

APPENDIX D

IDENTIFICATION OF SPECIES OF CONSERVATION PRIORITY: DETAILED METHODS AND APPROACH

2005 Wildlife Action Plan: Terrestrial Nongame Birds, Mammals, and Reptiles

Methods

The Species of Conservation Priority identification process began in July, 2002. After initially gathering input from partner land management agency personnel at the field level, a Species Priority Matrix was developed using standard species conservation prioritization methodology (Natural Heritage Scorecard; Panjabi et al. 2001). Nevada Natural Heritage Program Species Scorecard scores were incorporated into the Species Priority Matrix. NDOW Wildlife Diversity biologists were subsequently asked to score all species of nongame birds, mammals, and reptiles using the Species Priority Matrix. The Species Priority Matrix contained the following scoring categories.

1. Endangered, Threatened, or Candidate Species

Species with Endangered, Threatened, or Candidate Species status under either federal or state law were given 1 point. Total points possible in this category was 1 – multiple points for having both federal and state status were not given because state statutes are designed to generally reflect federal status.

2. Nevada Natural Heritage Program Score – Inverted

Each species was given the inverted score of the Nevada Natural Heritage Program State Rank score; that is, NNHP scores run from 1 (highest risk) to 5 (lowest risk), so it was necessary to invert the score in order for “highest risk” to have the greatest arithmetic weight in the matrix. The conversion scale is illustrated in the following table.

| NNHP State Rank | NV Species Priority Matrix Score |
|-----------------|----------------------------------|
| 5 | 1 |
| 4 | 2 |
| 3 | 3 |
| 2 | 4 |
| 1 | 5 |

3. Threat

The biologists were asked to assign scores to each species representing their perception of the degree of threat facing the species. The degree of threat was comprehensively assessed taking into account all possible threats and their degree of severity. This comprehensive approach basically followed that of the Partners In Flight

Species Assessment Database, and the following score criteria were adapted from the PIF exercise.

1. Future conditions (habitat quantity, habitat quality, disturbance, disease, predation, parasitism, competition with exotics, human exploitation, contaminants, etc.) are expected to remain stable; no known threats
2. Future conditions are expected to experience a slight decline; sustainable with little or no remedial action taken
3. Future conditions are expected to experience a moderate decline; correctable with moderate remedial action taken
4. Future conditions are expected to experience severe deterioration; not easily correctable without significant remedial action taken.
5. Future conditions are expected to experience extreme deterioration; immediate emergency action required; species is in danger of regional extirpation or major range contraction.

After threat scores were collected from all the Wildlife Diversity biologists, a rather complicated method of vote evaluation was implemented to derive a single threat score out of seven. Any score that received a clear majority out of seven was retained. Where two scores tied for a majority, the higher score was selected. Where three consecutive scores tied for a majority (that is, a 2, 3, and 4 for instance), the middle score (in this instance, 3) was retained.

4. *Area Importance*

This column evaluates Nevada's *area responsibility* for the maintenance of the continental population of a species. A three-tier score was assigned (1 – low responsibility; 2 – moderate responsibility; 3 – high responsibility). The scoring was heavily dependent on the color status maps available on the NatureServe website (2002) and (for birds), the PIF Species Assessment database. Evaluation was subjective -- based on the percent of range Nevada represented in a species' total continental range with consideration for the relationship of degree of concern in Nevada compared to surrounding states.

5. *Current Knowledge*

Wildlife Diversity biologists face an overwhelming task of building a knowledge base and management tool kit for hundreds of species – many of which are rarely encountered, much less understood. Critical questions include, *What do we know about this species? Could we design an effective conservation strategy based on what we know now? What information is missing that would prevent us from demonstrating improvement in the management of this species?*

State nongame programs have relatively similar histories regarding program species emphasis over the past thirty years. Most states have built strong bird conservation programs – particularly raptors, wetland birds, and songbirds. Reptiles and small mammals, on the other hand, have not received the historical program emphasis except as driven by political forces – particularly species listing concerns. Program expansion as facilitated by SWG produces a natural expectation that diversity programs will direct their emphases into areas where knowledge is lacking. Scores in this column were divided into three values – 3 representing species for which

relatively little scientific knowledge was available; 2 representing a moderate level of knowledge; 1 representing species already benefiting from long-term historical study and accumulation of knowledge.

6. Opportunity

The Opportunity column evaluates the degree of opportunity the Bureau has to 1) Learn something significant about a species, and 2) implement a conservation strategy that has a discernible chance of making a significant positive difference in the management of a species. This is in effect a “cost-benefit ratio” criterion, acknowledging that not all species are equal when it comes to our ability to construct significant management strategies for them. This analysis is appropriate to this exercise because the Species of Conservation Priority process was conceived as a “program emphasis” exercise – not exclusively a “species at risk” evaluation. To recognize opportunity as an evaluative criterion is to recognize the value of the groundwork that has been laid prior to SWG and keep the Wildlife Diversity program on course to realize the products of both prior scientific program development and conservation partnership-building. Scores were divided again into three values – with 1 representing relatively low opportunity and 3 representing relatively high opportunity. Generally speaking, species with low detection rates that would require intensively focused efforts to research (like most snakes) scored 1; species with high partner interest and processes in place to pool resources and share deliverables (like land birds and water birds – with collaborative monitoring and conservation delivery efforts already underway) scored 3; species with moderate to high partner interest but certain life history elements that might require some specialized, possibly difficult effort scored 2.

Results

Score

The simple addition of the values from the six categories produced a score that could range from 5 (score 1 in five categories and 0 in T/E/C) to 20 (maximum scores in all categories). Computed scores ranged from 6 to 17 (banded Gila monster). Distribution of the scores was fairly normal (high around the mean and tailed off at either extreme), and it was determined that about 20 percent of all species scored 13 or higher. Further analysis of potential cutoff scores indicated that 13 and above would provide fairly comprehensive habitat and taxonomic group coverage, while 14 and above would have potentially left some habitat and taxonomic coverages rather thin. Many migratory bird species with irregular or insignificant presence in the state (species for which we would not likely develop management strategies) were not scored.

Initially, exactly 100 species scored 13 or above. A secondary analysis was performed on species below the cutoff threshold (13) to see if there were species for which the math of the matrix did not provide adequate or accurate representation. An additional list of 19 species were found to warrant program emphasis despite their matrix scores. Those species were elevated to the Priority List with rationale raising the species total on the Priority List to 119.

Expert review

At the computation of the draft list, NDOW circulated the matrix results to 26 agency and conservation partners for review. Responses were received back from the U.S. Fish and Wildlife Service – Region I Office, Portland, USFWS, Univ. Nevada, Reno – Department of Environmental and Resource Sciences, Nevada Natural Heritage Program, and USFS Humboldt-Toiyabe National Forest. All reviewers who responded commented on the basic

soundness of the approach. Most comments received pertained to format and style matters (addition of scientific names, consistency details in some of the non-scoring columns, etc.).

List review and adjustments

The Species of Conservation Priority list was reviewed by the Wildlife Diversity biologists' team in December, 2004. Several species omitted from the 2002 priority selection were submitted for reconsideration. Matrix scores for the species of reconsideration were revisited, new scores were generated by consensus, and adjustments were made to the Species of Conservation Priority list based on the results. The Wildlife Diversity team also expressed concern about the integration of the Nevada species prioritization process with existing species planning efforts, most notably the various bird conservation initiatives and their continental and regional conservation plans. The publication of the Partners In Flight North American Landbird Conservation Plan in February, 2004 with its new Watch List and Bird Conservation Region priority lists made a re-evaluation of the Nevada process seem particularly pertinent.

An evaluation of Bird Plan priorities was integrated into the Nevada Species Priority Matrix. Bird species were given scores based on their relative priority within their respective continental and regional bird conservation plans. The six bird conservation plans included in the analysis included:

Partners In Flight North American Bird Conservation Plan
U.S. Shorebird Conservation Plan
North American Water Bird Conservation Plan
Nevada Partners In Flight Bird Conservation Plan
Intermountain West Report to the U.S. Shorebird Conservation Plan
Intermountain West Water Bird Conservation Plan

Two columns were added to the Species Priority Matrix – Continental Bird Plan Score and Regional Bird Plan Score. Scores ranging from 1-3 were assigned each species mentioned in any plan as a priority species, with 1 representing lowest elevated priority, 2 representing medium priority, and 3 representing highest priority within a plan. The Nevada PIF Bird Conservation Plan did not rank species in priority tiers, so species in the Nevada PIF plan only received a 1 (in the plan). After all plan priority species were scored, a third column was added to the Matrix and the higher of the two Bird Plan scores was entered into it, representing the species final Bird Plan score for addition to the total score. The final ranking of bird species following this conservation plan priority analysis produced a top-to-bottom array more representative of local, regional, and continental concerns.

Stewardship species

There was still a problem with the bird species list, however. After initially deciding that all plan priority birds would be included on the Nevada Species of Conservation Priority list, it was discovered that the total list of plan priority birds expanded the bird list to 115 species – almost the sum total of the entire list including mammals and reptiles before the bird plan analysis was applied. It was decided that this was just too many bird species. But to apply an “off-the-list” cut would necessarily eliminate priority status in Nevada of many conservation plan priority species. An acceptable compromise was reached when a new threshold score was applied to the bird scores (14), and the species scoring 14 and above were retained in the Species of Priority List while the species scoring 13 and below were designated Stewardship Species, or species of priority in one of the bird conservation plans that occurred in Nevada but were not necessarily at serious conservation risk or for which Nevada's role in the species' overall conservation was not particularly critical.

Through this designation, Nevada recognized its stewardship role in the conservation of those species, and assumed that conservation actions designed to meet the needs of the Species of Conservation Priority would also meet the needs of the Stewardship Species without focusing specifically on them. That basic stewardship assumption will be tested and evaluated annually to see if it still holds for the Stewardship Bird Species list based on the latest information. Species determined to warrant new specific focus will be elevated to the Species of Conservation Priority list as necessary. Currently, there are 64 bird Species of Conservation Priority and 51 Stewardship Bird Species.

