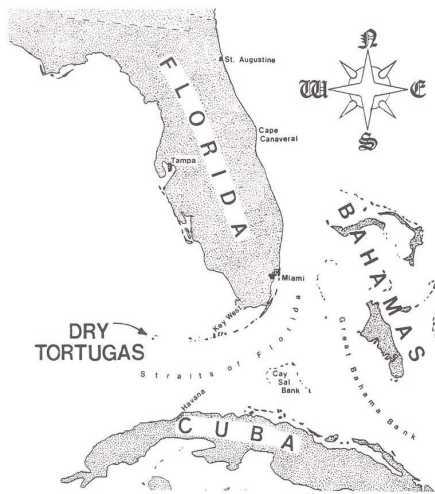

Unit 1 Lesson 1: Introduction to the Dry Tortugas and Sustainable Seas Expedition

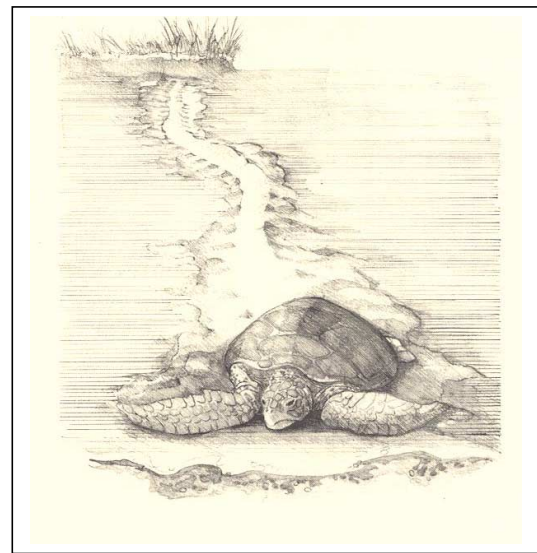
Lesson Objectives:

- Introduce students to the historical, geographic, and ecological importance of the Dry Tortugas.
- Introduce students to the Sustainable Seas Expedition

Vocabulary: Deep Worker, islets, National Marine Sanctuary, Ponce de Leon, shoals



National Park. Of the parks 64,657 acres, 99% is open water and submerged land.



The **Dry Tortugas** are a cluster of ten, low-lying islands located over 140 miles (252 km) from Florida's mainland, and 61 miles (110 km) from Key West. Composed of coral reefs and sand, some of these small islands, or **islets**, are only exposed at high tide, or at certain times of the year. Along with the surrounding **shoals** (shallow waters 12-20 meters deep), the islands compose the Dry Tortugas

Areas surrounding the National Park are further protected because they lie within the limits of the Florida Keys National Marine Sanctuary.

History and Geography of the Dry Tortugas

The Dry Tortugas have historical, geographical, and ecological importance. They have served as a naval base, marine research station, civil war prison, hospital, and bird sanctuary.

The Spanish explorer **Ponce de Leon** discovered the Tortugas in 1513. He named them “Las Tortugas” because of the abundance of turtles he found there. On early nautical charts they were labeled “Dry Tortugas” to indicate they lacked freshwater.



Ft. Jefferson lighthouse. Photo credit: Paula Coble

Although the Tortugas lack freshwater, they do not lack an abundance of elaborate organisms. Waters from the North Atlantic and Gulf of Mexico flow past the islands delivering nutrients and organisms from the Caribbean

basin. This produces an ecologically unique area, providing a breeding ground to several types of marine birds, and exotic marine life.

Hard as it is to imagine today, the Dry Tortugas were once an important naval outpost, defending trade routes between the United States and Cuba, and maintaining a lifeline between trade on the Mississippi River and the eastern U.S. The islets and shoals of the Tortugas represent the last obstacle

faced by ships passing from the Atlantic to the Gulf of Mexico. Fog, severe storms, and treacherous currents have caused nearly 200 shipwrecks, many of which resulted

in total losses.

