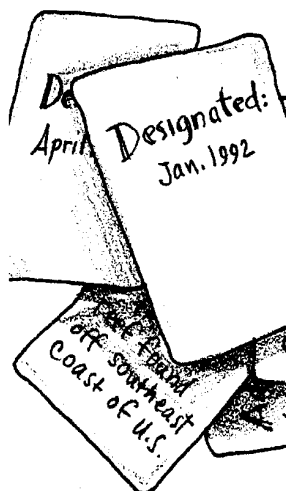


Sanctuary Rummy

Key Concepts

1. The Marine Sanctuary Act was passed to protect unique areas in the oceans and Great Lakes.
2. Latitude and longitude can be used to locate each National Marine Sanctuary (NMS).
3. There are areas within the ocean and Great Lakes, and along the coast that are worth preserving as Marine Sanctuaries.
4. Marine Sanctuaries need public support and involvement.



Background

Background information for “Sanctuary Rummy” is found in the preceding activity “Introduction to Marine Sanctuaries.”

Materials

For each group of 3–4 students:

- set of game “Sanctuary Rummy” cards
- one set of “Information Sheets”

For each student:

- “National Marine Sanctuary Summary Sheet”

Teaching Hints

“Sanctuary Rummy” is a card game in which students learn to identify the following characteristics of 14 marine sanctuaries: location, size, description, species present, and at least one additional fact about each sanctuary.

Laminate or glue the “sanctuary cards” to construction paper to make them more durable. Cut out the individual cards (along the column lines and across the stars). The cards will be blank on one side (construction paper side) and have sanctuary information on the other side. There are 107 individual cards.

Once made, the cards can be kept for future use. You may wish to have students make the sets for you.

Divide class into groups of 3 to 4 students.

How to play:

The objective of the game is to get “books” of 5 cards that represent the same sanctuary. For each book a student collects, he or she earns 5 points (1 point for each card). Students may consult the “Information Sheets” to determine which cards go with the same sanctuary or to check the accuracy of other student’s books. As students collect books, they lay them down face up on the table in front of them, allowing other players to check to see if the 5 cards represent the same sanctuary. If another player has an additional card that goes with the sanctuary that’s been collected as a book, he or she may lay it down on the table face up in front of them for 1 point. A book must have at least 5 cards in it before it can be laid down for points. The only time a player can lay down a single card is if that card goes with a sanctuary that has been laid down already as a book. The game ends when all the books have been made. The player with the most points wins the game.

How to Start:

The game begins as one player deals out 6 cards to each player. The remaining cards are placed on the table face down. The person to the left of the dealer begins the game by picking up one card from the remaining stack on the table. He or she must either discard that card or another card from their hand. When a card is discarded, it is placed on the table face up next to the “Remaining Card” pile. The second player may pick up either the discarded card or pick up one card from the remaining stack. Again, this player must also discard one card. Play continues around until all thirteen books are completed.

When a player lays down a book, the other players need to check the Information Sheets to see if all five cards represent the same sanctuary. If they do not, the player that laid down the book must pick up the cards. If the five cards do represent the same sanctuary, then the player gets to pick up the first five cards in the remaining stack to form a new “hand”. If another player lays down an “additional” card to go with the book and it does represent the same sanctuary, then he or she gets to pick up one card from the remaining stack. If the remaining cards run out before the game is over, take the discard pile, shuffle it, and place it face down as the “new” remaining stack and continue playing. When the game is over, obtain and complete the National Marine Sanctuary Summary Sheet.

Key Words

carnivorous - feeding on animals

echinoderms - means 'spiny-skinned'; a group of invertebrates which include starfish & sea urchins

gastropods - a group of invertebrates which includes snails and slugs

herbivorous - feeding on plants

invertebrates - organisms without backbones which includes squid and octopus

seamount - an underwater volcano which has not reached the water's surface

sessile - animals that are permanently attached to a substrate; not free-moving

<p><u>Location:</u></p> <p>In the Gulf of Mexico, about 110 miles southeast of Galveston, Texas</p>	<p><u>Coordinates:</u></p> <p>Latitude: 28°N Longitude: 94°S</p>	<p><u>Size:</u></p> <p>About 41.7 square miles.</p>
<p><u>Designation:</u></p> <p>January, 1992</p>	<p><u>Description:</u></p> <p>The east and west bank areas contain complex and highly productive reef communities that offer a combination of recreational and research opportunities matched by few other ocean areas.</p>	<p><u>Species:</u></p> <p>Home to at least 21 coral species; more than 175 species of fish; 80 species of algae and at least 250 species of large invertebrates.</p>
<p><u>Additional Information:</u></p> <p>Contains the northern-most living coral reefs in the U.S.</p>	<p><u>Location:</u></p> <p>On the eastern continental shelf, about 18 miles southeast from Cape Hatteras, North Carolina.</p>	<p><u>Location:</u></p> <p>20 miles due east of Sapelo Island, Georgia</p>

<p><u>Location:</u></p> <p>About 75 miles southwest of Key Largo National Marine Sanctuary and 8 miles southwest of Big Pine Key.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 25°10'N Longitude: 80°30'W</p>	<p><u>Size:</u></p> <p>Encompasses a submerged area of 5.3 nautical square miles.</p>
<p><u>Designation:</u></p> <p>January, 1981</p>	<p><u>Description:</u></p> <p>High coral spurs are separated by deep sand grooves.</p>	<p><u>Species:</u></p> <p>Coral spurs provide habitat for hundreds of species including staghorn, brain, and pillar corals; sea fans; sea whips, conchs, groupers, snappers, lobsters, crabs, sponges, anemones, and more.</p>
<p><u>Additional Information:</u></p> <p>Exceptional visibility and a wide range of depths makes the sanctuary accessible to even novice snorklers and divers. More than 60,000 divers, snorklers, and fisherman visit the sanctuary each year.</p>	<p><u>Description:</u></p> <p>Distinct habitats within the sanctuary include bank reefs, patch reefs, hard bottom, sandflats, and seagrass beds.</p>	<p><u>Additional Information:</u></p> <p>More than 1.5 million people visit the sanctuary each year. It is one of the most popular diving spots.</p>