2005 Wildlife Action Plan: Game Animals

Methods

Species classified as game animals in Nevada Administrative Code were prioritized by the NDOW Game Bureau in January, 2005. A Species Ranking Matrix was developed by Game Bureau personnel using the categories below.

1. Population Status

- Population status is at carrying capacity or is over-abundant. Numbers are believed to be as high as can be expected under current circumstances.
- Population status is below carrying capacity but is not being affected by major factors.
- Population is considered below carrying capacity but is not known to be affected by any natural or human factors.
- Population is considered below carrying capacity because of known natural or human influences.
- Population is considered well below carrying capacity. Remedial action is urgent in order to ensure species retention within most or all of its range.

2. Population Trend

- Population is increasing well through natural recruitment. There is no need for human intervention.
- Population is improving due to past or current remedial actions via human intervention.
- Population is neither improving nor declining.
- Population is declining but the trend can be corrected through remedial action via human intervention.
- Population is declining rapidly and is likely to disappear over much or all of its range without profound intervention.

3. Population Distribution in Nevada

- Populations occur within all suitable habitat in Nevada.
- Populations occur within most suitable habitat in Nevada, and can occupy all suitable habitat via human intervention
- Populations do not occur within all suitable habitat but expansion is not limited by any known factors.

- Population distribution is diminishing but formerly occupied range can be repopulated via human intervention.
- Population distribution is diminishing and urgent remedial action is needed to restore the species to its former range.

4. *Population Distribution Within the Species' Range*

- The species is not endemic to Nevada.
- The species is common in Nevada and throughout its total range.
- The species is not common in Nevada but is elsewhere outside of Nevada.
- The species is not common within total occupied range and population range within Nevada is important to the overall status of the species.
- The species' existence in Nevada represents a significant portion of its total range.

5. *Habitat Status*

- Nothing can be done. Habitat has been significantly diminished through natural actions and cannot be restored. Or, the habitat has been converted for human use and cannot be restored. Or, the species is non-endemic and only exists in this habitat via human intervention.
- Habitat is ecologically sound throughout all or a majority of the species' range. Habitat is widespread. Threats to the condition of the habitat do not appear imminent.
- Habitat is not imperiled by human action but condition can vary widely as a result of natural influences.
- Habitat occupied by the species can easily support the species but can also be easily improved through human intervention.
- All or a majority of the habitat occupied by the species is in poor ecological condition throughout all or a majority of the species' range but can be improved through human intervention.

6. *Habitat Trend*

- The ecological status of the habitat is stable and total area or condition is not likely to decline.
- The ecological status of the habitat is stable but is threatened with decline due to human actions.
- The ecological status of a significant portion of the habitat is declining due to widespread calamity.
- Preventable human-influenced land actions and/or natural processes are degrading much of the habitat within the natural range of the species.
- Urgent and significant remedial action is necessary to prevent the species' disappearance within remaining habitat.

7. *Planning Rank*

- The species can continue to exist in good numbers independent of human intervention. The species is not negatively affected by human influences.
- State, federal, or local planning efforts are already established and NDOW has committed to

participate in or take the lead in restorative or improvement actions.

- The species is presently managed for recovery under the Endangered Species Act.
- No planning efforts exist for this species but other criteria suggest that planned actions are necessary to improve the species or prevent its continued decline.
- Protection of the species under the Endangered Species Act appears imminent unless state actions occur that prevent further decline.

8. *Data Needs*

- NDOW collects good data at present that contributes to confident assessments of the species' status and trend.
- NDOW collects enough data at present that contributes to fair understanding of the species' status and trend to justify NDOW's management actions.
- NDOW does not have considerable data about the species status and trend in Nevada, but the species is believed to exist in numbers such that data collection is not considered a priority at this time.
- NDOW believes that additional data for this species is mandated to justify continued management actions.
- NDOW knows nothing about this species within Nevada.

9. *Human Interest*

Each game animal score received a human interest adjustment to reflect the amount of stakeholder interest in each species as it would affect Game Bureau program priority. The adjustment was calculated as the average of five criteria rankings considering the following concepts.

Species has significant economic importance to the state.

- 0 – has no perceivable impact on local or state economy
- 5 – recreation or science-based activities contribute significantly to local or state economies

Species has significant economic importance to NDOW's budget.

- 0 – few document sales attributed to the specific pursuit of this species
- 5 – document sales for this species are among the top five income sources for NDOW.

Expressed desire to pursue this species is greater than the limitations on the opportunity to do so.

- 0 – there are no regulatory restrictions upon persons wishing to pursue this species
- 5 – application rates for available tags are among the highest in the state.

Species status is a factor in other agencies' planning processes

- 0 – impacts to this species are not considered within land use decision processes.
- 5 – the status of this species is the top priority within land use decision processes.

Results

Total species score resulted from the simple addition of the nine criteria scores and species were ranked from highest (mule deer at 28.8) to lowest score (Rocky Mountain goat – 10.2). The selection of Game Animals of Conservation Priority was made through an intuitive assessment of where on the list a clear demarcation between the species of the most population conservation concern and the next tier of species. This resulted in the addition of 10 game species for inclusion in the CWCS Species of Conservation Priority list, as listed below.

- Mule deer
- Nelson bighorn sheep
- Greater Sage-Grouse
- Mountain Quail
- American Marten (cross-ranked in the nongame species priority matrix and already included)
- Canvasback
- Redhead
- Lesser Scaup
- Blue Grouse
- Northern River Otter (also cross-ranked in the nongame SPM)
- Columbia Sharp-tailed Grouse
- California bighorn sheep

Expert review

The Game Animal Species Ranking Matrix was distributed for internal review within the Game Bureau in January, 2005. It has received no external expert review to date.

Cross-ranking of species

Because of lack of funding and the urgency of other priorities, the Game Bureau shares some common program focus with the Wildlife Diversity Bureau for a few species classified as game animals or furbearers. Over the years, the Wildlife Diversity Bureau has provided program support for Greater Sandhill Cranes, American marten, mink, northwestern otter, and other mustelids despite their game animal or furbearer classification status. Wildlife Diversity biologists have recently expressed concern for the conservation status of kit fox, ringtail, and Sierra Nevada red fox, and since these species are of very little economic importance in the Nevada fur trade, they were cross-ranked in the nongame Species Diversity Matrix. Recent stakeholder concerns over the conservation status of pygmy rabbit and the likelihood that a conservation planning process might ensue for the species prompted conservation planning responsibility to be shifted to the Wildlife Diversity Bureau and pygmy rabbit, which scored above the cut in the nongame matrix anyway, was included on the Species of Conservation Priority list. Game animals or furbearers that have been added to the Species of Conservation Priority list because of Wildlife Diversity Bureau priority are listed below.

- Greater Sandhill Crane
- Pygmy rabbit
- Ringtail
- Kit fox
- Sierra Nevada red fox

Adjustments to Species of Conservation Priority list following stakeholder input

After stakeholder input was solicited and received through March and April, 2005, several adjustments were made to the Species of Conservation Priority list based on expert recommendations. At the suggestion of herpetologists from southern Nevada, the western diamondback rattlesnake was added to the reptiles of Conservation Priority based on the expressed concern over the conservation risk of the species within its extremely limited range in Nevada. Other species added to the list after stakeholder review included

- Long-eared myotis
- Hoary bat
- Desert kangaroo rat
- Wyoming ground squirrel (*nevadensis*)
- Panamint alligator lizard

Merriam's ground squirrel was removed from the list as a result of stakeholder review and replaced by Wyoming ground squirrel (*nevadensis*).

At the suggestion of a waterfowl hunters/experts focus group, the Northern Pintail was added to the Conservation Priority list based on continued nationwide conservation concern for the species, and Cinnamon Teal was added because of Nevada's stewardship responsibility for the maintenance of the world's breeding population. At the request of this same group, the Lesser Scaup was removed from the Conservation Priority list because, despite the elevated nationwide conservation concern for the species, it was demonstrated that Nevada plays a role of very little significance in the overall conservation of the species.

2005 Wildlife Action Plan: Native Fish, Amphibians, Shellfish, Aquatic Reptiles, and Aquatic Insects

Methods

The first step in developing a list of aquatic species of greatest conservation priority was to develop a peer-reviewed list of aquatic species that occur in Nevada. Over a dozen sources of Nevada aquatic species names were used to develop a preliminary list. There was not always agreement among these sources regarding either scientific or common names. Therefore, standards were adopted for each aquatic taxon group (fish, amphibians, and shellfish) based on commonly accepted sources. The main standard for fish was the American Fisheries Society Special Publication 29 *Common and Scientific Names of Fishes from the United States, Canada, and Mexico*, sixth edition (2004) for species, and subspecies if available. If subspecies names were not available in that publication, NatureServe.org was used. NatureServe was also consulted for amphibian and mollusk common and scientific names. Don Sada, Desert Research Institute, Reno, Nevada, reviewed the gastropod list. The NW Freshwater Mussel Workgroup was utilized for bivalves. D. Christopher Rogers, invertebrate ecologist/taxonomist, EcoAnalysts, Inc., Woodland, California was consulted for crustacea. The list was then sent to known taxa experts for review and adjustment.

The process for developing the native Aquatic Species of Conservation Priority list criteria for CWCS evolved from pre-existing ranking criteria such as the Natural Heritage Scorecard methodology (Panjabi et al. 2001), Endangered Species Act listing criteria (USFWS 2005), IUCN (World Conservation Union) Red List Ranking (2004), protected status under Nevada Administrative Code and the matrix developed to rank NDOW's terrestrial/avian

nongame species. The IUCN and ESA criteria are more geared to extinction risk than envisioned for our aquatic conservation list. Those criteria are focused on one end of the conservation risk scale – those of greatest risk of extinction. Although many native Nevadan aquatics, especially the fishes, fall into this category, the intention of this process was to rank species along the entire spectrum of conservation risk, including acknowledging where inadequate data exists to determine conservation risk.

