Egmont Key

Tampa Bay's Island of Discovery, Defiance and Refuge

Anthology of the Shoal and Island

Southeastern Geological Society

October 18, 2003

Assembled By Sandra Colbert & Bruce Rodgers, P.G.
Egmont Key

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Anthology of the Shoal and Island

Prepared for:

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Proviso

This guidebook is a collection of articles, reports and maps from numerous sources. Wherever possible the original sources of the information are identified and noted, but some may have been missed or identified improperly. It is not the intent of the Society or the persons assembling the information to omit, misrepresent or inaccurately identify where these materials originated.
Introduction

Egmont Key is an emergent shoal positioned in the mouth of Tampa Bay. It is one of two such shoals, the other being Passage Key approximately one mile south-southeast of Egmont Key. Although associated with a string of barrier islands positioned to the west of Florida, from approximately Tarpon Springs in the north to Ft. Myers in the south, these two islands (keys) have no land to their east and are therefore, not barrier islands.

At times of lower sea level, both keys, but particularly the north end of Egmont Key, might be formidable bluffs overlooking picturesque river valleys. When sea level rises, these fragile points of land are reclaimed by the gulf waters and re-configured by tidal currents. Presently, Egmont Key is a bay mouth shoal about 5-feet above high tide levels with a somewhat north-south alignment due to longshore currents and longshore transport. The materials in transport are primarily quartz sand and marine shell fragments.

Passage Key is only somewhat emergent at approximately 1-foot above high tide levels. Being smaller in area and lower in elevation, Passage Key is frequently overwashed by storm surges and heavy seas. Consequently, Passage Key is more shoal-like when compared to Egmont Key and exhibits an alignment more often paralleling ebb tide currents.

Due to exposure on all sides, neither Egmont or Passage Key have the marine or terrestrial vegetation typical of their island cousins to the north and south along Florida’s gulf coast. The most notable of the missing vegetation species are the mangroves, which form the estuarine nurseries along the protected lagoons typical of barrier islands. Marine grasses are also generally non-
existent, although a small sea grass bed is located in the shallows near the central portion of Egmont Key's eastern shore.

The terrestrial plant community noted on other islands to the north and south, but missing on Egmont Key, is the pine flatwood. No information has been forthcoming with respect to past pine flatwood communities, and their possible demise during military occupation. They also are conspicuously small in extent on Mullet Key to the north.

It is conjectured that the dynamics of these bay mouth islands allow for realignment and overwash more frequently than any of these three plant communities can gain establishment.
Summary of the Guidebook’s Contents

Egmont Key and its neighboring islands to the north and south, Mullet Key and Passage Key respectively, have experienced impact by man since the mid 1800s. However, Egmont Key has received more attention because of its strategic location in the central portion of the entrance to Tampa Bay, and its proximity to a deep channel, which snuggles it northern shore.

Following these few summary pages are Appendices that contain information from various sources on Egmont Key and its significance to the local history. Much of what is told about the island is in the form of maps, since so much information is presented in such limited space.

Be cautioned however ......

The maps lure your thoughts and imagination deeply into the island’s past and leave you wondering how the story will end.

Egmont Key - Island of Discovery

Certainly native North American human cultures first discovered Egmont Key, but credit goes to the more formal Europeans that fancied maps. The earliest know map dates to 1757. At that time, the Isle-of-the-Cross (Egmont Key) was noted to have a passable channel into to the bay to its south but shoaling to the north created shallow depths not negotiable by 18th century sea vessels. As Florida’s land holding passed from country to country in Europe, its original native cultures declined and their remnants were assimilated as tribes from
the north migrated into Florida, away from European settlers (Editor’s note: thing have not changed). By the mid-1800s, interest concerning Egmont Key was renewed due to the mapping and surveying efforts of a young military up-start, Robert E. Lee.

Egmont Key - Island of Defiance

Egmont Key’s first efforts at defiance are connected to the failed lighthouse structures erected in the 1840s and 1850s to mark the entrance into Tampa Bay. However, before the U.S. Civil War in the 1860s a more permanent lighthouse structure existed with new French-lens technology. To avoid the U.S. Navy from gaining entrance into Tampa Bay during the Civil War, the local Confederates in defiance removed the fresnal lens from the lighthouse. The navigational light was extinguished throughout the war years.

Nearing the end of the 19th century Tampa, Florida was gaining importance as a seaport, and the Cuban population raised concerns about the port’s safety as tensions between Spain and the U.S. escalated. This played closely with the U.S. military’s initiative throughout the country for coastal defenses in significant harbors. Thus, Fort Dade and Fort DeSoto bring Egmont Key, Passage Key and Mullet Key to the peak of the defiant years. With state-of-design rifled cannons and mortars, disappearing turrets, electricity and telephones, these keys assumed a major role as the strategic defenses of Tampa Bay and its ports in Tampa and St. Petersburg.

Wars bring technological advances and World War I brought the airplane. Now coastal defenses were rendered obsolete and they began to be abandoned around many of the ports throughout the U.S. The defiant years waned away. Passage Key’s defenses were consumed by storms and shoaling
sands, with southern Egmont Key following a similar albeit less aggressive fate. By the 1930s, Egmont Key's population of thousands had returned to that of a lighthouse keeper and a few harbor pilots.

_Egmont Key - Island of Refuge_

The U.S. Coast Guard assumed duties from the U.S. Lighthouse Service and set up a small training operation on Egmont Key by the mid 20th century, but generally, the island was left to sabal palms, strangler figs and the winds of longshore transport. While the vegetation wedged open the cracks in the abandoned artillery batteries, salt reclaimed the cannons and surf reclaimed the land.

Florida's population soared and while dredges created land from grass flats and sandy shoals, Egmont Key's isolation allowed its population of gopher tortoises and nesting sea turtles and sea birds to establish a presence in an ever-decreasing habitat. It is man's interest in the historic structures and their preservation, which by default included the habitat.

