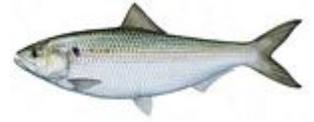


# Food Web Activity: Investigating an Important Link



## **Background Information:**

People depend on healthy ecosystems for food, recreation, and jobs. Restoring the health of ecosystems is a goal of local, state and national agencies such as the U. S. Fish and Wildlife Service (USFWS).

Wildlife biologists who are employed by these and other organizations work towards this goal by studying interactions within ecosystems and formulating a plan for maintaining and/or creating balance within them. When biologists identify an organism that is declining in number within an ecosystem, they must study the diet and habitat requirements of that organism in order to develop a plan to help restore its numbers.

In this activity, you will play the role of a fisheries biologist as you investigate the interactions of an ecosystem within the Chesapeake Bay region. You will determine which species forms an important “link” between first order and higher order consumers in this ecosystem and then decide what actions (if any) need to be carried out in order to restore their numbers.

Similar to the field guides and other resources that fisheries biologists use, you will use a set of Food Web cards to identify and gather information about diet and habitat requirement of the various species in this ecosystem.

## **Study Area**

Your study area covers the estuarine ecosystem within the lower Chesapeake Bay region. The coastal rivers and estuarine environments of the Chesapeake Bay are home to diverse organisms. Producers and consumers in these environments form an interconnected food web where a change in the number of one species (producer or consumer) can have an impact on other species. Species numbers can be affected by changes in habitat, predation, harvesting, and disease.

As a fisheries biologist, you will investigate an ecosystem within this study area.

## **Directions:**

### **Part 1:**

1. Cut out the food web cards
2. Carefully read each card and make note of each organism’s habitat and energy requirements. From this information arrange the cards in a manner that represents the feeding relationships within the ecosystem.
3. Place your cards on a large sheet such as newsprint or poster board. Affix the cards with a very small piece of tape as you may later decide to change your arrangement based upon discussion with your classmates.

4. With a pencil, draw in arrows to show the flow of energy through the food web. Remember that the arrow points to the organism receiving energy.
5. Write each group member's name on the large sheet.
6. When your group is done with their food web arrangement, pick another group that has finished their food web. Compare how the other groups' food web arrangement is similar to, or different from, the one created by your group. Record your observations in the chart below.

<b>Similarities between Webs</b>	<b>Differences between Webs</b>	<b>Explanation for Differences</b>

7. Participate in a class discussion to identify and record explanations for any differences between food web arrangements. As a class, come to a consensus concerning the best arrangement of organisms in the web.
8. Rearrange your group's food web to correspond with that decided upon by the whole class. Tape or glue your cards to your large sheet and redraw any arrows if necessary. Fill in the proper flow of energy between organisms with a marker.
9. Using your food web, answer the following questions:
  - (a) Which organisms are producers?
  - (b) Which organisms are first order consumers?
  - (c) Which organisms are second order consumers?
  - (d) Which organisms are third order consumers?
10. Which organism provides the important link in transferring energy directly from the zooplankton to the higher orders of consumers such as fishes and mammals? Use your food web and other data to justify your answer.

**Part 2:**

11. Read about the fisheries biologist and the American shad.
12. From the readings and the information you learned from your study of the food web, answer the following questions
  - (a) From where an American shad is born to where it migrates to grow into an adult, it transfers energy between which two environments?
  - (b) Summarize two ways that scientists and others are working to help restore the organism described in the readings.
  - (c) List two ways that scientists recommend to remove the blockages to fish migration in rivers caused by dams to help restore American shad.
13. Using the answers from question #12, decide which of these actions holds the best promise of restoring this organism in the near shore environment. Then create a poster (8-1/2" X 11") that shows the benefits of this action. Summarize the importance of the relationship between people and nature or between producers and consumers. Be creative and informative.
14. Optional: How can increasing the numbers of this organism impact the food supply for humans?

**Follow Up Activities:**

- Visit the Blackwater National Wildlife Refuge (<http://www.friendsofblackwater.org/>) or the Norfolk Botanical Gardens Eagle Cam ([www.norfolkbotanicalgarden.org/e-community/eagle-cam](http://www.norfolkbotanicalgarden.org/e-community/eagle-cam)) and observe bald eagles in their natural habitat. The “eagle cam” provides fascinating real-time images of eagles and their prey. You will be able to actually observe the eagles as they bring live shad to their offspring.
- Go fishing! While fishing in the coastal plain, see if you can identify species of fish described in your food web.

- Plant a shad bush (*Amelanchier* spp.) in your yard or neighborhood. This bush blooms when shad return to lay their eggs in rivers.