



Saving the Wild

Conservation Around the World

Teacher's Guide 9-12



Mission Programs



Mission Programs

Standards:

The *Saving the Wild: Conservation Around the World* education program supports the National Science Education Standards (NSES) and National Geography Standards.

NSES CONTENT STANDARDS for Grades 9-12 addressed in this guide

(www.nap.edu/readingroom/books/nses/html)

Science as Inquiry

- Exploring Coral Reefs, page 6
- Endangered Species Worldwide, page 8
- Humans vs. Nature: Can We Get Along?, page 10
- Virtual Pet Store, page 14
- Manatees on the Move, page 16

Life Science

- Exploring Coral Reefs, page 6
- Endangered Species Worldwide, page 8
- Humans vs. Nature: Can We Get Along?, page 10
- Virtual Pet Store, page 14
- Manatees on the Move, page 16

Science and Technology

- Line Up For Recycling, page 12

Science in Personal and Social Perspectives

- Exploring Coral Reefs, page 6
- Endangered Species Worldwide, page 8
- Humans vs. Nature: Can We Get Along?, page 10
- Virtual Pet Store, page 14
- Manatees on the Move, page 16

History and Nature of Science

Unifying Concepts and Processes

- Exploring Coral Reefs, page 6
- Endangered Species Worldwide, page 8
- Humans vs. Nature: Can We Get Along?, page 10
- Line Up For Recycling, page 12
- Virtual Pet Store, page 14
- Manatees on the Move, page 16

National Research Council. *National Science Education Standards*. Washington, D.C.: National Academy Press, 1996.

Pre/Post Assessment:

Use this assessment to discover how much your students already know about animal conservation and geography before you begin this unit and later as a conclusion to your study.

1. On a map or globe, locate the largest coral reef in the world. What threats do reefs face today? How would you tell others how to protect them?
2. Name 10 endangered species and where they live. Why are these animals endangered? What are the current conservation efforts to save them?
3. State an example where humans and animals (or the environment) have been involved in conflict. How was the situation resolved? Do you agree with the outcome? Why or why not?
4. You have been asked to help clean-up litter and fishing line around a popular lake. Describe the steps you would take to organize a campaign and how you would get others involved.
5. Do you have a pet? (If not, name a type of popular pet.) Where did it come from? Name three common animals in a pet store and explain how they got there or where they came from.
6. In southern Florida, manatees come ashore with large wounds on their backs and tails caused by boat propellers. What are some ways that manatees can be protected that are already being done? Brainstorm other solutions.

National Geography Standards

(www.nationalgeographic.com/xpeditions/standards)

The geographically informed person knows and understands:

The World in Spatial Terms

1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.
2. How to use mental maps to organize information about people, places, and environments in a spatial context.
3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Places and Regions

4. The physical and human characteristics of places.
5. That people create regions to interpret Earth's complexity.
6. How culture and experience influence people's perceptions of places and regions.

Physical Systems

7. The physical processes that shape the patterns of Earth's surface.
8. The characteristics and spatial distribution of ecosystems on Earth's surface.

Human Systems

9. The characteristics, distribution, and migration of human populations on Earth's surface.
10. The characteristics, distribution, and complexity of Earth's cultural mosaics.
11. The patterns and networks of economic interdependence on Earth's surface.
12. The processes, patterns, and functions of human settlement.
13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.

Environment and Society

14. How human actions modify the physical environment.
15. How physical systems affect human systems.
16. The changes that occur in the meaning, use, distribution, and importance of resources.

The Uses of Geography

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

Cover

Front (from left): black rhino (*Diceros bicornis*), killer whale (*Orcinus orca*), African lion (*Panthera leo*), Florida manatee (*Trichechus manatus latirostris*)

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Saving the Wild Conservation Around the World 9-12 Teacher's Guide

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National Geographic Education & Children's Programs

Founded in 1888, the National Geographic Society is one of the largest nonprofit scientific and educational organizations in the world. Its mission is to increase and diffuse geographic knowledge while promoting conservation of the world's cultural and natural resources. The mission of Education & Children's Programs, a division of the Society, is to motivate and enable each new generation to become geographically literate.

SeaWorld and Busch Gardens

Based on a long-term commitment to education and conservation, SeaWorld and Busch Gardens strive to provide an enthusiastic, imaginative, and intellectually stimulating atmosphere to help students and guests develop a lifelong appreciation, understanding, and stewardship for our environment. Specifically, our goals are...

- To instill in students and guests of all ages an appreciation for science and a respect for all living creatures and habitats.
- To conserve our valuable natural resources by increasing awareness of the interrelationships of humans and the environment.
- To increase students' and guests' basic competencies in science, math, and other disciplines.
- To be an educational resource to the world.

To the Teacher

The *Saving the Wild: Conservation around the World* Teacher's Guide for grades 9-12 was developed to help you teach your students—in an active, hands-on way—about animal conservation and geography. Our goal is to integrate geography, science, art, language, and literacy. We want students to understand their place in the world and how they are connected to the world, and to inspire them to become stewards of the environment. This Teacher's Guide supplements the in-park program offered by SeaWorld San Diego, San Antonio and Orlando and Busch Gardens Tampa Bay and Williamsburg.

The National Geographic Society/SeaWorld/Busch Gardens activities support the National Science Education Standards and the National Geography Standards. The brief background information in this guide (pp. 3-5) was written for you, the teacher. It will help you complete these activities with your students. We suggest you also refer to some of the materials listed on page 20 for more in-depth information. The National Geographic Society, SeaWorld, and Busch Gardens strive to provide teachers with up-to-date information and activities that motivate students to appreciate and conserve wildlife, the oceans, and the natural world.

Goals of the *Saving the Wild* Unit 9-12

Students will explore current issues in worldwide animal conservation while learning such geographic skills as map reading and spatial organization of Earth's living and nonliving components. Students will examine their relationship to the world and its environments.

Objectives

After completing the *Saving the Wild* unit, the student will be able to...

