



Lesson 2: Habitat Woes

Grade Level: 4-6

Time: 75 Minutes

Vocabulary:

Habitat, wetland, river, sediment, native, invasive, organism, pollution, food web, ecosystem, community, population, aquatic, resources, shelter.

Great Lakes Literacy Principles:

Principle 6

Concepts D, E, F

Summary:

Students learn ecological terms and concepts. Students participate in a role-playing activity to understand the effects of pollution and invasive species on native species' habitat and the food web.

Objectives:

- Evaluate the importance of suitable habitat for wildlife.
- Recognize that degradation of resources from pollution and invasive species are reasons why the current habitat is unsuitable for the native species.
- Compare their own habitat to an aquatic organism's habitat.
- Describe the differences among organism, population, community, and ecosystem.

Materials:

Habitat PowerPoint, drawing paper and markers for Degraded Habitat Activity. An editable PowerPoint (.ppt) file can be found on www.greatlakesmud.org/education.html.

Procedure:

After recapping lesson one, present the Habitat PowerPoint, read the explanation of the aquatic food web, and facilitate the Degraded Habitat Activity.

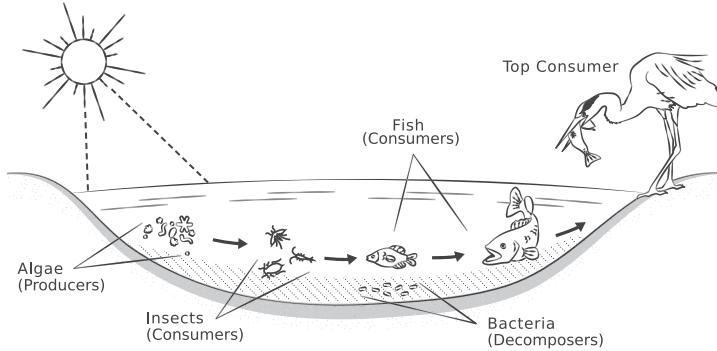
Assessment:

Have students draw a food web that shows five relationships among six components of an aquatic food web as the explanation of the food web is read.



Our Area of Concern: Connecting Life

Food webs are an important way to understand how aquatic habitats function. It is also a great tool to show how each organism depends on others for survival. This basic diagram shows several biotic and abiotic factors that contribute to an aquatic food web. Make sure you use resources specific to your waterbody because not all species are found in every location.



The sun's energy, soil nutrients, and CO₂ are captured by both plants (terrestrial and aquatic) and algae and converted into plant biomass that becomes the base of the food chain. Plants release O₂ as a waste product (which is very important to animals). This represents the net primary productivity, which one way or another supports the rest of the ecosystem.

The next level in the food web is primary consumers. They specialize in eating both dead and living plant matter. Detritovores eat detritus (or rotting vegetation), while herbivores eat living plants.

In an aquatic habitat, an abundance of submerged vegetation and algae provides an available food source. Many types of aquatic invertebrates (benthic organisms and bugs) and small fish like minnows specialize in eating detritus and/or living plants. Plus, many types of aquatic insects (dragonfly larvae) eat other small benthic organisms, like fly or mosquito larvae. And some small fish eat only insects (i.e. bluegill species). Typically, large fish are piscivores, and they eat minnows, bluegill, and other fish. Large piscivores include largemouth bass and northern pike. Because of sediment contamination, there are limits to safe human consumption of certain fish species.

Kingfishers are an example of perching birds that eat small fish, while great blue herons are wading birds that will eat small-to-medium-sized fish. Only large raptors (eagles, osprey) and mammals (primarily humans) are capable of capturing and eating bigger fish like largemouth bass. Insectivorous songbirds such as swallows, red-winged blackbirds, and warblers are commonly found around aquatic habitats. They often feed on adult-staged, flying, benthic organisms like dragonflies, mayflies, and mosquitos.

Small mammals can also be found near the water's edge. In river areas, beavers are herbivores that feed mostly on vegetation from trees, while carnivorous mink feed on small fish, birds, frogs, and snakes. Omnivores eat vegetation, small fish, and frogs. Reptiles like water snakes (carnivorous) and turtles (omnivorous) are also found in aquatic ecosystems.

Nearshore shallow water is great habitat for mallards and coots and other dabbling ducks (tip up, with head underwater and tails in the air) and their ducklings. This is because of the abundance of plants growing there. The benthic community also thrives in shallower water because food is readily available. Environmental dredging can help remove contaminants and help the benthos flourish. Since benthos form the base of the food web, these cleanups can have a positive long-term impact on many organisms.

Degraded Habitat Activity

Summary:

Students simulate a process of historical pollution and invasive species introduction through a role-playing activity.

Materials:

Drawing paper, markers.

Procedure:

1. Review the meaning of habitat with the students and ask students to think about what makes up their own habitat. Have students make comparisons between key elements of a habitat (food, water, for native animals.)
2. Divide the students into six groups: bird, fish, water, shelter, pollution, and invasive species.
3. Using drawing paper and markers, have each student create a habitat component card for the group they are in. Each student writes their habitat component on the paper and decorates the card.
4. Establish a large area (either in the classroom with tables, chairs, and desks moved away or outside) that can be used to simulate the bird's habitat before contamination. The "pollution" stays on the sidelines at this time, simply observing the undeveloped land.
5. Ask the students representing shelter and clean water to arrange themselves in the habitat area. Then, have the fish stand next to the water and have the birds join and stand among their resources.
6. Once all the species are established in their habitats, it is time for the pollution to enter the picture. The students who are simulating pollution remove the clean water and fish and stand in their place. Clean water and fish leave the habitat area. Then, because the ecosystem is weak, the invasive species remove the shelter and stand in their place. The shelter leaves the habitat area.
7. Ask the class if the birds are happy, and why or why not. Have the birds leave the habitat area.
8. Then tell the pollution and the invasive species that the U.S. Environmental Protection Agency and its partners are coming to clean up the environment. Have the pollution and invasive species leave the bird's habitat area.
9. Tell the clean water, fish, and shelter that they can go back to their original habitat/location since the pollution and invasive species are now gone.
10. Tell the birds to go back among their resources. Ask them if they are happy, and why or why not.

Wrap-Up:

Engage all of the students in discussion of what happened in this Degraded Habitat Activity. What actions took place? What were the consequences? Emphasize the resource needs of the bird and how these habitat requirements are being considered throughout the environmental cleanup design.