America’s Underwater Treasures Viewer Guide

“In part threatened by annihilation and in part still pristine, the sanctuaries are as much a part of our national heritage as Old Faithful or Mt. Rushmore and must be guarded for future generations.”

—Jean-Michel Cousteau

THEME
Achieving ocean health and balance through investigation and data collection techniques that show the necessity for marine sanctuaries, the effects of fisheries and the management practices being followed in today’s oceans.

SYNOPSIS
In this two-part, two-hour episode, Jean-Michel Cousteau, his son, Fabien, his daughter, Celine, and his team of expert divers set out to investigate, for the first time, all 13 of these unique ecosystems. While discovering what makes them unique, the group explores how these sites are conservation challenges for the country. Traversing thousands of miles, the Ocean Adventures team goes below and above the sea off the coasts of Michigan, Texas, Florida, North Carolina, Georgia, Massachusetts, California, Oregon, Hawai’i and American Samoa on a mission to introduce Americans to these fragile sanctuaries.

PRE-VIEWING ACTIVITIES
• Brainstorm all the ways that scientists might collect data and track where, when and how sea life migrates.
• List all the harmful things that can make their way into our oceans.
• Draw a map of a town, state or country. Label and describe the many ways these harmful things can travel to the ocean.
• Look at a map and locate all of the ocean basins of our one ocean.

FOCUS FOR VIEWING
• Refer to the viewing questions that go with each segment of America’s Underwater Treasures.

FOLLOW-UP ACTIVITIES
• Make a collage showing a pristine underwater marine sanctuary that is healthy and protected. Use vibrant colors and include at least 15 to 20 different ocean species. List five to eight reasons why your sanctuary is healthy. Use pictures from the Ocean Adventures Web site to help.
• Use the map on the Ocean Adventures Web site to find out where all the National Marine Sanctuaries are located. Read about each one and create your own symbol for the sanctuary. Then, draw a world map and use your symbols to show the location of each sanctuary on the map.
MATERIALS
• America’s Underwater Treasures Viewing Questions student handout
• America’s Underwater Treasures Viewing Questions teacher sheet
• Copy of the America’s Underwater Treasures episode from the Jean-Michel Cousteau: Ocean Adventures series

WEB LINKS
Map of the National Marine Sanctuaries
pbs.org/oceanadventures episodes/treasures

Exploring the National Marine Sanctuaries lesson plan
pbs.org/oceanadventures educators/treasures

To Fish or Not to Fish lesson plan
pbs.org/oceanadventures educators/treasures

Every Square Inch Counts lesson plan
pbs.org/oceanadventures educators/treasures

SEGMENT SUGGESTIONS
NOTE: See Teacher Sheet for segment location on PBS Home Video DVD.

Theme: Introduction to the National Marine Sanctuaries

Location in America’s Underwater Treasures:
PART 1
Introduction; Florida Keys NMS/Goliath Grouper; Channel Islands NMS; Channel Islands NMS/Tagging; Channel Islands NMS/Squid Fishery; Flower Garden Banks NMS/Coral; Dry Tortugas NP/Coral and Turtles; Gray’s Reef NMS; Olympic Coast NMS; Hawai’ian Islands Humpback Whale NMS

PART 2
Monitor NMS/Shipwrecks; Thunder Bay NMS/Shipwrecks; Stellwagen Bank NMS/Lobster; Monterey Bay NMS; Gulf of the Farallones NMS; Monterey Bay NMS/Water Quality and Canyon; Cordell Bank NMS; Fagatele Bay NMS

Pre-Viewing Questions:
• What does the word “sanctuary” mean to you?
• Why do you think we need to have National Marine Sanctuaries?
• What human activities could impact a National Marine Sanctuary?

Focus for Viewing:
• Show the Introduction segment to the whole class and use the Introduction viewing questions.
• Reserve the individual NMS segments for each group to use as a research tool for the Exploring National Marine Sanctuaries lesson.

