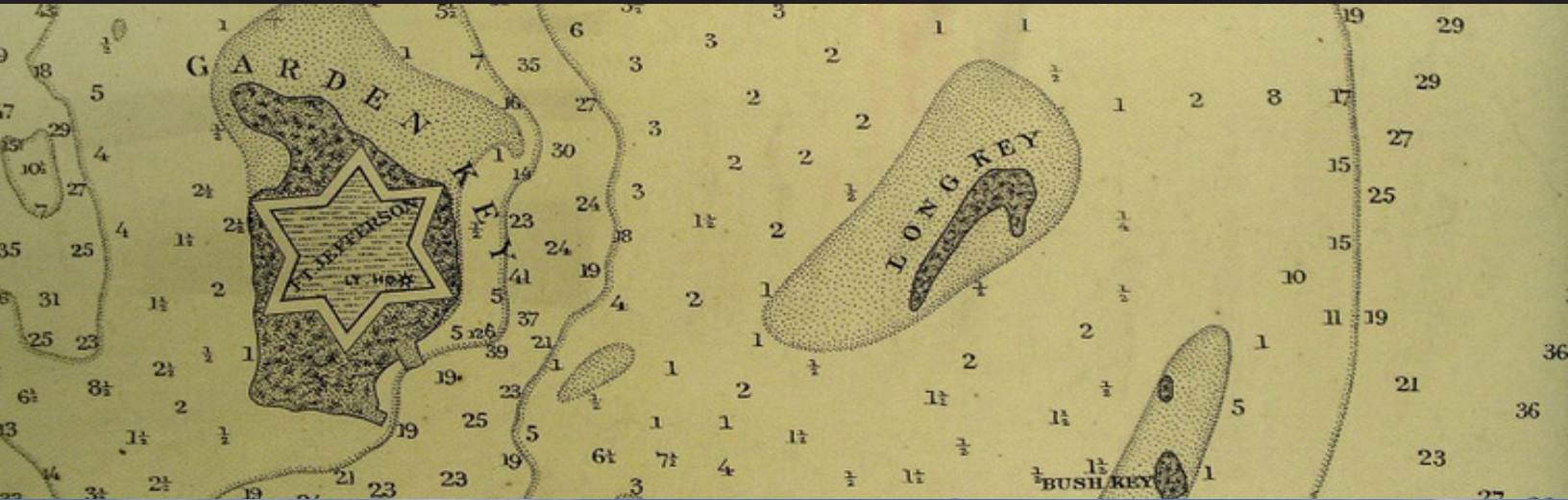


Dry Tortugas National Park

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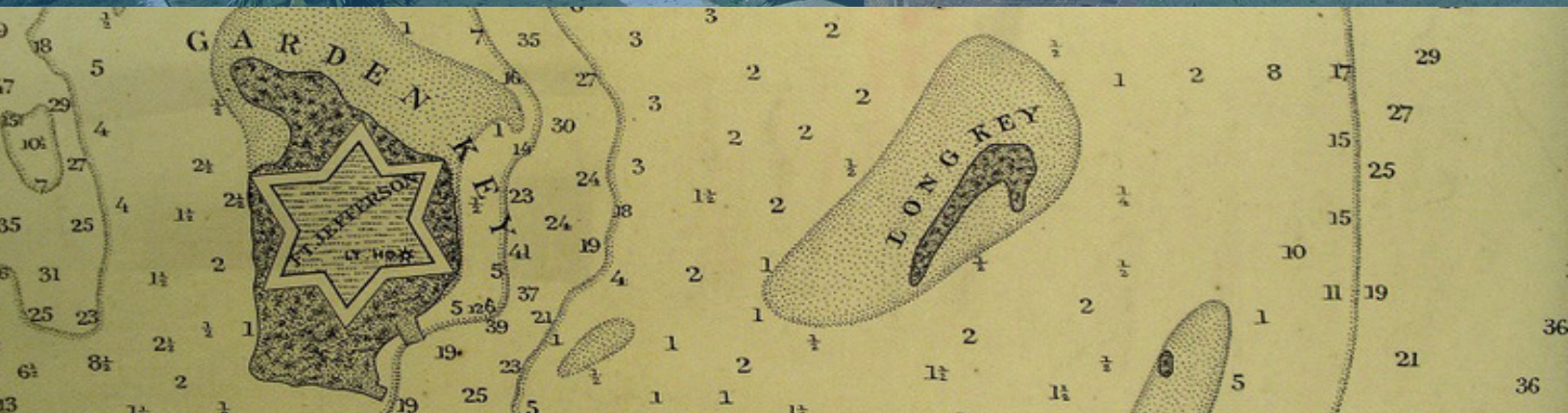
Dry Tortugas National Park
Florida



Activity Guide for Teachers



Dry Tortugas National Park



Acknowledgements



The National Park Service cares for special places saved by the American people so that all may experience our heritage. Learning the stories of our past connects us to that heritage.

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Contents

2-14 Natural History Of The Dry Tortugas

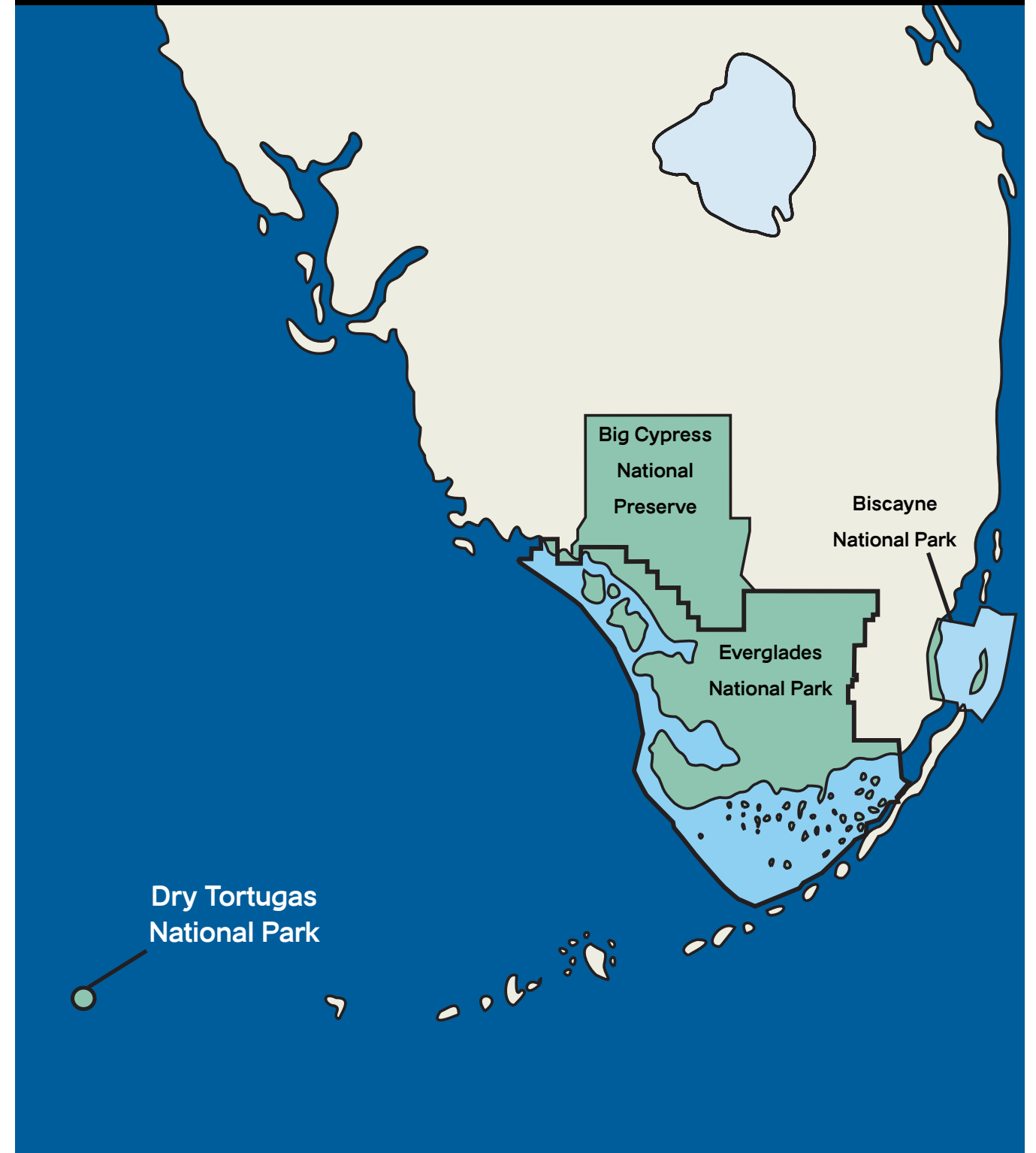
- 3 Geology
- 4 Dry Tortugas Habitats
- 4 Mangrove Forests
- 5 Seagrass Beds
- 5 Coral Reefs
- 6 Vegetation
- 9 Hurricanes
- 10 Birds of the Dry Tortugas
- 12 Sea Life
- 13 Endangered Species
- 14 Conclusion

