



MARINE PROTECTED AREAS LESSON PLAN

Water Parks

Theme

U.S. Marine Protected Areas

Links to Overview Essays and Resources Needed for Student Research

<http://oceanservice.noaa.gov/topics/oceans/mpa/>

<http://mpa.gov/>

Subject Area

Life Science

Grade Level

9-12

Focus Question

What are marine protected areas, and how do they contribute to natural, economic, and cultural resources?

Learning Objectives

- Students will be able to define “marine protected area” (MPAs), and identify the reasons for establishing MPAs.
- Students will be able to compare and contrast natural heritage, cultural heritage, and sustainable production MPAs.
- Students will be able to discuss an example of each of the above types of MPA.
- Students will be able to use the National Ocean Service’s inventory of marine protected areas to obtain information on various types of MPAs.

Materials Needed

- Copies of either “MPA Subject Review” (fill-in-the-blank version, with or without word bank) or “MPA Subject Review Crossword Puzzle,” one copy for each student or student group

- (optional) Computers with internet access; if students do not have access to the internet, download copies of materials cited under “Learning Procedure” and provide copies of these materials to each student or student group

Audio/Visual Materials Needed

None

Teaching Time

One or two 45-minute class periods, plus time for student research

Seating Arrangement

Groups of 2 - 3 students

Maximum Number of Students

30

Key Words

Marine protected area
Natural heritage MPA
Cultural heritage MPA
Sustainable production MPA

Background Information

In May 2000, the President of the United States issued Executive Order 13158 directing federal agencies to strengthen and expand a national system of marine protected areas (MPAs) to reverse the loss of ocean habitats, sustain fisheries, and preserve other valuable marine resources.

MPAs have been used for many years as a tool for protecting marine resources and controlling the ways that these resources are used. The first National Marine Sanctuary was established in 1975 to protect the wreck of the USS Monitor, a ship that sank in 1862 during the Civil War. National parks in the marine environment have been in existence even longer; the Everglades National Park, for example, was established in 1947 to protect more than 100 miles of coastline, mangrove, tropical bays, and seagrass beds. The purpose of Executive Order 13158 was to enhance the effectiveness of MPAs and ensure that the United States has a system of MPAs that is representative of U.S.

marine ecosystems and cultural marine resources. An important result of this Order was the creation of a resource center to assist MPA projects in the U.S. and other countries.

These initiatives vary widely in terms of specific resources being protected, activities undertaken to achieve this protection, and the overall objectives of resource use and resource protection. Some MPAs are focussed strictly on conservation and may strictly limit visitors and uses to protect target resources. Other MPAs are created to ensure that certain uses such as traditional fishing in local communities or recreational fishing can continue over a long period of time. All MPAs in the U.S., however, have conservation as their overarching objective.

This activity is intended to provide a foundation for other lessons concerned with MPAs by introducing students to

- Basic concepts and approaches used to create MPAs;
- Sources of information available through the National Marine Protected Areas Center; and
- How MPAs are being used in different locales as tools for conserving natural and cultural resources and for controlling the ways in which these resources are used.

Learning Procedure

1.

Direct students to “MPA Education Poster Site Descriptions” and “A User’s Guide to Marine Protected Area Types and Terms” at http://mpa.gov/information_tools/education/pdfs/Poster04companion.pdf and http://mpa.gov/what_is_an_mpa/MPA_UsersGuide.pdf. Have each student complete one version of the MPA Subject Review, then lead a discussion to review the answers. Be sure students understand the distinctions between “natural heritage,” “cultural heritage,” and “sustainable production” MPAs:

In natural heritage and cultural heritage MPAs, the primary mission is to protect natural and/or cultural resources. Varying types and degrees of human uses may be allowed, but these activities are secondary to the primary purpose of resource protection.

In contrast, allowing certain uses as well as protecting resources are both part of the primary purpose of sustainable produc-

tion MPAs. These MPAs allow resources to be used, as long as the resources can also be maintained and conserved. For example, in an area where local fishing has traditionally provided an important food supply to coastal communities a sustainable production MPA might allow local fishermen to continue to use fishery resources, but might limit fishing by non-residents. Or, in an area where recreational fishing by visitors is important to the local economy, a sustainable production MPA might allow recreational uses to continue as long as fishery resources are not depleted. A common misconception is that protected areas are synonymous with severely restricted use, but this is not true of many MPAs.