1. Show on a globe or world map the location of the two largest reef formations, as well as a third reef of his or her choice. The student will be able to explain how coral contributes to local economies and/or cultures.
2. Understand there are ongoing conflicts between how humans use the Earth's resources and what plants and animals need to survive. He or she will be able to discuss both the positive and negative consequences of one such conflict.
3. Use a world map or globe to locate the distribution of at least 10 endangered species. He or she will be able to describe the current threats and conservation efforts concerning one endangered species of animal or plant.
4. Describe the hazards of discarded monofilament fishing line and explain how to implement a clean-up campaign in his or her community.
5. Explain where five common pet store animals originate, as well as guidelines for making a responsible decision to purchase a pet.
6. Discuss his or her views on current conservation issues with family and friends.

Vocabulary

biodiversity — the genetic variability of living organisms on our planet.

conservation — taking care of our environment by wisely managing its resources.

distribution — the geographical occurrence of a species of plant or animal.

domestic pets — animals bred for centuries to select traits that make them well-adapted for living with humans.

ecosystem — a unit of plants, animals, and nonliving components of an environment that interact.

endangered species — a species of plant or animal of which numbers are decreasing at an alarming rate and is threatened with extinction by human-made or natural changes in the environment.

exotic pets — animals that have not been domesticated, such as boa constrictors, green iguanas, sugar gliders, parrots, and saltwater and freshwater aquarium fish.

extant — a species represented by living creatures.

extinct — no longer existing.

fishery — organized industry of catching, processing, and selling fishes or other aquatic species.

habitat — the place where a plant or an animal lives.

macropod — kangaroos, wallabies, and other marsupials of the family Macropodidae.

monofilament — a fishing line made of a single untwisted strand of synthetic filament.

population — a group of plants or animals of the same species that live in the same area and have the opportunity to breed with each other.

preservation — protecting resources, ecosystems, and structures for present and future generations.

restoration — returning resources, ecosystems, and structures to their original (or near-original) condition.

sustainable use — using resources in ways that do not deplete them.

telemetry — a wireless technology in which information is measured from a remote source and reported to a receiving station for analysis.

terrestrial — growing or living on land.

threatened species — a species likely to become endangered.

vessels — watercraft such as ships.

vocalizations — sounds produced for auditory communication.

Conservation around the World

Conservation means taking care of our environment by wisely managing its resources. Although the discipline of conservation is multifaceted, a view through “geographic eyes” can help students see, understand, and appreciate the web of relationships between people, places, and environments. A “geographically” based classroom activity may ask students to consider the significance of where resources (renewable or nonrenewable) are located or distributed, or whether there are any patterns in the locations of the resources. Students can use geographic tools (maps, globes, charts, etc.) to acquire, arrange, and use geographic information.

Practicing conservation can involve different methods. **Sustainable use** means using resources in ways that do not deplete them (e.g., reducing the use of nonrenewable resources and reusing resources). **Preservation** means protecting resources, ecosystems, and structures for present and future generations (e.g., protecting endangered animals and plants and their habitats). **Restoration** means returning resources, ecosystems, and structures to their original (or near-original) condition (e.g., cleaning a polluted river or helping endangered species make a comeback).



Rescue and rehabilitation programs for endangered species such as sea turtles are examples of preservation—protecting resources for present and future generations. Here the 500th sea turtle rescued and rehabilitated by SeaWorld is released. To learn how Crittercam, a research tool worn by wild animals, may aid sea turtle conservation go to news.nationalgeographic.com/news/2004/02/0212_040212_turtlecam.html.

Is conservation important?

When we practice conservation, we balance some of the needs of people—places to live, work, and play; food to eat, water to drink—with the need for a planet that will be healthy for years to come. One way we practice conservation is by interacting with the ecosystem in responsible ways. You are conserving when you observe fishing limits, when you recycle, and when you vote for laws to conserve resources such as timber, oil, and minerals such as iron ore.

When resources are not wisely managed, we “use up” what we have. Even though the Earth is a large place, it is not infinite. There are only so many fish in the sea, oil deposits underground, and trees growing on land. In an ecosystem everything, living and nonliving, has a role. When one element is removed—perhaps by erosion, over-hunting, habitat destruction, or disease—it affects the entire system. As more elements are removed the system becomes impoverished.

You need look no farther than your backyard to find examples of interdependence within an ecosystem. A songbird such as a Savannah sparrow (*Passerculus sandwichensis*) eats mostly insects in the summer. Insects such as crickets and grasshoppers feed on plants. Plants get their nourishment from the soil and the sun. Interactions like this within simple food chains take place every day in your own backyard!



What types of ecosystems can you find in your own backyard?



Pollution like this can be controlled through successful recycling programs.

What is an endangered species?

An endangered species is an animal or plant that is in danger of disappearing completely from our planet. Most scientists believe a species is endangered when its population is so small that it will become extinct in 15 years. Many species are threatened, which means that unless conservation measures are taken, they're likely to become endangered.

Extinction has always been a part of nature.

As climate and food supplies change, animals that can't adapt to an altered environment can't survive. Some scientists believe there have been as many as five mass extinctions over the last 450 million years. They also believe the Earth may be beginning a sixth mass extinction, the first caused by—and that will affect—humans.

Why should we worry?

When people talk about the balance of nature, they're talking about the way plants, animals, and people interact with each other and their environments. The balance can be upset when plants or animals become extinct. Each living organism plays a role in the Earth's ecosystem: When even one disappears, others are affected. For example, if a small fish becomes extinct a larger fish that ate it may not find enough food and die. Then a hawk that ate the larger fish might starve and die. Because of this complex relationship of food webs, it's important to maintain biodiversity—as much plant and animal variety as possible.

What's in it for me?

As we consider using ocean and land resources, we must also recognize that we are a part of this ecosystem. People are an important element: The more people there are, the more resources they use. We have the responsibility to study our ecosystem and learn how it works so that we know how our interactions will affect it. We must learn more about the products we buy so we don't contribute to endangering or threatening a species. The more we know about an ecosystem, the better we can predict the possibility of negative outcomes to use or harvest of its resources. This knowledge is important when we make decisions and create laws that manage (and hopefully conserve) the world around us.