NDOW's terrestrial/avian nongame species were ranked separately from the aquatics species primarily because aquatics species' distribution characteristics are a much larger contributing factor to their conservation need. Aquatic species, by definition, are linked to aquatic systems, which in Nevada tend to be isolated habitats more sensitive to local threats and stressors. That isolation and endemism are major contributing factors to their having the highest percentage of federally-listed species/subspecies of any wildlife taxon in Nevada (90 percent of Endangered, 75 percent of Threatened, and 80 percent of Candidate species). The same suite of factors that has contributed to protected status for many aquatic species is often also present for other unlisted aquatic species, but either to a lesser degree, or there is insufficient information to evaluate them. Most of the species on the aquatics species of greatest conservation priority list are already federally listed or state protected. In addition, many of the aquatic species that did not meet these highest levels of concern are subject to similar threats and stressors, particularly those affecting aquatic habitats and must be included in conservation planning so they do not decline to the point where it is necessary to increase their conservation ranking.

The following Species Priority Matrix criteria were developed to rank Nevada's native aquatics (if too little was known to rank a species for a criterion, then "unknown" was entered).

Endemism

Is the species/subspecies endemic to Nevada or does it have a regional/broad based natural distribution? For species that also occur outside of Nevada, do NV populations represent a significant focus of species distribution for conservation purposes?

1 = broad based, continental distribution

2 = species occurs naturally outside of NV, NV populations are peripheral or do not have significant conservation importance

3 = species occurs naturally outside of NV, NV populations have an important role in species conservation.

4 = species occurs naturally outside of NV, NV populations have a critical role in species conservation.

5 = species is Endemic to NV only

Population size/distribution (for snails, only the distribution portion was used for ranking)

Species has limited/restricted distribution and/or small population size(s) naturally or because of anthropogenic or other threats/impacts

1 = species is widely distributed (>10 locations) or large population sizes at multiple locations within Nevada.

2 = species has limited distribution in NV but populations are peripheral to range and not significant to species conservation (1 or 2 in Endemism category)

3 = species has restricted distribution (<10) or small population sizes (>2000 and <5,000 adult individuals) at two or more locations (fragmented or isolated distribution naturally or because of impacts)

4 = species occurs naturally at only one known location and/or small known total population size (<2,000 individuals).

Fragmentation

1 = species distribution is characterized by connectivity between locations of occurrence or is abundant in multiple expansive habitats.

2 = species has disjunct or fragmented distribution without significant connectivity between multiple locations of occurrence.

Population Trend

Increasing, stable, decreasing or unknown, based on available information.

1 = population trend of known populations is increasing over multiple years or is stable at capacity of occupied habitats.

2 = population trend of known populations is stable or moderately increasing/decreasing within expected natural levels of fluctuation (may be affected by less than optimum habitat in some of range or reduced from historic range/distribution). Stable, but below potential level.

3 = population trend of known populations may be showing decline or decrease due to anthropogenic or natural threats or loss of habitat quality/quantity at one or more known location(s) of occurrence.

4 = population trend of known populations is declining at one or more locations validated by survey and monitoring data or other methods.

Threats

Are there known, identifiable threats to the species or significant populations of the species? What is the severity/immediateness of those threats and can they be defined? Threats include, but are not limited to, habitat quality and quantity, known potential for habitat disturbance or deterioration, disease, predation, competition (with exotic or invasive species), and contaminants.

1 = future conditions are expected to remain stable or improved, no known substantive threats.

2 = future conditions expected to experience slight decline; current conditions are sustainable with minimal remedial action.

3 = future conditions have potential for moderate decline impacting species distribution, population sizes or trend; correctable with active management to address threat conditions.

4 = future conditions expected to experience severe decline significantly impacting species distribution or individual population(s); immediate, identifiable threats exist which need to be addressed by short-term and long-term management actions.

5 = Immediate action required; known, active threats are present which would significantly impact species persistence and viability, distribution, or result in local or widespread extirpation.

NDOW Ranking process/participants

The above ranking criteria were developed by the aquatics members of the CWCS team; then species lists were sent to regional NDOW staff for species ranking. If there was insufficient knowledge to rate a criterion for a species, it was marked “unknown.” If any of the five ranking criteria was marked “unknown,” then the species’ overall conservation need was ranked, based on best available information, as “high,” “med,” or “low” need). Some taxa (bivalves and crustacea) lacked sufficient information for most criteria; in that case experts were consulted for their estimation of risk.

Each NDOW Fisheries Bureau field and supervisory biologist was given an aquatic species list to rank. Meetings were then held with each region to discuss the individual rankings and pool them into a combined ranking list.

Dr. Donald Sada, an acknowledged expert on Nevada’s freshwater gastropods and spring systems, ranked the aquatic snails based on the ranking criteria above, with the exception that, as noted, the population size criteria was not applied. Freshwater snails may have populations exceeding 2,000 individuals at a site, but still be at high risk because of their extremely limited distribution

The Aquatic Species of Conservation Priority list ranking was completed by the Fisheries Bureau biologists’ team in December, 2004. In addition to providing ranking expertise, the Fisheries Bureau team provided a synopsis of information, by species, for the CWCS eight required elements. Since many of the aquatic species are already listed or otherwise recognized as needing focused conservation management, multi-partner conservation plans already exist for most of the aquatic Species of Conservation Priority. The Fisheries Bureau team used those currently existing planning efforts to summarize the information in the CWCS eight required elements in order to integrate the Nevada species prioritization/conservation planning process with existing species planning efforts.

Results

Score

The simple addition of the values from the five categories produced a score that could range from 5 (minimum score 1 in five categories) to 20 (maximum scores in all categories). Computed scores for fish ranged from 5 (generic speckled dace) to 20 (Moapa dace and Pahranaagat roundtail chub).

The ranked list was then examined to see if there was a score that provided a natural break related to other ranking criteria such as ESA listing status, NNHP rank, state status, Forest Service, and BLM status. All species

that were ESA listed had scores above 14 and we used that for the aquatic species of greatest conservation priority (ASGCP) cutoff. There were 39 species/subspecies of fish with a rank above 14, 23 of which are ESA-listed. Of the remaining 16 species with scores above 14, 14 are endemic only to Nevada and the other 2 are highly endemic or have a significant population decline. Thirty-three fish species fell below the cutoff; of these, 13 are either state protected or on a US Forest Service or BLM sensitive species list. It is important to consider that the ranking of a species or sub-species below the level of “greatest conservation need” does not indicate or suggest an absence of need for conservation actions for that species, or a need to revise or alter protected status. This is a process intended to provide a focus to the need for application of limited resources in some priority manner, and the ranking of risk is relative to other species considered, not to the absence of risk or conservation need at all.

A secondary analysis was performed on species rankings to see if there were species for which the matrix output did not provide adequate or accurate representation. Bull trout fell below the cutoff threshold but was elevated to the list of aquatic species of greatest conservation priority because it is federally listed as Threatened.

Expert review

Fish

The majority of the proposed fish Species of Conservation Priority have already gone through extensive expert review since they are federally or state protected and plans and conservation teams address their level of need. NDOW Fisheries Bureau biologists are considered the experts, or are among the experts for these fish species. All the NDOW fisheries field biologists, supervisory biologists, appropriate staff biologists, and the bureau chief participated in development and review of the species lists. The regional biologists also discussed CWCS with conservation plan partners and gave them information about accessing the CWCS documents on the web and providing comment. In addition, external species experts were informed of open house meetings scheduled for their areas where they could provide direct input to review and discussion of rankings and criteria.

Amphibians

As above, regional and staff biologists discussed CWCS with conservation plan partners and gave them information about accessing the CWCS documents on the web and providing comment, and were invited to open houses. In addition, a meeting was held in Las Vegas to discuss mammals and herptiles at which time more detailed information was provided and input solicited.

Shellfish (Bivalves, Gastropods, Crustaceans)

The acknowledged aquatic gastropod expert in Nevada, Dr. Sada, was directly involved in creating a prioritized list of snails, and Nevada’s Natural Heritage Program (NNHP) was also consulted. Bivalve information and ranking information was provided by NNHP and the Northwest Freshwater Mussel Working Group. Since there is little documented information available on Nevada crustacea, a notice was posted on the Crustacea list serve and feedback was received, including information from D. Christopher Rogers, EcoAnalysts, Inc., an acknowledged expert for branchiopods.

Aquatic species of greatest conservation priority

As noted above, NDOW expertise in freshwater shellfish is rather limited; experts in specific taxa were consulted

to provide general ranking information where it was otherwise lacking. The California floater, a freshwater mussel, was added to the list as it has a high state ranking through the Natural Heritage process and is ranked from Vulnerable to Critically Imperiled throughout its range. It is dependent on fish during an important phase in its life history, and its fate is therefore linked with that of fish and fish habitats.

Stewardship species

As noted above, the majority of the species that fell into the aquatic species of greatest conservation priority are already federally listed. Some species with other legal protections and ongoing conservation efforts fell below the matrix cutoff, but were noted by reviewers as worthy of special attention. These species are noted as Stewardship Species. They included Bonneville and Yellowstone cutthroat trout (refer to the species list in Appendix H for additional details). Although the majority of their range lies outside Nevada, the Nevada component of the population contributes to their conservation.

2005 Wildlife Action Plan: Non-native fish ranking

The CWCS is intended to address all state wildlife. Many non-native fish are very important economically to Nevada as sport fish, and some have an impact on conservation of native species, both positively and negatively. There are some exotics (e.g., tilapia) that cause considerable negative impact to Species of Conservation Priority. Providing good river and stream riparian habitats benefits both non-native and native trout species as well as native, non-game species of conservation concern which occupy those habitats. In order to balance the beneficial aspects of some non-native species and the negative impacts of others, non-native species were ranked for their importance to sport fisheries using criteria listed below. Most non-native game fish species are actively managed for sport fisheries at some level and are generally abundant within the aquatic habitats that they occupy. Because of this, and because of their introduced status, no non-native fishes have been identified as Species of Conservation Priority.

