2		TX	
<i>Texella brevidenta</i>	A Cave Obligate Harvestman	G1G2		TX	
<i>Texella brevistyla</i>	A Cave Obligate Harvestman	G1G2		TX	

<i>Texella diplospina</i>	A Cave Obligate Harvestman	G1G2		TX	
<i>Texella fendi</i>	A Harvestman	G1G2		TX	Incomplete distribution data
<i>Texella grubbsi</i>	A Cave Obligate Harvestman	G1G2		TX	
<i>Texella hardeni</i>	A Cave Obligate Harvestman	G1G2		TX	
<i>Texella renkesae</i>	A Cave Obligate Harvestman	G1G2		TX	
<i>Texella welbourni</i>	A Cave Obligate Harvestman	G1G2		NM	
<i>Thymoites minero</i>	A Cave Obligate Spider	G1G2		AZ	
<i>Tuberochernes ubicki</i>	A Cave Obligate Pseudoscorpion	G1G2		AZ	
<i>Tyrannochthonius troglodytes</i>	A Cave Obligate Pseudoscorpion	G1G2		TX	
<i>Cyprinella lepida</i>	Plateau Shiner	G1G2		TX	

<i>Ictalurus sp. 1</i>	Chihuahua Catfish	G1G2		TX	
<i>Satan eurystomus</i>	Widemouth Blindcat	G1G2		TX	
<i>Trogloglanis pattersoni</i>	Toothless Blindcat	G1G2		TX	
<i>Aspidoscelis arizonae</i>	Arizona Striped Whiptail	G1G2		AZ	
<i>Acarospora clauzadeana</i>		G1G2		NM	Incomplete distribution data
<i>Xanthoparmelia dissensa</i>		G1G2		AZ,NM	Incomplete distribution data
<i>Xanthoparmelia planilobata</i>		G1G2		NM	Incomplete distribution data
<i>Riccia californica</i>		G1G2		CA,OR, TX	Incomplete distribution data
<i>Asclepias prostrata</i>	Prostrate Milkweed	G1G2		TX	
<i>Berberis harrisoniana</i>	Kofka Barberry	G1G2		AZ,CA	
<i>Carex mckittrickensis</i>	Guadalupe Mountain Sedge	G1G2		TX	
<i>Cryptantha ganderi</i>	Gander's Cryptantha	G1G2		AZ,CA	
<i>Cuscuta dentatasquamata</i>	Los Pinitos Dodder	G1G2		AZ	

<i>Erigeron acomanus</i>	Acoma Fleabane	G1G2		NM,NN	
<i>Hexalectris revoluta</i>	Chisos Coralroot	G1G2		AZ, TX	
<i>Lesquerella kaibabensis</i>	Kaibab Bladderpod	G1G2		AZ	
<i>Perityle cochisensis</i>	Cochise Rockdaisy	G1G2		AZ	
<i>Potentilla albiflora</i>	White-flowered Cinquefoil	G1G2		AZ	
<i>Solanum leptosepalum</i>	Tigna Potato	G1G2		TX	
<i>Valerianella nuttallii</i>	Nuttall's Corn-salad	G1G2		AR, OK	
<i>Yucca necopina</i>	Brazos River Yucca	G1G2		TX	
<i>Holospira millestriata</i>		G1G2Q		AZ	
<i>Succinea pseudavara</i>		G1G2Q		KS, OK	
<i>Cyprinella sp. 2</i>	Nueces Shiner	G1G2Q		TX	
<i>Cirsium rusbyi</i>	Rusby's Thistle	G1G2Q		AZ	
<i>Cooperia smallii</i>	Small's Rainlily	G1G2Q		TX	
<i>Lupinus lemmonii</i>	Lemmon's Lupine	G1G2Q		AZ	
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Table 3. Statistics on Endangered Species Act Status for G1 and G1G2 Species in the U.S. Southwest. Source: NatureServe.

Taxonomy	G1 & G1G2	Listed or candidate⁸³	No. Petitioned	Percent with ESA status	Percent of Petition
Invertebrates	369	35	334	9%	70%
Vertebrates	57	34	23	60%	5%
Plants	143	25	118	17%	25%
Totals	569	94	475	16.50%	/

⁸³Also included in this category is the Gunnison sage-grouse, which has already been petitioned for listing.