African elephants (*Loxodonta africana*) are one of thousands of species that are endangered due to habitat destruction and poaching.



Earth's animals and natural resources may appear limitless but they are not. Such resources must be used wisely in order to preserve them for future generations.

Exploring Coral Reefs

OBJECTIVES

The student will be able to show on a globe or world map the location of the two largest reef formations, as well as a third reef of his or her choice. The student will be able to explain how coral contributes to local economies and/or cultures.

National Geography Standards: 1, 14

MATERIALS

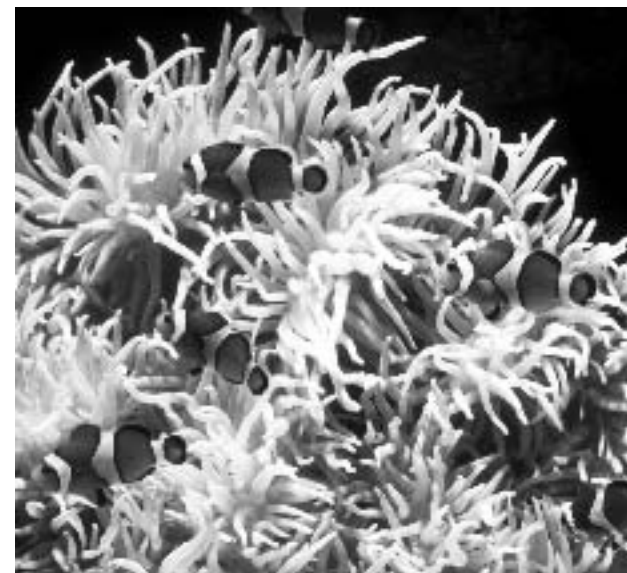
- Atlas
- Computer with Internet access if available
- Copies of world map (provided)
- Writing and drawing materials including color markers or pencils
- Equipment and materials for presentations

Recommended book: *World Atlas of Coral Reefs*

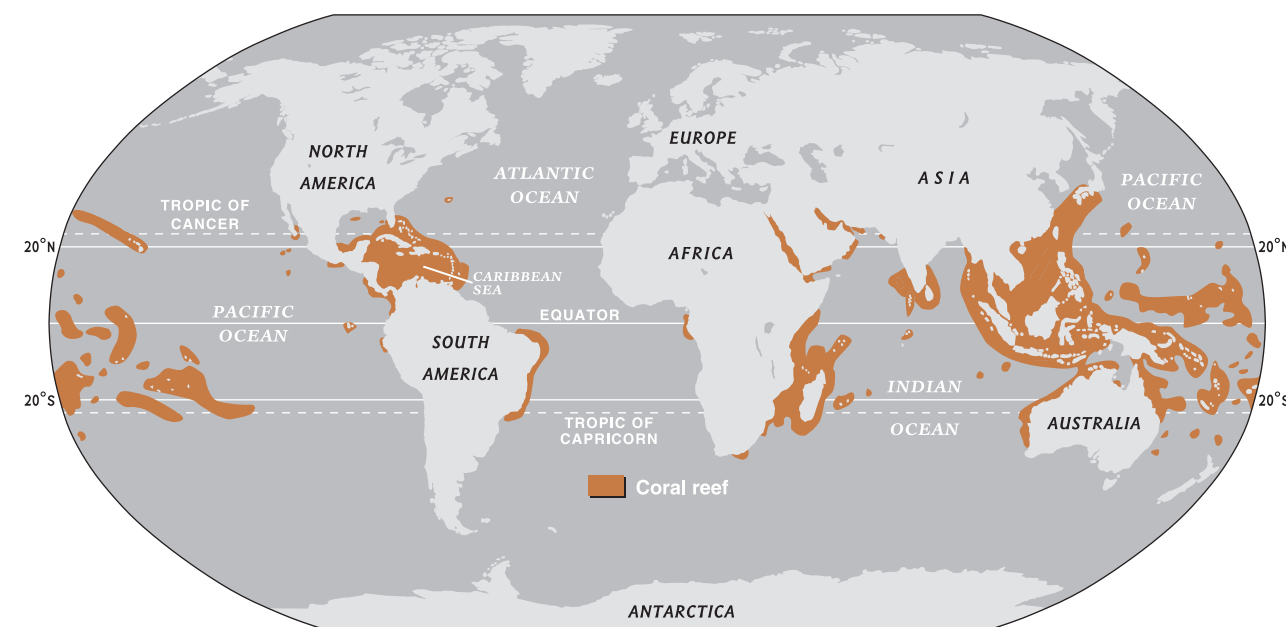
BACKGROUND

Reef-building corals are scattered throughout the tropical and subtropical western Atlantic and Indo-Pacific oceans, generally within 30°N and 30°S latitudes. Coral reefs encompass about 284,300 square km (109,769 square mi.). The Great Barrier Reef, on the northeast coast of Queensland, Australia, is the largest coral reef. It's 2,000 km (1,240 mi.) long and contains more than 3,000 separate reefs and shoals. The second largest reef system is along the coast of Belize in the Caribbean Sea. Coral reef ecosystems are found in more than 100 countries and territories. However, coral reefs comprise only 0.09% of the oceans' total area worldwide. So why should we pay attention to them?

Coral reefs are home to a wider variety of organisms than can be found above the ocean; reefs host an estimated half a million animal and plant species. Coral reefs remove and recycle carbon dioxide; excessive amounts of this gas contribute to global warming. Reefs also shelter land from tsunamis and other harsh weather. Local economies benefit from fishing opportunities and tourism. Unfortunately, coral reefs are in peril due to pollution, sediment flow from deforestation, elevated sea surface temperatures due to global warming, overfishing, and destructive fishing practices.



Coral reefs are inhabited by a wide array of animals such as clownfish (family *Pomacentridae*) and anemones (phylum *Cnidaria*).



