ZEBRA MUSSELS
Invade Ontario Waters

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What are Zebra Mussels?

The zebra mussel (*Dreissena polymorpha)* is a small (3-5cm long), freshwater clam with a brown and cream-coloured striped shell originally from Eurasia. It was first discovered in North America in Lake St. Clair in 1988. Scientists believe that zebra mussels arrived in the ballast water of a ship traveling from a European port. Zebra mussels spread quickly into all of the Great Lakes, the St. Lawrence River, and connected waterways, and many inland lakes in southern Ontario. The introduction of the zebra mussel has caused enormous changes to the Great Lakes basin ecosystem, and has had major economic and social impacts.

A female zebra mussel can produce up to one million eggs each year, with reproduction beginning when water temperatures reach 12°C or higher (mid-May to early September). Upon hatching, free-floating microscopic larvae (called veligers), are dispersed by water currents, wind and wave action. Two to three weeks later, the zebra mussel larvae begin to develop their shell and become too heavy to float in the water. They then settle and secrete sticky fibres (called byssal threads), which they use to attach to any hard surface. They continue to grow and are soon large enough to be seen by humans. Depending on conditions, zebra mussels can live between two to five years, and grow up to five centimeters in length.

A close relative to the zebra mussel is the quagga mussel *(Dreissena bugensis)*, which is also native to Eurasia. It is similar in appearance and biology to the zebra mussel, but can live in deeper and colder waters. The quagga mussel was introduced via ship ballast water to the Great Lakes in the 1980's, and has similar impacts as the zebra mussel.

Where are they found?

Zebra mussels are now found in all of the Great Lakes and the St. Lawrence River. They have spread inland via connected waterways such as the Rideau Canal and the Trent-Severn Waterway, and have spread to many inland lakes in southern Ontario, hitchhiking on recreational watercraft.

Zebra mussels are highly adaptable and can survive in lakes with a wide range of environmental conditions. In the future, zebra mussels, could spread throughout southern Ontario and regions of northern Ontario if prevention measures are not taken by recreational water users.

What do they eat?

Zebra mussels filter up to one litre of water per day and feed on tiny organisms in the water called phytoplankton. These organisms form the basis of the food web on which all aquatic life depends.

What are the impacts?

Zebra mussels can impact aquatic ecosystems in a variety of ways. Their greatest impact arises from their filter-feeding activity. Since zebra mussels filter-feed large quantities of plankton, they can reduce the amount of food available for fish and other aquatic species. Large quantities of zebra mussels feeding on phytoplankton cause clearer water, allowing sunlight to penetrate deeper. This forces light sensitive fish, such as walleye, into deeper and darker waters. Increased light penetration also encourages the growth of aquatic vegetation, including invasive plants such as Eurasian watermilfoil.

Zebra mussels avoid eating certain types of plankton. This can cause increasing occurrences of toxic algal blooms in the Great Lakes that, in turn, impact fish and wildlife. By filtering water, zebra mussels also accumulate suspended contaminants in their bodies. Scientists are concerned that the health of fish and birds that eat zebra mussels will be negatively affected by these contaminants.

Zebra mussels have caused dramatic declines in native clam populations in Lake Erie and Lake St. Clair, by attaching to the clams and hindering their movement, feeding and respiration. Large colonies of zebra mussels can also affect spawning shoals of some fish species, potentially impacting the survival of fish eggs.

The food that zebra mussels don't digest is combined with mucus as "pseudo-feces" and discharged onto the lake bottom where it accumulates. This shifts nutrients away from the water column to the lake bottom, disrupting the food chain. Scientists suspect that low oxygen environments created by decomposing pseudo-feces can create an environment where Botulism Type E can thrive. In recent years, Botulism Type E outbreaks have killed thousands of fish and birds in the Great Lakes.

Zebra mussels affect society in a number of different ways: they foul the bottom of boats, buoys, docks and other equipment; they attach to the insides of home, cottage and industrial water intake pipes, reducing water flow; and they cost millions of dollars each year to remove from power generating facilities and water treatment plants on the Great Lakes.

Colonies of zebra mussels on the lake bottom can cut swimmer's feet as a result of their sharp shell. Also, as thousands of dead zebra mussels wash up on beaches, they create a foul odour and an unpleasant sight when they decay.

You can help!

The Ontario Federation of Anglers and Hunters (O.F.A.H.) and the Ontario Ministry of Natural Resources (O.M.N.R) have set up a toll-free number, the **Invading Species Hotline 1-800-563-7711** and website **www.invadingspecies.com** for you to obtain information on and report sightings of zebra mussels and other invading species.

- **Report a sighting.** If you find zebra mussels in a new area, preserve it in rubbing alcohol or freeze it, then call the **Invading Species Hotline** or contact your local O.M.N.R. office to report your finding and confirm your sample as a zebra mussel.
- **Get involved.** Participate in **Invading Species Watch**, a community-based monitoring program to detect zebra mussels and spiny water flea in Ontario lakes and prevent their spread.
- **Find out more.** Contact the **Invading Species Hotline 1-800-563-7711** or visit **www.invadingspecies.com**

Randy Westbrooks @ U.S. Geological Survey

Boaters and Anglers – You can help!

Zebra mussels and veligers can hitchhike to other bodies of water by bait buckets, boats, trailers and other equipment such as fishing gear and even scuba gear. Zebra mussels are capable of surviving out of the water for several days, and may be too small to be seen with the naked eye. To protect your lake and prevent the spread of zebra mussels and other invading species, please take the following precautions before leaving one waterbody and entering another:

- Inspect your boat, trailer and equipment – remove all plants, animals and mud, and dispose of them on dry land or in the garbage.
- Drain water from motor, live well, bilge and transom wells while on land.
- Do not release live bait! Empty your bait bucket on dry land, or freeze or salt the bait for later use. It is illegal to release live baitfish from one water body into another.
- Remove organisms you can't see on your boat, trailer or equipment by:
  - Rinsing them with hot water (>40°C); or
  - Spraying with high pressure water (250 p.s.i.); or
  - Drying them in the sun for at least five days; and
  - Submerse hard-to-clean fishing equipment and nets in hot water (40°C) for ten minutes.