

***Strategic Beach Management Plan:
Introduction***

Office of Resilience and Coastal Protection

Florida Department of Environmental Protection

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Foreword

The Florida Legislature has declared the Department of Environmental Protection (Department or DEP) as 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, pursuant to Section 161.161, Florida Statutes (F.S.). The Department initially adopted the Strategic Beach Management Plan (SBMP) in October 2000 and updated it in May 2008, June 2015, May 2018, and April 2020. The updates to the SBMP are prepared in accordance with Sections 161.091, 161.101, 161.142, 161.143 and 161.161, F.S., to reflect current beach and inlet conditions.

A public meeting was held on September 16, 2019, to receive comments on the proposed SBMP. Comments from the public were also received by the Department by e-mail after the public meeting. The public comments received were reviewed, and edits to the SBMP were made by Department staff that were deemed necessary.

The SBMP contains information and management strategies for coastal inlets. A new or updated inlet management plan (IMP) adopted by the Department shall supersede inlet management strategies for that inlet set forth in the SBMP. Likewise, the strategies set forth in the SBMP shall supersede strategies in any previously adopted IMP to the extent 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. Strategies in the SBMP are subject to ongoing evaluation and update as conditions change and information becomes available to the Department. The strategies identified in the SBMP shall be eligible for state financial participation subject to Department approval and appropriation from the Florida Legislature, pursuant to Section 161.091, F.S. The level of state funding shall be determined based upon the activity being conducted pursuant to Section 161.101, F.S. and Chapter 62B-36, Florida Administrative Code (F.A.C). 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 Sections 161.101 and 161.161, F.S. Nothing in the SBMP precludes the evaluation of other alternative strategies which are consistent with Chapter 161, F.S.

Table of Contents

Foreword.....	ii
Introduction.....	1
Organization of the Strategic Beach Management Plan.....	3
Permitting	4
Monitoring Programs	7
Emergency Response	8
Florida Inlets	8
Project Management Overview	20
Assessment of Sand Sources	31
Offshore Sand Sources and Upland Sand Sources.....	32
Innovative Technologies	45
Conclusion.....	47
References.....	48
Appendix - Acronyms	i



Panama City Beach Shore Protection Project under construction in March 2017. Photo courtesy of Bay County, Lisa Armbruster.

Introduction

Beaches are dynamic landforms at the edge of the ocean or gulf subject to both natural and human-induced erosion. Sand moves along the shore due to breaking wave driven currents and tides, and storms can cause dramatic changes to the beach. Coastal erosion is caused in part by the creation and maintenance of inlets, where the sand has historically been removed from the coastal system by dredging, 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 near the shore can also contribute to coastal erosion by limiting the amount of sand stored in dunes and hardening the shore for protection of upland property. Changing sea levels can also contribute to long term coastal erosion along Florida's coastline. Coastal communities will need to plan for community resiliency in low-lying coastal zones to be prepared for coastal flooding, extreme high tides, sea level rise or storm surges. For additional information, see [Section 163.3177](#) and [Section 163.3178](#), F.S., regarding the Peril of Flood Act or the Sea Level Impact Projection (SLIP) Study within the coastal building zone, see Section [161.551](#), F.S., or the [Florida Resilient Coastlines Program](#) web page.

Florida depends on its 825 miles of sandy beaches fronting the Atlantic Ocean, Gulf of Mexico and Straits of Florida as a natural resource for the enjoyment of its residents and tourists. Beaches are Florida's primary tourist attraction, generating millions of dollars annually 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 and the Economics of Florida's Beaches, Phase II - The Economics of Beach Tourism in Florida (2005). An additional study by the Florida legislature's Office of Economic and Demographic Research (EDR) found that pristine beaches are the most important feature of Florida's brand as a tourist attraction with tourism being Florida's leading industry. See [Economic Evaluation of Florida's Investment in Beaches \(2015\)](#). 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, 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.

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, F.S. In 1986, pursuant to Sections 161.101 and 161.161, F.S., the Department of Natural Resources, Division of Beaches and Shores (now the

Department of Environmental Protection, Office of Resilience and Coastal Protection) is charged with the responsibility to identify those beaches of the state which are critically eroding and to develop and maintain a comprehensive long-term management plan for their restoration. The Department's long-term management plan has several components including the Critically Eroded Beaches Report and the SBMP.