15-28 Cultural History of the Dry Tortugas

- 17 The Early Explorers
- 17 Shipwrecks
- 19 Pirates and Privateers
- 19 Wreckers
- 20 Lighthouses
- 20 Coastal Defense Forts
- 21 Fort Jefferson
- 21 Construction
- 22 Bricks
- 22 Water
- 22 The War Years
- 23 The Civil War
- 23 Prison
- 24 Yellow Fever
- 25 After the War
- 25 Later Military Activity
- 26 The Tortugas Laboratory
- 27 National Monument
- 27 National Park

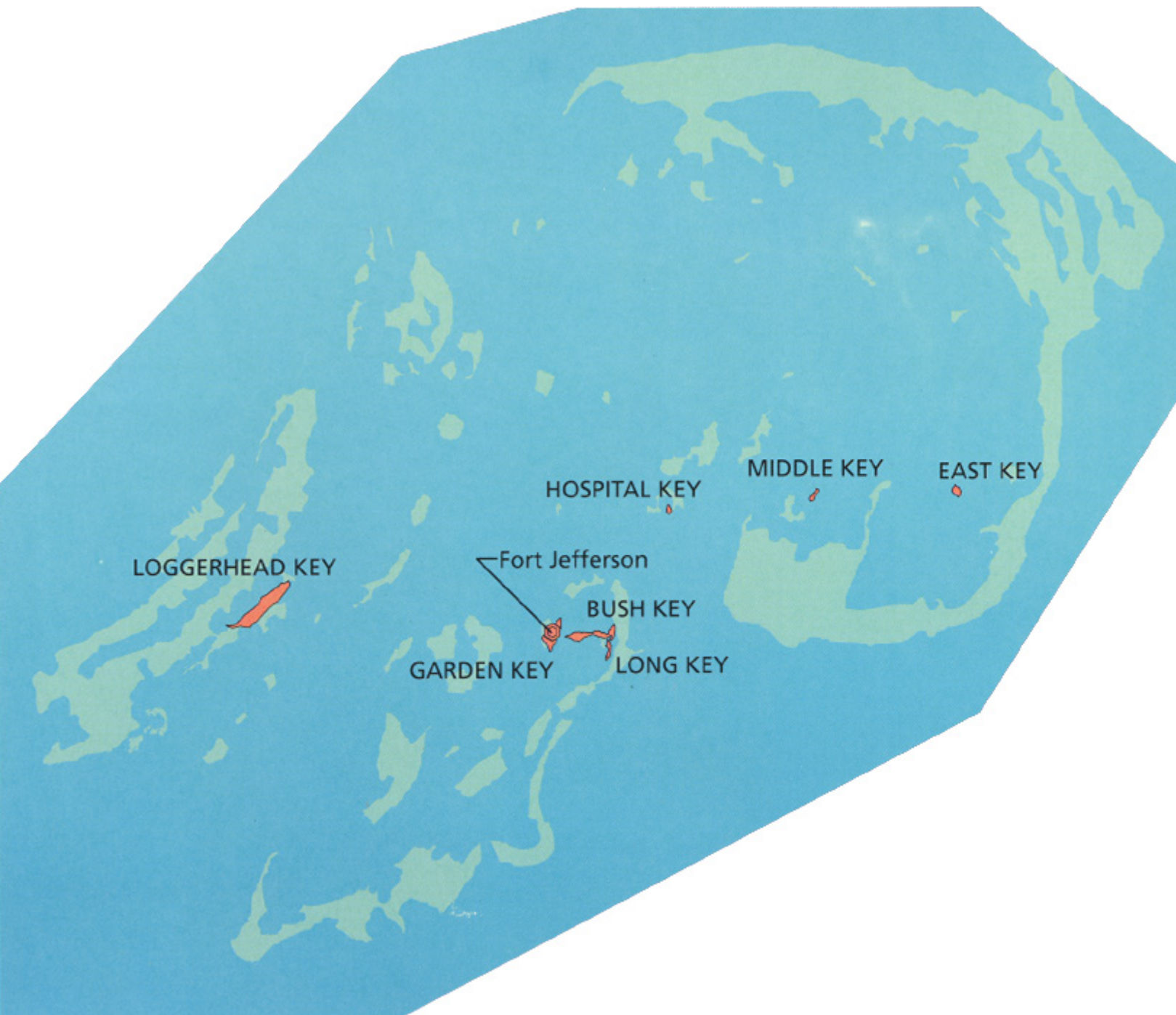
29 Resources

South Florida National Parks



The Dry Tortugas

Natural History



Natural History

2	Natural History Of The Dry Tortugas
3	Seascape
4	Dry Tortugas Habitats
4	Mangrove Forests
5	Seagrass Beds
5	Coral Reefs
6	Vegetation
9	Hurricanes
10	Birds of the Dry Tortugas
12	Sea Life
13	Endangered Species
14	Conclusion



Turtle Hatchling at Garden Key

Seascape

There are seven small islands at the western tip of the Florida Keys, in the Gulf of Mexico, 70 miles from Key West. These islands were discovered and named by the Spanish explorer, Don Juan Ponce de Leon, in 1513. Ponce de Leon and his crew sailed from Puerto Rico in three ships in search of riches and new discoveries for Spain. They first landed on the east coast of Florida where Ponce de Leon claimed the land for Spain and named it La Florida or “place of flowers.” He then sailed down the coast and along the Florida Keys, until he arrived at a group of small islands, marking the west end of the Florida Keys. The islands and waters around them were teeming with a variety of wildlife. He saw large numbers of birds, fish, and sea turtles and named the islands “Las Islas de Tortugas,” (The Islands of Turtles).

South Florida is extremely flat and just barely above sea level. This wide flat area is called the Florida Plateau. The plateau is composed primarily of limestone which is a sedimentary deposit. Limestone forms under warm shallow seas, and is composed of accumulations of shells and other skeletal materials of marine organisms. During the last few million years, this area has changed continually due to widely fluctuating changes in sea levels. The earth over time goes through warming and cooling periods. During cold periods called the Ice Ages, glaciers and the polar ice caps increase in size, locking up huge amounts of water. This causes a drop in sea level because large amounts of freshwater are frozen and, therefore, trapped in the glaciers. When warmer periods return, the glaciers and polar ice caps begin to melt and shrink. This process releases the stored water into the oceans, which causes sea levels to rise. This natural cycle is a gradual process that occurs over thousands or even millions of years, and continues today.

Each time the Florida Plateau was covered by the shallow sea, new layers of limestone were deposited on top of more ancient ones. About 100,000 years ago sea level was about 25 feet above present levels. All of South Florida, including the Dry Tortugas, was underwater, topped by a shallow sea. A cooler climate

20,000 years ago caused the sea level to drop 300 to 400 feet. This drop in sea level doubled the land size of the exposed the entire Florida Plateau as dry land. The Dry Tortugas at that time were no longer islands but a part of the Plateau. During the last 2,000 years,



Fort Jefferson on Garden Key

sea levels have risen only about six feet slowly and steadily. There is growing evidence that the planet is getting warmer at a faster rate and there is growing evidence this is in part due to our use of fossil fuels and their effects on greenhouse gases. This is what is now referred to as climate change.

Today, the seven islands in the Dry Tortugas are composed mostly of calcium carbonate sands, resting on earlier and deeper limestone reefs. South Florida’s rock formations are some of the youngest in the country, dating only to about six million years ago. Ocean currents and storms cause erosion and are active participants in constantly changing the shapes of these islands. The highest of these islands and the largest is Loggerhead Key. It is just seven feet above sea level and covers about 49 acres – that’s approximately the size of 38 football fields.

Habitats

Garden Key is the second largest island in the chain at about 22 acres. This is the current site of a historic structure known as Fort Jefferson and has the longest history of human occupation. The other islands, Long Key, Bush Key, Hospital Key, Middle Key, and East Key, have had the least impact from human occupation. These sandy islands are very important to the plants and animals that use them. Shifting sands have caused some of these islands to wash away. During the winter months, Middle Key usually rises from the sea and then disappears below the surface of the water during summer months. The shallow waters of the Gulf of Mexico surrounding the islands form the rest of the 100 square mile Dry Tortugas National Park.

