

City of Marco Island North Marco Island Beaches & Inlet Management

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1- Introduction

This document is prepared to outline the coastal management plan for projects and active monitoring programs at the northern and northwest part of Marco Island, (i.e, Sand Dollar Island, Tigertail Lagoon, Hideaway Beach, Collier Creek, and Capri Pass). The management plan is part of ongoing coordination efforts between the City of Marco Island and Collier County on coastal management.

a) Management plan area

The management plan area includes the north and northwest coast of Marco Island as illustrated in **Figure 1**.



Figure 1. Management Plan Area

The management plan area includes the north and northwest coastal areas of the island, including the following distinct features/areas described below and illustrated in **Figure 2**:

- Tigertail Lagoon and Sand Dollar Island (Big Marco Pass Critical Wildlife Area)

Tigertail Lagoon and Sand Dollar Island are distinct coastal morphologic features that extend over two miles from central Marco Island beach to the northern tip of Marco Island. This tidal lagoon and sand spit system evolved from the Big Marco Pass ebb shoal system over the past 50 years. Those features are designated as Critical Wildlife Area by the State of Florida and can only be accessed by land through the Collier County Tigertail Beach Park at the south part of the critical wildlife area. The Big Marco Pass Critical Wildlife Area¹ includes over 200 acres of wildlife habitat encompassing over 100 acres of tidal lagoon, wetland and mudflats with over 12 acres of seagrass beds, 48 acres of coastal vegetation, and over 40 acres of sandy habitat areas.

- Collier County Tigertail Beach Park

Tigertail Beach Park is one of only three public beach access points on Marco Island and receives over 200,000 visitors annually. It has a large public parking area, playground, food concession, and watercraft rentals. A shuttle bus runs from local hotels to the park. In addition, an increasing number of private, rental, and commercial tourist boats access the lagoon from its northern entrance. The County Park is one of 510 points on the Great Florida Birding and Wildlife Trail and is considered one of the best all-around birding spots in southwest Florida. The 2022-2023 restoration of these features represented the initially constructed of the restoration program for this system. The restoration project included construction of a protective berm, restoration of over 20 acres of lost wetlands due the hurricane impacts since 2017 and restoration of tidal flow through the lagoon that provide critical wildlife habitat and upland storm protection.



Figure 2. Boundaries of main features along the northern part of Marco Island

- Hideaway Beach

Hideaway Beach is a private community of more than 600 properties over 300 acres on the northwest side of Marco Island in Collier County, Florida. Most of the Hideaway Beach coastline is surrounded by public lands, some of which are designated by the State as Critical Wildlife Area (CWA) including Tigertail Lagoon and Sand Dollar Island which extends from central Marco Island beach to the northern tip of Marco Island. The northern part of Hideaway beach represented the south bank of Big Marco Pass which was part of large scale morphologic changes due to the Big Marco Pass and Capri Pass evolution over more than half century. The chronic erosion of Hideaway northern shoreline since the 1990's prompted the 1997 inlet management plan commissioned by Collier County (HM 1997). Erosion control structures and beach restoration projects occurred between 1997 and 2013 resulted in stabilization of hideaway Beach

¹ <https://myfwc.com/conservation/terrestrial/cwa/big-marco-pass/>

shoreline with 19 T-groins and a terminal groin and establishment of nearshore and offshore borrow areas for beach maintenance.

- Collier Creek Entrance Channel

Collier Creek entrance channel is a channel connecting Collier Creek to Big Marco River. This channel is the main hydraulic connection and navigation access to several canal waterfront properties and Esplanade Marina to open waters. **Figure 3** is an aerial view looking south on the northern part of Marco island shows the location of Collier Creek Entrance Channel.



Figure 3. Collier Creek Entrance

The Entrance to Collier Bay was dredged in 2001, 2012, 2016, 2018 post H. Irma and 2023. Sand from the Collier Creek Dredging projects was placed on Hideaway Beach in 2001, placed in the nearshore in 2012, 2016, hauled offsite in 2018 disposal and on Hideaway Beach 2023.