<p><u>Location:</u></p> <p>3 miles off the upper Florida Keys and extends some 8 miles out to sea.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 25°N Longitude: 80°10'W</p>	<p><u>Size:</u></p> <p>103 square nautical miles of coral reef</p>
<p><u>Designation:</u></p> <p>December, 1975</p>	<p><u>Description:</u></p> <p>Formed by reef-building corals and sediment producing algae.</p>	<p><u>Species:</u></p> <p>Home to over 100 species of hard and soft corals; more than 500 species of tropical fish; as well as spiny lobsters, eagle rays, and moray eels. Endangered sea turtles occur here.</p>
<p><u>Additional Information:</u></p> <p>The Carysfort Light House is located in the sanctuary. The lighthouse was built in 1852 and is the oldest functioning light house in the U.S.</p>	<p><u>Additional Information:</u></p> <p>This sanctuary is the second largest National Marine Sanctuary to date and the third largest protected barrier reef in the world.</p>	<p><u>Additional Information:</u></p> <p>Gas and oil exploration within the sanctuary is prohibited.</p>

<p><u>Location:</u></p> <p>Waters surrounding the Florida Keys</p>	<p><u>Coordinates:</u></p> <p>Latitude: 25°N Longitude: 81°W</p>	<p><u>Size:</u></p> <p>Encompasses 2,800 square nautical miles of the Atlantic and Gulf of Mexico surrounding the keys.</p>
<p><u>Designation:</u></p> <p>November, 1990</p>	<p><u>Description:</u></p> <p>Sanctuary includes the entire Florida Reef Tract, mangroves, nearshore and back country habitats. The “backcountry” includes Florida Bay and Gulf of Mexico waters.</p>	<p><u>Species:</u></p> <p>Endangered Northern right whales and loggerhead and Kemp's Ridley sea turtles are found here.</p>
<p><u>Size:</u></p> <p>Rectangular shaped area, 17 square miles</p>	<p><u>Additional Information:</u></p> <p>Contains the largest breeding population of Harbor seals in California.</p>	<p><u>Additional Information:</u></p> <p>Has the highest concentration of breeding marine birds in the continental U.S.</p>

<p><u>Location:</u></p> <p>Off the California coast, north and west of San Francisco.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 37°N Longitude: 122°W</p>	<p><u>Size:</u></p> <p>40 miles of shoreline; 1130 square miles</p>
<p><u>Designation:</u></p> <p>January, 1981</p>	<p><u>Description:</u></p> <p>Gusting winds, ocean currents, and the rotation of the earth produce an explosion of marine life in the spring and summer</p>	<p><u>Coordinates:</u></p> <p>Latitude: 31°24'N Longitude: 80°52'W</p>
<p><u>Additional Information:</u></p> <p>Largest inner-shelf live bottom reef found off southeast coast of U.S.</p>	<p><u>Additional Information:</u></p> <p>Direct access to the reef itself requires experience in open-ocean diving, thus limiting opportunity for a first hand encounter with the Marine Sanctuary environment.</p>	<p><u>Additional Information:</u></p> <p>A wealth of prehistoric artifacts from the Chumash Indians as the remains of over 100 historic ship wrecks line the ocean floor of the sanctuary.</p>

<p><u>Location:</u></p> <p>About 20 miles off the coast of Santa Barbara, CA</p>	<p><u>Coordinates:</u></p> <p>Latitude: 34°N Longitude: 120°W</p>	<p><u>Size:</u></p> <p>1450 square miles; encompasses waters surrounding the North Channel Islands and Santa Barbara Islands from mean high tide to 7 miles offshore.</p>
<p><u>Designation:</u></p> <p>September, 1980</p>	<p><u>Description:</u></p> <p>Formed as the result of vulcanism and plate tectonics about 14 million years ago. The islands are the visible peaks of an underwater ridge.</p>	<p><u>Species:</u></p> <p>More than 27 species of whales and dolphins use the sanctuary during at least part of the year.</p>
<p><u>Additional Information:</u></p> <p>The bank rises to 115 feet below the surface while only a few miles away the water is 6000 feet deep.</p>	<p><u>Additional Information:</u></p> <p>Tourism forms a major portion of the state economy. Prehistoric Polynesian and historic shipwreck remains are thought to lie within the sanctuary.</p>	<p><u>Description:</u></p> <p>Submerged live bottom reef. It consists of limestone outcroppings and ledges up to 9 feet in height with sandy, flat-bottomed troughs between. The outcroppings provide vertical relief as well as a solid base on which several types of sessile invertebrates can attach and grow.</p>

<p><u>Location:</u></p> <p>20 miles west of Point Reyes, California; about 60 miles northwest of San Francisco, California.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 38°N Longitude: 123°W</p>	<p><u>Size:</u></p> <p>An elliptical shaped, 9.5 mile bank resting on the sea floor area of 20 square miles.</p>
<p><u>Designation:</u></p> <p>May, 1989</p>	<p><u>Description:</u></p> <p>The northernmost seamount of the California continental shelf.</p>	<p><u>Species:</u></p> <p>Communities of hydrocorals, sea urchins, and algae are so lush that the organisms climb on top of each other for space.</p>
<p><u>Additional Information:</u></p> <p>Late in the 1970's, the population of crown of thorns starfish (<i>Acanthaster planci</i>) within the sanctuary exploded. Within months, millions of starfish were over the reefs, consuming all the coral they could reach.</p>	<p><u>Additional Information:</u></p> <p>The only true coral reef in the National Marine Sanctuaries</p>	<p><u>Location:</u></p> <p>50 miles south of San Francisco, on the California coast</p>

