

Strategic Beach Management Plan

Introduction

**Division of Water Resource Management
Florida Department of Environmental Protection**

June 2015



Manatee County Shore Protection Project being constructed in 2013.

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FOREWORD

The Strategic Beach Management Plan (SBMP) provides an inventory of Florida's strategic beach management areas fronting on the Atlantic Ocean, Gulf of Mexico, Straits of Florida and an inventory of Florida's 66 coastal barrier tidal inlets. The Florida Legislature has declared that the Department of Environmental Protection constitutes the beach and shore preservation authority for the state and has directed the Department to develop and maintain a comprehensive long-term management plan for the restoration and maintenance of the state's critically eroded beaches fronting the Atlantic Ocean, Gulf of Mexico and the Straits of Florida. The Department has developed the SBMP, incorporating by reference adopted Inlet Management Implementation Plans (IMP's), and held public meetings for the which the SBMP has been prepared, in accordance with Sections 161.091, 161.101, and 161.161, Florida Statutes.

The Department initially adopted the SBMP in October 2000, and has subsequently updated the SBMP in May 2008, to reflect current conditions and management strategies. Public meetings were held on December 9th, 10th and 11th of 2014 for the updated SBMP, dated June 2015. Comments were received from the public during the meetings and also by way of e-mails after the public meetings. The public comments were reviewed and edits were made to the SBMP by the Department that were deemed necessary.

Upon adoption, a new or updated IMP prepared by the Department, shall supersede the inlet management strategies for that inlet as listed in an existing SBMP. Likewise, the strategies set forth in an existing SBMP shall supersede strategies in any previously adopted IMP to the extent that they may be in conflict. In short, the document with the latest date for the IMP strategies applies.

The SBMP is based upon the supporting data referenced in the SBMP or contained within files of the Department. Each strategy contained in the SBMP is subject to continuing evaluation, and subsequent updates, as part of the Department's environmental permitting and authorization process.

The strategies identified in the SBMP shall be eligible for state financial participation subject to Department approval and appropriation from the Florida Legislature. The level of state funding shall be determined based upon the activity being conducted and applicable to Department statutes and rules. The Department may choose not to participate financially if the proposed method for implementation is not cost effective or fails to meet the intent of Chapter 161, F.S. Nothing in the SBMP precludes the evaluation of other alternative strategies which are consistent with Chapter 161, Florida Statutes.

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STATE OF FLORIDA STRATEGIC BEACH MANAGEMENT PLAN

INTRODUCTION

Beaches are dynamic land forms at the edge of the ocean or gulf subject to both natural and man-induced erosion. Sand moves along the shore due to wind driven currents and tides, and storms can cause dramatic changes to the beach. The majority of man-induced erosion is attributed to the creation and maintenance of inlets, where the sand has historically been removed from the coastal system, and the natural drift of sand along the shore is blocked by jetties, trapped in channels, or moved into ebb and flood shoals. The development and the placement of infrastructure in close proximity to the shore has also contributed to coastal erosion by limiting the amount of sand stored in dunes and hardening the shore for protection of upland property. Even on the calmest of weather days in Florida, the sand is always moving within the littoral zone.

Florida depends on its 825 miles of sandy beaches fronting the Atlantic Ocean, Gulf of Mexico and Straits of Florida for the enjoyment of its residents and tourists. Beaches are Florida's primary tourist attraction, generating millions of dollars for Florida's economy. The [*Economics of Florida's Beaches, Phase I - The Impact of Beach Restoration \(2003\)*](#) highlights the importance of beaches to Florida's ocean economy, see also the [*Economics of Florida's Beaches, Phase II - The Economics of Beach Tourism in Florida \(2005\)*](#). For every one dollar spent on beach nourishment in Florida, eight dollars are collected in state taxes paid by out-of-state tourists and resident users of Florida's beaches. Nourished beaches contribute to the expanding federal, state, and local tax bases; increase sales, income, and employment opportunities from resident and visitor spending; and enhance property values by protecting the developed shorefront from storm surges and prevent loss of upland property and protect wildlife habitat. Beaches provide habitat for many species, including endangered and threatened marine turtles, birds and mammals. Additional studies on the economics of beaches are referenced below.

The Florida Department of Environmental Protection (FDEP) has developed a multiyear repair and maintenance strategy to carry out the state responsibilities of a comprehensive, long-range, statewide program of beach erosion control; beach preservation, restoration, and nourishment; and storm and hurricane protection. The principles of this strategy are to:

- Maximize the infusion of beach-quality sand into the coastal system;

- Implement those projects that contribute most significantly to addressing the state’s beach erosion problems;
- Promote inlet sand bypassing to replicate the natural flow of sand interrupted by improved, modified or altered inlets and ports;
- Extend the life of beach restoration projects and reduce the frequency of nourishment;
- Encourage regional approaches to ensure the geographic coordination and sequencing of projects;
- Reduce equipment mobilization and demobilization costs.

The Strategic Beach Management Plan (SBMP) documents the specific strategies for constructive actions at critically eroded beaches and inlets consistent with these principles. Projects must have a clearly identifiable beach management benefit consistent with the SBMP to be eligible for state funding assistance. Resources and opportunities to achieve the strategic goals of the program are discussed in the context of a subregion defined by the boundaries of distinct coastal littoral processes. The SBMP also provides a summary of previous actions taken to address beach erosion within each subregion.

Beach and inlet management activities and practices in the State of Florida are governed by the [Dennis L. Jones Beach and Shore Preservation Act](#), Chapter 161, Florida Statutes that became law in 1965.

Feasibility studies and reports conducted by local governments, consultants, federal and state agencies are incorporated by reference at the end of each subregion. The [Critically Eroded Beaches Report](#), lists those segments of shoreline designated by FDEP as critically eroded, and therefore are eligible for state funding assistance for beach management activities. Project cost estimates and schedules may be found in the [Beach Management Funding Assistance Program](#). Additional information about beach management projects by County can be found at the [Local Government Funding Request](#) link and also at the [Long Range Budget Plan](#) link.

The SBMP is a dynamic management tool for use by state, local and federal government officials. It is intended to be updated periodically as specific strategies are implemented, new resources and opportunities are identified, and proposed strategies are developed by FDEP and federal or local government sponsors. The entire SBMP is available on the FDEP, [Division of Water Resource Management](#) web site with paper copies available upon request.

ORGANIZATION OF THE SBMP

There are 7 regions and 32 subregions that are described in the SBMP, as shown in Figure 1. There is a

brief overview of the area that describes inlets, storms and critically eroded shoreline. Each description of a project area has a title describing the geographical area, county and range (R) survey markers that define the critically eroded segment of shoreline in the beginning of each subregion. This information can also be found in the critical erosion report. For inlets or passes, the inlet name would be labeled and the R survey marker on either side of the inlet would be stated along with the county. The paragraph below describes the geographical area; the proposed or constructed projects, a project history table and the specific project boundary. At the bottom of each geographical area and project description is a separate **strategy paragraph** that describes how to best manage the critically eroded shoreline.

The **strategy paragraph** includes the planned activities that the State recommends to mitigate critical erosion and also the activities that would be considered eligible for State cost sharing. There are several elements required for beach management activities to be eligible for State cost sharing: proposed work must be consistent with Chapter 161, Florida Statutes, proposed work must be within a critical erosion area designated by the State, proposed work must be consistent with the strategies listed in the State adopted SBMP and/or Inlet Management Plans (IMPs), proposed monitoring must be required by state or federal permit and the proposed work must have a FDEP approved scope of work. To be consistent with Chapter 161, bypass material must be placed on the dry beach to be considered eligible for cost sharing. State cost sharing is provided through Legislative appropriations based on proposed activities listed in the annual local government funding request (LGFR), processed through the [*Beach Management Funding Assistance Program*](#).