Dry Tortugas National Park is home to the following habitats: sandy islands and salt water communities, which include the mangrove forest, seagrass beds, and coral reefs. All land plants that grow here must be adapted to salt or be salt tolerant in order to survive

in the subtropical heat and salty air. While the number of habitats is limited, there is an abundance of wildlife at the park. Upon his discovery, Ponce de Leon described the area as a place with large numbers of birds, sea turtles, fish, and seals. This was good news for the famed explorer and his crew since there were no grocery stores for explorers and they had to find food and water as they travelled.

The two largest islands, Loggerhead Key and Garden Key have more vegetation than the five smaller ones. Garden Key gets some protection from storms and salt spray by being completely surrounded by a moat, which reduces wave action. In addition to the moat, there is added protection from the 405-foot high walls of Fort Jefferson, which shelters the 10 acre parade ground. Several types of introduced tropical and sub-tropical trees provide habitat and shade for birds both inside the parade ground and outside the fort walls.

Mangrove Forest

The mangrove forest at the Dry Tortugas is primarily located on Long Key and consists mostly of red mangroves growing on the outer edges of the rocks. These trees can tolerate extremely salty conditions and grow in almost impenetrable thickets. They can grow in shallow sea water up to approximately three feet deep and produce multiple, curved prop roots from the trunk and branches. The prop roots have numerous pores that provide oxygen for the submerged roots and also allow for the elimination of excess salts. The red mangrove seed, also known as a propagule, are cigar or pencil-shaped and may be up to a foot in length. This seed, with its waxy flowers can germinate and begin to grow while still on the tree. When the seedling ripens, it falls from the tree and either lands on the soft bottom sand or is carried away by tides and currents. The propagule is buoyant and tends to bob vertically in the water for months until it becomes embedded in a shallow sandy area. It then begins to develop prop roots and eventually grows into a large tree or tree island.

The mangroves provide a primary nesting habitat for birds such as the Magnificent Frigate bird. Tree leaves also fall into the water, decompose, and provide nutrients for simple organisms like bacteria, fungi, protozoan, or nematodes. These, in turn, provide food for the higher animals on the food chain, such as fish, shrimp, lobster, and snails. Some of these animals provide food for larger predators, such as sharks, tarpon, and other large fish. This habitat is also a valuable nursery ground for shrimp, fishes, crabs, and a myriad of other marine life by providing relatively safe cover and food for their young.

Seagrass Beds

Seagrass beds are common throughout the Dry Tortugas. These grass beds grow in clear shallow water and play a significant role in the balance of the park's ecology. Composed of grasses, algae, and sponges they provide nursery areas and cover for shrimp, conch, lobster, and many different species of fish. Seagrasses,

such as turtle grass, form mats of vegetation along the sea floor and stabilize the bottom with its roots and rhizomes much like land grasses impede soil erosion on land.

Mangrove Roots



Turtle grass is a flowering plant with wide leaves that is home to many species of algae. Animals such as the green sea turtle and fish feed directly on the grass. Many other small animals feed on the algae which may then be eaten by larger animals in the food chain. Decomposed organic material in the sea beds is eaten by shrimp, lobsters, crabs, mollusks, and conch.

Coral Reefs

The sandy islands of the Dry Tortugas rest on older reef formations where living coral reefs are still growing today. Hard corals are the reef builders. Coral reefs are composed of living animals, called polyps, which attach to the sea bottom to form colonies, and secrete calcium carbonate. Single-celled algae live in the polyps. The algae produce oxygen through photosynthesis, which is used by the coral to rid itself of carbon dioxide, a waste product. Over time, reefs are built and formed one layer at a time into massive coral heads. Hard

Dry Tortugas from Space Station



Vegetation

corals extend their tentacles at night to feed so they are not usually visible during the daytime. Some of the common hard corals are the brain coral and star coral.

Soft corals form branching colonies and are flexible. They orient themselves in the current to get the best feeding position as food floats past them. Because of their feathery appearance and manner in which they sway in the current soft corals are often confused for plants. Common soft corals are sea whips, sea fans, sea feathers, and sea plumes. Both hard and soft corals feed on organic material and plankton.

These colorful coral reefs provide habitat for a wide variety of plants and animals. They provide hollow spaces for fish and animals to use as shelter and protection. The reef is also very diverse providing food for all levels of the food chain from algae and worms to the top feeders in the food chain including barracuda, sharks, and humans. Common reef fish seen in the Dry

Tortugas are snapper, grouper, angelfish, blue tang, sergeant majors, parrotfish, porgies, squirrelfish, and grunts.

Coral reefs are very fragile and even a light touch from swimmers can damage the reefs. Boat collision and throwing anchors in the coral can cause extreme damage to this crucial habitat. Strict regulations are enforced to protect them in the park.

Buttonwood Tree

This tree can grow up to 40 feet tall and features clusters of button-like fruit. Buttonwoods are common throughout the parade ground and the campground. This resilient tree can withstand high winds, salty air, wet or dry seasons, and full sun or partial shade. The wood of this tree has been used for cabinetwork, charcoal making, and firewood and is considered ideal for smoking meats and fish. If the tree is toppled over by a storm, it may continue to grow on its side with

branches growing up from the trunk. This serves as an excellent adaptation against South Florida's hurricanes and/or high wind storms.

Gumbo Limbo Tree

This unusual tree, nicknamed the "tourist tree" gets its name from its flaky red bark, which often resembles the reddish peeling skin of unsuspecting Florida tourists. The Gumbo Limbo tree has special green bark that can transform sunlight in to energy through a process known as photosynthesis. Most trees can only accomplish this through their green leaves. The red peeling bark prevents animals and other plants from growing on its weak branches. It is a tropical tree that can be found throughout South Florida, the Caribbean, Central America, and northern South America. Throughout time, this tree has been used for a multitude of ailments including: stomachaches, snake bites, strains, swelling, wounds, yellow fever, and many others. The gumbo limbo when blown down by hurricanes or strong winds can sprout from broken limbs and grow again. A broken limb can be placed along a fence line where it will begin to grow as a living fence post, which is why it is also known as the fence post tree.

Geiger Tree

This tree is usually small, growing up to 20 feet tall and is a very hardy tree in the marine environment. The clusters of beautiful, trumpet-shaped red or orange flowers are apparent throughout most of the year and serve as a major nectar source for migrating Ruby-throated Hummingbirds. The large dark green leaves of the Geiger tree are usually compared to sandpaper due to its rough texture.

Coconut Palm

The origin of the coconut palm in South Florida is still being debated. It was not found on the Atlantic coast at the time of European explorations, but today is found worldwide on tropical beaches. This tree's usefulness cannot be underestimated. The coconut, which can at once be described as a fruit, nut, or seed is filled with

a drinkable liquid known as coconut milk. In addition, the "meat" of the nut is frequently eaten raw or used to prepare food. The extracted oil is used in a variety of foods including margarine and ice cream. After the oil is extracted, the left-over coconut makes a very good

Gumbo Limbo Tree



food for livestock. Today, oil from the nut is also used in shampoo, soap, synthetic rubber, plastics, cosmetics, as well as many home remedies. The palm fronds are used for everything from thatched roofs, to baskets and fish traps. Today Coconut Palms are often used as landscaping throughout South Florida. During the last 10 years, many of the palms in the Dry Tortugas have taken a beating from hurricanes and few remain.

Sea Grape Tree

This is a drought and salt resistant tree, which can grow up to 50 feet in height, but also may behave more like a shrub depending on growing conditions. The leaves are very large and round, often 10 inches across. When dried out, these leaves are sometimes used as paper and sent as post cards. When the green fruits on the

Buttonwood Tree





tree turn purple, they become edible. The salt tolerant seeds float and are widely dispersed throughout the Caribbean.

Seaside Mahoe

The Seaside Mahoe is another large tree growing within the parade ground. It is not a native tree to the area but provides shelter and shade for animals and humans. It grows to a height of about 60 feet and has large heart shaped leaves. Migrating birds feed on the numerous insects that feed there. In turn, many of the migrating warblers can be found searching out bugs amidst the branches.

