

Zebra Mussels



Exotic Species

- Create competition with native species
 - Can lead to elimination of native species
- Have a greater impact on ecosystems that have been disrupted by humans
- Successful exotic species:
 - Are abundant in their homelands
 - Have short generation times
 - Have high genetic variation
 - Are larger than their most closely related species
 - Have wide environmental tolerance in general



Zebra Mussel

- Scientific name: *Dreissen polymorpha*
- Found in freshwater lakes and rivers
- Obtained their name from striped pattern which can be found on their shells
- Has a distinct D shape on their shell
- Size ranges from that of a fingernail to two inches
- The shape of each shell varies



Zebra Mussel

- Byssal threads allow them to attach to objects in water
 - The threads originate inside the shell and are hard to remove once they attach to other objects
- Zebra mussels are filter feeders
 - They remove particles from the water
 - Increases water clarity and reduces pollution
 - Reduction of pollution enriches food supplies found on the lake bottom which is eaten by bottom dwellers
 - This then leads to enriched food for the fish that feed on those bottom dwellers



Life Cycle

- Life span: 4 to 5 years
- Females begin reproducing at the age of two
 - One female produces between 30,000 and one million eggs per year
- Spawning takes place from late spring to early summer by free-swimming larvae
- Numerous species prey on zebra mussels so only 2% reach adulthood
- The rate of predation decreases in colder waters
- Despite the many predators of the Zebra mussels, they are still thriving

Introduction to the United States

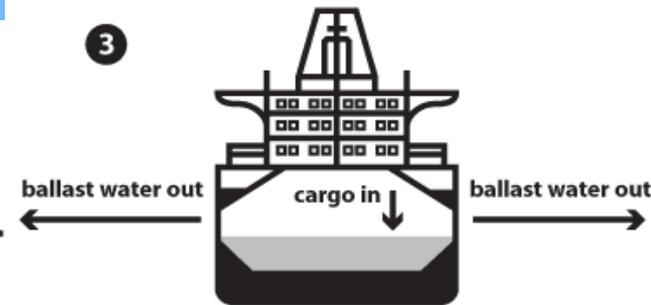
- Brought to the Great Lakes from Eurasia
 - Probably originated in Ukraine.
- Traveled in the ballast of ships
 - Water pumped into tanks was used to provide the ship with stability and buoyancy



1. At source port, unloading cargo, filling with ballast water (ballasting).



2. Voyage empty of cargo, full of ballast water.



3. At destination port, loading cargo, discharging ballast water (deballasting).

Introduction to the United States

- In Ukraine, ships filled up with water containing zebra mussel larvae
 - This water was often emptied into the Great Lakes
- Zebra mussels established themselves and matured into adults and spread

NOT WANTED



Zebra Mussel Outlaws

Presence in the Hudson

- First appeared in the Hudson River near the Catskill area in May 1991 due to an accidental introduction by humans
 - Fisherman and recreational boaters inadvertently transported zebra mussels from infested waters into un-infested waters
 - Mussel larvae can be carried in boat bilge water, bait buckets, and engine cooling water systems
 - Young and adult mussels can attach to boat hulls, engine drive units, and boat trailers.

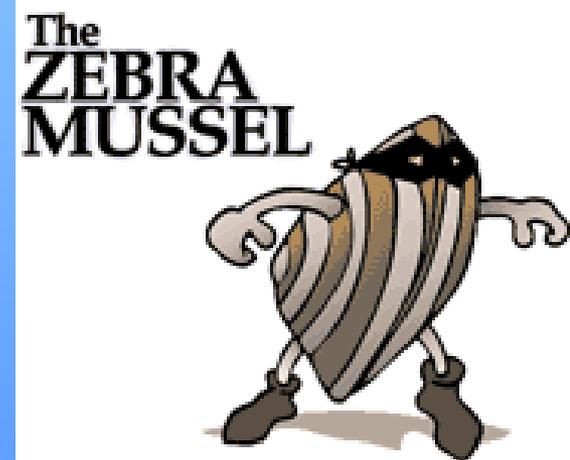


Presence in the Hudson

- Kept wet, but not submerged, adult zebra mussels may survive beyond a week
 - Chain lockers provide low temperatures and high humidity which serves as a temporary refuge for clusters of adult mussels that could easily be released when transoceanic ships drop anchor in freshwater ports

Effects on Native Aquatic Species

- Since September 1992 they have been dominant in the Hudson River, constituting more than half of heterotrophic biomass
- Zebra mussels feed by pumping water into their bodies through an intake siphon, filtering out particles of food and then pumping the water back out
 - This leaves nothing for native Hudson mussels, such as phytoplankton and zooplankton
 - Phytoplankton biomass fell by 80% and zooplankton by 70%



Effects on Ecosystems

- They can attach themselves to the shells of other organisms making it impossible for the native species to feed
- They can consume so much phytoplankton that it upsets the food web
- They may contain high concentrations of toxic materials that could harm or kill fish and wildlife that consume them



Effects on Humans



- New York towns and industries rely on fresh water from the Hudson River to function
- The Zebra Mussels can clog pipes that power plants and water suppliers utilize
- Zebra mussels infiltrate interior plant structures, causing obstruction of pump valves and leading to failures of vital plant components

Effects on Humans



- Summer 2009, Buffalo Water Department faced a multi-million dollar problem: a giant mound of dead Zebra mussels was piling nearly 8 feet high
 - Clogged the opening of a Lake Erie pipe that supplied water to homes and business
 - The pipe is not working at full capacity because more than two thirds of the opening is blocked
- Boat and dock owners have to find ways to remove the mussels covering their boat hulls, piers, and moorings
 - Boats could overheat due to Zebra Mussels blocking boat's engine cooling water intake.
 - Mussels attached to hulls can increase drag which increases fuel consumption

Effects on Humans

- In recreational areas, the smell of dead, rotting mussels has driven beachgoers away
- The sharp shell and small size makes it hard to see which causes many people to step upon and cut themselves
- This can turn off potential visitors and cause abandonment of beaches

How to Solve the Problem

- Getting rid of the exotic species is hard
- Many solutions have limitations and drawbacks
 - Altering the habitat or poisoning them will affect the native species
 - Introducing a predator to the ecosystem could invite even more problems
- Boaters should keep their boats and equipment clean when travelling to avoid inadvertent transportation of the Zebra Mussels



**STOP AQUATIC
HITCHHIKERS!™**

Prevent the transport of nuisance species.

Clean all recreational equipment.

www.ProtectYourWaters.net

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