When describing project activities, the first beach project is described as a “beach restoration” project and any project constructed after the first restoration is described as a “beach nourishment” project. Bypassing projects take place at inlets or passes and take sand from one side of the inlet, or from within the inlet or its shoals and place the material along the shorelines adjacent to the inlet to mitigate the erosive effects of the inlet. At the end of each subregion, there will be a summary of each subregion strategies for beach and inlet management. This would include sponsors and funding, project coordination, environmental protection, sand sources and additional information found in the introduction and subregion maps.

It should also be noted that each original or updated inlet management plan, adopted by FDEP after the adoption of the *SBMP*, supersedes the strategies listed in the *SBMP*. Likewise, the strategies set forth in the *SBMP* supersede strategies in any previously adopted inlet management plan to the extent that they may be in conflict. It is also important to remember when reading the *SBMP* that there are other

documents that may get updated or amended independently of the SBMP from time to time; such as [permits](#), [critical erosion report](#) and [inlet management plans](#).

PERMITTING

All projects proposed to implement the SBMP strategies must obtain the appropriate federal and state permits and authorizations and must comply with local comprehensive plans and ordinances. Applicants must demonstrate that the project will comply with Florida's water quality standards and must protect threatened and endangered species as required in [Biological Opinions](#) issued by the [U.S. Fish and Wildlife Service](#) and [NOAA's National Marine Fisheries](#). Projects must also comply with the authorities of the [Florida Fish and Wildlife Conservation Commission \(FWC\)](#), the Florida Division of Historical Resources in the Department of State, and other state agencies as incorporated in the [Florida Coastal Management Program](#) with in the [Florida Coastal Office](#). All beach management or inlet projects must obtain a joint coastal permit (JCP) through FDEP's [Beaches, Inlets & Ports Program](#). Each project that obtains or is pursuing a permit can be viewed at the [Permits by County](#) link. Permitting (JCP) considerations typically include an assessment of the compatibility of sand proposed to be utilized with the existing beach; project dimensions that may adversely affect nearshore hardbottom, or allow additional lighting on the beach that could affect marine turtle nesting and hatchlings; turbidity levels at the borrow site and placement site; and seasonal windows of construction and construction management to protect marine turtles, manatees, Gulf sturgeon, and nesting and migrating shorebirds and other imperiled species. Projects in or near [Aquatic Preserves](#) and other Outstanding Florida Waters must comply with more stringent state water quality standards. The Palm Beach Island [Beach Management Agreement \(BMA\)](#) is a pilot project to manage the beach and permitting activities as a complete cell from Lake Worth Inlet to South Lake Worth Inlet. When constructing a beach restoration project, sovereign submerged state land is covered by sand and shortly before the project is constructed a mean high water line (MHWL) survey is conducted to establish an [erosion control line \(ECL\)](#). The ECL establishes and defines the boundary between upland private land and the newly constructed state owned public land or beach. Locating sovereign submerged lands is discussed further in [Chapter 253, F.S.](#)

FDEP also has the [Coastal Construction Control Line \(CCCL\) Permitting Program](#) that establishes an area of jurisdiction in which special siting and design criteria are applied for upland construction and related activities to minimize the impact to the beach and dune system. Condominiums, hotels, homes, pools and boardwalks etc. that are planning to be constructed seaward of the CCCL must meet the requirements of this program to protect the beach and dune system.

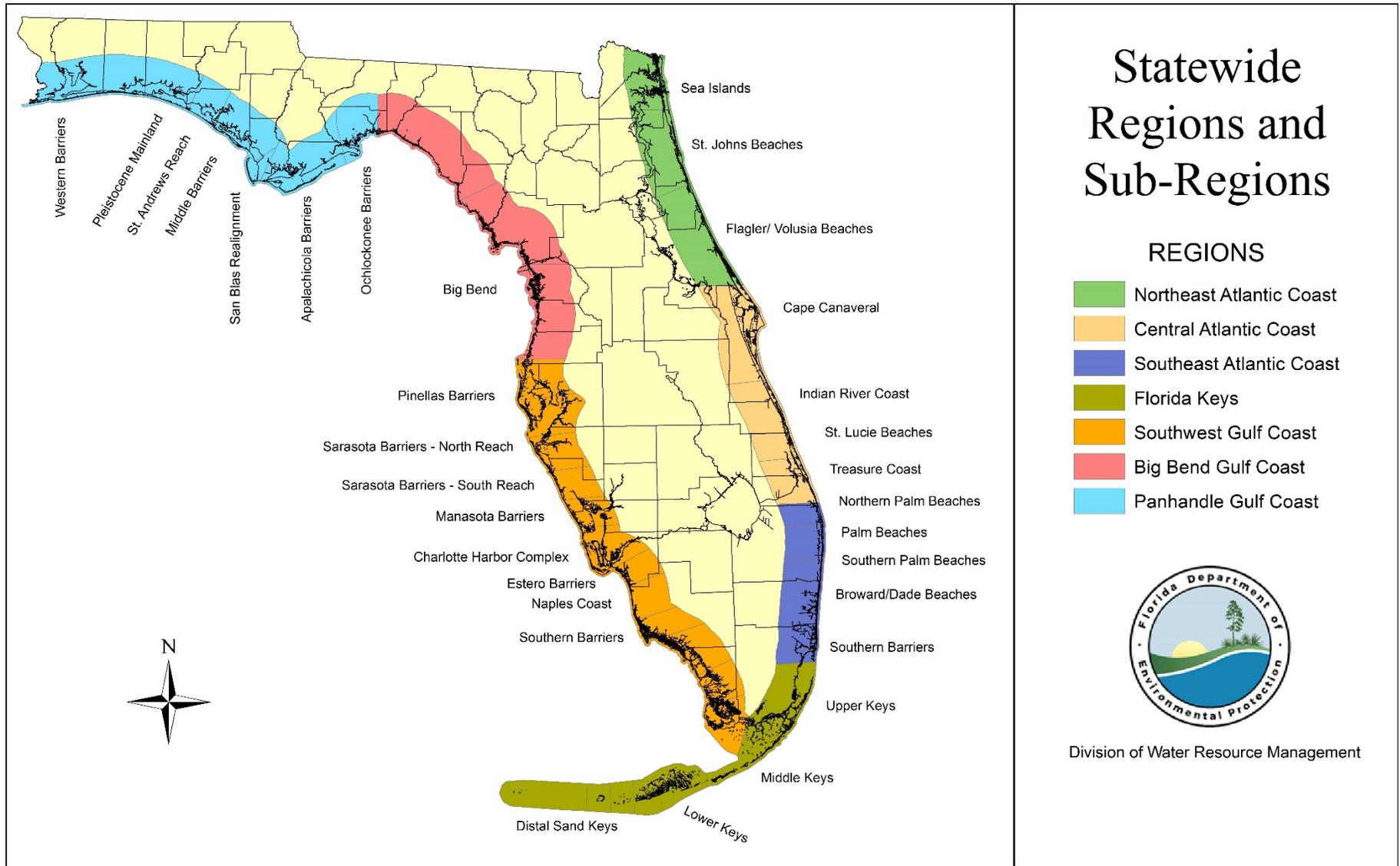


Figure 1. Statewide regions and sub-regions map.

MONITORING PROGRAMS

FDEP conducts [regional coastal monitoring](#) to collect and process beach profile survey data and aerial photography. Monitoring of beach and inlet management projects is incorporated into regional monitoring activities to avoid duplication. Physical and environmental monitoring programs are being conducted at ongoing and recently completed projects. FDEP cost shares in physical and environmental monitoring programs that are required by state and federal permits. FDEP has also developed technical specifications for [Monitoring Standards for Beach Erosion Control Projects](#).