Cactus

There have been two recorded species of cactus growing on Garden Key since the early 1900's. Prickly

Pear and Apple Cactus were both introduced, and continue to grow on the parade ground today. They both have delicious edible fruit, and it is easy to speculate that this was one of the primary reasons for their introduction. It can also be noted that many species of plants on the parade ground were introduced to alleviate the barren isolated feeling.

Apple Cactus is a large erect thorny columnar cactus growing up to 30 feet. The stems are segmented and multi-lobed. Fruits ripen to a soft red color and often split open while still on the plant.

Prickly Pear is an erect or sprawling shrub with flat circular thorny pads, up to 7 feet in height, producing yellow to red flowers in the spring and summer, followed by purplish-red fruits. Numerous drought tolerant, exotic cacti can also be found in the parade ground of the fort. Some are quite large and stately.

Hurricanes



Bay Lavender

Bay lavender is a sprawling shrub that can reach heights of two to five feet and grows well on sand and exposed rock just above the wave action. The plant has grey leaves and white bell-shaped flowers that are produced year-round. It grows in spreading clumps and binds the sand together making it a very effective at controlling shoreline erosion.

Sea Purslane

This plant, also known as sea pickle, is a perennial herb and an early colonizer along sand and gravel beaches. It spreads across the sand or rocks forming extensive mats as it sends down roots, helping to build dunes by catching sand in between the stems and leaves. Even if it is eliminated during storms, it will regenerate from rhizomes (root fragments) and seeds buried in the sand. Land crabs living on the beach use it as a food source. The fleshy stems and roots are edible and have a salty taste.

Sea Oats

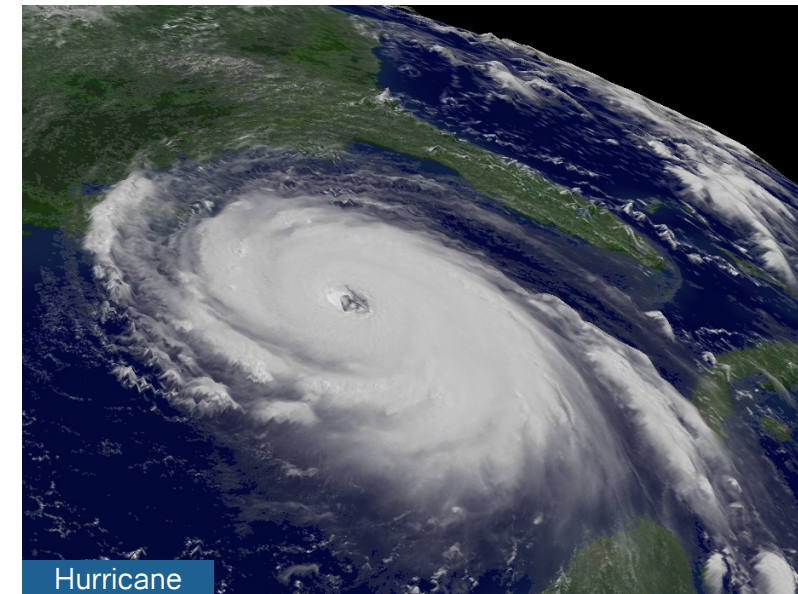
Growing on most of the islands, this grass reaches heights of six feet and ends in clusters of long, showy, yellowish seed heads. With its extensive system of underground stems and roots and ability to regenerate from rhizomes, it serves as another significant plant in preventing erosion of sandy beaches. Since these plants grow in clumps, they tend to trap sand aiding in the building of sand dunes.

Hurricanes

This natural disturbance is a key player in shaping the islands' reefs and sandy beaches. Tropical plants and animals have evolved to endure the high winds and rough sea conditions.

Individual plants and animals have developed ways to survive or regenerate. For example, gumbo limbo, buttonwood, and sea grape trees can be blown down or lose limbs and still continue to grow. Mangroves protect the beaches and shorelines with their thick wind

and wave blocking barriers; they usually grow back quickly after storms. Severe storms can cause more damage and a longer recovery, but nature is patient and resilient, it is not on a time clock.



The Dry Tortugas has about a 15 percent chance of being affected by a hurricane each year. In 1998, the park took a direct hit from Hurricane Georges with winds recorded at over 100 mph. Since then, the park has been struck by five more hurricanes.

During these hurricanes, park employees usually stay at the park inside of Fort Jefferson. The fort has generators for electricity and the capability to produce and store its own freshwater. The large masonry huge brick structure has reinforced powder magazine rooms that serve as excellent hurricane shelters for the staff and provides a safe harbor for people.

Birds

Over 200 species of birds have been documented in the park with vast numbers of birds migrating through the park in the spring and fall. Dry Tortugas is located in the flyways between the United States, the West



Birds

Indies, Cuba, Central and South America. These birds are visitors on their way to their summer or winter range.

March and April are the busy season for spring migration, with most of the birds headed north. The storms in the spring cause the birds passing by to seek refuge on the islands. Generally the worse the weather is, the more birds seek refuge or “fall out” on the islands. Many different species of birds may show up during these migrations. There are colorful warblers, vireos, and buntings, along with larger terns, gulls, and herons. Also present are several species of hawks, falcons, and kestrels. Even small hummingbirds show up as they pass through the Gulf of Mexico. People come from all over the world to see these migrations. Some of the species seen here are rare sightings in the United States.

Of the spring and fall migration periods, it is the spring that attracts the largest number of birds and bird watchers. Migrating from their ranges to the south, hundreds of species stop in at the Dry Tortugas to

seek shelter and rest, a vast rest area on the migratory route. March and April are the prime months for this migration. Following this migration are larger raptors seeking meals, including, Merlin's, Peregrine Falcons, Sharp-shinned, and Broad-winged Hawks. Aiding to the “fall out” of bird species are strong cold weather fronts that push even more varieties of birds to the Dry Tortugas during this time.

The fall migration takes place over a longer period of time, usually from about July to November. The birds during this season are headed to their southern ranges. Large concentrations of birds are not seen during this season compared to the spring migration. This is, however, the time when large numbers of raptors may be seen.

The habitat for breeding bird species in the park is limited. Therefore, only a few species of birds nest in the park. Some of these species, however, do nest in large numbers.

Sooty Tern

The Sooty Tern is the most noticeable nesting bird and may number up into the thousands. Bush Key is its only known nesting site in the entire continental United States. Every year, beginning in December, the birds come to the island. Their cry, which sounds like “wide awake, wide awake,” is heard at night as they fly overhead. Their numbers continue to build up until February when they begin to land on the island and nest. These birds lay their eggs on the ground. After the eggs hatch, the male and female parents take turns tending to the chicks and bringing food from the sea sometimes as far as from 50 miles away.

The Sooty Terns historically nested on a small sandy island southwest of Garden Key. This key was named Bird Key and washed away in the 1930's. The terns then moved their nesting site to Bush Key.

When the Sooty Terns are in the park, their cry is loud and continuous, as they fly back and forth from the sea to the island. When the young birds are able to fly, the colony begins to leave, and usually all the birds are gone by August. When they leave, they will spend the next four or five months flying over the ocean non-stop. They have the amazing ability to feed while they fly and will do this in the Caribbean Seas and the Atlantic Ocean off the coast of West Africa.

Brown Noddy

Several other interesting birds nest in the Dry Tortugas. The Brown Noddy nests on Bush Key, but in much smaller numbers than the Sooty Terns. Brown Noddies build nests in the bushes and mangrove trees and arrive at the park at about the same time as the Sooty Terns, but stay longer. These may be easily recognizable by their characteristic nodding heads.

Magnificent Frigatebird

The Magnificent Frigatebird is a large black bird with a seven foot wing span that is commonly seen soaring above the fort walls and around the islands. The males

are solid black and have an interesting red breast pouch that can be puffed out to the size of a football in order to attract females. The females are all black with a white breast patch. The frigate bird, also called a Man-o'-War bird, gets its name from a class of sailing

Magnificent Frigatebird



warship that was used primarily to sail on its own great distances and raid other ships. The birds themselves have a reputation for stealing food and nesting material from other birds, hence connection to the warship of days gone by. The frigatebird nests on Long Key and Bush Key in the mangroves. This island is one of the few places in the US where they maintain a year round nesting presence it may possibly be the only site left in the Continental United States where they nest.

Masked Booby

There are two species of Booby birds that inhabit the Dry Tortugas, the Masked and Brown Boobies. Booby birds get their name from the Spanish word “Bobo” which means clownish or foolish. They got this name because of their clumsy nature on land, and the ease at which Spanish sailors were able to capture them.