<p><u>Location:</u></p> <p>Southwest shore of Tutuila Island of American Samoa just east of the International Date Line; nearly 2300 miles south of Honolulu</p>	<p><u>Coordinates:</u></p> <p>Latitude: 14°S Longitude: 170°30'W</p>	<p><u>Size:</u></p> <p>163 acre embayment; approximately 0.25 square miles of terraced coral reef</p>
<p><u>Designation:</u></p> <p>April, 1986</p>	<p><u>Description:</u></p> <p>The sanctuary is nestled within an eroded ancient volcano. The warm water produces vibrant coral reef rings around the American Samoan Isles.</p>	<p><u>Species:</u></p> <p>The sanctuary contains the most diverse community of coral in the U.S., over 200 species.</p>
<p><u>Coordinates:</u></p> <p>Latitude: 37°N Longitude: 122°W</p>	<p><u>Size:</u></p> <p>5327 square miles</p>	<p><u>Designation:</u></p> <p>1992</p>

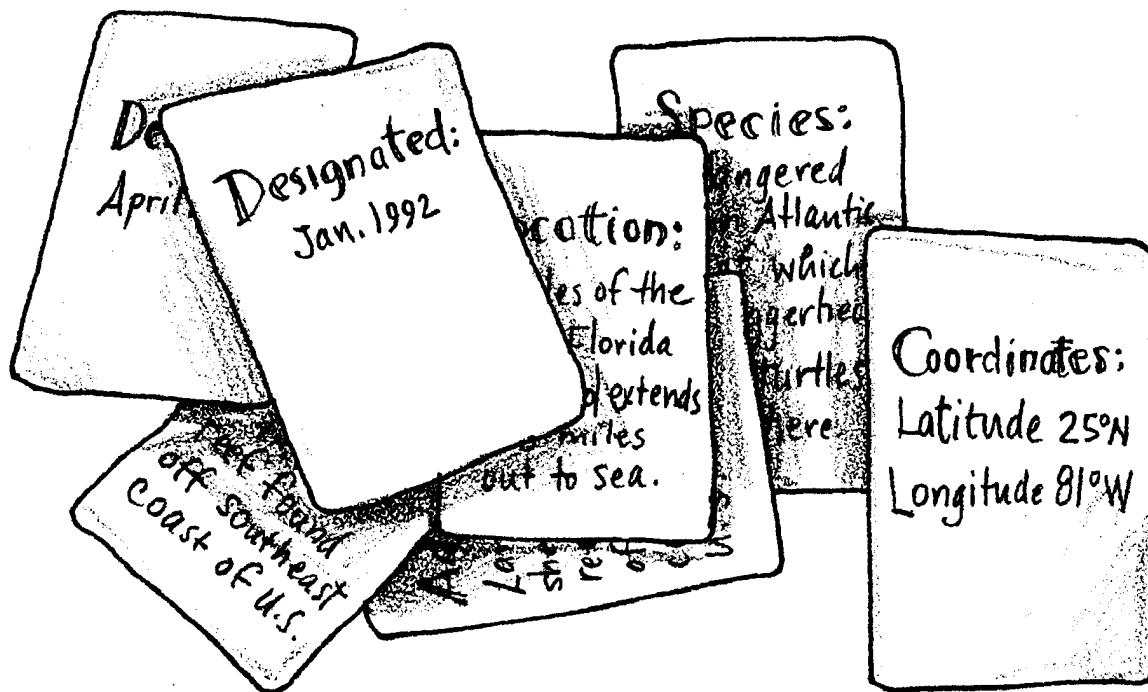
<p><u>Description:</u></p> <p>This area contains nutrient rich currents that make a rich diversity of marine life possible. Within the sanctuary there are rugged shores, sandy beaches, kelp forests, sandy sea floors, kelp forests, and a submarine canyon.</p>	<p><u>Species:</u></p> <p>This area supports the most diverse community of kelps and algae in the United States. There are also large number of pinnipeds, whales, fish, sea otters, sea lions, sardine, squid, and seabirds.</p>	<p><u>Additional Information:</u></p> <p>More than 10,000 feet deep, this canyon rivals the Grand Canyon.</p>
<p><u>Additional Information:</u></p> <p>1,276 vessels rest on the bottom in this sanctuary</p>	<p><u>Location:</u></p> <p>50 miles east of Boston, MA, in the southwestern Gulf of Maine</p>	<p><u>Coordinates:</u></p> <p>Latitude: 42°3'N Longitude: 70°2'W</p>
<p><u>Size:</u></p> <p>About 742 square miles; about 18.5 miles in length and 6.25 miles at its widest point.</p>	<p><u>Designation:</u></p> <p>1992</p>	<p><u>Description:</u></p> <p>This area is a glacially deposited submerged sand bank surrounded by highly productive waters. Twice a year, upwelling of deep ocean waters creates an area rich in nutrients.</p>

<p><u>Location:</u></p> <p>Surrounding the islands of Maui, Lanai, and Molokai and a small portion of Kauai in the Hawaiian Island chain.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 21°N Longitude: 157°W</p>	<p><u>Size:</u></p> <p>About 575 square miles</p>
<p><u>Designation:</u></p> <p>1992</p>	<p><u>Description:</u></p> <p>Contains waters from the high water mark to the 100 fathom depth around the islands of Molokai, Lanai, Maui, and a portion of Kauai. Extensive coral reef communities and unique ecosystems occur within the sanctuary waters.</p>	<p><u>Species:</u></p> <p>This is the principal breeding and calving area for the wintering population of the endangered North Pacific Humpback Whale. Other marine mammals include sperm and pilot whales and a variety of dolphins. Three species of sea turtles are also found in sanctuary waters.</p>
<p><u>Additional Information:</u></p> <p>The bank's shallowest areas are about 65 feet deep with other areas of the upper plateau within the 100 foot range. The sides drop off quickly, sliding down to 300 feet at its western flanks.</p>	<p><u>Additional Information:</u></p> <p>Commercial whale watching earns an estimated \$10-15 million each year.</p>	<p><u>Additional Description:</u></p> <p>Several important nesting areas for shorebirds are found on offshore rocks and cliffs next to the sanctuary.</p>