Physical monitoring consists of the collection and analysis of topographic and bathymetric surveys of the beach and dune system, inlet channels and shoals, and the nearshore and offshore zones to the depth of active littoral sand transport in the area. Where sandy beaches are located, FDEP has range or reference (R) survey markers approximately every 1000 ft for the purpose of measuring beach erosion and beach accretion. The survey makers have been used since the early 1970's to measure beach erosion and provide location points along Florida's sandy coastline. Physical monitoring also consist of aerial photography found on [Map Direct](#) and a collection of aerials and shoreline trends systems found on the [COASTS](#) link. Physical monitoring is used to assess and manage beach erosion control projects and inlet sand bypassing projects, to track shoreline position and volumetric changes to document performance and nourishment intervals, and to validate the sediment budget for littoral sand transport through the area.

Environmental monitoring consists of the collection and analysis of nesting and hatching data for marine turtles and shorebirds; density and diversity of epibiotic species on nearshore hardbottom and artificial reefs; submerged aquatic vegetation and some fish surveys. Environmental monitoring is used to assess the effects of beach erosion control projects and the success of artificial reefs required as mitigation for project impacts.

EMERGENCY RESPONSE

If the Governor declares a shore erosion emergency, FDEP may spend limited state funds to alleviate shore erosion. There also may be federal public assistance funds to help cover the costs of emergency response work and storm damage recovery. FDEP recommends that local sponsors develop emergency response plans for post-storm recovery and emergency beach maintenance. These plans should include a damage assessment methodology, preliminary plans and contract documents, applications for emergency permits, sources of sand and identification of a local funding sources. FDEP also recommends that communities document ongoing programs they have to monitor beach erosion and

maintain their beach and dune systems; this documentation may help determine the scope of eligible recovery work if federal public assistance is available after a disaster event. Following Hurricane Opal in 1995 and the 2004/ 2005 hurricane seasons, FDEP created [Recovery Plans](#) which focuses on projects to be constructed prior to the next hurricane season. The Legislature allocated additional funding to implement these plans. The recovery plans identified projects which would provide a reasonable level of protection to the upland along the areas impacted, and were meant to be coordinated by all levels of government in the most efficient manner possible. FDEP also creates [Post Storm Reports](#) after tropical storms or hurricanes impact the state’s shoreline, such as with Hurricane Floyd in 1999 as shown in Figure 2.

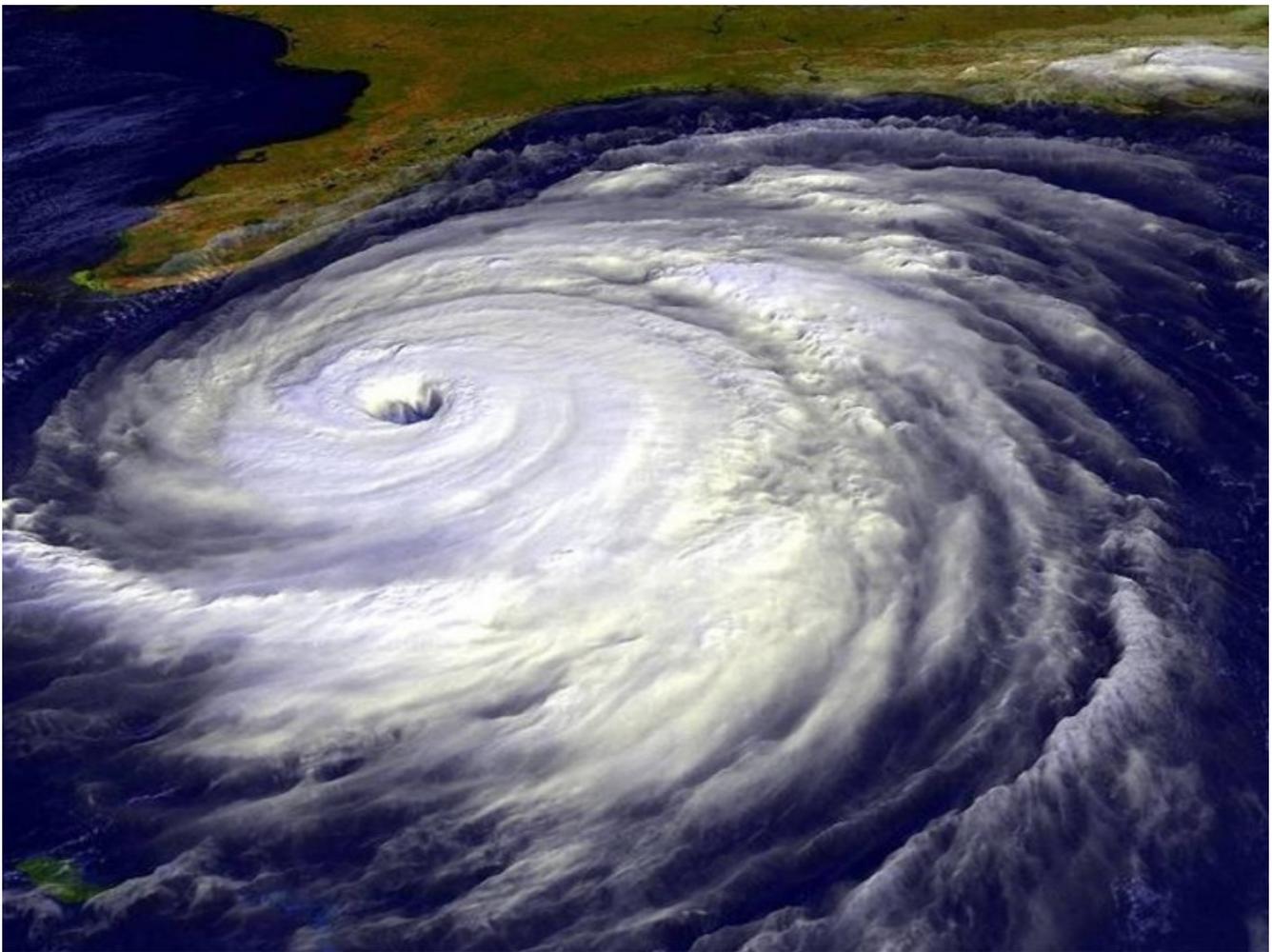


Figure 2. NOAA satellite image of Hurricane Floyd taken on September 14, 1999

The [Florida Division of Emergency Management \(FDEM\)](#) and FDEP encourages everyone in Florida to [get a plan](#) and be prepared for natural disasters and hurricane season. The Atlantic hurricane season begins June 1 and ends on November 30.

PROJECTS

FLORIDA INLETS

There are 66 coastal barrier inlets in Florida with 21 inlets along the Atlantic coast and 45 inlets along the Gulf coast, as shown in Table 1, Table 2, Table 3, and Table 4. [Inlet Management Plans \(IMP\)](#) adopted by FDEP are incorporated into the SBMP by reference along with other inlet management strategies. Florida’s inlet management plan strategies are governed by Sections 161.142 F.S. and 161.143 F.S. with the intent of balancing the inlet’s sediment budget. Not all inlet management studies conducted for local governments by consultants are adopted by FDEP into the State’s IMP’s. There are currently a total of 17 inlet management plans that have been adopted by FDEP.

See Figure 3 below that shows the locations of Florida’s managed inlets.

Table 1. Florida Atlantic coast managed inlets.

