

## Zebra Mussels



The **zebra mussel**, *Dreissena polymorpha*, is a species of small freshwater mussel, an aquatic bivalve mollusc. This species was originally native to the lakes of southeast Russia. However, it has been accidentally introduced in many other areas, and has become an invasive species in many different countries.

Following the discovery of zebra mussels in Laurel Lake (Lee and Lenox, Massachusetts), Biodrawversity LLC was hired to conduct a Phase I Assessment of 17 Berkshire County lakes and the mainstem Housatonic River for the presence of zebra mussels and the potential of these waterbodies to support zebra mussels based on physical, chemical, and biological parameters. The one waterbody in our watershed included in the assessment, Cheshire Reservoir, is considered at high risk based on water chemistry, although no zebra mussels were found. The full report can be found at:

<https://www.mass.gov/files/documents/2017/09/13/zebra-mussel-phase1-assessment.pdf>

And a report entitled a rapid response plan for the zebra mussel contains excellent background information including species identification, ecology, and potential control measures. It is available at:

<https://www.mass.gov/doc/zebra-mussel-rapid-response-plan-for-massachusetts/download#>

The following description of the organism and its ecology is from Wikipedia the free encyclopedia.

Zebra mussels get their name from a striped pattern which is commonly seen on their shells, though not all shells bear this pattern. They are usually about the size of a fingernail, but can grow to a maximum length of nearly two inches (5 cm). The shape of the shell is also somewhat variable.

Lake floor food supplies are enriched by zebra mussels as they filter pollution out of the water. This biomass becomes available to bottom feeding species and to the fish that feed on them. The zebra mussel reduced eutrophication of Lake Erie and increased water quality. The catch of yellow perch increased 5 fold after the introduction of zebra mussels into Lake St. Clair. Zebra mussels attach to most substrates including sand, silt, and harder substrates. Other mussel

species frequently represent the most stable objects in silty substrates, and zebra mussels attach to, and often kill these mussels. This has eliminated many native mussel species from affected lakes in North America.

### **Life cycle**

The lifespan of a zebra mussel is four to five years. A female zebra mussel begins to reproduce at two years of age. In terms of reproduction, zebra mussels are among the most prolific of all animals. An adult female zebra mussel may produce between 30,000 and one million eggs per year. Spawning usually begins in the months from late spring to early summer by free-swimming larvae, which are microscopic in size, thus invisible to the naked human eye. About two to five percent of zebra mussels reach adulthood.

### **As an invasive species**

In the U.S. and Canada, they were first detected in the Great Lakes in 1988, in Lake St. Clair, located between Detroit, Michigan and Windsor, Ontario. It is believed they were inadvertently introduced into the lakes in the ballast water of ocean-going ships traversing the St. Lawrence Seaway. Another possible often neglected mode of introduction is on anchors and chains, although this has not been proven. Since adult zebra mussels can survive out of water for several days or weeks if the temperature is low and humidity is high, chain lockers provide temporary refuge for clusters of adult mussels that could easily be released when transoceanic ships drop anchor in freshwater ports.

From their first appearance in American waters in 1988, zebra mussels have spread to a large number of waterways, including Lake Simcoe and the Mississippi, Hudson, St. Lawrence, Ohio, Cumberland, Missouri, Tennessee, Colorado, and Arkansas rivers disrupting the ecosystems, killing the local unionid mussels, (primarily by out-competing native species for food) and damaging harbors, boats, and power plants. Water treatment plants were initially hit hardest because the water intakes brought the microscopic free-swimming larvae directly into the facilities. The U.S. Coast Guard estimates that economic losses and control efforts cost the United States about \$5 billion each year.

In July, 2009, The Massachusetts Department of Conservation and Recreation confirmed that zebra mussels had been found in Laurel Lake in the Berkshires, the first documented case in a Massachusetts body of water.

A common inference made by scientists predicts that the zebra mussel will continue spreading passively, by ship and by pleasure craft, to more rivers in North America. Trailered boat traffic is the most likely vector for invasion into the North American west. This spread is preventable if boaters would take time to thoroughly clean and dry their boats and associated equipment before transporting these to new bodies of water. Since no North American predator or combination of predators has been shown to significantly reduce zebra mussel numbers, such spread would most likely result in permanent establishment of zebra mussels in many North American waterways.

The cost of fighting the pests at power plants and other water-consuming facilities is \$500

million a year in the U.S., according to the Center for Invasive Species Research at the University of California, Riverside.

Zebra mussels are filter feeders. When in the water, they open their shells to admit detritus. Zebra mussels are a great nuisance to people. Since colonizing the Great Lakes, they have covered the undersides of docks, boats, and anchors. They have also spread into streams and rivers nationwide. In some areas they completely cover the substrate, sometimes covering other freshwater mussels. They can grow so densely that they block pipelines, clogging water intakes of municipal water supplies and hydroelectric companies.

Also, as their shells are very sharp, they are known for cutting people's feet, resulting in the need to wear water shoes.

Zebra mussels are also believed to be the source of deadly avian botulism poisoning that has killed tens of thousands of birds in the Great Lakes since the late 1990s.

However, zebra mussels and other non-native species are credited with the increased population and size of smallmouth bass in Lake Erie and yellow perch in Lake St. Clair. They cleanse the waters of inland lakes, resulting in increased sunlight penetration and growth of native algae at greater depths. This cleansing also increases water visibility and filters out pollutants. Each quagga and zebra mussel filters about a quart of water a day.

Recent research has found that zebra mussels don't attach to copper-nickel alloys, which can be used to coat intake and discharge grates, navigational buoys, boats, motors, etc., where the pests tend to congregate.