ACTION

1. Divide students into small groups and distribute world maps on page 19. As a class, identify and discuss the largest reef formation, the Great Barrier Reef. Then, in their groups, students will conduct research to discover what the second largest reef system is and name it. They will also choose a third coral reef to research in more detail. Using the library or Internet, each group should find the following information about the reef they've chosen:

- Reef(s) name
- Reef location
- Reef type
- Current health status
- How the reef(s) supports the local economy (fishing, tourism, etc.)
- Any governmental or local protection and conservation programs working to protect the reef(s).

2. Using the information gathered, student groups put together an educational 2- to 3-minute "infomercial" about their reefs. Ideas include creating a brochure or poster, short video, slide show presentation, or acting out a "live" commercial. Groups should identify the audience (children, adults, fishing

industry, government, conservationists, etc.) and state the infomercial's goal.

3. Have student groups present their infomercials to classmates.



Great barracudas (*Sphyraena barracuda*), a predatory reef fish, can obtain a size up to 3 m (10 ft.).

Saving My Wild

Are there any products made from coral reefs found in your local stores? Some common examples might be coral jewelry and coral calcium vitamins. Can students find any others? What kind of school projects can be done to help restore or build reefs? (Example: Science students at Harlee Middle School in Bradenton, Florida, created reef balls [artificial reefs] made of concrete and worked with Mote Marine Laboratory of Sarasota to have the balls placed in ideal areas off the coast of Manatee and Sarasota counties.)

Online Sources

U.S. National Marine Sanctuaries

www.sanctuaries.nos.noaa.gov/oms/oms.html

(See Florida Keys, Flower Garden Banks, Gray's Reef, Hawaiian Islands Humpback Whale, and Northern Hawaiian Islands)

Nature Conservancy

nature.org/magazine/fall2002/coralreefs/

Missouri Botanical Garden: Marine Ecosystems

mbgnet.mobot.org/salt/index.htm

National Geographic Earthpulse [Oceans]

www.nationalgeographic.com/earthpulse/

NOAA: Year of the Ocean: 25 Things You Can Do To Protect Coral Reefs

www.yoto98.noaa.gov/books/reefs/reef1.htm

World Wildlife Fund: Corals

www.worldwildlife.org/coral/

Status of Coral Reefs of the World: 2004

www.aims.gov.au/pages/research/coral-bleaching/scr2004/

Endangered Species Worldwide

OBJECTIVES

The student will be able to use a world map or globe to locate the distribution of at least 10 endangered species. The student will be able to describe the current threats and conservation efforts concerning one endangered species of animal or plant.

National Geography Standard: 14

MATERIALS

- Atlas
- Computer with Internet access if available
- Large world map (you can make a large map by projecting an overhead transparency onto butcher paper)
- Writing and drawing materials including color markers or pencils

BACKGROUND

In the United States, four major federal laws protect wild animals and plants: the Endangered Species Act, the Marine Mammal Protection Act, the Lacey Act, and the Animal Welfare Act. The United States is also a member of CITES, the Convention on International Trade in Endangered Species of Wild Flora and Fauna. This treaty, with more than 160 member countries, protects rare, threatened and endangered species that are exported or imported.

Thousands of birds, mammals, fishes, amphibians, reptiles, and plants are endangered and many more become extinct each year before scientists have even had the chance to discover them. Within the U.S., more than 700 plant species and 500 animal species are listed as threatened or endangered. (A species likely to become endangered in the foreseeable future is classified as "threatened".)

ACTION

1. As a pre-activity to the lesson, ask students to identify areas on a world map where they think endangered animal and plant species live. Ask students to come to class the following day with a list of 10 or more endangered species and where they live to contribute to a class list.
2. As a class, make a list of endangered species. Ask students to choose a species from their list or from the class list to research.
3. Write the following questions on the classroom board for students to answer about their species:
 - What is its common name and scientific name?
 - Where does it live? Describe both the *distribution* (the geographical occurrence of a species) and the *habitat* (the place where a species lives).
 - Are there patterns to its distribution?
 - What are the current and past population estimates? If possible, find out the methods scientists used to determine the population number.
 - Explain a major reason or reason(s) for the species' population decline.
 - Why is it important to make an effort to save this species?
4. Allow time for students to gather information. When ready, have each student indicate where his or her species is found on the map and present researched information. Presentations can be oral reports or poster displays.
5. After all students have presented their animals, have the class determine the top five endangered species and discuss conservation efforts (if there are any) on their behalf. Do students think these animals will continue to live? Why or why not?
6. What animals or plants have been removed from the endangered list because of successful conservation plans? What were the plans or laws that were used to help these species achieve this new status? What is being done to ensure the continued protection of the species?
7. As a post-activity to this lesson, ask students to reflect on what they learned by comparing the information they discovered to their "previous knowledge" in the pre-activity (step #1, above).



Ring-tailed lemurs (*Lemur catta*) are among more than 40 endangered and threatened species cared for at Busch Gardens® Tampa Bay. For more about lemurs go to the National Geographic Creature Feature at nationalgeographic.com/kids/creature_feature/0201/lemurs.html.

Saving My Wild

Are there any animals or plants in the students' region or state that are endangered? What conservation efforts are taking place? What can students do locally to get involved with saving endangered species? Have students brainstorm service-learning activities that will help them get involved in education about conservation of our endangered animals and plants. Vote on one idea, create a plan, implement the plan, and report results. For examples of student projects visit <http://www.seaworld.org/conservation-matters/eea>

Online Sources

U.S. Fish & Wildlife: Endangered Species

endangered.fws.gov

endangered.fws.gov/wildlife.html#Species

World Wildlife Fund WildFinder

www.worldwildlife.org/wildfinder

National Geographic Earthpulse

www.nationalgeographic.com/earthpulse/

Humans vs. Nature: Can We Get Along?

OBJECTIVES

The student will understand there are ongoing conflicts between how humans use the Earth's resources and what plants and animals need to survive. He or she will be able to discuss both the positive and negative consequences of one such conflict.