Any of the introduced fish species can exert a negative impact on native fish species through competition, predation, etc. The Nevada Department of Wildlife, however, goes to great lengths to prevent negative interaction between native fish species and non-native fish species. Management Plans written for the majority of the state's fishable lakes and reservoirs address competition issues prior to them becoming a problem. Also, since the majority of Nevada's lakes and reservoirs are artificial, there were no native species present to start with.

Annually, as part of NDOW's F-20 grant process, the potential impacts to native fishes as a direct result of stocking new waters or stocking new species into existing waters are evaluated. This is part of the Section 7 process for grant approval. NDOW's assessments are then reviewed by the Regional Office of the US FWS with input from the Nevada Field Office of the US FWS in Reno.

Methods

Extant non-native fish were prioritized by the NDOW Fisheries Bureau in December, 2004. A Species Ranking Matrix was developed by Fisheries Bureau Sport Fish Program personnel using the following categories.

Knowledge

Is information on Nevada species' distribution/populations/habitat requirements adequate for management?

1 = Very limited or no information

2 = Some information

3 = Information adequate

Legal Status

Game or nongame species.

1 = Nongame species

2 = Game species

Introduction

1 = Not planned

2 = Planned

Management Opportunity

1 = No plans to include in any planning process

2 = Not included in any planning process at the present time, but may be in the future.

3 = To be included in the planning process within the next 5 years.

4 = Species are included within present planning process in progress reports or species management plans.

Conservation Opportunity

1 = Would prefer to eliminate fish from state.

2 = Prefer to maintain populations within state.

Socioeconomic Evaluation

Value as a game species, commercial species, indicator species and/or prey species.

0 = Significant threat to extant native fish populations

1 = Low value

2 = Medium value

3 = High value

Threats

Threats to species as defined by human caused impacts (LMB virus, whirling disease, channel catfish virus, etc.).

1 = Low threat

2 = Medium threat

3 = High threat

Results

The simple addition of the values from the seven categories produced a score that could range from 6 (minimum scores in all categories) to 19 (maximum scores in all categories). Computed scores for fish ranged from 6 (tilapia, goldfish, mollies, etc.) to 18 (channel catfish, largemouth bass, rainbow trout). The list also indicates which species are considered undesirable in all or parts of Nevada because of their impacts on native fishes or desirable sport fishes.

Adjustments to Species of Conservation Priority list following stakeholder input

After stakeholder input was solicited and received through May, 2005, a few adjustments were made to the Aquatic Species of Conservation Priority/Stewardship lists based on expert recommendations. At the suggestion of herpetologists the Mountain Yellow-legged frog was added to the list. This species was not on the original list because it was believed to be extirpated from Nevada. However, after feedback and discussion with experts and stakeholders, it was decided to include it on the list in the event that any are found in Nevada in the future.

Based on discussions with Nevada Natural Heritage Program staff, the California floater was also added to the list. It is ranked by NNHP as Critically Imperiled in Nevada and is rated from Vulnerable to Critically Imperiled throughout its range.

Species that were mentioned fairly frequently during the stakeholder/partner process were eastern Nevada trout species, particularly Bonneville and Yellowstone cutthroat trout. They did not rank high during the matrix analysis because ongoing conservation plans and actions have succeeded in reducing risk. However, these actions need to continue in order to maintain the progress made in their conservation, and they should be considered in land management and other conservation actions.

Expert review of aquatic species of conservation priority

Fish

The majority of the proposed fish species of conservation priority have already gone through extensive peer review since they are federally or State protected and plans and conservation teams address their level of need.

NDOW Fisheries Bureau biologists are considered the experts, or are among the experts for these fish species. All the NDOW fisheries field biologists, supervisory biologists, appropriate staff biologists, and the bureau chief participated in development and review of the species lists. The regional biologists also discussed.

CWCS with conservation plan partners and gave them information about accessing the CWCS documents on the web and providing comment. In addition, external species experts were informed of open house meetings scheduled for their areas where they could provide direct input to review and discussion of rankings and criteria.

Amphibians

As above, regional and staff biologists discussed CWCS with conservation plan partners and gave them information about accessing the CWCS documents on the web and providing comment, and were invited to open houses. In addition, a meeting was held in Las Vegas to discuss mammals and herptiles, at which time more detailed information was provided and input solicited.

Shellfish

The acknowledged aquatic gastropod expert in Nevada, Dr. Sada, was directly involved in creating a prioritized list of snails, and Nevada's Natural Heritage Program (NNHP) was also consulted. Bivalve information and ranking information was provided by NNHP and the Northwest Freshwater Mussel Working Group. Since there is little documented information available on Nevada crustacea, a notice was posted on the Crustacea listserve and feedback was received, including information from D. Christopher Rogers, EcoAnalysts, Inc., an acknowledged expert for branchiopods.

Table 1. Results of applying the Climate Change Vulnerability Index (CCVI) to Nevada’s Species of Conservation Priority (see next page).



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|----------------|-----------------------------------|----------------------------------|-------|-------|------------------------------------|-----|----|----|------|-------|------|--------|-----|-----|----|-----|-----|------|-----|-----|----|-------|-------|-----|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | | | D1 |
| Invert-Mollusk | <i>Anodonta californiensis</i> | California floater | G3Q | S1 | N | N | N | SI | N-SD | N | Inc | GI-Inc | N | N | SD | N | N | SI-N | U | U | U | U | MV | Mod |
| Invert-Mollusk | <i>Eremopyrgus eganensis</i> | Steptoe hydrobe | G1 | S1 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Fluminicola dalli</i> | Pyramid Lake pebblesnail | G1 | SNR | GI | N | N | SI | N | N | Inc | Inc | N | N | N | N | N | U | U | U | U | HV | VH | |
| Invert-Mollusk | <i>Fluminicola turbiniformis</i> | turban pebblesnail | G3 | SNR | GI | N | N | SI | N | N | SI | Inc | N | N | N | N | N | U | U | U | U | HV | VH | |
| Invert-Mollusk | <i>Fluminicola virginius</i> | Virginia Mountains pebblesnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | HV | VH | |
| Invert-Mollusk | <i>Juga interioris</i> | smooth juga | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis aloba</i> | Duckwater springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis anatina</i> | southern Duckwater springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis anguina</i> | longitudinal gland springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis augustae</i> | elongate Cain Spring springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis aurata</i> | Pleasant Valley springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis avernalis</i> | Moapa pebblesnail | G1G2 | S1S2 | GI | N | N | SI | SD | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis basiglans</i> | large gland Carico springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis bifurcata</i> | small gland Carico springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis breviloba</i> | Flag springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis bruesi</i> | Fly Ranch springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | U | U | U | U | HV | Low | |
| Invert-Mollusk | <i>Pyrgulopsis carinifera</i> | Moapa Valley springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis coloradensis</i> | Blue Point springsnail | GH | SH | GI | N | N | SI | N | N | GI | GI-Inc | N | N | N | N | N | U | U | U | U | MV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis cruciglans</i> | transverse gland springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | U | U | U | U | EV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis crystalis</i> | Crystal Spring springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis deaconi</i> | Spring Mountains springsnail | G1 | S1 | GI | N | N | SI | N | N | SI | Inc | N | N | N | N | N | U | U | U | U | HV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis dixensis</i> | Dixie Valley springsnail | G1 | S1 | GI | N | N | SI | SD | N | GI | Inc-SI | N | N | N | N | N | U | U | U | U | MV | VH | |
| Invert-Mollusk | <i>Pyrgulopsis erythropoma</i> | Ash Meadows pebblesnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis fairbanksensis</i> | Fairbanks springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |
| Invert-Mollusk | <i>Pyrgulopsis fausta</i> | Corn Creek springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | U | U | U | U | PS | VH | |



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|----------------|----------------------------------|---------------------------------------|-------|-------|------------------------------------|-----|----|----|------|-------|------|--------|-----|-----|----|-----|-----|-----|-----|-----|----|----|-------|-------|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | | |
| Invert-Mollusk | <i>Pyrgulopsis gracilis</i> | Emigrant springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis hovinghi</i> | Upper Thousand Spring springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis hubbsi</i> | Hubbs springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis humboldtensis</i> | Humboldt springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis imperialis</i> | Kings River springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis isolata</i> | elongate-gland springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis landyei</i> | Landyes springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis lata</i> | Butterfield springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis leporina</i> | Elko pyrg | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis limaria</i> | squat Mud Meadows springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Invert-Mollusk | <i>Pyrgulopsis lockensis</i> | Lockes springsnail | G1 | S1 | GI | N | N | SI | SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis marcida</i> | Hardy springsnail | G1 | S1 | GI | N | N | SI | SD | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis merriami</i> | Pahranagat pebblesnail | G1 | S1 | GI | N | N | SI | SD | N | Inc | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis micrococcus</i> | Oasis Valley springsnail | G3 | S2 | GI | N | N | SI | N | N | GI | SI | N | N | N | N | N | N | U | U | U | U | MV | VH |
| Invert-Mollusk | <i>Pyrgulopsis militaris</i> | northern Soldier Meadow pyrg | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Invert-Mollusk | <i>Pyrgulopsis millenaria</i> | Twentyone Mile springsnail | G1 | S1 | GI | N | N | SI | SD | N | GI | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis montana</i> | Camp Valley springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis nanus</i> | distal-gland springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis neritella</i> | neritiform Steptoe Ranch springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis notidicola</i> | elongate Mud Meadows springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Invert-Mollusk | <i>Pyrgulopsis orbiculata</i> | sub-globose Steptoe Ranch springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis papillata</i> | Big Warm Spring springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis peculiaris</i> | bifid duct springsnail | G2 | S1 | GI | N | N | SI | N | N | Inc | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis pellita</i> | Antelope Valley springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis pictilis</i> | ovate Cain Spring springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |



