

The Effect of Zebra Mussels on Lake Erie

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Invasive Species Throw Ecosystems into Chaos

The effects of invasive species have long been documented as a negative trend on the ecosystems in which they reside. Invasive species often dominate new environments, throwing off the delicate balance of things and eliminating rare or key species. What few people realize is that through the negative window that invasive species are viewed there are also some positive effects that they can have. Zebra Mussels are one of these species that have had an unexpected effect on an environment, though what effect they will continue to have is still an unknown.



The Death of a Lake

During the 1960's and 1970's huge amounts of pollution from agriculture and industry was dumped into Lake Erie. By the middle of the 1970's Lake Erie was declared dead. This was due to the large amounts of pollutants that were feeding huge growths of algae and other plants that grew quickly and then died, using up all the oxygen in the water as they decomposed. This lack of oxygen created huge dead zones, which though smaller, still exist today. A variety of measures were taken to help restore Lake Erie to a viable ecosystem, regulations, such as the Clean Water Act were put in place causing a sharp decrease in these nutrients, and in the late 1980's the introduction of the Zebra Mussel (*Dreissena polymorpha*) helped turn things around.



The Introduction of Zebra Mussels

Zebra Mussels were introduced to the Great Lakes in 1988. First discovered in Lake St. Claire and quickly spreading from there. They are thought to have been brought to the Great Lakes in ballast water from the many cargo vessels that travel from Europe to the ports on the Great Lakes. This is a great example of an accidental introduction of a species. Thousands of ships pass through the Great Lakes every year and little thought was given to what incidental cargo they might have in their ballast water.

After they were introduced they quickly spread throughout the Great Lakes and into many of the connecting waterways. By 1992 they were as far north as Wisconsin and as far south as Arkansas. Since then they have spread all across the eastern U.S.



Figure 1 – Distribution of Zebra and Quagga Mussels (a similar, newer invasive) Feb 2009
Source: <http://media.eriegov.org/regions/mollusks/zebramusselmaps/znmy2009.jpg>

Effects on water quality

Zebra Mussels filter a liter of water a day, removing almost all nutrients as well as all zoo and phytoplankton. Due to this amazing filtration power once Zebra Mussels established themselves in Lake Erie it was only a matter of time before they had helped to clean the polluted waters. In just a few years time clarity of the water increased by 600% and the nutrient levels had dropped 80%. They did not accomplish this task all on their own, policies like the Clean Water Act helped to cut down on inputs of these factors, but they did help in the clean up of the damage that was already done. These little creatures who cover beaches have done a unique thing, they have been helpful.

Economic Impacts

One of the negative impacts that the Zebra mussel has had on Lake Erie and the surrounding areas is impacts on shipping and industry. Any pipe that takes in water from Lake Erie is subject to invasion by zebra mussels. They coat any surface they can cling to from intake pipes to screens to wells to docks and moorings they attach to themselves and to each other, sometimes in colonies eight inches thick.

There are many instances of this behavior causing huge problems for industry and the public alike. It is estimated that 5 billion dollars will be spent on Zebra Mussel removal in the next decade.

In Monroe, MI Zebra Mussels regularly clogged the water intake for the cities water supply, causing water outages frequently from 1989-91.



The Good the Bad and the Future

As you can see there are still many negative effects on Lake Erie, and all the Great Lakes from the Zebra Mussel. But a lesson can be learned here that despite the problems is caused from billions of dollars of removal cost to turning beaches into strips of tiny little knives the Zebra Mussel has also helped perform a great service by cleaning Lake Erie and with the help of the Clean Water Act turning it back into a enjoyable place for both recreation and industry to thrive. What the future holds for this little mollusk as it continues to reproduce at rapid rates and outcompete other species is yet to be determined but hopefully something can be done to help control the species that brought Lake Erie back to life.

References

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