

## IDENTIFICATION OF SPECIES OF CONSERVATION PRIORITY

### Climate Change Vulnerability Assessment of Conservation Priority Species

#### *Overview of the NatureServe Climate Change Vulnerability Index (CCVI)*

The Nevada Natural Heritage Program (NNHP) assessed the relative vulnerability, and the relative importance of factors contributing to that vulnerability, for Nevada's Species of Conservation Priority (SOCP) using the NatureServe Climate Change Vulnerability Index (CCVI). The CCVI was chosen for this project for a number of reasons: 1) it was designed as a rapid way of assessing a large number of species in a relatively short period of time; 2) it is cost-effective (free tool provided by NatureServe); 3) it is packaged as a programmed Excel workbook and is easy to use; 4) it was not overly technical; it was designed to be used by any person with a science background; and, 5) the results are presented in a way that allows the user to group taxa by their relative risk or by specific sensitivity factors, which helps direct management and adaptation.

The CCVI uses a scoring system that integrates a species' predicted *exposure* (direct and indirect) to climate change within the assessment area (i.e., the state of Nevada) and a series of factors, all supported by published studies, associated with a species' *sensitivity* to changes in climate. The tool also incorporates documented or modeled response to climate change, if available. The tool weighs each sensitivity score depending on the magnitude of projected climate change, incorporates any documented or modeled responses, and calculates a final vulnerability index score.

**Direct exposure** is the magnitude of projected temperature and moisture change across the species' range within the assessment area. For this project, direct exposure was measured using climate data obtained from The Climate Wizard. The Climate Wizard uses base climate projections previously downscaled by Maurer et al. (2007). As recommended in NatureServe's Guidelines for Using the NatureServe Climate Change Vulnerability Index (Young et al., 2011), a mid-century time line, Medium A1B emissions scenario, and ensemble average of 16 general circulation models were used for the species' vulnerability assessments. Predicted moisture changes were based on the Hamon AET:PET Moisture Metric, also developed by The Climate Wizard team. This metric integrates temperature and precipitation through a ratio of actual evapotranspiration (AET) to potential evapotranspiration (PET) with consideration of total daylight hours and saturated vapor pressure (Young et al., 2011).

**Indirect exposure** includes phenomena such as sea level rise (not a factor in Nevada), the presence of natural and/or anthropogenic barriers that would hinder or prevent a species from dispersing to a new area with a favorable climate envelope, or human-induced land use changes designed to mitigate greenhouse gases (e.g., the construction of renewable energy projects such as wind farms or solar arrays may remove key habitats or create barriers).

There are six **species-specific sensitivity** factors considered by the CCVI. These factors are listed below with a brief summary/explanation.

1. *Dispersal and movements* – species with poor dispersal abilities may not be able to track shifting favorable climate envelopes.

2. *Predicted sensitivity to temperature and moisture changes* – species requiring specific moisture and temperature regimes may be less likely to find similar areas as the climate changes and previously-associated temperature and precipitation patterns uncouple. Four separate factors are scored here as listed below in a through d:
  - a. Historical and physiological sensitivity to changes in temperature.
  - b. Historical and physiological sensitivity to changes in precipitation, hydrology, or moisture regime.
  - c. Dependence on a specific disturbance regime likely to be impacted by climate change – species dependent on habitats that are maintained by regular disturbances (e.g., fires or flooding) are vulnerable to climate change-induced changes in the frequency and intensity of these disturbances.
  - d. Dependence on ice, ice-edge, or snow-cover habitats – the extent of oceanic ice sheets and mountain snow fields are decreasing as temperatures increase, imperiling species dependent on these habitats.
3. *Restriction to uncommon geological features or derivatives* – species requiring specific substrates, soils, or physical features such as caves, cliffs, or sand dunes may become vulnerable to climate change if their favored climate conditions shift to areas without these physical elements.
4. *Reliance on interspecific interactions* – because species will react idiosyncratically to climate change, those with tight relationships with other species may be threatened. A series of five factors are scored within this category as listed below in a through e:
  - a. Dependence on other species to generate habitat.
  - b. Dietary versatility (animals only).
  - c. Pollinator versatility (plants only).
  - d. Dependence on other species for propagule dispersal.
  - e. Forms part of an interspecific interaction not covered above.
5. *Genetic factors* – a species' ability to evolve adaptations to environmental conditions brought about by climate change is largely dependent on its existing genetic variation. Two factors are included in this category:
  - a. Measured genetic variation.
  - b. Occurrence of bottlenecks in recent evolutionary history.
6. Phenological response to changing seasonal temperature and precipitation dynamics – research suggests that some phylogenetic groups are declining due to lack of response to changing annual temperature dynamics (e.g., earlier onset of spring, longer growing season), including some bird species that have not advanced their migration times, and some temperate zone plants that are not moving their flowering times.

The final section of the CCVI incorporates any available data on **documented or modeled response** to climate change. This is an optional section and is not required for the CCVI to calculate a vulnerability score. If peer-reviewed, published data are available related to a species response to climate change (e.g., range shifts, range contraction, or phenology mismatches), the species response would be scored in this section. Additionally, the results of available species-specific models can be incorporated in this section. These data are rarely available and this section was not scored for any of the Nevada SOCP.

# Nevada Wildlife Action Plan

---

After all of the appropriate factors are scored, an overall CCVI score is automatically calculated by the tool (i.e., Extremely Vulnerable, Highly Vulnerable, Moderately Vulnerable, Not Vulnerable/Presumed Stable, or Not Vulnerable/Increase Likely), and a measure of confidence of the score (Very High, High, Moderate, Low) is provided. This confidence relates specifically to the level of uncertainty indicated by the assessor based on the range of values given for each factor. Checking a range of values for particular factors tends to decrease confidence in species information.

The CCVI does not include factors that are already considered in existing conservation status assessments. Conservation status ranks assess a species vulnerability to extinction from a wide variety of factors such as population size, range size, threats, and demographic factors. These types of factors are not repeated in the CCVI. The CCVI only takes into consideration those factors that are related to a species vulnerability to climate change. The goal is for the CCVI to complement NatureServe Conservation Status Ranks and not to partially duplicate factors. Ideally, CCVI scores and Conservation Status Ranks should be used in concert.

Complex interactions such as shifts in competitive, predator-prey, or host-parasite interactions are likely to be important as well, but they are not included in this rapid assessment because of the difficulty and unpredictability inherent in simultaneous evaluation of climate change on interacting species.

## ***Applying the CCVI to Nevada's Species of Conservation Priority***

Species' range maps and natural history information were obtained from a number of sources including the Nevada Wildlife Action Plan (WAP) (Wildlife Action Plan Team, 2006), the NNHP Biotics database, The Revised Nevada Bat Conservation Plan (Bradley et al., 2006), Atlas of the Breeding Birds of Nevada (Floyd et al., 2007), The Nevada Comprehensive Bird Conservation Plan (GBBO, 2010), NatureServe Explorer, federal agency documents (e.g., USGS professional reports or published studies, USFWS Recovery Plans, Federal Register), field guides, and expert input.

Assessments were completed for a representative group of species within each taxonomic group. After these initial CCVI scores were calculated by NNHP, an expert workshop was held (December 2009 in Reno) to solicit feedback and comments from biologists working throughout Nevada. The two-day workshop was well-attended and included representatives from federal (BLM, EPA, NPS, USFS, and USFWS) and state (NDOW, NNHP) agencies, a non-profit organization (TNC), and academia (UNR). Highly constructive comments and feedback were obtained from the attendees on the scoring of the factors, and additional species information was also obtained to better inform the assessments. All feedback and comments were incorporated into the CCVI for each species and scores were recalculated.

