



## MYSTIC AQUARIUM INSTITUTE FOR EXPLORATION

### **Human Impacts**

#### **Definitions**

**Sustainable Fishing:** Fishing with long-term goals that include leaving a healthy and well-managed fish population world wide while having no negative impact on marine habitats and other marine species.

**Aquaculture:** The propagation and rearing of aquatic organisms in controlled or selected aquatic environments for any commercial, recreational, or public purpose.

**Commercial Fishing:** Term used to describe fishing to sell and can be carried out from boats of all sizes, from huge supertrawlers to small rowing boats.

**Industrial Fishing:** The use of large boats with large capacities is commonly referred to as industrial fishing

**Bycatch:** The term given to any animal species that is caught unintentionally.

**Watershed:** A region or area that may contain several rivers, streams, or lakes that ultimately drain to a particular watercourse or body of water.

**Ecosystem:** An ecological community, together with its physical environment, considered as a unit.

**Food Chain:** An arrangement of the organisms according to the order an organism consumes another organism in which each uses the next member as a food source.

**Nonpoint Source Pollution:** Pollution that cannot be traced to a specific origin or starting point, but seems to flow from many different sources.

**Wetlands:** Land or areas, such as tidal flats or swamps that are often or periodically saturated with water.

**Tributaries:** A stream that flows into a larger stream or other body of water.



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### **Activity 1: Run Off**

Materials: soil, red powdered tempera paint, measuring spoon, teaspoon (5 ml), stirring spoon, funnel, wide-mouthed jar, measuring cup, coffee filter paper

Objective: Students will understand how contaminants in soil can be taken up by water and spread to pollute a large body of water. Have the students perform the experiment below and then answer the questions based on the results

Directions: Add  $\frac{1}{2}$  teaspoon (2.5 ml) of red tempera paint to  $\frac{3}{4}$  cup (225 ml) of soil. Mix thoroughly. Set the funnel in the jar. Place the coffee filter inside the funnel. Pour the colored soil mixture into the paper filter. Pour  $\frac{3}{4}$  cup (225 ml) water into funnel. After all the water has run through the funnel, empty contents of the jar. Replace jar underneath the funnel and add another  $\frac{1}{2}$  cup of water to the colored soil mixture.

#### Questions:

- How does the water coming into the jar from the funnel appear?
- What happens to the water as it flows through the colored soil mixture and why?
- If the soil represents all the land in the Connecticut River valley watershed, what might the red paint going into the soil represent?
- Where will this material ultimately end up?

### **Activity 2: Watershed Game**

Materials: eye dropper, cup of water, laminated watershed game board

Objective: Students will play a game to trace a water droplets journey from a river's source through a watershed and get deposited to the ocean.

Directions: The students will work in groups and take turns. They will take an eye dropper full of water and place a drop or two of water at the start. This is the beginning of their water droplets journey. They will then attempt to move the paper around to get the water droplet to stay in the lines and travel through the forest, meadow, marsh and beach to finish by draining into the ocean.



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### **Activity 3: Penguin Land**

Material: 10 pieces of colored paper

Objective: As land development increases, the amount of space for penguin nesting sites decreases. This can lead to increased competition for resources in a concentrated area.

Directions: Break the students into pairs explaining that they will take on the role of penguins competing for a nesting site area. Place 10 pieces of colored paper on the floor; let the students know that each piece of paper represents an area of the beach suitable for nest building. At the teacher's signal, the penguins will migrate around the room until each pair finds and stands on a piece of paper, a site to nest. Students who did not find a place to stand, will return to their seats. For the second round, remove 2 pieces of paper as a result of an oil spill. Repeat the activity. Did all of the pairs find a nesting site this round? Why or why not? Brainstorm with your students other events that would cause nesting sites to disappear.

### **Activity 4: Sustainable Fishing**

Materials: Swedish fish, goldfish crackers, straws, bowls, spoons, plates

Objective: Explain to the students that over fishing is a current problem affecting the world's oceans. To illustrate how fish populations can be exploited, the students will play the role of fishermen in this activity.

Directions: Place 5 Swedish fish and 5 goldfish crackers in each bowl. Explain that in order to survive, they must catch at least 4 fish. The Swedish fish represent a longer lived fish which can be sold at a higher cost than the goldfish crackers. After each round the stock will be replenished with a 1:1 ratio for goldfish crackers and 1:2 ratios for the Swedish fish candies. Round 1: Each student is asked to catch their fish using nothing but a straw (no hands can be used in this round). This represents fishing in its most basic form with no fish finders, nets, or other forms of technology. Give the students 20 seconds to fish. Count fish and replenish stocks. Round 2: For this round, technology has advanced and students may also use their hands to focus the straw. Give the students 20 seconds to fish. Count fish and replenish stocks. Round 3: Introduce the spoon as a new form of technology. Tell the students that they can use the straw, spoon, or both to fish this round. If one student has depleted their stock, have the students compete from the same bowl. Discuss with the class the results of the activity.



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**Activity 5: Oil Spill Lab**

Materials: vegetable or baby oil, pan, water string, cotton balls, Styrofoam, kitty litter, sand, detergent, eye dropper, spoon

Objective: Oil in the ocean can come from many sources but despite its origin, oil can affect many organisms from plankton to fish to whales. This activity will illustrate that some items which may be used to clean up oil are disposal problems – balancing pros and cons.

Directions: Make an oil spill in the pan using the oil and have the students use any of the above materials to try to clean up as much oil as possible from the tray. Which materials and methods worked the best to clean up the oil? How could these materials or others like them be used to clean up large oil spills? Would any of these materials or methods be harmful to the marine environment? If so, which ones and why?