Two lighthouses were built to keep mariners off the reefs. The first, on Garden Key, was lit in 1826, but it was not adequate. A second, taller lighthouse on Loggerhead Key was lit in 1858. Lighthouses are still standing in both locations.

The Dry Tortugas National Park

The Dry Tortugas National Park, formerly known as the Fort

Jefferson National Monument, was created on October 25, 1992 to

provide increased protection of the marine resources and historic structures.

Located on Garden Key, Fort Jefferson is the largest coastal nineteenth century masonry fort. Work was begun on it in 1846, and although it was used as a fort, it was never fully completed.



With all the shipwrecks, it may be a surprise that the reefs around Garden Key actually provide a good year-round harbor! The outer harbor is large enough to shelter a fleet equal in size to all the navies of Europe in 1830. The deep inner harbor was adequate for the largest warships of the time, and the fort easily protected its narrow entrance.

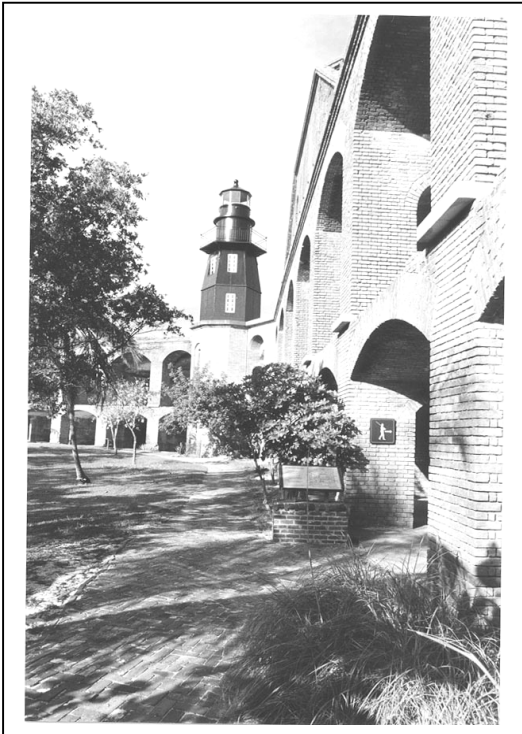
Even before it was a national monument, Dry Tortugas was a bird sanctuary, established in 1908 by the United States federal government to protect

the sooty terns, whose eggs were being over-harvested for human consumption. Between March and September, these birds nest in great numbers on Bush Key. John J. Audubon, the famous ornithologist visited the islands in 1832 to collect exotic species. Because the Tortugas lie on a major flyway between North and South America, an unusual number of migratory species can be observed here during certain seasons. Other birds of interest include brown noddies, frigate birds, masked and brown boobies, and brown pelicans.

In 1904, the Carnegie Institution of Washington established a Marine Biological Laboratory at Tortugas, FL. The pre-fabricated buildings were shipped from New York and assembled on Loggerhead Key to house scientists and support staff. A 70' steamer, the *Anton Dohrn*, was used for research and transportation.

Researchers at the Carnegie Laboratory studied coral reefs and other underwater life using early diving suits. The laboratory was also known for studies of mangrove communities and the

first-ever underwater photographs
- black and white as well as color.

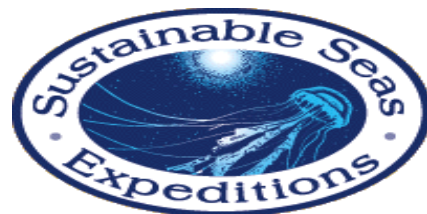


The lab closed around 1940, when microbiology began to dominate large organism biology. A fire destroyed the remaining buildings in 1964.

Scientists still study the coral reef organisms and other fauna surrounding the Dry Tortugas, to understand the fragile ecosystem and learn how to best protect it from pollution, human activities, and other threats.

What is the Sustainable Seas Expedition (SSE)?

