U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service

Lesson 22: Marine Policy

Overview

This lesson presents some of the key social and environmental challenges facing the ocean and its resources including pollution, habitat degradation and climate change. The lecture emphasizes key policy tools used to address these challenges including the Clean Water Act and the Magnuson-Stevens Fishery Conservation and Management Act. In the activity, students observe trends in commercial fishery data and describe some management tools that exist to prevent overfishing.

Lesson Objectives

Students will:

1. Identify three major challenges in marine policy
2. Describe major pieces of legislation enacted to tackle these challenges
3. Interpret fisheries stock data and determine whether stocks are overfished

Lesson Contents

1. Teaching Lesson 22
    a. Introduction
    b. Lecture Notes
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    d. Student Activity
2. Student Handouts
3. Mock Bowl Quiz

Standards Addressed

National Science Education Standards, Grades 9-12
Science in personal and social perspectives

Ocean Literacy Principles
The ocean and humans are inextricably interconnected

DCPS, High School
Environmental Science
E.2.1 Understand and explain that human beings are part of Earth's ecosystems and that human activities can, deliberately or inadvertently, alter ecosystems.

Lesson Outline[1]

I. Introduction

Introduce the lesson by leading a discussion about some environmental and social concerns and challenges related to the ocean. Ask students to describe some of the issues they have learned about or that personally interest them. Have students keep a list of the various challenges that are mentioned as the discussion proceeds. They might mention some of the following:

- Habitat degradation (e.g., wetland loss, destruction of mangroves)
- Water pollution (including oil spills)
- Threats, endangerment or extinction of marine species
- Climate change, global warming
- Overfishing

Next, ask students to identify one law or policy they are aware of that addresses each challenge on their list. Encourage them to discuss agencies, actors or strategies that they know for each challenge even if they don't know of a specific law or policy. Some examples of actors[2] or laws for each of the challenges described above include:

- Habitat degradation (National Environmental Protection Act, Environmental Protection Agency [EPA])
- Water pollution (Clean Water Act, Oil Pollution Act, EPA)
- Species protection (Endangered Species Act, International Union for Conservation of Nature [IUCN])
- Climate change (Intergovernmental Panel on Climate Change [IPCC])
- Overfishing (Magnuson-Stevens Fishery Conservation and Management Act, NOAA)

II. Lecture Notes

Use the PowerPoint for Lesson 22 (File: Lesson 22 – Marine Policy.ppt) to present the following information. Distribute the Student Handout before you begin for students to take notes on key information.

Water Pollution (slide 4)

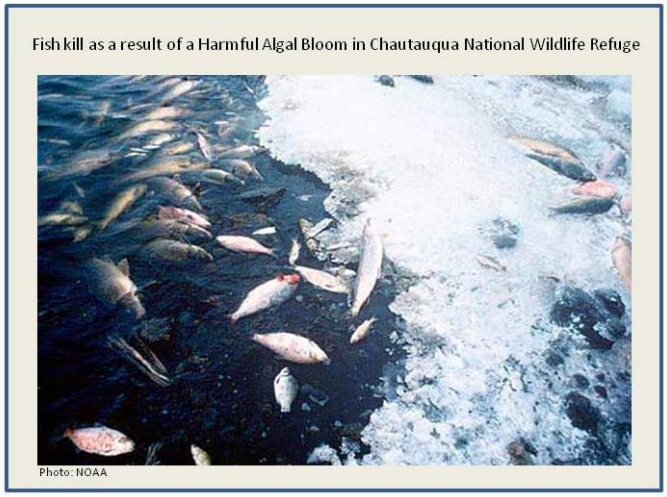
1. Runoff is an example of non-point source pollution. It may come from agricultural, industrial, urban, or other sources. When it rains, the rain washes all types of elements and chemicals—including fertilizer, car gasoline, oil and pesticides—down storm drains and into rivers and other aquatic areas. There isn't one direct source but the chemicals contained in such runoff can pollute and impact local water bodies.

[1] Unless otherwise indicated, all websites provided or referenced in this guide were last accessed in November 2010.

[2] The word actor as defined here means an entity (group or person) that has a role in enacting a policy action.

2. Airborne pollutants (hydrocarbons, metals) from factories and other sources may be deposited in water bodies.

3. Excess nutrient concentrations in the water may stimulate excess algal growth. Bacterial decomposition of the excess algae that depletes oxygen levels may kill fish and other marine life. Harmful Algal Blooms, also known as HABs, may also occur and can lead to contamination of seafood and other ecosystem impacts.


Fish kill as a result of a Harmful Algal Bloom in Chautauqua National Wildlife Refuge
Photo: NOAA

4. Spilled oil may cover and kill marine organisms.

Overfishing (slide 8)

1. The Maximum Sustainable Yield (MSY) represents the greatest number of fish that can be caught each year without impacting the long-term productivity of the stock.
2. Overfishing occurs when fishing morality exceeds a specific threshold, usually set at a level to achieve the MSY.

III. Additional Resources

1. Background information: http://oceanservice.noaa.gov/education/tutorial_pollution/04nonpointsource.html

IV. Student Activity

There are two options for the student activity for this lesson. Both are property of the Science Education Resource Center (SERC) and created by Erin Bardar of Technical Education Research Center (TERC) for the SERC EarthLabs project. These activities are included here in accordance with the Creative Commons copyright license. Make sure to check out some of the other great EarthLabs activities at: http://serc.carleton.edu/earthlabs/.