Follow-up Activity:
• Use the Exploring National Marine Sanctuaries lesson plan to help your students understand why sanctuaries are essential to the functioning of our oceans. Deepen their knowledge of species interactions, food webs and human activities that influence our ocean populations.
Theme: Fisheries management

Location in America’s Underwater Treasures:
Florida Keys NMS/Goliath Grouper; Channel Islands NMS/Squid Fishery; Stellwagen Bank NMS/Lobster; Monterey Bay NMS

Pre-Viewing Questions:
• How do you think overfishing could affect ocean fish populations?
• What are some jobs that fishermen must do when they are at sea?

Focus for Viewing:
• Use Questions 1 through 7 from the Florida Keys NMS/Goliath Grouper America’s Underwater Treasures viewing questions.
• Use Questions 1 through 6 for Channel Islands NMS/Squid Fishery from the America’s Underwater Treasures viewing questions.
• Use Questions 1 through 4 for Stellwagen Bank NMS/Lobster from the America’s Underwater Treasures viewing questions.
• Use Questions 1 through 5 for Monterey Bay NMS from the America’s Underwater Treasures viewing questions.

Post-Viewing Discussion Questions:
• Why do you think it is important to understand the breeding cycle of the fish that you are catching?
• What are some ways that modern-day fishermen can help keep fish populations healthy?

Follow-up Activity:
• Use the To Fish or Not to Fish lesson plan to deepen your students’ knowledge and understanding of all sides of the overfishing debate. Help students think critically by having them play the roles of people involved in the controversy and debate the issues.
• Illustrate the life cycle of a popular fish. Find out how this marine organism is being fished today.
Ocean Literacy: Essential Principles and Fundamental Concepts
http://coexploration.org/oceanliteracy/

Essential Principle #1: Earth has one big ocean with many features.
a. The ocean is the dominant physical feature on our planet Earth, covering approximately 70 percent of the planet’s surface. There is one ocean with many ocean basins, such as the North Pacific, South Pacific, North Atlantic, South Atlantic, Indian and Arctic.
b. Although the ocean is large, it is finite and its resources are limited.

Essential Principle #5: The ocean supports a great diversity of life and ecosystems.
i. Estuaries provide important and productive nursery areas for many marine and aquatic species.

Essential Principle #6: The ocean and humans are inextricably interconnected.
b. 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.
c. The ocean is a source of inspiration, recreation, rejuvenation and discovery. It is also an important element in the heritage of many cultures.

Theme: Data collection

Location in America’s Underwater Treasures:
Channel Islands/NMS; Channel Islands NMS/Tagging; Stellwagen Bank NMS/Lobster; Monterey Bay NMS

Pre-viewing Questions:
• What are some ways that scientists can collect data on all kinds of marine life?
• How do you think that data collection can help us protect our oceans?

Focus for Viewing:
• Use Questions 1 through 6 for Channel Islands NMS from the America’s Underwater Treasures viewing questions.
• Use Questions 1 through 5 for Channel Islands NMS/Tagging from the America’s Underwater Treasures viewing questions.
• Use Questions 1 through 4 for Stellwagen Bank NMS/Lobster from the America’s Underwater Treasures viewing questions.
• Use Question 6 for Monterey Bay NMS from the America’s Underwater Treasures viewing questions.

Post-viewing Discussion Questions:
• What are some of the ways that the researchers collect data on fish movement?
• What big difference do the researchers notice between protected and unprotected areas in the ocean?
• What are some ways that we can collect data on what flows into our oceans?

Follow-up Activity:
• Learn how to measure the abundance of marine life and practice effective sampling techniques used by today’s scientists by using the Every Square Inch Counts lesson plan.
• Find a problem that our oceans face today and create a poster presentation that describes the many different data-collection techniques that you could use to study that problem.
• Do a report on a specific piece of equipment that is used by ocean researchers today.

Additional educator resources for Jean-Michel Cousteau: Ocean Adventures can be found at pbs.org/oceanadventures.
e. 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 (point source, nonpoint source and noise pollution) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

g. 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 in order to effectively manage ocean resources for all.