The SBMP identifies strategies at critically eroded beaches and inlets consistent with the goals set forth in Section 161.091, F.S., of the Beach and Shore Preservation Act:

- 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; and
- Reduce equipment mobilization and demobilization costs.

“Critically eroded shoreline” is defined in subsection 62B-36.002(5), F.A.C., as, “a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded areas may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects. The “[Critically Eroded Beaches in Florida](#)” report lists segments of shoreline that have been designated by the Department as critically eroded.

The SBMP addresses critical erosion and beach project areas in the context of subregions that are defined by the boundaries of distinct coastal littoral processes. The SBMP also provides a summary of previous projects to address beach erosion within each subregion. Feasibility studies and reports conducted by local governments, consultants, federal and state agencies are listed at the end of each subregion section in the SBMP.

There are several elements required for beach management activities to be eligible for state cost sharing: proposed work must be consistent with Chapter 161, F.S., be within a critical erosion area designated by the state, be consistent with the strategies listed in the state adopted SBMP and/or IMPs, monitoring must be required by state or federal permit and the proposed work must have a Department approved scope of work. To be consistent with Chapter 161, F.S., beach quality bypass material must be placed on the 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](#). State cost share is subject to adjustment for the level of public accessibility that is calculated for beach management projects. Project cost sharing criteria is described further in the beach funding rule [62B-36.007, F.A.C.](#) Chapter 161, F.S. was amended in 2019 by the legislature to enhance the cost share criteria and cost sharing opportunities within the beach funding program. Rulemaking is underway to rule 62B-36, F.A.C. to implement the amended Sections of 161.101 and 161.143 F.S., to develop a revised beach and inlet ranking methodology. Additional information about beach management projects by county can be found at the [local government funding requests](#) webpage and also at the [long range budget plan](#) webpage. The SBMP is a dynamic management tool for use by private individuals and federal, local and state 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 the Department and federal or local government sponsors. The entire SBMP is available on the Department's [Office of Resilience and Coastal Protection \(RCP\)](#) website with a list of acronyms within the plan. Additional information on Florida's [public beaches or coastal access guide](#) can be found on the Department's web page or in [Map Direct](#).

Organization of the Strategic Beach Management Plan

The SBMP describes beach and inlet management strategies for seven coastal regions and 32 subregions, as shown in Figure 1. For each region and subregion, the SBMP contains the following:

- A description of inlets, storms and critically eroded shoreline, as well as beach/inlet projects are provided. For ease of reference, the SBMP describes critically eroded shoreline segments using Department [range or reference \(R\) monuments](#) in the title. Where sandy beaches are located, the Department has positioned R monuments approximately every 1000 ft along the state's shoreline for the purpose of measuring beach erosion and beach accretion. Inlets (also

commonly referred to as “passes”) are labeled with adjacent R monuments and the name of the county.

- A description of the geographical area; the proposed or constructed projects, a project history table and the specific project boundary is also provided.
- Sand placement volumes listed in the project paragraph or project tables use the “placement volume” instead of the pay volume.
- Strategies that the state recommends for management of the critically eroded shoreline, to mitigate critical erosion and the activities that would be considered eligible are listed for state cost sharing under Sections 161.101 and 161.161, F.S.
- A summary of each subregion strategies for beach and inlet management, including sponsors, funding, project coordination, environmental protection, sand sources and additional information can be found in the introduction and subregion maps.

IMPs adopted by the Department after the adoption of the SBMP supersede the strategies identified in the SBMP. Likewise, the strategies set forth in the SBMP supersede strategies in any previously adopted IMP to the extent they may be in conflict. The Department is currently reviewing the [American Shore and Beach Preservation Association](#) (ASBPA)’s - [beach nourishment database](#) to make sure there is consistency between the Department’s project data and ASBPA’s project data.

Permitting

All projects proposed to implement the strategies identified in the SBMP must obtain the appropriate federal and state permit authorizations. Applicants must demonstrate 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 Department of State’s [Division of Historical Resources](#), and other state agencies as incorporated in the [Florida Coastal Management Program](#) within [RCP](#).

