

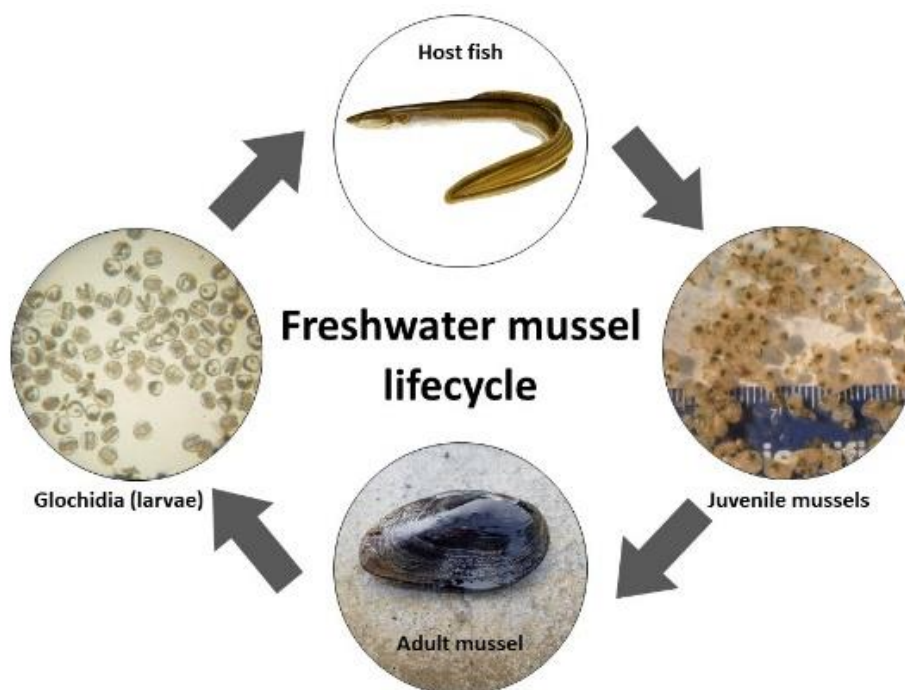
MUSSEL BASICS



Life history

Freshwater mussels are a diverse fauna found in lakes, streams, and rivers worldwide. More than 300 species are found in North America, and Maryland is home to 17 native species. Mussel size and lifespan are highly variable among species; the largest mussels can reach nearly a foot in length and individuals of some species live for more than 100 years.

Freshwater mussels have a complex life-history. Mussel larvae (glochidia) undergo an obligate parasitic phase, typically on the gills or fins of a fish host. Host specificity varies among mussel species. As a result of this unique relationship, mussels have developed a variety of lures and techniques to attract their host fish [Visit Missouri State University's [Unio Gallery](#) to see photos and videos]. After metamorphosis is complete, juveniles excyst from their hosts and fall to the substrate. Adult mussels are relatively sessile, so dispersal is dependent upon the movement of host fish while glochidia are attached.



Mussel distribution is inherently patchy due to the heterogeneous distribution of suitable habitat within streams. Mussels can form dense aggregations; a healthy mussel bed can contain thousands of individuals of several different species. As suspension feeders, mussels feed on seston, which includes algae, plant material, zooplankton, and bacteria. Each mussel filters more than 10 gallons of water per day to breathe and eat; this constant filtering has earned them the nickname of “nature’s water purifiers”.

Threats to freshwater mussels

Freshwater mussels are among the most imperiled taxa in North America with more than 70% of species considered to be in need of conservation. The decline in range and abundance of mussel populations from historical levels has been well documented and attributed to a variety of man-made factors.

Habitat degradation

-- Dams, Channelization, and Dredging

The reproductive strategy of mussels makes their populations particularly vulnerable to habitat modification and fragmentation. If host fish cannot access habitat occupied by mussels, recruitment will cease. Over time, these mussel populations lose their viability and become co-extirpated with their host fish regardless of the number of adult mussels present or quality of environmental conditions. The primary hosts of many species of mussels found in the Mid-Atlantic are migratory fish species, such as American Eel and herring. Consequently, mussel conservation can be highly dependent upon aspects of fish conservation, including remediating the barriers to migration, in addition to the improvement of habitat and water quality of rivers and streams.

-- Pollution

Often described as the “canary in the coal mine for freshwater”, mussels are sensitive to various types of pollution. Eutrophication caused by the influx of excess nutrients promote algal blooms and can lead to hypoxia (low or depleted oxygen). The EPA has identified sediment as the most common pollutant in freshwaters. Sediment can reduce the filtering ability of mussels and limit growth. Mussels are also sensitive to changes in thermal regime. Thermal pollution caused by land-use changes and urbanization can lead to asynchrony of reproductive processes, altered filtration rates, and increased mortality. Pharmaceuticals and personal care products are the most recent emerging contaminant for freshwater ecosystems. Studies have shown that, even at low concentrations, many of these compounds can adversely affect the behavior and health of aquatic organisms.

Historic exploitation

The inside of freshwater mussel shells is composed of layers of iridescent nacre, also known as mother of pearl. With hues of white, pink, and purple, this material has long been sought after for jewelry and fashion. Many mussel populations were exploited during the North American pearl rushes that began in 1857. Likewise, mussels were harvested extensively throughout much of the twentieth century for the pearl button and cultured pearl industries.

See "[Harvesting the River](#)" from the Illinois State Museum for photos and videos.

Invasive species and emerging diseases

The invasive Zebra and Quagga mussels were first identified in the United States in the late 1980s. These small mussels can attach to objects using byssal threads and often form dense aggregations. Zebra and Quagga mussels outcompete native mussel species for food and suitable habitat. Zebra mussels have even been known to smother native mussels by attaching to exposed portions of shell.



Various parasites including protozoans, ciliates, and trematodes have been identified in freshwater mussels. However, bacterial and viral pathogens were not known to affect North American Unionids. Recent large-scale die-offs have led biologists to question the possibility of a new disease that is targeting freshwater bivalves. Scientists at the University of Wisconsin-Madison have identified a novel virus that belongs to a group of viruses known to be lethal to invertebrates. Research is ongoing and additional studies are needed to definitively attribute this virus to mass mortality events.

Listen to an NPR report: [Nature's 'Brita Filter' is Dying and Nobody Knows Why](#)