In total, 340+ species were assessed using the CCVI, 254 of which are included in this WAP as Nevada SOCP. The results of the CCVI assessments for the SOCP, including CCVI scores and the factors contributing to the species vulnerability (if applicable), are included in the Species Accounts. A detailed table of CCVI results, including the scores for each factor, the overall vulnerability score, and confidence for each SOCP, is included in Appendix D.

## **2012 SPECIES OF CONSERVATION PRIORITY LISTS**

The following is the listing of the Species of Conservation Priority for the Nevada Wildlife Action (WAP) Revision (2012). Some species from the 2005 list remain while new species were added and are distinguished by the green, italicized font.

# Nevada Wildlife Action Plan

---

## Aquatics

### Mollusks

Common Name	Scientific Name
California floater	<i>Anodonta californiensis</i>

### Gastropods

Common Name	Scientific Name
Amargosa tryonia	<i>Tryonia variegata</i>
Antelope Valley pyrg	<i>Pyrgulopsis pellita</i>
Ash Meadows pebblesnail	<i>Pyrgulopsis erythropoma</i>
bifid duct pyrg	<i>Pyrgulopsis peculiaris</i>
Big Warm Spring pyrg	<i>Pyrgulopsis papillata</i>
<i>Blue Point pyrg</i>	<i>Pyrgulopsis coloradensis</i>
Butterfield pyrg	<i>Pyrgulopsis lata</i>
Camp Valley pyrg	<i>Pyrgulopsis montana</i>
Corn Creek pyrg	<i>Pyrgulopsis fausta</i>
Crystal Spring pyrg	<i>Pyrgulopsis crystalis</i>
Distal-gland pyrg	<i>Pyrgulopsis nanus</i>
Dixie Valley pyrg	<i>Pyrgulopsis dixensis</i>
Duckwater pyrg	<i>Pyrgulopsis aloba</i>
Duckwater Warm Springs pyrg	<i>Pyrgulopsis villacampae</i>
Elko pyrg	<i>Pyrgulopsis leporina</i>
elongate Cain Spring pyrg	<i>Pyrgulopsis augustae</i>
elongate Mud Meadows pyrg	<i>Pyrgulopsis notidicola</i>
elongate-gland pyrg	<i>Pyrgulopsis isolata</i>
Emigrant pyrg	<i>Pyrgulopsis gracilis</i>
Fairbanks pyrg	<i>Pyrgulopsis fairbanksensis</i>
Flag pyrg	<i>Pyrgulopsis breviloba</i>
flat-topped Steptoe pyrg	<i>Pyrgulopsis planulata</i>
Fly Ranch pyrg	<i>Pyrgulopsis bruesi</i>
grated tryonia	<i>Tryonia clathrata</i>
Hardy pyrg	<i>Pyrgulopsis marcida</i>
Hubbs pyrg	<i>Pyrgulopsis hubbsi</i>
Humboldt pyrg	<i>Pyrgulopsis humboldtensis</i>
Kings River pyrg	<i>Pyrgulopsis imperialis</i>
Lake Valley pyrg	<i>Pyrgulopsis sublata</i>
Landyes pyrg	<i>Pyrgulopsis landyei</i>
large gland Carico pyrg	<i>Pyrgulopsis basiglans</i>
Lockes pyrg	<i>Pyrgulopsis lockensis</i>
longitudinal gland pyrg	<i>Pyrgulopsis anguina</i>

## Nevada Wildlife Action Plan

Common Name	Scientific Name
median-gland Nevada pyrg	<i>Pyrgulopsis pisteri</i>
minute tryonia	<i>Tryonia ericae</i>
Moapa pebblesnail	<i>Pyrgulopsis avernalis</i>
Moapa Valley pyrg	<i>Pyrgulopsis carinifera</i>
monitor tryonia	<i>Tryonia monitorae</i>
neritiform Steptoe Ranch pyrg	<i>Pyrgulopsis neritella</i>
northern Soldier Meadow pyrg	<i>Pyrgulopsis militaris</i>
northern Steptoe pyrg	<i>Pyrgulopsis serrata</i>
northwest Bonneville pyrg	<i>Pyrgulopsis variegata</i>
Oasis Valley pyrg	<i>Pyrgulopsis micrococcus</i>
ovate Cain Spring pyrg	<i>Pyrgulopsis pictilis</i>
Pahrnagat pebblesnail	<i>Pyrgulopsis merriami</i>
Pleasant Valley pyrg	<i>Pyrgulopsis aurata</i>
Point of Rocks tryonia	<i>Tryonia elata</i>
Pyramid Lake pebblesnail	<i>Fluminicola dalli</i>
Sada's pyrg	<i>Pyrgulopsis sadai</i>
small gland Carico pyrg	<i>Pyrgulopsis bifurcata</i>
smooth juga	<i>Juga interioris</i>
southeast Nevada pyrg	<i>Pyrgulopsis turbatrix</i>
southern Duckwater pyrg	<i>Pyrgulopsis anatina</i>
southern Soldier Meadow pyrg	<i>Pyrgulopsis umbilicata</i>
southern Steptoe pyrg	<i>Pyrgulopsis sulcata</i>
sportinggoods tryonia	<i>Tryonia angulata</i>
Spring Mountains pyrg	<i>Pyrgulopsis deaconi</i>
squat Mud Meadows pyrg	<i>Pyrgulopsis limaria</i>
Steptoe hydrobe	<i>Eremopyrgus eganensis</i>
sterile basin pyrg	<i>Pyrgulopsis sterilis</i>
sub-globose Steptoe Ranch pyrg	<i>Pyrgulopsis orbiculata</i>
transverse gland pyrg	<i>Pyrgulopsis cruciglans</i>
turban pebblesnail	<i>Fluminicola turbiniformis</i>
Twentyone Mile pyrg	<i>Pyrgulopsis millenaria</i>
Upper Thousand Spring pyrg	<i>Pyrgulopsis hovinghi</i>
Vinyards pyrg	<i>Pyrgulopsis vinyardi</i>
Virginia Mountains pebblesnail	<i>Fluminicola virginius</i>
White River Valley pyrg	<i>Pyrgulopsis sathos</i>
Wong's pyrg	<i>Pyrgulopsis wongi</i>