- Capri Pass navigation Channel

The Capri Pass navigation channel represents the entrance channel to the federal Naples to Marco Pass channel and gulf access to Big Marco River and Collier Creek. The markers for Capri Pass channel were moved southward by the US Coast Guard in 2023 to align the navigation channel with best waters and avoid shoaling along the old navigation channel alignment. **Figure 4** shows the navigation channels north of Marco Island and illustrates the realignment of the entrance channel southward near Marco Island. The figure also illustrates the locations of marinas for private and commercial vessels using the Capri Pass Navigation Channel for gulf access.

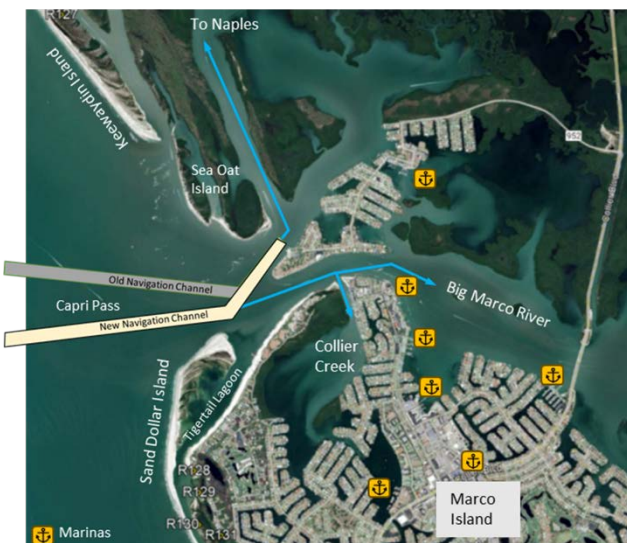


Figure 4. Capri Pass Navigation channel

b) Stakeholders

The following entities represent the local authorities and stakeholders within this system. The following entities are all involved in managing, maintaining or regulating coastal activities within this Management Plan Area.

- The City of Marco Island

The City of Marco Island (City) is the geographic location and municipal entity where most of the features and areas referenced in this plan are located. The City and its Hideaway Tax District are the owner/permit holder for the Tigertail Lagoon/Sand Dollar Island Ecosystem Restoration Project. The City is also the co-permittee with Collier County on the Hideaway Erosion Control project which includes maintenance of hideaway Beach and entrance to Collier Bay.

- Collier County

Marco Island is part of Collier County, and the two entities continue to coordinate in coastal management and matters of public interest to Collier County and Marco Island Citizens. Collier County Tigertail Beach Park, located at the south part of this management plan area is one of the major Collier County Beach Parks.

- Florida Department of Environmental Protection (FDEP)

The Florida Department of Environmental Protection is the State permitting authority and the owner of submerged lands. Permitting and coordination on construction activities and compliance with permit requirements are integral part of any management program that includes beaches, inlets and wetlands.

- Florida Fish and Wildlife Conservation Commission (FWC)

The Florida Fish and Wildlife Conservation Commission is an authority which reviews permitting projects and provides guidance related to wildlife and habitat protection. They mainly oversee project design and project management as it pertains to nesting marine turtles and shorebirds, both of which are federally protected.

- US Army Corps of Engineers (USACE)

The US Army Corps of Engineers is a federal permitting agency responsible for permitting work done in U.S. waters under the Clean Waters Act and the Rivers & Harbors Act. They evaluate the project's potential impacts and public interest, and review project design alternatives and impact mitigation from the permittee. They work alongside other federal entities like the National Ocean and Atmospheric Administration (NOAA) and NOAA's National Marine Fisheries Service (NMFS) for environmental and biological impact reviews. The role of USACE is also to maintain federal navigation channels.

- US Coast Guard

The US Coast Guard is responsible for public safety within the coastal zone. They partner with USACE for beach projects involving inlet channel maintenance dredging and beach nourishment.

2- Background

The management plan area includes the Capri Pass/ Big Marco River, the northern and northwest coastline to central Marco Island's gulf coast. The evolution of Capri Pass/ Big Marco Pass over more than half century is part of ongoing large scale natural tidal inlet evolution at the north end of Marco Island. Prior to the 1960's, Big Marco Pass was the main inlet between Marco Island and Sea Oat Island. In 1967 Capri Pass was opened on the up-drift side of Big Marco Pass creating a dual inlet system for few decades until Capri Pass became the main inlet for this system in the early 2000's. **Figure 5** shows the inlet configuration in 1969, two years after Capri Pass was opened, and a comparison of more recent conditions represented by 2011 aerial photos with the 1965 shoreline before Capri Pass opened. The opening of Capri Pass created a dual inlet system of Capri Pass and Big Marco Pass separated by a small island (Coconut Island) and by a large and complex ebb shoal system (Dabees and Kraus, 2004).

