



## Sheepnose (a freshwater mussel) *Plethobasus cyphus*

The sheepnose 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.

### 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, and the overall shape is slightly longer than wide and somewhat inflated.

The sheepnose shell is smooth, shiny, and light yellow to a dull yellowish brown, 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 streams from which it was known historically; 25 streams are currently occupied compared to 76 in the past. Additionally, the sheepnose was eliminated from hundreds of miles of rivers in the Illinois, Cumberland, Mississippi and Tennessee River basins. The sheepnose is now found in Alabama, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and Wisconsin.



*The sheepnose shell 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.*

Photo by USFWS; Kirsten Lunch

**Reproduction:** The life cycle of the sheepnose is complex and includes a stage parasitic on fish. 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 of fish to continue developing into a juvenile mussel.

Sheepnose glochidia are expelled in jellylike masses of mucus that look like something a fish would eat. These masses of mucus are called conglutinates. Sheepnose conglutinates are narrow, red or pink, and discharged in an unbroken

line they look like small worms. When a fish eats a conglutinate, glochidia are exposed to and attach to the fish's gills.

The only confirmed wild host for sheepnose glochidia is the sauger (*Stizostedion canadense*), although recent laboratory studies have successfully transformed sheepnose glochidia on fathead minnow (*Pimephales promelas*), creek chub (*Semotilus atromaculatus*), central stoneroller (*Campostoma anomalum*) and brook stickleback (*Culaea inconstans*).

If glochidia successfully attach to a host fish, they mature into juvenile mussels within a few weeks, then drop off. If they land on suitable habitat, glochidia grow and mature into adult mussels. Using fish as hosts allows the sheepnose to move

upstream and populate habitats it could not otherwise reach.

As a group, mussels are long-lived, with individuals living up to several decades and sometimes up to 100 to 200 years. Sheepnose are reported to live as long as 30 years.

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

**Feeding Habits:** Adults are suspension-feeders. They siphon water and feed on suspended algae, bacteria, detritus and microscopic animals. Adult mussels spend their entire lives partially or completely buried in the river bottom.

### What are threats to the sheepnose mussel?

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

The sheepnose depends on fish to move upstream. Dams that block fish movement also prevent mussels from moving upstream. Upstream mussels become isolated from downstream populations, leading to small, unstable populations that are more likely to die out.

### Small Populations 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.

**Sedimentation:** Poor land use practices, dredging, intensive timber harvests, road construction and other activities accelerate erosion, which increases sedimentation. Sediment that blankets a river bottom may suffocate mussels. Large amounts of sediment in the water also reduce the ability of mussels to remove food and oxygen, 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 landfills. Pollution also comes from diffuse sources like runoff from fields, construction sites and roads. Contaminants may kill mussels directly, 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.

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