### Fishes

Common Name	Scientific Name
<i>Alvord chub</i>	<i>Gila alvordensis</i>

## Nevada Wildlife Action Plan

Common Name	Scientific Name
Ash Meadows Amargosa pupfish	<i>Cyprinodon nevadensis mionectes</i>
Ash Meadows speckled dace	<i>Rhinichthys osculus nevadensis</i>
Big Smoky Valley speckled dace	<i>Rhinichthys osculus lariversi</i>
Big Smoky Valley tui chub	<i>Gila bicolor ssp. (unnamed)</i>
Big Spring spinedace	<i>Lepidomeda mollispinis pratensis</i>
bonytail chub	<i>Gila elegans</i>
bull trout (Jarbidge River basin pop)	<i>Salvelinus confluentus pop. 4</i>
Clover Valley speckled dace	<i>Rhinichthys osculus oligoporus</i>
Cui-ui	<i>Chasmistes cujus</i>
desert dace	<i>Eremichthys acros</i>
Devils Hole pupfish	<i>Cyprinodon diabolis</i>
Diamond Valley speckled dace	<i>Rhinichthys osculus ssp. (unnamed)</i>
Fish Lake Valley tui chub	<i>Gila bicolor ssp. (unnamed)</i>
flannelmouth sucker	<i>Catostomus latipinnis</i>
Hiko White River springfish	<i>Crenichthys baileyi grandis</i>
Independence Valley speckled dace	<i>Rhinichthys osculus lethoporus</i>
Independence Valley tui chub	<i>Gila bicolor isolata</i>
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>
<i>Little Fish Lake Valley tui chub</i>	<i>Gila bicolor ssp. (unnamed)</i>
<i>Meadow Valley speckled dace</i>	<i>Rhinichthys osculus ssp. (unnamed)</i>
<i>Meadow Valley Wash desert sucker</i>	<i>Catostomus clarkii ssp. (unnamed)</i>
Moapa dace	<i>Moapa coriacea</i>
Moapa speckled dace	<i>Rhinichthys osculus moapae</i>
Moapa White River springfish	<i>Crenichthys baileyi moapae</i>
Monitor Valley speckled dace	<i>Rhinichthys osculus ssp. (unnamed)</i>
Moorman White River springfish	<i>Crenichthys baileyi thermophilus</i>
<i>mountain whitefish</i>	<i>Prosopium williamsoni</i>
Oasis Valley speckled dace	<i>Rhinichthys osculus ssp. (unnamed)</i>
Pahranagat roundtail chub	<i>Gila robusta jordani</i>
Pahranagat speckled dace	<i>Rhinichthys osculus velifer</i>
Pahrump poolfish	<i>Empetrichthys latos latos</i>
Preston White River springfish	<i>Crenichthys baileyi albivallis</i>
Railroad Valley springfish	<i>Crenichthys nevadae</i>
Railroad Valley tui chub	<i>Gila bicolor ssp. (unnamed)</i>
razorback sucker	<i>Xyrauchen texanus</i>
<i>Sheldon tui chub</i>	<i>Gila bicolor eurysoma</i>
Virgin River chub	<i>Gila seminuda</i>
Virgin River chub (Muddy River pop.)	<i>Gila seminuda pop. 2</i>
Virgin River spinedace	<i>Lepidomeda mollispinis mollispinis</i>
Wall Canyon sucker	<i>Catostomus sp.</i>

# Nevada Wildlife Action Plan

---

Common Name	Scientific Name
Warm Springs Amargosa pupfish	<i>Cyprinodon nevadensis pectoralis</i>
Warner Valley redband trout	<i>Oncorhynchus mykiss pop. 4</i>
White River desert sucker	<i>Catostomus clarkii intermedius</i>
White River speckled dace	<i>Rhinichthys osculus ssp. 7</i>
White River spinedace	<i>Lepidomeda albivallis</i>
White River springfish	<i>Crenichthys baileyi baileyi</i>
woundfin	<i>Plagopterus argentissimus</i>
<i>Yellowstone cutthroat trout</i>	<i>Oncorhynchus clarkii bouvieri</i>

## Amphibians

Common Name	Scientific Name
Amargosa toad	<i>Bufo nelsoni</i>
Arizona toad	<i>Bufo microscaphus</i>
Columbia spotted frog (Great Basin pop)	<i>Rana luteiventris pop. 3</i>
<i>Great Basin spadefoot</i>	<i>Spea intermontana</i>
Great Plains toad	<i>Bufo cognatus</i>
northern leopard frog	<i>Rana pipiens</i>
relict leopard frog	<i>Rana onca</i>
<i>Sierra Nevada yellow-legged frog</i>	<i>Rana sierrae</i>
<i>western toad</i>	<i>Bufo boreas</i>

## Terrestrial

### Reptiles

Common Name	Scientific Name
banded Gila monster	<i>Heloderma suspectum cinctum</i>
common chuckwalla	<i>Sauromalus ater</i>
common night lizard	<i>Xantusia vigilis vigilis</i>
desert horned lizard	<i>Phrynosoma platyrhinos</i>
desert iguana	<i>Dipsosaurus dorsalis</i>
desert tortoise (Mojave Desert pop.)	<i>Gopherus agassizii</i>
Great Basin collared lizard	<i>Crotaphytus bicinctores</i>
greater short-horned lizard	<i>Phrynosoma hernandesi</i>
long-nosed leopard lizard	<i>Gambelia wislizenii</i>
long-tailed brush lizard	<i>Urosaurus graciosus</i>
northwestern pond turtle	<i>Actinemys marmorata marmorata</i>
Panamint alligator lizard	<i>Elgaria panamintina</i>
pygmy short-horned lizard	<i>Phrynosoma douglasii</i>
<i>ringneck snake</i>	<i>Diadophis punctatus</i>
<i>rosy boa</i>	<i>Lichanura trivirgata</i>

## Nevada Wildlife Action Plan

---

Common Name	Scientific Name
rubber boa	<i>Charina bottae</i>
Shasta alligator lizard	<i>Elgaria coerulea shastensis</i>
<i>sidewinder</i>	<i>Crotalus cerastes</i>
Sierra alligator lizard	<i>Elgaria coerulea palmeri</i>
Sonoran mountain kingsnake	<i>Lampropeltis pyromelana</i>
<i>Smith's black-headed snake</i>	<i>Tantilla hobartsmithi</i>
<i>spotted leaf-nosed snake</i>	<i>Phyllorhynchus decurtatus</i>
western banded gecko	<i>Coleonyx variegatus</i>
<i>western blind snake</i>	<i>Leptotyphlops humilis</i>
western redbelt skink	<i>Plestiodon gilberti rubricaudatus</i>
<i>western shovel-nosed snake</i>	<i>Chionactis occipitalis</i>

### Birds

Common Name	Scientific Name
American Avocet	<i>Recurvirostra americana</i>
<i>American Bittern</i>	<i>Botaurus lentiginosus</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>
Bell's Vireo	<i>Vireo bellii</i>
Bald Eagle (Contiguous US Pop)	<i>Haliaeetus leucocephalus</i>
<i>Bank Swallow</i>	<i>Riparia riparia</i>
Bendire's Thrasher	<i>Toxostoma bendirei</i>
Black Rosy-Finch	<i>Leucosticte atrata</i>
Black Tern	<i>Chlidonias niger</i>
Black-chinned Sparrow	<i>Spizella atrogularis</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Brewer's Sparrow	<i>Spizella breweri</i>
California Spotted Owl	<i>Strix occidentalis occidentalis</i>
Canvasback	<i>Aythya valisineria</i>
Cassin's Finch	<i>Carpodacus cassinii</i>
Columbian Sharp-tailed Grouse	<i>Tympanuchus phasianellus columbianus</i>
Common Loon	<i>Gavia immer</i>
<i>Common Nighthawk</i>	<i>Chordeiles minor</i>
Dusky Grouse	<i>Dendragapus obscurus</i>
Ferruginous Hawk	<i>Buteo regalis</i>
<i>Flammulated Owl</i>	<i>Otus flammeolus</i>
<i>Gilded Flicker</i>	<i>Colaptes chrysoides</i>
<i>Golden Eagle</i>	<i>Aquila chrysaetos</i>
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>
Great Basin Willow Flycatcher	<i>Empidonax traillii adastus</i>

## Nevada Wildlife Action Plan

Common Name	Scientific Name
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>
Greater Sandhill Crane	<i>Grus canadensis tabida</i>
Le Conte's Thrasher	<i>Toxostoma lecontei</i>
Lewis's Woodpecker	<i>Melanerpes lewis</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Long-billed Curlew	<i>Numenius americanus</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Mountain Quail	<i>Oreortyx pictus</i>
Northern Goshawk	<i>Accipiter gentilis</i>
Northern Pintail	<i>Anas acuta</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>
<i>Prairie Falcon</i>	<i>Falco mexicanus</i>
Redhead	<i>Aythya americana</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Sage Sparrow	<i>Amphispiza belli</i>
<i>Sage Thrasher</i>	<i>Oreoscoptes montanus</i>
<i>Scott's Oriole</i>	<i>Icterus parisorum</i>
Short-eared Owl	<i>Asio flammeus</i>
Sierra Nevada Mountain Willow Flycatcher	<i>Empidonax traillii brewsteri</i>
Sooty Grouse	<i>Dendragapus fuliginosus</i>
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>
Tricolored Blackbird	<i>Agelaius tricolor</i>
Virginia's Warbler	<i>Vermivora virginiae</i>
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>
Western Least Bittern	<i>Ixobrychus exilis hesperis</i>
<i>Western Sandpiper</i>	<i>Calidris mauri</i>
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>
White-faced Ibis	<i>Plegadis chihi</i>
White-headed Woodpecker	<i>Picoides albolarvatus</i>
<i>Wilson's Phalarope</i>	<i>Phalaropus tricolor</i>
Yuma Clapper Rail	<i>Rallus longirostris yumanensis</i>

