ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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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 Mussel, *Dreissena polymorpha*

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, Michigan, in June, 1988. The mussel has expanded to infest many lake and river systems of North America since then. 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. As of yet, there are no infestations in New Hampshire.

Adult and juvenile mussels 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 securely attach to nearly any surface, forming barnacle-like crusts several feet thick. Zebra mussels will attach to stone, wood, concrete, iron, steel, aluminum, plastic, fiberglass, PVC, and even crayfish and other mussels. They have also recently been found growing on softer substrates like plants.

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, and, over time, can severely affect the food web.

- 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 and reduce speed, thus increasing fuel consumption.
    - Growth of larval mussels drawn into 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 are often found in water temperatures between 68°F and 77°F and water currents 0.15 to 0.5 meters per second for proper growth. The mussels spawn 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 that 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 that 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, local marina, 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.

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 and trailer your gear in the open drain position to allow for release of any water and drying, if possible.
- Dumping any bait buckets away from water.
- Inspecting the boat by checking the hull, trim plates, anchors and the trailer, and basically anything that comes in contact with infested waters.
- 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 https://www.des.nh.gov/.