Almost a century after their construction, the southern artillery batteries were remanded to the gulf waters, battery Burchsted in the 1960s, and John Page in the 1980s. At the northern end of Egmont Key, batteries McIntosh, Guy Howard and Charles Mellon stood watch over an advancing sea and ghostly palms. Guy Howard collapsed near its centennial (in 1999), while McIntosh and Mellon received a stay (in 2001) from their constructors, the U.S. Army Corp of Engineers. The stay came in the form of dredged sand from one of the protected ports of a century earlier, Bayboro Harbor in St. Petersburg.
As a Florida State Park (Egmont Key) and National Wildlife Refuge (Egmont and Passage Key) the island will for the time being remain a refuge for these stressed creatures, with the addition of an also stressed human population arriving each summer on Saturday and Sunday. Therefore, for a few years longer (thanks to coastal nourishment), until redistributed by winds and waves, Egmont Key remains the Island Refuge at the entrance to Tampa Bay.

And Egmont’s lighthouse? Well, it remains sentinel to mariners past, present and future and to the architects that designed these marvelous structures. As the global positioning system has closed all lighthouses but Egmont’s along the Florida gulf coast, Egmont Key light became the first and now is the last lighthouse to guide seamen along the Florida gulf coast and safely to port.
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Southeastern Geological Society – October 18, 2003

Egmont Key – Maps and Sketches

Appendix A
EGMONT KEY 1757
AS CHARTED BY
Francisco Maria Celi

EGMONT CHANNEL

GULF OF MEXICO

TAMPA BAY

SOUTHWEST CHANNEL
measured depths of
3, 3.5, and 4 fathoms

From: Ware, John D., Florida Historical Quarterly, Volume L Number 2, October 1971. (Re-drawn by, Bruce A. Rodgers, 1974)

Not to scale and north to the top
Tampa Bay Entrance Channels and Barrier Island Defenses – May 1917, U.S. Army

Named on each of the three keys are the artillery batteries. Note the depth of North Channel pre-dates maintenance dredging.
Figure 18. Beach ridge map with radiocarbon dates. The numbers correspond to acquired cores as described in appendix 3.

From: J.A. Kling, University of South Florida, August 1997
Figure 22. Shoreline map of Egmont Key: 1877, 1935, and 1996 (Terry, 1996).

From: J.A. Kling, University of South Florida, August 1997

Original Scale 1:24,000 North to the top
ARTESIAN WELL
A. M. C. McDowell
FORT DADE, FLORIDA

Well Remains Operational – Constructed Circa October 30, 1920
structure on concrete piers, covered with 3 ply composition reefing.

Artesian Well

An eight inch well was sunk to a depth of 360 feet and a natural flow of 250 gallons per minute obtained. The 8" casing was driven to a depth of 180 feet where rock brought it to a standstill.

Fresh water was found but of insufficient quantity and an artesian flow. Drilling was continued thru fairly hard material with one notable exception, when at 233 feet, a stream of flowing sand about 2 feet thick was encountered causing considerable trouble. Soft limestone was struck at 310 feet, water began to flow at 330 feet and drilling was stepped at 360 feet. On shutting off the flow for a test the hole filled up with sand 127 feet and the flow stopped. A six inch casing was put in 320 feet and the flow recovered. A leg of the well is submitted herewith. The water contains sulphur gas, salt and lime and is poor for boiler use but probably wholesome for drinking.

Reservoir.

A reservoir of 100,000 gallons capacity was built after plans furnished by Lockwood, Green and Company of reinforced concrete 40' X 20', 6 feet deep. Its foundation is about 6" below the water table or 4 feet below the general level of the ground. An aeration trough was built around the inside of the wall near the top. The water is led from the well into the trough from which it fell in a thin sheet into the reservoir. This eliminates the sulphur gas entirely. An automatic valve made on the job shuts the flow from the reservoir when full and turns it into a 6" pipe that leads west 500 feet into the Gulf. This pipe is terra cotta except a few feet at each end which is cast iron. The outfall is above high tide and embedded in a concrete pier. From the reservoir and emergency overflow and skimmer was led into the old system of surface wells. These old wells are now cut off from the system by valves but could be used in the artesian flow should fail.

(b) Pest Map showing location on reservation and giving building numbers, enclosed.

(h) Photographs of buildings enclosed.

(i) Soil Data

No surface soil.

0' - 90' Sand & shell
90' - 100' Clay & sand
100' - 110' Rock
110' - 160' Sand, clay & boulders
160' - 180' Stiff blue clay
180' - 190' Rock
Appendix B
Shifting Sands

By Sandy Colbert

The natural history of Egmont Key goes back 10,000 years to the time of the ice ages when it changed from an island in the middle of the Hillsborough River to an island in the middle of Tampa Bay. The island's long isolation from the mainland allowed for the development of several unique subspecies of plants and reptiles and shielded it from human intrusion.

But in spite of its isolation perhaps no other Florida state park has been impacted by man more than Egmont Key. Since it was first visited by the Spanish in 1579 until today, the island's native vegetation has been stripped and replaced by exotics, its native wildlife disseminated and its beaches have eroded to an extent unprecedented in historical times.

In 1834, Major Francis Dade hunted deer on Egmont Key and a soldier wrote home to his mother describing the tall cedars and live oak that covered the island. During the next 70 years all the oaks and cedars disappeared. They fell victim to loggers who stripped the island for its valuable timber, to the army for firewood and other uses by those stationed there during the Seminole and Civil Wars, and to mother nature in the hurricanes that swept over the island.

When Ft. Dade was established in 1898 to protect Tampa from Spanish invasion, what ever remained of the island's native plant and animal communities was quickly destroyed. Vegetation was cleared for the over 70 buildings that were erected on the island. The native animals were soon replaced by horses, dogs, and cats.