### Mammals

Common Name	Scientific Name
Allen's big-eared bat	<i>Idionycteris phyllotis</i>

## Nevada Wildlife Action Plan

Common Name	Scientific Name
Allen's chipmunk	<i>Neotamias senex</i>
American marten	<i>Martes americana</i>
American pika	<i>Ochotona princeps</i>
bighorn sheep	<i>Ovis canadensis</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
California leaf-nosed bat	<i>Macrotus californicus</i>
cave myotis	<i>Myotis velifer</i>
dark kangaroo mouse	<i>Microdipodops megacephalus</i>
desert kangaroo rat	<i>Dipodomys deserti</i>
desert pocket mouse	<i>Chaetodipus penicillatus</i>
fringed myotis	<i>Myotis thysanodes</i>
hoary bat	<i>Lasiurus cinereus</i>
Humboldt yellow-pine chipmunk	<i>Neotamias amoenus celeris</i>
Inyo shrew	<i>Sorex tenellus</i>
little brown myotis	<i>Myotis lucifugus</i>
long-eared myotis	<i>Myotis evotis</i>
Merriam's shrew	<i>Sorex merriami</i>
<i>Mexican free-tailed bat</i>	<i>Tadarida brasiliensis</i>
Mono Basin mountain beaver	<i>Aplodontia rufa californica</i>
montane shrew	<i>Sorex monticolus</i>
mountain pocket gopher	<i>Thomomys monticola</i>
mule deer	<i>Odocoileus hemionus</i>
northern flying squirrel	<i>Glaucomys sabrinus</i>
Pahranagat Valley montane vole	<i>Microtus montanus fucosus</i>
pale kangaroo mouse	<i>Microdipodops pallidus</i>
Palmer's chipmunk	<i>Neotamias palmeri</i>
Preble's shrew	<i>Sorex preblei</i>
pygmy rabbit	<i>Brachylagus idahoensis</i>
river otter	<i>Lontra canadensis</i>
sagebrush vole	<i>Lemmiscus curtatus</i>
<i>Sierra Nevada snowshoe hare</i>	<i>Lepus americanus tahoensis</i>
<i>silver-haired bat</i>	<i>Lasionycteris noctivagans</i>
spotted bat	<i>Euderma maculatum</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
water shrew	<i>Sorex palustris</i>
western jumping mouse	<i>Zapus princeps</i>
western red bat	<i>Lasiurus blossevillii</i>
western small-footed myotis	<i>Myotis ciliolabrum</i>
Wyoming ground squirrel	<i>Spermophilus elegans nevadensis</i>

## Rationale for Adding New Species of Conservation Priority

The following aquatic and terrestrial species were added to the SOCP list based on climate change analysis through the CCVI or other demonstrated conservation concern for the species. For additional information, please refer to the Species Accounts section of this plan.

### *Aquatic Species*

#### *Alvord chub*

Occupies low-elevation moderate gradient montane stream habitats subject to projected higher level climate change effects from increased thermal load and altered seasonal runoff patterns including reduces late warm season base flows.

#### *Little Fish Lake Valley tui chub*

Occupies sub-montane (valley floor) isolated spring/pool and wetland habitats subject to accelerated effects from climate change including increased thermal loads and dependence on non-carbonate aquifer local recharge subject to effects from changes in seasonal precipitation and early spring onset of runoff events.

#### *Meadow Valley Wash speckled dace*

Occupies mid to low-elevation montane streams, anticipated accelerated effects from groundwater development and projected climate change effects from increased thermal inputs and greater frequency in stochastic flow events affecting habitat quality and distribution from changed monsoonal storm patterns.

#### *Meadow Valley Wash desert sucker*

Occupies mid to low-elevation montane streams, anticipated accelerated effects from groundwater development and projected climate change effects from increased thermal inputs and greater frequency in stochastic flow events affecting habitat quality and distribution from changed monsoonal storm patterns.

#### *Mountain whitefish*

Occupies mid- to high-elevation montane stream and river habitats conspecific with native trout species. Projected effects from climate change are similar to LCT and other native cutthroat trout including impacts from increased thermal loads, reductions in total habitat suitability and linear extent and negative habitat changes from modified runoff patterns and reduced late summer base flows.

#### *Relict dace*

Occupies isolated spring, springbrook and wetland habitats. Specific impacts are projected on some populations from proposed groundwater development projects. Thermal effects from climate change are anticipated to restrict total available habitat and distribution for some populations; some populations occur in non-carbonate aquatic systems with higher potential for cc related flow effects.

#### *Sheldon tui chub*

Occupies low-elevation (valley floor) spring/pool and stream habitats subject to projected higher level climate change effects from increased thermal load and altered seasonal runoff patterns including reduces late warm season base flows.

## *Warner Valley redband trout*

Occupies mid-elevation montane stream systems with projected impacts from climate change including increased thermal loading and shifts in temporal stream flow patterns affecting habitat suitability and habitat distribution

## *Yellowstone cutthroat trout*

Occupies mid- to high-elevation montane stream systems with projected impacts from climate change including increased thermal loading and shifts in temporal stream flow patterns affecting habitat suitability and habitat distribution

## *Great Basin spadefoot toad*

New species because of disease concerns and potential effects from climate change on amphibians in general due to life history requirements. Could be threatened by large scale habitat conversion.

## *Sierra Nevada yellow-legged frog*

Although this species is considered extirpated from Nevada, this has not been confirmed. Surveys and management actions should be considered through long-term reintroduction or natural repopulation as the species is extant in adjacent areas in California.

## *Western toad*

Although this species is common throughout the Great Basin, there are potentially isolated and endemic species that need more certain taxonomic delineation.

## **Terrestrial Species**

### *American Bittern*

A WAP species because of perceived population declines in the U.S. and western region. This species is moderately vulnerable to climate change and its preferred habitat is sensitive and vulnerable to degradation.

### *Bank Swallow*

New WAP species due to continental population declines and continued concern in California. This species is moderately vulnerable to climate change.

### *Common Nighthawk*

New species due to significant declining trends in the U.S., western region, and the Great Basin.

### *Flammulated Owl*

This was added as a new WAP species due to rangewide population declines and concerns over conifer habitat with respect to climate change.

### *Gilded Flicker*

New SOCP in WAP due to its restricted range in Nevada and declining trend rangewide.

### *Golden Eagle*

WAP species due to Bald & Golden Eagle Protection Act. Concerns with conflicts with renewable energy development.

# Nevada Wildlife Action Plan

---

## *Prairie Falcon*

This was added as a new WAP species due to potential conflicts with renewable energy development.

## *Scott's Oriole*

WAP species due to declining population trends in Nevada and its preferred Joshua tree habitat is vulnerable to climate change.

## *Sage Thrasher*

New WAP species because it is moderately vulnerable to climate change and due to the possibility of large scale sagebrush habitat conversion and loss.

## *Western Sandpiper*

This was added as a SOCP in the WAP due to declining rangewide population trend and Nevada's stewardship responsibility for this species during migration.