All beach management or inlet projects must obtain a joint coastal permit (JCP) through the Department’s [Beaches, Inlets & Ports Program](#). Each project that obtains or is pursuing a permit can

be viewed at the [Permits by County](#) webpage. JCP permitting 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; use of structures to control erosion within one segment of beach but potentially cause erosion on another segment; and seasonal windows of construction and construction management to protect marine turtles, manatees, Gulf sturgeon and nesting and migrating shorebirds and other imperiled species (see, for example, Section 161.163, F.S. and Chapter 62B-41, F.A.C.). Projects in or near [Aquatic Preserves](#) and other Outstanding Florida Waters (OFW) must comply with more stringent state water quality standards, pursuant to [Sections 258.39 and 373.414, F.S.](#) In addition, beach and inlet projects must comply with applicable requirements relating to sovereign submerged state land and coastal construction found in [Chapter 253, F.S.](#) and [Section 161.053, F.S.](#)

The Department's [Coastal Construction Control Line \(CCCL\) Permitting Program](#) is an area of jurisdiction in which specific siting and design criteria are applied for upland construction to minimize adverse impact to the beach and dune system. Condominiums, hotels, homes, pools and boardwalks, etc. that are constructed seaward of the CCCL must meet the specific requirements of this program. Also, dune restoration projects landward of the mean high water may be permitted through the CCCL program. The CCCL location is based upon appropriate engineering predictive models and scientific principles to determine the upland limits of the effect of a one-hundred-year coastal storm event.

A more precise definition of a one-hundred-year storm event is that the storm surge of a major storm has a one percent probability of occurring at a specific location in any given year. Encountering a one-hundred-year storm event for one year does nothing to change the probability of receiving another one-hundred-year storm event the next year or the following year. The CCCL is located along most coastal counties of Florida and where there is not a CCCL, there is a fifty-foot set back line. The fifty-foot set back line is measured from the mean high water line and creates a jurisdiction of siting and design criteria that are regulated by the CCCL program in the following counties: Wakulla, Taylor, Dixie, Levy, Citrus, Hernando, Pasco and Monroe.

