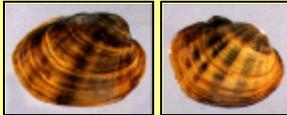


Propagation of the Federally Endangered Higgins' Eye Pearlymussel at the Genoa National Fish Hatchery as a Survival Strategy

An Endangered Species

The Higgins' eye pearlymussel (*Lampsilis higginsii*) is a bivalve mollusk that is endemic to portions of the Upper Mississippi River (UMR) basin.



Male (left) and female (right) Higgins' eye pearlymussels

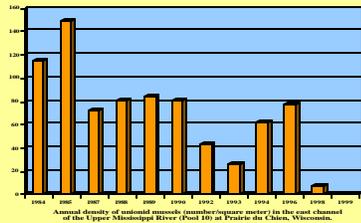
It has been a federally listed endangered species since 1976. Listing criteria for this species include:

- (1) the diminished extent of its historical range;
- (2) the paucity of live specimens found here during most of the 20th century;
- (3) the vulnerability of its remaining populations to demise.

Now in Greater Jeopardy

Biological impacts stemming from the recent introduction and proliferation of zebra mussels (*Dreissena polymorpha*) in portions of the UMR further jeopardize the survival of the Higgins' eye pearlymussel (as well as populations of several other native mussel species) and have now reached a critical stage. For example, several zebra mussel indices (density, infestation rate upon native mussels, area colonized) are currently at peak levels of observation for many river locations. Meanwhile, native mussel communities have recently suffered marked declines in density and diversity. This is the result of zebra mussel-induced stress that weakens the physiological condition of vulnerable native mussel species, ultimately causing increased mortality and decreased recruitment.

For example, the number of native species inhabiting an UMR site that has historically been one of the most diverse mussel beds in the upper Midwest decreased from 27 in 1996 to 7 in 1999. Meanwhile, the abundance of living native mussels here decreased by 98% during this period to its lowest reported level in more than 15 years.



Survival Requires Prompt Actions

All of the designated essential habitats for the Higgins' eye pearlymussel in the UMR are now infested with zebra mussels, placing this native species in imminent danger of extirpation here. Should this occur, the remaining gene pool for this species will be fragmented between two small isolated populations in the St. Croix and Wisconsin Rivers that have yet to become zebra mussel infested.

Faced with this rapidly deteriorating environmental crisis, a partnership of state and federal natural resource agencies and a non-government organization have designed and are enacting a suite of pro-active conservation strategies to help the Higgins' eye pearlymussel recover from the brink of extinction and restore it to suitable portions of its historic range. Among these efforts is the propagation of Higgins' eye pearlymussels at the Genoa National Fish Hatchery (NFH) in southwestern Wisconsin.

Propagation as a Survival Strategy



This building at the Genoa NFH was recently constructed to propagate endangered mussels. Thousands of Higgins' eye pearlymussels will be produced here annually to help prevent the extinction of this species.



Mature Higgins' eye pearlymussel females from the St. Croix River are brought to the Genoa NFH in mid-spring where biologists prepare to collect glochidia (developing mussel larvae) from gravid individuals.



A rubber stopper holds the shell open while a needle and syringe are used to flush thousands of microscopic glochidia from the marsupium (brood chamber) with a stream of water.



Thousands of glochidia are placed in buckets of aerated water with several small fish (bass or walleye) for a short period of time. These fish will serve as hosts for the parasitic glochidia for the next several weeks.



A biologist periodically inspects the gills of the fish with a dissection microscope to ensure that an optimum number of glochidia have attached themselves to this common infection site.



Glochidia infested fish are kept in aquaria and cared for daily. As the glochidia grow, they transform into juvenile mussels that detach from the fish and settle to the bottom of the tank.



Water siphoned from the aquaria is filtered through a series of sieves. Juvenile mussels retained in the sieves are scattered onto beds of crushed rock in shallow artificial streams and fed a suspension of algae daily.



This juvenile Higgins' eye mussel detached from its host fish 4-8 weeks ago and is smaller than a pin head. Its muscular foot is extended beyond the transparent shell to help it feed (note the green algae within its shell).



This juvenile Higgins' eye mussel detached from its host fish 12-16 weeks ago and is larger than a pin head. Both the shape and the pigmentation of the shell now resemble an older Higgins' eye.



The rocky substrate containing the juvenile mussels is removed from the artificial hatchery streams late in the summer and placed in water filled coolers for transport to existing mussel beds in the Wisconsin River.



Upon arrival at a deployment site, the mix of juvenile mussels and rock is spread inside wood framed boxes (2-ft x 2-ft x 8-in) with weighted plywood bottoms and hardware cloth (0.125-in mesh) screen-covered tops.



A diver positions the box and secures it to the riverbed with rock and rebar. These mussels will be inspected annually to evaluate the long-term success of this survival strategy.

Support for this continuing propagation effort is provided by:



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