

Appalachian Monkeyface (Pearlymussel)

Quadrula sparsa

Introduction

The Appalachian monkeyface (pearlymussel) is an endangered species of freshwater mussel believed to exist only in a small area of the upper Clinch and Powell rivers in Tennessee and Virginia.

This mussel was historically found in the upper Tennessee and Cumberland River systems, including the Clinch, Holston and Powell rivers. Some archaeological records suggest the species may have also existed as far south as the lower Clinch and Hiwassee Rivers.

On June 14, 1976, the Appalachian monkeyface was listed as endangered throughout its entire range in Tennessee and Virginia, and in 1984, a recovery plan addressing the Appalachian monkeyface was approved.

Characteristics

The Appalachian monkeyface is a medium-sized mussel measuring about 2 inches. This mollusk has a heavy shell, yellow-green to brown in color, with a bumpy, triangular texture. The glossy interior layer known as mother-of-pearl, or nacre, is made of shingle-like crystals of calcium carbonate.

Habitat

The Appalachian monkeyface is historically found in shallow areas of fast-flowing streams. It prefers a mix of rubble, gravel and sandy bottoms relatively free of silt. It often remains buried with only its apertures unburied. Apertures are siphon-like openings used to cycle water and are important for feeding, respiration and reproduction.

Diet

Like other freshwater mussels, the Appalachian monkeyface is a filter



Virginia Tech

Hatchery-reared tagged mussels from Virginia Department of Game and Inland Fisheries and Virginia Tech for stocking in the river.

feeder, eating small matter including detritus, bacteria, phytoplankton, diatoms, zooplankton, algae and protozoa. Cilia, hair-like structures between the gills, collect food particles before making their way to the mouth.

The Appalachian monkeyface glochidia, or larvae, are parasitic feeders. Their diet consists of water until they are able to attach to a host fish through tiny hooks. They then feed on fish body fluids until the glochidia mature enough to detach.

Life Cycle

The reproductive cycle of the Appalachian monkeyface is similar to that of other native freshwater mussels. Males release sperm into the water column, where they are taken in by the females through their siphons during feeding and respiration. The females retain the embryos in their gills until they develop into glochidia. The mussel

glochidia are released into the water and must attach to the appropriate species of fish, which they attach to for a short time while they develop into juvenile mussels. The specific fish species that serves as a suitable host for the Appalachian monkeyface is not known.

Once they are matured, they detach from the fish host and sink to the stream or river bottom where they continue to develop to adult mussels. Besides being vital to development, this life cycle enables glochidia to essentially hitch a ride on host fish, a process that helps distribute the species to expand its population range.

Threats and Recovery

At one time the Appalachian monkeyface was thought to be widespread in the Tennessee River drainage, but it was never abundant. This species has always been

documented as rare; but even more so today, as much of its historic range was lost through construction of dams that converted important river habitat into reservoirs. More than 50 impoundments on the Tennessee and Cumberland Rivers have eliminated most of the desired habitat for the species.

The Tennessee River drainage is described as primarily as rural landscape. But the remaining populations of the Appalachian monkeyface are threatened by pollutants and excessive sediments derived from agriculture, development, and fossil fuel extraction and processing activities from coal and gas.

There is little evidence to suggest that the remaining populations of the Appalachian monkeyface are reproducing at a rate that can sustain the species long term. Efforts to propagate the Appalachian monkeyface using laboratory methods have been attempted, but the difficulty in finding brooding females has led to little success.

Other recovery initiatives for this species have focused primarily on habitat improvements, including the reduction of water pollutants. Activities such as excluding livestock from streams and creating vegetated buffers along the streams have been and continue to be implemented and benefit not only the Appalachian monkeyface but other co-occurring listed species.



USFWS

Outreach event and mussel release in 2010.

Mussels—The muscle of our ecosystems

The presence of diverse and reproducing mussel populations indicate healthy aquatic systems, which means good resources for water, for fishing, and for waterfowl and other species. Declining or at-risk mussel populations indicate problems for other fish and wildlife species—even people, too.

The Appalachian monkeyface and other mussels are also important to freshwater ecosystems because they are filter feeders. When they feed, they filter particles through their siphons and clean the water, and they then release converted waste that becomes food for other invertebrates.

Mussels themselves are food sources for wildlife including otters, muskrats, raccoons, waterfowl and several fish species. If the population disappears, or is in poor health, the animals that depend on them may also be at risk. Freshwater mussels continue to have societal and economic value and an important role in the cultured pearl industry.

Every species in an ecosystem is important. The loss of a particular species may represent a ripple effect with potential to harm the overall system.



You can help!

North America has the highest diversity of freshwater mussels in the world. You can help preserve that:

- If you reside on property that borders a stream or other waterway, minimize use of chemicals or fertilizers.
- To help control erosion and reduce runoff, maintain a buffer of natural vegetation along stream banks.
- Install fencing to prevent livestock from entering streams to reduce trampling of mussels, siltation, and waste inputs. Protecting water quality is the most effective way to conserve mussels and keep our waterways clean.

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