

California Floater - *Anodonta californiensis*

Abundance: Unknown

Status: NSS1 (Aa)

NatureServe: G3 S2

Population Status: Given the low numbers of California floater found in this survey and considering the impacts of water development (e.g., stream dewatering and the presence of barriers to fish movement); the California floater may be more imperiled in Wyoming than what was once thought. Only 13 live California floaters were found during systematic native mussel surveys.

Limiting Factor: The impoundments and irrigation diversions throughout the Bear River drainage prevent downstream populations of California floater from using the migration capabilities of their host fish (Watters 1996). Limited populations in downstream states and within Wyoming make the source populations sparse. If the isolated populations of California floater found in the Bear river drainage experience more severe drought years and increased anthropogenic disturbances, it may cause a rapid decline in their existing population numbers, making their recovery very difficult (Haag and Warren 2008). The short-lived nature of California floater reduces their chances of recolonization in the absence of immigration from downstream populations, (Haag and Warren 2008).

Comment: NSSU to NSS1 (Aa)

Introduction

North America hosts the world's highest diversity of freshwater mussels (over 300 species), but more than 70% of the mussels in North America are imperiled or critically imperiled (Williams et al. 1993). The shells of the California floater (*Anodonta californiensis*) are up to 12.7 cm (5 inches) in length and can be yellow-green, yellow-brown, olive, pale brown, red-brown, or black (Nedeau et al. 2009). These mussels do not display external sexual dimorphism. California floaters live in the western United States from Arizona to Washington and California to Wyoming (NatureServe 2015). These mussels have a wide range, but have sparse populations (Hovingh 2004). These bivalves are considered critically imperiled (Nevada and Arizona) to imperiled (California, Washington, Oregon, Wyoming, Montana, Idaho and Utah; NatureServe 2015). The number of individuals and sites occupied by the California floater are likely declining in the United States (NatureServe 2015). In Wyoming, California floaters are only known from the Bear River mainstem, the tributary Yellow Creek and the shoreline of Woodruff Narrows Reservoir (Beetle 1989; Hovingh 2004; Cvcancara 2005). California floaters were first found near Cokeville in the Bear River in 2008 where this species co-occurs with the western pearlshell (*Margaritifera falcata*). Only two other drainages in the state are known to have two living mussel species co-occurring. Freshwater mussels are filter feeders that remove fine organic matter from the water column (Smith 2001). The life cycle of native mussels requires a host fish during the larval stage. Larval mussels (glochidia) disperse while attached to their host and develop into adults if released on suitable substrate (Cummings and Graf 2010). Natural hosts for the California floater are poorly known but introduced Mosquitofish (*Gambusia affinis*; d'Eliscu 1972), Speckled Dace (*Rhinichthys osculus*), Margined Sculpin (*Cottus marginatus*), Longnose Dace (*Rhinichthys cataractae*; O'Brien et al. 2013), and Chubs (*Gila* spp.; Hovingh 2004), Green Sunfish (*Lepomis cyanellus*) and Cutthroat Trout (*Oncorhynchus clarkii* spp.). Raccoons, muskrats, otters, fishes, turtles, and birds all feed on mussels (Grabarkiewicz and Davis 2008). Wyoming's native mussel diversity is naturally low (seven species known), owing to the generally high elevation, headwater character of Wyoming's aquatic ecosystems.

Habitat

The California floater prefers shallow habitats with sand and silt substrate in large rivers, lakes, and low gradient streams (Beetle 1989; Hovingh 2004; Whaley et al. 2004; Nedeau et al. 2009) with relatively stable water levels (Hovingh 2004). This mussel is found mostly in pools, near channel banks, and in sedge-occupied substrates (Cuffey 2002). The mussel prefers low velocity flow regimes and lakes.

Problems

h Water quality degradation, chemical pollution, silt, and interrupting glochidial host fish relationships.

Conservation Actions

- h Baseline population data was collected from the Bear River drainage during the 2011 field season, but more data and continued monitoring is needed.