Managed Inlet	County	IMP	Year Adopted
St. Mary’s River Entrance*	Nassau	Yes	1998
St. Johns River Entrance*	Duval	No	N/A
St. Augustine Inlet*	St. Johns	Yes	Updated in 2014
Ponce de Leon Inlet*	Volusia	Yes	1997
Port Canaveral Inlet*	Brevard	Yes	Updated in 2014
Sebastian Inlet	Brevard and Indian River	Yes	2000
Ft Pierce Inlet*	St. Lucie	Yes	1997
St. Lucie Inlet*	Martin	Yes	1995
Jupiter Inlet	Palm Beach	Yes	1997
Lake Worth Inlet*	Palm Beach	Yes	1996
South Lake Worth Inlet	Palm Beach	Yes	1999
Boca Raton Inlet	Palm Beach	Yes	1997
Hillsboro Inlet	Broward	Yes	1997
Port Everglades Entrance*	Broward	Yes	1999
Bakers Haulover Inlet*	Dade	Yes	1997
Government Cut*	Dade	No	N/A

Table 2. Florida Atlantic coast unmanaged inlets.

Unmanaged Inlet	County	IMP	Year Adopted
Nassau Sound	Nassau	No	N/A
Fort George Inlet	Duval	No	N/A
Matanzas Inlet	St. Johns	No	N/A
Norris Cut	Dade	No	N/A
Bear Cut	Dade	No	N/A

Table 3. Florida Gulf coast managed inlets.

Managed Inlet	County	IMP	Year Adopted
Pensacola Pass*	Escambia	No	N/A
East Pass*	Okaloosa	Yes	Updated in 2013
St. Andrews Inlet*	Bay	No	N/A
Mexico Beach Inlet	Bay	No	N/A
Bob Sikes Cut*	Franklin	No	N/A
Hurricane Pass	Pinellas	No	N/A
Clearwater Pass*	Pinellas	No	N/A
Johns Pass*	Pinellas	No	N/A
Blind Pass*	Pinellas	No	N/A
Egmont Channel*	Hillsborough	No	N/A
Longboat Pass*	Manatee	No	N/A
New Pass*	Sarasota	No	N/A
Venice Inlet*	Sarasota	Yes	1998
Stump Pass	Charlotte	No	N/A
Boca Grande Pass*	Lee	No	N/A
Blind Pass	Lee	No	N/A
Matanzas Pass	Lee	No	N/A
Wiggins Pass	Collier	No	N/A
Clam Pass	Collier	No	N/A
Doctors Pass	Collier	Yes	1997
Gordon Pass*	Collier	No	N/A

Table 4. Florida Gulf coast unmanaged inlets.

Unmanaged Inlet	County	IMP	Year Adopted
Eloise Inlet	Bay	No	N/A
St. Joseph Bay Entrance	Gulf	No	N/A
Indian Pass	Gulf and Franklin	No	N/A
West Pass	Franklin	No	N/A
East Pass	Franklin	No	N/A
Ochlockonee Bay Entrance	Franklin	No	N/A
Mashes Sands Cut	Wakulla	No	N/A
Pass-a-Grille*	Pinellas	No	N/A
Bunces Pass	Pinellas	No	N/A
Southwest Channel*	Hillsborough and Manatee	No	N/A
Passage Key Inlet*	Manatee	No	N/A
Big Sarasota Pass	Sarasota	No	N/A
Gasparilla Pass	Charlotte	No	N/A
Captiva Pass	Lee	No	N/A
Redfish Pass	Lee	No	N/A
San Carlos Bay Entrance	Lee	No	N/A

Unmanaged Inlet	County	IMP	Year Adopted
Big Carlos Pass	Lee	No	N/A
New Pass	Lee	No	N/A
Big Hickory Pass	Lee	No	N/A
Little Marco Pass	Collier	No	N/A
Big Marco / Capri Pass Complex	Collier	No	N/A
Caxambas Pass	Collier	No	N/A
Blind Pass	Collier	No	N/A
Morgan Pass	Collier	No	N/A

¹ – Note: While certain inlets have inlet management plans adopted by the Department, others may have special inlet management strategies in the *Strategic Beach Management Plan*.

² – Note: * by inlet name is a federal navigational project managed by USACE at some capacity.

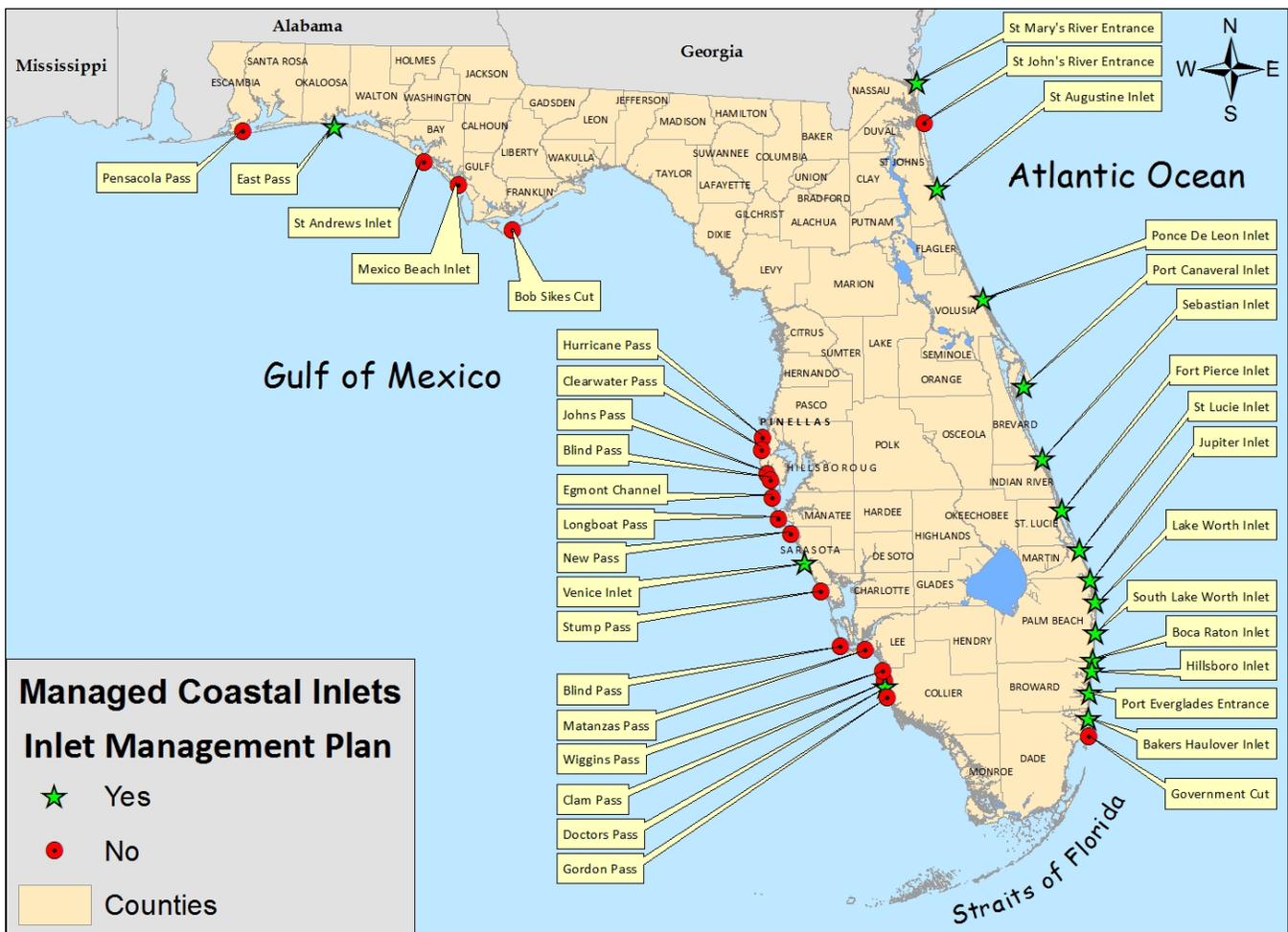


Figure 3. Florida's managed inlets.