Essential Principle #7: The ocean is largely unexplored.

b. Understanding the ocean is more than a matter of curiosity. Exploration, inquiry and study are required to better understand ocean systems and processes.

c. Over the last 40 years, use of ocean resources has increased significantly; therefore, the future of sustainability of ocean resources depends on our understanding of those resources, their potential and their limitations.

d. New technologies, sensors and tools are expanding our ability to explore the ocean. Ocean scientists are relying more and more on satellites, drifters, buoys, subsea observations and unmanned submersibles.

AUTHOR

Elsie Ovrahim is an Oakland Middle School science teacher and an independent contractor for the KQED Education Network. KQED Education Network uses the power of KQED Public Media to inspire learning by providing curriculum materials, professional development, online resources and special events for educators, child-care providers, families, youth and the community at large.

CREDITS

Jean-Michel Cousteau: Ocean Adventures is produced by KQED Public Broadcasting and Ocean Futures Society.

The exclusive corporate sponsor is The Dow Chemical Company.

PART 1

Introduction (2:12-4:28)
1. What fraction of America’s borders is water? more than half
2. In what year did Congress create the first National Marine Sanctuary? 1975
3. “I think its time for us to explore and discover America’s Underwater ______________.” Treasures
4. To whom does Jean-Michel delegate certain expeditions? his son and daughter -- Fabien and Celine

Florida keys NMS/Goliath Grouper (4:28-10:20)
1. Where does the adventure begin? in a remote part of the National Marine Sanctuary in the Florida Keys
2. How many pounds do goliath groupers usually weigh, and how old are some of them? 800 pounds, 50 years old
3. Why are they vulnerable to overfishing? come together at predictable times and places and are territorial, making them easy to hunt
4. Why can smaller fish use groupers as a habitat? because the grouper is so huge
5. What kept the groupers from being exterminated? legislation was passed
6. What do we know about this species? complicated life cycle
7. What did the researchers find that was the bottleneck for the grouper? the mangroves
8. What is a “no–take” area? a place where fish are not bothered, and juveniles can grow

Channel Islands NMS (10:20-14:35)
1. What makes this a multiuse sanctuary? rich enough for both wildlife and people
2. Why are these islands a unique sanctuary? lots of “no–take” and monitoring areas
3. What is the “best piece of equipment in all of marine ecology”? the 1-square-meter quadrat
4. How many times a year do the scientists survey this sanctuary? once a year -- six months of diving
5. Why do the researchers count each individual stipe in a kelp plant? there is a good relation between the size of the plant and the density of fish
6. What impairs the natural cycle of the kelp’s recovery? overfishing of the large fish
7. How many feet do the kelp grow in a day? 2 feet a day
Channel Islands NMS/Tagging (16:45-19:07)
1. What do the researchers do to track certain fish coming in and out of the “no-take” zone? *place an acoustic tag inside certain fish*
2. What is placed on the ocean floor that can collect data on the fish carrying acoustic tags? *an acoustic receiver or listening station*
3. How many fish have been tagged? *more than 200 fish*
4. What have the researchers found out about the sheephead fish? *no movement of sheephead out of the reserve*
5. What differences do the researchers expect to see between the fish that are in the “no-take” zone versus the fish that are outside the “no-take” zone? *larger fish, higher abundance of fish and more fish spilling over into Channel Island fishing areas*

Channel Islands NMS/Squid Fishery (19:07-21:07)
1. What are the squid doing under the light boats? *mating*
2. How many metric tons of squid were caught in one recent season? *70,000*
3. What made the squid catch go down to nearly zero for another season? *El Niño, rising water temperatures*
4. How has the squid survived overfishing and natural Earth cycles? *because of their life cycle -- they live for one breeding season and lay hundreds of eggs*
5. What happens to the females when they lay their eggs? *the females die*
6. How have the fishermen figured out when to fish the squid? *pay attention to the mating and birthing cycle -- catch the squid after they have laid their eggs*