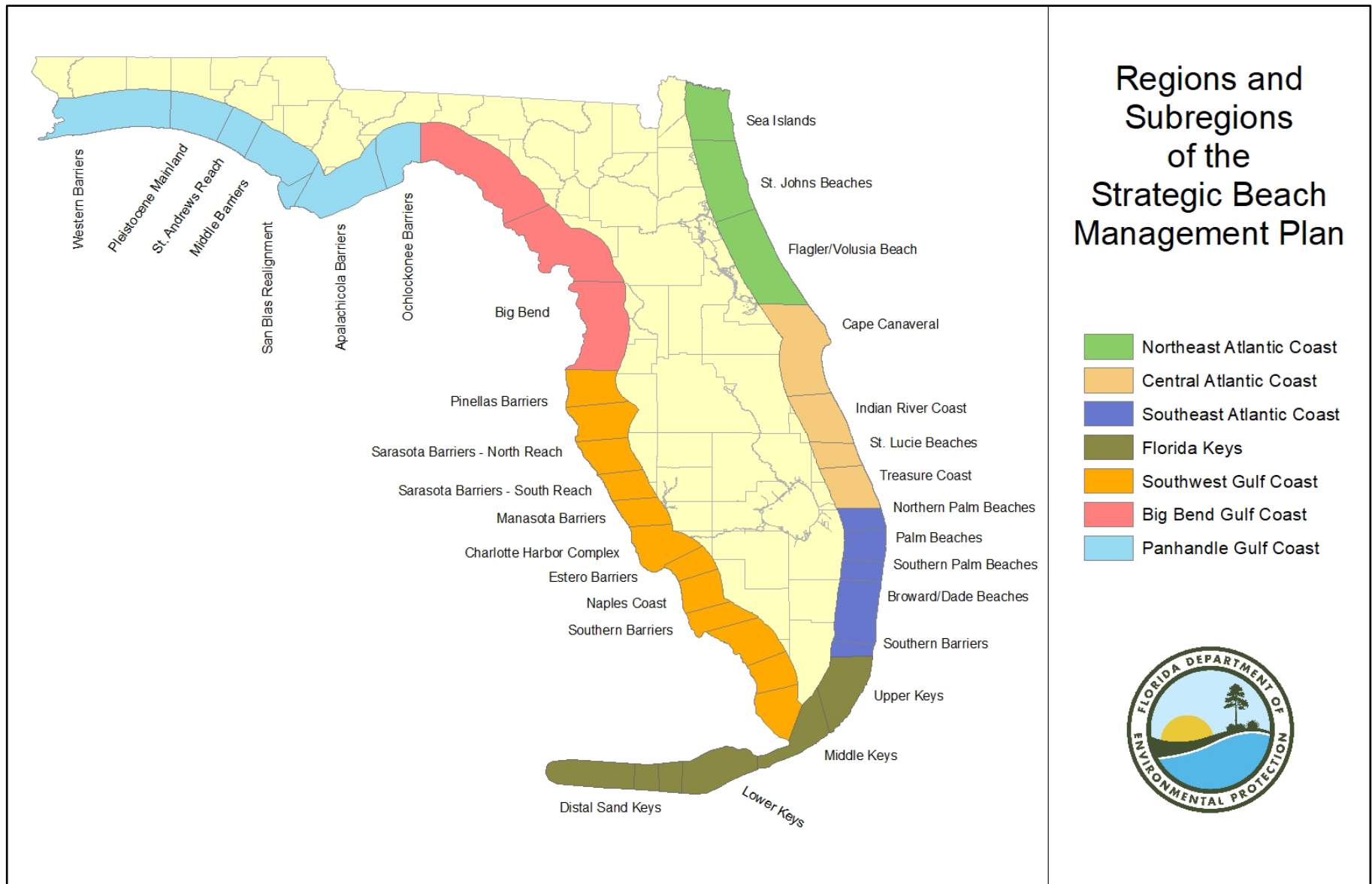


Figure 1. Map of the statewide SBMP's regions and subregions. View an [interactive map](#).

Monitoring Programs

The Department conducts [regional coastal monitoring](#) to collect and process beach profile survey data and aerial photography. 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 of project nourishment and to validate the sediment budget for littoral sand transport through a specific coastal zone area. Permit-required monitoring of beach and inlet management projects is incorporated into regional monitoring activities to avoid duplication. Physical and environmental monitoring programs are being conducted for ongoing and recently completed projects. The Department may share in the cost of physical and environmental monitoring programs that are required by state and federal permits, pursuant to Sections 161.101 and 161.161, F.S., when state appropriations are provided.

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. The Department has also developed technical specifications for [Monitoring Standards for Beach Erosion Control Projects](#). Profile surveys at R monuments have been used since the early 1970s to measure beach erosion and to develop a [historic shoreline database](#) to assist with managing Florida's sandy coastal zone. Physical monitoring also consists of the review of aerial photography found on the Department's [interactive maps](#) and also a digital collection of aerial photographs and shoreline trends system ([COASTS](#)).

Environmental or biological 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 that are required for mitigation for some beach nourishment project impacts. The Department, through the [Beaches, Inlets and Ports Program](#), has issued guidance for nearshore hardbottom assessment and monitoring protocols for the subregions that have hardbottom. For additional information, see the [Standard Operation Procedures for Nearshore Hardbottom Monitoring of Beach Nourishment Projects](#).

Emergency Response

The RCP Beaches programs prepare for hurricane season each year by developing a list of vulnerable shoreline “hot spot” areas, conducting trainings as needed for RCP staff; and preparing equipment and supplies to use when responding as needed to coastal storm events. RCP field staff document current conditions at each identified vulnerable hot spot shoreline areas as these areas will be where windshield surveys are completed throughout the storm season.

Every May, many RCP staff participate in a statewide hurricane exercise coordinated by the Division of Emergency Management (DEM) and the DEP’s Office of Emergency Response (OER). The exercise may involve preparing mock reports to test response capabilities, deploying teams to conduct mock damage assessments, or developing potential actions to protect vulnerable coastal areas. Communications and points of contact with federal and state partners are renewed or established through this exercise.

Another exercise activity includes conducting pre-storm season baseline windshield survey inspections. RCP field staff and DEP’s district offices conduct and train “volunteers,” who inspect and photo-document conditions at each of the selected hot spot shoreline areas in their specific geographic location. Countywide inspection reports are finalized and shared with RCP Beaches staff, DEM and OER Emergency Support Function 10 (ESF-10). These pre-storm season baseline inspections provide valuable comparative survey data when assessing actual damage caused by a storm event.