MANAGEMENT OVERVIEW

In June, 2015, approximately 409.9 miles of sandy beaches and 8.7 miles of inlet shoreline are designated critically eroded, a condition where previous or continuing erosion threatens private or public development and infrastructure, or significant cultural or environmental resources (Table 5). 227.6 miles are under active management. A listing of the critically eroded beaches under active management is provided in Table 6 with a total of 78 listed projects.

Active management to mitigate the erosive impacts of many inlets to the adjacent beaches has been implemented. Active management includes beach and dune restoration, beach nourishment, and feeder beaches, or inlet sand bypassing and other actions to mitigate the erosive effects of inlets. The first beach restoration in Florida may have begun as early as 1949 and again in 1951, which is communicated in greater detail in the Clearwater Beach paragraph of the Southwest Gulf Coast Region. See Figure 4 below that shows Florida’s managed beaches.

Table 5. Miles of critically eroded beaches under active management by region.

REGION	CRITICALLY ERODED BEACHES (Miles)	CRITICALLY ERODED MANAGED BEACHES (Miles)	% MANAGED
Northeast Atlantic Coast	56.0	21.6	39
Central Atlantic Coast	82.7	45.3	55
Southeast Atlantic Coast	72.1	45.8	64
Florida Keys	10.2	1.5	15
Panhandle Gulf	84.3	51.9	62
Big Bend Gulf	2.3	0.2	9
Southwest Gulf	102.3	61.1	60
TOTAL	409.9	227.4	56



Figure 4: Florida's managed beaches

Table 6. Miles of critically eroded beaches under active management by project name, with a total of 78 listed projects.

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
<i>Northeast Atlantic Coast Region</i>				
Sea Islands Subregion				
Nassau County Shore Protection Project	Nassau	R9-R33	4.4	Yes
South Amelia Island Beach Nourishment Project	Nassau	R60-R80	3.3	No
Duval County Shore Protection Project	Duval	V501-R80	10.1	Yes
St. Johns Beaches Subregion				
Anastasia State Park Beach Restoration	St. Johns	R132-R137	0.9	No
St. Johns County Shore Protection Project	St. Johns	R137 -R151	2.9	Yes
<i>Central Atlantic Coast Region</i>				
Cape Canaveral Subregion				
Brevard County Shore Protection Project – North Reach	Brevard	R1-R53	9.4	Yes
Patrick Air Force Base Beach Restoration Project	Brevard	R53-R75.3	4.0	Yes
Brevard County Shore Protection Project – South Reach	Brevard	R118-R139	3.8	Yes

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Indian River Coast Subregion				
Ambersand Beach Nourishment Project	Indian River	R1-R17	3.1	No
Wabasso Beach Restoration Project – Sector Three	Indian River	R20-R51.3	6.1	No
Indian River County Beach Restoration Project – Sector Seven	Indian River	R99-R108	1.7	No
St. Lucie Beaches Subregion				
Fort Pierce Shore Protection Project	St. Lucie	R34-R41	2.3	No
South St. Lucie Beach Restoration	St. Lucie	R98-R115	3.4	No
Treasure Coast Subregion				
Martin County Shore Protection Project	Martin	R1-R25.6	4.2	Yes
Bathtub Beach	Martin	R34-R36	0.2	No
St. Lucie Inlet Management Plan Implementation	Martin	R50-R55	1.0	Yes
Jupiter Island Beach Nourishment Project	Martin	R75-R115	6.1	No
Southeast Atlantic Coast Region				
Northern Palm Beaches Subregion				
Jupiter Carlin Shore Protection Project	Palm Beach	R13-R19	1.1	Yes

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Juno Beach Nourishment Project	Palm Beach	R26-R38	2.4	No
Palm Beaches Subregion				
Lake Worth Inlet Management Plan Implementation	Palm Beach	R76-78	0.6	Yes
Mid-Town Beach Nourishment Project	Palm Beach	R89-R102	2.8	No
Phipps Ocean Park Beach Restoration Project	Palm Beach	R116-R126	1.4	No
Ocean Ridge Beach Nourishment Project	Palm Beach	R152-R159	1.4	Yes
Southern Palm Beaches Subregion				
Delray Beach Shore Projection Project	Palm Beach	R175.5-R188	2.7	Yes
Boca Raton Shore Projection Project (North)	Palm Beach	R205-R212	1.5	Yes
Central Boca Raton Beach Nourishment Project	Palm Beach	R216-R222	1.5	No
South Boca Raton Beach Nourishment Project	Palm Beach	R223-R227.9	1.0	No
Broward-Dade Beaches Subregion				
Hillsboro Beach Nourishment Project	Broward	R6-R12	1.2	No
Broward County Beach Erosion Control Project-Segment II	Broward	R25-R53	5.4	Yes
John U. Lloyd State Park Beach Restoration Project	Broward	R86-R94	1.6	Yes

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Broward County Beach Erosion Control Project-Segment III	Broward	R101-R128	5.3	Yes
Dade County Shore Protection Project, Sunny Isles	Miami-Dade	R7-R20	2.6	Yes
Dade County Shore Protection Project, Bakers Haulover Park	Miami-Dade	R20-R26.7	1.6	Yes
Dade County Shore Protection Project, Bal Harbor, Surfside, Miami Beach	Miami-Dade	R27-R74.4	9.2	Yes
Southern Barriers Subregion				
Key Biscayne Shore Protection Project	Miami-Dade	R101-R113	2.5	Yes
<i>Florida Keys Region</i>				
Curry Hammock State Park Beach Nourishment Project	Monroe	na	0.1	No
Bahia Honda State Park Beach Restoration Project	Monroe	na	0.5	No
Smathers Beach Nourishment Project	Monroe	na	0.6	No
Fort Zachary Taylor Historical State Park Beach Nourishment Project	Monroe	na	0.3	No
<i>Panhandle Gulf Region</i>				
Western Barriers Subregion				
Pensacola Beach Restoration Project	Escambia	R107-R151	8.2	No
Navarre Beach Restoration Project	Santa Rosa	R192-R213.5	4.1	No

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Eglin Air Force Base	Okaloosa		5.1	Yes
Western Destin	Okaloosa		1.2	No
Destin-Western Walton Beach Restoration Project	Okaloosa	R39-R50	2.1	No
Pleistocene Mainland Subregion				
Destin-Western Walton Beach Restoration Project	Walton	R1-R23	5.0	No
St. Andrews Reach Subregion				
Carillon Beach and Pinnacle Port Beach Restoration Project	Bay	R1-R5	1.5	Yes
Panama City Beach Shore Protection Project	Bay	R5-R91.5	16.3	Yes
St. Andrews Inlet Management Plan Implementation	Bay	R91.5-R97	0.9	Yes
St. Joseph Peninsula Beach Restoration	Gulf	R67-R105.5	7.5	No
Big Bend Gulf Coast Region				
Sun Coast Subregion				
Fort Island Gulf Park Beach Restoration Project	Citrus	N/A	0.2	No

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
<i>Southwest Gulf Coast Region</i>				
Pinellas Barriers Subregion				
Honeymoon Island State Park Beach Restoration Project	Pinellas	R8-R10.5	0.5	No
Pinellas County Beach Erosion Control Project-Sand Key	Pinellas	R56-R66	1.8	Yes
Pinellas County Beach Erosion Control Project-Sand Key	Pinellas	R71-R107	6.8	Yes
Pinellas County Beach Erosion Control Project-Treasure Island	Pinellas	R126-R143	3.5	Yes
Pinellas County Beach Erosion Control Project-Long Key, Upham Beach	Pinellas	R144-R148	0.7	Yes
Pinellas County Beach Erosion Control Project-Long Key, Pass-a-Grille	Pinellas	R160-R166	0.9	Yes
Sarasota Barriers North Reach Subregion				
Manatee County Shore Protection Project, Anna Maria Island	Manatee	R12-R36	4.6	Yes
Anna Maria Beach Nourishment and Coquina Beach Restoration Project	Manatee	R7-R10 and R36-R41	1.5	No
Sarasota County Shore Protection Project, Longboat Key	Manatee	R44-R67	4.4	No
Sarasota County Shore Protection Project, Longboat Key	Sarasota	R1-R29	5.4	No
Lido Key Shore Protection Project	Sarasota	R35-R43.2	1.8	Yes