By the time Egmont Key became a national wildlife refuge under the management of the US Fish and Wildlife Service in 1974, even the island's small rodents and nesting birds had been eliminated by the feral cats that roamed the island. The box and gophers tortoises have survived and perhaps in some quiet dark place, its mole skinks.

The development of the Tampa Bay area in the 1950's and early 1960's began to alter the shore lines of the land surrounding Egmont Key. Bays were filled in, bridges built, shipping channels deepened and shorelines hardened by seawalls. This altered current flow and affected sediment supply. The island began to erode at an ever increasing rate. Over 800,000 cu. yards of beach have been lost since 1940. What was once a prime nesting area for sea turtles has now been reduced to a few feet above high tide.

In 1989, US Fish and Wildlife Service joined with the State of Florida to co-manage the island as a State Park and in 1991 the Egmont Key Alliance was incorporated as a Citizens Support Organization to assist the Park Manager with the rejuvenation of the island.

With that goal in mind, the Alliance, set out to do something about restoring the native plant and animal communities of Egmont Key and to stem the ever increasing erosion.

To date, we have established an off shore sea grass protection zone and begun the removal of all exotic plant species from the island. The Alliance worked in cooperation with the US Fish & Wildlife Service to increase the size of the off limits zone of the wildlife refuge while preserving public access to the safe boat anchorage on the south east side of the island.

We have also been successful in encouraging local governments to initiate geological studies on the dynamics of the beach erosion. No such studies had every been done of Egmont Key in the past. The State of Florida selected a costal engineering firm to develop short and long term solutions to the erosion problems that will protect the historical structures and stem or reverse the loss of the recreational beach.

In 2001, utilizing recommendations from the engineering study, the Alliance, was successful in having Egmont Key designated as a suitable place to receive beach quality sand from dredging projects in and around Tampa Bay. Working in cooperation with the Tampa Bay Estuary Program, the Agency on Bay Management, the Department of Environmental Protection, the City of St. Petersburg and the US Army Corps of Engineers the Alliance was able to secure over 600,000 cu. yards of sand from St. Petersburg's Bayboro Harbor dredging project to be placed on the northwest shore of Egmont Key. The new sand beach offers short term protection to the historical structures from erosion while providing acceptable nesting areas for sea turtles and local and migratory birds. Successful hatchings of both bird and reptile allied the fears of some naturalists that wildlife would not use the new beach. Encouraged by nature's adaptability, the Alliance believes sand replacement is a viable interim solution to the island's erosion problems.

While Egmont Key is still in need of much tender loving care, the beginnings of restoring the island's natural environments have begun and the Alliance will continue to work with public and private entities to restore, preserve and protect this unique island in the mouth of Tampa Bay.
Defending Tampa Bay
The story of the guns of Fort Dade

With the Spanish-American War looming on the horizon, the city of Tampa, through its leading citizen, Henry Plant, convinced the government that Tampa Bay should be protected against the possibility of enemy attack. Fort Dade was established on Egmont Key in the spring of 1898, and although the war lasted only four months (and the big excitement locally was that Teddy Roosevelt and the Rough Riders gathered in Tampa on their way to Cuba) the construction of Ft. Dade and Ft. DeSoto on Mullet Key continued for years as part of a continuing program of coastal defense for this country.

After the Civil War, most U.S. defenses, including coastal defenses, were neglected. As the 1800’s drew to a close, however, dramatic advances in artillery were achieved, using technology available not only to the United States, but other industrial countries as well. In the 1890’s there were simultaneous innovations in the construction of long gun barrels, breech loading, and slower burning propellants. Compared to the best previous artillery, these new weapons could fire projectiles 4 times as heavy to ranges 2 to 3 times as great as any before with remarkable accuracy and armor penetrating ability. It has been suggested that guns of the type installed here on Egmont Key represented the greatest single advance in artillery between the invention of the cannon in the 14th century and the introduction of the nuclear shell only 40 years ago.

Forts changed too. Always before, forts had been conspicuous, walled structures, intended to keep the enemy out. Fortifications of the sort built here placed a few powerful guns in dispersed, concealed positions, with the expectation that the enemy could be engaged effectively at extreme range. In addition, electrically controlled underwater mines were placed in both the main ship channel and southwest channel, and lighter guns were placed to defeat enemy efforts to sweep these mines.

One of the often asked questions by visitors to Egmont Key is, “Where’s the fort?” Actually the entire island is Fort Dade. The large concrete structure are individual artillery batteries, each with its own name and mounting one particular sort of cannon. On the north end of Egmont Key is Battery Mellon, which mounted three 3-inch guns intended to deal with patrol boats and mine sweeping activities. Next to the south, is Battery Guy Howard, now collapsing into the Gulf, which had two 6-inch guns, and just south is Battery McIntosh, which was one of the first batteries built, mounting two 8-inch guns. The south end of the island has suffered severe erosion over the years, and the two batteries several hundred yards out in the Gulf. These two structures were Battery John Page, mounting two 3-inch guns, and Battery Burchsted, with one 3-inch gun and two 6-inch guns.

The guns installed at Batteries McIntosh and Howard used the ingenious disappearing carriages which utilized the recoil energy of the gun to move the gun back and down behind the parapet wall, out of sight of the enemy, where it could conveniently be loaded and aimed while completely invisible from the sea. When it was ready to be fired, it was raised only for a moment, fired, and disappeared again.

On the north end of the key, adjacent to Battery Mellon, there are ruins of the buildings used for loading and maintaining the electric mines which were placed in the channels. One of the buildings still contains the ruins of a large tank in which the miles of control cables necessary for the mine system were stored to prevent them from corroding after being removed from the salt water of the Gulf.