## *Wilson's Phalarope*

WAP species because it is moderately vulnerable to climate change. Its preferred breeding habitat is sensitive and vulnerable to degradation. Nevada also has migration stewardship responsibility.

## *Northern rubber boa*

New WAP species because it requires mesic microhabitats in the Great Basin that are vulnerable to drying due to climate change and reliant upon aspen riparian areas, a vulnerable habitat type.

## *Ring-necked snake*

WAP species because it requires mesic microhabitats in the Mojave Desert that are vulnerable to drying due to climate change.

## *Rosy boa*

This was added as a new WAP species because it occurs in isolated populations that leave the species vulnerable to decline especially with respect to climate change and collection. Known from only one location in Nevada.

## *Sidewinder*

WAP species because of current and increasing habitat development and fragmentation, especially in consideration of alternative energy development and large scale solar power plants.

## *Smith's black-headed snake*

A WAP species because it has fragmented populations and its habitat is vulnerable to deterioration especially with respect to climate change..

## *Spotted leaf-nosed snake*

WAP species because of current and increasing habitat fragmentation, especially in consideration of alternative energy development and large scale solar power plants.

## *Western blind snake*

This was added as a new WAP species because it requires mesic microhabitats in the Mojave Desert that are vulnerable to drying due to climate change.

# Nevada Wildlife Action Plan

---

## *Western shovel-nosed snake*

WAP species because of current and increasing habitat fragmentation, especially in consideration of alternative energy development and large scale solar power plants.

## *Mexican free-tailed bat*

This was added as a SOCP in the WAP because of this species habit of roosting in large colonies and its vulnerability to decline due to energy development

## *Sierra Nevada showshoe hare*

WAP species because it is an isolated subpopulation with limited habitat connectivity and shared stewardship with California.

## *Silver-haired bat*

New WAP species because of regional population concerns and is especially vulnerable to wind turbine collision/mortality.

DRAFT

## DEFINING NEVADA'S LANDSCAPE FOR WILDLIFE

For the Nevada Wildlife Action Plan, an ecological framework for strategy development was devised for initial analyses using ecoregions and modified Bailey's sections. Four ecoregions and 10 modified Bailey's sections overlap Nevada (Figure 4) (CPET 1999; MDEPT 2001; Nachlinger et al., 2001). Modified Bailey's sections are divisions within an ecoregion that are defined by similarities of geomorphic process, surface geology, soils, drainage networks, and regional climate patterns.

Although there are several different ecoregional classifications in use in the United States, there is a great deal of overlap in all of the maps and scrutiny reveals more similarities than differences (Groves, 2003). Ecoregional boundaries should not be taken too literally because there is typically a gradual transition from one major ecosystem type to another and only rarely are ecoregional boundaries represented by distinct edges. In addition, most ecoregions contain patches of habitats that are more representative of adjacent ecoregions. We also recognize that ecological classification is not a panacea for categorizing all taxa or biological features. As the Nevada WAP evolved, the complexity and often redundant nature of attempting to create a strategic plan using modified Bailey's sections as our units of planning became evident. Specifically, key habitat types for wildlife occur across multiple sections and ecoregions. The complexity of forcing aquatic species and their habitats into a mostly terrestrial-based system was also problematic.

Aquatic species and their habitats are more easily categorized into a system defined by hydrologic factors. The aquatic framework is more appropriately defined by ecological drainage units which are aggregations of fourth level hydrologic unit codes (HUCs). Ecological drainage units can be subdivided into fifth and sixth level HUCs (subbasin or watershed scale) which refines the aquatic framework to a more focused, smaller scale and is particularly important for the discussion and planning for many of the isolated aquatic species found throughout Nevada. Currently, HUCs defined at the eighth level are easily available for Nevada. However, since most Nevada Aquatic Species of Conservation Priority are geographically isolated populations, it became evident that developing a finer-level system would be a very useful tool for identifying and managing key populations.

For hydrologic analysis and water planning and management purposes, the U.S. Geological Survey (USGS) and the Nevada Division of Water Resources (NDWR), Department of Conservation and Natural Resources, have divided the State of Nevada into 256 Hydrographic Areas and Sub-Areas. This smaller hydrologic unit typically comprises a valley, a portion of a valley, or terminal basin. It would be beneficial to aquatic species conservation for NDOW to partner with NDWR, USGS, the Nevada Department of Environmental Protection, universities, conservation groups, and other aquatic resource planning bodies to develop and incorporate a standardized hydrologic unit system at this scale that would aid in exchange of information.

While the four major ecoregions in Nevada are readily recognizable to most partners, Bailey sections were not an intuitive framework for the development of aquatic species conservation strategies. For aquatic species, much of the structure for conservation delivery is already in place in the form of county or multi-county species conservation working groups. . In this context, partner feedback indicated that framing objectives and actions by key habitat type would offer an effective approach.

As a result, the Nevada WAP provides a user-friendly format to the multiple partners that will be involved in its implementation. A framework based on modified Bailey's sections will likely be useful in the terrestrial ecological linkage for future partnership development with California, Oregon, Idaho, Utah, and Arizona. The use of HUCs that by their nature overlap state boundaries will be useful in linking aquatic conservation efforts

among neighboring states. Multi-state implementation of WAPs will facilitate the identification of common priorities. Collaboration among western states will also promote cooperative studies for wildlife and their key habitats that will address objectives across ecologically based units rather than geopolitical boundaries.