Throughout hurricane season, DEM tracks all tropical developments and sends detailed weather reports to all state government emergency responders. When a tropical disturbance approaches the state and impacts appear likely, RCP coordinates and plans for staff to conduct post-storm windshield survey inspections. The BIP program contacts local governments and municipalities to request information relative to pre- and post-storm surveys or damage assessments. All information is uploaded and stored in a central storm database.

Beaches Field Services staff and district office volunteers conduct the post-storm windshield surveys as soon as conditions are safe at the pre-established locations or other locations DEM requested. Windshield surveys are used as a first-look rapid assessment at impacted areas and assist Florida’s State Emergency Operation Center (SEOC) in determining the most impacted coastal regions. They also aid RCP in determining specific locations where staff resources are most critical and useful for

planning any necessary post-storm emergency dune fortification activities. The windshield surveys also assist Beaches Damage Assessment Teams in selecting areas most important to assess. The department's Preliminary Post Storm Beach Windshield Survey Data are available at the [SEOC's Event/Map Portal](#).

In addition to photo documenting beach and dune erosion, and damage to upland structures, the windshield survey reports also provide preliminary levels of beach and dune erosion at each site, consistent with and by using the chart below in Figure 2. The Beaches programs' beach and dune erosion condition photo examples are located and described below in Figure 3 for condition I; Figure 4 for condition II; Figure 5 for condition III; and Figure 6 for condition IV.

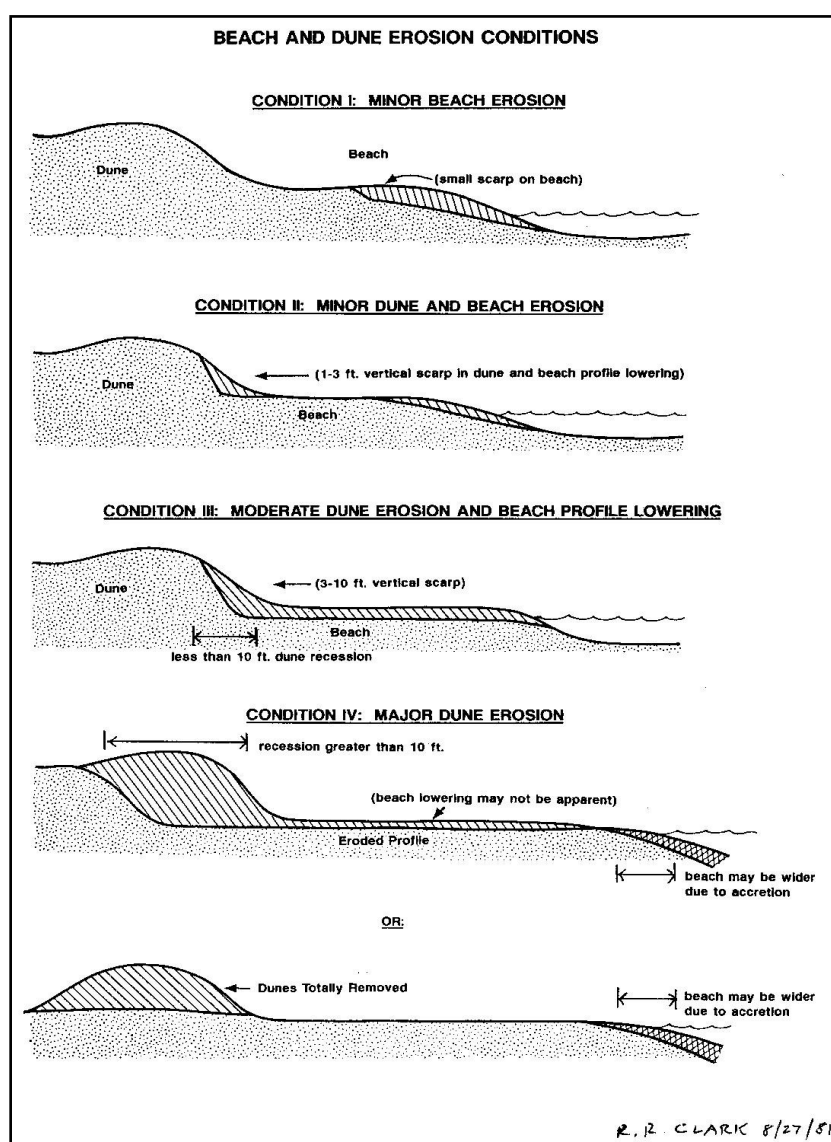


Figure 2. Graphic illustrating beach and dune erosion conditions.