<p><u>Species:</u></p> <p>An important feeding area for large populations of fish and mammals. Commercially important fish and shellfish are cod, flounder, mackerel, bluefin tuna, bluefish, herring, lobsters, scallops, and sea clams.</p>	<p><u>Species:</u></p> <p>Marine mammals present include sea lions, seals, sea otters, and several species of whales and dolphins including the endangered blue whale</p>	<p><u>Designation:</u></p> <p>January, 1981</p>
<p><u>Location:</u></p> <p>Northern-most portion of the Pacific coast continental shelf of Washington state.</p>	<p><u>Coordinates:</u></p> <p>Latitude: 47°N Longitude: 124°W</p>	<p><u>Size:</u></p> <p>About 2500 square nautical miles.</p>
<p><u>Designation:</u></p> <p>July, 1994</p>	<p><u>Description:</u></p> <p>Encompasses a variety of habitats, including high energy rocky coasts, tide pools, sandy beaches, marshes, kelp beds, sea stacks, and open water.</p>	<p><u>Species:</u></p> <p>Twenty-nine species of marine mammals breed, rest within, or migrate through the sanctuary. Other species include the bald eagle, sea otter peregrine falcon, brown pelican, short-tailed albatross, Stellar sea lion, and humpback whale.</p>

<p><u>Coordinates:</u></p> <p>Latitude: 35N Longitude 75W</p>	<p><u>Size:</u></p> <p>A circular area slightly greater than one mile in diameter over the wreckage of the U.S.S. Monitor.</p>	<p><u>Designation:</u></p> <p>January, 1975</p>
<p><u>Description:</u></p> <p>The wreckage lies in a dynamic environment that is affected by currents and movements of the Gulf Stream. Because of its iron construction, it has suffered natural deterioration from its long exposure to sea water.</p>	<p><u>Additional Information:</u></p> <p>The wreckage was not discovered for 111 years. In August of 1973, scientists aboard the Duke University's research vessel located it using side scan sonar.</p>	<p><u>Additional Information:</u></p> <p>Resting place of the first ironclad warship built. It significantly altered both naval technology and marine architecture in the nineteenth century.</p>
<p><u>Additional Information:</u></p> <p>Resting place of a famous civil war ship that sank in a storm off Cape Hatteras, North Carolina, on December 31, 1862 while under tow for repairs.</p>	<p><u>Additional Information:</u></p> <p>Resting place of a totally steam-powered vessel which had the engineering spaces, crew's and officer's quarters, and galley located below the water line.</p>	

Sanctuary Rummy



What makes the marine sanctuaries unique and worth protecting? Let's take a look.

Here's what you'll need for your group of 3 or 4.

Materials:

- set of "Sanctuary Cards"
- set of "Sanctuary Information Sheets"
- National Marine Sanctuary Sheet

Here's what you do.

Procedure

1. Work in a group of 3-4 students.
2. Obtain a complete set of "Sanctuary Cards" and one set of "Sanctuary Information Sheets" to be shared by the group. Now you are ready to play sanctuary rummy!

How to Play

The object of the game is to collect “books” of 5 cards that represent the same sanctuary. For each book you collect, you earn 5 points (1 point for each card).

You may consult the “Sanctuary Information Sheets” to determine which sanctuary the cards represent or to check the accuracy of other student’s books.

When you collect a book, call out “Sanctuary Opened!” and lay the cards down face up on the table in front of you. Allow other players to check to make sure that the 5 cards represent the same sanctuary.

If another player has an additional card that goes with the sanctuary you’ve collected as a book, he or she may lay it down face up on the table for 1 point. A book must have at least 5 cards in it before it can be laid down for points.

The game ends when all the books have been made. The player with the most points wins the game.

How to Start

Select a dealer who will then deal out 6 cards to each player. The remaining cards are placed face down on the table.

The person to left of the dealer begins the game by picking up one card from the remaining card stack on the table. The player must then either discard that card or another card from their hand. When a card is discarded, it is placed face up on the table next to the “Remaining Card” pile.

The second player may pick up either the discarded card or pick up one card from the remaining stack. Again, this player must also discard one card.

Play continues around until all 13 books are completed.

If the remaining cards run out before the game is over, take the discard pile, shuffle it, and place it face down as the “new” remaining stack and continue playing.

When the game is over, obtain and complete the assignment outlined on the National Marine Summary Sheet.

National Marine Sanctuary Summary Sheet

Choose **one** of the following to complete:

a. Select the National Marine Sanctuary you would most like to visit. Then, write a letter to a friend describing the following:

1. location (include its latitude and longitude)
2. size
3. description (what the sanctuary is like)
4. unique features and/or the kinds of plants and animals you are likely to see there, and
5. why you would like to visit this National Marine Sanctuary more than any other sanctuary.

Write the letter using complete sentences in paragraphs.

or

b. Select one of the National Marine Sanctuaries and create a brochure encouraging people to visit and support the sanctuary program. Using complete sentences in paragraphs, include the following information:

1. location
2. size
3. description
4. plant or animal species and/or historical artifacts present
5. why it is worth visiting and preserving.
6. a map showing the location of the sanctuary
7. at least one drawing or picture of either plants, animals and/or historical artifacts present within the sanctuary.