## Nevada Ecological Framework Map

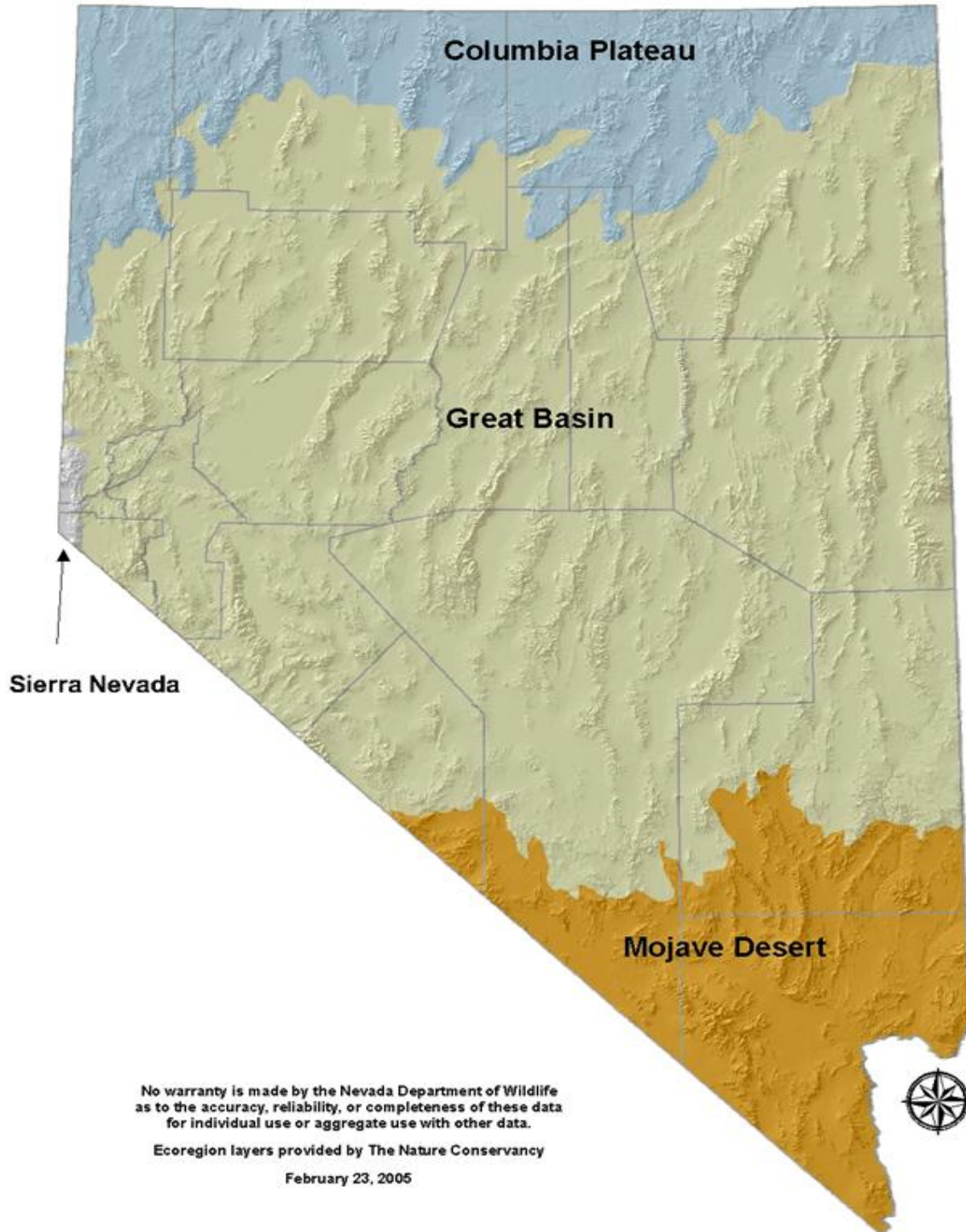


Figure 4. A map of the four main ecoregions in Nevada.

## Key Habitats

### *Aquatic Habitat Information*

Because of the absence of an easily definable aquatic habitat geospatial data layer which fit into the developed structure of this process, the WAP team chose a hybrid approach to incorporating aquatic habitat information. Rather than develop an entirely separate, HUC based, aquatic habitat definition structure, which would have been duplicative of much of the information contained in associated terrestrial habitat definitions, aquatic habitats have been incorporated into their associated terrestrial key habitat groups. This applies primarily to flowing water (stream or lotic) habitats, and also to smaller standing water (lentic) aquatic habitats such as montane pools and marshes. Where the ability exists to more clearly define aquatic features on the landscape, these have been presented as the unique key habitat groups, Lakes and Reservoirs and Spring and Springbrook aquatic habitats. This structure has the benefit of closely linking aquatic and terrestrial habitat strategies for those key habitats, such as stream systems, where conservation and management approaches must integrate aquatic and terrestrial components to ensure these systems are fully functional and supporting diverse species assemblages at their full potential.

## Linking Nevada's Species of Conservation Priority to 22 Key Habitats

After identifying the Species of Conservation Priority and describing the habitat framework for which the conservation strategies will be developed, the next step was to link the priority species to the habitat framework so that the strategies will be relevant to species conservation. The assumption in effecting the species-habitat linkage is that species occur in habitats based on the availability of key structural elements that satisfy a species' most basic needs for food, cover, and reproductive needs (nesting, denning, etc.). Enough is known about the basic life history needs of most vertebrate species in Nevada that they can be roughly characterized and categorized by the key habitat elements to which they respond. For example, birds that feed on insects in the canopies of cottonwood trees are characterized as "overstory/canopy" species; while many reptiles respond positively to the rocky landscape features in their habitats ("rocks/canyons"). Species that respond to the same set of habitat features were grouped together in species assemblages – literally, species assembled together by similar habitat needs.

Conservation strategies for habitat management were written toward the needs of these species assemblages by addressing the conservation issues associated with the maintenance of the key habitat features. For example, one of the 22 Key Habitats is Intermountain Conifer Forests and Woodlands. Goals and objectives for this habitat address natural processes to maintain the structure but they also incorporate the value of this habitat to Nevada's WAP Species of Conservation Priority. Structural attributes of intermountain conifer forests and woodlands important to wildlife such as a mature overstory or the presence of snags and cavities were identified and species were grouped within these features ("species assemblages"). For aquatic species, cold versus hot springs or ephemeral versus permanent water sources are important distinctions for setting conservation objectives. However, for many key habitat types incorporating aquatic species, assemblages of those species are driven as much by the isolation and local endemism of those species as they are by specific structural characteristics of individual aquatic habitats within the key type. Species assemblages are identified for each of the 22 Key Habitats and were formulated through a series of workshops and interviews with species experts in Nevada, supplemented by information available in the literature describing species requirements.

In addition to habitat-based strategies addressing the needs of species assemblages, actions for individual species are identified. This was necessary when the required action is not habitat-based, or when it involves species-based research or monitoring. Even though the species in question might have broad habitat use patterns, an attempt was made to attach the species-based action to the Key Habitat strategy where it was most likely to have relevance. This was purely an organizational decision that was made to avoid the need to write a separate section for species-based action.

Many of the species-based conservation actions call for the development of species/habitat relationships models. These studies and the resultant models basically describe the species-habitat linkage through key habitat features that are used to inform conservation strategy development in this plan. The refinement of knowledge of these relationships will allow better understanding of the habitat features influencing species' distribution on the landscape, create better-informed species assemblages, and develop a more critically-focused conservation strategy with better prospects for success.

## **The WAP Conservation Landscape and Focus Areas**

The second required element for Nevada's WAP includes describing the locations of key areas essential to the conservation of fish and wildlife species of concern (see section IV. C. "Discussion of the Eight Elements" for more information). Addressing this element began with a landscape analysis that identified areas in Nevada that represented the highest biodiversity of WAP Species of Conservation Priority.

The number of documented occurrences of terrestrial wildlife species within Nevada's landscapes were calculated using a set of species occurrence GIS layers and a Nevada Basin and Range landscape I.D. layer (BRRC 2002). The species analyzed included the WAP Species of Conservation Priority described above. Terrestrial species identified in the priority matrix have been documented in 600 of the 829 basins and ranges (i.e., landscapes) of Nevada. It is impossible and likely unnecessary to work in all areas to meet conservation goals for all species. The next step was to refine the analysis and identify the landscapes that are most important for Nevada's fish and wildlife in order to focus conservation efforts to maximize conservation for Species of Conservation Priority. The number of Species of Conservation Priority occurrences for each landscape (i.e., species richness) was calculated, and this process identified 30 landscapes encapsulating 91 percent of the priority species in the analysis. The number of terrestrial species of concern documented within each of these landscapes ranges from 24 to 60. Species that were not captured by the species richness assessment occurred in localized areas (i.e., local endemics), and their key landscape was added to the conservation landscapes list. In order to acknowledge and represent the key focal areas of our conservation partners, the 30 landscapes that emerged from this preliminary analysis were supplemented with additional priority areas that have been generated from previous conservation efforts (see Appendix G *pending*), including priority sage grouse population management units (PMUs), Audubon Important Bird Areas, and critically important springs and watersheds for aquatic species conservation.

The identification of biologically important areas for aquatic Species of Conservation Priority was based on the same concepts employed for terrestrial wildlife species, but landscape units more meaningful to aquatic species distribution were used. An initial analysis was conducted to identify hydrologic unit codes (HUCs) with aquatic Species of Conservation Priority and their respective species richness values. Out of 72 HUCs in Nevada, 54 contain aquatic Species of Conservation Priority. Twenty-nine of these HUCs represent occurrences of 94 percent of the species from our analysis with 3 to 18 aquatic Species of Conservation Priority present in the HUC. HUCs cover very large areas but aquatic species are not typically widely distributed across the HUC because they are restricted to aquatic habitats. To further refine key areas for aquatic species, a 2-km<sup>2</sup> grid was

## Nevada Wildlife Action Plan

---

overlaid on Nevada using GIS and species richness was calculated for the individual cells. This information, combined with expert opinion on important areas for individual Species of Conservation Priority (e.g., Lahontan cutthroat trout), was used to identify biologically important areas for aquatic Species of Conservation Priority at the watershed scale.