Sooty Tern



Sea Life

The Masked Booby is special at the Dry Tortugas because it nests on Hospital Key. As the name implies, this large white seabird has what appears to be a black facial mask. The Masked Booby is another year round resident and lays its eggs in the sand on the barren small island of Hospital Key. Some of the other birds that may be found nesting in the park are Pelicans, Roseate Terns, and Mourning Doves.

Turtles

The endangered hawksbill turtle, leatherback turtle, and green turtle frequent the waters around the Dry Tortugas. The threatened loggerhead turtle is also a common visitor to the park. Presently, the green turtles and loggerhead turtles nest on the islands.

The female turtles come ashore on the sandy beaches at night between April and September to lay their clutches of eggs. Amazingly, the females that hatch from those clutches will return to that very same area

to lay their eggs when they mature. Between the two species they have about 220 nests a year with 100 to 120 eggs for each nest. Loggerhead's nests are the most common.

Even with several thousand hatchlings a year, the survival rate is very low. The baby turtles have to get past birds, crabs and other predators to get to the sea, where they encounter another threat, large hungry fish.

The loggerhead is the larger of the two turtles weighing as much as 450 pounds.

Sea turtles are protected in the United States, but do not have that protection in other countries where they are still being harvested for food.

Fish

About 300 species of fish are associated with excellent habitat found in and around coral reefs. Many of these tropical reef fishes display amazing color combinations.

A few of these are the angelfish, blue tangs, sergeant majors, squirrelfish, porgies, and grunts.

The colorful parrotfish are equipped with strong jaws. They actually chew up the reef to have a tasty meal from the algae embedded in it. Swimmers and divers can actually hear them biting into the coral when they are feeding. The coral is digested and comes back to the reef as sand.

Larger fish in and around the reef are tarpon, grouper, yellowtail snapper, nurse sharks, and barracuda. Reef sharks, hammerhead sharks, and black tipped sharks cruise through the area in search of food.

Invertebrates

One group of invertebrates at the park is the arthropods. They have jointed legs and a hard outer skeleton. This group is divided into crustaceans, arachnids and insects. Some of the important crustaceans in the park are the lobsters, shrimp and crabs.

Lobsters are important to people for food as well as a part of their natural cycle in nature. Since the lobsters within Dry Tortugas National Park are protected, they are more numerous and larger than lobsters in other parts of the Florida Keys. The Florida Spiny Lobster, unlike the Maine Lobster, has no claws. Their population is spread by larvae floating in the ocean currents.

Shrimp are also common in and around the Dry Tortugas. They are actively harvested outside the park boundary. The shrimp replenish their numbers by laying eggs which float in the currents. They find protection in the shallow water of the mangroves and other vegetation until they are large enough to move into open water.

Another arthropod, the hermit crab, is common in the park. These animals are not true crabs and are more closely related to scorpions. They have a soft abdomen and no shell so they live in empty shells for protection. As they outgrow their shell, they discard it and move into a larger shell.

The conch, now a protected species in Florida, is making a comeback from overfishing in Florida and the park. It is a marine snail rather than a crustacean.

Hermit Crab



The Queen Conch is prized as a beautiful pink and white shell. They are mostly plant eaters and move with a claw-like foot. They are eaten by the loggerhead turtle. The turtle has powerful jaws and can crush the shell to get to the conch.

Humans are the biggest threat to the conch because they use them to make tasty salads, fritters, and chowders. Most of the conch sold in the Florida Keys comes from other countries such as Jamaica.

Seals

When Ponce de Leon discovered the islands in 1513, he found seals living on the islands. These seals were easily taken for food by his crew and others that sailed in the area. What they were feasting on was the Caribbean monk seal, which was last sighted in the Dry Tortugas area in 1908. The last sighting anywhere was in 1952. Sadly, the species was declared extinct in 1996.

Masked Booby



Conclusion

Dry Tortugas National Park provides a 100-square mile area of protection for the plants and animals living there. In addition, the park is surrounded by the Florida Keys National Marine Sanctuary which provides an additional layer of regulations. The area serves as a beautiful living example of natural and cultural diversity. Despite, this level of protection there are still many threats to the wildlife and plants.

Many of the animals don't stay in the park year-round. Sea turtles roam the open sea and are still harvested for food in many countries. Pelagic sea birds fly over the world's oceans, from the Tortugas to the coast of Africa. Fish, marine mammals, and migratory birds travel through the park between North America, Central and South America, and the Caribbean. Other places have few or no regulations to protect these animals from many different threats.

Within the park, water can affect plants and coral reef systems. Currents bring water into the park after it has washed off of farmlands treated with pesticides and herbicides. Oil spills and garbage can be carried into the park through currents. Even climate change with its temperature variation will affect the coral reefs and the life depending on it.

The world was a bigger place when Ponce de Leon discovered the Dry Tortugas in 1513. At that time, there were about 425 million people on the entire planet. Today, our numbers have grown to over 7 billion.

The following species are listed as endangered in Dry Tortugas National Park:

- Hawksbill Turtle
- Green Turtle
- Leatherback turtle
- Atlantic Ridley Turtle

The following species are listed as threatened in Dry Tortugas National Park:

- Loggerhead Turtle
- Arctic Peregrine Falcon
- Piping Plover
- Roseate Tern

These animals are listed on the federal endangered species list. The state list may vary and both lists may change as they are updated.

Cultural History



View from Fort Jefferson



Cultural History

15-28 Cultural History of the Dry Tortugas

- 17 The Early Explorers
- 17 Shipwrecks
- 19 Pirates and Privateers
- 19 Wreckers
- 20 Lighthouses
- 20 Coastal Defense Forts
- 21 Fort Jefferson
- 21 Construction
- 22 Bricks
- 22 Water
- 22 The War Years
- 23 The Civil War
- 23 Prison
- 24 Yellow Fever
- 25 After the War
- 25 Later Military Activity
- 26 The Tortugas Laboratory
- 27 National Monument
- 27 National Park

The Early Explorers

The Early Explorers

The late 1400s and early 1500s was a period of exploration by Europeans of the New World. Ships from Spain, Great Britain, Portugal, France, Italy, and other countries were sent on voyages of discovery to the New World. They were seeking land for new empires, riches in the form of precious metals, and other regions to spread their religion.

An Italian, Amerigo Vespucci, sailing for Spain, landed in South America in 1497. In 1513, sixteen years later, Vasco de Balboa landed on the east side of Panama and walked across the land to discover the Pacific Ocean. So it was just a matter of time before someone stumbled upon the small islands now called the Dry Tortugas. When Ponce de Leon discovered and named the islands, he also discovered the Gulf Stream. The Gulf Stream is a fast moving current running through the Straits of Florida between the Florida Keys and Cuba. It moves east along the Florida Keys and follows the east coast of the United States, gradually turning again to the east. This fast moving current was used by European sailing ships to increase their speed on their return to Europe.

The early sailing ships were subject to wind and weather and sailed at night with only starlight or the moon to guide them. As a result of these conditions, they often ran aground in the shallow waters of the Florida Keys and the Dry Tortugas. Large treasure

Shipwreck



Shipwrecks

The islands of the Tortugas saw limited activity for the next 300 years. Ship traffic gradually increased as the Europeans colonized most of the islands in the Caribbean, Cuba, and parts of North and South America. Mariners would stop at the islands to seek shelter from storms. They would also collect turtle and bird eggs for food, as well as birds, sea turtles, seals, fish, and other animals for meat.

In the early days, charts were inaccurate, or did not exist, and navigation equipment was limited. Even under good conditions, the Florida Keys and reefs were a challenge for mariners. Ships began taking cargo and supplies to various ports from Cuba to Central and South America. They also began taking ships loaded with treasure through the Florida Straits along the Florida Keys and back to Europe.

fleets began taking their valuable cargo to Europe from South America through the Straits of Florida. One well documented disaster occurred in 1622 when a treasure fleet left Havana for Spain. The ships were caught in a hurricane causing six ships to sink, including three heavily loaded with treasure. The "Nuestra Señora de Rosario" crashed into the reefs in the Dry Tortugas. A search expedition found the remains of the ship and rescued the crew and passengers. They also recovered the treasure from the shallow water.

Coaling Docks Warehouse





Two other treasure ships sank nearby. The “Santa Margarita,” which was partially recovered on later expeditions and the third ship, “Nuestra Señora de Atocha,” went undiscovered until 1985 when Mel Fisher chanced upon it. Ships continued to run aground on the islands and reefs of the Dry Tortugas. There are over 250 documented shipwrecks in the Dry Tortugas.

