Spectaclecase (a freshwater mussel)
Cumberlandia monodonta

The spectaclecase is a freshwater mussel that the U.S. Fish and Wildlife Service has proposed to list as 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 are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

Photo by USFWS; Tamara Smith

The shell of a young spectaclecase mussel is smooth and solidly light yellow, tan, or brown, becoming rough and dark brown to black as the mussel ages.

What is a spectaclecase mussel?

Appearance: The spectaclecase is a large mussel that can grow to at least 9 inches in length. The shape of the shell is elongated, sometimes curved, and somewhat inflated (hence its name).

Range: Historically, the spectaclecase was found in at least 44 streams of the Mississippi, Ohio, and Missouri River basins in 15 states. Today, the spectaclecase has been extirpated from 4 states and is found in only 19 streams. Its current range includes Alabama, Arkansas, Illinois, Iowa, Kentucky, Minnesota, Missouri, Tennessee, Virginia, West Virginia, and Wisconsin. With few exceptions, spectaclecase populations are highly fragmented and restricted to short stream reaches.

Reproduction: The life cycle of most freshwater mussels is complex and includes a stage that is parasitic on fish or other host species. Initially, males release sperm into the water current. As female mussels siphon water for food and respiration, they also siphon sperm that fertilizes their eggs. Within special gill chambers, fertilized eggs develop into microscopic larvae called glochidia. Female mussels expel mature glochidia, which then must attach to the gills or fins of a specific species, usually a fish, to complete development into a juvenile mussel. If glochidia successfully attach to a host, they mature into juvenile mussels within a few weeks and then drop off. If they land in a suitable area, they continue to grow and mature. Using fish (or other aquatic species) as a host allows mussels to move upstream and populate habitats they could not otherwise reach. The host species for spectaclecase are unknown.

As a group, mussels are long-lived, with individuals living up to several decades, and possibly up to 100 to 200 years in extreme instances. The oldest documented spectaclecase was thought to be 70 years old.

Habitat: Spectaclecase mussels are found in large rivers where they live in areas sheltered from the main force of the current. This species is usually found in clusters in firm mud and in sheltered areas, such as beneath rock slabs, between boulders, and even under tree roots.

Feeding Habits: Adults are suspension-feeders, siphoning in water and feeding on the suspended algae, bacteria, detritus, microscopic animals, and dissolved organic material. Adult mussels spend their entire lives partially or completely buried within the substrate.

What are threats to the spectaclecase mussel?

Dams: Population losses due to impoundments have contributed more to the decline and imperilment of the spectaclecase than any other factor. Dams affect both upstream and downstream populations by disrupting natural river flow patterns, scouring river bottoms, changing water temperatures, and eliminating habitat. Large rivers throughout nearly all of the spectaclecase mussel's range have been impounded, leaving short, isolated patches of habitat below dams.

Spectaclecase mussels depend on a fish species, or other aquatic species, to move upstream. Because dams block fish passage, mussels are also prevented from moving upstream. This isolates upstream populations from those downstream, leading to small, unstable populations, which are more likely to die out.

Sedimentation: Poor land use practices, dredging, intensive timber harvests, highway construction, and other activities may accelerate erosion and increase sedimentation. Sedimentation that results in blanketing a river bottom may suffocate mussels because they cannot move fast enough to avoid the impact. Also, increased sedimentation reduces the ability of mussels to remove food and oxygen from the water column, which can lead to decreased growth, reproduction, and survival.

Pollution: Adult mussels are easily harmed by toxins and degraded water quality from pollution because they are sedentary (they tend to stay in one place). Pollution may come from specific, identifiable sources such as accidental spills, factory discharges, sewage treatment plants, and solid waste disposal sites or from diffuse sources like runoff from fields, feedlots, mines, construction sites, private wastewater discharges, and roads. Contaminants may directly kill mussels, but they may also indirectly harm spectaclecase by reducing water quality, affecting the ability of surviving mussels to reproduce, and lowering the numbers of host fish.

Channelization: Dredging and channelization have profoundly altered riverine habitats nationwide. Channelization physically changes streams by accelerating erosion, reducing depths, decreasing habitat diversity, destabilizing stream bottoms, and removing riparian vegetation.

Small Population Size and Fragmentation: Most of the remaining populations of the spectaclecase are small and geographically isolated. These small populations remaining in short s ections of rivers are susceptible to extirpation from single catastrophic events, such as a toxic spill. Also, this level of isolation makes natural repopulation of any extirpated population impossible without human intervention.

Nonnative Species: The invasion of the nonnative zebra mussel into the United States poses a serious threat. Zebra mussels proliferate in such high numbers that they use up food resources and attach to native mussel shells in such large numbers that the native mussel cannot open its shell to eat or breath.

What is being done to conserve and restore spectaclecase mussels?

Listing: In 2004, the U.S. Fish and Wildlife Service designated the spectaclecase mussel as a candidate species for listing as threatened or endangered under the Endangered Species Act (ESA) and in January 2011 the Service proposed listing the spectaclecase as endangered. The ESA provides protection against certain practices and would require planning for recovery.

Prevent or Slow Spread of Zebra Mussels: States and Tribes are working to prevent the spread of zebra mussels to areas such as the northern portions of the St. Croix River by enforcing aquatic nuisance species laws, monitoring, and providing information for boaters at water access sites.

