

# Invasive Species

By Troy Averill

**Lesson Overview:** Students will be introduced to the ecological and economical impact of invasive species in the Great Lakes and the role of ballast water in bringing those species here. Students will visit the website (<http://www.glerl.noaa.gov/>) to compile a list of 10 facts learned. Students will read NOAA's Aquatic Invaders & the Great Lakes brochure and complete a guided reading worksheet. A powerpoint presentation will be used to provide some basic background. Students will develop an invasive species presentation that will be shared in class, with the best being distributed at curriculum night.

## Sources Consulted:

National Oceanographic and Atmospheric Administration (NOAA) Great Lakes Environmental Research Laboratory  
<http://www.glerl.noaa.gov/>

NOAA Aquatic Invaders and the Great Lakes brochure: <http://www.glerl.noaa.gov/pubs/brochures/invasive/AIS.pdf>

NOAA Great Lakes Environmental Research Laboratory - Brochures and Information: [glrl.noaa.gov/pubs/brochures/](http://www.glerl.noaa.gov/pubs/brochures/)

**Learning objectives:** After this lesson, students will be able to do the following:

1. Understand how invasive species enter the Great Lakes. (Specifically: ballast water)
2. Identify some Great Lakes invasive species
3. Describe the ecological and economical impact of some invasive species

## Michigan Grade Level Content Expectation

### Social Studies

G4.0.1 – Describe major kinds of economic activity in Michigan today (Tourism)

E1.0.3 – Analyze how Michigan's location and natural resources have influenced economic development.

### Science

L.EC.E.1 – Organisms interact in various ways including providing food and shelter for one another.

L.EC.M.2 – Relationship of organisms. Two types of organisms may interact with one another in several ways: producer/consumer, predator/prey, or parasite/host.

L.EC.06.23 – Predict how changes in one population might affect other populations based upon their relationships in the food web.

S.RS.E.1 – Reflecting on knowledge is the application of scientific knowledge to new and different situations.

B3.4 - Although the interrelationships and interdependence of organisms may generate biological communities in ecosystems that are stable for hundreds or thousands of years, ecosystems always change when climate changes or when one or more new species appear as a result of migration or local evolution. The impact of the human species has major consequences for other species.

B3.4c – Examine the impact of human activities

B3.5 - Populations of living things increase and decrease in size as they interact with other populations and with the environment. The rate of change is dependent upon relative birth and death rates.

B3.5C - Predict consequences of invading organism on the survival of other organisms.

## Background:

More than 180 aquatic nuisance species (ANS) now exist in the Great Lakes. The most invasive of these - including the well known zebra mussel – reproduce and spread, ultimately degrading habitat, out-competing native species, and short-circuiting food webs. The majority of invasive species get into the Great lakes via ballast water of ships.

## List of Materials Needed per Student:

1. Brochure: NOAA Aquatic Invaders and the Great Lakes brochure:  
<http://www.glerl.noaa.gov/pubs/brochures/invasive/AIS.pdf>

## New Vocabulary:

Ballast water – Water pumped into and out of a ship to maintain buoyancy when changes in cargo load.

Invasive specie – A specie that enters a new habitat for which it is non indigenous and disrupts the food web and ecology of the community.

Non-indigenous – A specie that has not evolved naturally into the ecosystem and food web

# **NOAA Aquatic Invaders and the Great lakes: Brochure Student Worksheet:**

(Write answers in complete sentences on a separate piece of paper)

1. What is the scientific name of the first reported invasive specie in the Great Lakes and when was it reported?
2. Approximately how many invasive species are in the Great Lakes Basin as of May 2007 and why is this number difficult to report accurately?
3. Invasive species were separated into five classifications in the brochure, list them:
  - a.
  - b.
  - c.
  - d.
  - e.
4. What does it mean that a non-native specie is “established”?
5. How does the brochure define “Invasive”?
6. List five examples of invasive species:
  - a.
  - b.
  - c.
  - d.
  - e.
7. According to the graph, what is the most common way that non-indigenous species are getting into the Great Lakes?
8. Look at the graph showing the rate of invasive species by decade. Approximately what year does a noticeable increase in aquatic invaders begin? What happened that year that is the likely cause of the increase?
9. How are the Quagga mussel responsible for the increased death of waterbirds?
10. How are the Zebra and Quagga mussle effecting the Whitefish and Perch populations?
11. How are Round Gobys effecting the native fish population?
12. What does GLERL stand for?
13. What are the two critical research targets for GLERL?
  - a.
  - b.

Assessment:

## Invasive Species Project

You will be researching your own invasive specie as a project. You will present your findings in class in Powerpoint form to your peers. This project will be due one week from today. Volunteers will be taken to present on the 1<sup>st</sup> day and will be rewarded with extra credit. Grade will be based on detail provided for each of the questions below, accuracy of the information, your knowledge of your presentation, embedded pictures and graphics, and your skill to communicate the information. (Hint, if you are not comfortable with oral presentations, more detail in the powerpoint will help guide your presentation).

The questions that need to be addressed in your powerpoint presentation are the following:

Part 1:

1. How are invasive species defined?
2. What specific problems might your invasive specie have on native species and or the ecosystem?
3. How might your invasive specie affect local human population ecologically?
4. What are the financial costs of your invasive specie economically to your community?
5. Where did your invasive specie originally come from and how did it get introduced into the Great Lakes?
6. What are their current distributions (Population levels in specific Lakes or regions)?
7. How does your invasive specie spread into other areas?
8. How do we identify your specific invasive specie? (Provide pictures)
9. What are some general characteristics of your invasive specie?
10. How might scientists and engineers prevent the spread to other areas?
11. What can individuals (non-scientists) do to help the spread of invasive species?
12. How might someone get more information, where do you look? (website addresses, magazine articles)

Part 2:

Prepare a 10 question quiz and answer key from your presentation.