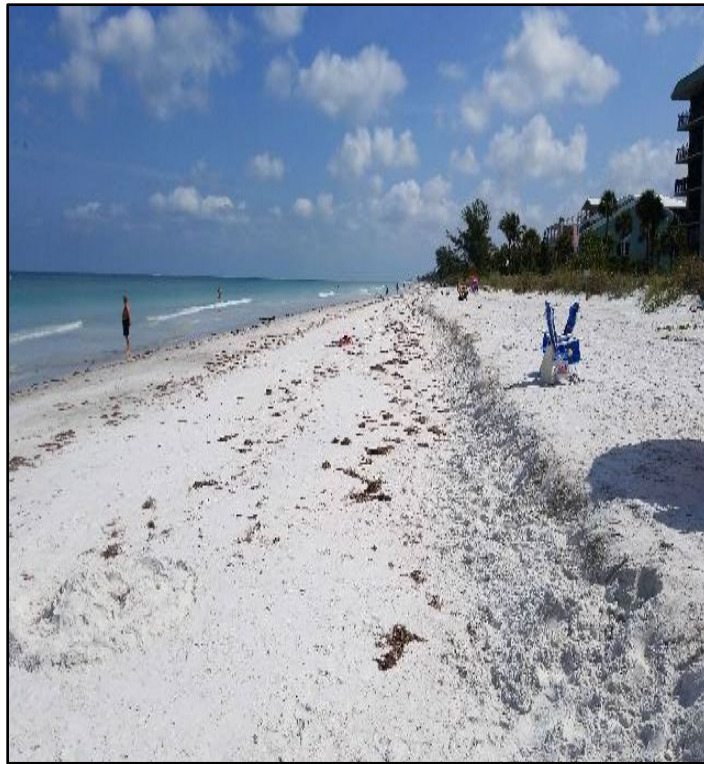


Figure 3. Condition I or Minor Beach Erosion is generally characterized by minor escarpment damage along the existing seaward berm or mid-beach area.



Figure 4. Condition II or Minor Dune and Beach Erosion is generally characterized by minor sandy beach deflation, or profile lowering, along with a 1-foot to 3-foot recession and vertical escarpment of the existing dune.

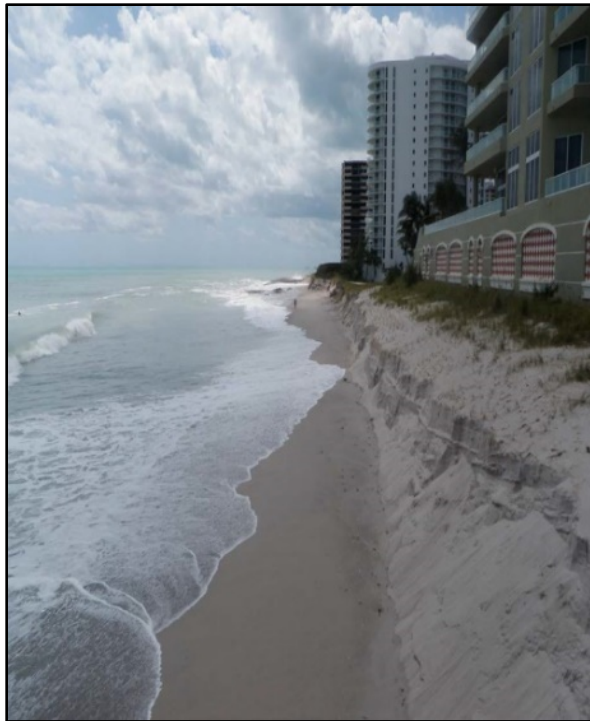


Figure 5. Condition III or Moderate Dune Erosion and Beach Profile Lowering is generally characterized by a moderate and consistent deflation across the sandy beach to the back-beach berm along with a 3-foot to 10-foot recession and vertical escarpment of the existing dune.