Extensions

Write to the Marine Sanctuary you are most interested in for more information. Share the information with the class. Here are the addresses:

Channel Islands NMS
113 Harbor Way
Santa Barbara, CA 93109

Hawaiian Islands Humpback
726 South Kihei Road
Kihei, HI 96753

Cordell Bank NMS
Fort Mason, Building 201
San Francisco, CA 94123

Monitor
NOAA, Building 1519
Fort Eustis, VA 23604-5544

Fagatele Bay NMS
P.O. Box 4318
Pago Pago, American Samoa 96799

Monterey Bay
299 Foam Stree, Suite D
Monterey, CA 93940

Florida Keys NMS
9499 Overseas Highway
Marathon, FL 33050

Olympic Coast NMS
138 West First Street
Port Angeles, WA 98362

Flower Garden Banks NMS
1716 Briarcrest Dr., Suite 603
Bryan, TX 77802

Stellwagen Bank
14 Union Street
Plymouth, MA 02360

Gray's Reef NMS
10 Ocean Science Circle
Savannah, GA 31411

Gulf of Farallones NMS
Fort Mason, Building 201
San Francisco, CA 94123

Proposed Sanctuaries:

Northwest Straits
1305 East-West Highway, 12th Floor
Silver Spring, MD 20910

Thunder Bay
Dept. of Parks and Recreation
Natural Resources Building, #141
Michigan State University
East Lansing, MI 48823

World Wide Web Address:

<http://www.nos.noaa.gov/ocrm/srd/nmsp/>

Flower Garden Banks Marine Sanctuary Information Sheet

Location: In the Gulf of Mexico, about 110 miles southeast of Galveston, Texas; 50-300 feet below the surface

Coordinates: Latitude: 28°N Longitude: 94°W

Size: About 41.7 square miles

Designation: January, 1992

Description: The sanctuary is divided into major areas called the East and West Banks. Each contains complex and highly productive reef communities. The sanctuary offers a combination of recreational and research opportunities matched by few other ocean areas.

Species: Flower Garden Banks is home to at least 21 coral species; more than 175 species of fish; 80 species of algae and at least 250 species of large invertebrates. This area also provides habitat for lobster, grouper, snapper, manta rays, loggerhead sea turtles and spotted dolphins.

Additional Information: Contains the northern-most living coral reefs in the United States.

Unlike other Caribbean reef systems, the Flower Gardens have no soft corals or gorgonians. The reason for this absence is unknown.

Each year, approximately eight days after the late August full moon, mass spawning of corals occurs.

References:

NOAA. 1992. Flower Garden Banks National Marine Sanctuary. *J. Marine Education*, 11(2):17

Broussard, A. and T. Bright. 1991. Flower Garden Banks: National Marine Sanctuary. NOAA, Sanctuary and Reserves Division, Silver Springs, MD

Gulf of Farallones National Marine Sanctuary Information Sheet

Location: Off the California coast, north and west of San Francisco

Coordinates: Latitude: 37°N Longitude: 122°W

Size: 40 miles of shoreline; 1130 square miles

Designation: January, 1981

Description: Gusting winds, ocean currents, and the rotation of the earth produce an explosion of marine life during the spring and summer.

Species: The sanctuary is famous for its furbearing marine mammals and huge flocks of sea birds. Marine mammals present include sea lions, seals, sea otters, and several species of whales and dolphins including the endangered blue whale. Commercially valuable species such as Dungeness crab, Pacific herring, and rockfish also occur in the sanctuary.

Additional Information: Contains the largest breeding population of Harbor seals in California.

Has the highest concentration of breeding marine birds in the continental U.S.

References:

Coleman, A. 1992. Gulf of Farallones National Marine Sanctuary. *J. Marine Education*, 11(2):21-23.

***U.S.S. Monitor* Sanctuary Information Sheet**

Location: On the eastern continental shelf, about 18 miles southeast of Cape Hatteras, North Carolina

Coordinates: Latitude: 35°N Longitude: 75°W

Size: A circular area, slightly greater than one mile in diameter over the wreckage of the *U.S.S. Monitor*

Designation: January, 1975

Description: The wreckage lies in a dynamic environment that is affected by currents and movements of the Gulf Stream. Because of the *Monitor*'s iron construction, it has suffered natural deterioration from its long exposure to sea water.

Additional Information: The *Monitor* was the first ironclad warship built. Its design significantly altered both naval technology and marine architecture in the nineteenth century.

A famous civil war ship, the *Monitor* was totally steam-powered. The engineering spaces, crew's and officers' quarters, and galley were located below the water line.

The *Monitor* sank in a storm off Cape Hatteras, North Carolina, on December 31, 1862 while under tow for repairs.

The wreckage was not discovered for 111 years. In August of 1973, scientists aboard Duke University's research vessel located the *Monitor* using sidescan sonar.

The *Monitor* was nominated as the first National Marine Sanctuary to protect the wreckage from treasure hunters.

References:

Hill, D. 1992. The *Monitor* National Marine Sanctuary. *J. Marine Education*, 11(2):24-26.

Looe Key Region of Florida Keys National Marine Sanctuary Information Sheet

Location: About 75 miles southwest of Key Largo Region of Florida Keys National Marine Sanctuary and 8 miles southwest of Big Pine Key.

Coordinates: Latitude: 25°10'N Longitude: 80°30'W

Size: Encompasses a submerged area of 5.3 square nautical miles.

Designation: January, 1981

Description: High coral spurs are separated by deep sand grooves in this unusual coral system. Habitats occurring here include seagrass beds, patch reefs, and sand flats.