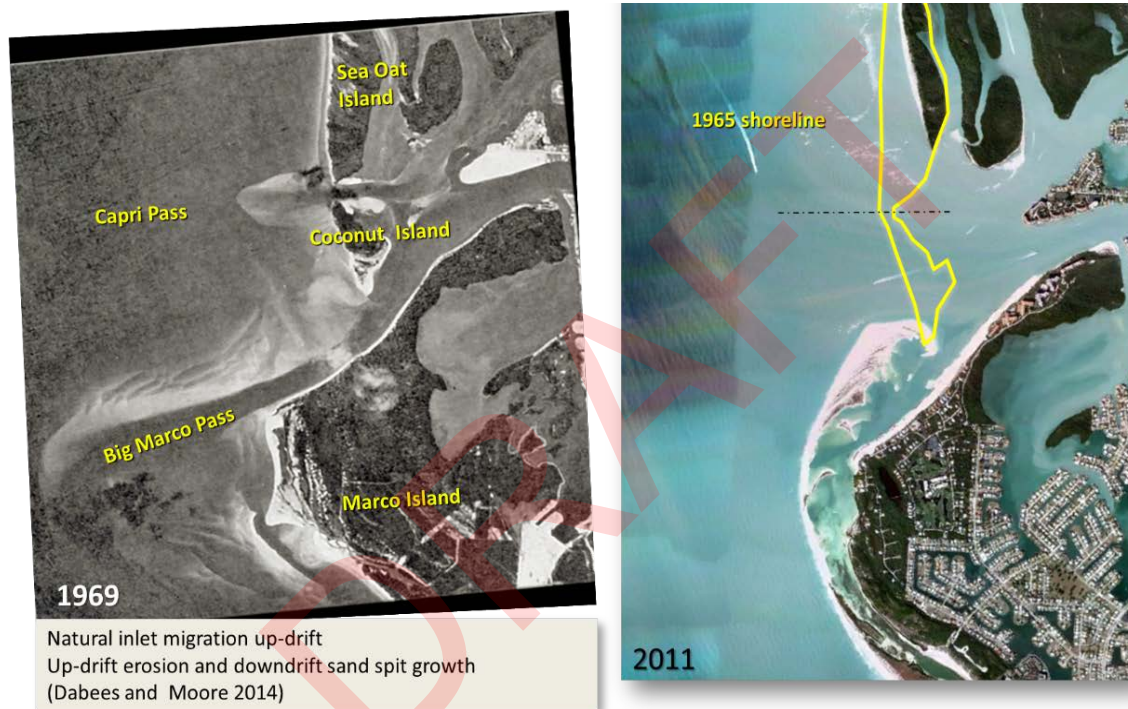


Figure 5: Comparison of the 1960's and existing conditions at the study area

The reduction of tidal prism of the original inlet resulted in onshore migration of its large ebb shoal rendering the pass more restrictive to tidal flow. The newer inlet, Capri Pass, became more dominant as it gradually captured a larger share of the tidal prism. The dual inlet process continued until the older inlet (Big Marco Pass) closed in the 2000's. Onshore movement of the ebb shoal at the closed inlet provided a large volume of sand to the down-drift beach (Marco Island) and formation of the active ebb shoal to the north. Formation of the new ebb shoal caused significant erosion on the north side of Capri Pass, along the south end of Sea Oat Island. The up-drift beach erosion is represented on the right end side of **Figure 5** which compares the 1965 and recent conditions represented in the figure by the 2011 aerial photo.

Figure 6 shows the varying stages of Sand Dollar Island in decadal stages. First, Sand Dollar Island was a detached emergent shoal in the 1980's along the south side of the Big Marco Pass. The island then

became a sand spit when the south end of it attached to Marco Island in the 1990's. During the 2000's, Sand Dollar Island continued to migrate onshore causing Big Marco Pass to close. In the mid 2000's, the small island that separated Big Marco Pass from Capri Pass collapsed onshore and eventually welded with the north end of the Sand Dollar Island sand spit during the 2010's.