Flower Garden Banks MNS/Coral (21:08-26:10)
1. What have the researchers found out about the coral reef through their long-term monitoring of the health of the reef? *the coral reef is healthy and thriving*
2. How is a balance created between the coral reef and the oil-drilling platform? *following safe work practices, operating oil platform correctly*
3. How long has the oil rig been at the MNS? *since 1981*
4. Oil rigs are like shipwrecks, offering new habitat for sea life, which is always competing for *space*
5. What do certain coral reef species do at the exact same time every year? *release their eggs and sperm into the water*
6. When does this happen at the Flower Garden Banks NMS? *between the seventh and the 10th night after the full moon in August*
7. Why do these species release their eggs and sperm into the water? *so that the eggs can be fertilized and carried away to start another colony*
**Dry Tortugas NP/Coral and Turtles (26:10-32:38)**

1. What happens nearby at another coral reef in parts of the Florida Keys where this release of sperm and eggs has failed? *single genetic individuals are found, don’t have other reefs that are close enough for the eggs and sperm to mate with, isolated from others*

2. What does Dr. Miller do to help increase the population of coral reef species? *allows baby corals to develop on tiles in the laboratory and then transplants them to help increase the number of coral colonies in the sanctuary*

3. What is causing a lot of the coral reefs to disappear? *disease, algae takeovers and coral bleaching caused by increase in water temperature*

4. Why is it hard to teach people the importance of the oceans? *because they can’t see it*

5. “People protect what they ________.” *love*

6. What virus is causing the green turtles to become infected? *viral Pamplona, caused by herpes virus*

7. What actually causes the turtle to die? *effects of the tumors on its skin and eyes*

**Gray’s Reef NMS (32:38-40:36)**

1. Why is this area called a “crossroads”? *because you see a lot of temperate- and cold-water species as well as their warm-water cousins*

2. What is a “turtle garage”? *an area carved out in the rock where the turtles hide*

3. Why do the turtles want to go toward the green vegetation? *these areas do not get washed out very often, safer to lay eggs*

4. Why do the researchers use only red light? *It has the shortest wave length in the color spectrum and allows them to see, but not disturb, the turtles*

5. What does the loggerhead turtle do after it has laid its eggs? *goes back out to sea*

6. What do the loggerheads face outside the sanctuary? *threats from the nets and long lines of the commercial fishing industry*

7. What do commercial fishermen use to avoid accidentally catching turtles in their nets? *Turtle Exclusion Devices, or TEDs*

8. What does the small net of fish help to tell fishermen? *if they are taking too many fish per catch*

**Olympic Coast NMS (40:37-45:55)**

1. What is it called when lost fishing gear continues to trap and kill animals? *ghost fishing*

2. How many coastal tribes does this sanctuary support? *four*

3. What program did the Makah and the Olympic Coast NMS develop? *removing lost fishing gear*

4. What are modern nets made of? *synthetic materials, plastic*

5. “Because it’s underwater and nobody sees it, it’s out of sight out of ________.” *mind*
6. What do wolf eels eat? sea urchins
7. Who are the ocean’s “soft intelligence”? octopuses

Hawai’ian Islands Humpback Whale NMS (45:55-53:00)
1. Humpback whales are ___________. endangered
2. What is the population worldwide? 20,000-25,000
3. What are the males competing for? the position closest to the female
4. What are the major threats to the whales? becoming entangled in nets and crashing into ships
5. In what areas of the world are the whales not protected? Russia and Japan
6. “The health of the humpback whale population is at least an ___________ of what the health of the ocean is.” indicator
7. Why is it important to learn about each piece of the ecosystem? improves our ability to manage the ecosystem in a sustainable way

PART 2
Monitor NMS/Shipwrecks (53:28-59:07)
1. What is one of America’s underwater cultural treasures? the Civil War battleship USS Monitor
2. How many feet below the surface is this ship? more than 240 feet
3. How many crewmen died when the USS Monitor sank? 16
4. What kind of samples did the team collect when they reached the USS Monitor and why? samples of wood and iron, to be used in ongoing studies of saltwater deterioration and to aid in restoration efforts
5. Where will the piece that was taken from the ocean be on display? Mariners’ Museum in Newport News
6. How many shipwrecks can be found in the North American waters? 100,000