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Sarasota Barriers South Reach Subregion				
South Siesta Key Beach Restoration Project	Sarasota	R67-R77	2.1	No
Sarasota County Shore Protection Project, Venice	Sarasota	R116-R133	3.3	Yes
Manasota Barriers Subregion				
Charlotte County Beach Restoration Project	Charlotte	R28-R39	1.8	No
Charlotte Harbor Complex Subregion				
Lee County Shore Protection Project, Gasparilla Island	Lee	R10-R26	3.2	Yes
Lee County Shore Protection Project, Captiva Island	Lee	R84-R109	5.0	Yes
Sanibel Island Beach Restoration Project	Lee	R109-R118	1.5	No
Sanibel Island Beach Restoration Project, Gulf Pines Subdivision (private)	Lee	R129-R133	0.6	No
Estero Barriers Subregion				
Lee County Shore Protection Project, Estero Island	Lee	R174.6- R181.5	1.2	Yes
Lovers Key State Park Beach Restoration	Lee	R215-R220	1.2	No
Big Hickory Island	Lee	R222.3- R225.5	0.8	No
Bonita Beach Restoration Project	Lee	R226-R230.4	0.9	No

<i>Region, Subregion and Project</i>	<i>County</i>	<i>Location</i>	<i>Managed Miles</i>	<i>Federal Authorization</i>
Naples Coast				
Collier County Beach Restoration Project, Vanderbilt Beach	Collier	R22.3-R30.5	1.6	No
Collier County Beach Restoration Project, Park Shore	Collier	R50.65-R57.5	1.0	No
Collier County Beach Restoration Project, City of Naples	Collier	R57.8-R79	3.1	No
City of Naples Erosion Control Structures	Collier	R88-89	0.2	No
Southern Barriers				
Central Marco Island Beach Restoration Project	Collier	R134.5-R139	0.8	No
South Marco Island Beach Restoration Project	Collier	R143-148	0.9	No

SAND SOURCES

The [Regional Offshore Sand Source Inventory \(ROSSI\)](#) project was created to store data collected from assessment of marine sand sources for beach nourishment activities and as a centralized location for users to access the information. The second component of the project, is an Oracle enterprise database management system used to store the tabular data. The spatial and tabular data are accessed by coastal engineers, managers, and researchers via the online web portal. The tool consists of a database that can be searched and manipulated through an online query builder as well as with existing ArcIMS Geographic Information System (GIS) routines that provide access over the Internet.

The Bureau of Ocean Energy Management (BOEM) through the Minerals Management Program (MMP) is responsible for the use of offshore sand resources located outside of state waters and within federal waters on the Outer Continental Shelf. The MMP has initiated regional management of sand sources, where feasible, to manage the growing need for these sand sources. Projects in Brevard County, Collier County, Dade County, Duval County, Manatee County and Sarasota County have obtained sand through the MMP leasing program. The FDEP is currently working with BOEM to coordinate a regional agreement in southeast Florida for the use of sand sources that would provide shore protection in the following counties (St. Lucie, Martin, Palm Beach, Broward and Dade Counties).

FDEP and the U.S. Army Corps of Engineers (USACE) completed the southeast regional [Sediment Assessment and Needs Determination \(SAND\) study](#) in a collaborative manner and the study was reviewed by and vetted through all the participating stakeholders. The SAND study determined that the regional offshore supply of sand in state and federal waters is more than adequate to meet the needs of all the beach nourishment projects in the five southeastern coastal counties, St. Lucie, Martin, Palm Beach, Broward, and Miami-Dade, for the next 50 years (year 2062). (Ousley et al., 2014).

FDEP has outlined various regional sediment management (RSM) strategies in its inlet management plans and the SBMP. The USACE, Jacksonville District RSM work aids the FDEP in updating these plans. It is the goal of FDEP to coordinate with the USACE and implement strategies mutually beneficial to USACE and FDEP missions by leveraging federal authorities, permits, and funding.

OFFSHORE DREDGING VS. TRUCK HAULS

The volumetric differences between the two types of mechanical equipment used to transport sand sources to beach and dune nourishment projects are described in Table 7. Truck hauls, as shown in Figure 5, account for approximately 4% of the total beach nourishment activities from the listed projects

below in Table 7. Offshore dredging projects, as shown in Figure 6, account for approximately 96% of total beach nourishment activities for the listed projects below in Table 7. The volumetric differences per year of truck haul activities vs. offshore dredging activities are illustrated below in Figure 7.



Figure 5. Wabasso Beach Project (Sector 3) truck haul construction in Indian River County, 2010.



Figure 6. South Boca Raton Beach Nourishment Project by dredge, 2013. Photo courtesy of ATM.

