An Unwelcome Newcomer

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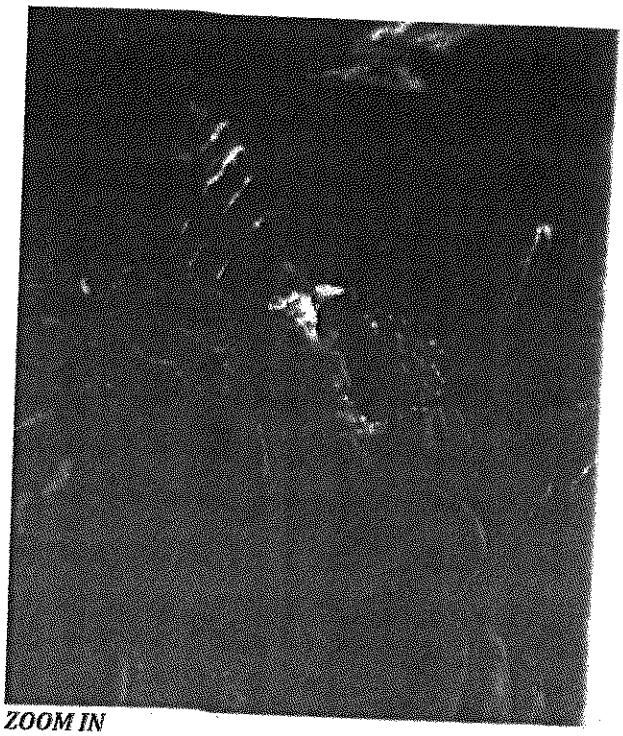
Invasion of the Zebra Mussels

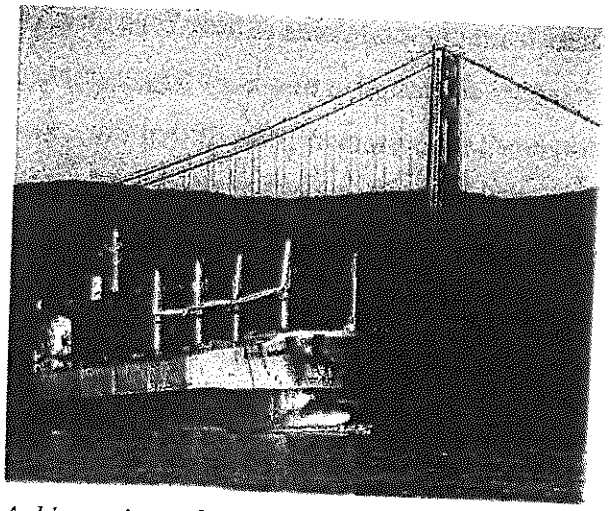
The zebra mussel is a small aquatic animal with two shells like a clam, named for its striped shell. This tiny creature may look harmless, but it can cause big problems. The zebra mussel is an invasive species, a species that's brought from its native area to a new place where it thrives and causes changes in the local habitats and communities.



ZOOM IN
Zebra mussels pump water through their gills to filter out particles of food (primarily phytoplankton).

Zebra mussels once lived only in freshwater lakes and rivers of Europe and Asia. But in the 1980s, they appeared in the Great Lakes between the United States and Canada. Scientists think the tiny animals were carried across the ocean inside of cargo ships. Within a few years, the mussels were found along waterways from Wisconsin to Arkansas.

How do these mussels spread so quickly? A single female can lay up to one million eggs each year. Then the young mussels float easily along water currents. When they're older, they attach themselves to hard surfaces like rocks on the riverbeds and the bottom of boats. They form dense colonies, with as many as 10,000 mussels in a single square foot. Each mussel clings with a mass of thread-like strands, making these colonies nearly impossible to remove.



A ship passing under a bridge on the Hudson.