Species: Coral spurs provide habitat for hundreds of species including staghorn, brain, and pillar corals; sea fans; sea whips, conchs, groupers, snappers, lobsters, crabs, sponges, black sea urchins, turtle grass, hermit crabs, damselfish, neon gobies, Cuban hogfish, blue hamlet, longsnout butterfly fish and anemones.

Additional Information: Exceptional visibility and a wide range of depths makes the sanctuary accessible to even novice snorklers and divers. More than 60,000 divers, snorklers, and fisherman visit the sanctuary each year.

The sanctuary is named after the British warship, *H.M.S. Looe*, that ran aground in 1744. The crew of the vessel survived on a near-by island, which afterwards was named Looe Key. The island is now awash, but the name remains. The wreckage site of the *H.M.S. Looe* was heavily salvaged in the 1950's prior to the Sanctuary's designation.

References:

Gill, P. and L. MacLaughlin. 1992. Florida's National Marine Sanctuaries: Key Largo, Looe Key, and Florida Keys. *J. Marine Education*, 11(2):12-16.

Key Largo Region of Florida Keys National Marine Sanctuary Information Sheet

Location: 3 miles off the upper Florida Keys; extends out to 300 foot depths some 8 miles at sea on the continental shelf

Coordinates: Latitude: 25°N Longitude: 80°10'W

Size: 103 square nautical miles of coral reef

Designation: December 1975

Description: The coral reefs of the Key Largo sanctuary were formed by reef-building corals and sediment producing algae. Distinct habitats within the sanctuary include bank reefs, patch reefs, hard bottom, sand flats, and seagrass beds.

Species: The sanctuary is home to over 100 species of hard & soft corals; more than 500 species of tropical fish; as well as spiny lobsters, grunts, sea fans, parrotfish, eagle rays, and moray eels. Endangered sea turtles also occur here.

Additional Information: More than 1.5 million people visit the sanctuary each year. It is one of the most popular diving spots.

The Carysfort Light House is located in the sanctuary. The lighthouse was built in 1852 and is the oldest functioning light house in the U.S. The sanctuary also has numerous shipwrecks within its boundaries.

References:

Gill, P. and L. MacLaughlin. 1992. Florida's National Marine Sanctuaries: Key Largo, Looe Key, and Florida Keys. *J. Marine Education*, 11(2):12-16.

Florida Keys National Marine Sanctuary Information Sheet

Location: Waters surrounding the Florida Keys

Coordinates: Latitude: 25°N Longitude: 81°W

Size: Encompasses 2,800 square nautical miles of the Atlantic and Gulf of Mexico surrounding the keys.

Designation: November, 1990

Description: The sanctuary includes the entire Florida Reef Tract, mangroves, nearshore and back country habitats. The “backcountry” includes Florida Bay and Gulf of Mexico waters. The area acts as a nursery, provides habitat, and is a source of food for many commercially important fishes, invertebrates, and juvenile reef inhabitants. Key Largo and Looe Key NMS’s are included in the Larger Florida Keys Sanctuary. The Florida Keys sanctuary has the following habitats: hardwood hammock, sandy beach, mangrove, hard bottom, bank reefs, coral reefs, seagrass, and sand and mud.

Species: The different habitats support different communities of plants and animals:

sandy beach: snails, bivalves, sea turtles, crabs, and several nesting birds

mangrove swamps: juvenile spiny lobster, pink shrimp, snook, mullet, tarpon, and mangrove snappers.

hard bottom: various calcareous algae, fish, lobster, and sea turtles.

seagrass: provides food and safe haven for economically important species such as pink shrimp, spiny lobster, and several species of fish.

sand and mud: segmented algae, a variety of forams, burrowing sea urchins, snails, clams, and worms.

Additional Information: This sanctuary is the second largest National Marine Sanctuary to date and the third largest protected barrier reef in the world.

Gas and oil exploration within the sanctuary is prohibited.

References:

Gill, P. and L. MacLaughlin. 1992. Florida’s National Marine Sanctuaries: Key Largo, Looe Key, and Florida Keys. *J. Marine Education*, 11(2):12-16

National Geographic. 1991. A National Sanctuary for the Florida Keys. *National Geographic*, 179(6): preceding page 1.

Multer, B. et. al. 1993. Florida Keys National Marine Sanctuary: Past, Present, and Future. Florida Keys NMS, Planning Office, Marathon, FL.

Gray's Reef National Marine Sanctuary Information Sheet

Location: 20 miles due east of Sapelo Island, Georgia

Coordinates: Latitude: 31°24'N Longitude: 80°52'W

Size: Rectangular shaped area, 17 square miles

Designation: January, 1981

Description: The sanctuary encompasses a submerged live bottom reef. The reef consists of limestone outcroppings and ledges up to 9 feet in height with sandy, flat-bottomed troughs between. The outcroppings provide vertical relief as well as a solid base on which several types of sessile invertebrates can attach and grow.

Species: The limestone rock provides homes for sponges, corals, hydroids, colonial tunicates, as well as for many burrowing organisms. These, in turn, attract a variety of fishes and free moving invertebrates. Large water temperature changes between seasons result in both tropical and temperate species coinciding. During the summer, the reef is populated by tropical fish species. Other organisms present include Loggerhead sea turtles (threatened), green, leatherback, and Kemp's Ridley sea turtles (endangered); Northern right whales (extremely endangered) and several sea birds such as terns, petrels, and gannets.

Additional Information: Named after the late Milton B. Gray, a marine taxonomist at the University of Georgia Marine Institute on Sapelo Island, Georgia. Exhibits and interpretive information available at the Fernbank Museum of Natural History (Atlanta), University of Georgia Aquarium (Skidaway Island), and the Sapelo Island Visitors Center.

The sanctuary is the largest inner-shelf live bottom reef found off southeast coast of U.S. and is a popular sport fishing and diving destination.

