

## THE ZEBRA MUSSEL:

### Answers to Commonly Asked Questions

by

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**What Are Zebra Mussels?** Zebra mussels are small (2 inch and smaller) bivalve molluscs (relatives of clams) with elongated shells typically marked by alternating light and dark bands, ranging from nearly all light to nearly all dark but most often with a herringbone, stippled, or radial striping pattern.



### I've Heard That There Are Two Types of Zebra Mussels — What's the Difference?

Two species of zebra mussel were introduced to North America, *Dreissena polymorpha*, commonly referred to as the "zebra mussel," and *Dreissena bugensis*, nicknamed the "quagga mussel." In most regards there is little or no difference in impact or control between the two species except that the quagga can inhabit deeper, colder waters.

### Where Did Zebra Mussels Come from and How Did They Get Here?

Zebra mussels are natives of the Black, Caspian and Aral Sea basins of Eastern Europe and Western Asia. It is believed that the mussels were introduced into North America in freshwater ballast dumped into the Great Lakes by ships originating from Soviet and European freshwater ports inhabited by the mussel.

### When Were They First Discovered in North America and How Far Have They Spread?

The mussels were first discovered in Lake St. Clair in June 1988 (they were probably introduced in the mid-1980s). Since then, they have spread throughout all five of the Great Lakes and their connecting waterways, the Erie Canal, the Finger Lakes, and the Allegheny, Arkansas, Cumberland, Genesee, Hudson, Illinois, Mississippi, Mohawk, Monongehela, Ohio, Oswego, Ottawa, and Tennessee Rivers. It is believed that the mussels will ultimately infest most environmentally susceptible waters of North America from coast to coast, south of central Canada to the Florida Panhandle.

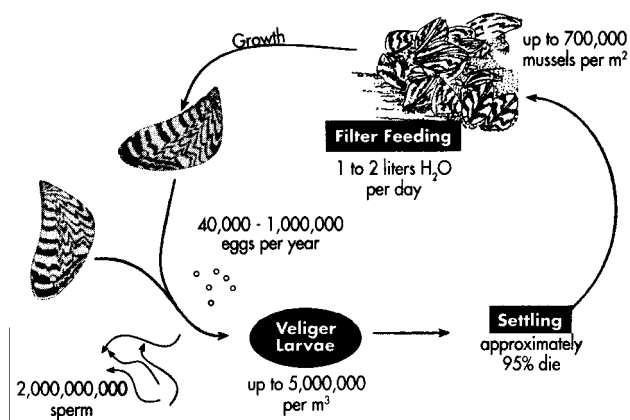
### How Do Zebra Mussels Spread?

Mussel larvae (veligers) can spread by flowing and wind driven water currents, commercial bait and hatchery stocking activities, and in anglers' bait bucket water. Adults spread by attaching to organisms such as crayfish and turtles, by attaching to ship, barge and recreational boat hulls, on or in recreational boats trailered between water bodies, and by flow through navigation and irrigation canals.

### Tell Me About the Mussel's Life Cycle.

Zebra mussels may live from 2 to 5 years and reach sexual maturity by the end of their first year at a shell length of approximately one half inch. Each female mussel can produce as many as 1 million eggs per year. Spawning begins when water temperatures reach about 54°F, peaks at about 63°F, and continues until waters cool below 54°F. Spawning takes place outside the adults and results in planktonic veligers approximately 40 microns in length which can be transported by water currents considerable distances from the parent colony. Within 2 to 5 weeks of hatching, the veligers become too large and heavy to remain planktonic and settle out of the water column. At this point, they must attach to a hard surface. Zebra mussels secrete tough elastic strands, (byssal threads), with an extremely sticky "glue" at the end by which they securely attach to nearly any solid surface including stone, wood, rooted aquatic vegetation, concrete, iron, steel, and plastic. Veligers which settle into sand or silt will be covered and die, although colonies may be founded upon hard surfaced objects as small as a native mussel or piece of drift wood.

