

# Water Those? Aquatic Invasive Species at Sleeping Bear Dunes National Lakeshore: Distance Learning Pre-Visit Lesson Plan for Teachers



**Grade Levels:** 3-5

**Setting:** Classroom

**Standards:**

2-LS4-3, 3-LS4-3, 3-LS3-2, 4-LS1-1,  
3-LS4.D, 4 ESS2.E, 5-LS1-1, 5-LS2.A

**Duration:**

1-2 class periods

**Materials Needed:**

- Paper
- Pencil, crayons, colored pencils, or markers

**Attachments:**

- Creature Feature worksheet
- Unwanted Poster template
- Michigan Sea Grant's "Great Lakes Most Unwanted" aquatic invasive species card game
- Vocabulary list
- List of research resources

**Overview:** Welcome to the Sleeping Bear Dunes National Lakeshore's "Water Those? Aquatic Invasive Species" pre-visit lesson plan. In this lesson, students will learn that they will soon be interacting with a park ranger to learn about the National Park Service and Sleeping Bear Dunes National Lakeshore's native and non-native plants and animals.

In the lesson, students learn to define "native species," "non-native species," and "invasive species." They will learn about the invasive species that are threatening Michigan by playing the Michigan Sea Grant's Great Lakes Most Unwanted aquatic invasive species card game. After playing the game, students will use the cards to complete a Creature Feature worksheet. Students will work in small groups and use their research to create an Unwanted Poster about one invasive species.

Students will elect a representative from their group to tell the ranger one interesting fact about their invasive species during the distance learning program. The distance learning program will build on this background knowledge as students learn how invasive species impact the Lake Michigan nearshore environment at Sleeping Bear Dunes.

**Objectives:** By the end of this lesson, students will be able to...

- Understand the difference between native, non-native, and invasive species
- Name and visually recognize the invasive species from the Michigan Sea Grant card game.
- Explain how these aquatic invasive species arrived in the Great Lakes.
- Analyze several impacts their assigned species has to the ecosystem

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## **Vocabulary:**

*Aquatic plant or animal:* growing or living in water

*Crustacean:* large class of mostly water-dwelling arthropods (such as shrimp, water fleas, barnacles, crabs) that have an exoskeleton

*Invasive species:* a non-native plant or animal that enters an ecosystem to which it does not belong and competes with one or more native species for food, shelter, and/or reproductive opportunities. Invasive species can also harm human health and the economy

*Mollusk:* any of the category of invertebrate animals with a soft body without segments and usually enclosed in a shell (such as snails, clams, and mussels)

*Native species:* a plant or animal that occurs naturally in a particular ecosystem

*Non-Native species:* a plant or animal that was introduced to an ecosystem by people, either on accident or on purpose, but does not cause harm to native plants/animals

*Terrestrial plant or animal:* living or growing only on land

*Zooplankton:* very small floating or swimming animals which drift with water currents.

## **Background Information for Teachers:**

Invasive non-native species are plants and animals that are native to other regions of the world and have the ability to flourish and replace native species. Many came in grain shipments, ships, crates, ship ballast water, or the personal belongings of people as the U.S. was settled. Many others have been intentionally introduced by flower gardeners, seed & plant companies, bird lovers, pet owners, and as stow-aways on food producing trees and seed. A number of these non-native species are very aggressive and do not have any natural predators or diseases in North America.

At Sleeping Bear Dunes National Lakeshore, we deal with a number of aquatic invaders. The Welland Ship Canal was constructed for ship passage around Niagara Falls and the sea lamprey soon followed the big ships coming into Lake Michigan and devastated the native lake trout. Next came the alewife, also from the Atlantic, and with lack of adequate predators it soon increased to more than 50% of the fish biomass of Lake Michigan. Zebra and quagga mussels came in the water ballast of freight ships loading in European harbors and dumping in the Great Lakes. These mussels are choking off pipes and inlets, and coating rocks, boat hulls, and pilings throughout the Great Lakes. They are devastating the native

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freshwater clam populations both through competition and attaching to them while also accumulating toxins and heavy metal that end up in the food chain and impact fish-eating birds and predatory fish. It is also becoming apparent that they play a role in the formation of the large, green mats of *Cladophora* algae, found with increasing regularity on the Lake Michigan beaches. Ruffe and round goby are recent fish invaders who are just getting a foothold and may have great impacts on the Great Lakes fishery. Spiny water fleas have invaded Lake Michigan in the ballast tanks of foreign freighters and impact the zooplankton on which native fish depend. Invasive aquatic plants such as Eurasian watermilfoil, with the ability to completely choke off the shallow areas of small lakes, inlets, and rivers is working its way north on unsuspecting boat props.