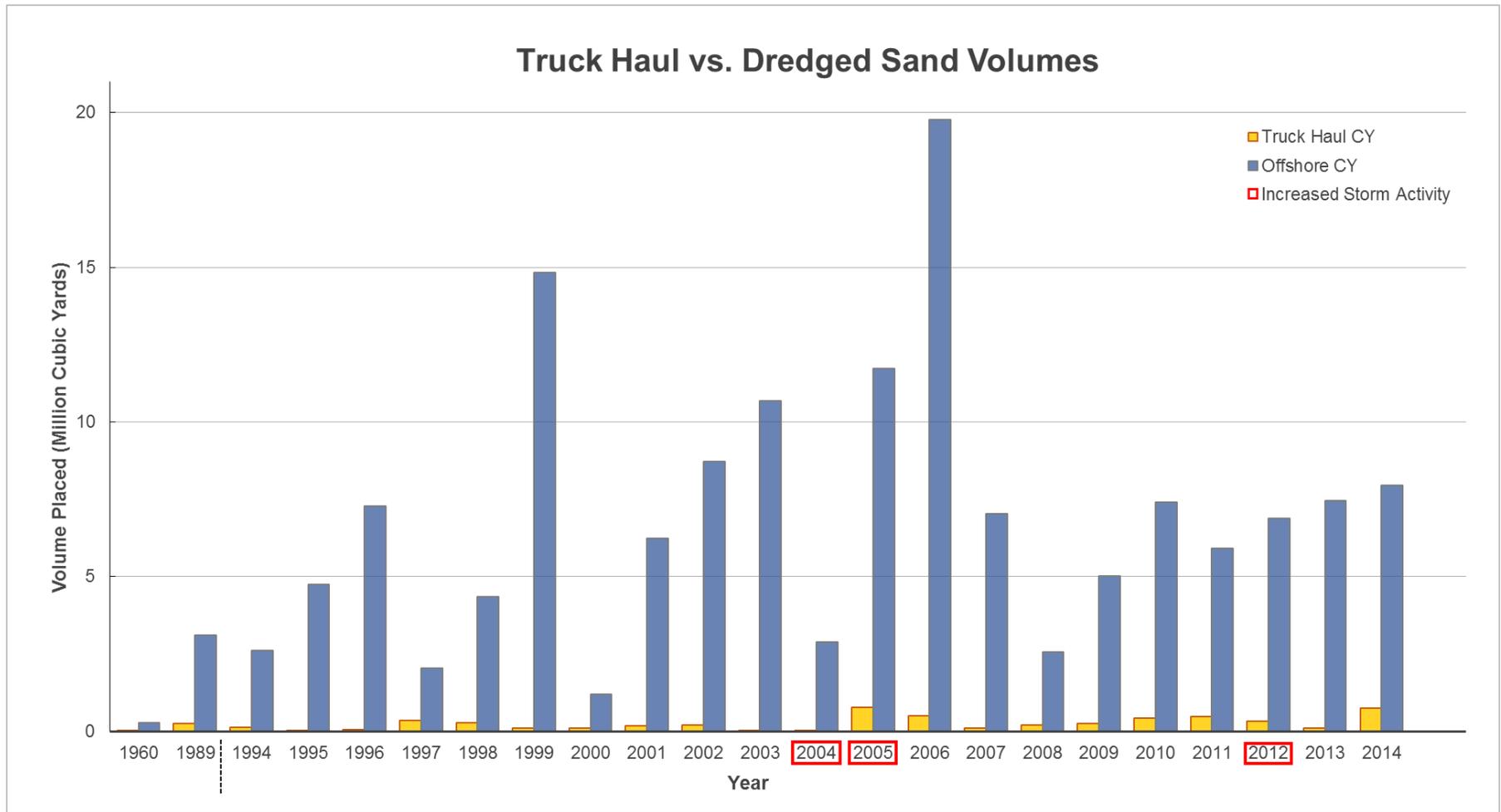


Figure 7. Graph showing the amount of offshore dredged sand volumes when compared to truck hauled sand volumes. Please note: red boxes highlighting years 2004, 2005, and 2012 indicate increased storm activity. Years predating 1994, show only the years with truck haul activities for comparisons purposes.

Footnotes for Graph:

- 1.) The data depicted on the bar graph in figure 7 represents all the data available to FDEP for truck haul and dredged sand placement activities for the years indicated. The bar graph is intended to be as accurate as possible.
- 2.) The data is comparing upland truck hauls with dredging activities including inlet channel dredging, inlet bypass dredging and offshore dredging. Note, not all of the inlet or Intracoastal Waterway dredging activities and data shown in the graph above and summary below is described in the SBMP.
- 3.) The dredge volumes represent volume of material placed on the dry beach only. Nearshore placement was excluded.
- 4.) Data from the year 2014 only represents information available from the first quarter.
- 5.) The data for the years prior to 1994 represented on the bar graph only includes the years that had truck haul data. Several years between 1960 through 1993 are not depicted because they only had dredged sand placement on the beach and no truck hauled sand placement.
- 6.) After Hurricane Opal (1995), there was significant dune repair work that occurred in the Panhandle. The dune recovery work in 1996 was done intermediately in Escambia, Santa Rosa, Okaloosa and Walton Counties with material coming from beach scraping, overwash or upland material. The exact volume of material coming from upland sources isn't known and appears upland sources were mostly used in Santa Rosa County, (See Taylor Engineering Report "Shoreline Conditions Assessment - Post Storm Management Recommendations - Hurricane Opal Dune & Recovery Plan" dated, 10-1999).
- 7.) Increased storm activity related to the following significant storms:
 - 2004 - Hurricane Charley, Hurricane Frances, Hurricane Jeanne, and Hurricane Ivan.
 - 2005 - Hurricane Dennis, Hurricane Katrina, Hurricane Ophelia and Hurricane Wilma.
 - 2012 - Tropical Storm Debbie and Hurricane Sandy.

Table 7. Summary of offshore dredged sand volumes and truck haul volumes by project location.

<i>Year</i>	<i>Volume (CY)</i>	<i>Truck Haul Project Location (Local Sponsor)</i>	<i>Volume (CY)</i>	<i>Offshore Dredging Project Location (County)</i>
1960	30,000	Smathers Beach, City of Key West	266,000	Dade
1989	246,000	Honeymoon Island (230,000) Pinellas County & Key West (16,000) City of Key West	3,114,800	Broward, Lee & Volusia
1994	130,000	Cape Canaveral Beach – Canaveral Port Authority & Miami Bch. (30,000) Dade County	2,600,000	Nassau County
1995	3,299	Rest Beach (2,600 pre Hurricane Opal and 699 post H. Opal) City of Key West	4,748,920	Brevard, Charlotte, Duval, Lee, Manatee, Nassau, Palm Beach & St. Lucie
1996	59,188	Naples & Park Shore (19,188) Collier County & Cocoa Beach (40,000) Brevard County	7,274,220	Collier, Lee, Manatee, Martin, Nassau, Pinellas & Sarasota
1997	349,427	Naples & Park Shore (19,187) Collier County, Sebastian Inlet (236,240) Indian River County, Sunny Isles (9,000) Dade County & Miami Bch. (85,000) Dade County	2,042,569	Collier, Dade, Manatee, Martin, Nassau & Sarasota
1998	286,376	Naples & Park Shore (19,188) Collier County, Rest Beach (1,188) City of Key West, Patrick AFB (163,000) AFB & Miami Beach (18,000) Dade County	4,344,280	Brevard, Broward, Charlotte, Collier, Dade, Martin, Nassau, Palm Beach, Sarasota & St. Lucie
1999	97,865	Naples & Park Shore (19,187) Collier County, Bathtub Beach (28,000) Martin County, Sebastian Inlet (50,032) Indian River County and Rest Bch. (646) City of Key West	14,838,504	Collier, Dade, Indian River, Martin & Okaloosa
2000	92,865	Naples & Park Shore (19,188) Collier County, Sebastian Inlet (50,077) Indian River County, Key West (23,600) City of Key West	1,193,450	Collier, Martin, Palm Beach & Pinellas
2001	173,398	Singer Island (Palm Beach County - 10k), Naples & Park Shore (19,187) Collier County, Sebastian Inlet (114,611) Indian River County, Key West (4,600) City of Key West & Segment III (25,000) Broward County	6,441,908	Brevard, Collier, Martin, Nassau, Palm Beach & Sarasota
2002	194,223	Naples & Park Shore (19,188) Collier County, Sebastian Inlet (50,035) Indian River County & 32 nd St., Miami Bch. (125,000) Dade County	8,720,209	Collier, Dade, Manatee, Martin, Nassau, Okaloosa & Palm Beach

<i>Year</i>	<i>Volume (CY)</i>	<i>Truck Haul Project Location (Local Sponsor)</i>	<i>Volume (CY)</i>	<i>Offshore Dredging Project Location (County)</i>
2003	19,187	Naples & Park Shore (19,187) Collier County	10,677,921	Collier, Dade, Duval, Escambia, Palm Beach, Martin, Nassau, Okaloosa, St. Johns & St. Lucie
2004	13,000	Singer Island (Palm Beach County)	2,893,373	Lee, Martin, Nassau, Palm Beach, Pinellas & St. Lucie
2005	650,500	Mid Reach; 307,300 and South Beaches; 252,200 (Brevard County), Singer Island (Palm Beach County 56,000) Miami Bch. (35,000) Dade County	11,725,158	Bay, Brevard, Collier, Duval, Escambia, Martin, Nassau, Okaloosa, Palm Beach, Sarasota, St. Johns & St. Lucie
2006	496,938	Mid Reach (127,584) and South Beaches (47,770) Brevard County, Panama City Beach (17k) Bay County, Singer Island (30,000) Palm Beach County, Miami Bch. (110,000) Dade County & South St. Lucie Dune Project (160,000) St. Lucie County, West Coco Plum Bch. (4,100) City of Marathon & Rest Beach (484) City of Key West	19,774,347	Bay, Broward, Charlotte, Collier, Escambia, Manatee, Martin, Nassau, Okaloosa, Palm Beach, Pinellas, Volusia, Santa Rosa, Sarasota & Walton
2007	99,293	Singer Island (Palm Beach County)	7,017,780	Brevard, Dade, Indian River, Lee, Martin, Nassau, Okaloosa, Palm Beach, Sarasota & St. Lucie
2008	194,272	Mid Reach (95,777) and South Beaches (30,948) Brevard County, Singer Island (50,697) Palm Beach County, Key Biscayne (2,400) Dade County, Little Crawl Key (14,450) City of Marathon	2,569,875	Nassau, Martin, Okaloosa, Palm Beach & Pinellas,
2009	248,459	Mid Reach; 91,822 and South Beaches; 69,132 (Brevard County), Miami (48,000) Dade County & Rest Beach (505) City of Key West	5,029,868	Bay, Dade, Gulf, Lee, Martin, Nassau, Palm Beach, Sarasota & St. Lucie
2010	436,581	Navarre Beach (11,881) Santa Rosa County, Sector 3 (300k) Indian River County, Bathtub Bch. (72,700) Martin County	7,396,965	Brevard, Collier, Dade, Martin, Okaloosa, Palm Beach & Pinellas

