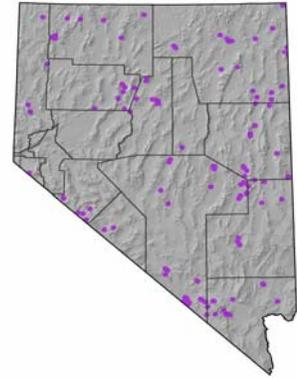


A number of species in the genera *Eremopyrgus*, *Fluminicola*, *Juga*, *Pyrgulopsis*, and *Tryonia* are included in the 2012 WAP due to their localized populations and susceptibility to a number of threats including water issues, exotic species invasion, development, trampling by livestock and wild horses, and climate change.



<b>Agency Status</b>
<b>NV Natural Heritage</b>
<b>USFWS</b> <span style="float: right;">No Status</span>

**TREND:** Trend varies depending on the conditions at each location.

**DISTRIBUTION:** Highly localized across the state.

**GENERAL HABITAT AND LIFE HISTORY:**

Many species of endemic aquatic gastropods are a remarkable remnant of episodes in the Great Basin's history when extensive waterways covered the area. During the past two million years, these high water stands occurred at roughly 100,000-year intervals, with the lakes and rivers rising for the last time about 13,000 years ago. Each time the region dried up, springsnails and other aquatic species were stranded in isolated colonies, surviving only within the sharply defined boundaries of the small springs, seeps, and wetlands. When large lakes and rivers disappeared, the salts and minerals of the local soils, and the geochemistry and geothermal aspects of the surviving aquifers, concentrated their influence on the small, residual ecosystems. As the isolated springsnail populations adapted to the conditions of each inhabitable water source, an inevitable process of evolution created the multiple species being discovered continually today. (Doherty 2002). Very little is known about the life history of NV's endemic gastropods.

**CONSERVATION CHALLENGES:**

Species in the genus *Pyrgulopsis* are particularly susceptible to extinction because the entire population of any single species is often tied to a single spring. Such sites may be no more than a few square meters and easily destroyed by water diversion, capping, groundwater pumping, invasive or exotic species, development, or trampling by livestock. Even within an individual spring system the suitable habitat for and distribution of endemic gastropods may be limited to unique, small micro-habitats because of distance from the spring source, thermal and substrate characteristics, velocity, and other factors. Hence, these species may be particularly sensitive to disturbance and site alteration even when it includes only a small part of a spring system.

**NEEDS:**

***Research Needs:*** Additional spring surveys are needed to assess the presence or absence of aquatic gastropods and to fully describe the taxonomy and biogeographical features of these genera. Little is known about the life history of each species, and much basic biology remains to be done.

***Monitoring and Existing Plans:*** Approximately 300 springs were visited in 2008 and 2009 to determine their current condition and if sensitive aquatic gastropods were present. The results of these surveys, a partnership between The Nature Conservancy, Desert Research Institute, and Nevada Natural Heritage Program, are included in the Nevada Springs Conservation Plan (Abele 2011).

***Approach:*** In 1998, six federal land management and resource agencies, along with the Smithsonian Institution and The Nature Conservancy, signed a Memorandum of Understanding to work to conserve the nearly 100 species of aquatic gastropods in habitats on federal and Nature Conservancy lands in the Great Basin. The agencies and involved scientists are working to identify threatened habitats and raise the awareness of a broad range of springs stakeholders throughout the West. (Doherty 2002). An effort needs to be made to develop productive working relationships with private landowners and to help these landowners meet their needs while managing springs to the maximum benefit of these species.

## California floater

## *Anodonta californiensis*

WAP 2012 species due to its susceptibility to a number of threats including water issues, exotic species invasion, climate change, and development.



Agency Status	
NV Natural Heritage	G3QS1
USFWS	No Status
BLM-NV	Sensitive
USFS-R5	Sensitive
CCVI	Moderately Vulnerable

**TREND:** Trend is unclear although based on evidence from elsewhere, this species is almost certainly declining.

**DISTRIBUTION:** Historically found within the Humboldt and Truckee river basins. May also have been in Carson or Walker Rivers. Some authors believe all occurrences in Nevada to be historical.

### **GENERAL HABITAT AND LIFE HISTORY:**

The California floater exists in shallow muddy or sandy habitats in larger rivers, reservoirs, and lakes.

Embryos develop into larvae called glochidia, which are released by the female and attach to a host fish. The full range of host fish are not known, but they may parasitize native minnows as well as the nonnative mosquito fish. During breeding, males release sperm into the water and females must inhale it for fertilization to occur. The California floater reaches maturity within 4-5 years and has a life span of 10-15 years.

### **CONSERVATION CHALLENGES:**

Vulnerable to pollution; diversion of rivers for irrigation, hydroelectric, and water supply projects; elimination of natural fish hosts; eutrophication due to agricultural runoff and urbanization; and impoundments. The California floater thrives in reservoirs, but many reservoirs experience severe annual water-level fluctuations that impact the standing crop of mussels in shallow water. During continued drought some habitats may dry up completely, as was the case for Washoe Lake in 2004. Nonnative species may compete with their host fish or eat young mussels (e.g., common carp).

### **NEEDS:**

**Research Needs:** Determine potential host fishes. Identify potential suitable range and characterize current distribution and occurrence in NV. Assess genetics to determine range-wide population structure.

**Monitoring and Existing Plans:** This species is not currently monitored and does not occur in any other existing plans.

**Approach:** Continue interaction with the Northwest Freshwater Mussel Working Group (NWFMWG). Through an outreach program, solicit volunteers/researchers to conduct distribution surveys, using the recently developed guide to freshwater mussels of the northwest, and protocols recommended by the working group. Encourage select volunteers and researchers to collect appropriate samples for genetic evaluation; provide written guidance for sample collection. Partner with aquatic field biologists and ecologists to collect information while conducting other projects in habitats that could support freshwater mussels.