



Zebra Mussels in the Upper Mississippi River System (UMRS)

U.S. ARMY CORPS OF ENGINEERS

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Location

Upper Mississippi River System

State(s)

IA,IL,MN,MO,WI

Congressional District(s)

IA-1, IA-2, IA-3, IA-4, IL-11, IL-13, IL-14, IL-15, IL-16, IL-17, IL-18, IL-2, IL-3, MN-1, MN-7, MO-6, WI-1, WI-2, WI-3, WI-5, WI-6

Status

The Corps leads a multi-agency panel known as the Mussel Coordination Team that has developed a conservation plan to try to save the endangered Higgins Eye Pearlymussel (*Lampsilis higginsii*) from possible extinction from zebra mussels. This panel was formed to carry out the reasonable and prudent measures as guided by the Endangered Species Act jeopardy Biological Opinion (BO) issued by the FWS on May 15, 2000. In 2013 this group was involved with the propagation, relocation, and cleaning of these endangered mussels in critical habitat areas within the UMRS. The Corps continued its national effort to address invasive species spearheaded by the Invasive Species Leadership Team to examine agency strategies for dealing with invasive species like the zebra mussel on Corps lands. This effort led to the development of guidance on invasive species in 2009 and implementation of this guidance in 2014 through the development of a Program Management Plan.

Description

Since their initial introduction in 1985, zebra mussels have spread from the Great Lakes into several major river systems, including the Mississippi, Ohio, Illinois, Tennessee, and Arkansas, and are now spreading to numerous inland lakes and reservoirs. Zebra mussels attach to hard substrates on the bottom of the river, encrusting water intakes and smothering native mussels. Zebra mussel larvae (veligers) float passively in the water column while adults can move upriver or overland by attaching themselves to recreational or commercial vessels. Within one or two years of their colonization of a new area, zebra mussels typically undergo explosive population growth attaching in mass to a variety of substrates (i.e. plants, rocks, mussels, woody debris, etc.). For example, zebra mussel populations in the Illinois River exploded in 1993, reaching densities of nearly 100,000/m². Since then Illinois River populations have experienced high mortality, resulting in greater than 99% reduction at most sites and have not returned. Researchers believe this decline is due to less than ideal temperature, flow, and suspended sediment levels. Zebra mussels are present in the Upper Mississippi, but are no longer found in the abundance of former years. Reasons for this smaller population size are poorly understood.

Additional Project Information

Transport and Spread - Many human-related transport mechanisms exist on the Upper Mississippi River including watercraft, buoys, marina and boatyard equipment, fishing equipment, fish cages, fish stocking water, bait and bait bucket transfer, marker buoys and floats, amphibious planes, recreational equipment, and litter. The abundant Lake Pepin



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population of zebra mussels is believed to be self-sustaining and a significant source of veligers (immature zebra mussels) that settle and mature downstream. Preliminary research performed by the Mussel Coordination Team indicated that control of zebra mussels within Lake Pepin might reduce the abundance of zebra mussels below Pool 4.

Control Strategies - The conservation plan outlines four broad goals for implementing feasible zebra mussel control measures:

1) No Action - Under the no action alternative, zebra mussels would continue to be transported throughout the UMRS via transport on barges and recreational vessels. This alternative would jeopardize the continued existence of endangered mussel species. In light of the jeopardy BO, this is not considered a feasible alternative.

2) Natural/Environmental Control Measures - Measures being investigated include the restoration of riverine conditions in the navigation pools and/or the mechanical removal of zebra mussel from native endangered species. The efficacy of zebra mussel specific toxicants (chemical molluscicides: chlorine, chlorine dioxide) and/or diseases is also being investigated. The key to the success of any of these measures is gaining an understanding of biological controls such as natural cycles of abundance and habitat preferences of the zebra mussel.

3) Transport/Dispersal Control Measures - Methods for controlling upriver transport of zebra mussels fall into two categories: passive and active.

A. Passive control methods would include treatments that prevent zebra mussels from attaching to barge hulls. The use of toxic coatings (e.g. copper, zinc) or non-stick surfaces (silicone based) is being investigated.

B. Active control methods would include manual removal (scraping, high pressure wash), thermal treatments (steam injection, hot water >32 degrees C), electrical currents, dewatering, desiccation (freezing, heated air), acoustical vibration, ultraviolet light, etc. Active measures could be employed on individual barge hulls or on a larger scale, for instance on a lock and dam or lock chamber.

4) Barriers to Introduction of Exotics - A final alternative to be investigated would be the installation of behavioral, thermal, electrical or other barriers to prevent the introduction of zebra mussels and other exotics to the UMRS. Additionally, methods for preventing the overseas transport of exotics to the US are being examined.

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