

Evaluate: A New Mussel in Town

Quagga mussels are an invasive species closely related to the zebra mussel. They arrived in the Great Lakes region a few years after the zebra mussels. Quagga mussels are now found in all of the Great Lakes.

In this activity you will examine data on the spread of the quagga mussel and compare it to data on the zebra mussel populations in one of the Great Lakes, Lake Michigan. You will compare this information to other data about biotic and abiotic factors in Lake Michigan and how those factors have changed as the quagga mussel has spread.



Guiding Question

Has the quagga mussel had a positive or negative effect on the Lake Michigan ecosystem?

Materials

For each student:

- Argument Tool

Process & Procedure

Constructing an Argument

1. Using data from the information items that follow, the concepts you have learned in this chapter, and the Argument Tool, construct a scientific argument about whether the quagga mussel has had a positive or negative effect on the Lake Michigan ecosystem. Use the list below to guide you as you use the Argument Tool.

- **Question:** Record the question “Has the quagga mussel had a positive or negative effect on the Lake Michigan ecosystem?”
- **Claims:** Record the two possible claims that could be made in response to the question.
- **Evidence:** What evidence supports each of the two claims?
- **Science Reasoning:** For each claim, critique the quality and strength of evidence that supports the claim.

Information Item 1

The Next Invasion: Quagga Mussels



Quagga mussels and zebra mussels share many characteristics, but they also have important differences. They are both filter feeders, and can filter up to a liter of water per day. Both species produce up to a million eggs per mussel per year. Both species will attach to hard surfaces, and can clog water pipes and equipment at water treatment and power generation facilities. Zebra mussels can survive being out of water for longer than quagga mussels. However, quagga mussels can also live on sandy and muddy river and lake bottoms. They can live in deeper water and in a much

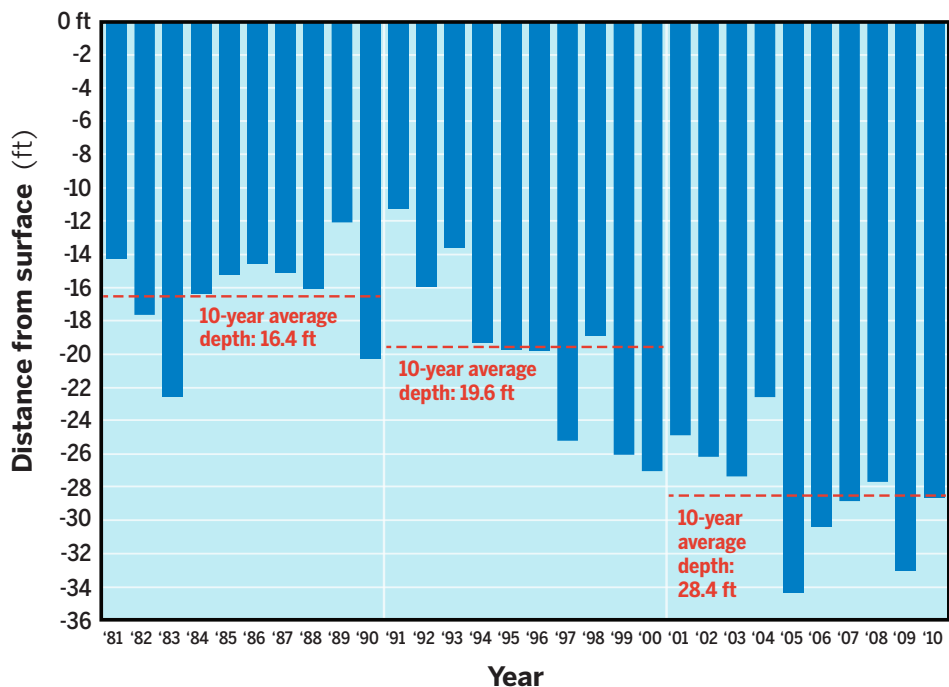
wider temperature range than zebra mussels.

The quagga mussel's ability to live in deeper water allows them to filter the plankton from the water at the bottom of deep lakes. Scientists believe that the quagga mussels are competing for food with another species, diporeia. Diporeia are a small, shrimp-like organism that used to cover the bottom of many of the Great Lakes. Scientists used to find up to 20,000 diporeia per meter on the bottom of Lake Michigan. Now in some areas there are almost no diporeia left. Diporeia are an important food source for many fish in the Great Lakes, including the Whitefish, chubs, and smelt. Chubs and smelt are prey for trout and salmon. Trout, salmon, and Whitefish fisheries are important sources of income for many people.

