Cylindrical Papershell - Anodontoides ferussacianus

Abundance: Unknown

Status: NSS2 (Ab) NatureServe: G5 SNR

Population Status: The short lifespan of the cylindrical papershell requires them to experience suitable spawning conditions more frequently than longer-lived species (Haag and Warren 2008). Given the low numbers of cylindrical papershell found during systematic surveys and considering the impacts of water development (e.g., stream dewatering and the presence of barriers to fish movement); the cylindrical papershell may be more imperiled in Wyoming than previously thought. A total of 17 cylindrical papershell were found during focused surveys (Mathias 2015).

Limiting Factor: Water development in the form of impoundments and irrigation diversions throughout cylindrical papershell's range present even more challenges for native mussels to complete their life history and maintain stable populations, especially in a headwaters state. Not only do these barriers prevent downstream populations of cylindrical papershell from using the dispersal capabilities of their host fish (Watters 1996), they also cause the streams to dry and cease flow by impounding or diverting valuable water. In Wyoming, cylindrical papershell are only native to the North and South Platte drainages. Limited populations in downstream states and within Wyoming make the source populations sparse.

Comment: NSSU to NSS2 (Ab)

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). Shells of the cyclindrical papershell (Anodontoides ferussacianus) are up to 7.5 cm (3 inches) in length and can be light-green to yellow-brown. These mussels do not display external sexual dimorphism. Cylindrical papershell live in the Mississippi, Ohio, Cumberland and St. Lawrence River drainages from Arkansas to Manitoba and Wyoming to Vermont (NatureServe 2015). These bivalves are considered critically imperiled (Vermont, Kansas and Missouri) to secure (Indiana and Ohio) and presumed extirpated in Tennessee (NatureServe 2015). Cylindrical papershell are ranked as vulnerable in Wyoming. The cylindrical papershell is widespread and common throughout most of the range with a few exceptions (Cummings and Mayer 1992, NatureServe 2015). In Wyoming, cylindrical papershell are known from tributaries of the North and South Platte River drainages (Hoke 1979; Beetle 1989; Cvancara 2005; Mathias 2015). The cylindrical papershell were found in the lower Laramie River and Horse Creek and evidence of the mussel were found in Crow Creek and Lodgepole Creek in the South Platte River drainage. This mussel co-occurs with the plain pocketbook (Lampsilis cardium) in the lower Laramie River, one of only three known locations with co-occurring, live mussel populations. Freshwater mussels are filter feeders that remove fine organic matter from the water column (Smith 2001). The life cycle of aquatic 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). Cylindrical papershells are host fish generalist and known hosts for theses mussels that are found in Wyoming include White Sucker (Catostomus commersonii), Iowa Darter (Etheostoma exile), Common Shiner (Luxilus cornutus), Mottled Sculpin (Cottus bairdi), Bluegill (Lepomis macrochirus), Largemouth Bass (Micropterus salmoides), Black Crappie (Pomoxis nigromaculatus), Brook Stickleback (Culaea inconstans), and Fathead Minnow (Pimephales promelas; OSUMD 2010; Watters et al. 2009). 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 cylindrical papershell mussel inhabits small streams and low gradient headwater streams, and they have been observed in mud and sand substrate (Hoke 1979; Beetle 1989; Cummings and Mayer 1992; Whaley et al. 2004)

Problems

- Pollution, changes in flow regime, extremely low flows, siltation, changes in substrate, and interrupting glochidial host fish relationships.

Conservation Actions

- Baseline population data was collected from the North and South Platte river drainages during the 2013-2014 field seasons. Continued surveys to document new occurrences and monitor existing populations is crucial to a more refined NSS. Potential reintroductions of CPM from populations in Wyoming (Horse Creek and Laramie River) and/or neighboring states could augment existing populations and help establish new populations.