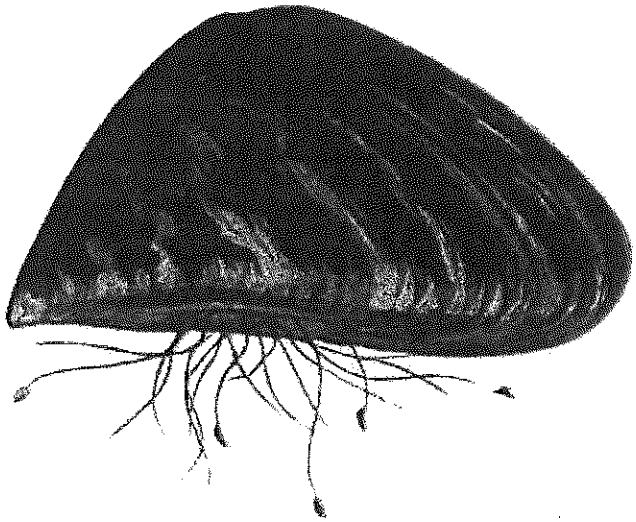
Zebra mussels can cling to any hard surface—including native mussels and other shelled animals. These animals die because they can't feed. Zebra mussels can upset food webs in other ways, too. These filter feeders pump water through their gills and strain out microscopic organisms called plankton. Zebra mussels can quickly clear out huge bodies of water, removing food for the native invertebrates and small fish.

Zebra mussels can also affect humans — and cause millions of dollars in damage. The mussels clog water pipes to businesses and power plants. They damage boats, docks, buoys, and other structures. And their shells wash up in huge numbers on beaches.

The Hudson River Invasion

The Hudson River flows south through New York State, from the mountains to New York City. The scientists described in this study began monitoring the river's ecosystem in 1986. At that time, no zebra mussels lived in the river. But a series of waterways and canals connect the river to the Great Lakes, so scientists predicted it was just a matter of time before the zebra mussel would arrive in the Hudson.

The Hudson River's ecosystem is very different from the Great Lakes. Lake water settles into layers, with cool water near the bottom and warm, clear



STICK TO IT
Zebra mussels have tiny tentacle-like appendages called "byssal threads" that are coated in a sticky foam that help the mussel stick to almost any hard surface!

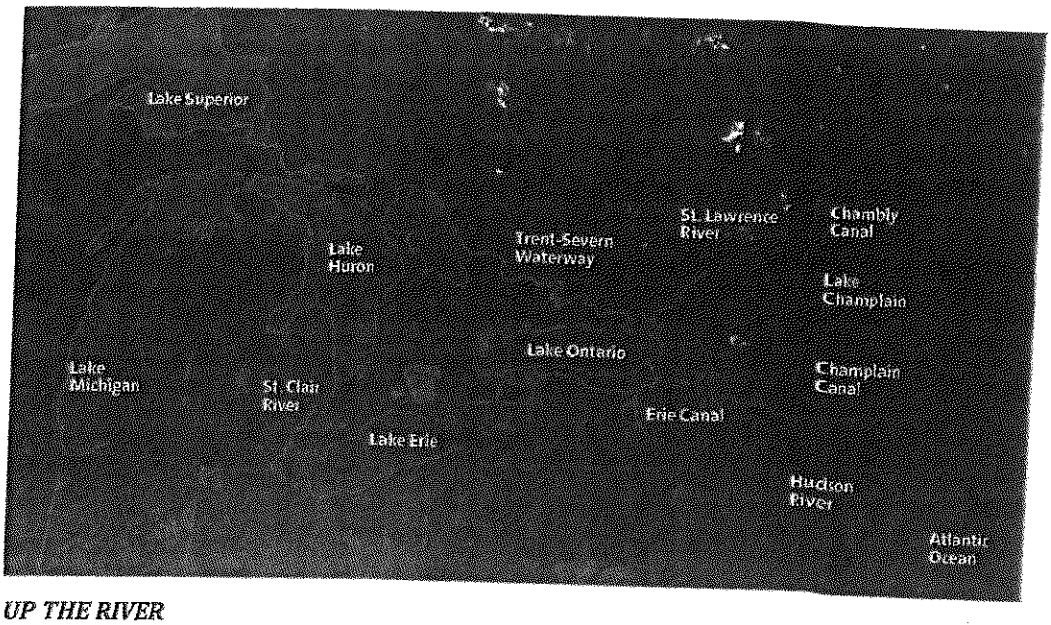
JUST THE FACTS...