The two possibilities are below:

1. Print and complete Parts A & B of Lesson 5 "Gone Fishing" found at:
Part A: http://serc.carleton.edu/eslabs/fisheries/5_a.html
Part B: http://serc.carleton.edu/eslabs/fisheries/5_b.html

2. If your students have computers and internet access, you may want to have them do Lesson 3: "Oh What a Tangled Web: Ecosystem-Based Management" found at: http://serc.carleton.edu/earthlabs/fisheries/3.html

Tips for the Bowl – Marine Policy

Below are some of the primary laws and agreements relating to the marine environment. Paying attention to recent environmental policy issues by browsing the New York Times and Washington Post is also a good idea!

Pollution

Coastal Zone Management Act (1972): Provides for management of nonpoint source pollution.
Federal Water Pollution Control Act (1972): Regulates pollutant discharges into US waters.
Marine Protection, Research and Sanctuaries Act (1972): Regulates ocean dumping and transport of waste; provides for the designation and protection of areas designated as marine sanctuaries.
Oil Pollution Act (1990): Provides federal guidance for preventing, responding to, and defining liability for oil pollution incidents (e.g., spills) in U.S. waters.

Habitat and Wildlife Protection

National Environmental Policy Act (1969): Requires governmental agencies to consider impacts to the environment for proposed actions.
Marine Mammal Protection Act (1972): Prohibits the taking of any marine mammals.
Endangered Species Act (1973): Provides for the conservation of endangered and threatened species as well as the ecosystems and habitats upon which they depend.

Fisheries

The Magnuson-Stevens Fishery Conservation and Management Act (MSA): The primary law governing marine fisheries management in U.S. federal waters.

Other Important Information

United Nations Convention on the Law of the Sea (UNCLOS)[3]: Defines the rights and roles of individual countries in their use of the ocean, establishing guidelines for business, the environment, and the management of marine resources.
Exclusive Economic Zones (EEZ): Zones of the ocean over which countries have rights regarding resource use and exploration.
U.S. Commission on Ocean Policy: Mandated by the Oceans Act of 2000 to establish findings and develop recommendations for a new and comprehensive national ocean policy. Final report issued in 2004.
Stratton Commission: The predecessor to the U.S. Commission on Ocean Policy. Conducted the first comprehensive review of U.S. ocean policy. Led directly to the development of NOAA in 1970.

[3] There were three UNCLOS conventions: UNCLOS I (1958), UNCLOS II (1960), and UNCLOS III (1982) but it was specifically UNCLOS III adopted in 1982 that more clearly established international rules governing the oceans.

Marine Policy

1. Which of the following is an example of non-point source pollution?
    w. Factory dumping waste into a river
    x. Sewage treatment plant discharge
    y. **Agricultural runoff**
    z. Oil spill from a ship

2. Short answer: What is the name given to fish and other marine life caught incidentally in pursuit of another species?
    Answer: Bycatch

3. This law is the primary piece of legislation governing U.S. federally managed fisheries
    w. U.S. Fish and Wildlife Conservation Act
    x. Marine Fishing Policies and Conventions of the U.S.
    y. U.S. National Fisheries Executive Order 13750
    z. **Magnuson Stevens Fishery Conservation and Management Act**

4. What does the acronym EBM refer to in marine policy?
    w. **Ecosystem-based management**
    x. Ecosystem boundary marker
    y. Economic based management
    z. Environmentally based management

5. What makes EBM different from traditional policy approaches to management of marine resources?
    w. EMB focuses on individual species rather than communities
    x. EBM focuses exclusively on marine mammals rather than all marine life
    y. **EBM focuses on whole ecosystems rather than individual species**
    z. EBM includes only environmental and not economic concerns

6. Zones of the ocean over which individual countries have special rights of resource use and exploration are known as:
    w. Marine Protected Areas
    x. **Exclusive Economic Zones**
    y. Exclusive Harvest Zones
    z. Exclusive Marine Boundaries

7. Short answer: The greatest number of fish that can be caught each year without impacting the long-term productivity of the stock:
    Answer: Maximum Sustainable Yield (or MSY)

8. The U.S. Exclusive Economic Zone extends out to how many nautical miles from shore?
    w. 2
    x. 20
    y. **200**
    z. 220

9. This act provides for management and regulation of non-point source pollution:
    w. Federal Water Pollution Control Act
    x. Oil Pollution Act
    y. Marine Protection, Research and Sanctuaries Act
    z. **Coastal Zone Management Act**

10. Team Challenge Question

Fisheries form a large and vitally important industry in the United States. Answer the questions below about fisheries management in public policy.

1. What is the primary law that governs marine fisheries management in U.S. federal waters? (2pt)

2. Describe the fishery management system it initially established. (2pt)

3. The legislation provides a special term for those habitats required by marine species for spawning, breeding, feeding and growth to maturity. What is it? (2pt)

4. Which federal agency is responsible for using the tools in this law to promote the stewardship of the nation's living marine resources and their habitat? (1pt)

ANSWER

Team Challenge Question

Fisheries form a large and vitally important industry in the United States. Answer the questions below about fisheries management in public policy.

1. What is the primary law that governs marine fisheries management in US federal waters? (2pt)
   The Magnuson-Stevens Act (Also acceptable: Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Reauthorization Act)

2. Describe the fishery management system it initially established. (2pt)
   Eight regional Fishery Management Councils were established

3. The legislation provides a special term for those habitats required by marine species for spawning, breeding, feeding and growth to maturity. What is it? (2pt)
   Essential Fish Habitat

4. Which federal agency is responsible for using the tools in this law to promote the stewardship of the nation's living marine resources and their habitat? (1pt)
   National Oceanic and Atmospheric Administration (NOAA) or NOAA Fisheries Service or National Marine Fisheries Service (NMFS)