2.

Assign one of the following clues to each student or student group:

- A National Marine Sanctuary in Monterey Bay, CA, with more than 100 submerged cultural resources
- A sanctuary for calving humpback whales in the Hawaiian Islands
- A National Marine Sanctuary containing kelp forests near Anacapa Island, CA
- A National Marine Sanctuary near the Olympic Coast containing a seamount
- A National Marine Sanctuary in Fagatele Bay containing coral reefs
- A National Marine Sanctuary that includes the Flower Garden Banks
- An MPA within the city limits of New Orleans, LA
- An MPA containing the remnants of a land bridge that once connected Asia and North America
- A National Marine Sanctuary near Georgia that includes extensive nearshore live-bottom reefs
- An MPA in American Samoa that includes two rain forests and a coral reef

Tell students that the National Ocean Service is conducting an inventory of existing marine protected areas in the United States, and their assignment is to use this inventory to identify an MPA that matches their assigned clues and to obtain information for a brief report that should include the following:

- The complete name of the MPA;

- Who operates the MPA;
- A description of the MPA's location, including maps (if available);
- Size of the MPA;
- Resources that the MPA is intended to protect; and
- Unique, unusual, and/or important features of the MPA.

Direct students to the MPA Site Inventory exploration page at http://www2.mpa.gov/mpa/mpaservices/inventory/explore_inventory.lasso. Suggest that students look over all of the options for searching the inventory before beginning a search. In some cases students will need to use one search to figure out the name of their MPA, then another search to obtain detailed information. For example, a search of cultural resources might be the easiest way to find the name of MPAs containing land bridge remnants or shipwrecks. Once a likely name has been identified, a second search under the "Query by Site" heading will provide links to detailed information about that MPA.

3.

Have students make brief oral presentations about the MPA they identified that matches their assigned clues. The intended MPAs are:

- A National Marine Sanctuary in California containing more than 100 submerged cultural resources – Monterey Bay National Marine Sanctuary, California
- A sanctuary for calving humpback whales in the Hawaiian Islands – Hawaiian Islands Humpback Whale National Marine Sanctuary, Hawaii
- A National Marine Sanctuary containing kelp forests near Anacapa Island, CA – Channel Island National Marine Sanctuary, California
- A National Marine Sanctuary near the Olympic Coast containing a seamount – Olympic Coast National Marine Sanctuary, Washington
- A National Marine Sanctuary in Fagatele Bay containing coral reefs – Fagatele Bay National Marine Sanctuary, American Samoa
- A National Marine Sanctuary that includes the Flower Garden Banks – Flower Garden Banks National Marine Sanctuary, Texas
- An MPA within the city limits of New Orleans, LA – Bayou

- Sauvage National Wildlife Refuge, Louisiana
- An MPA containing the remnants of a land bridge that once connected Asia and North America – Bering Land Bridge National Preserve, Alaska
- A National Marine Sanctuary near Georgia that includes extensive nearshore live-bottom reefs – Gray’s Reef National Marine Sanctuary, Georgia
- An MPA in American Samoa that includes two rain forests and a coral reef – National Park of American Samoa, American Samoa

The Bridge Connection

<http://www.vims.edu/bridge/archive0900.html>

<http://www.vims.edu/bridge/seaturtles.html>

<http://www.vims.edu/bridge/archive0300.html>

<http://www.vims.edu/bridge/channelislands.html> – Link to Bridge archives for articles about marine protected areas in the Channel Islands, Gray’s Reef, Galapagos Islands, and Costa Rica.

The Me Connection

Have students write a brief essay discussing how the marine protected area concept might be applied to natural and/or cultural resources in their own community, including a description of the resources to be protected and the personal benefits that could result from such an initiative.

Extensions

Visit <http://nos.noaa.gov/topics/oceans/mpa/welcome.html> for links to photo galleries and case studies of several MPAs in the United States.

Resources

<http://mpa.gov/> – website for the National MPA Center, with definitions, program descriptions, list of MPA sites, virtual library, tools, and links to regional information centers

National Science Education Standards

Content Standard A: Science as Inquiry

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

Content Standard C: Life Science

- Interdependence of organisms

Content Standard F: Science in Personal and Social Perspectives

- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

Links to AAAS “Oceans Map” (aka benchmarks)

5D/H3 – Human beings are part of the earth’s ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.