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|----------------|--------------------------------------|-------------------------------------|-----------|-------|------------------------------------|-----|----|--------|------|-------|--------|--------|------|-----|----|-----|-----|-----|-----|-----|----|----|-------|-------|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | | |
| Invert-Mollusk | <i>Pyrgulopsis pisteri</i> | median-gland springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis planulata</i> | flat-topped Steptoe springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis sadai</i> | Sada's springsnail | G1G2 | S1S2 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis sathos</i> | White River Valley springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis serrata</i> | northern Steptoe springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis sterilis</i> | sterile basin springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis sublata</i> | Lake Valley springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | GI | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis sulcata</i> | southern Steptoe springsnail | G1 | S1 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis turbatrix</i> | southeast Nevada springsnail | G2 | S2 | GI | N | N | SI | N | N | Inc | SI | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Invert-Mollusk | <i>Pyrgulopsis umbilicata</i> | southern Soldier Meadow springsnail | G1Q | S1 | GI | N | N | SI | N | N | GI | Inc-SI | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Invert-Mollusk | <i>Pyrgulopsis variegata</i> | northwest Bonneville springsnail | G2 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis villacampae</i> | Duckwater warm springs springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Pyrgulopsis vinyardi</i> | Vinyard's springsnail | G1 | S1 | GI | N | N | SI | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | EV | VH |
| Invert-Mollusk | <i>Pyrgulopsis wongi</i> | Wong's pyrg | G2 | S1 | GI | N | N | SI | SD | N | Inc | SI | N | N | N | N | N | N | U | U | U | U | MV | VH |
| Invert-Mollusk | <i>Tryonia angulata</i> | sportinggoods tryonia | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Tryonia clathrata</i> | grated tryonia | G2 | S2 | GI | N | N | SI | N-SD | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Tryonia elata</i> | Point of Rocks tryonia | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Tryonia ericae</i> | minute tryonia | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Tryonia monitorae</i> | Monitor tryonia | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Invert-Mollusk | <i>Tryonia variegata</i> | Amargosa tryonia | G2 | S2 | GI | N | N | SI | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Catostomus clarki intermedius</i> | White River desert sucker | G3G4T1T2Q | S1S2 | GI | N | N | N | SD | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Catostomus clarkii ssp. 2</i> | Meadow Valley Wash desert sucker | G3G4T2 | S2 | GI | U | N | SD-Dec | N | N | Inc-SI | SI | SI-N | N | SD | N | N | N | U | U | U | U | PS | Low |
| Fish | <i>Catostomus latipinnis</i> | flannelmouth sucker | G3G4 | S1 | N | SI | N | Dec | SD | N | GI | N | SI | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Catostomus sp. 1</i> | Wall Canyon sucker | G1 | S1 | N | N | N | SD | N | N | GI | GI-Inc | N | N | N | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Chasmistes cujus</i> | cui-ui | G1 | S1 | GI | SI | N | SD | SD | N | Inc | GI-N | N | N | N | N | N | N | U | U | U | U | MV | VH |



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|-------|---|----------------------------------|--------|-------|------------------------------------|-----|----|--------|------|-------|--------|--------|------|-----|----|-----|-----|-----|-----|-----|----|----|-------|-------|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | | |
| Fish | <i>Crenichthys baileyi albivallis</i> | Preston White River springfish | G2T1 | S1 | GI | N | N | N-SD | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Crenichthys baileyi baileyi</i> | White River springfish | G2T1 | S1 | GI | N | N | N | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Crenichthys baileyi grandis</i> | Hiko White River springfish | G2T1 | S1 | GI | N | N | N-SD | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Crenichthys baileyi moapa</i> | Moapa White River springfish | G2T2 | S2 | Inc | SI | N | SD | SD | SD | GI | SI | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Crenichthys baileyi thermophilus</i> | Moorman White River springfish | G2T1 | S1 | GI | N | N | SD | SD | SD | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Crenichthys nevadae</i> | Railroad Valley springfish | G2 | S2 | GI | N | N | SD | SD | SD | Inc | N | SI-N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Cyprinodon diabolis</i> | Devils Hole pupfish | G1 | S1 | GI | N | N | N | N | N | GI | N | N | N | N | N | N | N | U | Inc | U | U | PS | VH |
| Fish | <i>Cyprinodon nevadensis mionectes</i> | Ash Meadows Amargosa pupfish | G2T2 | S2 | GI | N | N | SD | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Cyprinodon nevadensis pectoralis</i> | Warm Springs pupfish | G2T1 | S1 | GI | N | N | SD | N | N | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Empetrichthys latos</i> | Pahrump poolfish | G1T1 | S1 | GI | N | N | SD | SD | N | Inc | GI-N | N | N | N | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Eremichthys acros</i> | desert dace | G1 | S1 | GI | SI | N | SD | N | SD | GI | Inc | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Gila alvordensis</i> | Alvord chub | G2 | S2 | GI | U | N | SD | N | N | GI-Inc | Inc-SI | SI-N | N | SD | N | N | N | U | U | U | U | HV | Low |
| Fish | <i>Gila bicolor eury soma</i> | Sheldon tui chub | G4T1 | S1 | GI | U | N | SD-Dec | N | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Gila bicolor isolata</i> | Independence Valley tui chub | G4T1Q | S1 | N | N | N | SD | N-SD | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | PS | Low |
| Fish | <i>Gila bicolor ssp. 4</i> | Fish Lake Valley tui chub | G4T1Q | S1 | N | N | N | SD | SD | N | GI | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Gila bicolor ssp. 6</i> | Little Fish Lake Valley tui chub | G4T1 | S1 | GI | U | N | SD-Dec | N | N | GI | Inc-SI | SI-N | N | SD | N | N | N | U | U | U | U | HV | Mod |
| Fish | <i>Gila bicolor ssp. 7</i> | Railroad Valley tui chub | G4T1Q | S1 | GI | N | N | SD | SD | N | Inc | GI | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Gila bicolor ssp. 8</i> | Big Smoky Valley tui chub | G4 | T1 | GI | N | N | SD | N-SD | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Gila bicolor ssp. 9</i> | Dixie Valley tui chub | G4T1Q | S1 | GI | U | N | SD-Dec | SD | N | GI-Inc | Inc-SI | N | N | SD | N | N | N | U | U | U | U | PS | High |
| Fish | <i>Gila elegans</i> | bonytail | G1 | S1 | N | SI | N | Dec | N | N-SD | GI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Gila robusta jordani</i> | Pahranagat roundtail chub | G3T1 | S1 | Inc | Inc | N | SD | N | Inc | GI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Gila seminuda</i> | Virgin River chub | G1 | S1 | SI | SI | U | SD | SD | N | GI | SI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Lepidomeda albivallis</i> | White River spinedace | G1 | S1 | GI | N | N | SD | SD | N | GI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Lepidomeda mollispinis mollispinis</i> | Virgin River spinedace | G1G2T1 | S1 | N | N | N | SD | SD | N | Inc | SI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Lepidomeda mollispinis pratensis</i> | Big Spring spinedace | G1G2T1 | S1 | GI | N | N | SD | SD | N | GI | SI | SI | N | SD | N | N | N | U | U | U | U | MV | VH |



**NatureServe Climate Change
Vulnerability Index (CCVI), Release 2.01**

**Assessment Results for the
Nevada Species of Conservation Priority (SOCP)**
Abridged version, March 21, 2012

| Group | Species | English Name | GRank | SRank | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | Index | Conf. |
|-----------|---------------------------------------|-----------------------------------|---------|-------|-----|-----|----|-----|------|-------|--------|-------|------|-----|----|-----|-----|-----|-----|-----|----|----|-------|-------|
| Fish | <i>Moapa coriacea</i> | Moapa dace | G1 | S1 | GI | N | N | SD | SD | SD | GI | N | U | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Oncorhynchus clarki henshawi</i> | Lahontan cutthroat trout | G4T3 | S3 | SI | SI | N | Dec | SD | Inc | N | Inc | SI | N | SD | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Oncorhynchus clarkii bouvieri</i> | Yellowstone cutthroat trout | G4T2 | S1 | GI | U | N | SD | N-SD | N | SI | GI | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Oncorhynchus mykiss pop. 4</i> | Warner Valley Redband Trout | G5T2Q | S2 | GI | U | N | SD | N | N | GI | Inc | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Plagopterus argentissimus</i> | woundfin | G1 | S1 | SI | Inc | N | SD | SD | N | GI | SI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Prosopium williamsoni</i> | mountain whitefish | G5 | S3 | GI | U | N | SD | N | SI-N | SI-N | Inc | N | N | SD | N | N | N | U | U | U | U | MV | Mod |
| Fish | <i>Relictus solitarius</i> | relict dace | G2G3 | S2S3 | GI | N | N | N | N-SD | N | Inc-SI | SI | N | N | SD | N | N | N | U | U | U | U | MV | Mod |
| Fish | <i>Rhinichthys osculus lariversi</i> | Big Smoky Valley speckled dace | G5T1 | S1 | GI | N | N | SD | N | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Rhinichthys osculus lethoporus</i> | Independence Valley speckled dace | G5T1 | S1 | GI | N | N | SD | N-SD | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Rhinichthys osculus moapae</i> | Moapa speckled dace | G5T1 | S1 | GI | N | N | SD | SD | N | GI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Rhinichthys osculus nevadensis</i> | Ash Meadows speckled dace | G5T1 | S1 | GI | N | N | SD | N | N | GI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Rhinichthys osculus oligoporus</i> | Clover Valley speckled dace | G5T1 | S1 | GI | N | N | SD | N-SD | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Rhinichthys osculus ssp. 10</i> | Diamond Valley speckled dace | G5TH | SH | GI | N | N | SD | N-SD | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Rhinichthys osculus ssp. 11</i> | Meadow Valley speckled dace | G5T2 | S2 | GI | U | N | SD | N-SD | N | SI | SI | SI-N | N | SD | N | N | N | U | U | U | U | PS | Mod |
| Fish | <i>Rhinichthys osculus ssp. 5</i> | Monitor Valley speckled dace | G5T1 | S1 | GI | N | N | SD | N | N | GI | GI | N | N | SD | N | N | N | U | U | U | U | HV | VH |
| Fish | <i>Rhinichthys osculus ssp. 6</i> | Oasis Valley speckled dace | G5T1 | S1 | Inc | N | N | SD | N | N | GI | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Rhinichthys osculus ssp. 7</i> | White River speckled dace | G5T2T3Q | S2S3 | Inc | N | N | SD | SD | N | GI | Inc | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Fish | <i>Rhinichthys osculus velifer</i> | Pahranagat speckled dace | G5T1Q | S1 | GI | N | N | SD | N | N | GI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Fish | <i>Salvelinus confluentus pop. 4</i> | bull trout | G3T2Q | S1 | Inc | N | N | SD | N-SD | GI | N | GI | SI | N | SD | N | N | N | U | U | U | U | HV | Low |
| Fish | <i>Xyrauchen texanus</i> | razorback sucker | G1 | S1 | N | SI | N | Dec | N | N-SD | GI | N | N | N | N | N | N | N | SD | N/A | U | U | IL | Low |
| Amphibian | <i>Anaxyrus boreas</i> | western toad | G4T4 | S3S4 | N | N | N | SD | N-SD | N | N | Inc | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Anaxyrus cognatus</i> | Great Plains toad | G5 | S2 | N | SI | U | N | SD | N | Inc | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Anaxyrus microscaphus</i> | Arizona toad | G3G4 | S2 | N | SI | N | N | SD | N | Inc | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Anaxyrus nelsoni</i> | Amargosa toad | G2 | S2 | N | N | N | N | N | N | GI | Inc | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Lithobates onca</i> | relict leopard frog | G1 | S1 | GI | N | N | SI | N | N | GI | N | N | N | SD | N | N | N | SI | N/A | U | U | MV | VH |