Zebra mussels usually grow to about the size of your thumbnail.

Cargo ships carry extra water (called ballast) to help balance the boat in oceans and rivers. Zebra mussels can be transported in this ballast water.

Zebra mussels can typically live for 2-5 years and start reproducing by their second year.

Zebra mussels love to eat plankton (microscopic organisms) and survive in both cold and warm water.



UP THE RIVER
The Hudson River connects the Atlantic Ocean to the Great Lakes through a series of artificial waterways, including the Erie Canal. Hundreds of cargo ships use this "water highway" to transport important materials, like gasoline, metal, and wood.

water above. But water in the Hudson is affected by tides from the Atlantic Ocean. These tidal currents mix the water from top to bottom. Tides also stir up silt from the riverbed, making the water turbid or cloudy. Little sunlight can pass through the murky water. Less sunlight means fewer plants and phytoplankton.

Scientists wondered how zebra mussels might affect the Hudson River ecosystem. Soon they would find out.

Name: _____ Date: _____

1. What is a zebra mussel?

A a small striped fish found in rivers and lakes
B a small animal with two shells that lives in water
C a large animal with one shell that lives in water
D a large plant with striped leaves that lives in water

2. How can zebra mussels cause native mussels and other shelled animals to die?

A The zebra mussels feed on the native mussels and other shelled animals.
B The zebra mussels rest on top of native mussels and shelled animals and crush them.
C The zebra mussels force native mussels and shelled animals to move out of the habitat.
D The zebra mussels cling to native mussels and shelled animals and prevent them from eating.

3. Scientists predicted that the zebra mussel would arrive in the Hudson River. What evidence supported their prediction?

A Zebra mussels cling to hard surfaces, forming colonies that are almost impossible to remove.
B Zebra mussels came to the Great Lakes from the freshwater lakes of Europe and Asia.
C Zebra mussels are able to survive in cold and warm water, and the Hudson River has both.
D Zebra mussels were in the Great Lakes, and waterways connect the Great Lakes to the Hudson River.

4. The scientists wondered how zebra mussels might impact the Hudson River ecosystem. What is one example of information that might help them understand the zebra mussels' impact?

A the amount of plankton in the river before and after zebra mussels arrive
B the number of boats traveling on the river before and after zebra mussels arrive
C the amount of time it takes for zebra mussels to travel to the Hudson River
D the strength of the tides that come from the Atlantic Ocean after zebra mussels arrive

5. What is the main idea of this article?

A Zebra mussels are the most dangerous invasive species because of the effects they can have on humans.
B Zebra mussels are an invasive species that can affect food webs and new habitats, and were expected to arrive in the Hudson River.
C Zebra mussels can upset food webs by clinging to shelled animals and removing food from large bodies of water.
D Scientists started monitoring the Hudson River's ecosystem in 1986, even though the river had no zebra mussels at the time.

6. Read the following sentence from the text.

"The zebra mussel is an invasive species, a species that's brought from its **native area** to a new place where it thrives and causes changes in the local habitats and communities."

What does the phrase "**native area**" mean in this sentence?

A the food source of a species
B the animals or plants related to a species
C the new habitat to which a species moves
D the place where a species is naturally found

7. Choose the answer that best completes the sentence.

Zebra mussels can affect humans and cause millions of dollars in damage. _____, the mussels clog water pipes to businesses and power plants.

A For example
B Consequently
C However
D Therefore

8. What do zebra mussels feed on?

9. The Hudson River has murky water, which means that only a little sunlight can pass through. How does this affect the things that live in the river?

10. How might the number of fish in the Hudson River be impacted by the arrival of zebra mussels? Use evidence from the text to support your answer.