BGLEECA

Invasive Species Watch (ISW) in Big Gull Lake
Lynda Corkum

The Invasive Species Watch (ISW) program is a partnership between the Ontario Federation of Anglers and Hunters (OFAH) and the Ontario Ministry of Natural Resources (OMNR) to track the spread of the zebra mussel (*Dreissena polymorpha*) and spiny water flea (*Bythotrephes longimanus*) in Ontario and to increase public awareness about invasive species. Many other groups have joined this partnership to help with this endeavour. The ISW program depends on volunteers, who collect water samples using plankton haul nets. Samples are sent to OFAH staff to identify the species. Only the presence or absent of species are reported, not their abundance.

Aquatic invasive species are non-native species, including algae, larger plants, invertebrates and fishes. By definition, the introduction or spread of invasive species "threatens the environment, the economy or society, including human health" (OMNR 2010). There are about 186 invasive species in the Laurentian Great Lakes. The Invasive Species Watch (ISW) program monitors the presence of two species, the spiny water flea and veligers (early life stage) of zebra mussels, in lakes throughout Ontario. Monitoring for these species in Big Gull Lake began in 1999. Both species have been recorded in the lake.

Monitoring surveys of Big Gull Lake have detected the presence of both the spiny water flea and veligers (early life stage) of zebra mussels. Since Big Gull Lake was first surveyed for these species in 1999, zebra mussel veligers were reported once in 2006. Spiny water fleas were reported in 2005, 2006, 2012 and 2013. How did these two invasive species reach our lake? What does the presence of these invasive species mean for our lake?

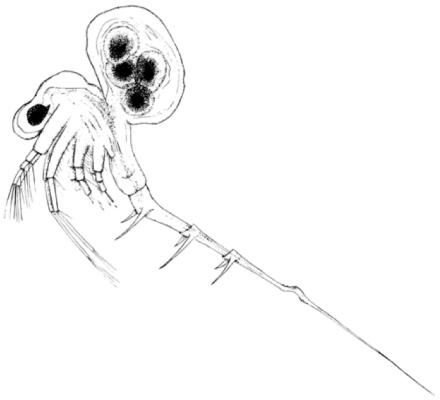
Aquatic invasive species may have entered Big Gull Lake from rivers, in bait buckets, on fishing gear, in live wells and bilge waters or as "hitch hikers" on boats or wildlife. The veligers and the spiny water flea live within the water of lakes and large rivers and are dispersed by water currents. Once veligers mature into adult mussels, they settled on the lake bottom.

For more information on Aquatic Invasive Species (AIS) , The Invading Species Awareness Program, or to request copies of the AIS field guide, and find out whether updated or new pages are available:

call the Invading Species Hotline (1-800-563-7711),
visit www.invadingspecies.com or
email invading_species@ofah.org

Spiny Water Flea

The spiny water flea (*Bythotrephes longimanus*) is a large (1.5 cm long), predacious zooplankton that was first introduced into Lake Ontario in 1982. The species entered Lake Ontario in ballast water of ships from Europe. This planktonic species of zooplankton is now found in over 100 inland lakes of Ontario. The spiny water flea competes with fish for food. The spiny water flea feeds on smaller zooplankton, reducing food availability that would be typically eaten by larval sport fishes (bass, walleye, yellow perch and others) and for smaller species of fishes such as minnows. The decline of native zooplankton by the predaceous water flea can be substantial. The spines on the tail of this species help protect the species from being eaten by many species of fish. The tail spines attach to fishing line and make it difficult to reel in lines. The spines can cause particular problems by clogging commercial fishing nets, a concern wherever fish are harvested commercially.



Spiny Water Flea (Drawing provided by OFAH)
Total length is 1.5 cm; the tail makes up 60% of the total length.
Tail is relatively straight with up to 3 barbs and a pointed end.
Balloon-like egg pouch
May have yellow, orange, blue & green coloring with a red stripe through half of the tail

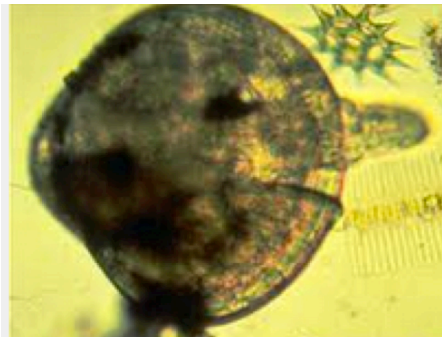
Spiny water flea and a fishhook water flea (another large zooplankton invader) present on a fishing line. Photo credit: Andrea L. Jaeger Miehls, Michigan State University

Zebra Mussel

The adult zebra mussel (*Dreissena polymorpha*) is a small (typically 2 to 3 cm long), striped, bottom-dwelling, freshwater mussel (clam) that is D-shaped and has a hinged shell. The shells have alternating brown and beige stripes, hence the common name, zebra mussel. Adults were first found in Canada in Lake St. Clair in 1988. They likely arrived in the ballast water of ships. Since then the mussels have dispersed throughout the Great Lakes and into some inland waters of Ontario. The mussels have spread most often by attachment to boats and through bait bucket transfers from one lake to another.