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| Group | Species | English Name | GRank | SRank | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | Index | Conf. |
|-----------|--------------------------------------|--|---------|-------|------|------|-----|------|------|-------|--------|-------|------|-----|------|-----|-----|-----|-----|-----|----|----|-------|-------|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Amphibian | <i>Lithobates pipiens</i> | northern leopard frog | G5 | S2S3 | SI | SI | N | SD | SD | N | Inc-SI | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Rana luteiventris</i> | Columbia spotted frog (Toiyabe sub-population) | G4T2T3Q | S2S3 | N | Inc | N | N | N-SD | N | N | GI | SI | SI | SD | N | N | N | U | U | U | U | HV | Low |
| Amphibian | <i>Rana luteiventris</i> | Columbia spotted frog (NE sub-population) | G4T2T3Q | S2S3 | Inc | SI | N | N | N-SD | N | N | GI | Inc | N | SD | N | N | N | U | U | U | U | HV | Low |
| Amphibian | <i>Rana sierrae</i> | Sierra Nevada mountain yellow-legged frog | G1G2 | SH | N | N | N | N | N | N | SI | GI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Amphibian | <i>Spea intermontana</i> | Great Basin spadefoot | G5 | S4 | N | SI-N | Inc | SD | N-SD | N | SI | SI | SI | N | SD | N | N | N | U | U | U | U | MV | Mod |
| Reptile | <i>Actinemys marmorata marmorata</i> | northwestern pond turtle | G3G4 | S3 | N | N | N | SD | SD | N | Inc | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Charina bottae</i> | northern rubber boa | G5 | S3S4 | SI-N | SI-N | N | N-SD | N-SD | N | N | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Chionactis occipitalis</i> | Mohave (or Mojave) shovel-nosed snake | G5 | S4 | SI | SI | Inc | N-SD | SD | N | GI-Inc | N | N | N | SI | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Coleonyx variegatus</i> | western banded gecko | G5 | S4 | SI | SI | Inc | N | SD | N | Inc | N | SI | N | SD | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Crotalus cerastes</i> | sidewinder | G5 | S4 | SI | SI | Inc | N-SD | SD | N | Inc-SI | N | N | N | SI | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Crotaphytus bicinctores</i> | Great Basin collared lizard | G5 | S4 | N | N | Inc | N | SD | N | SI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Diadophis punctatus</i> | ring-necked snake | G5 | S3 | SI | SI | Inc | N | N-SD | N | Inc-SI | N | N | N | SD | N | N | N | U | U | U | U | MV | Mod |
| Reptile | <i>Dipsosaurus dorsalis</i> | desert iguana | G5 | S3 | SI | SI | Inc | N | SD | N | Inc-SI | N | SI | N | SI-N | N | N | N | U | U | U | U | MV | Mod |
| Reptile | <i>Elgaria coerulea palmeri</i> | Sierra alligator lizard | G5T4 | S2S3 | N | N | N | N | N | SI | N | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Elgaria coerulea shastensis</i> | Shasta alligator lizard | GT4 | SNR | N | N | N | N | N | GI | GI-Inc | N | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Elgaria panamintina</i> | Panamint alligator lizard | G2G3 | SNR | N | N | N | N | N | SI | GI-Inc | N | SI-N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Gambelia wislizenii</i> | long-nosed leopard lizard | G5 | S4 | N | N | Inc | N | N | N | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Gopherus agassizii</i> | desert tortoise | G4 | S2 | SI | SI | Inc | SD | SD | N | Inc | N | SI | N | N | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Heloderma suspectum</i> | Gila monster | G4 | S2 | SI | SI | Inc | N | SD | N | Inc-SI | N | SI-N | N | SD | N | N | N | Inc | N/A | U | U | HV | Mod |
| Reptile | <i>Lampropeltis pyromelana</i> | Sonoran mountain kingsnake | G4G5 | S2 | Inc | N | N | N | N | SI | Inc | N | SI | N | SD | N | N | N | U | U | U | U | HV | VH |
| Reptile | <i>Lichanura trivirgata</i> | Mexican rosy boa | G4G5 | SNR | SI | SI | Inc | N-SD | N | SI-N | GI-Inc | N | N | N | SD | N | N | N | U | U | U | U | PS | Mod |
| Reptile | <i>Phrynosoma douglasii</i> | pygmy short-horned lizard | G5 | SNR | N | N | SI | N | N | N | SI-N | N | SI | N | N | N | N | SI | N | U | U | U | MV | Low |
| Reptile | <i>Phrynosoma hernandesi</i> | greater short-horned lizard | G5 | S3 | N | N | SI | N | N-SD | N | N | N | N | N | N | N | SI | N | U | U | U | U | PS | VH |
| Reptile | <i>Phrynosoma platyrhinos</i> | desert horned lizard | G5 | S4 | N | N | Inc | N | SD | N | SI-N | N | N | N | N | N | SI | N | U | U | U | U | PS | Low |
| Reptile | <i>Phyllorhynchus decurtatus</i> | spotted leaf-nosed snake | G5 | S4 | N | SI | Inc | N-SD | SD | N | GI-Inc | N | SI | N | SD | N | N | N | U | U | U | U | PS | Mod |



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| Group | Species | English Name | GRank | SRank | Vulnerability Index (CCVI) Factors | | | | | | | | | | | | | | | | | Index | Conf. | |
|---------|--|------------------------------|-------|-------|------------------------------------|-----|-----|------|------|-------|--------|-------|------|-----|------|--------|------|-----|-----|-----|----|-------|-------|-----|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | | | D1 |
| Reptile | <i>Plestiodon gilberti rubricaudatus</i> | western red-tailed skink | G5 | S2 | Inc | N | N | N | N | SI | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Rena humilis</i> | western threadsnake | G5 | S4 | SI | SI | Inc | SI-N | SD | N | Inc | N | SI | N | N | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Sauromalus obesus</i> | chuckwalla | G5 | S3 | SI | SI | Inc | N | SD | N | Inc | N | SI | N | SD | N | N | N | U | U | U | U | MV | VH |
| Reptile | <i>Tantilla hobartsmithi</i> | Smith's black-headed snake | G5 | S4 | SI | N | Inc | N-SD | SD | N | GI-Inc | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Reptile | <i>Urosaurus graciosus</i> | western brush lizard | G5 | S4 | SI | SI | Inc | N | N | N | Inc | N | SI | N | N | N | N | N | U | U | U | U | HV | VH |
| Reptile | <i>Xantusia vigilis</i> | desert night lizard | G5 | S4 | SI | SI | Inc | N | SD | N | Inc | N | SI | N | SD | SI | N | N | U | U | U | U | MV | VH |
| Bird | <i>Accipiter gentilis</i> | northern goshawk | G5 | S2 | N | N | Inc | Dec | N | N | SD | SI | Inc | N | N | SI | N | N | U | U | U | U | MV | VH |
| Bird | <i>Agelaius tricolor</i> | tricolored blackbird | G2G3 | S1B | N | N | N | Dec | SI-N | N | GI | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Amphispiza belli</i> | sage sparrow | G5 | S4B | N | N | Inc | Dec | N-SD | N | SI | N | Inc | N | SD | GI-Inc | N | N | U | U | U | U | MV | Mod |
| Bird | <i>Anas acuta</i> | northern pintail | G5 | S5 | N | N | Inc | Dec | SD | N | N | GI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Aquila chrysaetos</i> | golden eagle | G5 | S4 | N | N | Inc | Dec | SD | N | SI-N | N | N | N | SI | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Asio flammeus</i> | short-eared owl | G5 | S4 | N | N | Inc | Dec | SD | N | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Athene cunicularia hypugaea</i> | western burrowing owl | G4 | S3B | N | N | Inc | Dec | N-SD | N | SI | N | N | N | N | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Aythya americana</i> | redhead | G5 | S4 | N | N | Inc | Dec | N | N | SI-N | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Aythya valisineria</i> | canvasback | G5 | S3 | N | N | Inc | Dec | N | N | SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Botaurus lentiginosus</i> | American bittern | G4 | S3B | N | N | Inc | Dec | N | N | SI | Inc | SI-N | N | SD | N | N | N | U | U | U | U | MV | Low |
| Bird | <i>Buteo regalis</i> | ferruginous hawk | G4 | S2 | N | N | Inc | Dec | N | N | SI-N | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Calidris mauri</i> | western sandpiper | G5 | S5M | N | N | Inc | Dec | SI-N | N | Inc-SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | Low |
| Bird | <i>Carpodacus cassinii</i> | Cassin's finch | G5 | S5 | N | N | SI | Dec | N | N | N | N | Inc | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Centrocercus urophasianus</i> | greater sage-grouse | G4 | S3S4 | N | N | Inc | SD | SD | SI | SI | N | Inc | N | SD | GI-Inc | SI | N | U | U | U | U | HV | Low |
| Bird | <i>Charadrius alexandrinus nivosus</i> | western snowy plover | G4T3 | S3B | N | N | Inc | Dec | N | N | Inc-SI | Inc | SI | N | SI-N | N | SI-N | N | U | U | U | U | MV | Mod |
| Bird | <i>Chlidonias niger</i> | black tern | G4 | S2S3B | N | N | Inc | Dec | N | N | Inc-SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Chordeiles minor</i> | common nighthawk | G5 | S5B | N | N | Inc | Dec | SI | N | SI-N | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Coccyzus americanus occidentalis</i> | western yellow-billed cuckoo | G5T3Q | S1B | N | N | Inc | Dec | SI-N | SI-N | GI-Inc | SI-N | N | N | SD | SI-N | SI | N | U | U | U | U | MV | Low |
| Bird | <i>Colaptes chrysoides</i> | gilded flicker | G5 | S1 | N | N | Inc | Dec | N | N | Inc | N | N | N | SD | GI-Inc | N | N | U | U | U | U | PS | VH |