National Geography Standards: 6, 14

MATERIALS

- Index cards
- Computer with Internet access if available
- Newspapers, magazines
- Pencils or pens

ACTION

1. About a week before beginning the activity, ask students to look through newspapers, magazines, or search online for events that involve conflict between how humans use the environment and the needs of plants or animals. For example, one such conflict might be when a government agency increases deer hunting limits in a certain area to help manage a deer population that is growing too fast. Other ideas are available on the recommended Web sites under Online Sources. (Conflicts do not necessarily need to be in your area.)
2. Ask students to clip or print the articles and bring them to class. Students must provide sources for their information and/or names of organizations that published the information. Ask them to review information from a few different sources and not rely on just one. Compare and contrast these sources to see how the viewpoints correspond. Does a source give a factual report, or is the source biased?
3. When you have collected 10 or more topics, review events with the class.
4. Divide the class into two groups and ask each group to choose ONE of the 10 events. Each group will then split into two teams, those for the "humans" and those for the environment or animals. Give students a few days to gather information and prepare their arguments. For each event, ask students to take the position of different people involved in the event such as lawmakers, environmentalists, land developers, city officials, farmers or ranchers, homeowners, community members, and others.
5. When ready, have each group stage a 10-minute debate. Students from both sides should state their views and allow time for rebuttal. The student group that isn't debating is the audience. After the debate, the audience can ask questions. After the two debates, discuss the topics as a class: Is there an easy solution to these conflicts? What knowledge, if any, do scientists contribute to understanding the conflict? How, if at all, did information from scientists differ from media reports? Do students think all sources are equally valid? How do economical or political agendas (generate income, provide jobs, improve economy) drive these conflicts? How does the media affect public opinion?



Most major cities are found by rivers and oceans. What possible effect can this type of development have on river or beach ecosystems?



Human pollution is a major threat to ecosystems around the world, whether on land or in the sea.

Saving My Wild

Students could present information they've gathered to other students in the school. They should emphasize the pros and cons involved in each decision: There isn't always an easy solution. Students can create displays for the school multimedia center or library that represent either or both sides of the conflict.

Online Sources

National Geographic Magazine Online: A River Dammed

www.nationalgeographic.com/ngm/0104/feature1/index.html

Conservation International

www.conservation.org

The Izaak Walton League of America

www.iwla.org

National Fish and Wildlife Foundation

www.nfwf.org

National Wildlife Federation

www.nwf.org

The Nature Conservancy

www.nature.org

World Wildlife Fund

www.worldwildlife.org

The Conservation Fund

www.conservationfund.org

National Audubon Society

www.audubon.org

International Rhino Foundation

www.rhinos-irf.org

Rocky Mountain Elk Foundation

www.rmef.org

Line Up for Recycling

OBJECTIVES

The students will be able to describe the sources of discarded monofilament fishing line and its hazard to wildlife. Students will plan a clean-up campaign in their area. As an option, students can carry out the campaign. During the campaign, students will document the procedure, record the amount of line collected and write a "planning book" to become a resource for others to use.

National Geography Standards: 14, 16

MATERIALS

- ❑ Internet access. Visit "How to start a monofilament recycling program" at <http://www.fishinglinerecycling.org/implementing.htm>
- ❑ Reel of fishing line and 10 to 12 lengths of line cut to 30.5 cm (12 in.) each

BACKGROUND

Monofilament Recovery and Recycling Program (MRRP) is an innovative recycling project dedicated to reducing the environmental damage caused by discarded monofilament fishing line. Monofilament line is another name for single-strand, high-density, nylon fishing line that is used on fishing reels and in the manufacturing of fishing nets. Wildlife is adversely affected by monofilament line in two ways: Entanglement and ingestion. Humans are also affected by monofilament line, which can wrap around boat propellers and SCUBA divers. Monofilament fishing line can last up to 600 years in the environment. Some facts about monofilament fishing line:

- From 1980 to 1999, one in every five manatee rescues in the U.S. was a result of entanglement in fishing line (monofilament).
- From 1996 to 2000, the Florida Marine Research Institute documented 163 turtles that were entangled in fishing line.
- From 1995 to 2000, approximately 35 dolphins in the Southeast U.S. died as a result of monofilament-related injuries.
- Researchers have documented more than 60 fish species that have swallowed or become entangled in marine debris.
- From 1999 to 2000, more than 265 seabirds of various species were rescued due to hook and line entanglements. Of those 265 seabirds, 92 died.

ACTION

1. Ask students to raise their hands if they have ever been fishing. Show students the fishing line reel and distribute the cut pieces for students to touch. Ask students to try to break the line or pull it apart. Explain that this single-strand, high-density, nylon fishing line is used around the country (and the world) by commercial and recreational fishermen. Ask students if they think this small, lightweight line could pose problems to ocean animals. Use the background information to illustrate specific instances.
2. Ask students if they have seen discarded fishing line around their neighborhood, town or favorite fishing area(s). Introduce the Web pages from the Monofilament Recovery and Recycling Program (either on overhead transparencies or by making handouts). Explain that this is a successful ongoing recycling program.
3. Have the class break into groups to investigate the many aspects and steps involved in organizing and running their own monofilament line recycling program. Issues to think about include advertising, organizing a clean-up, and coordinating volunteer help. Students can find information, downloads, and support materials at <http://fishinglinerecycling.org/startup.htm>
4. After students have finished their research, the class should discuss and analyze the pros and cons of starting their own program. Is a program needed in

their area? How much might it cost? If students would like to continue, ask them to create an action plan with a timeline and a list of tasks to perform. If a monofilament line recycling program exists in the area, students can volunteer to work with that program for extra credit or to fulfill a community service requirement.

5. During the campaign, ask students to document their actions, record the amount of line collected and create a "planning book" as a resource for others to use.
6. Research methods of recycling the line after it has been collected. What products can be produced from recycled line?