Adult shells typically attach to hard surfaces (and less frequency to soft sediment) by bysall threads. The immature veligers are round organisms float and swim in the water, facilitating the dispersal of the species. The veliger stage lasts for about 5 weeks before it develops sufficiently to settle to the bottom of a lake or river. Veligers have only been found once (2006) in Big Gull Lake. Zebra mussels are found elsewhere throughout our drainage basin, including Crotch, Silver and Sharbot lakes.

There are many negative effects of zebra mussels in lakes and rivers. Zebra mussel adults foul boats, docks and other hard surfaces, including water intake pipes, reducing water flow. Zebra mussels filter lake water when feeding on phytoplankton (plant plankton). The filtering activity of zebra mussels clears the nearshore of lakes, enabling aquatic plants to grow. With increased visibility, walleye move to deeper waters. The adult shells are sharp and can cut one's feet and hands. Expect rocky shorelines to be covered with mussels once they become established in the lake.



Zebra mussel veliger (photo by Ontario Ministry of Natural Resources
Free-swimming larval stage.
Typically 0.1mm in diameter
Have tiny hairs to help organism swim and feed.

Zebra mussel adult (photo by Amy Benson
Typically 2 to 3 cm up to maximum of 5 cm.
Triangular shell connected by a hinge; flat on ventral surface.
Striped shell, hence the common name, zebra mussel.

What is the forecast for Zebra Mussels in Big Gull Lake?

Lynda Corkum

I recently contacted Dr. Gerry Mackie, Canada's authority on freshwater mussels, to determine if Zebra Mussels could become established in Big Gull Lake. Zebra Mussel veligers (immature forms found in the water column of the lake) had been found in Big Gull Lake in 2006. Gerry and his crew sampled Big Gull Lake July 27, 2011. They took plankton tows in the lake, but found no evidence of veligers.

To predict the likelihood of Zebra Mussel adults becoming established once the species has dispersed to a lake depends on both geology and water chemistry. Typically, lakes that sit within the Canadian Shield (which is mainly granite, a type of igneous rock that doesn't dissolve easily when exposed to water) have neutral to acidic waters, which should limit the establishment of Zebra Mussels. Acidity is measured by pH (a scale that measures the amount of hydrogen ion). Neutral pH is pH 7, with lower pH values being more acid. The more acid the pH, the harder it is for mussels to maintain their shells, which are made from calcium carbonate. Big Gull Lake is on the Canadian Shield and has a pH of 7.7. This value is marginal for Zebra Mussel establishment.

Some Shield lakes have limestone outcroppings and in these areas, mussels can become established because of the carbonates in the rock which dissolve and increase the pH. My colleague, Dr. Maria Cioppa, who is a geologist, checked all available geologic maps and no limestone borders on Big Gull Lake.

Because the mussel shells are made up of calcium carbonate, the other important factor to monitor is lake calcium. Elevated calcium levels in the water maintain the hard shell. Zebra Mussels may become a nuisance when calcium levels exceed 25 -28 mg/L. Gerry Mackie recorded elevated calcium levels (35.5 mg/L) in Big Gull lake. Despite these high levels of calcium in the water, the drainage from igneous rock means that Big Gull Lake is not likely to be a hot spot for Zebra Mussels.

To find out if other invasive species occur in our lake, go to the following website: http://www.invasivestrackingsystem.ca/searchform.php?Form=MainSpottingsite&MenuItemID=92.

The Ontario Invasive Species Awareness Program
provides the following suggestions to prevent aquatic species invasions:

~ Lean how to identify the species and prevent their spread;

~ Inspect your boat, trailer and fishing equipment after each use. Remove all animals, plants and mud before moving to a new water body.

~ Drain water from motor, live well, bilge and transom wells while on land.

~Rinse all recreational equipment with high pressure (>251 psi), hot water (50°C/122°F) OR let dry in the sun for at least 5 days.