

RESOURCE LIBRARY
ACTIVITY : 50 MINS

Human Impacts on Marine Ecosystems

Students use a variety of media to discuss and analyze human-related pressures placed upon marine ecosystems and resources.

GRADES

9 - 12+

SUBJECTS

Biology, Ecology, Earth Science, Oceanography, Geography, Human Geography, Physical Geography

CONTENTS

4 PDFs, 1 Audio, 1 Link, 1 Video

OVERVIEW

Students use a variety of media to discuss and analyze human-related pressures placed upon marine ecosystems and resources.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/human-impacts-on-marine-ecosystems/>

DIRECTIONS

1. Activate students' prior knowledge.

Tell students that they will learn about human-related impacts that threaten the ocean. Give each student a copy of the "Ocean Priorities" Anticipation/Reaction Guide. Read aloud the directions. Explain that students will decide if they agree or disagree with a series of statements both before and after listening to the National Public Radio "Ocean Priorities" podcast. Have students read and respond to the statements in the "response before the podcast" column.

2. Have students listen to the NPR podcast “Ocean Priorities.”

Distribute copies of the worksheet Ocean Priorities Notetaking. As students listen to the NPR podcast (8 minutes), have them take notes about the ocean priorities/threats and ocean management and research priorities discussed in the interview. After the podcast, have students respond again to the seven statements on the Anticipation/Reaction Guide. Discuss student responses to the guide and ask which of their responses changed after listening to the podcast. Use the Notetaking Answer Key to summarize the main points of the podcast. Ask:

- *What is meant by the podcast’s title, “Ocean Priorities?”* (Ocean priorities are the greatest threats to ocean health and are the top priorities for ocean management.)
- *What do the guests mean when they say “The ocean is not a luxury item?”*

3. Have students analyze the global map of human impacts to marine ecosystems.

Display the map of human impacts to marine ecosystems. Briefly discuss the meaning of the choropleth map key. Ask:

- *What color represents marine ecosystems with very low human impact?* (blue)
- *What color represents marine ecosystems with very high human impact?* (red)
- *What color appears to dominate throughout the World Ocean?* (orange; medium high impact)
- *Which areas appear to have the lowest human impact?* (Central Pacific, Antarctic/Southern, and Arctic Oceans, and northern Australia and the Torres Strait)
- *Select one area that has low or very low human impact. Why do you think that is?*
- *Select one area that has high or very high human impact. Why do you think that is?*

4. Show students the NOAA animation “Humans Impact the Ocean.”

Display the NOAA animation. Read aloud the text as students watch the animation. Ask:

- *What percentage of the world’s ocean is unaffected by human impacts?* (about 4%)
- *What region has the highest concentration of Marine Protected Areas in the world?* (the northern coast of Australia near Papua New Guinea)
- *Discuss as a class the ending statement “Imagine if these protected areas were as common in the rest of the ocean.” What would need to change? What areas would you protect first?*

Modification

For students who need help with listening comprehension, use the printed transcript of the NPR "Ocean Priorities" podcast.

Informal Assessment

Use students' notes and responses to the podcast's Anticipation/Reaction Guide to assess their misconceptions and comprehension of how humans impact the ocean.

Extending the Learning

Assign each student one of the five [L.A. Times Altered Oceans](#) articles to read at home. Have students take notes using the *L.A. Times: Altered Oceans Series* worksheet. Invite volunteers to share their findings with the class. After one volunteer has presented on each article, discuss as a class how the ocean issues are related to one another.

OBJECTIVES

Subjects & Disciplines

Biology

- [Ecology](#)

Earth Science

- [Oceanography](#)

Geography

- [Human Geography](#)
- [Physical Geography](#)

Learning Objectives

Students will:

- describe the relationship humans have with marine resources and habitats
- explain how human-related impacts affect the abiotic and biotic components of various marine ecosystems
- identify and discuss the major threats and management priorities for the world ocean

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Guided listening
- Information organization
- Multimedia instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information Literacy
 - Media Literacy
- 21st Century Themes
 - Global Awareness
- Critical Thinking Skills
 - Analyzing
 - Understanding
- Geographic Skills
 - Analyzing Geographic Information
 - Answering Geographic Questions

National Standards, Principles, and Practices

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.

- **Standard 8:**

The characteristics and spatial distribution of ecosystems and biomes on Earth's surface;

NATIONAL SCIENCE EDUCATION STANDARDS

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

Interdependence of organisms

- **(9-12) Standard F-3:**

Natural resources

- **(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 1f:**

The ocean is an integral part of the water cycle and is connected to all of the earth's water reservoirs via evaporation and precipitation processes.

- **Principle 1g:**

The ocean is connected to major lakes, watersheds and waterways because all major watersheds on Earth drain to the ocean. Rivers and streams transport nutrients, salts, sediments and pollutants from watersheds to estuaries and to the ocean.

- **Principle 1h:**

Although the ocean is large, it is finite and resources are limited.

- **Principle 2c:**

Erosion—the wearing away of rock, soil and other biotic and abiotic earth materials—occurs in coastal areas as wind, waves, and currents in rivers and the ocean move sediments.

- **Principle 5i:**

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

- **Principle 6a:**

The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth's oxygen. It moderates the Earth's climate, influences our weather, and affects human health.

- **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 6d:**

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

- **Principle 6e:**

Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (such as point source, non-point source, and noise pollution) and physical modifications (such as changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

- **Principle 6g:**

Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Pencils

REQUIRED TECHNOLOGY

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

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction

OTHER NOTES

Before starting the activity, download and queue up the Science Friday podcast and the Humans Impact the Ocean animation. For the extension activity, save each of the five Altered Oceans articles as PDFs and provide printouts for any students who do not have computer and Internet access at home.

BACKGROUND & VOCABULARY

Background Information

Human exploitation of the ocean's resources and destruction of marine habitats are driving species extinction, destroying fisheries, generating pollution, and creating ecological imbalances throughout the world. The ocean, once thought to be a limitless and resilient reservoir, is showing signs of irreparable damage. The creation of Marine Protected Areas (MPAs) is one strategy for preserving marine habitats.

Prior Knowledge

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Recommended Prior Activities

- [An Imbalance in our Ocean](#)

Vocabulary

Term	Part of Speech	Definition
choropleth map	<i>noun</i>	representation of statistical data, such as population, over a specific area using colors or patterns to represent types or intensity of data.
marine ecosystem	<i>noun</i>	community of living and nonliving things in the ocean.

For Further Exploration

Websites

- [NPR: Talk of the Nation—Examining the State of the Oceans with Sylvia Earle](#)
- [NPR: Science Friday—State of the Oceans](#)
- [NPR: Science Friday—NOAA Administrator Jane Lubchenco](#)
- [National Geographic Education: National Teacher Leadership Academy \(NTLA\)](#)

FUNDER

ORACLE



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