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Nevada Species of Conservation Priority (SOCP)**
Abridged version, March 21, 2012

| Group | Species | English Name | GRank | SRank | Vulnerability Index (CCVI) Factors | | | | | | | | | | | | | | | | | | Index | Conf. |
|-------|-------------------------------------|---------------------------------|--------|--------|------------------------------------|-----|-----|--------|--------|-------|--------|-------|--------|-----|----|--------|-----|-----|-----|-----|----|----|-------|-------|
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | | |
| Bird | <i>Contopus cooperi</i> | olive-sided flycatcher | G4 | S2B | N | N | Inc | Dec | N | N | N | N | SD | N | SD | N | N | N | U | U | U | U | IL | VH |
| Bird | <i>Dendragapus fuliginosus</i> | sooty grouse | G5 | SNR | Inc-SI | N | N | SD-Dec | N | N | N-SD | N | Inc-SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Dendragapus obscurus</i> | dusky grouse | G5 | S3 | N | N | Inc | SD-Dec | N-SD | N | N-SD | N | Inc-SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Dolichonyx oryzivorus</i> | bobolink | G5 | S3B | N | N | Inc | Dec | SI-N | N | GI-Inc | N | N | N | SD | N | N | N | U | U | U | U | PS | Mod |
| Bird | <i>Empidonax traillii adastus</i> | (Great Basin) willow flycatcher | G5T5 | S1S2 | N | N | Inc | Dec | N | N | SI | Inc | N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Empidonax traillii brewsteri</i> | mountain willow flycatcher | G5T3T4 | S2B | N | N | Inc | Dec | SI-N | N | N | SI | SI-N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Empidonax traillii extimus</i> | southwestern willow flycatcher | G5T1T2 | S1B | N | N | Inc | Dec | N | SI | Inc | SI | N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Falco mexicanus</i> | prairie falcon | G5 | S4 | N | N | Inc | Dec | SD | N | SI-N | N | N | N | SI | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Falco peregrinus</i> | peregrine falcon | G4 | S2 | N | N | Inc | Dec | N-SD | N | SI | SI | N | N | SI | N | N | N | U | U | U | U | PS | Low |
| Bird | <i>Gavia immer</i> | common loon | G5 | S2N | N | N | Inc | Dec | N | N | SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Grus canadensis tabida</i> | greater sandhill crane | G5T4 | S2BS3M | N | N | Inc | Dec | N | N | SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Gymnorhinus cyanocephalus</i> | pinyon jay | G5 | S3S4 | N | N | N | Dec | N-SD | N | Inc | N | SI | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Haliaeetus leucocephalus</i> | bald eagle | G5 | S1BS3N | N | N | Inc | Dec | N | N | N-SD | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Icterus parisorum</i> | Scott's oriole | G5 | S4B | N | N | Inc | Dec | N-SD | N | Inc-SI | N | N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Ixbrychus exilis hesperis</i> | western least bittern | G5 | S2 | N | N | Inc | Dec | SI-N | N | GI | SI | SI-N | N | SD | SI | N | N | U | U | U | U | PS | Mod |
| Bird | <i>Lanius ludovicianus</i> | loggerhead shrike | G4 | S4 | N | N | SI | Dec | SD | N | SI | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Leucosticte atrata</i> | black rosy-finch | G4 | S3 | N | N | Inc | Dec | SI | GI | N | N | N | SI | SI | N | N | N | U | U | U | U | HV | VH |
| Bird | <i>Leucosticte tephrocotis</i> | gray-crowned rosy-finch | G5 | S3N | N | N | Inc | Dec | Inc-SI | Inc | N | N | N | SI | SI | N | N | N | U | U | U | U | HV | VH |
| Bird | <i>Limnodromus scolopaceus</i> | long-billed dowitcher | G5 | S4N | N | N | Inc | Dec | N | N | Inc-SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Melanerpes lewis</i> | Lewis's woodpecker | G4 | S3 | N | N | Inc | Dec | N | N | SI | SI | SD | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Numenius americanus</i> | long-billed curlew | G5 | S2S3B | N | N | Inc | Dec | N | N | SI | Inc | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Oreortyx pictus</i> | mountain quail | G5 | S3 | N | N | N | Dec | N | N | SI | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Oreoscoptes montanus</i> | sage thrasher | G5 | S5B | N | N | Inc | Dec | SD | N | Inc-SI | N | Inc | N | SD | GI-Inc | N | N | U | U | U | U | MV | Mod |
| Bird | <i>Otus flammeolus</i> | flamulated owl | G4 | S4B | N | N | Inc | Dec | SI | N | SI-N | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Pelecanus erythrorhynchos</i> | American white pelican | G4 | S2B | N | N | Inc | Dec | N | N | Inc | SI | N | N | SI | N | SI | N | U | U | U | U | MV | VH |



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| Group | Species | English Name | GRank | SRank | Natl barriers | Anth barriers | CC mitigation | Dispersal/Movement | historical thermal niche | physiological thermal niche | historical hydrological niche | physiological hydrological niche | Disturbance | Ice/snow | Phys habitat | Other spp for hab | Diet | Other spp disp | Genetic var | Gen bottleneck | Phenol response | Doc response | Index | Conf. |
|--------|---|-------------------------------|--------|----------|---------------|---------------|---------------|--------------------|--------------------------|-----------------------------|-------------------------------|----------------------------------|-------------|----------|--------------|-------------------|------|----------------|-------------|----------------|-----------------|--------------|-------|-------|
| Bird | <i>Phalaropus lobatus</i> | red-necked phalarope | G4G5 | S4M | N | N | Inc | Dec | N | N | Inc | SI | N | N | SI | N | N | N | U | U | U | U | MV | VH |
| Bird | <i>Phalaropus tricolor</i> | Wilson's phalarope | G5 | S2S3BS4M | N | N | Inc | Dec | SI | N | Inc | Inc | N | N | SD | N | N | N | U | U | U | U | MV | VH |
| Bird | <i>Picoides albolarvatus</i> | white-headed woodpecker | G4 | S2 | N | N | N | Dec | N | N | N | N | Inc-SI | N | SD | N | N | N | U | U | U | U | PS | Low |
| Bird | <i>Plegadis chihi</i> | white-faced ibis | G5 | S3B | N | N | Inc | Dec | N-SD | N | SI | SI | N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Rallus longirostris yumanensis</i> | Yuma clapper rail | G5T3 | S1 | N | N | N | Dec | N | N | GI | SI | N | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Recurvirostra americana</i> | American avocet | G5 | S4B | N | N | Inc | Dec | N-SD | N | SI | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Riparia riparia</i> | bank swallow | G5 | S3 | N | N | Inc | Dec | N | N | Inc | SI | N | N | SI | N | N | N | U | U | U | U | MV | VH |
| Bird | <i>Selasphorus rufus</i> | rufous hummingbird | G5 | S3M | N | N | Inc | Dec | SI | N | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Spizella atrogularis</i> | black-chinned sparrow | G5 | S3B | N | N | Inc | Dec | N | N | Inc-SI | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Spizella breweri</i> | Brewer's sparrow | G5 | S4B | N | N | Inc | Dec | N-SD | N | SI | N | SI | N | SD | GI-Inc | N | N | U | U | U | U | MV | Mod |
| Bird | <i>Strix occidentalis occidentalis</i> | California spotted owl | G3 | S1N | N | N | N | Inc | N | N | SI | N | Inc | N | SD | N | N | N | U | U | U | U | MV | VH |
| Bird | <i>Toxostoma bendirei</i> | Bendire's thrasher | G4G5 | S1 | N | N | Inc | Dec | N | N | Inc | N | SI | N | SD | SI | N | N | U | U | U | U | PS | VH |
| Bird | <i>Toxostoma lecontei</i> | LeConte's thrasher | G4 | S2 | N | N | Inc | Dec | SD | N | Inc | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Tympanuchus phasianellus columbianus</i> | Columbian sharp-tailed grouse | G4T3 | S1 | N | N | Inc | Dec | SD | N | SI | N | Inc | N | SD | N | N | N | U | Inc | U | U | MV | VH |
| Bird | <i>Vermivora virginiae</i> | Virginia's warbler | G5 | S4B | N | N | Inc | Dec | Inc-SI | N | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Bird | <i>Vireo bellii arizonae</i> | Arizona Bell's vireo | G5T4 | S2B | N | N | Inc | Dec | N | N | Inc | SI | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Aplodontia rufa californica</i> | aplodontia (mountain beaver) | G5T3T4 | S1 | Inc | N | N | SI | N | Inc-SI | N | Inc | SI | N | SD | N | N | N | U | U | U | U | HV | Low |
| Mammal | <i>Brachylagus idahoensis</i> | pygmy rabbit | G4 | S3 | N | N | SI | SD | SD | N | SI | N | Inc | N | SI-N | GI-Inc | Inc | N | U | U | U | U | EV | Mod |
| Mammal | <i>Chaetodipus penicillatus</i> | desert pocket mouse | G5 | S1 | N | N | Inc | N | N | N | GI-Inc | N | N | N | SI | N | N | N | U | U | U | U | MV | VH |
| Mammal | <i>Corynorhinus townsendii</i> | Townsend's big-eared bat | G4 | S2 | N | N | SI | Dec | SD | N | N | N | N | N | Inc | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Dipodomys deserti</i> | desert kangaroo rat | G5 | S2S3 | N | N | Inc | N | SD | N | GI-Inc | N | N | N | SI-N | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Euderma maculatum</i> | spotted bat | G4 | S2 | N | N | SI | Dec | SD | N | SI | N | N | N | SI | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Glaucomys sabrinus</i> | northern flying squirrel | G5 | S3 | N | N | N | N-SD | N | N | N | N | Inc | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Idionycteris phyllotis</i> | Allen's big-eared bat | G3G4 | S1 | N | N | SI | SD-Dec | SI-N | N | SI-N | N | N | N | N | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Lasionycteris noctivagans</i> | silver-haired bat | G5 | S3 | N | N | Inc | Dec | N | N | N | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |



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|--------|-----------------------------------|-------------------------------|---------|-------|------|------|------|-----|------|-------|--------|--------|-----|-----|--------|--------|-----|-----|-----|-----|----|--------|-------|-------|
| Mammal | <i>Lasiurus blossevillii</i> | western red bat | G5 | S1 | N | N | SI | Dec | SD | N | GI-Inc | SI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Lasiurus cinereus</i> | hoary bat | G5 | S3 | N | N | Inc | Dec | SD | N | N | N | N | N | SD | N | N | N | U | U | U | U | IL | VH |
| Mammal | <i>Lemmiscus curtatus</i> | sagebrush vole | G5 | S3 | N | N | Inc | SD | SD | N | SI | N | Inc | N | N | GI-Inc | N | N | U | U | U | U | HV | VH |
| Mammal | <i>Lepus americanus taioensis</i> | Sierra Nevada snowshoe hare | G5T3T4Q | S3 | N | N | N | SD | N | N | N | SI-N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Lontra canadensis</i> | northern river otter | G5 | S2 | N | N | N | SD | N-SD | N | SI-N | Inc | SI | N | SD | GI-Inc | N | N | U | U | U | U | MV | Mod |
| Mammal | <i>Macrotus californicus</i> | California leaf-nosed bat | G4 | S2 | N | N | SI | Dec | N | N | GI | N | N | N | Inc | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Martes americana</i> | American marten | G5 | S2S3 | N | N | N | SD | N | N | SI-N | N | Inc | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Microdipodops megacephalus</i> | dark kangaroo mouse | G4 | S2 | SI-N | SI-N | SI | N | N | N | Inc | N | Inc | N | SI | N | N | N | U | U | U | U | HV | Mod |
| Mammal | <i>Microdipodops pallidus</i> | pale kangaroo mouse | G3 | S2 | SI-N | SI | SI | N | SD | N | Inc | N | N | N | Inc | N | N | N | U | U | U | N | MV | VH |
| Mammal | <i>Microtus montanus fucosus</i> | Pahranagat Valley vole | G5T2 | S2 | SI-N | N | SI | N | N | N | Inc | SI | SI | N | SD | N | N | N | U | U | U | U | PS | Low |
| Mammal | <i>Myotis ciliolabrum</i> | western small-footed myotis | G5 | S3 | N | N | SI | Dec | SD | N | N | N | N | N | SI | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Myotis evotis</i> | long-eared myotis | G5 | S4 | N | N | N | Dec | N-SD | N | SD | N | N | N | SD | N | N | N | U | U | U | U | IL | VH |
| Mammal | <i>Myotis lucifugus</i> | little brown bat | G5 | S3 | N | N | SI | Dec | N-SD | N | SI-N | N | N | N | SD | N | N | N | U | U | U | U | IL | Mod |
| Mammal | <i>Myotis thysanodes</i> | fringed myotis | G4G5 | S2 | N | N | SI | Dec | SD | N | SI | N | N | N | N | N | N | N | U | U | U | U | IL | VH |
| Mammal | <i>Myotis velifer</i> | cave myotis | G5 | S1 | N | N | SI | Dec | N | N | GI | N | N | N | Inc | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Neotamias amoenus celeris</i> | Humboldt yellow-pine chipmunk | G5T2 | S2 | SI | N | N | N | N | N | Inc | N | N | N | SD | GI-Inc | N | N | U | U | U | U | MV | VH |
| Mammal | <i>Neotamias palmeri</i> | Palmer's chipmunk | G2 | S2 | GI | N | N | N | N | SI | SI | N | SI | N | SD | N | N | N | U | U | U | U | HV | VH |
| Mammal | <i>Neotamias senex</i> | Allen's chipmunk | G5 | S2S3 | SI | N | N | N | N | N | N-SD | N | Inc | N | SD | N | N | N | U | U | U | SI | PS | VH |
| Mammal | <i>Ochotona princeps</i> | American pika | G5 | S2 | GI | N | N | SD | N-SD | GI | SD | N | N | SI | Inc-SI | N | N | N | U | U | U | Inc-SI | MV | Mod |
| Mammal | <i>Odocoileus hemionus</i> | mule deer | G5 | S5 | N | SI | SI | Dec | SD | N | N | N | Inc | N | SD | N | SI | N | U | U | U | U | PS | VH |
| Mammal | <i>Ovis canadensis</i> | bighorn sheep | G4 | S4 | SI | SI | SI | Dec | N | N | N | N | N | N | SI | N | SI | N | U | U | U | U | MV | VH |
| Mammal | <i>Sorex merriami leucogenys</i> | Merriam's shrew | G5 | S3 | N | N | SI-N | N | SD | N | SI-N | N | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Sorex monticolus</i> | montane shrew | G5 | S3 | Inc | N | N | N | N | N | SI-N | Inc-SI | SI | N | SD | N | N | N | U | U | U | N-SD | MV | VH |
| Mammal | <i>Sorex palustris</i> | American water shrew | G5 | S2 | Inc | N | N | N | N-SD | N | SI-N | Inc | SI | N | SD | N | N | N | U | U | U | SI | MV | VH |
| Mammal | <i>Sorex preblei</i> | Preble's shrew | G4 | S1 | SI | N | N | N | SD | N | SI | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |



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| Group | Species | English Name | GRank | SRank | Natl | Anth | CC | Dispersa | historical | physiological | historical | physiological | Disturbance | Ice/snow | Phys habitat | Other spp for hab | Diet | Other spp disp | Genetic var | Gen bottleneck | Phenol response | Doc response | Index | Conf. |
|--------|--|---------------------------|-------|-------|----------|----------|------------|-----------|---------------|---------------|--------------------|--------------------|-------------|----------|--------------|-------------------|------|----------------|-------------|----------------|-----------------|--------------|-------|-------|
| | | | | | barriers | barriers | mitigation | /Movement | thermal niche | thermal niche | hydrological niche | hydrological niche | | | | | | | | | | | | |
| | | | | | B2a | B2b | B3 | C1 | C2ai | C2aii | C2bi | C2bii | C2c | C2d | C3 | C4a | C4b | C4d | C5a | C5b | C6 | D1 | | |
| Mammal | <i>Sorex tenellus</i> | Inyo shrew | G3G4 | S2 | SI | N | N | N | N | N | N | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Spermophilus elegans nevadensis</i> | Wyoming ground squirrel | G5T4 | S4 | N | N | N | N | N | N | SI-N | N | N | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Tadarida brasiliensis</i> | Brazilian free-tailed bat | G5 | S3S4 | N | N | Inc | Dec | SI-N | N | N | N | N | N | SI-N | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Thomomys bottae</i> | pocket gopher | G5 | SNR | SI | SI | Inc | SI-N | N-SD | N | Inc-SI | N | N | N | SD | N | N | N | U | U | U | U | MV | Mod |
| Mammal | <i>Thomomys monticola</i> | mountain pocket gopher | G5 | S3 | SI | N | N | N | N | N | N-SD | SI | SI | N | SD | N | N | N | U | U | U | U | PS | VH |
| Mammal | <i>Zapus princeps</i> | western jumping mouse | G5 | S2 | SI | N | N | N | N-SD | N | N-SD | Inc | SI | N | SD | N | N | N | U | U | U | SI | PS | Mod |

Factor Scores:

- GI** - Greatly Increase Vulnerability
- Inc** - Increase Vulnerability
- SI** - Somewhat Increase Vulnerability
- N** - Neutral
- SD** - Somewhat Decrease Vulnerability
- Dec** - Decrease Vulnerability
- U** - Unknown

Color coding:

- To highlight factors that influence climate change vulnerability.
- Red** - Greatest influence in increasing vulnerability
- Orange** - Moderate influence in increasing vulnerability
- Green** - Contributes to decrease in vulnerability

Index Scores:

- EV** - Extremely Vulnerable: Abundance and/or range extent within geographical area assessed extremely likely to substantially decrease or disappear by 2050.
- HV** - Highly Vulnerable: Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.
- MV** - Moderately Vulnerable: Abundance and/or range extent within geographical area assessed likely to decrease by 2050.
- PS** - Not Vulnerable/Presumed Stable: Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.
- IL** - Not Vulnerable/Increase Likely: Available evidence suggests that abundance and/or range extent within geographical area assessed is likely to increase by 2050.

Confidence (in species information):

- VH** - Very High confidence
- High** - High confidence
- Mod** - Moderate confidence
- Low** - Low confidence