Online Sources

U.S. Environmental Protection Agency: Educational Resources

www.epa.gov/highschool/

U.S. Environmental Protection Agency: Municipal Solid Waste: Reduce, Reuse, Recycle

www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm

Monofilament Recovery and Recycling, Brevard County Florida

www.brevardcounty.us/mrrp/

Monofilament Recovery and Recycling (Texas)

<http://mrrp.tamu.edu/index.htm>



A green sea turtle (*Chelonia mydas*) swallowed a hook and fishing line. Without medical assistance this endangered animal could perish.

SeaWorld's veterinarian staff operates on the troubled turtle.

After a brief recovery period, this turtle was released.

Virtual Pet Store

OBJECTIVES

The student will be able to discuss the supply of common pet store animals, the disadvantages of buying animals captured from their natural environment, and pros and cons of breeding animals. The student will have the option of exploring careers in wildlife management or animal shelter rescues.

National Geography Standard: 16

MATERIALS

- Access to library or Internet
- Paper and pencils or pens
- Optional: tools for multimedia presentation (software to make slide show, video recorder, etc.)

BACKGROUND

Do students have pets at home? Many families share their living space with pets. Most people own **domestic pets**, such as dogs and cats—animals bred for centuries for select traits that make them well adapted for living with humans. Increasing numbers of people own **exotic pets**, or animals that have not been domesticated, such as boa constrictors, green iguanas, sugar gliders, parrots, and saltwater and freshwater aquarium fish.

Unfortunately, domestic and exotic pets face many problems. Most potential pet owners do not realize how long their pets (both domestic and exotic) can live, how big they get as adults, or where their pets come from. With proper care, some species of parrots can live as long as humans. Certain breeds of domestic dogs reach weights of 45.5 kg (100 lbs.) or more. Boa constrictors can grow in excess of 3.05 m (10 ft.). Most people are also unaware of the requirements to feed, house, and keep their pets healthy. Unwanted cats, dogs and other pets are often taken to animal shelters, euthanized, or abandoned or released into nonnative habitats.

Many animals are bred specifically for the pet trade. But most potential pet owners aren't aware that millions of birds, reptiles, fishes, and other animals are caught in their native habitats and sent to the U.S., often illegally.

ACTION

1. A few days before beginning the activity, ask students to visit a local pet store and remember or write down the common names of 10 animals they saw there.
2. Begin your Virtual Pet Store by making six columns on the blackboard with these headings: Bird, fish, reptile, amphibian, small mammal, invertebrate. Then ask students what animals they saw at the pet store and write their answers in the chart. Try to keep the lists fairly even, listing about 6 to 7 animals in each column. (See sample pet list on next page for suggestions.)
3. Divide class into student groups or pairs and have each group or pair choose an animal. (If you have "extras" students may choose more than one). Ask students to use the library or the Internet to research how that animal is raised (or caught) and arrives at the store. Tropical fishes, reptiles, and birds are more commonly collected from the wild than mammals. Dogs and cats are bred or "pre-owned" and up for adoption. For each animal, student groups should record country of origin and native habitat (if any) and the process by which the animal arrives at the store (breeder, distributor, private party donation, animal rescue group). Also have students list what is required to properly care for each kind of pet. What happens to unwanted pets (animal shelters, many are released into nonnative habitat)?
4. Discuss as a group how some animals come to be pets. Topics to cover: Illegal pet trade (birds, reptiles, fishes), puppy mills, destructive collection techniques (aquarium fish, live corals), and the role of responsible breeding and/or handling. What animals are popular pets? Why? (For example, Dalmatian dogs were popular after the movie *101 Dalmatians* was released. At Easter, people may buy a rabbit.) What pets do students have at home? How do they care for them?
5. Ask students if anyone is interested in a career with animals. Would they like to volunteer at a local animal rescue agency, humane society, or work at a pet store to get more experience? Professional animal careers include wildlife biologist, park ranger, wildlife veterinarian, exotic animal trainer, zookeeper, and more. Students can find out more information about careers working with exotic animals at the following Web sites:
 - SeaWorld/Busch Gardens ANIMALS: Guide to Zoological Park Careers**
[//www.SeaWorld.org/career-resources/info-books/zoo-careers/index.htm](http://www.SeaWorld.org/career-resources/info-books/zoo-careers/index.htm)
 - American Zoo and Aquarium Association**
[//www.aza.org/ForEveryone/Careers/](http://www.aza.org/ForEveryone/Careers/)

Saving My Wild

Have student groups prepare a 10-minute talk or video on responsible pet ownership and present this to younger grade levels. They can use animal puppets or stuffed animals to demonstrate, or, if school policy allows, they may want to bring a dog or other pet.

Online Sources

(Students may also want to look up Web sites for local animal shelters and animal sanctuaries.)

Centers for Disease Control and Prevention (CDC)

www.cdc.gov/healthypets/animals/reptiles.htm

Florida Sea Grant

www.flseagrant.org/program_areas/coastal_habitats/publications/aquarium_hobby_sts_web.pdf

Marine Aquarium Council

www.aquariumcouncil.org/

National Geographic

www.nationalgeographic.com

National Wildlife Federation

www.nwf.org/

World Wildlife Fund

www.worldwildlife.org

U.S. Fish and Wildlife Service

www.international.fws.gov/permits/pets.html

Sample pet list for Action #2

Small mammals

domestic dog breeds: golden retriever, Dalmatian, fox terrier, boxer, etc.
domestic cat breeds: American shorthair, Persian, Siamese, manx, etc.
rabbits
sugar gliders
rodents: hamsters, rats, mice, chinchillas, Guinea pigs

Fish

freshwater: goldfish, molly, tetra, cichlid, guppy, arawana, catfish
saltwater: anemonefish, triggerfish, angelfish, lionfish, damsel fish, butterfly fish

Reptiles

snakes: rosy boa, Burmese python, king snake, garter snake
lizards: anole, green iguana, gecko, chameleon, African monitor lizard
turtles: box, mud, slider, painted

Amphibians

frogs: African clawed, American green, fire-bellied toad, pacman
salamanders/newts: tiger salamander, axolotl, fire-bellied newt

Birds

parrots: cockatiel, lovebird, parakeet, Amazon parrot, macaw, cockatoo
finch
toucan
canary

Invertebrates

land hermit crab, tarantula, scorpion, Madagascar hissing cockroach, live coral

Manatees on the Move

OBJECTIVES

The students will be able to show four or more West Indian manatee habitats on a map and describe and/or illustrate yearly movements of manatees along the Florida coastline. He or she will be able to describe the top three threats to manatees and create an educational campaign to target the causes of the threats.

