Spectaclecase (a freshwater mussel)
Cumberlandia monodonta

The spectaclecase is a freshwater mussel that the U.S. Fish and Wildlife Service listed 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 up to 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 14 states. It has been extirpated from 3 states and today is found in only 20 streams. The spectaclecase's current range includes Alabama, Arkansas, Illinois, Iowa, Kentucky, Minnesota, Missouri, Tennessee, Virginia, West Virginia, and Wisconsin. With few exceptions, spectaclecase populations are fragmented and restricted to short stream reaches.

Reproduction: The life cycle of the spectaclecase is complex and includes a stage parasitic on fish or other host species. Males release sperm into the river current. As females 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. After they mature, female mussels expel the glochidia, which must then attach to the gills or fins of a specific species, usually a fish, to continue developing into a juvenile mussel.

If glochidia successfully attach to a host, they mature into juvenile mussels, and then drop off. If they land in a suitable area, glochidia grow into adult mussels. Using fish (or other aquatic species) as a host allows the spectaclecase to move upstream and populate habitats it could not otherwise reach. The host species for spectaclecase are not known.

As a group, mussels are long-lived, with individuals surviving up to several decades, and sometimes up to 100 to 200 years. 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 river current. This species often clusters in firm mud and in sheltered areas, such as beneath rock slabs, between boulders and even under tree roots.

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

What are threats to the spectaclecase mussel?

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

Spectaclecase mussels likely 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.

Small Population Size and Fragmentation: Most remaining populations of spectaclecase are small and geographically isolated. Small populations remaining in short sections of rivers are susceptible to extirpation from single catastrophic events, such as a toxic spill. Also, this level of isolation makes natural repopulation of areas that once supported mussels impossible without human intervention.

Sedimentation: Poor land use practices, dredging, intensive timber harvests, highway construction, and other activities accelerate erosion and increase sedimentation. Sediment that blankets a river bottom can suffocate mussels since they cannot move to avoid the impact. Also, large amounts of sediment in the water column reduce the ability of mussels to remove food and oxygen, which can lead to reduced 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 locations such as accidental spills, factory discharges, sewage treatment plants and landfills, or from diffuse sources like runoff from fields, feedlots, mines, construction sites 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.

Nonnative Species: The invasion of the nonnative zebra mussel into the United States poses a serious threat to native mussels. Zebra mussels proliferate in such high numbers that they use up food resources. They 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 the spectaclecase?

Listing: The spectaclecase was added to the list of threatened and endangered species, giving the species full protection under the Endangered Species Act. The ESA provides protection against practices that kill or harm the species and requires planning for recovery and conservation actions.

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 animals and plants?

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.

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