Information Item 2

The graph below shows how the water clarity has changed over time in Lake Michigan. The bars indicate how far scientists are able to see into the lake from the surface of the water.

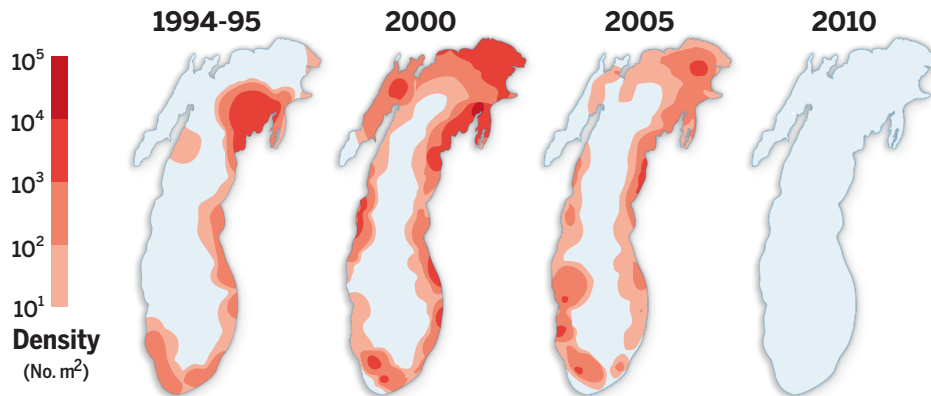
Water Clarity Over Time in Lake Michigan



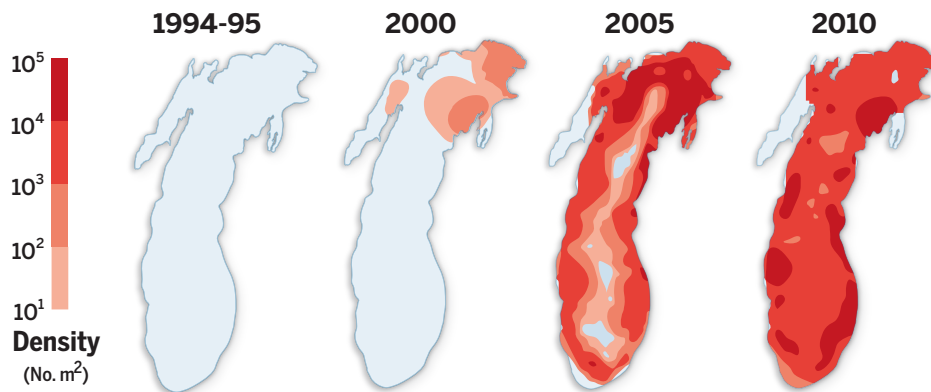
Information Item 3

The maps below show how the distribution of zebra mussels, quagga mussels, and diporeia has changed over time in Lake Michigan, one of the Great Lakes.

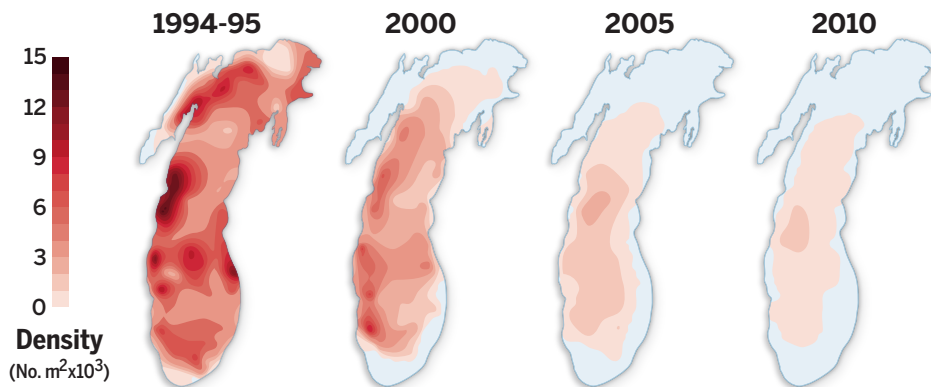
Lake Michigan Zebra Mussel Density



Lake Michigan Quagga Mussel Density



Lake Michigan Diporeia Density



Analysis

1. What additional information would have been useful to know in developing your argument?
2. Compare the change in distribution of the zebra mussels in Lake Michigan to that in the Hudson River over the last 20 years. Do you think that the changes have occurred because of the same reasons? Explain.