Monitoring/Research

More records of cylindrical papershell from the North and South Platte River drainages would be extremely valuable. If time allows and resources are available, thorough systematic surveys where live mussels are present should be performed. Surveying for cylindrical papershell (average lifespan of seven 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 within their Wyoming range would be critical in determining a more refined NSS ranking.

Recent Developments

State Wildlife Grant and Governor's ESA funding were used to during the 2013 and 2014 field seasons using systematic surveys techniques developed in 2011. Live individuals were extremely rare. An administrative report is available that summarizes the data that were collected during systematic surveys (Mathias 2015).

References

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.

Hoke, E. 1979. Wyoming mussel distributions as revealed by survey activities conducted during the summer of 1978. Wyoming Game and Fish Department, Cheyenne, Wyoming.

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).

OSUMD. 2010. Mussel host database [web application]. Molluscs Division of the Museum of Biologicial 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.

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.

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

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.

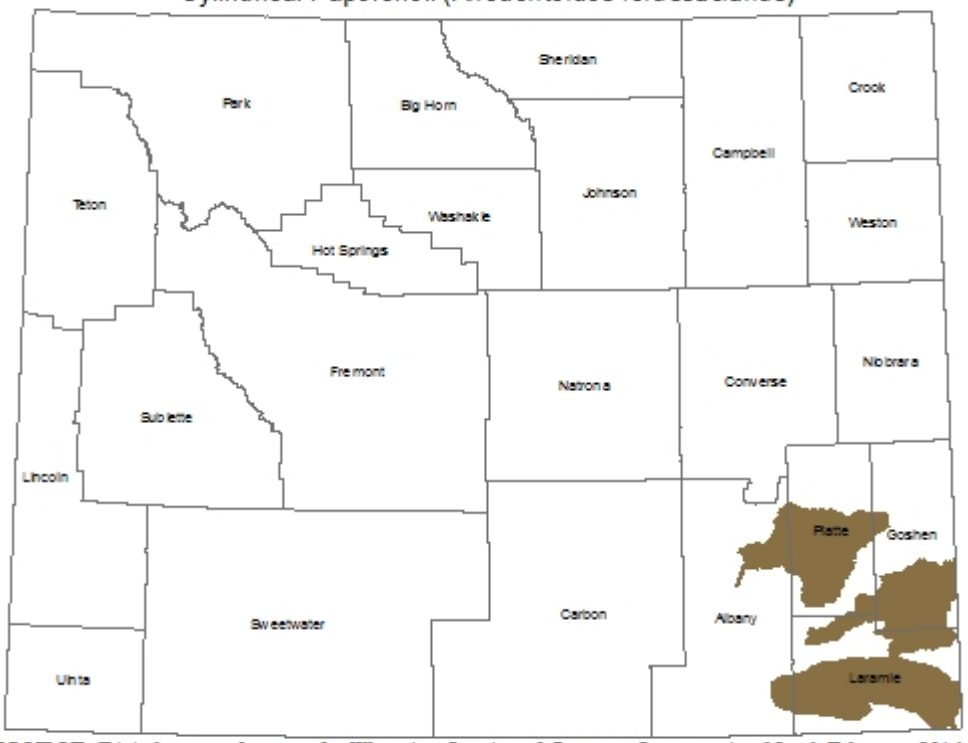
Watters, G.T., Hoggarth, M.A., and D.H. Stansberry. 2009. The Freshwater Mussels of Ohio. The Ohio State University Press, Columbus, OH.

Mathias, P.T.. 2015. Native freshwater mussel surveys of the North and South Platte river drainages, Wyoming. Wyoming Game and Fish Department Fish Division Administrative Report, Cheyenne, WY.

Haag, W.R. and M.L. Warren Jr. 2008. Effects of severe drought on freshwater mussel assemblages. Transactions of the American Fisheries Society 137(4): 1165-1178.

Watters, G.T. 1996. Small dams as barriers to freshwater mussels (Bivalvia, Unionoida) and their hosts. Biological Conservation 75(1): 79-85.

Cylindrical Papershell (*Anodontoides ferussacianus*)



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.