Fort Dade remained active through World War I, used for training and to protect against the increasingly remote prospect of an enemy navy operating in the Gulf of Mexico. By early in the 20’s, however, the sort of fortification built here was obsolete. The Army abandoned Ft Dade in 1923. Curiously, you would think the airplane would be what made the difference, but in fact it was further advances in artillery—by the end of World War I, battleships came to be armed with guns that could outshoot the defenses of Tampa Bay.

The idea of coastal defense seems almost foolish today, as we have lived for many years in a place where the idea of enemy ships entering Tampa Bay, firing on our cities, burning our crops, and running off our livestock seems absurd. It has not, however, always been that way through the history of Florida and the United States.
An Island of History

Egmont Key has a rich and varied history. Before Europeans arrived in this part of Florida in 1513, led by Ponce de Leon, the Tampa Bay area was a metropolitan area of the Native American Timucuan culture. Even though hundreds of Native Americans lived, fished, and built shell mounds throughout the Bay area, we have no idea of what they did on Egmont Key, because so much has happened to the island since then. The early Spanish records have little specific information about the island, although an explorer named Celi surveyed the key in 1757 and erected a cross on the south end. Celi called Egmont Key the Island of the Cross. When the British began exploring the area in the early 1800's it was renamed Egmont Key, for John Perceval, the Earl of Egmont, a member of the Irish House of Commons, who was also related to Lord Hillsborough, for whom Hillsborough county was named.

The Spanish ceded Florida to United States in 1821, and as commerce grew along the Gulf Coast of the new country, it became necessary to build a lighthouse on Egmont Key. The new lighthouse was completed in 1848, and was at that time the only lighthouse on the west coast between St. Marks and Key West. That fall, a hurricane damaged the new lighthouse beyond repair, although it remained in use until the present lighthouse was completed 10 years later.

In 1849, Col. Robert E. Lee surveyed the Gulf Coast and recommended that Egmont Key be set aside as a federal military reservation.

As the Third Seminole War drew to a close in the late 1859's, the last of the Seminoles were brought to Egmont Key and held before being transported to Oklahoma. The last of them were taken away in 1858 on the steamer "Grey Cloud".

The key remained in Union hands during the Civil War, and served as a base of operations for ships blockading the Florida coast. Several raids on Fort Brooke and Tampa were launched from the island, and a number of Union sympathizers from the Bay area moved to Egmont until the war was over. These included several farmers from the area around Pinellas Point in what is now south St. Petersburg.

As the Spanish-American War loomed in early 1898, Henry Plant a major figure in the early growth of Tampa, prevailed upon the government to fortify Egmont Key to defend Tampa from the possibility of attack by the Spanish. Fort Dade on Egmont Key and Fort DeSoto were started in the spring of 1898 with the placement of temporary artillery batteries on the both ends of the island. Although the Spanish American War was over in a few months, construction of the defenses of Tampa Bay continued. By 1910, there were 5 concrete artillery batteries, 70 buildings, a network of brick streets, water, sewer, and electricity to serve a garrison of several hundred troops. By the early 1920's artillery of the sort placed on Egmont Key was obsolete, and the Army abandoned Ft Dade.

The Coast Guard took over the island during the 1930's and built a sizable small arms practice firing range on the west side of the island. Coast Guardsmen came from all over the country during the winter to practice shooting. They used some of the buildings of what had been Ft Dade. During this time most of the rest of the buildings were destroyed by storms and fires.

During World War II, there were lookouts established by the Coast Guard, the Navy, and the Army. Ft DeSoto and Mullet Key were used as a practice bombing range. Fortunately, there was little threat to the west coast of Florida and after the War the island was looked after by the Coast Guard, until 1974 when the island was designated a National Wildlife Refuge.

In 1988, the first Coastal Cleanup was held on Egmont Key. At that time this was the largest civilian/military operation of its kind. Nearly 70 tons of accumulated trash was removed from the key. The next year the Florida Park Service entered into a co-management agreement with the US Fish and Wildlife Service, and on October 1, 1989 Egmont Key State Park was opened. Shortly after that the Egmont Key Alliance was established as a volunteer Citizen Support Organization to help the Park Service preserve, protect, and restore the natural and cultural resources of this fascinating island.
Lighting the Way
The story of Egmont Key Light

Despite its isolated location on Egmont Key, seen by mariners and occasional visitors, Egmont Key Light has been vital to the safety of commerce on the west coast of Florida for over 150 years. The first lighthouse was built in 1848 as commerce began to grow along the Gulf Coast of the rapidly growing United States. When it was built, this was the only lighthouse between St. Marks and Key West, and its primary purpose was to guide ships along the coast, as well as mark the entrance to the increasingly important port at Tampa.

The first lighthouse was built of brick and cost $10,000. It was located about 100 feet northeast of the existing structure. The keeper’s house, also brick, was built just north of the lighthouse. In April of 1848, the first keeper, Sherrod Edwards, and his family moved in and the light was lit. At that time, lard oil was used as a fuel for the light. In September of that same year, there was a hurricane which damaged the lighthouse seriously. The story is that keeper Edwards and his family took refuge in a rowboat tied to a palm tree as the water rose over the island.

The first lighthouse had been damaged beyond repair, and a new, taller one was built in 1858 for $16,000. This is the structure that still stands. Other buildings were built over the years. The little brick building near the lighthouse was built in 1895 and used for oil storage, and the larger brick building was built in the 1920’s for the radio transmitter. There were other buildings that have since been torn down. There were two large sheds at the land end of the dock which served the buoy depot that was set up in the late 1800’s. For many years all buoys used between St. Marks and Key West were stored and maintained here on Egmont Key. The assistant lighthouse keeper finally got his own house in 1898, just south of the lighthouse. All that remains of that house is the cistern, which is still used today.

Over the years, the light station was maintained and improved. The dock was rebuilt several times. Almost every recorded annual report to the Lighthouse Board includes some reference to repairing, improving, or rebuilding the dock, mostly as a result of damage due to storms.