The landscape analysis permitted us to compile a set of maps we refer to as the conservation landscape (Figure 5). The conservation landscape provides information about the location of biologically diverse areas in Nevada, highlights landscapes containing endemic species, and recognizes important areas identified in prior conservation planning efforts. The map does not provide a prioritization of individual landscapes but is intended as an informational resource for strategy development and implementation. Each key habitat strategy in the Nevada WAP includes a list of preliminary focal areas derived from the conservation landscape assessment. Preliminary focal areas provide a general overview of key areas for fish and wildlife but by no means are intended to imply that conservation action should be restricted to these areas. Prioritization of key areas in the conservation landscape will be carried out by local working groups during WAP implementation. The conservation landscape provides a framework for evaluating Nevada's WAP in a statewide context to help determine the extent to which conservation actions identified in the 21 key habitat strategies are benefiting the WAP Species of Conservation Priority.

The conservation landscape map will be updated in the final version of this plan. The Greater Sage- Grouse Habitat Categorization Map for Nevada will also be included in the final version of this plan,

# Nevada Wildlife Action Plan

**Table 2. Nevada’s Ecological Systems, Key Habitats, and Ecological System Groups**

Ecological System Group	Key Habitat	Ecological System
<i>Basins and Desert Scrub</i>	Intermountain (cold desert) scrub	Inter-mountain Basins Greasewood Flat
		Inter-mountain Basins Mixed Salt Desert Scrub
		Inter-mountain Basins Semi-desert Shrub Steppe
		Inter-mountain Basins Wash
	Mojave mid-elevation mixed desert scrub	Colorado Plateau Blackbrush-Mormon tea Shrubland
		Mojave Mid-elevation Mixed Desert Scrub
	Mojave/Sonoran (warm desert) scrub	Sonora-Mojave Creosotebush-White Bursage Desert Scrub
		Sonora-Mojave Mixed Salt Desert Scrub Sonora-Mojave-Baja Semi-Desert Chaparral
<i>Developed Lands and Agriculture</i>	Agricultural lands	Agriculture
	Developed landscapes	Developed, Medium - High Density
		Developed, Open Space - Low Intensity
<i>Lower Montane</i>	Lower montane chaparral	Great Basin Semi-Desert Chaparral
		Mogollon Chaparral
	Lower montane woodlands	Great Basin Piñon-Juniper Woodland
		Inter-Mountain Basins Juniper Savanna
		Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland
		Rocky Mountain Gambel Oak-Mixed Montane Shrubland
	<i>Riparian and Wetlands</i>	Desert playas & ephemeral pools
North American Warm Desert Playa		
Intermountain rivers and streams		Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
		Rocky Mountain Subalpine-Montane Riparian Shrubland
		Rocky Mountain Subalpine-Montane Riparian Woodland
Lakes and Reservoirs		Open Water
Marshes		North American Aid West Emergent Marsh
Mesquite bosques and desert washes		North American Warm Desert Riparian Mesquite Bosque
		North American Warm Desert Wash
Mojave rivers and streams		Invasive Southwest Riparian Woodland and Shrubland
		North American Warm Desert Lower Montane Riparian Woodland and Shrubland
		North American Warm Desert Riparian Woodland and Shrubland
Wet Meadows		Mediterranean California Subalpine-Montane Fen
		Rocky Mountain Alpine-Montane Wet Meadow

# Nevada Wildlife Action Plan

Ecological System Group	Key Habitat	Ecological System
		Temperate Pacific Montane Wet Meadow
<i>Sagebrush Semidesert</i>	Sagebrush	Great Basin Xeric Mixed Sagebrush Shrubland
		Inter-Mountain Basins Big Sagebrush Shrubland
		Inter-Mountain Basins Big Sagebrush Steppe
		Inter-Mountain Basins Montane Sagebrush Steppe
<i>Sand Dunes and Badlands</i>	Cliffs and Canyon	Colorado Plateau Mixed Bedrock Canyon and Tableland
		Inter-Mountain Basins Cliff and Canyon
		North American Warm Desert Bedrock Cliff and Outcrop
		North American Warm Desert Volcanic Rockland
		Sierra Nevada Cliff and Canyon
	Sand dunes and badlands	Inter-mountain Basins Active and Stabilized Dune
		North American Warm Desert Active and Stabilized Dune
		North American Warm Desert Badland
		North American Warm Desert Pavement
	<i>Montane to Alpine</i>	Alpine and tundra
Rocky Mountain Alpine Bedrock and Scree		
Rocky Mountain Dry Tundra		
Aspen woodland		Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex
		Rocky Mountain Aspen Forest and Woodland
Grasslands and meadows		Inter-Mountain Basins Semi-Desert Grassland
		North Pacific Montane Grassland
		Rocky Mountain Subalpine Mesic Meadow
		Southern Rocky Mountain Montane-Subalpine Grassland
Intermountain conifer forests and woodlands		Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland
		Rocky Mountain Bigtooth Maple Ravine Woodland
		Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland
		Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland
		Rocky Mountain Ponderosa Pine Woodland
		Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
		Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
		Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland
		Sierra conifer forests and

# Nevada Wildlife Action Plan

---

Ecological System Group	Key Habitat	Ecological System
	woodlands	Forest and Woodland
		Mediterranean California Ponderosa-Jeffrey Pine Forest and Woodland
		Mediterranean California Red Fir Forest and Woodland
		Northern Pacific Mesic Subalpine Woodland
		Sierra Nevada Subalpine Lodgepole Pine Forest and Woodland
<i>Other</i>	Barren landscapes	Barren Lands, non-specific
		Recently Burned
		Recently Mined or Quarried
	Invasive grasslands and forblands	Invasive Annual and Biennial Forbland
		Invasive Annual Grassland
		Invasive Perennial Grassland

