

## For More Information

### Xerces Society Freshwater Mussel Resources

The Xerces Society has developed resources to improve identification, conservation, research, and management of western freshwater mussels, including *Conserving the Gems of Our Waters*, a comprehensive guide for restoration and construction projects.

Access this and other resources at: [xerces.org/western-freshwater-mussels](http://xerces.org/western-freshwater-mussels).

### Pacific Northwest Native Freshwater Mussel Workgroup

The Xerces Society and partners are members of the Pacific Northwest Native Freshwater Mussel Workgroup, which collaboratively addresses conservation challenges facing freshwater mussels in the Pacific Northwest, and in the West more generally. Resources are available for British Columbia, Colorado, Idaho, Montana, Oregon, Washington, and Wyoming.

Learn more at: [pnwmussels.org](http://pnwmussels.org).



The Xerces Society is a nonprofit organization that protects the natural world by conserving invertebrates and their habitat. Established in 1971, the Society is a trusted source for science-based information and advice. Our team draws together experts from the fields of habitat restoration, entomology, botany, and conservation biology with a single passion—protecting the life that sustains us.

The Xerces Society for Invertebrate Conservation  
628 NE Broadway, Suite 200, Portland, OR 97232  
(855) 232-6639  
[xerces.org](http://xerces.org)

Regional offices from coast to coast.

The Xerces Society's work to protect freshwater mussels has been made possible with generous support from the Alice C. Tyler Perpetual Trust; Charlotte Martin Foundation; Confederated Tribes of the Umatilla Indian Reservation; The Dudley Foundation; Endangered Species Chocolate, LLC; J.Crew; Meyer Memorial Trust; The Nature Conservancy and PGE Salmon Habitat Fund; Spirit Mountain Community Fund; White Pine Fund; Whole Systems Foundation; and Xerces Society members. Thank you. We also want to acknowledge the PNW Freshwater Mussel Workgroup's work to expand the conservation of these animals throughout the region.

All illustrations © Patrick Norton, [patricknortonillustration.com](http://patricknortonillustration.com)



# FRESHWATER MUSSEL CONSERVATION

## *A Guide to Saving the Unsung Heroes of Our Waters*

Freshwater mussels are rarely recognized for the important role they play in supporting river, stream, and lake ecosystems. Salmon and other native fish are among the myriad species that benefit from the services mussels provide. Sadly, freshwater mussels are sensitive to changes in their environment and as a group they are among the most imperiled animals in the world.

Many mussels face extinction from changes in the quality of their habitat, and the quantity of water left in rivers after withdrawals for human use. By using and managing water more carefully, and by protecting mussel populations and restoring their habitat, we can ensure a better future for mussels and the many animals that benefit from them.

## About North American Freshwater Mussels

Home to nearly one-third of the world's freshwater mussel species, North America is a hotspot of mussel diversity. Unlike oysters or blue mussels from intertidal and estuarine areas, freshwater mussels are found only in freshwater habitats that remain permanently wet and are inhabited by fish.

Mussels depend on host fish to complete reproduction. In return, fish benefit from the improved water and habitat quality that mussels provide. Indeed, these filter-feeding creatures are the unsung heroes of ecosystems, providing water purification through filtration, cycling nutrients, and increasing habitat for the other macroinvertebrates that form the basis of food webs.

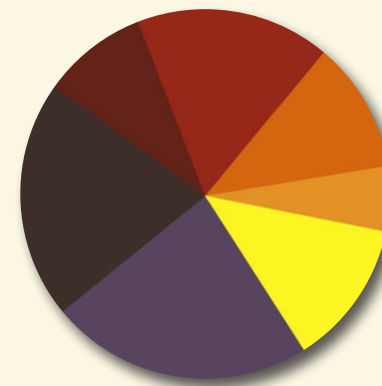
Freshwater mussels have also been historically and culturally important sources of food, tools, and other implements for at least 10,000 years.

## Status of Freshwater Mussels

Of the nearly 300 North American freshwater mussel species, over 70% are imperiled or extinct, representing one of the most at-risk groups of animals in North America. Yet, because they are typically well-camouflaged and unobtrusive, the decline of mussels has received less attention than the challenges facing many other species.

### IUCN Statuses: North American Freshwater Mussels

- Extinct
- Critically Endangered
- Endangered
- Vulnerable
- Near Threatened
- Least Concern
- Data Deficient/Not Evaluated



More than 70% of North America's freshwater mussel species are considered imperiled. IUCN Red List data show more than half of the species are Near Threatened or at greater risk, but many of the species marked as Data Deficient/Not Evaluated have been assessed by other researchers.

*IUCNRedList.org, data download: May 2018.*

Among the causes of mussel declines are the destruction of habitat, especially the impoundment and channelization of rivers and streams. Pollution, like ammonia, pesticides, and other contaminants, have also contributed to their extinction and imperilment. Additional impacts, such as the introduction of zebra mussels and other invasive species, increased diversion and management of water resources, and the effects of climate change (such as increased drought and decreased streamflow), all contribute to freshwater mussel declines.

## Conserving Freshwater Mussels & Habitat

Freshwater mussels rely on the same critical resource that we do: fresh water. It is imperative that we consider mussels and other aquatic species when we are making water and land management decisions.

Restoration and infrastructure projects that improve aquatic habitat (such as the removal of defunct dams and the restoration of floodplain, riparian, and instream habitat) also benefit mussels—as long as these projects are conducted with an awareness of mussels and a willingness to protect them during the restoration process.

Limiting development or conversion of existing mussel habitat is essential to conserving fragile populations. In addition, managing water to reduce pollution, maintain natural stream flow, and reduce water abstraction and consumption will ensure a future for mussels.

## What You Can Do

**LEARN MORE** about species native to your area and volunteer with local watershed stewardship groups that work to monitor native species, educate others, and improve habitat.

**ADVOCATE FOR MUSSELS!** Ask whether mussels are present at project sites during aquatic restoration or construction affecting streams, rivers, or lakes. If so, ensure mussels are being considered and protected from impacts. Share your support for projects that fund mussel research and conservation efforts.

**DO YOUR PART TO REDUCE THREATS** to freshwater mussels by preserving streamside and shoreline habitat, minimizing pesticide use, and ensuring you do not introduce aquarium pets or invasive species—which can spread diseases, damage ecosystems, and harm infrastructure.

# Freshwater Mussels: Supporting Healthy Waters

North America is a global hotspot for freshwater mussel diversity. The continent's nearly 300 species comprise about one-third of the world's freshwater mussels!

They might be hidden, but freshwater mussels are vitally important to people and ecosystems. They filter impurities from water, leaving it cleaner and clearer—helping to provide safe drinking water, sustaining fisheries and recreation, and supporting healthy, abundant aquatic wildlife.

Construction and restoration projects that involve bridges, dams, and riparian areas can and should be conducted in ways that minimize harm to freshwater mussels.

Mussels provide food for a variety of species. Otters especially rely upon them during lean times.

Three freshwater mussel species are shown in this riverscape: western pearlshell, *Margaritifera falcata* (left), western ridged mussel, *Gonidea angulata* (center), and floater, genus *Anodonta* (right).

To complete their life cycle, mussel larvae briefly attach to particular species of fish like sculpin (left). The larvae ride along for several weeks, metamorphose, release, and drop to the bottom, burying themselves in the sediment.

Mussels occur in "beds" that can have more than 100,000 individuals and may include multiple species. Healthy beds have animals of varied ages, from juveniles to adults as old as 100 years!