In April 1998, an initiative to explore, document and provide

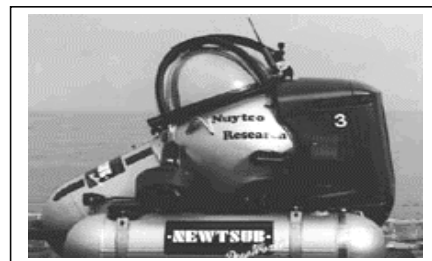


scientists with critical data was launched. This extensive project to gather information on America's coastal waters was named *The Sustainable Seas Expedition*. It is a five-year, \$5 million, multi-agency collaborative. The National Geographic Society, the National and Atmospheric Administration (NOAA), and the Richard and Rhoda Goldman Fund are working together to generate public awareness of deep-water exploration and public education in NOAA's twelve national marine sanctuaries, and coastal waters.

The 12 marine sanctuaries were established to protect, conserve and enhance the **biodiversity**, ecological integrity and cultural legacy of the nation's marine environment. Dr. Sylvia Earle,

National Geographic Society Explorer-in-Residence is the chief scientist of this mission to explore the 12 marine sanctuaries.

One of the primary research tools to be used is a one-person submersible, the **Deep Worker**, which can dive to depths up to 2000 feet. These small, maneuverable submersibles provide more time to explore at depths unattainable using SCUBA (self-contained underwater breathing apparatus). Deep Worker is also small and light enough to be more easily launched from a ship, greatly reducing the cost of the exploration.



Activity 1-1: How do Coral Reefs Protect the Beach?

Background: In tropical regions, scattered islands are fringed with coral reefs. They rise from the ocean floor, and are composed largely of shells, algae and the remains of tiny colonial animals called corals. Some coral reefs form long offshore barriers, others form crescent-shaped reefs and islands arranged in circular patterns.

Coral reefs surround the islands of the Dry Tortugas, and others are also found in some of the other designated National Marine Sanctuaries.

Materials:

Ruler

Water

Rectangular Cake Pan

Play Sand

Gravel

Piece of cardboard about one inch narrower than the cake pan



Procedure:

1. Mold sand near one end of the pan to make an island. You might have to dampen the sand to get it to stick together.
2. Completely surround the island with a wall of gravel.
3. Pour 2 inches of water into the pan.
4. At the end of the pan, away from the island, use the cardboard to make waves in the water. What happens to the sand?
5. Make more waves, what happens to the sand now?
6. Discuss how the gravel protects the island.
7. Remove the gravel, and make more waves. What happens to the sand now?

Explanation:

When the gravel was in place, it kept the sand from being washed away by the waves. When you took the gravel away, the waves washed sand away from the mound. Coral reefs that lie offshore, parallel to the coastline, are called barrier reefs. Barrier reefs in the environment protect beaches in much the same way the gravel protected the sand in the experiment.

Student Information Sheet 1: Introduction to the Dry Tortugas and the Sustainable Seas Expedition

The Dry Tortugas National Park is an island chain located southwest of the Florida mainland in the Gulf of



Mexico. The island chain and surrounding coral reefs and shoals cover approximately 100 square miles. Nearly all of the Dry Tortugas National Park is covered by water. The area is designated as a national park to preserve its natural resources. Popular activities in the park include diving, snorkeling, fishing and bird watching.

Ponce de Leon, the Spanish explorer, discovered the islands and named them *Las Tortugas*, after the large turtles that he found there. On early nautical charts they were labeled “Dry Tortugas” to indicate they lacked freshwater.

The purpose of the Sustainable Seas Expedition (SSE) is to explore the designated National

Marine Sanctuaries, and to utilize a submersible named Deep Worker to study the deep-water environments in these areas. Deep Worker is small and capable of exploring depths up to 2,000 feet. It can dive to depths that are too deep for SCUBA (self-contained underwater breathing apparatus). It is a one-person craft with a clear acrylic dome over the pilot’s head and shoulders. The pilot sits in the warm, dry cabin with a computer touch-screen control system, including mechanical arms, almost as if driving an underwater car. One important goal of the SSE is to excite public interest in the ocean so people will help protect and preserve ocean resources.