The Dry Tortugas became well known islands as a landmark for passing vessels. They are the first islands

seen coming from the Gulf of Mexico heading to the Florida Keys. They are a marker for those ships sailing between Cuba and the Gulf Coast. Early charts for the Tortugas were modified adding “Dry” to Tortugas, to inform travelers there was no freshwater there.

Florida, the Dry Tortugas, and Cuba were under the Spanish flag until the mid-1700s. The French held the Louisiana territory along the Gulf Coast. The British claimed the east coast.

Wreckers



Pirates and Privateers

Privateers operated in the Straits of Florida. These privately owned and equipped war ships were commissioned by their governments to attack their enemy during wartime and take their goods. When the countries were not at war the privateers were out of a job and often became self-employed pirates.

During the 1600s and 1700s, the Spanish treasure ships sailed together with warships for protection. These, flotillas, as they were called were attractive prizes for English, French, and Dutch privateers and pirates. The Florida Straits between Cuba and the Florida Keys was a narrow and heavily used corridor. It was an excellent place to find passing ships. Many a famous pirates sailed and plundered the area within the Florida Straits. The famous commander of the Dutch Privateer Fleet, Admiral Piet Heyn often waited for treasure ships at the Dry Tortugas.

During the Revolutionary War, American privateers continued to patrol, attack, and capture British ships. Pirate activity increased rapidly following the War of 1812, between the United States and Britain. As military seamen lost their jobs, many turned to piracy. Pirate numbers grew rapidly, and by 1822 an estimated 3,000 piracies had occurred in an eight-year period, in and around the Florida Straits. Congress authorized the president to send a naval force to the West Indies to attack the pirates in that area, but the pirates had much smaller and faster ships and usually escaped capture.

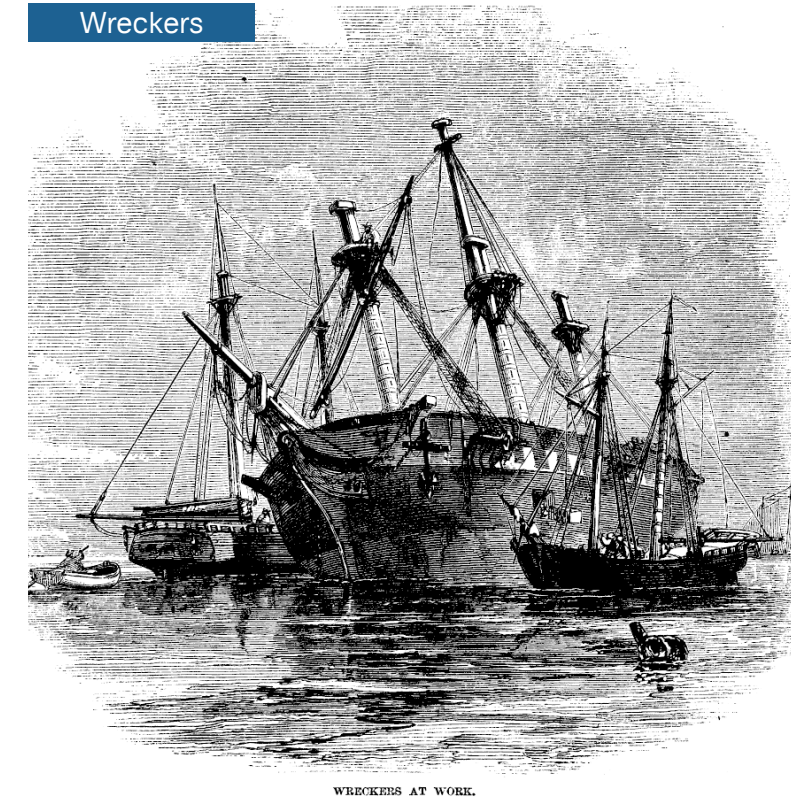
The United States put a war hero from the War of 1812, Captain David Porter, in charge of the squadron. He used small shallow draft vessels similar to those used by the pirates and spread his antipiracy ships around the Caribbean; gradually piracy was reduced in the region.

Wreckers

The Dry Tortugas and the Florida Keys have a long history of grounding and sinking ships. Those people who make a living salvaging and recovering cargo are

called “wreckers.” The earliest known wreckers were the Native Americans living in the keys. They were good swimmers and divers and were often hired by the Spanish to recover goods from their sunken ships.

Wreckers



As time passed, wrecking became a controlled business enterprise. Wreckers would watch and wait for ships to run aground or sink. A federal court was established to regulate this activity in Key West. The first to arrive at a disabled vessel, if granted permission by the captain of the vessel in distress, was in charge of recovery and supervision of the site. The salvage fee was determined by the court. Often wreckers would stay at the Dry Tortugas, fishing and passing the time, until a ship would run aground. Wrecking was a profitable business and for a time was partly responsible for making Key West the richest city per capita in the United States.

Civil War Era Reenactment



Lighthouses

Lighthouses

Spain sold Florida to the United States for five million dollars in 1821. Once Florida and the Florida Keys were part of the United States, the U.S. Lighthouse Service began building lighthouses along the coast to prevent groundings. The first lighthouse constructed in the Dry Tortugas was on Garden Key, made of brick and mortar, it stood at 70 feet tall. A house was also built for the caretaker of the lighthouse, these were the first permanent structures built in the Dry Tortugas. The keeper's house burned down in later years, after the fort had been constructed around it.

Wrecks continued to occur in the Dry Tortugas. Congress appropriated money for a second lighthouse on Loggerhead Key and it was finished in 1857. This lighthouse was much larger and taller. The brick walls were 8 feet thick at the base and it rose to a height of 152 feet. A two-story house was built for the lighthouse

keeper and his family. There was also a separate machine room and a two-story kitchen. The lighthouse keeper's house burned down in 1945.

The Loggerhead lighthouse is still in operation today and has been equipped with solar panels that provide it with power. The last lighthouse built on the Tortugas was after Fort Jefferson had been constructed. A lighthouse made of iron was constructed on top of the southeast bastion of Fort Jefferson. It was designated a harbor light and is 75 feet tall.

Coastal Defense Forts

After the Revolutionary War, the United States recognized a need for a nationalized defense for its coastal harbors and cities. The first forts were generally made of wood-and-dirt and were not very strong. Learning as they went, masonry-and-dirt replaced the former construction style and proved to be much

Fort Jefferson

stronger. These forts were built between 1794 and 1807, and were referred to as "First System" forts.

The next period was that of the "Second System" forts, and showed much improvement. These were built between 1810 and 1812. A number of these forts were built entirely of masonry, making them much stronger than the rest. Arched walls were constructed for the gunrooms or casemates.

Following the War of 1812, when the British burned Washington, D.C., and landed along our coastline, the importance of defense forts became a serious goal. Engineers designed a new type of fortification to build along the United States Coast. Although these forts would be of different sizes and shapes, they would follow the same type of design to defend against artillery attack. These new brick and mortar forts were designed with arch type construction and were known as the "Third System" forts. These forts were built between 1816 and 1867. There were 43 of these forts built along the coast from Maine to Mississippi, with two in California.

Fort Jefferson

The Dry Tortugas was studied as a possible location for a coastal defense fort in 1829 by Commodore John Rodgers. He was impressed with its location for a fort, being directly in the path of all vessels traveling through the Mississippi River, west Florida, and all the eastern coastal states. This strategic location would provide good anchorage and a protected harbor with waters deep enough for warships to traverse.

While the British, Spanish, and French had fortified colonies in the Caribbean, this fort could be the first line of defense against vessels headed to the United States coast. From this location, ships from Spanish and British ports in the Caribbean could be deterred. Louisiana had been purchased by the United States in 1803 and settlers were moving into the area of the Mississippi. Their trade goods could be shipped more safely by boat past the Tortugas around Florida

and up the east coast. It was also noted in reports from Commodore Rodgers that a fort located here could keep enough fresh water, supplies, and coal for warships for a year.

Fort Jefferson



President John Tyler signed the first appropriations bill to begin fort construction in 1844. The fort was to be built on Garden Key and was proclaimed a military reservation. The fort was designed by Joseph Totten, the Chief Engineer for the U.S. Army Corp of Engineers. The design made the fort an elongated hexagon with three tiers of guns, located in the 45-foot high walls. This ambitious plan called for 2,000 brick arches, room for 450 guns, and the ability to hold a garrison of 1,500 men.

Construction

Lieutenant Horatio G. Wright was the supervisor of the construction at Fort Jefferson. All building materials except sand and coral rubble had to be shipped in. Waiting on shipments of bricks, cement, lumber, granite, slate, iron, and other supplies often took months. Many of the supplies came from as far away as Vermont and New York.