Thunder Bay NMS/Shipwrecks (59:07-1:04:45)
1. How many shipwrecks are found at the bottom of this sanctuary? 160
2. What is another major use for this NMS? training ground for next generation of underwater explorers
3. What do the U.S. Naval Sea Cadets study? how to dive, how to use diving gear, how to explore
4. The capsizing of the Audubon is only a ___________ theory
5. What is threatening the shipwreck research that is going on in the Great Lakes? two species of mussels that had invaded the Great Lakes
6. How did the invasive mussels get to Thunder Bay? in the ballast water of ships
Stellwagen Bank NMS/Lobster (1:04:45-1:10:10)
1. What happened when cod was overfished in the mid-1990s? the lobster population flourished
2. What is the key factor in careful management of the lobster? understanding its breeding cycle
3. What kind of equipment do the researchers use to track lobster during their breeding cycle? attach a tag to a lobster and use a hydrophone to pick up the specific frequency and tone of the tag
4. Why is it important to have large, older lobsters in the population? because the females will produce more and larger offspring

Monterey Bay NMS (1:10:10-1:17:53)
1. The Monterey Bay NMS is the ___________ of all sanctuaries. deepest
2. With whom does the ecosystem of Monterey Bay have to be in delicate balance? industry, agriculture, recreation and fisheries
3. What type of fish was over-harvested in Monterey? sardines
4. What is the difference between a protected area like Point Lobos and an unprotected area like Macabee Reef? less sea life, diminished diversity, pollution from old cannery equipment
5. What do fishermen need to understand? if we do not protect and renew the resource, then there will be nothing for future generations to fish -- fishermen will benefit more than anyone
6. What do the species that are tagged by the TOPPs project provide researchers? collection of data, how species use the ocean, where they are located from season to season, sending back data on the ocean

Gulf of the Farallones NMS (1:17:53-1:27:13)
1. What species of seal is studied at this NMS? the elephant seal
2. What must the male elephant seal do before he can get a harem? he must dethrone the alpha male/beach master
3. Why is life also difficult for the female seals? have to give birth on a crowded beach, pups weigh 60-80 pounds, have to protect pup from predation and other females, have to stay with pup at all times
4. How many breeding sea birds mate in the Farallone Islands? 300,000
5. “The oceans provide the ________, and the islands provide the safe haven.” food
6. What kind of shark congregates on the Farallones each fall? the great white shark
7. Why is the water at the Farallone Islands green? because it is nutrient rich, sunlit and full of phytoplankton, or marine plants
8. What was dumped off the coast of San Francisco Bay that is cause for concern? 47,500 barrels of nuclear waste
9. Why is the radioactive material dangerous? could produce cancer and/or bioaccumulate in the food chain and be found in species of fish that people eat
10. “The ocean is the life of the ________.” world
Monterey NMS/Water Quality and Canyon (1:27:13-1:30:39)
1. What have the farmers introduced to improve the way they do things? less-toxic pesticides, drip irrigation
2. What do volunteers do after a major storm? take samples to measure water quality
3. What are the samples of urban runoff helping us to do for sea otters? found parasite from household cats that is killing sea otters, disposable kitty litter might carry the parasite
4. How many weeks at a time can the Western Flyer be at sea? three
5. After 16 years of research, about how much of the Monterey Bay Canyon has been covered? 5 percent

Cordell Bank NMS (1:30:39-1:35:44)
1. What was found when Cordell Bank was first explored? lush community of organisms, support of small to large organisms in the food chain
2. What makes Cordell Bank so rich with life? California current, upwelling, geologic structure
3. How long does it take to get the team back in the boat? 40 minutes
4. “Competition for _______ is what Cordell Bank is all about.” space