The keeper’s life was not an easy one. For the most part over the years, the keeper and his assistant and their families were the only people on the island. Bulk supplies like oil for the light were brought in once a year, and the keeper and his family raised much of their own food and frequently went by small boat to Bradenton or Tampa for other supplies. Maintaining a lighthouse with an oil lamp required constant attention to trimming and adjusting the wicks, cleaning the chimneys and lenses, and washing the windows of the lantern room. While the light was bright and well focused as oil lamps go, it was not nearly as bright as an electric light and scrupulous attention to the cleanliness of every part of the system was necessary or the light would be obscured. It took from dawn until about 10:00 AM to finish cleaning up and preparing the light for the next night’s work. Curtains were taken down at dusk and hung up at dawn when the light was extinguished to prevent discoloration of the glass in the lenses.

In 1939, the Coast Guard took over the Lighthouse Service and, rather than lighthouse keepers and their families, the island was occupied by a group of Coast Guardsmen, typically about 3 or 4 at any one time. They converted the assistant keeper’s house into a barracks and demolished the original keeper’s house. In the mid 40’s, they renovated the lighthouse. Since the upper portion of the brick in the tower was deteriorated, it was shortened by several feet and an aircraft style rotating beacon was installed, replacing the acetylene lamp. The light was increased from 3,000 candlepower to 175,000 candlepower.

In 1957 the second keeper’s house was demolished and the modern building now used as the Park Manager’s residence and Park Office was built. Finally, in the late 1980’s, the light was fully automated and the Coast Guard personnel were reassigned. Shortly after that the Florida State Park Service joined with the US Fish and Wildlife Service to care for the resources of the island.

It has been over 150 years since Sherrod Edwards first carried cans of whale oil up the spiral staircase of the first lighthouse here on Egmont Key. Through the years of the Lighthouse Board, Bureau of Lighthouses, and the Coast Guard, a series of keepers about whom we know almost nothing worked through heat and hurricane, mosquitoes and winter gales, to keep the Egmont Key Light working and the station in good order. Even with all the advances in navigation available today, the light remains an important part of the system of aids to navigation which guide mariners and aviators safely to their destinations in Tampa Bay.
Nature's Own
By Cindi Para

As you step onto the shores of Egmont Key, you cannot help but notice the natural beauty of the island. From the clear blue water surrounding the island and the sea oats swaying gently in the breeze on the dunes to the open savannah and wooded areas inland, all are providing habitat for many native and exotic plants and animals. It is all part of what makes Egmont Key a valuable and important place for wildlife.

The gopher tortoise is the most prominent of the wildlife on Egmont Key. They’re everywhere! With its medium brown carapace and claw like front feet, it moves about with surprising speed, across open areas and crashing through the underbrush. The top of their carapace often has been rubbed smooth from their roaming in the scrub areas searching for flowers and fruits to eat. The burrows they live in are a unique ecosystem within itself and they share it with lizards, frogs and snakes.

NEVER put your hand into a burrow. You don’t know what you might find! Be careful where you step – that soft sand in front of the burrow may contain eggs. And please don’t confuse them with other land turtles like the smaller box turtle, with its yellow patterned shell, or the loggerhead sea turtle, that only comes ashore to nest, both of which are present on the island as well.

The seagrass beds on the East beach provide protection to a variety of marine life including fish, shrimp and other mollusks. And at low tide, on the protected beach behind the seagrass beds you can see snowy egrets, American oyster catchers and occasional blue herons wading and in search of food. The southern part of the island is a protected bird sanctuary and parts of the interior of the island are a wildlife refuge. The bird sanctuary boundaries have been enlarged and as a result there has been an increase in the number of tern and black skimmer nests. It has also enlarged the nesting and feeding areas for willets, sanderlings and the white ibis, with it’s long red curved bill. Egmont Key is one of the sites for the Audubon migratory bird count in the spring and the fall, noting the species and numbers of birds seen on the island.

None of the wildlife would be here though, if food and shelter were not available. Plants are the key to having wildlife but a healthy habitat has to have diversity. Unfortunately the island is being taken over by Brazilian pepper trees and Australian pines. There is an active eradication program in place on Egmont Key and as areas die out and are cleared, many natives and beneficial plants are making a comeback. Seagrape, hercules club and wax myrtle are becoming more common in the interior, while patridge pea, blue porterweed and beach sunflowers can be seen closer to the coast.

From the seagrass beds along the shoreline to the interior elevations, habitats are created, for all creatures great and small. And so with the sea life and the wildlife I would have to agree, what a wonderful and wondrous place – Egmont Key!
Egmont Key Erosion Control Project

Feasibility Study

Prepared by:

Coastal Planning & Engineering, Inc.

Boca Raton, Florida

December 1997

Selected Excerpts

Appendix C
1. **Coastal Berm.** The berms are located island-wide, and consist of sand and shell which have been deposited by storms. The dominant plant species in this community include cabbage palm, strangler fig, poison ivy, Spanish stopper, saw palmetto, sea grape and Florida privet. Southern red cedars occur sporadically. The exotic Brazilian pepper is located throughout this community, but efforts are being made to eradicate it. Gopher tortoise burrows, some inhabited by more than one tortoise, are abundant in this area, as are box turtles. The primary food of the box turtle, the cockroach, is abundant among the detritus which covers the floor of the coastal berm community.

2. **Beach Dune.** The beach dune community is located along the western and southern shore of the island. The plants which grow on the dune include sea oats, sand spur, railroad vine, and the hairy beach sunflower, which has been given the USFWS "C2" designation, which identifies it as a candidate for listing (as threatened, species of special concern, etc.) although there is not enough evidence to support its listing.

3. **Marine Unconsolidated Substrate.** This community is more commonly referred to as the beach. The Egmont Key beaches are host to shorebirds including terns, skimmers, oystercatchers, plovers and sandpipers. Invertebrates include amphipods, shrimp and crabs, which are consumed by redfish, flounder and spot.