Loggerhead Lighthouse



Bricks

The fort was named Fort Jefferson by the Secretary of War, Charles M. Conrad, in honor of Thomas Jefferson, the nation's third president, on October 8, 1850. By 1857, the first level (tier) was started and there were 299 people working on the fort.

Bricks

Over 16 million brick were used in the construction of Fort Jefferson. When viewing the fort, two different colored bricks are clearly seen in the walls of Fort Jefferson. Brown Pensacola brick were used first and makes up the majority of the casemates and exterior walls. Later, during the Civil War, this changed to red brick from Maine. There were 26 major seacoast fortifications in the Southeast prior to the Civil War. Of that number, only 4 stayed in Union hands throughout the entire course of the war, Fort Jefferson was one of them. When Florida, and therefore Pensacola, left the Union, the flow of bricks for construction of the fort stopped. The Union army had to go all the way to Maine to find brick for continued construction.

Water

A critical issue to those living and working at the fort was the lack of freshwater. The fort was designed to catch rain water from the roof and divert it into over 100 cisterns below the fort's lower floor. There was a design capacity for one and a half million gallons of water. The parade ground was also equipped with a cistern that had a 92,000 gallon capacity. In later years, water distilling plants were added to supplement rain water. Today, the primary water supply comes from the large cistern located in the parade ground.

The War Years

By the 1860s, there was increasing unrest in the southern states during the presidential election year. It was rumored that the south would secede from the Union if Abraham Lincoln was elected president. On January 10, 1861, Florida seceded from the Union. Captain Montgomery C. Meigs was the engineer in charge at the fort and noted that there was not a single cannon in the fort. He contacted the coastal defense

Prison

fort in Key West, Fort Zachary Taylor, requesting guns and ammunition. Shortly thereafter, he was elated when a steamer arrived in the harbor with a company of U.S. Artillery soldiers to occupy and protect the fort.

The Civil War

The Civil War began in 1861 with the first shots fired by Confederate troops on Fort Sumter, South Carolina. Fort Jefferson was no longer a coastal defense fort for the United States, but was now a Union fort. The fort provided anchorage, supplies, and protection for Union warships blockading the South. By the end of 1861, there were 105 cannons in the fort and by the following year 1000 soldiers occupied the island along with the 400 people already living there. Water became a problem and condensers were ordered to make freshwater from the sea.

While the state of Florida went with the Confederate states, Fort Jefferson, Fort Taylor, and Fort Pickens remained in Union hands. Key West was accessible only by boat and the 3,000 residents that lived there co-existed with the military.

Prison

Shortly after the beginning of the Civil War, the fort became a prison as well as a military outpost. The place was remote and isolated and the Union army needed a place to keep prisoners. Most of the prisoners were Union soldiers and had committed crimes that ranged from minor offenses, to murder and desertion.

A few prisoners arrived in 1961 and the population continued to grow throughout the years. By 1868, there were more than 700 prisoners crowded in the fort alongside the soldiers and workers. The majority of prisoners worked on fort construction, which was still in progress. They were treated about the same as other workers unless they caused trouble or had been charged with serious crimes.

The mistreatment of prisoners was reported on many occasions. Punishment could be severe. Often, the

rebellious prisoners would have a ball and chain attached to their legs. There were reports of prisoners and even some soldiers, being tied up and left in the



scorching sun while other reports stated they were held underwater in the moat.

New military recruits were brought to the fort for training purposes. These soldiers were trained in military customs, courtesy, and maintenance of their uniforms and gear. They were put through grueling physical exercise under less than pleasant outdoor conditions. They marched for hours around the parade ground under the blistering sun and received training in heavy artillery drills. This arduous task involved hauling the 128 pound cannon balls from the shot magazines on the ground floor to the top of the fort where the large cannons were located. For any infraction of the rules, the soldiers received the same punishment as the prisoners, usually a ball and chain attached to their legs. Allegedly, this practice was employed to improve their fitness.



Dr. Mudd

While most of the prisoners were associated with the war, four of the prisoners were civilians. They were convicted by a military court as co-conspirators in the assassination of President Lincoln by John Wilkes Booth. Dr. Samuel A. Mudd treated Booth for a broken leg after he had shot President Lincoln. Dr. Mudd professed his innocence stating that he did not recognize the person he treated for the broken leg. He was given a life sentence of hard labor, but was pardoned by President Johnson in 1869 and released after serving only four years of his sentence. His cell is still marked today.

Yellow Fever

Yellow fever was a deadly and recurring disease for people living in the fort and sub-tropical environments. In 1867, during an outbreak, 270 of the 454 people living in the fort (59%) were stricken with the fever. Within three months, 38 people died including the fort surgeon, Dr. Joseph Smith, and his three-year-old son. The commander of the fort was Major Stone, whose wife

also died in the outbreak, left the fort with his young son in hopes of protecting him from the disease. A few days later, word came from Key West of the death of Major Stone and his son. At the time, they were unaware that yellow fever was transmitted by mosquitoes. Serious outbreaks of yellow fever occurred every few years.

Dr. Mudd assisted Dr. Smith in the hospital during the epidemic. Following Dr. Smith's death, Dr. Mudd, even though he was a prisoner, took over management of the hospital and tended to the sick up to the time when Dr. Whitehurst arrived as a replacement for Dr. Smith. There was a hospital in the fort and a small hospital north of Garden Key, fittingly named Hospital Key.

There was another serious outbreak of yellow fever in 1873. Thirty-seven people caught it and 14 died. Most of those that died were buried on Bird Key. From the top of the fort, residents could see the rows of whitewashed crosses on Bird Key where the victims were buried. Yellow fever was a fearful disease of the tropics.

After the War

By 1868, Congress had new priorities for funding and coastal defense forts all along the coast were losing funds. There was no funding for Fort Jefferson in 1869 and the last garrison of troops left in 1874. A few caretakers were left to care for the engineer's property and a detail of soldiers were left to maintain the guns and ammunition.

Construction on the fort, still not complete, slowed. In October of 1873, a hurricane hit the Dry Tortugas and seriously damaged the barracks. Another hurricane hit the fort in 1875 making it the fourth hurricane to hit the area in nine years.

The Navy used the facility for a coaling station and anchoring of warships. The U.S.S. Maine loaded coal from the coaling docks before its fateful journey to a Havana harbor where it blew up and sank on February 18, 1898. The explosion of the ship contributed to the cause of the Spanish-American War. The navy rebuilt the coaling docks and added large sheds with piers, docks, and loading conveyor belts. They also dredged the harbor around the fort 300 feet wide and 30 feet deep, so that the water was deep enough for the large warships to get to the coaling docks. Everything was in place and operational by 1901. Several hurricanes struck Fort Jefferson, during the next few years including a large one in 1910. The hurricanes severely damaged structures inside and outside the fort including the coaling sheds and docks. The Navy abandoned the coaling station, refusing to spend any more money on repairs. This ended the military presence at Fort Jefferson, leaving only the families tending the lighthouses on Loggerhead and Garden Key. A marine research laboratory was established on Loggerhead Key in 1904 by the Carnegie Institution.

Later Military Activity

During World War I, the Garden Key lighthouse was decommissioned. A wireless communications system was set up in Fort Jefferson by the military. By way of an underwater communications cable the fort was

able to connect with Key West. A facility was built to support seaplanes stationed in the Dry Tortugas to serve as spotters for enemy ships approaching the United States.

Dr. Mudd



During World War II, submarine-chasing vessels were working from the area in search of German submarines. The Dry Tortugas was also used on a small scale by the military as a testing site for the poisonous mustard gas.

Quarantine



The Tortugas Laboratory

The Tortugas Laboratory

Dr. Alfred Goldsborough Mayor was a marine biologist who travelled the world studying marine ecosystems and was especially interested in jellyfish. In the late 1800s, he became interested in building a marine laboratory on Loggerhead Key. He had previously visited the Dry Tortugas and was impressed by the diversity of marine life in the shallow seas surrounding the tiny islands, which included hundreds of species of fish, algae, flora, invertebrates, and corals.

He convinced the Carnegie Institution of Washington to fund the station in 1902 and was chosen to direct

the operation. Dr. Mayor had a research vessel, the *Physalia*, built to support the studies conducted in the marine lab. He ordered prefabricated buildings and had them shipped to the Dry Tortugas. By 1904, Mayor had the buildings assembled and placed on the north end of Loggerhead Key. Workers constructed a dock, with dock buildings, a pier, and a windmill for pumping sea water into the laboratory. The lab was established “for the study of marine life from the tropical Atlantic.”