National Geography Standards: 1, 6, 14

MATERIALS

- Copies of Florida map (provided)
- Overhead transparency of Manatee Range
- Access to library resources or the Internet
- Color markers or pencils
- Photo of manatee on overhead transparency or in book
- Paper, photos, software for slide shows (as needed for reports)
- Non-fiction book about manatees

BACKGROUND

There are three species of manatees: *Trichechus senegalensis*, the West African manatee; *Trichechus inunguis*, the Amazonian manatee; and *Trichechus manatus*, the West Indian manatee. The West Indian manatee species is divided into two subspecies: The Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). The Florida manatee is one of the most endangered marine mammals in the United States. In this activity, students will focus on the Florida manatee.

ACTION

1. First, find out what students already know about manatees. Ask students, What is a manatee? Where do manatees live? Write the answers on the chalkboard, white board, or overhead and continue the discussion with these questions: Are manatees endangered? If so, why? What are some of the threats to manatees? Do you know of or do you think that there are campaigns or conservation measures to help manatees?

At this point, depending on students' knowledge about manatees, you may assign them some library reading materials or refer them to one of the Web sites listed under Online Sources where they can discover more about manatees. To prep for this background reading, ask the class what they would like to know about manatees, and assign questions to student groups.

2. Divide the class into groups of two to five students and distribute copies of Florida Map (page 18). Using the Manatee Range (page 17) on an overhead as an example, have students shade their maps to indicate manatee distribution along the Florida coast.
3. Have each student group choose an area on the map of Florida to "explore." Using the Internet or library resources, ask students to research their specific area. Helpful questions to answer might be: How many manatees die in this area? Are measures in place to

help stop injuries? If so, what are the measures and are they working? This information is available from the Florida Fish and Wildlife Conservation Commission Web site (see Online Sources).

4. Next, have student groups brainstorm from one to three new ideas for decreasing or preventing manatee deaths. How would students advertise these new conservation measures? Would it be easy or difficult to convince local residents to follow (or buy) the solution? To illustrate the new conservation measures, students can use slide shows, video, posters, or brochures.
5. Finally, have student groups present their ideas to classmates. Take the activity to the next level by contacting the Florida Fish and Wildlife Conservation Commission and seeing if they are interested in implementing the idea! In addition, select the best ideas and present them to community groups. As an extension to this activity, you can ask your area's Fish and Wildlife Commission representative to visit your class and talk about his or her job.
6. Do students think the issues, problems, and solutions they have studied about the Florida manatee might be helpful to related species in other areas of the world (e.g., the manatee in West Africa and South America; the dugong in East Africa and the South Pacific)?

Online Sources

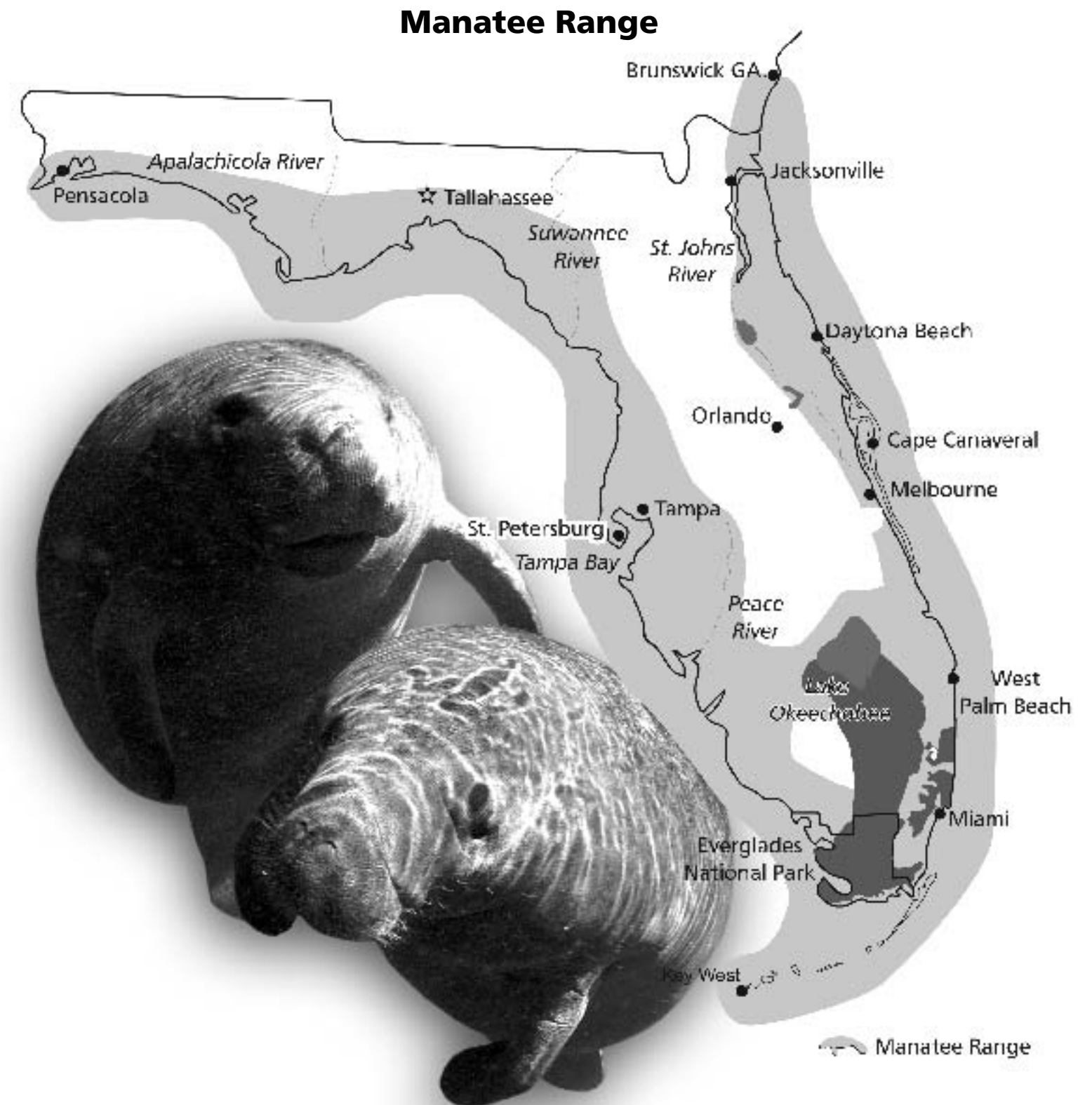
Florida Fish and Wildlife Conservation Commission
www.floridaconservation.org/psm/manatee/manatee.htm