Fagatele Bay NMS (1:35:44-1:42:30)
1. “There is probably no place else in America with a higher ______ ______ of marine life than here.” concentration
2. Of all the ecosystems on Earth, coral reefs are the most ______ ______and the most ______. resilient, diverse
3. Corals are animals; what lives in their tissues and gives them their color? tiny plants
4. What happened when outsiders came into Samoa? everything changed, overfishing, new ideas and destructive methods of fishing
5. What causes coral bleaching? sea surface temperatures becoming too warm
6. What job does a coral have in a reef ecosystem? food, protection
7. What is the job of a sponge? filters the water
8. What is the Samoan culture based on? respect

Northwest Hawai’ian Islands National Marine Monument (1:42:31-1:43:32)
1. Will fishing be allowed in this area? no
2. What is carried to these remote islands by the currents? marine debris
3. “What we can do is to continue to learn and take ________.” action
# Ocean Vocabulary Sheet

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PART 1
Introduction
1. What fraction of America’s borders is water?
2. In what year did Congress create the first National Marine Sanctuary?
3. “I think it’s time for us to explore and discover America’s Underwater __________.”
4. To whom does Jean-Michel delegate certain expeditions?

Florida Keys NMS/Goliath Grouper
1. Where does the adventure begin?
2. How many pounds do goliath groupers usually weigh, and how old are some of them?
3. Why are they vulnerable to overfishing?
4. Why can smaller fish use groupers as a habitat?
5. What kept the groupers from being exterminated?
6. What do we know about this species?
7. What did the researchers find that was the bottleneck for the grouper?
8. What is a “no-take” area?

Channel Islands NMS
1. What makes this a multiuse sanctuary?
2. Why are these islands a unique sanctuary?
3. What is the “best piece of equipment in all of marine ecology”?
4. How many times a year do the scientists survey this sanctuary?
5. Why do the researchers count each individual stipe in a kelp plant?
6. What impairs the natural cycle of the kelp’s recovery?
7. How many feet do the kelp grow in a day?

Channel Islands NMS/Tagging
1. What do the researchers do to track certain fish coming in and out of the “no-take” zone?
2. What is placed on the ocean floor that can collect data on the fish with acoustic tags?
3. How many fish have been tagged?
4. What have the researchers found out about the sheephead fish?
5. What do the researchers expect to see in the fish that are in the “no-take” zone versus the fish that are outside the “no-take” zone?

Channel Islands NMS/Squid Fishery
1. What are the squid doing under the light boats?
2. How many metric tons of squid were caught in one recent season?
3. What made the squid catch go down to nearly zero for another season?
4. How has the squid survived overfishing and natural Earth cycles?
5. What happens to the females when they lay their eggs?
6. How have the fishermen figured out when to fish the squid?
America’s Underwater Treasures Viewer Guide
Student Handout

Viewing Questions

**Flower Garden Banks MNS/Coral**
1. What have the researchers found out about the coral reef through their long-term monitoring of the health of the reef?
2. How is a balance created between the coral reef and the oil-drilling platform?
3. How long has the oil rig been at the MNS?
4. Oil rigs are like shipwrecks, offering new habitat for sea life, which is always competing for _______.
5. What do certain coral reef species do at the exact same time every year?
6. When does this happen at the Flower Garden Banks NMS?
7. Why do these species release their eggs and sperm into the water?

**Dry Tortugas NP/Coral and Turtles**
1. What happens nearby at another coral reef in parts of the Florida Keys where this release of sperm and eggs has failed?
2. What does Dr. Miller do to help increase the population of coral reef species?
3. What is causing a lot of the coral reefs to disappear?
4. Why is it hard to teach people the importance of the oceans?
5. “People protect what they ________.”
6. What virus is causing the green turtles to be infected?
7. What actually causes the turtle to die?

**Gray’s Reef NMS**
1. Why is this area called a “crossroads”?
2. What is a “turtle garage”?
3. Why do the turtles want to go toward the green vegetation?
4. Why do the researchers use only red light?
5. What does the loggerhead turtle do after it has laid its eggs?
6. What do the loggerheads face outside the sanctuary?
7. What do commercial fishermen use to avoid catching turtles in their nets?
8. What does the small net of fish help to tell fishermen?