Figure 6: Decadal stages of Sand Dollar Island evolution

a) History of regional coastal management

The varying segments incorporating the northern part of Marco Island have had management plans and management studies completed in the past. These management documents include:

- **1997:** *Big Marco and Capri Pass Inlet Management Study* by Humiston & Moore Engineers
- **2018:** *Collier Creek Management Plan* by Aptim Environmental & Infrastructure, INC.
- **2021:** *Tigertail Lagoon & Sand Dollar Island Ecosystem Restoration: Engineering Management Plan* by Humiston & Moore Engineers,
- **2021:** *Tigertail Lagoon/Sand Dollar Island Ecosystem Restoration Project: Environmental Management Plan* by Turrell Hall & Associates

b) Existing permits and management authorities

All of the coastal segments are incorporated in active state and federal permits for beach nourishment, dredging, and erosion control structures. Listed below are the active permits for this area:

- DEP-0309260-001-JC/ USACE- SAI-1988-00290: Hideaway Beach Nourishment and Groins Project, Collier Creek Navigation Segment
- DEP-0401778-001-JC, USACE SAI-2007-04224: Tigertail Lagoon/ Sand Dollar Island Ecosystem Restoration Project

3- Plan Objectives

The Beach Management Plan for North Marco Island encompasses many layers of coastal protection and environmental enhancements. Each portion of the management plan serves as a resilient storm impact buffer to the inland residential communities while simultaneously benefitting native wildlife/wildlife habitats. The management plan includes ecosystem maintenance, coastal resiliency and storm protection, regional sand management, navigation safety, public interest, and recreational benefits.

a) Ecosystem Maintenance

The FWC Critical Wildlife Area (CWA) that encompasses Sand Dollar Island and Tigertail Lagoon protects and provides vital habitats for various endangered shorebirds, including Piping Plovers, Wilson's & Snowy Plovers, Least Terns, Roseate Spoonbills, Red Knots, Ospreys, Bald Eagles, and more. Other endangered species like sea turtles and manatees also benefit from this protected environment. Sections of the beach are seasonally closed to the public to protect nesting and feeding birds.

By maintaining the habitat, enhancing its natural features, and repairing the environment after major storm impacts, this project area can promote plant and animal biodiversity. Furthermore, mangrove shorelines, like what is present along Hideaway Beach and south of it, can sequester significant amounts of carbon from the atmosphere while simultaneously protecting marine areas and supporting phytoplankton, which is a top oxygen producer.

b) Coastal Resiliency and Shore Protection

Implementations of nature-based features like Sand Dollar Island, a detached berm, is beneficial for wave dissipation and flood reduction from surge during energetic events such as tropical storms and hurricanes. Nature based features also have the ability to grow and adapt to rising sea levels while maintaining their function.

The Sand Dollar Island berm acts as the first line of defense from storms by absorbing most of the incoming wave energy from reaching Tigertail Lagoon and Hideaway Beach. **Figure 7** illustrates this function during Tropical Storm Eta, where offshore waves are large and minimal waves reach the lagoon.



Figure 7: Sand Dollar Island berm dissipating wave energy from entering Tigertail Lagoon and Hideaway Beach

c) Regional Sand Management

The Beach Management Plan involving Sand Dollar Island and Hideaway Beach utilizes renewable sand sources for beach renourishment and maintenance of the lagoon. In addition to permitted offshore sand borrow area lining Capri Pass navigation channel, the Sand Dollar Island sand spit acts as a sand trap to northward moving sand from the berm.

d) Navigation Safety

Active permits for this management area include potential benefits for improving navigation safety along the navigation channel. The offshore borrow area adjacent to the entrance to Capri Pass is being extended as disposal area for excess sand from Collier Creek. Future efforts may include verification of beach compatibility of the off shore borrow area extension and modifying existing permits to include the navigation channel as part of the off shore borrow area as sand source, so navigation safety can be further improved in a known shoaling areas. **Figure 8** displays this borrow area extension in relation to 2024 bathymetric conditions.