Monitoring/Research

More records of California floater from the Bear River drainage would be extremely valuable. If time allows and resources are available, thorough systematic surveys where live mussels are present should be performed. Surveying for California floater (average lifespan of 10-15 years) is recommended at sites with known live populations every five years to observe if their populations are increasing, decreasing, or stable. Any new sites in the Bear River drainage would be critical in determining a more refined NSS ranking.

Recent Developments

State Wildlife Grant funding was used during for fiscal years 2011 and 2012 in western Wyoming surveying the Bear River drainage. An administrative report is available that summarizes the data that were collected during systematic surveys (Mathias 2014).

Range expansion in Wyoming for California was noted in Yellow Creek, upstream of Woodruff Narrows Reservoir. This is the furthest upstream in Wyoming this species has been found to date.

References

Hovingh, P. 2004. Intermountain freshwater mollusks, USA (Margaritifera, Anodonta, Gonidea, Valvata, Ferrissia): geography, conservation, and fish management implications. *Monographs of the Western North American Naturalist* 2:109-135.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application] Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: December 31, 2015).

Nedeau, E., A. K. Smith, and J. Stone. 2005. Freshwater mussels of the Pacific Northwest. Pacific Northwest Native Freshwater Mussel Workgroup, Vancouver, Washington.

OSUMD. 2010. Mussel host database [web application]. Molluscs Division of the Museum of Biological Diversity, Ohio State University, Columbus, OH. Available: <http://128.146.250.235/MusselHost/> (Accessed January 14, 2010).

Whaley, R. A., A. M. Cvancara, and K. A. Lippincott. 2004. House of Pearl. *Wyoming Wildlife*. 68:12-17.

Smith, D. G. 2001. Pennak's Freshwater Invertebrates of the United States. John Wiley and Sons, Inc., New York. Pp. 638.

Cuffey, K. M. 2002. Freshwater mussels in a California North Coast Range river: occurrence, distribution, and controls. Technical completion report (University of California Water Resources Center), Project Number W-933. <http://escholarship.org/uc/item/4nb992t4>.

Cummings, K. S., and D. L. Graf. 2010. Mollusca: bivalvia. Pages 309-384 in J. H. Thorp and A. P. Covich, editors. *Ecology and Classification of North American Freshwater Invertebrates*. Academic Press, New York.

Grabarkiewicz, J. and W. Davis. 2008. An introduction to freshwater mussels as biological indicators. EPA-260-R08-015. U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC.

Beetle, D. E. 1989. Checklist of recent Mollusca of Wyoming. *Great Basin Naturalist* 49:637-645.

Cummings, K. S. and C. A. Mayer. 1992. Field guide to freshwater mussels of the Midwest. *Illinois Natural History Survey Manual* 5.

Cvancara, A. M. 2005. Illustrated key to Wyoming's freshwater mussels. Alan M. Cvancara, Casper, WY.

d'Eliscu, P.N. 1972. Observation of the glochidium, metamorphosis, and juvenile of *Anodonta californiensis* Lea, 1857. *Veliger* 15:57-59.

O'Brien, C., Nez, D., Wolf, D. and J.B. Box. 2013. Reproductive Biology of *Anodonta californiensis*, *Gonidea angulata*, and *Margaritifera falcata* (Bivalvia: Unionoida) in the Middle Fork John Day River, Oregon. *Northwest Science* 87(1): 59-72.

Williams J. D., M.L. Warren, K.S. Cummings, J.L. Harris and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. *Fisheries* 18: 6-22.

Mathias, P.T. 2014. Native freshwater mussel surveys of the Bear and Snake Rivers, Wyoming. Wyoming Game and Fish Department Fish Division Administrative Report, Cheyenne, WY.

California Floater (*Anodonta californiensis*)



SOURCE: Digital maps of ranges for Wyoming Species of Greatest Conservation Need: February 2016. Wyoming Game and Fish Department. Note that brown indicates the current known range of the species.