

## STUDENT ACTIVITY: THE FISH TRAP CHALLENGE

### GRADE LEVEL

5th to 8th

### NATIONAL SCIENCE EDUCATION STANDARDS

Content Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Content Standard E: Science and Technology

- Abilities of technological design
- Understanding about science and technology

Content Standard F: Science in Personal and Social Perspectives

- Populations, resources, and environments
- Natural hazards
- Risks and benefits
- Science and technology in society

### STEM OBJECTIVES

**Science:** Students will understand the ecology, anatomy, and diet of the animal they are studying.

**Technology:** Students will use the Internet to research and learn about their animal.

**Engineering:** Students will build a trap.

**Mathematics:** Students will design a trap.

### OCEAN LITERACY OBJECTIVES

([www.coexploration.org/oceanliteracy](http://www.coexploration.org/oceanliteracy))

- Students will understand that the ocean and humans are inextricably interconnected (Essential Principle 6).
- Students will understand that humans affect the ocean in a variety of ways. Laws, regulations, and resource management affect what is taken out and put into the ocean (Fundamental Concept 6e).

### OVERVIEW

**Bycatch** is fish harvested in a fishery that are not sold or kept for personal use. It includes **economic discards** (fish not

retained because they are of an undesirable size, sex, or quality or for other economic reasons) and **regulatory discards** (fish that fishermen are required by regulation to discard whenever caught). Some examples are sea turtles caught in shrimp trawls in the Gulf of Mexico or in tuna or swordfish longlines in the Pacific Ocean; salmon caught in pollock trawls in Alaska; and undersized cod caught in New England.

Fishery managers use various measures to reduce bycatch and to facilitate their post-release survivability.

- **individual fishing quotas** or **catch shares** are established so fishermen can then take the time to find areas with high abundance of the target species of legal size and move away from areas where bycatch levels are high;
- **limits on bycatch** are set so the fisheries close if and when the bycatch limits are exceeded;
- **closed areas, closed seasons, and time-area closures** are established so the effort of a particular fishery is reduced, which in turn reduces that fishery's bycatch; and
- **gear restrictions or modifications** are used so unwanted fish and protected species are less likely to be caught, can escape after being caught, and have improved likelihood of survivability after being released if they are caught.

### Examples of gear restrictions:

- ban on drift gillnets, long gillnets, and limits on fish traps/pots in the U.S. South Atlantic region; and
- ban on demersal fish trawls, bottom longlines, bottom-set gillnets, drift gillnets, and other potentially harmful gear in the entire 1.5 nm<sup>2</sup> U.S. exclusive economic zone (EEZ) waters surrounding the U.S. Pacific islands.

### Examples of gear modifications:

- **bycatch reduction devices** on shrimp and groundfish trawls;
- **circle hooks** and **minimum fishing depths** to help to reduce sea turtle bycatch and decrease mortality of turtles that are released;
- **side-setting with bird curtains, night setting,** and **blue-dyed bait** on longline vessels to reduce seabird bycatch; and

- **excluder devices, specific mesh sizes, and escape vents or rings** designed to allow unwanted species or undersized fish to escape before they become bycatch.

#### ACTIVITIES

**Option 1:** For schools in urban or other areas without access to a body of water for field work

1. Students use the Internet and other available resources to research their local fisheries to see what marine resources are found and if there are any regulations regarding fishing seasons, minimum sizes, restricted areas, etc.
2. Students select a fish, crab, or crayfish that can be caught legally in nearshore waters. This can be a freshwater or saltwater species. They do further research to understand the ecology, anatomy, and diet of the animal they are studying.
3. Students create a paper and pencil design of a trap that would catch only the legal size individuals of their selected species, while safely releasing any bycatch caught in their trap. The biggest challenge of this project is to make sure that the trap has escape hatches or vents or something else to allow unwanted, undersized, and illegal species to escape.
4. Students build a model of their fish trap.
5. Students present an oral report to the class on how their trap would work to address bycatch.

**Option 2:** For schools in rural or other areas with access to a body of water for field work

1. Students do a field study to identify the fish and invertebrates found in a nearby body of water. The local Department of Fish and Wildlife or equivalent may be a useful resource.
2. Students select a fish or invertebrate to study. They use the Internet and other available resources to see if there are any regulations regarding fishing seasons, minimum sizes, restricted areas, etc., and to learn about the ecology, anatomy, and diet of the animal they are studying
3. Students create a paper and pencil design of a trap that would catch only the legal size individuals of their

selected species, while safely releasing any bycatch caught in their trap. The biggest challenge of this project is to make sure that the trap has escape hatches or vents or something else to allow unwanted, undersized, and illegal species to escape.

4. Students build a model of their fish trap. This trap could be made out of natural or manmade materials. Woven palm fronds, willow branches, milk cartons, or anything that will not injure the animals or pollute the waters can be used. Students need to figure out what they might want to use for bait.
5. *Optional:* With an accompanying adult (such as their parent), students can test their trap on a given Saturday, or the teacher can pick a date to meet the students and their parents at a given site to see and test their designs. Prior to setting the trap, teachers should seek permission from their local fish and game office. Traps should be placed out in safe waters and monitored to see what is caught. Anything that won't be eaten, won't be used in an aquarium, or can't be caught or kept legally must be released as bycatch. The students or observers log the catch and bycatch.
6. Students present an oral report to the class on how their trap would work or how the trap worked if it was tested.

#### FOR MORE INFORMATION

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#### CREDIT



This lesson is based on a lesson of the same title in the *FishQuest* curriculum by the Western Pacific Fishery Management Council in partnership with Pacific Resources in Education and Learning, the Hawaii Department of Education, and Hawaii Public Television. It was modified by the Western Pacific Council with the gracious assistance of Craig Strang, Lawrence Hall of Science, University of California; and Mellie Lewis, College of Exploration.