**Olympic Coast NMS**
1. What is it called when lost fishing gear continues to trap and kill animals?
2. How many coastal tribes does this sanctuary support?
3. What program did the Makah and the Olympic Coast NMS develop?
4. What are modern nets made of?
5. “Because it's underwater and nobody sees it, it's out of sight out of _______.“
6. What do wolf eels eat?
7. Who are the ocean’s “soft intelligence”? 
Viewing Questions

Hawai’ian Islands Humpback Whale NMS
1. Humpback whales are ______________.
2. What is the population worldwide?
3. What are the males competing for?
4. What are the major threats to the whales?
5. In what areas of the world are the whales not protected?
6. “The Health of the humpback whale population is at least an ___________ of what the health of the ocean is.”
7. Why is it important to learn about each piece of the ecosystem?

PART 2
Monitor NMS/Shipwrecks
1. What is one of America’s underwater cultural treasures?
2. How many feet below the surface is this ship?
3. How many crewmen died when the USS Monitor sank?
4. What kind of samples did the team collect when they reached the USS Monitor and why?
5. Where will the piece that was taken from the ocean be on display?
6. How many shipwrecks can be found in the North American waters?

Thunder Bay NMS/Shipwrecks
1. How many shipwrecks are found at the bottom of this sanctuary?
2. What is another major use for this NMS?
3. What do the U.S. Naval Sea Cadets study?
4. The capsizing of the Audubon is only a _________.
5. What is threatening the shipwreck research that is going on in the Great Lakes?
6. How did the invasive mussels get to Thunder Bay?

Stellwagen Bank NMS/Lobster
1. What happened when cod was overfished in the mid-1990s?
2. What is the key factor in careful management of the lobster?
3. What kind of equipment do the researchers use to track the lobster during their breeding cycle?
4. Why is it important to have large, older lobsters in the population?

Monterey Bay NMS
1. The Monterey Bay NMS is the ______________ of all sanctuaries.
2. With whom does the ecosystem of Monterey Bay have to be in delicate balance?
3. What type of fish was over-harvested in Monterey?
4. What is the difference between a protected area like Point Lobos and an unprotected area like Macabee Reef?
5. What do fishermen need to understand?
6. What do the species that are tagged by the TOPPs project provide researchers?
Viewing Questions

Gulf of the Farallones NMS
1. What species of seal is studied at this NMS?
2. What must the male elephant seal do before he can get a harem?
3. Why is life also difficult for the female seals?
4. How many breeding sea birds mate in the Farallone Islands?
5. “The oceans provide the _______, and the islands provide the safe haven.”
6. What kind of shark congregates on the Farallones each fall?
7. Why is the water at the Farallone Islands green?
8. What was dumped off the coast of San Francisco Bay that is cause for concern?
9. Why is the radioactive material dangerous?
10. “The ocean is the life of the ________.”

Monterey NMS/Water Quality and Canyon
1. What have the farmers introduced to improve the way they do things?
2. What do volunteers do after a major storm?
3. What are the samples of urban runoff helping us to do for sea otters?
4. How many weeks at a time can the Western Flyer be at sea?
5. After 16 years of research, about how much of the Monterey Bay Canyon has been covered?

Cordell Bank NMS
1. What was found when Cordell Bank was first explored?
2. What makes Cordell Bank so rich with life?
3. How long does it take to get the team back in the boat?
4. “Competition for __________is what Cordell Bank is all about.”

Fagatele Bay NMS
1. “There is probably no place else in America with a higher ________ _______ of marine life than here.”
2. Of all the ecosystems on Earth, coral reefs are the most ________ _______ and most ________ _______.
3. Corals are animals; what lives in their tissues and gives them their color?
4. What happened when outsiders came into Samoa?
5. What causes coral bleaching?
6. What job does a coral have in a reef ecosystem?
7. What is the job of a sponge?
8. What is the Samoan culture based on?

Northwest Hawaiian Islands National Monument
1. Will fishing be allowed in this area?
2. What is carried to these remote islands by the currents?
3. “What we can do is to continue to learn and take ____________.”