Additional Resources:

Bonn, C. 1992. Gray's National Marine Sanctuary. *J. Marine Education*, 11(2):18-20.

Gilligan, M. 1988. Oasis in the South Atlantic Bight. *Sea Frontiers*, July/Aug., pages 217-221.

Channel Islands National Marine Sanctuary Information Sheet

Location: About 20 miles off the coast of Santa Barbara, CA

Coordinates: Latitude: 34°N Longitude: 120°W

Size: 1450 square miles; encompasses waters surrounding the North Channel Islands and Santa Barbara Islands from mean high tide to 7 miles offshore.

Designation: September, 1980

Description: The Channel Islands sanctuary includes the four northern channel islands. Formed 14 million years ago, the islands are the result of vulcanism and plate tectonics. The islands are the visible peaks of an underwater ridge and were connected as a single island some 17-18,000 years ago. The ridge was formed as the massive westward moving North American tectonic plate rode up over the submarine Pacific plate. With both warm and cool currents, the channel waters provide exceptional breeding grounds for a wide variety of plants and animals. A wide variety of habitats exist including eel grass beds, kelp forests, rocky basalt reefs, towering rock pinnacles, sandy bottom, and open ocean hundreds of feet deep.

Species: More than 27 species of whales and dolphins use the sanctuary during at least part of the year. There are also five species of pinnipeds (seals and sea lions) that occur in the area. Over 60 species of birds feed in the sanctuary and more than 25 species of sharks occur here. The sanctuary also provides full/part time homes to several endangered species such as the humpback whale, sei whale, southern sea otter, Guadalupe fur seal, California brown pelican, and California least tern.

Additional Information: A wealth of prehistoric artifacts from the Chumash Indians as well as the remains of over 100 historic ship wrecks line the ocean floor of the sanctuary.

A large, nearshore, giant kelp forest provides habitat for teeming populations of fish and invertebrates.

References:

Jacobs, T. 1992. Channel Islands National Marine Sanctuary. *J. Marine Education*, 11(2):5-8.

Driessen, P. 1988. Sojourn at Anacapa. *Sea Frontiers*, Jul/Aug, pages 209-216.

Cordell Bank National Marine Sanctuary Information Sheet

Location: 20 miles west of Point Reyes, California; about 60 miles northwest of San Francisco, California

Coordinates: Latitude: 38°N Longitude: 123°W

Size: The area is a 9.5 mile elliptically shaped bank resting on the sea floor area of 20 square miles.

Designation: May, 1989

Description: Cordell Bank is the northernmost seamount of the California continental shelf. The sanctuary is a unique combination of oceanic conditions and undersea topography that provides a highly productive environment. The prevailing California Current brings nutrients to the upper level of the bank, stimulating plankton growth. These nutrients combined with high light penetration and wide depth ranges, have led to a special association of subtidal and oceanic species.

Species: More than 350 species are found at Cordell Bank. Communities of hydrocorals, sea urchins, and algae are so lush that the organisms climb on top of each other for space. Many of the sea mammals at Cordell Bank are either threatened or endangered such as Guadalupe fur seals; green, leatherback, and Pacific Ridley's sea turtles; and gray, northern right, blue, fin, sei, humpback, and sperm whales. Other sea mammals using the area are white-sided dolphins, Stellar sea lions, minke whales, Dahl's porpoises, harbor porpoises, killer whales, Risso's dolphin, northern fur seal, northern elephant seals, and harbor seals. Thirty-three species of sea birds have been sighted in the area.

Additional Information: The bank rises to 115 feet below the surface while only a few miles away the water is 6000 feet deep.

References:

Robinson, R. 1985. Cordell Bank: An Underwater Island. *Sea Frontiers*, May/June, p132.

Shmieder, R. 1984. Marine Sanctuary Candidate: Cordell Bank. *Oceans*, Jul/Aug., p22.

NOAA. 1992. Cordell Bank: National Marine Sanctuary. *J. Marine Education*, 11(2):11.

Fagatele Bay National Marine Sanctuary Information Sheet

Location: Southwest shore of Tutuila Island of American Samoa just east of the International Date Line, 2,300 miles south of Honolulu.

Coordinates: Latitude: 14°S Longitude: 170°30'W

Size: 163 acre embayment; approximately 0.25 square miles of terraced coral reef

Designation: April, 1986

Description: The sanctuary is nestled within an eroded ancient volcano. The warm water within the area produces vibrant coral reef rings around the American Samoan Isles.

Species: The sanctuary contains the most diverse community of coral in the U.S., over 200 species. More than 200 species of fish, 100 different mollusks (mostly gastropods), cephalopods, a variety of crustaceans, echinoderms, decapods, and marine plants, as well as the endangered species of sea turtles and whales live within the sanctuary. The area is also home to many nesting sea birds and 2 species of flying foxes with one meter wingspans.

Additional Information: Late in the 1970's, the population of crown of thorns starfish (*Acanthaster planci*) within the sanctuary exploded. Within months, millions of starfish were over the reefs, consuming all the coral they could reach. After a few months, the mature reef ecosystem had been reduced to mostly coral skeletons. Only 10% of the corals survived. Twelve years later, new coral heads were present. However, it may take up to 50 years for the reef to recover to its former splendor.

Fagatele Bay is the only true coral reef in the National Marine Sanctuaries.

References:

Daschbach, N. 1992. Fagatele Bay National Marine Sanctuary. *J. Marine Education*, 11(2):9-11.

Monterey Bay National Marine Sanctuary Information Sheet

Location: 50 miles south of San Francisco, on the California coast

Coordinates: Latitude: 37°N Longitude: 122°W

Size: 5327 square miles

Designation: 1992

Description: This area contains nutrient rich currents that make a rich diversity of marine life possible. Within the sanctuary there are rugged shores, sandy beaches, kelp forests, sandy sea floors, kelp forests, and one of the country's largest submarine canyons. The canyon bisects the broad curve of the bay.