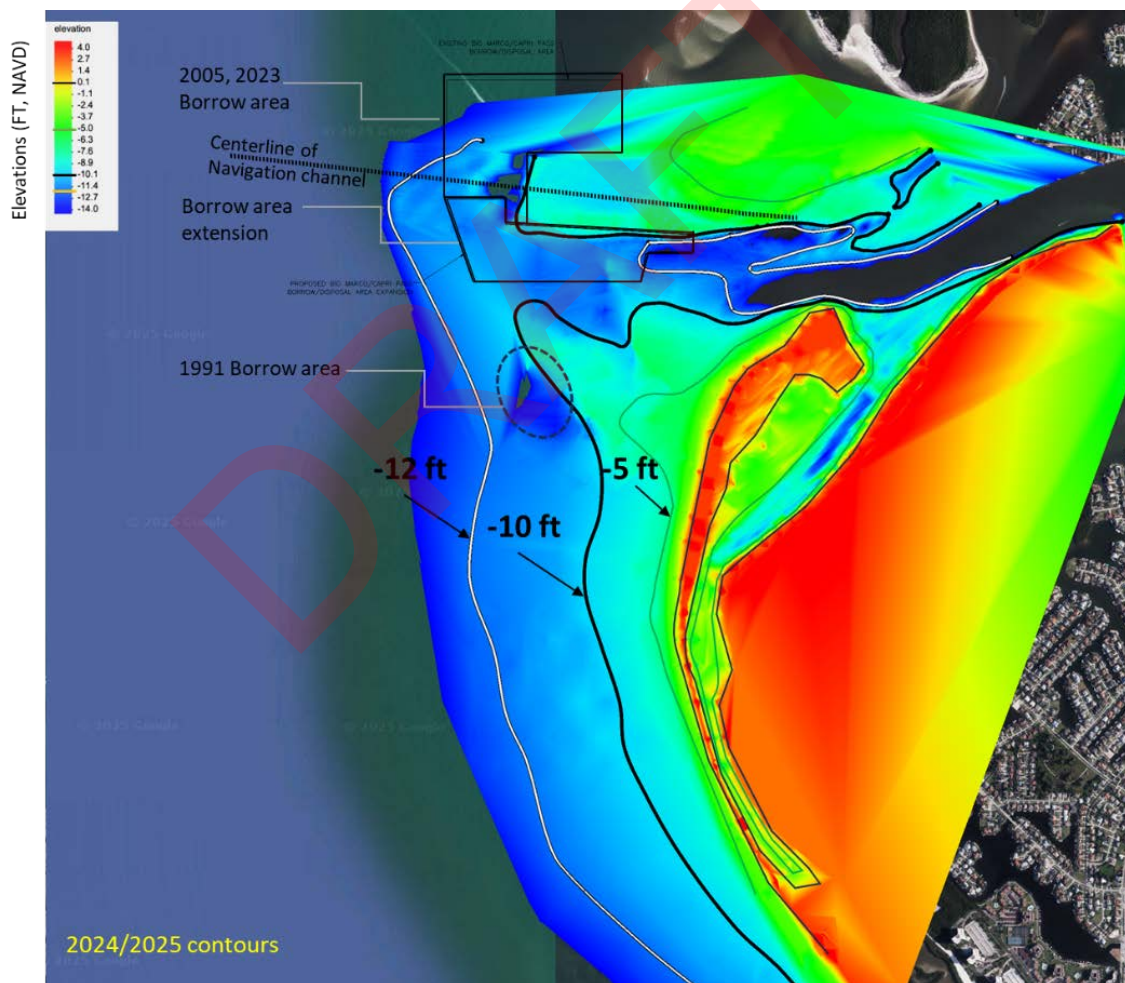


Figure 8: Offshore borrow area extension to improve navigational safety within Capri Pass.

- Yearly topographic monitoring surveys.
 - Dredging flow channel if necessary to maintain flow and water quality within the lagoon (based on annual monitoring survey)
- Hideaway Beach- City
 - Yearly topographic monitoring surveys.
 - Renourishment to design template based on need to maintain resiliency/shore protection (based on annual monitoring survey)
- Collier Creek Entrance Channel- County
 - Yearly topographic monitoring surveys.
 - Maintenance dredging when needed for navigation safety (monitoring based)
- Capri Pass Navigation Channel- County
 - Biennial monitoring surveys.
 - Coordination with US coast Guard on channel marker locations to align with best water for navigation safety (based on biennial monitoring survey)

b) Adaptive management

The Beach Management Plan provides an active framework with authorizations for management and adaptation measures from various agencies and stakeholders. Monitoring, maintenance and coordination with stakeholders provide valuable information that is used to design adaptive measures to improve system functions and coastal resiliency.