



Higgins' Eye Pearlymussel

Lampsilis higginsii

The Higgins eye pearlymussel is an *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. *Threatened species* are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is the Higgins Eye Pearlymussel?

Appearance: The Higgins eye is a freshwater mussel with a rounded to slightly elongate smooth-textured shell that is usually yellowish brown with green rays. The shell, made up of 2 hinged, inflated halves, is up to 4 inches long with a rounded side and a pointed (males) or squared (females) side. The inside of the shell is white with portions that are iridescent and areas that may be tinged with cream or salmon. The soft body enclosed by the shell consists of gills for breathing, a digestive tract for processing food, and a large muscled foot for moving and for anchoring on the stream bottom.

Range: Since 1980, live Higgins eye have been found in parts of the upper Mississippi River north of Lock and Dam 19 at Keokuk, Iowa and in three tributaries of the Mississippi River: the St. Croix River between Minnesota and Wisconsin, the Wisconsin River in Wisconsin, and the lower Rock River between Illinois and Iowa. Recently, we successfully reintroduced the Higgins eye into the Iowa River and Wapsipinicon River in Iowa. The current range is about



Photo by USFWS

50% of the historic range, which extended as far south as St. Louis, Missouri and included several additional tributaries of the Mississippi River.

Habitat: The Higgins eye is a freshwater mussel of larger rivers where it is usually found in deep water with moderate currents. The animals bury themselves in sand and gravel river bottoms with just the edge of their partially opened shells exposed. River currents flow over the mussels as they siphon water for microorganisms such as algae and bacteria, which they use as food. Higgins eye are prey for wildlife like muskrats, otters, and raccoons; they filter water which improves water quality; and mussel beds create microhabitats on river bottoms that provide food and cover for other aquatic life.

Reproduction: Male Higgins eye release sperm into river currents and females downstream siphon the sperm to fertilize their eggs. After fertilization, females store developing larvae (glochidia) in their gills until expelling them back into the current. Some glochidia are able to attach to the gills of host fish, where they develop further. After a few weeks, juvenile mussels detach from the fish's gills and settle on the river bottom, where they can mature into adult mussels and possibly live up to 50 years. The sauger, walleye, yellow perch, largemouth and smallmouth bass, and freshwater drum are considered suitable hosts for Higgins eye glochidia.

Why is the Higgins eye pearlymussel endangered?

Habitat Loss and Degradation: Higgins eye depend on deep, free-flowing rivers with clean water. Much

of their historic habitat has been changed from free-flowing river systems to impounded river systems. Impoundments changed water flow patterns, substrate characteristics, and host fish habitat which, in turn, affect how Higgins eye feed, live, and reproduce. Municipal, industrial, and farm run-off degrade water quality. As filter-feeders, mussels concentrate chemicals and toxic metals in body tissues and can be poisoned by chemicals in their water. Dredging and waterway traffic produce siltation which can cover river substrate and mussel beds.

Exotic Species: Invasive zebra mussels are the greatest known threat to Higgins eye. They are a freshwater mussel native to the Black and Caspian Seas that were introduced into Lake Erie in the late 1980's from ship ballast water discharge. These small mussels are less than 2 inches long, but tens of thousands can colonize a square meter area. Zebra mussels attach to any hard surface, including shells of other mussels, preventing them from normal travel, burrowing, and opening and closing their shells.

Several Higgins eye populations in the Mississippi River have been hit

hard by zebra mussel colonization. The Prairie du Chien, Wisconsin, population has been reduced from one of the most numerous to one of the most threatened. Technology to control zebra mussels is being studied, but no successful measures have been developed that can reliably limit zebra mussel colonization and not harm native mussels.

What is being done to prevent extinction of the Higgins eye pearlymussel?

Listing and Recovery Planning: The Higgins eye was added to the U.S. List of Endangered and Threatened Wildlife and Plants in 1976. As a result of the listing, the U.S. Fish and Wildlife Service prepared a recovery plan that describes actions needed to help this species survive. The Recovery Plan was revised in 2004 to incorporate new information and address the more recent threat of zebra mussels.

Research: Researchers are continuing studies of zebra mussels and their impacts on Higgins eye, of commercial navigation impacts on mussels, and of water quality and contaminant relationships to the species.

Habitat Protection: A variety of government and private conservation agencies are working to preserve Higgins eye and its habitat.

Propagation and Reintroduction: Since about 2000, government agencies have cooperatively developed techniques to propagate Higgins eye and reintroduce the captive bred mussels into rehabilitated habitats in the Mississippi River and several tributaries.

What can I do to help prevent the extinction of species?

Protect: Protect water quality by minimizing use of lawn chemicals (i.e., fertilizers, herbicides, and insecticides), recycling used car oil, and properly disposing of paint and other toxic household products.

Follow: When boating, please follow any rules established to prevent the spread of exotic pests like the zebra mussel.

Encourage and Implement the use of agricultural practices that minimize the erosion of topsoil into rivers and streams and that moderate the flow of surface runoff – increased runoff from agricultural lands is an important factor in the increased rate of sedimentation in the Mississippi River.



Photo by Minnesota DNR; Bernard Sietman

This female Higgins eye is buried in the river bottom with a portion of shell and mantle exposed. The mantle looks like a small fish to attract larger fish. When a fish approaches she releases her glochidia, which can then attach to the fish's gills.

U.S. Fish & Wildlife Service
<http://www.fws.gov/midwest/endangered>

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