<i>Year</i>	<i>Volume (CY)</i>	<i>Truck Haul Project Location (Local Sponsor)</i>	<i>Volume (CY)</i>	<i>Offshore Dredging Project Location (County)</i>
2011	470,386	Mid-Town (52k) and Phipps Ocean Park (56k) Town of Palm Beach, Singer Island (30,313) Palm Beach County, Sector 3 (174,673) Indian River County, Bathub Bch. (8,800) Martin County, Doctor's Pass (22,000) Collier County, Ft Pierce Bch. (62,000) St. Lucie County, Smathers Beach (12,800) City of Key West, Little Crawl Key (600) City of Marathon, Rest Beach (200) City of Key West & Patrick AFB (51,000) AFB	5,917,588	Bay, Broward, Charlotte, Duval, Lee, Manatee, Nassau & Palm Beach
2012	317,495	Sector 3 (90k) Indian River County, Hallandale Beach (80,000) City of Hallandale, Key Biscayne (37,500) Village of Key Biscayne & Fort Island (5,250) Citrus County, Jupiter-Carlin (41,145) Palm Beach County, Martin County Truck Haul (38,400), Smathers Bch. (5,000) City of Key West & Rest Beach (200) City of Key West & Segment II (20,000) Broward County	6,888,593	Dade, Indian River, Lee, Manatee, Martin, Nassau, Palm Beach, Pinellas, St. Johns & St. Lucie
2013	94,134	Smathers Beach, Key West (4,740) City of Key West, Sailfish Point (8,400) Martin County, Sebastian Inlet (18,000) Indian River County. Miami Bch. (6,296) Dade County & Coco Plum Beach (1117) City of Marathon	7,451,613	Collier, Okaloosa, Martin, Nassau, Palm Beach & St. Lucie
2014	736,457	Collier County Beach Nourishment (234,497) Collier County, Segment II (130k) Broward County, Miami Bch. (31,365) Dade County, Sombrero Beach (1000) City of Marathon, Patrick AFB (17,000) AFB, Kennedy Space Center (85,000) NASA, Mid Reach (191,770) Brevard County, South Beaches (47,262) Brevard County, Coral Cove (25,926) Palm Beach County & (12,800) Dade County	7,948,295	Brevard, Dade, Lee, Manatee, Nassau, Palm Beach, Pinellas and St. Lucie
Total Volume (CY)	5,549,343		150,676,236	

INNOVATIVE TECHNOLOGIES

FDEP is directed to periodically review innovative technologies for beach erosion control and, on a limited basis, authorize, through the permitting process, experimental projects that are alternatives to traditional projects to determine the most effective and less costly techniques. FDEP is authorized to co-sponsor demonstration projects of new or innovative technologies which have the potential to reduce project costs, conserve beach quality sand, extend the life of beach nourishment projects, and improve inlet sand bypassing. FDEP in ranking annual funding priorities of the beach erosion control program, considers the use of innovative, cost-effective, and environmentally sensitive applications to reduce erosion.

An innovative technology workshop was conducted by the FDEP in February of 2006. FDEP explained the applicable rules and statutes and presented the procedures for obtaining regulatory approval to those who presented their technologies. During 2006 and 2007, FDEP formed an independent committee of coastal engineers and scientists to review and select innovative projects to be funded through a specific legislative appropriation in FY2006-2007. Based upon an evaluation of proposals. Funds were to be used for the design, permitting, construction, and monitoring of demonstration projects. Projects selected for funding were determined by the committee to have the potential to be economically viable when compared to conventional technology and expected to optimize the management of sediment, or some other erosion control system, and project performance.

Projects for examining the use of new approaches for beach management techniques are listed in Table 8.

Table 8. Innovative technology projects

<i>Project Name</i>	<i>Location</i>	<i>Date</i>	<i>Status</i>
Artificial Seaweed	Collier County, Manatee County, and Palm Beach County	Early 1980's	Ineffective and non-functional.
Beach Builder Screws	Flagler County	1985	Ineffective in moving sand and discontinued.
Beach Dewatering	Flagler County	1988	Results of the installation were inconclusive.
Undercurrent Stabilizers	Collier County	1984	No substantial beneficial effect on sediment accretion rates.

<i>Project Name</i>	<i>Location</i>	<i>Date</i>	<i>Status</i>
Prefabricated Erosion Prevention Reef (PEP) I	Town of Palm Beach	1987	Project had little, if any beneficial effect on the beach landward of the structure and was ordered removed.
PEP II	Town of Palm Beach	1991	Project determined to be causing erosion.
Biodune	St. Johns County and Brevard County	1986 and 1988	The Biodune synthetic gel composite did not affect coastal processes. Vegetation had difficulty establishing in the dune. Breaches in the dune toe rendered the product ineffective.
Aragonite Nourishment Project	Fisher Island, Dade County	1990	Overall shoreline location and beach planform have remained stable.
Longard Tubes	Sand Key, Pinellas County	1992	Project performed well to stabilize the beach as temporary groins until construction of large-scale beach restoration project.
PEP Reef	Indian River County	1996	Results of the installation inconclusive.
Net groin study	Naples, Collier	2000	Results of the installation inconclusive.
Net groin study	Okaloosa County (Eglin Air Force Base)	2001	A third party peer review of the results of this test project indicated that this system did not meet the performance expectations and was not cost effective.
Porous groin study	Inlet Beach, Walton	2004	Results of the installation inconclusive.
Submerged geotube	Stump Pass, Charlotte	2005	Resulted in shoreline retreat and was ordered removed.
Recycled glass sand demonstration project	<i>Broward County</i>	2006	Test plots were installed on the upper beach in the summer. The next phase of testing in the surf zone was indefinitely postponed by County
Pressurized Equalizing Modules (PEMS)	Town of Hillsboro Beach, Broward County	2008	PEMS installed in March of 2008 and removed in 2011 as a NTP item for Hillsboro/Deerfield Nourishment. A third party peer review of the results of this test project indicated that this system did not meet the performance expectations.

<i>Project Name</i>	<i>Location</i>	<i>Date</i>	<i>Status</i>
Multi-Purpose Artificial Surfing Reef	<u>Brevard County</u>	2008	Feasibility Study to assess construction of a multipurpose artificial surfing reefs (ASRs), which may be compatible with Brevard’s shore protection project program. The document summarizes the ASR feasibility to assess potential locations for various types of multi-purpose artificial surfing reef. The project has not been constructed and was not considered to be economically justified by the County.

SUMMARY

The SBMP document is written with the intent of being a comprehensive plan that illustrates the strategies the State of Florida uses to manage the coastline in critically eroded beach segments. The plan also describes the historical and present beach restoration activities taken to restore and manage Florida’s beaches for its citizens, tourist and future generations to enjoy.

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