Monitoring and Research: Many of the states that have spectaclecase populations and some federal agencies are conducting surveys and funding research to find out specifics about this mussel's life history requirements and threats to its survival.

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

Learn more about how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity. Discuss with others what you have learned.

Help improve water quality in your local streams by minimizing use of lawn-care chemicals and properly disposing of or recycling hazardous materials found in your home, like batteries, paint, car oil, and pesticides.

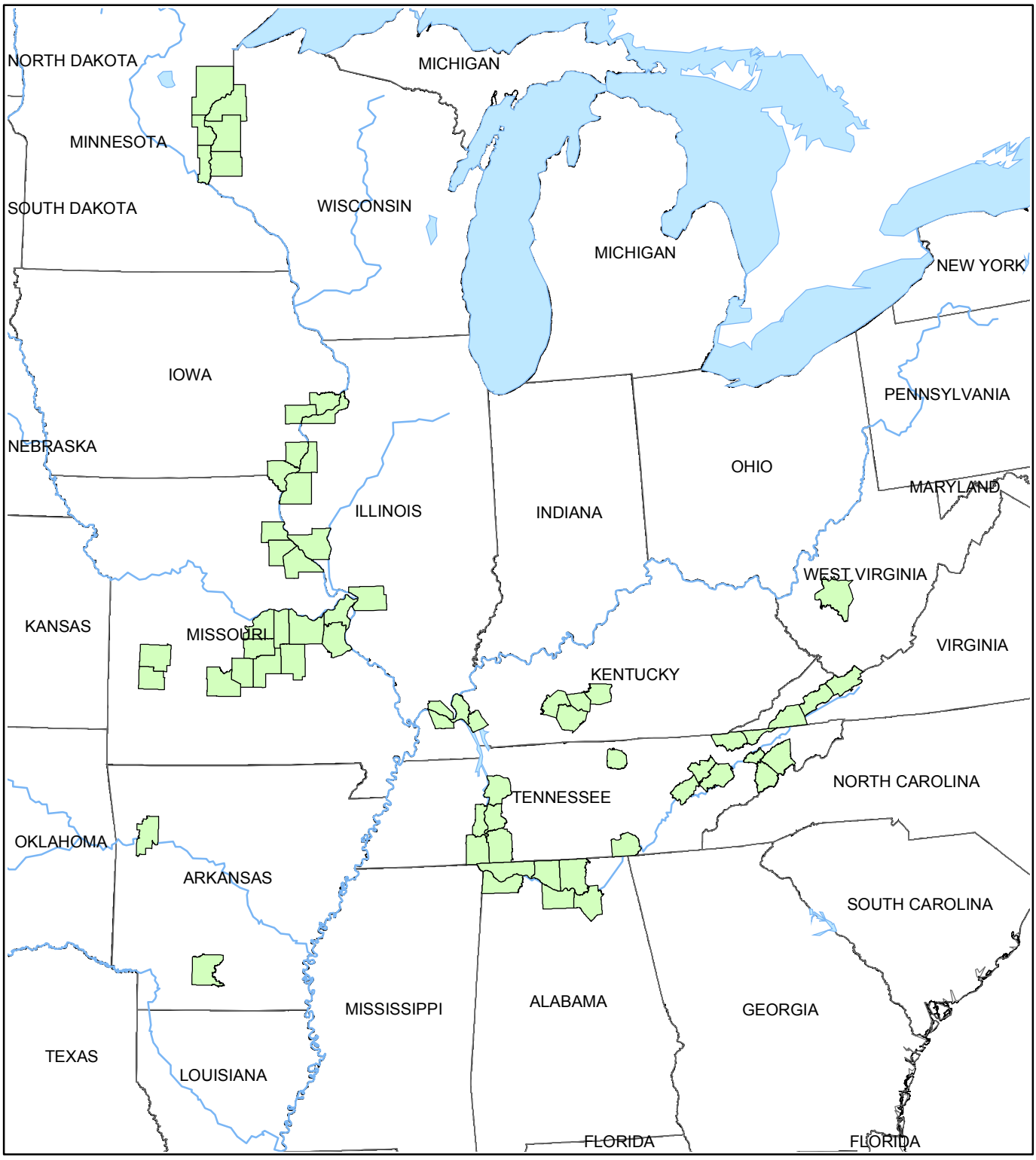
When boating, please follow rules established to prevent the spread of exotic pests like the zebra mussel.

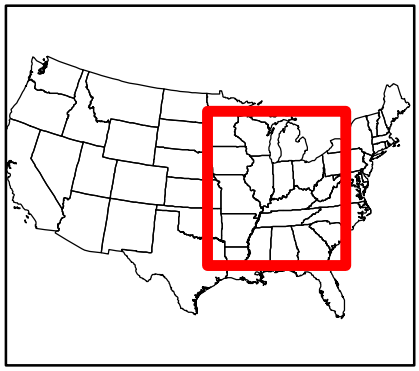
Join a conservation group or volunteer at a local nature center, zoo, or wildlife refuge.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5350
http://www.fws.gov/midwest/endangered

January 2011

Current Range of the Spectaclecase





Spectaclecase Extant (live since 1990) Counties

Major Rivers

Major Lakes

States

125 0 125 250 375 500

Kilometers

N

W E

S