MARINE PROTECTED AREAS LESSON PLAN

Marine Protected Areas Subject Review

1. _____ is an area of the marine environment that has been reserved by laws or regulations to protect natural or cultural resources
2. _____ are large freshwater areas that are included in the term “marine protected areas.”
3. The _____ Ecological Reserve protects waters and coral gardens off the Florida Keys.
4. MPAs protect entire _____, rather than just one animal.
5. The _____ National Wildlife Refuge covers 20,000 acres of wetlands in the Chesapeake Bay.
6. Padre Island National Seashore is a nesting site for five species of _____. (2 words)
7. A _____ zone is a zone in which fishing is not allowed.
8. Area 512 is located in the _____. (2 words)
9. Area 512 protects the molting habitat of the Red _____. (2 words)
10. Great South Channel Critical Habitat was established to protect the nursery and feeding grounds of the _____. (2 words)
11. Wetland restoration, ecological research, and education are major activities at _____ National Estuarine Research Reserve. (2 words)
12. _____ National Marine Sanctuary includes 160 shipwrecks. (2 words)

13. _____ is an underwater shipwreck from the Civil War that is protected by a National Marine Sanctuary.
14. The primary goal of all MPAs in the United States is _____.
15. Natural and/or cultural resources receive a higher level of _____ in MPAs than in surrounding waters.
16. The primary purpose of an MPA established to protect resources that reflect maritime history _____
_____. (2 words)
17. The primary purpose of an MPA established to protect biological communities, habitats, and ecosystems _____
_____. (2 words)
18. The primary purpose of an MPA established to support the long-term use of renewable living resources _____
_____. (2 words)

WORD BANK

Bering Sea
Monitor
Conservation
Right Whale
Protection

Cultural Heritage
Sea Turtle
No Take
South Slough
Thunder Bay

Natural Heritage
MPA
Sustainable
Production
King Crab

Great Lakes
Tortugas
Habitats
Blackwater



MARINE PROTECTED AREAS LESSON PLAN

Marine Protected Areas: Crossword Puzzle

A crossword puzzle grid with 17 numbered starting points for clues. The grid consists of white squares for letters and empty spaces for non-letter characters. The numbered squares are:

- 1: Top-left corner.
- 2: Row 2, column 1.
- 3: Row 1, column 3.
- 4: Row 4, column 1.
- 5: Row 4, column 5.
- 6: Row 3, column 6.
- 7: Row 7, column 1.
- 8: Row 8, column 1.
- 9: Row 2, column 9.
- 10: Row 5, column 10.
- 11: Row 5, column 11.
- 12: Row 6, column 10.
- 13: Row 13, column 13.
- 14: Row 14, column 10.
- 15: Row 15, column 1.
- 16: Row 16, column 13.
- 17: Row 17, column 1.

Across

2. Natural and/or cultural resources receive a higher level of _____ in MPAs than in surrounding waters.
4. Area 512 is located in the _____. (2 words)
7. The _____ National Wildlife Refuge covers 20,000 acres of wetlands in the Chesapeake Bay.
8. A zone in which fishing is not allowed.
9. Padre Island National Seashore is a nesting site for five species of _____. (2 words)
10. MPAs protect entire _____, rather than just one animal.
12. _____ National Marine Sanctuary includes 160 shipwrecks. (2 words)
14. Area 512 protects the molting habitat of the Red _____. (2 words)
15. Wetland restoration, ecological research, and education are major activities at _____ National Estuarine Research Reserve. (2 words)
17. An MPA established primarily to protect resources that reflect maritime history. (2 words)

Down

1. _____ is an area of the marine environment that has been reserved by laws or regulations to protect natural or cultural resources.
3. The primary goal of all MPAs in the United States is _____.
5. Large bodies of fresh water that are included in the term "marine protected areas."
6. An MPA established primarily to protect biological communities, habitats, and ecosystems. (2 words)
9. An MPA established primarily to support the long-term use of renewable living resources. (2 words)
11. The _____ Ecological Reserve protects waters and coral gardens off the Florida Keys.
13. Great South Channel Critical Habitat was established to protect the nursery and feeding grounds of the _____. (2 words)
16. An underwater shipwreck from the Civil War that is protected by a National Marine Sanctuary.