Species: Monterey Bay supports the most diverse community of kelps and other algae in the United States. There are also large numbers of invertebrates, whales, fish, sea otters, sea lions, sardine, squid, and seabirds. Monterey Canyon provides habitat for such species as blue and sperm whales, giant squid, deep water jellyfish, sharks, sea stars, sponges, coral, sea anemones, and tunicates. On the sandy sea floors there are salmon, rockfish, anchovies, albacore, squid, and flatfish. Sanddabs and stingrays also hide on the sandy sea floor. Giant kelp beds provide habitat for a wide variety of organisms such as sea urchins, snail, melibe sea slugs, and sea otters.

Additional Information: Monterey Canyon is so wide and deep it rivals the Grand Canyon. It is more than 10,000 feet deep at its seaward end.

The sea floor has a wide variety of historical and cultural treasures. There are 1276 vessels that rest on the bottom along the central and northern coast.

References:

Gore, R. 1990. Between Monterey Tides. National Geographic, February:1-43.

Stellwagen Bank National Marine Sanctuary Information Sheet

Location: About 26 miles east of Boston, MA, in the southwestern Gulf of Maine

Coordinates: Latitude: 42°3'N Longitude: 71°2'W

Size: About 742 square miles; the bank is about 18.5 miles in length and 6.25 miles at its widest point. The sanctuary, which encompasses the bank, is roughly 37 miles long and 20 miles wide.

Designation: 1992

Description: Stellwagen Bank National Marine Sanctuary contains a glacially deposited submerged sand bank surrounded by highly productive waters. Twice a year, upwelling of deep ocean waters creates an area rich in nutrients.

Species: Stellwagen Bank is an important feeding area for large populations of fish, shellfish, and mammals. Some of the commercially important fish and shellfish are cod, flounder, mackerel, bluefin tuna, bluefish, herring, lobsters, scallops, and sea clams. The mammals using this area include white-sided and white-beaked dolphins, harbor porpoises, orcas, pilot whales, and minke whales. There are three endangered species of whales, humpback, northern right, and fin, which use the area for spring and summer feeding.

Additional Information: The bank's shallowest areas are about 65 feet with other areas of the upper plateau at the 100 foot range. The sides drop off quickly, sliding down to 300 feet at its western flanks.

Commercial whale watching earns an estimated \$10-15 million each year.

References:

Foster, S. and B. Barr. 1993. You can Bank on It. *Marine Sanctuary*, 1(1):9-11.

Smrcina, A. 1992. *National Marine Sanctuary: Stellwagen Bank*. NOAA/National Marine Sanctuary Program, Silver Springs, MD.

Ward, N. 1995. *Stellwagen Bank: A Guide to the Whales, Sea Birds, and Marine Life of the Stellwagen Bank National Marine Sanctuary*. Down East Books, Camden, ME. 232 p.

Hawaiian Islands Humpback Whale National Marine Sanctuary Information Sheet

Location: Surrounding the islands of Maui, Lanai, and Molokai and a small portion of Kauai in the Hawaiian Island chain.

Coordinates: Latitude: 21°N Longitude: 157°W

Size: About 575 square miles

Designation: 1992

Description: Hawaiian Islands Humpback Whale National Marine Sanctuary contains waters from the high water mark to the 100 fathom depth around the islands of Molokai, Lanai, Maui, and a portion of Kauai. Extensive coral reef communities and unique ecosystems occur within the sanctuary waters.

Species: Hawaiian Islands Humpback Whale National Marine Sanctuary is the principal breeding and calving area for the wintering population of the endangered North Pacific Humpback Whale. Other marine mammals found in the sanctuary include sperm and pilot whales and a variety of dolphins. The highly endangered native Hawaiian Monk Seal and three species of sea turtles also are found in sanctuary waters.

Additional Information: Several important nesting areas for shorebirds are found on offshore rocks and cliffs next to the sanctuary.

Tourism forms a major portion of the state economy. Prehistoric Polynesian and historic shipwreck remains are thought to lie within the sanctuary.

References:

Anon. Hawaiian Islands Humpback Whale National Marine Sanctuary. Sanctuary Fact Sheet. 1992. NOAA/National Marine Sanctuary Program, Silver Springs, MD.

Olympic Coast National Marine Sanctuary Information Sheet

Location: Northern-most portion of the Pacific coast continental shelf of Washington state.

Coordinates: Latitude: 47°N Longitude: 124°W

Size: About 2500 square nautical miles

Designation: July, 1994

Description: The Olympic Coast sanctuary encompasses a variety of habitats, including high energy rocky coasts, tide pools, sandy beaches, marshes, kelp beds, sea stacks, and open water. Coastal upwelling and freshwater from streams create nutrient-rich waters leading to abundant life.

Species: The seabird colonies found in the sanctuary are among the largest in the continental U.S. The sanctuary supports five species of salmon, and bald eagles are numerous. Other fish and shellfish including steelhead trout, halibut, pink shrimp and Dungeness crab are also abundant. Twenty-nine species of marine mammals breed, rest within, or migrate through the sanctuary. Endangered or threatened species include the bald eagle, peregrine falcon, brown pelican, short-tailed albatross, Stellar sea lion, sea otter, and humpback whale.

Additional Information: Indian village sites, ancient canoe runs, petroglyphs, Indian artifacts, and numerous shipwrecks are found within the sanctuary.

The rugged Olympic Coast sanctuary is valuable for commercial and recreational use including fishing and transportation.

References:

Anon. Olympic Coast National Marine Sanctuary. Sanctuary Fact Sheet. 1995. NOAA/National Marine Sanctuary Program, Silver Springs, MD.