4. **Coastal Grassland.** The plants occurring in this transitional zone include sea oats, tall threawn grass, muhly grass, beach panicum, sand spurs, and seaside gentian.

5. **Marine Grass Beds.** The Management Plan identifies 10 acres of seagrass beds in the submerged lands offshore of the eastern (leeward) side of the island.

The south end of Egmont Key is a nesting bird sanctuary, with access limited during nesting season for protection of the birds. Species which have been observed nesting here include the black skimmer, least tern and American oystercatcher. Adult royal terns rest and feed on Egmont Key, as do recently fledged young and their parents.

An artesian well exists on Egmont Key, but the water recovered from the well requires significant treatment prior to use.

While the major habitats may be stable on a short term basis, all of the habitats are affected to some degree by the continuing erosion of the west, north and southwest shorelines. The coastal berm has lost significant acreage as a result of long term erosion. In the vicinity of the Pilot Trail, cabbage palm trees are dying as a result of erosion, settlement, and salt water intrusion into the roots system. Similarly, the beach dune has been impacted as there is limited pioneer dune system within the park.

The beaches utilized by nesting and resting shorebirds is limited by the erosion. The south spit, while fairly wide, is an extremely dynamic feature which has been moving northeast for most of this century. Continued erosion will threaten the shorebirds over the long term. Coastal grasslands and marine grass beds are the least threatened by the erosion. Nevertheless, a large overwash of the low
island could significantly modify these environments. These could be classified as threatened by erosion and storm effects.

2. Geologic Studies

During the last decade, the island and the region have been studied from a coastal geology framework. Duncan (1993) evaluated seismic data to better interpret the regional geology of the Tampa Bay entrance. A small amount of the data was in the vicinity of Egmont Key. More recent studies have been focused on the potential role of the Egmont channel, and removal of part of a shoal north of the channel has had on the island particularly the north end. These studies have provided the following geologic framework for the island.

Egmont Key is located on the ebb-tidal delta at the mouth of Tampa Bay, and lies at the northern end of the west-central barrier coast (Duncan, 1993). Ebb-tidal deltas form from the accumulation of sediment seaward of inlets. While most ebb tidal deltas do not have portions that are supratidal, Egmont Key is an exception. Egmont Key is a vegetated supratidal portion of the Egmont tidal delta (Kling and Davis, 1997). As such, it is not a barrier island. The island lies parallel to the coastline and is located between two large tidal channels. This location is influenced by the complex interaction of tidal currents from the two channels, and the refraction of waves around the ebb-tidal delta and channel margin linear bars (Kling and Davis, 1997).

It is believed that the Holocene sands of Egmont Key are stratigraphically underlain by undifferentiated Plio-Pleistocene sediments that, in turn, are underlain by the Miocene Hawthorn Formation (Kling and Davis, 1997). The depth to bedrock, approximately 90 feet, is deeper directly under Egmont Key than any other location along the west central Florida coast (Duncan, 1993).

The geologic history of the island was performed by interpretation of 13 vibracores, seven radiocarbon dates, maps, and aerial photographs beginning in 1877 (Kling and Davis, 1997). Egmont Key consists of beach ridges, with each ridge forming at different periods and different orientations. Six beach ridges were identified (Figure 5). Beach ridge 1 was dated the oldest and 3-6 becoming successfully younger. The age was determined by averaging the ages of shells located within the beach ridges. From the data it was concluded that the intertidal sand shoal existed in the present location of Egmont Key at least 1000 years BP with the beach ridges developing shortly thereafter (Kling and Davis, 1997). Beach ridges form parallel to the present shoreline, therefore the orientation of these ridges also can help to determine historical shoreline orientations.

Sand supplied to the west central Florida coast is from erosion and reworking of the barrier islands, and pre-Holocene deposits. The constant reworking of the same sediments has produced a sediment supply, which is typically fine-grained, moderately well to well sorted quartz sand. Three facies were identified on Egmont Key;
a) Quartz sand facies- fine-grained quartz sand with little carbonate content represents ancient beach deposits.

b) Shelly Sand - This sand has a higher carbonate content (25-50%).

c) Shell Gravel - consists of >15% gravel, minimal mud, and a carbonate content up to 70%.

Wang, Kling, and Davis (1996) concluded that the dredging of the north channel shoal has had minimal effects on coastal erosion. This supported previous preliminary analyses by Davis (1990). The study further concluded that the navigation channel was causing focusing of wave energy onto the north end of the island.

Kling and Davis (1997) performed surveys and current measurements of the beach and nearshore zone. They concluded that the island is wave dominated and that nearshore tidal currents do not play a major role in the sediment processes on the west shoreline. Major shoreline changes were presumed to be associated with storm events though a direct link was not found. The deep channels were identified as impacting the sediment processes, but their role was poorly quantified.

E. SITE INVESTIGATIONS

The beaches were inspected through direct observation as well as beach surveying. As a result of these observations and measurements, four general zones of shoreline stability were identified. These are described in the following sections. The descriptions are intended to be qualitative. Quantitative methods will be described in Section G.

1. West Beach - Profile Lines 3-11 - Critically Eroded

The west side of the Key is highly erosional. Cabbage palms adjacent to the beach are dead or dying (Photograph 1) because of periodic overwash over the island and direct erosion of the roots.

With the erosion has come the endangerment and loss of historical resources. Five gun batteries once stood along the western shoreline of Egmont Key. The two southernmost batteries, Page and Burchsted, became inundated over the past 20 years as the shoreline receded. Gun battery Macintosh (Photograph 2) is five to fifteen feet behind a protective dune face. The face is scarped, and had no vegetation at the time of inspection. Gun battery Howard (Photograph 3) is located at the mean high water line and has been impacted by storms, particularly Tropical Storm Josephine. The structure was constructed of unreinforced concrete within an unknown foundation. The structure has cracked and differentially settled.

