NATIONAL GEOGRAPHIC

RESOURCE LIBRARY
ACTIVITY : 2 HRS 30 MINS

Fisheries Sustainability

Students identify the issues and terminology related to fisheries sustainability and explore the impacts those issues have on specific United States fisheries.

GRADES

9 - 12+

SUBJECTS

Biology, Ecology, Earth Science, Oceanography, English Language Arts, Geography, Human Geography, Physical Geography

CONTENTS

4 PDFs, 3 Videos, 2 Links

OVERVIEW

Students identify the issues and terminology related to fisheries sustainability and explore the impacts those issues have on specific United States fisheries.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/fisheries-sustainability/

DIRECTIONS

1. Have students answer pre-assessment questions.
Distribute the Fisheries Sustainability worksheet and give students time to independently answer the questions in Part 1. Then have a whole-class discussion about students' responses.

2. Have students take notes as they watch two National Geographic videos.
Explain to students that they will take notes in Part 2 of the Fisheries Sustainability worksheet as they watch videos. Show students the National Geographic videos "Declining Fish" (3

minutes) and "Herring Hazards" (8 minutes). Then, as a class, discuss what students listed as important ideas, statistics, and key terms.

3. Have students make concept map vocabulary cards to learn more about fisheries sustainability.

Divide students into small groups and distribute the Fisheries Sustainability Vocabulary handout. Read the directions aloud. Have students use the terms to create concept map vocabulary cards. Using index cards or paper cutouts, have them draw triangles on each card and then write the following information in each angle of the triangle: a definition of the term (in their own words), characteristics of the term, and examples of the term. After each group has made all of its vocabulary cards (11 total), have the group number or letter the cards so that they know which term each card represents. Explain that each group will be trading its cards with another group, so they need to make sure that the other groups do not know their numbering/lettering system. After trading cards, challenge students to match each term to its corresponding concept map card. Facilitate group work and address any misconceptions, as needed. Tell students that, during the next class session, they will apply what they have learned to predict the status of several United States fisheries.

4. Have students complete the Fisheries Sustainability Research worksheet.

Divide students into pairs and distribute the Fisheries Sustainability Research worksheet. Have them use the provided NOAA National Marine Fisheries Service FishWatch website to research and predict the status of a variety of United States fisheries.

5. Have students map the fisheries using the National Geographic Water Planet Mega Map.

Ask each group of students to use their completed fisheries sustainability research to map one or more fishery on the Water Planet Mega Map, included in the World Physical MapMaker Kit. Make sure that all of the fisheries are mapped.

6. Have students reflect on what they learned.

Summarize the important information students should glean from their research. The primary issues affecting the sustainability of marine fisheries include overfishing, illegal fishing, habitat damage, bycatch, and management. Marine fisheries in the United States have a status that ranges from sustainable to collapsed or recovering. To be sustainable, a fishery's population must be managed in a way that provides for today's needs without damaging the ability of the species to reproduce and be available for future generations. Have a whole-class discussion. Ask: *What were your fisheries status predictions? Explain your reasoning. Why do you think groups made different predictions?* Have students look back at the questions they

answered in Part 1 of the Fisheries Sustainability worksheet. On the back of the worksheet, or on a separate sheet of paper, have each student write about whether or not their answers have changed based on what they learned from the activity and how. Then have a whole-class discussion about their reflections.

Informal Assessment

Assess students' completed worksheets for accuracy. Check students' understanding by asking them to orally restate the observations they made, including key terms, after watching the videos and completing the card activity. Use the provided Fisheries Sustainability Research Answer Key to facilitate group discussion and questioning.

Extending the Learning

Have students research and present information about the sustainability of a managed fishery in their own state. Use the NOAA: Fisheries—Office of Sustainable Fisheries website to find a list of State-Federal Fisheries.

OBJECTIVES

Subjects & Disciplines

Biology

- Ecology

Earth Science

- Oceanography

- English Language Arts

Geography

- Human Geography
- Physical Geography

Learning Objectives

Students will:

- use scientific terminology to describe the sustainability status of marine fisheries
- describe the primary fisheries issues and their effects on the sustainability of various United States fisheries

Teaching Approach

- Learning-for-use

Teaching Methods

- Cooperative learning
- Discussions
- Information organization
- Multimedia instruction
- Research
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Learning and Innovation Skills
    - Communication and Collaboration
- Critical Thinking Skills
  - Analyzing
  - Applying
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Organizing Geographic Information

National Standards, Principles, and Practices

IRA/NCTE STANDARDS FOR THE ENGLISH LANGUAGE ARTS

- **Standard 8:**

Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and

communicate knowledge.

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- **Standard 14:**

How human actions modify the physical environment

- **Standard 18:**

How to apply geography to interpret the present and plan for the future.

NATIONAL SCIENCE EDUCATION STANDARDS

- **(9-12) Standard C-4:**

Interdependence of organisms

- **(9-12) Standard E-2:**

Understandings about science and technology

- **(9-12) Standard F-4:**

Environmental quality

- **(9-12) Standard F-5:**

Natural and human-induced hazards

OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

- **Principle 5c:**

Some major groups are found exclusively in the ocean. The diversity of major groups of organisms is much greater in the ocean than on land.

- **Principle 5i:**

Estuaries provide important and productive nursery areas for many marine and aquatic species.

- **Principle 6b:**

From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our nation's economy, serves as a highway for transportation of goods and people, and plays a role in national security.

- **Principle 6c:**

The ocean is a source of inspiration, recreation, rejuvenation and discovery. It is also an important element in the heritage of many cultures.

- **Principle 6d:**

Much of the world's population lives in coastal areas.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Index cards
- Markers
- Paper
- Pencils

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per small group, Projector, Speakers
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction
- Small-group instruction

OTHER NOTES

Before starting the activity:

- Queue up the videos.
- Using the MapMaker Kit Assembly video as a guide, print, laminate, and assemble the Water Planet Mega Map.

Background Information

The primary issues affecting the sustainability of marine fisheries include overfishing, illegal fishing, habitat damage, bycatch, and management. Marine fisheries in the United States have a status that ranges from sustainable to collapsed or recovering. To be sustainable, a fishery's population must be managed in a way that provides for today's needs without damaging the ability of the species to reproduce and be available for future generations.

Prior Knowledge

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Recommended Prior Activities

- Fisheries and Seafood Consumption

Vocabulary

Term	Part of Speech	Definition
bycatch	*noun*	fish or any other organisms accidentally caught in fishing gear.
collapsed fishery	*noun*	fishing industry where the number of fish has been severely reduced or depleted. Also called a depleted fishery.
fishery	*noun*	industry or occupation of harvesting fish, either in the wild or through aquaculture.
recovering fishery	*noun*	fishing industry where catches are increasing after having been reduced or depleted.
sustainable fishery	*noun*	industry of harvesting fish or shellfish that can be maintained without damaging the ecosystem or fish population.
sustainable seafood	*noun*	fish, shellfish, and other aquatic organisms harvested from fish farms or fisheries that can be maintained without damaging the ecosystem.

For Further Exploration

Websites

- NOAA: National Marine Fisheries Service—FishWatch Glossary
- NOAA: Fisheries—Office of Sustainable Fisheries
- National Geographic Environment: The Ocean—The Impact of Seafood
- National Geographic Magazine: Still Waters, The Global Fish Crisis
- National Geographic Education: National Teacher Leadership Academy (NTLA)

FUNDER

ORACLE

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