

## **Quaggas! Lake Michigan's Ecosystem Disruptors**

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<http://naturechange.org/2016/09/07/quaggas-lake-michigans-ecosystem-disruptors/>

For the last 10 years or so, a team of scientists from the University of Wisconsin – Milwaukee and the National Park Service has been helping to research the causes of botulism poisoning in birds along the shores of Sleeping Bear Dunes National Lakeshore Park. Leading this team, Dr. Harvey Bootsma is a marine biologist and limnologist who has studied aquatic food webs and nutrient dynamics for over 20 years.

In this video, we interview Harvey about the work he and his team are doing to better understand how nutrients are cycling in Lake Michigan and the disruptive impacts of quagga mussels. In the nearshore areas where Harvey and his team do most of their research, they find concentrations of quaggas at 5,000 to 10,000 per square meter. Each mussel is able to filter  $\frac{1}{2}$  to 3 liters of water each day, consuming the plankton as they go. In short, they are clearing much of Lake Michigan of the very smallest plants that form the base of the food chain.

By consuming all this plankton, Harvey says, the quaggas are extracting the phosphorus from the open waters of Lake Michigan and recycling it in the nearshore benthic zones where bottom-growing algae can easily access it. As a result, quaggas are having a double impact on the ecology of the lake. They are increasing the clarity of the water, allowing more light to reach further down. And they are changing nutrient cycling.

### **Topics Covered**

Great Lakes; Fish; Fisheries; Biology; Invasive Species; Water Quality; Quagga Mussels

### **Next Generation Science Standards**

- 2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
- HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.\*

- HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.\*