2. East Beach - Stable

The field inspection conducted in July and August 1997 revealed that the east side of the island (Photograph 4) consists of a stable beach, which supports salt tolerant vegetation.
above the mean high water line and provides nesting habitat for sea turtles. The wave energy along the east beach is very low. Although this area is accreational or stable; nevertheless, it should be periodically monitored.

3. South Beach - Profile Lines 12-14 - Migrating

The south end of the island is best described as a sandy spit (Photograph 5). Historical surveys indicate that the spit has existed in locations to the west of its present location for much of this century. The beach on the west side of this point seems to be eroding, with the east side accreting. Evidence of storm overwash exists on the spit. The erosion/accretion patterns have resulted in a migrating beach feature.

4. North Beach - Profile Lines 1-2 - Moderately Eroded

Gun battery Mellon (Photograph 6) is located within the north beach area, and stands approximately 20 feet from the dune crest. The beach to the north and east of Mellon battery is wide, and has a low elevation. Observations and surveys indicate that this area has recently accreted, but it must be monitored regularly, since its low elevation makes it vulnerable to overwash from storm waves. The area by the Coast Guard dock is low in elevation, but may receive minor quantities of sediment. The beach was observed to drop off quickly into the adjacent channel.

F. GENERAL CAUSES OF EROSION

Prior to the development of engineering alternatives it is worthwhile to understand the coastal processes that may have created the island and are eroding. The following processes may have impacted Egmont Key.

1. Onshore Transport During Geologic Time

The accelerating erosion rates of the island suggests coastal process changes over time. These may be related to man’s activities in the vicinity or be a totally natural occurrence. The creation of the island from submerged ebb shoal suggests landward transport of material from a wide and shallow shoal to create a low profile dry land feature. Early on, the landward transport of sand exceeded the longshore transport and losses off both ends of the island. Over time as the shoal deepened the longshore processes dominated and erosion has resulted.

2. Sea Level Rise

The level of the Gulf of Mexico is rising with respect to Egmont Key. Over the long term the island will recede solely due to increasing water levels and subsequent adjustments to the beach profile. Sea level rise typically constitutes only a small percentage of the observed
erosion on barrier islands. While sea level rise is impacting Egmont Key, it is only a minor impact.

3. **Wave Refraction**

As waves travel from deep water to the beach they change direction and height in relation to the water depths. On long barrier islands, the offshore bathymetry parallels the shoreline resulting in breaking waves that are spatially uniform in height and direction. At Egmont Key the offshore bathymetry is only parallel to the beach landward of the -6 foot NGVD contour (Figure 6). Seaward of the -6 foot contour the bathymetry is more irregular with linear bar features adjacent to both inlets. These shallower bars will tend to turn waves in their direction; therefore, there is an increased tendency for littoral transport away from the center of the island and towards the inlets. This phenomena is visible in the aerial photographs (originals) that were obtained as part of this study. This refraction process is dominating the coastal processes of the south end of the island where waves can break at steep angles to the beach. This encourages the lengthening of the sandy spit area.

4. **Nonlinear Tidal Hydraulics**

Kling and Davis (1997) describe the tidal hydraulics of the ebb shoal area with strong currents in the inlets and only minor tidal currents along the beaches. The southwest channel is also described as being flood dominant while the Egmont Channel is ebb dominant. The dominant tide usually has higher velocities and more sediment transport associated with them. When multiple inlets serve an inland water body, as in the case of Tampa Bay, some of the inlets will be ebb dominated and some will be flood dominated. It can be postulated that as a result of the dredging of Egmont Channel, that the tidal hydraulics of the bay and inlets are different today than in historic times. This change in hydraulics or in the degree of flood or ebb dominance may have affected the sediment transport at the ends of Egmont Key.

While the dredging of the Egmont Channel from a natural depth of 19 feet to 45 feet is a primary candidate for causing a change in the hydraulics, other man-induced and natural activities may have contributed as well. These include the following:

a. Construction of the causeway approaches to the Sunshine Skyway Bridge.
b. Dredging and filling within Boca Ciega Bay thereby affecting its tidal prism and the hydraulics within the Pass-A-Grille channel.
c. Morphodynamics of Passage Key and Mullet Key.

The role nonlinear tidal hydraulics has on the erosion on Egmont Key is not clear.

Early in the last century, the bulge in the south half of the island sacrificially eroded supplying sand to the north where shallow shoals restricted transport off the island, caused deposition, and accretion. Later, as the southern bulge decreased and the shoal at the north end deepened, the north half of the...
island became erosional, losing sand quickly to the inlet. The deepening of the shoal may have been partially accelerated by the navigational dredging, sand may have eroded from the shoal into the channel. Conversely, sand borrowed by Pinellas County on the north side of the channel would have had no effect on the shoal deepening south of the channel or erosion losses on the island. With the deeper shoal and a well defined flood marginal channel at the north end, the littoral drift flows freely into the deep navigation channel.

The bathymetry around the island was analyzed by comparing NOAA Nautical Chart 11411, Tampa Bay to Port Richey, and the 1997 offshore survey completed by Coastal Planning & Engineering (Figure 6). Some key points noted were the increased depth of the former -2 foot (MLW) shoal at the north end. This could be a possible cause of the high erosion at the north end. The shoal may have previously acted as a barrier, enabling sand to remain in the active beach zone. Another important finding is the position of the historic -6 foot contour is now approximately the -8 foot contour, indicating not only is the island eroded, the entire shoal may be eroding. There appears to be no sediment entering the ebb shoal area.

We conclude therefore that the accelerated erosion of the island is largely a natural phenomenon and may only secondarily be affected by man’s actions. Therefore, we cannot envision any change in maintenance dredging practices which would improve the situation.