Scientists from around the world were invited to participate in the marine research between April and March of each year. The lab was closed the rest of the year during peak hurricane season. Over the

The National Park Service

years, scientists studied many aspects of the marine environment around the Dry Tortugas. There were papers published on tropical fish, migration of birds, and scores of new species of plants and animals that were discovered. The first experimental heart transplants were accomplished at the lab using sharks. Dive helmets were used to study sea life under water long before the invention of self-contained underwater breathing apparatus (SCUBA), also the first underwater black and white, and color photographs were taken at the site.

The Tortugas Marine Laboratory published 35 volumes of research papers devoted to the marine life surrounding the Dry Tortugas. During its operation, over 140 scientists worked at the lab, including many of the most prominent researchers of the time.

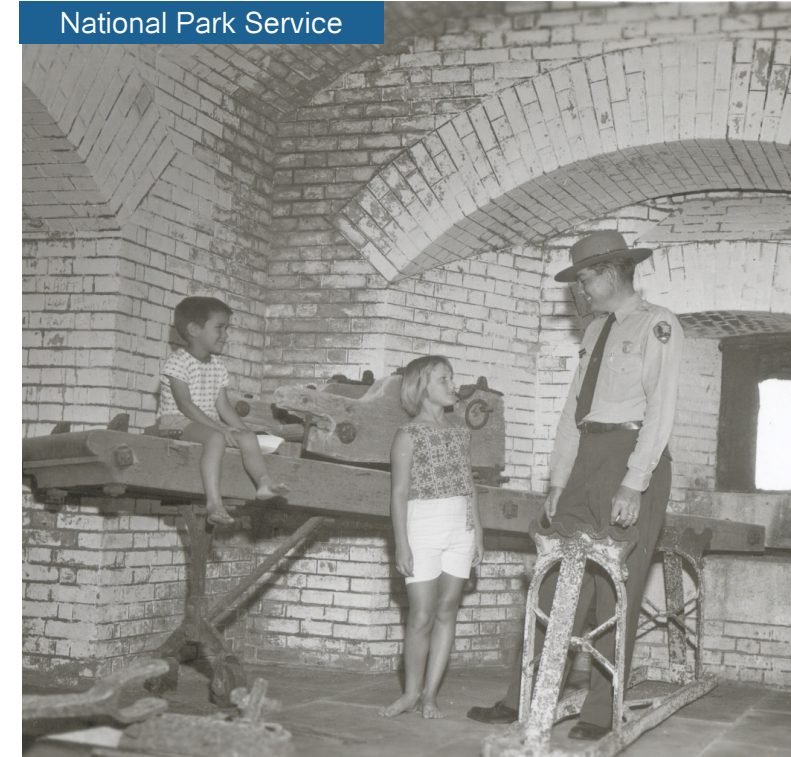
When he was not at the lab or home with his family, Dr. Mayor travelled around the world in the *Physalia*, collecting specimens and conducting research. In 1919, he was diagnosed with tuberculosis, and spent some time in Arizona trying to recover. He returned to the Dry Tortugas in 1922 against the advice of his doctor. While wading in shallow water off Loggerhead Key, he fainted and drowned. He left behind his wife and three children.

The Tortugas Lab continued to operate until 1939. Once abandoned, the facilities deteriorated in the heat and salt air. Today, all that remains are a few concrete walls from a cistern and a monument to Alfred Goldsborough Mayor, written by his wife.

After the military left the Dry Tortugas in the early 1900s, the place was mostly deserted. All that remained were the lighthouse keepers and their families, along with the scientists coming and going to the Tortugas Research Station. Every so often boaters and fishermen visited the area and mainly used the islands and harbors to anchor and seek protection from storms. In 1908, President Theodore Roosevelt, an avid conservationist, proclaimed by Executive Order, the Dry Tortugas area as a bird sanctuary and assigned the Department of

Agriculture to manage the area. The attention brought to the Dry Tortugas through scientific studies on the migrating Sooty Terns probably influenced that decision.

National Park Service



National Monument

In 1935, President Franklin D. Roosevelt used his executive powers to increase protection of the area by making it part of the National Park Service. This enabled staff to live on-site in order to help protect the artifacts, shipwrecks, historical structures, wildlife and reefs. The area was named Fort Jefferson National Monument.

National Park Status

As visitation increased, the area drew further attention. In 1992, Congress signed the bill making the area a National Park, and President Bill Clinton signed it into

Tortugas Laboratory

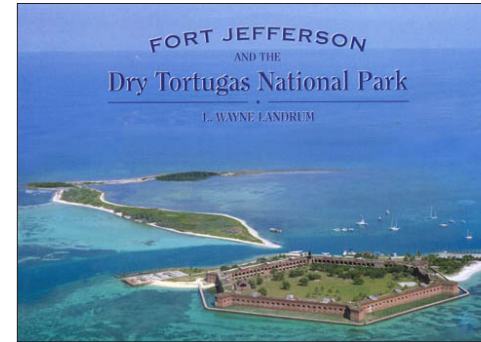




law. The new legislation was exceedingly specific with respect to the protection of the islands and reefs, but also included the protection of the waters within the 100-square-mile park.

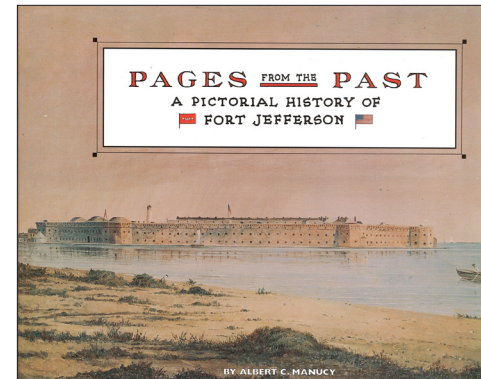
Today, employees of the National Park Service live and work on the islands, introducing visitors to the area and teaching them about the park. Some employees enforce park regulations, while others maintain the

buildings, electrical systems, boats, tractors, and other equipment necessary to keep the place running. Park employees and special work crews also continue to stabilize the 100-year-old fort that was never finished. There are about 15 people living on Garden Key inside the fort and two residences on Loggerhead Key. It is far less crowded than the Civil War period when at times more than 1,500 people shared the 13 acres inside the fort.



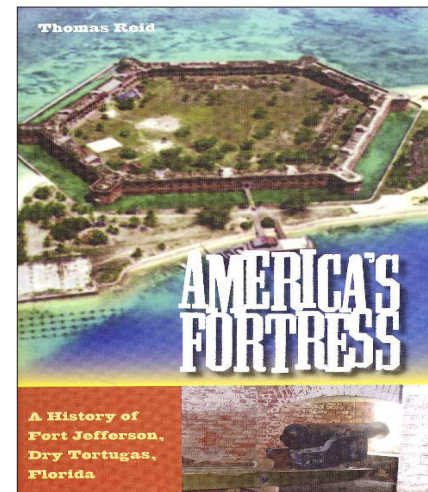
Fort Jefferson and the Dry Tortugas National Park

Big Pine Key FL L W L;
2nd edition (2003)



Pages from the past: A pictorial history of Fort Jefferson

Florida National Parks & Monuments Association; First Edition edition (1999)



America's Fortress: A History of Fort Jefferson, Dry Tortugas, Florida

University Press of Florida; 1st edition (December 31, 2006)

Everglades Association
www.evergladesassociation.org

The official cooperating association of Everglades NP, the Everglades Association, operates several bookstores in park visitor centers and also maintains an online store. Purchase orders from schools receive a 10% discount. The Everglades online store has a section for Educators and Children.

Web Resources

- Everglades National Park
www.nps.gov/ever
- Big Cypress National Preserve
www.nps.gov/bicy
- Biscayne National Park
www.nps.gov/bisc
- Dry Tortugas National Park
www.nps.gov/drto
- South Florida Natural Resource Center
www.nps.gov/ever/naturescience/sfnrc.htm
- FIU Everglades Digital Library
everglades.fiu.edu
- USGS South Florida Information Access
sofia.usgs.gov/virtual_tour/kids
- South Florida Water Management District
www.sfwmd.gov
- Comprehensive Everglades Restoration Plan
www.evergladesplan.org
- South Florida National Parks Trust
www.southfloridaparks.org
- PBS Teachers, Exploring the National Parks
www.pbs.org/teachers/connect/resources/7261/preview



Garden Key Lighthouse at night



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