

# Fishout!

## Objectives:

- ◆ Compare the catches made by traditional fishermen with those made by high-technology fleets.
- ◆ Assess the impact on the environment of both traditional and high-tech fishing techniques.

**Materials:** (Per group) plastic shoe box containing different colors of beads and white beans, plastic spoons, small scoops, forceps, Ziplock® bags, blindfolds.

**Introduction:** In colonial times farmers would graze their animals in pasture areas called a *commons*. This pasture area, such as the Boston Commons, was owned by no one person but held by the community as a whole. Since each farmer wanted to maximize his or her gain by keeping as many animals on the commons as possible, he/she gradually added more and more animals to the pasture. At first there were few people and few animals, and disease limited the number of animals. Later, however, there were enough animals added to the pasture to damage the grazing land. If enough damage was done, it could not be used by any of the farmers for their animals. The challenge of avoiding damage to the common area is to find ways to agree upon and enforce ways to limit the uses and abuses of commons resources or, in other words, to encourage *stewardship* of resources that people hold in common. Aristotle said, "That which is common to the greatest number gets the least amount of care. Men pay most attention to what is their own. They care less for what is common."

For several hundred years the fisheries of the Grand Banks have been among the richest in the world. In the past few years, however, cod fishermen have noticed fewer and fewer fish caught. Recently the Canadian government has placed a total moratorium on

fishing in the area. This action has enraged fishermen in several European countries and has almost come to shots fired. No one is happy with the action taken, but the government of Canada hopes to allow its fisheries to recover if no fish can be taken from the area for a number of years.

Our Gulf of Mexico yields more finfish, shrimp, and shellfish annually than the South and Mid-Atlantic, Chesapeake, and New England regions combined. The Gulf shrimp fishery is among the most valuable fisheries in the U.S. In addition, the Gulf provides critical habitat for 75% of the migratory waterfowl traversing the U.S.

Some of the valuable fisheries in our area of the northern Gulf of Mexico include shrimp, oysters, redfish, snapper, and grouper. In recent years even these seemingly endless resources show some signs of overuse. The challenge of this activity *Fishout!* is to determine the effects of use on a resource of unknown size and to develop one or more methods of assuring continued catches.

Traditional fishermen use poles, nets, and dredges and cannot "see" beneath the waters to locate their quarries. Fishermen using high-technology methods are able to pinpoint their prey with a high degree of accuracy using such methods as aerial location and sonar. Traditional fishermen often pull in nets filled with many different marine organisms, the unusable parts of which are called *bycatch*. High-tech fishermen are less likely to take in unwanted species.

**Procedure:** The plastic box represents your fisheries area and resource pool. The various colors and shapes of the beads represent different marine organisms. Each shape

represents a different desirable organism. Beans represent unwanted bycatch. Different groups will use various fishing methods that represent different levels of fishing technology. You must record everything you catch that cannot be returned to the resource pool. Read through your entire activity before beginning. Ask your teacher if you have questions.

**Group 1:** Represents the most primitive fishing technologies. You can only "fish" using forceps and you must be blindfolded. Everything you catch must be taken to shore. Because you fish out of primitive boats without motors or refrigeration, half of everything you catch spoils before it can be used and must be disposed of in your ziplock bag along with all accidental bycatch.

**Group 2:** Represents the lowest level of technology. You can "fish" using a small net (plastic spoon), but you too are blindfolded. Everything you catch is dead by the time you get it aboard but at least you can refrigerate your fish. Your bycatch is tossed overboard (into the ziplock bag) but all of your fish can be counted.

**Group 3:** Represents a different level of technology and conservation. You must "fish" using forceps but because you have access to aircraft, you do not need to be blindfolded. All of your catch can be refrigerated so you lose none of it, but because you have no use for it, your bycatch is useless and must be stashed in your ziplock bag.

**Group 4:** Represents the middle level of technology. You can fish using a small net (plastic spoon). Because you have a "fish-finder" (echo-location sonar), you need not wear a blindfold. You have refrigeration, so all of your catch is usable, but your bycatch dies and must be removed from the environment (stashed in the ziplock).

**Group 5:** Represents the next to highest level of technology. You can fish a large net (scoop). Because you have a "fish-finder," you need not wear a blindfold either. Due to

refrigeration, you save all of your catch. New developments have made half of your bycatch useful, so save it. Dispose of the rest of your bycatch in your ziplock bag because it is dead and lost to the environment.

**Group 6:** Represents the highest level of technology. Not only do you have a large net and fish-finder, you also have access to the newest development in technology, a large net that also preserves the lives of your bycatch. Your total catch is preserved due to refrigeration, but you recognize that half of it needs to be returned to the sea as breeding stock each time. All of your bycatch survives, so it too can be returned to the resource pool.

**Predict** which groups will catch the most fish:

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will *best* maintain their resource pool

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### Round 1

1. Each member of the group will fish your resource area twice this first "year." Each person may choose to take any number of "fish" from the area. It is each individual's choice how much of the resource to use. The fish left in the fisheries area will replace themselves, just as a natural population of fishes reproduces every so often. Keep the "fish" you catch in front of you in the small cup and record each person's catch in the data table.

### Round 2

2. Repeat the procedure for another "year," again letting each group member "fish" twice and letting each person determine his/her "catch" each time. Record the catches on the data sheet. If you *fish out* all of your resources, you are done playing. Your fishery has been wiped out.

### Round 3

3. Repeat the procedure one more time for year three, recording your catches on the data chart.

Now record your results on the board in Data Table #2 for the entire class. Record other groups' data on your Data Table #2.

**Data Table #1**

Student	round 1 catch	round 2 catch	round 3 catch	total bycatch

**Data Table #2**

group	total bycatch	total round 1 catch	total round 2 catch	total round 3 catch
1				
2				
3				
4				
5				
6				

Now determine each group's environmental score by adding total numbers of fish caught and taken home and subtracting the total number of bycatch:

#### Analysis:

1. How did you feel as you fished? Did anyone take too many fish? Was any group greedy? How did that make the others feel? Did everyone try to take as many fish as possible? Why or why not?

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Does society reward those with the "most"? How?

2. Do populations continue to double forever? Why or why not?

3. Look at the data for all of the groups. Which groups caught the most fish?

Why?

4. Did any of the groups *fish out* \_\_\_\_\_

Which?

Why did they lose their resource?

5. Which of the groups do you think were most successful?

Explain what you mean by "success."

6. What other kinds of *commons* can you think of in our community or school?

7. Can you think of natural resources other than fisheries that are commons resources?

8. What other kinds of global commons can you think of?

## Conclusions:

1. Review your predictions. Comment on their accuracy:

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2. What can people do to use commons resources most wisely?

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3. How does an agency like the Department of Marine Resources manage commons resources?

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4. What role do you play in determining the actions taken by such governmental bureaus?

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5. Is governmental action the only way that you can think of to maintain commons areas? Explain.

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By Kay B. Baggett, J. L. Scott Marine Education Center and Aquarium, Biloxi, MS.

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