It can often be overwhelming to learn about the impacts of these invasive species because it may seem as if there is no hope. However, scientists and park rangers are working together to study these species so that we can come up with solutions to the problems we face. We have already learned that there are very simple steps we can all take to stop the spread of invasive species! The first step is education.

## **Procedure:**

Prior to the lesson, print and assemble the Great Lakes Most Unwanted invasive species card game: <http://www.miseagrant.umich.edu/lessons/files/2013/05/AIS-most-unwanted-card-game-2013.pdf>

*\*If you are unable to print these or other materials for this lesson, please contact the Education Technician at [slbe\\_education@nps.gov](mailto:slbe_education@nps.gov) and ask for a packet to be mailed to your school.\**

## **Introduction for Your Students:**

Soon we will be getting a virtual visit from a park ranger at Sleeping Bear Dunes National Lakeshore to learn about the park's aquatic plants and animals. These plants and animals fall into one of three categories: native, non-native, and invasive.

Explain the definitions of "native," non-native, "and "invasive" species. *Native species* are types of plants and animals that occur naturally in a certain area. For example, if you were born in Michigan, you are a Michigan native species. *Non-native* species of plants or animals are those that were brought to a particular place by humans, either or purpose or by accident. These non-native species do not

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cause any harm to their new ecosystem, to human health, or to the economy. Ask students if they like apples and cherries; these plants are non-native, but they do not harm our environment so we do not worry about them being here. Explain that an *invasive species* is a type of non-native species that is causing *major* harm to the environment, human health, or our economy. These invasive species do not cause all of this harm in their native ecosystem, but here in their new ecosystem they do not play by the rules and they act like bullies. They take resources away from native plants and animals and they spread rapidly because they do not have natural predators and/or are very effective at spreading their seeds and reproducing.

There are many types of invasive plant and animals in Michigan and at Sleeping Bear Dunes National Lakeshore. We are going to play a game to learn about these invasive bullies, how they got here, how they break the rules, and how they are impacting our environment.

### Steps:

1. Break class up into groups of 3-4 students. Explain the rules and monitor as students play the Great Lakes Most Unwanted card game.
  - a. Rules of the game:  
<http://www.miseagrant.umich.edu/lessons/lessons/by-broad-concept/life-science/invasive-species/activity-great-lakes-most-unwanted/>
2. After the game, review each invasive species with the class as a whole, if needed. Review other vocabulary words that might be unfamiliar to your students. Assign each group an invasive species (it is ok if some groups are assigned the same species) to research.
3. Have groups use the invasive species cards to research their species. Each student will fill out a Creature Feature worksheet. The teacher may elect to have students use their school library or the internet to do additional research.
4. Groups will work together to design an Unwanted Poster about their invasive species. Teachers can decide whether or not to have students use the poster template or create their own. Feel free to get creative!
5. Each group will present their poster to the class as a team. (Or, you could opt to do a poster gallery walk instead.) Ask groups to decide on one interesting fact about their invasive species to share with the ranger during the distance learning program.
6. After the presentations, discuss as a class what you think you would do to

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prevent the spread of these species. During the distance learning program, the ranger will show students what scientists and rangers are doing at Sleeping Bear Dunes right now. The post-visit activity will ask students to think about creative ways to educate other people about these invasive species, their impact on the ecosystem, how they spread, and what people can do to help.

7. The teacher will ask the class if they have any questions and if they have additional questions that they would like the ranger to answer during the distance learning program.

## **Resources:**

-United States Geological Survey nonindigenous aquatic species:

<https://nas.er.usgs.gov/default.aspx>

-Midwest Invasive Species Information Network: <http://www.misin.msu.edu/>

-Michigan Sea Grant education resources: <http://www.miseagrant.umich.edu/education/>

-Sleeping Bear Dunes National Lakeshore non-native and invasive species:

<https://www.nps.gov/slbe/learn/nature/nonnativespecies.htm>

-Great Lakes aquatic invertebrates and insects coloring sheets:

[http://taajatucker.com/coloring\\_sheets](http://taajatucker.com/coloring_sheets)