
ENVIRONMENTAL Fact Sheet



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Zebra Mussels

What are Zebra Mussels and Where Do They Come From?

Zebra mussels are small shellfish marked by alternating light and dark bands. They are typically two inches or less (roughly the size of a pistachio nut) in size and have a life span of four to eight years. Zebra mussels have an extremely high reproductive rate of 30,000-1,000,000 new mussels per year and are able to reproduce at one year of age.

Zebra mussels are native to the drainage basins of the Black, Caspian and Aral Seas of Eastern Europe. It is believed that ships originating from European ports carried the mussel in freshwater ballast that was discharged into Great Lake ports. The first North American zebra mussel discovery was in Lake St. Clair, Mich., in June 1988. By September 1991, the mussel was found in all five of the Great Lakes, the St. Lawrence River, the Finger Lakes region of New York, and throughout the Mississippi River basin. The mussel is expected to infest most areas of North America within the next few years. During the summer of 1993 the zebra mussel was discovered in Lake Champlain, Vermont. In 1998, the mussel was found in East Twin Lake, Connecticut. During the summer of 2009 the zebra mussel was identified in a pond in the Berkshire region of Massachusetts. With infestations to the south and west, it is anticipated that their arrival in New Hampshire is just a matter of time.



Zebra Mussel, *Dreissena polymorpha*

Adult and juvenile mussels (referred to as veligers) are transported by waterfowl and by attachment to boat hulls, crayfish and turtles. Larval stage mussels (veligers) can be transported in anglers bait bucket water and boat engine cooling water. Similar to other introduced non-native species such as milfoil, these exotic mussels can reproduce rapidly because natural predators are not present to keep the population in check.

Why are Zebra Mussels a Concern in North America?

Zebra mussels are not native to the United States. They disrupt aquatic ecology via the food web and cause problems to humans wherever they have appeared. Zebra mussels are the only freshwater mussel that can secrete durable elastic strands, called byssal fibers, by which they can use to securely attach to nearly any surface, forming barnacle-like crusts several feet thick. Through this mechanism zebra mussels can attach to stone, wood, concrete, iron, steel, aluminum, plastic, fiberglass, PVC, and even crayfish other mussels. They have also recently been found growing on softer substrates like plants and even mud.

What Problems Do Zebra Mussels Cause?

The zebra mussel's ability to rapidly propagate and physically attach to objects creates several problems:

- Zebra mussels filter small particles such as phytoplankton (microscopic plants), small zooplankton (microscopic animals), and detritus (pieces of organic debris) from water. Mussels are capable of filtering up to 1 liter of water within a 24 hour period. Large populations of zebra mussels can severely alter the lake or riverine food web by competing with existing species such as salmon and walleye.
- Raw water intakes such as those at drinking water, electric generation, and industrial facilities can become infested with zebra mussels. A water supply system serving 50,000 people in a Michigan city had to shut down due to pump failure by zebra mussels in its intake system.
- Beaches in infested areas may be impacted by the washing up of sharp shells in shallow areas, which can cut bathers and litter beaches. Decomposition of mussels can also create obnoxious odors.
- Impacts on boating and navigation include:
 - Organisms attached to hulls increase drag, reduce speed, thus increasing fuel consumption.
 - Growth of larval mussels drawn into a boat engine cooling water intakes may occlude the cooling system, leading to overheating and possible damage to the engine.
 - If shells are drawn into the engine, abrasion of cooling system parts, especially impellers, could result.
 - Marker buoys can sink under the weight of mussel encrustation.
 - Docks can be destabilized or sunk by mussel colonization.

What Kind of Habitat Do Zebra Mussels Prefer?

Zebra mussels can tolerate fairly wide ranges of environmental conditions. They prefer water temperatures between 68°F and 77°F and water currents 0.15 to 0.5 meters per second for proper growth. The mussels prefer spawning in water temperatures in the mid 50°F range. While normally a freshwater species, the zebra mussel can adapt to and inhabit brackish waters ranging from 0.2 to 2.5 parts per thousand total salinity in estuarine locations. Zebra mussels are found in lakes that are not overly enriched but which have a higher calcium content. Only a few of New Hampshire's waterbodies are at a risk for infestation, especially waterbodies with calcium levels greater than 12 ppm, like the Connecticut and Merrimack rivers, and lakes and ponds along the western border of New Hampshire.

How Can Zebra Mussels Be Controlled?

An effective way to permanently eliminate infestations has not been found, therefore, emphasis must be placed on controlling impacts on ecosystems and water users. For drinking water, electrical generation and industrial facilities, screen mesh can exclude adult and juvenile mussels from water intake systems. This method is only effective in excluding those mussels which originate upstream of the screens or filters. Veligers can pass through the screens and infest downstream areas. Other controls for water intakes include increasing intake and distribution flows to rates exceeding those at which zebra mussels can attach, and physically scraping the mussels where access for personnel and equipment is available. Oxygen deprivation, thermal controls (exposing mussels to water temperatures greater than 140°F), and chemical controls can be used to kill the mussels. However, these methods will likely affect other aquatic organisms.

What Can Individuals Do To Help?

Tell your lake, river or watershed association, your local marina, your municipal officials, or anyone with an interest in aquatic resource protection about the zebra mussel. If you are in the power generation industry, plan now for the mussel's invasion to your facility. Call the UNH Cooperative Extension Services or NH Sea Grant, both in Durham, to learn about their zebra mussel public education program, or the NH Fish and Game Department to learn about their initiatives with the zebra mussel. You can also contact the DES, as the state agency with the primary responsibility of protecting and managing the state's lakes and rivers. DES intends to take an active role in zebra mussel prevention and control.

When boating in infested waters, be sure to clean and de-mussel your boat before you leave the area. De-musseling includes performing the following activities AWAY FROM ANY SURFACE WATER:

- Draining the bilge, live wells and engine cooling system.
- Dumping any bait buckets.
- Inspecting the boat by checking the hull, trim plates, anchors, and the trailer.
- Washing down the boat with hot water (140°F), if mussels are found, and allowing the boat and trailer to sit for 2-5 days dry and/or spraying down gear with a 10% bleach solution and letting the solution stand for a few minutes before rinsing clean.

The best defense is to prevent the zebra mussel from entering the waters of New Hampshire. However, when they arrive, we all need to implement the proper controls to prevent these undesirable invaders from spreading.

For More Information

For more information, please see www.des.nh.gov