Sheepnose (a freshwater mussel)
Plethobasus cyphyus

The sheepnose 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; Kristen Lundh

The shell of the sheepnose is extremely hard, so much so that clammers on the Cumberland River called it "clear profit" because they were "the only ones who get anything out of it" as it was too hard for making buttons.

What is a sheepnose mussel?

Appearance: The sheepnose is a medium-sized mussel that grows to about 5 inches in length. The shell is thick and solid, with the overall shape slightly longer than wide and somewhat inflated.

The sheepnose shell is smooth, shiny, and light yellow to a dull yellowish brown and without lines or rays but with dark concentric ridges. The ridges result from periods when growth stops or slows.

Range: The sheepnose is found across the Midwest and Southeast. However, it has been eliminated from two-thirds of the total number of streams from which it was historically known (24 streams are currently occupied compared with 77 streams historically), and it has also been eliminated from hundreds of miles of rivers in the Illinois and Cumberland River basins, and from several reaches of the Mississippi and Tennessee Rivers. The sheepnose is currently found in Alabama, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin.

Reproduction: The life cycle of the sheepnose, like most freshwater mussels, is complex and includes a stage that is parasitic on fish. 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 the mature glochidia, which then must attach to gills or fins of a specific host fish species to complete development into a juvenile mussel.

Sheepnose expel glochidia in conglutinates, a jellylike mass of mucus and glochidia, that mimic fish food in appearance. These conglutinates are narrow, red or pink, and discharged in unbroken form so that they look like small worms. When a fish eats a conglutinate, glochidia are exposed to and can attach to the fish's gills.

If glochidia successfully attach to a host fish, they mature into juvenile mussels within a few weeks and then drop off. The sauger (*Stizostedion canadense*) is the sheepnose mussel's only known host, but others may be available. After dropping off, glochidia continue to grow and mature if they land in suitable areas. Using fish as hosts allows the sheepnose to move upstream and populate habitats it could otherwise not reach.

As a group, mussels are long-lived, with individuals living up to several

decades, and possibly up to 100, and even 200 years. Sheepnose, especially thick-shelled individuals from large rivers, are thought to live longer than other mussel species, however, we have no age information.

Habitat: Sheepnose mussels live in larger rivers and streams where they are usually found in shallow areas with moderate to swift currents flowing over coarse sand and gravel. Sheepnose have also been found in mud, cobble, and boulders. In larger rivers they may be found in deep runs.

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 sheepnose mussel?

Dams: Dams affect both upstream and downstream mussel populations by disrupting natural river flow patterns, scouring river bottoms, changing water temperatures, and eliminating habitat. Large rivers throughout most of the sheepnose mussel's range have been impounded; leaving short, isolated patches of habitat below dams.

The sheepnose also depends on host fish to move upstream. Because dams block fish passage, mussels are also prevented from moving upstream, which isolates upstream from downstream populations, leading to small, unstable populations, which are more likely to die out.

Sedimentation: Poor land use practices, dredging, intensive timber harvests, road 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, 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. Pollution also comes 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 sheepnose by reducing water quality, which reduces survival and reproduction, and lowers the numbers of host fish.

Channelization: Dredging and channelization have profoundly changed rivers nationwide. Channelization physically alters rivers by accelerating erosion, reducing depths, decreasing habitat diversity, destabilizing stream bottoms, and removing riparian vegetation.

Small Population Size and Fragmentation: Most populations of sheepnose are small and geographically isolated. These small populations, which live in short sections of rivers, are susceptible to extirpation from single catastrophic events, such as toxic spills. Also, isolation makes natural repopulation impossible without human assistance.

Nonnative Species: The invasion of the nonnative zebra mussel into the United States poses a serious threat. Zebra mussels proliferate to such an extent that they deplete food resources and 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 and restore sheepnose mussels?

Listing: The sheepnose mussel was designated by the U.S. Fish and Wildlife Service as a candidate species for listing as threatened or endangered under the Endangered Species Act. The Service is now proposing to list it as endangered. If listed, the sheepnose will receive the full protection of the Endangered Species Act, which 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 states with sheepnose populations and some federal agencies are conducting surveys and funding research to find out about the sheepnose mussel's specific 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
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