DRAFT

# Nevada Wildlife Action Plan

ID	Preliminary Focal Area	ID	Preliminary Focal Area	ID	Preliminary Focal Area	ID	Preliminary Focal Area
1	Black Rock Desert	44	Toiyabe Range	88	Wall Canyon	131	Stillwater NWR
2	Smoke Creek desert	45	Monitor Range	89	Summit Lake/Mahogany Crk	132	Ruby Marshes
3	Pyramid Lake Valley	46	Clan Alpine Range	90	Pyramid Lake	133	Franklin Lake
4	Lahontan Valley	47	Desatoya Mountains	91	Meadow Valley Wash	134	Quinn River
5	Fletcher	48	Pine Nut Range	92	Condor Canyon	135	Kirch WMA
6	Mason Valley	49	Lincoln County	93	Lower Meadow Valley Wash	136	Mason Valley WMA
7	Walker River	50	Schell Creek Range	94	Goose Creek	137	Fernley WMA
8	White River Valley	51	Bodie Hills	95	Las Vegas Wash	138	Argenta Marsh
9	Carico Lake Valley	52	White Mountains	96	Grapevine/Sacaton Canyon	139	Duck Flat
10	Humboldt Sink	53	Great Basin National Park	97	Muddy River	140	Pahranagat NWR
11	Lovelock Valley	54	Egan Range	98	Virgin River	141	Soda Lake
12	Winnemucca Lake Valley	55	Ward Mountain Creek Drainage	99	Black Canyon	142	Wall Canyon Reservoir
13	Quinn River Valley	56	Wilson Creek Range	100	Overton WMA	143	Walker Lake
14	Kings River Valley	57	Clover Range	101	Amargosa River/Oasis Valley	144	Lake Mead
15	Mormon Mesa	58	Beaver Dam Slope	102	Colorado River below Davis Dam	145	Lake Mohave
16	Coyote Springs Valley	59	Hidden Forest	103	Pahranagat Valley	146	South Fork Reservoir
17	Gold Butte-Pakoon	60	North Snake Range	104	San Antonio	147	Wild Horse Reservoir
18	Piute-El Dorado Valleys	61	Fox Creek Range	105	Steptoe Valley WMA	148	Wilson Reservoir
19	Newberry Mountains	62	Ichabod Range	106	North Spring Valley	149	Rye Patch Reservoir
20	Mormon Mountains	63	Butler Basin	107	Jackson Mountains	150	Harmon Reservoir
21	Pahute Mesa	64	East Humboldt Range	108	Big Smoky Valley	151	Gridley Lake
22	Black Mountains	65	Independence Mountains	109	Clover Valley	152	Calcutta Lake Complex
23	Blue Diamond Hills	66	Jarbidge Mountains	110	Independence Valley	153	Railroad Valley
24	Upper Las Vegas Wash	67	Ruby Mountains	111	Cottonwood Canyon	154	Fernley Sink
25	Red Rock Canyon	68	White Pine Range	112	Diamond Valley	155	Continental Lake
28	McCullough Range	69	Lake Tahoe Basin	113	Fish Lake Valley	156	Snow Water Lake
27	Desert National Wildlife Range	70	Carson Range	114	Duckwater/Bull Creek	157	Blow Sand Mountains
26	River Mountains	71	Humboldt River	115	Monitor Valley	158	Crescent Dunes
29	Spring Mountains	72	Paradise Valley	116	Overton Arm	159	Sand Mountain
30	Wee-Thump Joshua Tree Wilderness	73	Little Humboldt River	117	Upper Muddy River	160	Silver State Sand Dunes
31	Buffalo/Skedaddle	74	Bruneau River	118	Ferguson Springs	161	Big Dune
32	Massacre	75	Mary's River Range	119	Ash Meadows	162	Black Mountains Area-Muddy River Drainage
33	Sheldon NWR	76	Deep Creek Range	120	Soldier Meadows	163	Moapa Valley
34	Montana Mountains	77	Wassuk Range	121	Spring Valley	164	Saint Thomas Wash
35	Santa Rosa Range	78	Truckee River	122	Big Bend-Fort Mohave	165	Sheep Range
36	Owyhee Desert	79	Carson River	123	Pahrump	166	Cloverdale Creek
37	O'Neil Basin	80	Reese River	124	Amargosa Valley	167	Genoa
38	Salmon Falls Creek	81	Mary's River	125	Stump Spring	168	High Rock Canyon - High Rock
39	Thousand Springs Valley	82	North Fork Humboldt River	126	Hiko Wash	169	Owyhee Desert-South Fork Owyhee Drainage
40	Tuscarora	83	South Fork Humboldt River	127	Catclaw Wash Complex	170	Goshute Mountains
41	Cortez	84	Jarbidge River and Tributaries	128	Hiko Springs	171	Opal Mountains
42	Shoshone	85	Owyhee River and Tributaries	129	Carson Lake	172	Sonoma Range
43	Toquima Range	86	Owyhee River and Tributaries	130	Carson River		
		87	Bonneville Drainage				
						173	Majuba Mountain
						174	East Range
						175	Double H Mountains
						176	Las Vegas Valley
						177	Truckee Meadows
						178	Carson City
						179	Elko
						180	Mesquite
						181	Orovada
						182	North Ruby Valley
						183	Carson Valley
						184	Owyhee River
						185	Adobe Range
						186	Corn Creek
						187	Pilot Peak
						188	Frazier Creek
						189	Dorsey Creek
						190	Willow Creek Drainage
						191	Dry Lake Valley
						192	South Fork Deep Creek
						193	Ruby Mtns-Huntington Valley
						194	Dixie Creek
						195	Bruneau Range Creeks

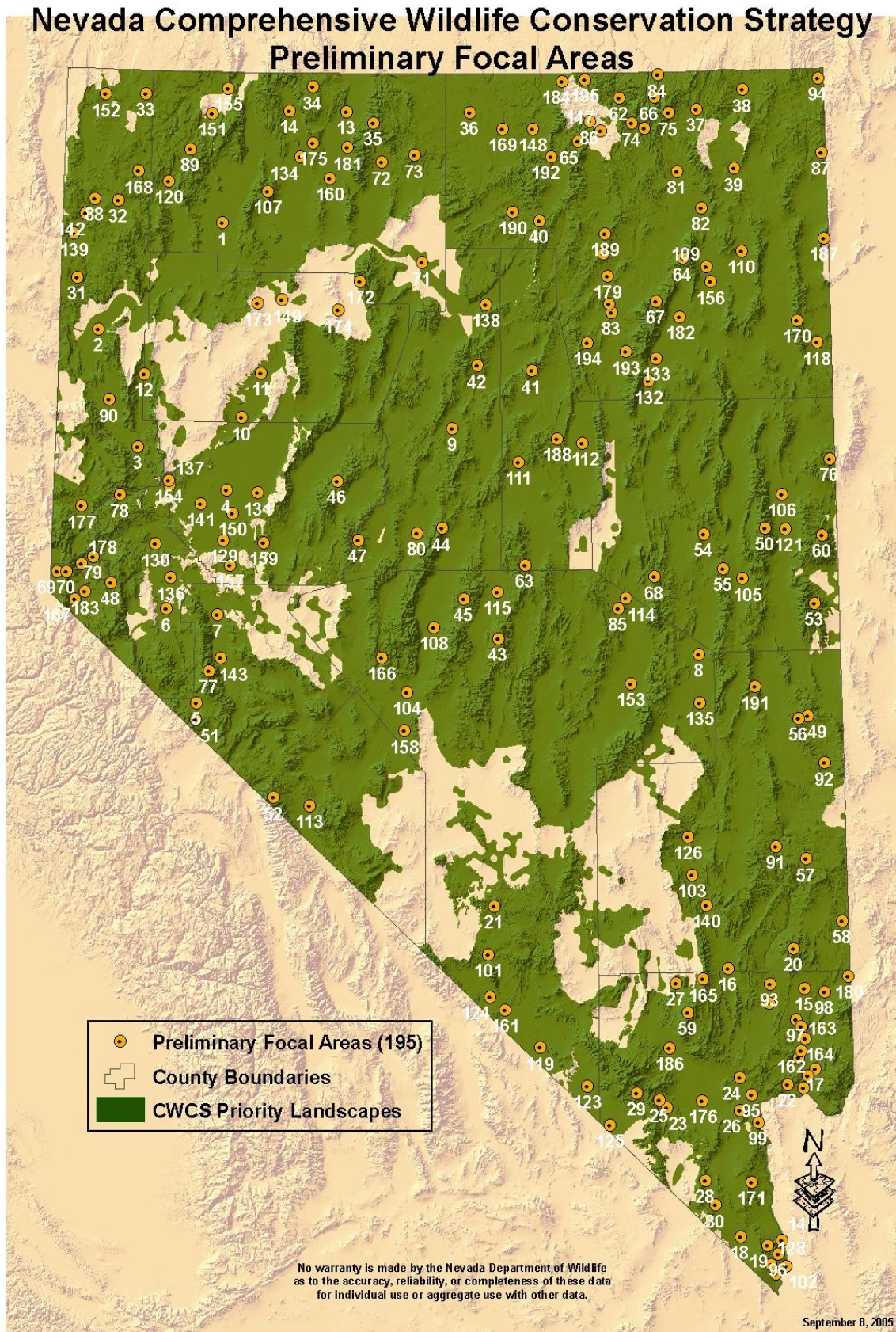


Figure 5. Preliminary Focal Areas identified to guide the application of the Nevada WAP.