G. SHORELINE CHANGES

Historically, Egmont Key is a dynamic island due to its location on an ebb shoal where it is influenced by tidal currents, waves, and wave generated currents. Historical shoreline changes were derived by analyzing aerials and surveys. In 1991 the Department of Natural Resources, now FDEP, established monuments on Egmont Key, at which time they performed an onshore survey. Coastal Planning & Engineering, Inc. and Echezebal and Associates resurveyed the FDEP lines in October 1997. The monument locations are shown in Figure 7. These two surveys were compared, volume changes (Table 1) and shoreline changes (Table 2) were computed. Historical shorelines and erosion rates were also analyzed using a shoreline comparison (Terry, 1996). This comparison, shown in Figure 7, includes shoreline data from 1877 to 1996, and indicates the island has changed dramatically. The 1991-1997 shoreline changes correlate well with previous shoreline changes and indicate an increase in erosion rates throughout the years.

1. 1877 to 1943

In the 66 years between 1877 and 1943, the island’s morphology began to change. The large bulge of shoreline at the south end of the island began to erode, with most of the sand being transported north. This resulted in accretion at the north end. The largest area of accretion occurred at R2, near the north end with 8.8 ft/yr, or 581 feet of shoreline accretion. The average erosion measured at the south end was 1,066 feet over the 66 year period. The erosion of the south end could be attributed to a northward movement of the southwest passage channel (Figure 7). Two large storms also occurred during this period, the 1921 and 1926 hurricanes, and could have been a contributing factor of the erosion that had occurred
at the south end. Kling and Davis (1997) suggest that the 1921 and 1926 hurricanes affected the southwest channel marginal linear bars, enabling waves to strike the south end of Egmont Key eroding away the wide portion of the island and generating a north-directed littoral drift.

During this time period 14,000 cubic yards per year eroded from the study area (R1 to R12), or 946,000 cubic yards total (Table 1). The net volume loss is low due to the accretion at the north end of the island.

2. 1943 to 1976

During this period erosion accelerated. The shoreline is oriented approximately north-south and retreated nearly uniformly (Figure 7). The average annual erosion rate during this time period was 12.9 feet per year with a volumetric loss of 55,000 cubic yards per year. The volume loss rate tripled since the prior time period. The large volumetric losses occurred near the center of the island, with the largest volumetric erosion occurring at R4 and R5 on the north central portion of the island.

3. 1976-1996

During the 20 year period from 1976 to 1996 the Gulf side of the island has retreated rapidly, with an average retreat rate of 25.4 feet per year for a total of 510 feet. This is the largest retreat rate calculated for any time period and confirms that the trend of increasing erosion (Figure 8). Figure 8 shows that the erosion rates have increased with time and that the highest rates between 1991 and 1997 occur between R8 and R9. The shoreline appears to be retreating at a high rate with the largest recession at R9. The south end of the Gulf front shoreline, from R9 south, is trending east-west with a spit forming to the south-east.

4. 1991 to 1997

The calculations for the 1991-1997 period were performed from beach profile surveys. The results show the beach is eroding at a high rate. The average annual erosion rate was 21.4 feet per year for the entire island and 24.6 feet per year on the Gulf side of the island. A volumetric change of -467,000 was estimated during this time period with an average annual erosion rate of 78,000 cubic yards per year. The highest erosion is still occurring near the center of the island (R8).

As indicated in a study conducted by Wang, Kling, and Davis, with the RCPWAVE model in 1996, the high erosion rates at the north end of Egmont Key (R3) are possibly caused by the Tampa Bay shipping channel immediately north of the island. The channel apparently focus wave energy on the north end of the island, which also contributed to the severe shoreline erosion.
NOTES:

1. COORDINATES SHOWN HEREON ARE REFER TO FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, HAD 83/90.
2. THE ELEVATIONS SHOWN HEREON ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM, (NVD) 1929.
3. SHORELINE SHOWN WAS DIGITIZED FROM 1997 AERIAL.
4. EQUIPMENT USED TO OBTAIN THE BATHYMETRIC DATA INCLUDED A TRIMBLE DGPS AND INNERSPACE 448 FATHOMETER INTERFACED TO COASTAL OCEANOGRAPHIC "KYPACK" DATA COLLECTION/PROCESSING SYSTEM.
5. TRACKLINES ON THE NORTH, SOUTH, AND WEST SIDE OF THE ISLAND WERE TYPICALLY RUN OFF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) MONUMENTS AT APPROXIMATELY 1000 FOOT SPACING. TRACKLINES ALONG THE EAST SIDE OF THE ISLAND WERE SPACED AT APPROXIMATELY 1250 FEET.
6. DUE TO SEAGRASS ALONG THE EAST SIDE OF EGMONT KEY THE BOAT WAS UNABLE TO SURVEY INTO WATER DEPTHS LESS THAN 3.5 FEET.
7. DUE TO THE LAYOUT OF THE TRACKLINES WHICH WERE INTENDED TO MEASURE NEARSHORE TOPOGRAPHY, THE BATHYMETRY AS SHOWN IS NOT INTENDED TO REPRESENT THE TRUE NATURE OF THE SEA FLOOR.
8. THE USE OF THIS BATHYMETRIC DATA REQUIRES KNOWLEDGE OF DATUM'S AND KNOWLEDGE OF COASTAL INLET AND ESTUARINE PROCESSES. THE DATA IS PROVIDED MAINLY FOR USE BY PROFESSIONALS.
9. THIS CHART IS NOT TO BE USED FOR NAVIGATIONAL PURPOSES.
10. CONTOURS SHOWN HEREON WERE GENERATED BY A COMPUTER.

LEGEND:

\( \Delta \) DENOTES FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) MONUMENT.

FIGURE 6
EGMONT KEY FLORIDA BATHYMETRIC SURVEY
COASTAL PLANNING & ENGINEERING, INC.
2481 NW BOCA RATON BLVD
BOCA RATON, FL 33431