www.myfwc.com/manatee/

Parker Manatee Aquarium, South Florida Museum
www.southfloridamuseum.org/aquarium.asp

Save the Manatee Club
www.savethemanatee.org/

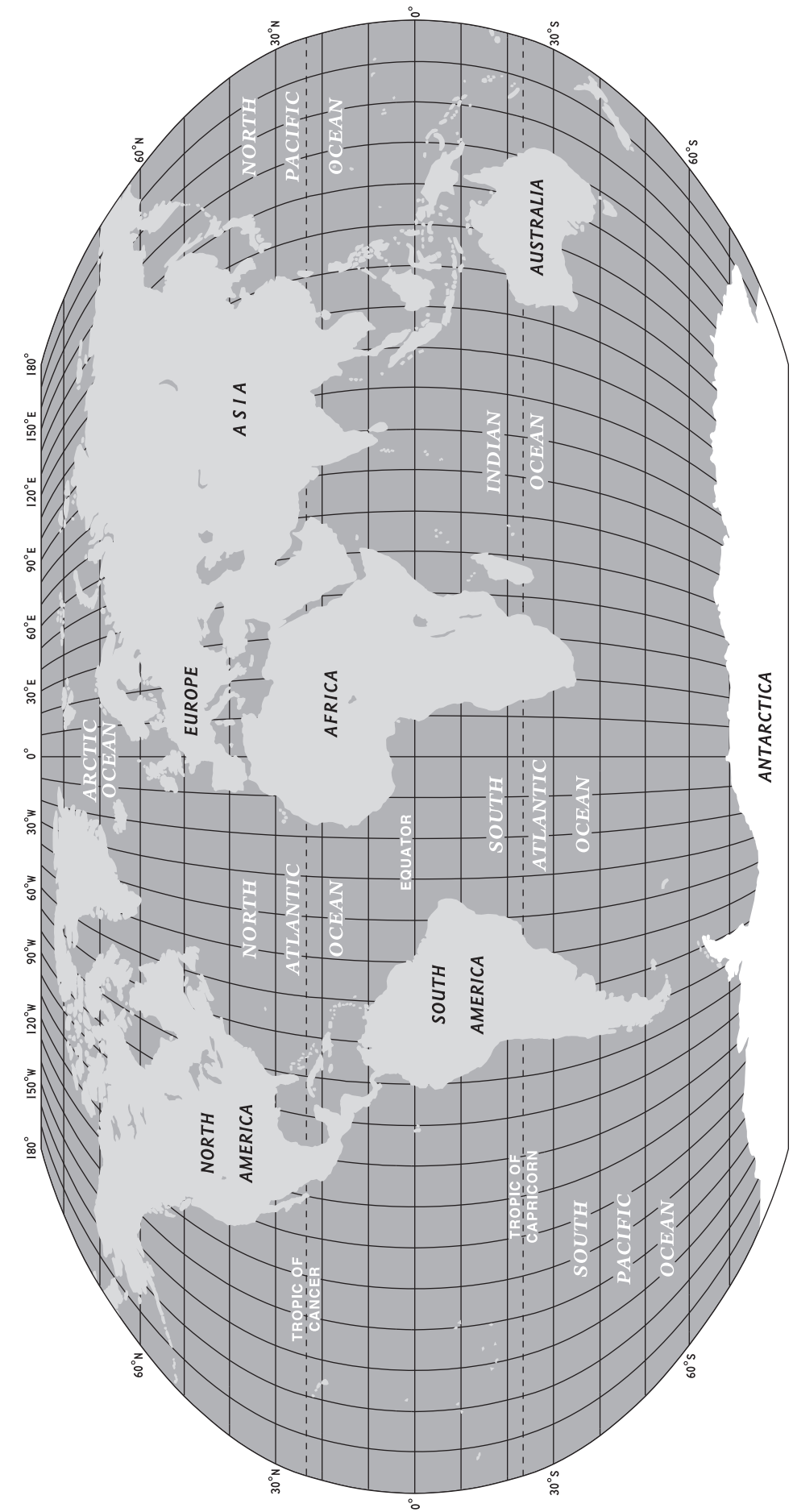
SeaWorld/Busch Gardens ANIMALS
www.swbg-animals.org



Florida Map



World Map



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www.hswri.org

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www.nationalgeographic.com/crittercam

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www.nationalgeographic.com

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www.nationalgeographic.com/xpeditions

SeaWorld/Busch Gardens ANIMALS: Guide to Zoological Park Careers
www.swbg-animals.org/career-resources/info-books/zoo-careers

U.S. Dept. of Agriculture: Natural Resources Conservation Service
www.nrcs.usda.gov

Agencia de Protección Ambiental de EE.UU (Spanish)
www.epa.gov/espanol

Zoo de Madrid (Spanish)
www.zoomadrid.com/index.html

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Videos available through SeaWorld or online at www.swbg-estore.com

Saving a Species: Birds on the Brink

Saving a Species: The Great Apes

Saving a Species: The Manatee Story

Saving a Species: The Sea Turtle Story

Saving a Species: The Shark Story

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