Zebra mussel use siphons to draw up to 2 quarts of water per day into their shell where a gill system filters phytoplankton and zooplankton (microscopic plants and animals), algae, and detritus (bits of organic debris) from the water. This can dramatically increase water clarity. Since the introduction of zebra mussels into Lake Erie, water clarity has increased from about 1 foot to as much as 35 feet in some areas.



### Where Do Zebra Mussels Live?

Zebra mussels prefer water temperatures between 68° and 77°F (temperatures below 45°F or above 89°F discourage colonization). While a freshwater species, they can adapt to brackish areas up to about 2 parts per thousand total salinity in estuaries. Mussels need at least 12 parts per million calcium for robust growth. While the mussels are generally found within 23 feet of the surface, they have been found as deep as 225 feet in Lake Ontario. In some areas of the Great Lakes, colonies up to 100,000 per square yard with layers of shells up to 6 inches deep have been reported.

Because of an affinity for water currents, zebra mussels colonize water intakes, pipelines and canals which serve as excellent habitat because the flow of water provides a continuous source of food and oxygen and carries away the mussels' wastes. Such structures protect the mussels from predation, siltation, waves, and ice scour. Colony densities of up to 750,000 per square yard have been reported in intake canals.

### Why Should I Be Concerned About Zebra Mussels?

**Ecologic Impacts:** Since phytoplankton and detritus are major food sources for aquatic food webs, their removal by zebra mussels could cause a decline in zooplankton which feeds upon those food sources. This could alter natural food webs and result in fewer fish of all kinds, particularly predatory sportfish such as trout, salmon, and bass.

Zebra mussel colonization of rock cobble could impair reproduction of such fish as walleye and lake trout which spawn only on rocky-bottomed areas. Increased water clarity may reduce the ability of larval fish to avoid predation. Adult fish may relocate to deeper, darker waters. Increased water transparency may result in an increase in rooted

vegetation, including such nuisances as Eurasian watermilfoil.

Zebra mussels may outcompete native mussels for food and habitat. Native clams in Lake St. Clair and western Lake Erie are already disappearing .

**Socioeconomic Impacts:** A major impact of zebra mussels is the fouling of raw water intakes at drinking water, electric power generation, and industrial facilities, resulting in lost pumping ability, clogged pipes, obstructed valves, obnoxious smells from decayed mussel flesh, increased corrosion of cast iron pipes, and safety hazards if sprinkler systems fail to deliver fire fighting water. The control of these impacts is usually paid for by the buyers of the public water, electricity, and industrial products.

Zebra mussels attach to boat hulls and increase drag, reduce speed and increase fuel consumption. Mussels may clog a boat's engine cooling water intake, leading to overheating and damage to the engine. Recreational use of beaches is impacted by colonization of nearshore bottom and by huge amounts of shells littering beaches after storms. Smells from rotting mussels detract from the enjoyment of beach use.

## HOW CAN THE SPREAD OF THE ZEBRA MUSSEL BE STOPPED?

You can help slow the mussels' "march" across North America (and prevent your own equipment from being fouled) by observing "good boatkeeping" when transporting your boat from waters infested by zebra mussels.

- Drain all bilge water, live wells, bait buckets, and any other water from your boat and equipment.
- Inspect your boat's hull, drive unit, trim and trolling plates, prop guards, anchor, and trailer; scrape off and trash any suspected mussels. Remove all water weeds from boat or trailer.
- Trash leftover bait at the launch site; leftover live aquatic bait should not be taken from infested to uninfested waters.
- Before launching into uninfested waters, thoroughly flush the hull, drive unit, live wells, bilge, trailer, bait buckets, engine cooling water system, and other boat parts that got wet in infested waters, using a hard spray from a garden hose. Use hot water if your boat was in infested waters for a long period of time. **DO NOT** use chlorine bleach.
- Let the boat dry in the sun for at least 2 to 4 days before launching.

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This paper is a result of research funded by the National Oceanic and Atmospheric Administration Award #NA90AA-D-SG078 to the Research Foundation of State University of New York of the New York Sea Grant Institute. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon. The views expressed herein are those of the author(s) and do not necessarily reflect the views of NOAA or any of its sub-agencies.