Figure 6. Condition IV or Major Dune Erosion is generally characterized by recession of the existing dune along with a vertical escarpment, or “cliffing,” in excess of 10 feet and a less-defined amount of beach deflation or profile lowering across the sandy beach. Condition IV may also include a complete loss or removal of a previously existing dune feature.

The Beaches Damage Assessment Teams are comprised of staff members from the Coastal Engineering and Geology Program, Beaches Field Services Program and BIPP. These teams conduct detailed assessments of all shoreline areas of impacted regions as well as within the coastal building zone (see [Section 161.161 \(1\) k](#), F.S.), following each storm that causes damage to private and/or public property, including structures, or causes significant beach and/or dune erosion.

The data and information from these assessments are used to alert staff of areas where storm erosion or damaged coastal armoring appears to have left upland structures vulnerable to additional damage if a subsequent storm were to impact the area, where emergency sand fill may be warranted, as well as areas where quantities of structural debris are found on the beach.

These detailed assessments are used to prepare a post-storm beach conditions and coastal impact report, assist in preparing a storm recovery plan and used in designating new areas in the critically eroded beaches report. Staff from the BIPP and the Beaches Management Funding Assistance (BMFA) Program conduct sand loss assessments of engineered beaches. These assessments are conducted in coordination with DEM, the Federal Emergency Management Agency (FEMA), as well as the local government sponsors. Assessments are intended to provide a preliminary assessment of sand loss quantities from an engineered beach which may be eligible for FEMA funding assistance to replace those losses. Additionally, these same Beaches staff members will assist in assessments of federally authorized beach projects led by the U.S. Army Corps of Engineers (USACE). In some cases, assessments of both federal and nonfederal projects may be combined using teams comprised of both the USACE and Beaches staff.

Other department staff provide vital GIS services, including maintaining two web mapping dashboards for inspection reports, collecting aeriels and storm data from other agencies and universities and maintaining a historical collection of photographs found in [COASTS](#). When LIDAR data is available, GIS staff conduct volumetric calculations and prepare maps showing erosion and accretion.

Information from the assessments described above, as well as information from local government sponsors, NOAA, United States Geological Survey (USGS), USACE and others are reviewed in preparation for drafting a Post-Storm Beach Conditions and Coastal Impact Report. Surveys, LIDAR and video data is particularly sought. These [reports](#) are then published on [RCP's website](#).

A Storm Recovery Plan, recommending priority actions, is prepared when there is widespread and

significant damage, likely leading to requests for additional state funding. The department coordinates with FEMA, USACE and local sponsors to discuss timelines, permitting and the likelihood of federal funding. Sand losses are estimated based on best available information, including locally conducted surveys, federally conducted LIDAR data or the sand loss assessments described above. Available sand sources and the amount of public accessibility are used to calculate estimated costs of repair and eligibility for state cost-sharing assistance. Options considered include supplemental sand for FEMA berms, acceleration of restoration or nourishment plans and repair of erosion control structures. Once DEP's Secretary approves the Post-Storm Recovery Plan, it is provided to the Governor and Florida Legislature for their consideration.

The department 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 local funding sources. DEP also recommends that communities maintain records of their ongoing programs to monitor beach erosion and maintain their beach and dune systems (Figure 7). Such documentation may help demonstrate the need for federal public assistance for beach or dune restoration projects after a disaster event.

Florida was significantly impacted by four hurricanes: Hermine (2016), Matthew (2016), Irma (2017) and Michael (2018). To see additional information for strategies and funding to address recovery for the beaches and dunes, see the [Hurricane Damage Assessment Report for 2016: Florida's Beaches and Dunes](#). For the 2017 hurricane season, see the [Hurricane Irma Post-Storm Beach Conditions and Coastal Impact in Florida](#) report. To see additional information on strategies and funding to address recovery for the beaches and dunes due to Hurricane Michael (Figure 7), see the [Hurricane Michael Post-Storm Report](#) and [Hurricane Michael Recovery Plan](#). For all other hurricane-related material visit [DEP's Division of Water Resource Management web page](#).

Note: pages 8-13 of the Emergency Response section were updated in December 2020.

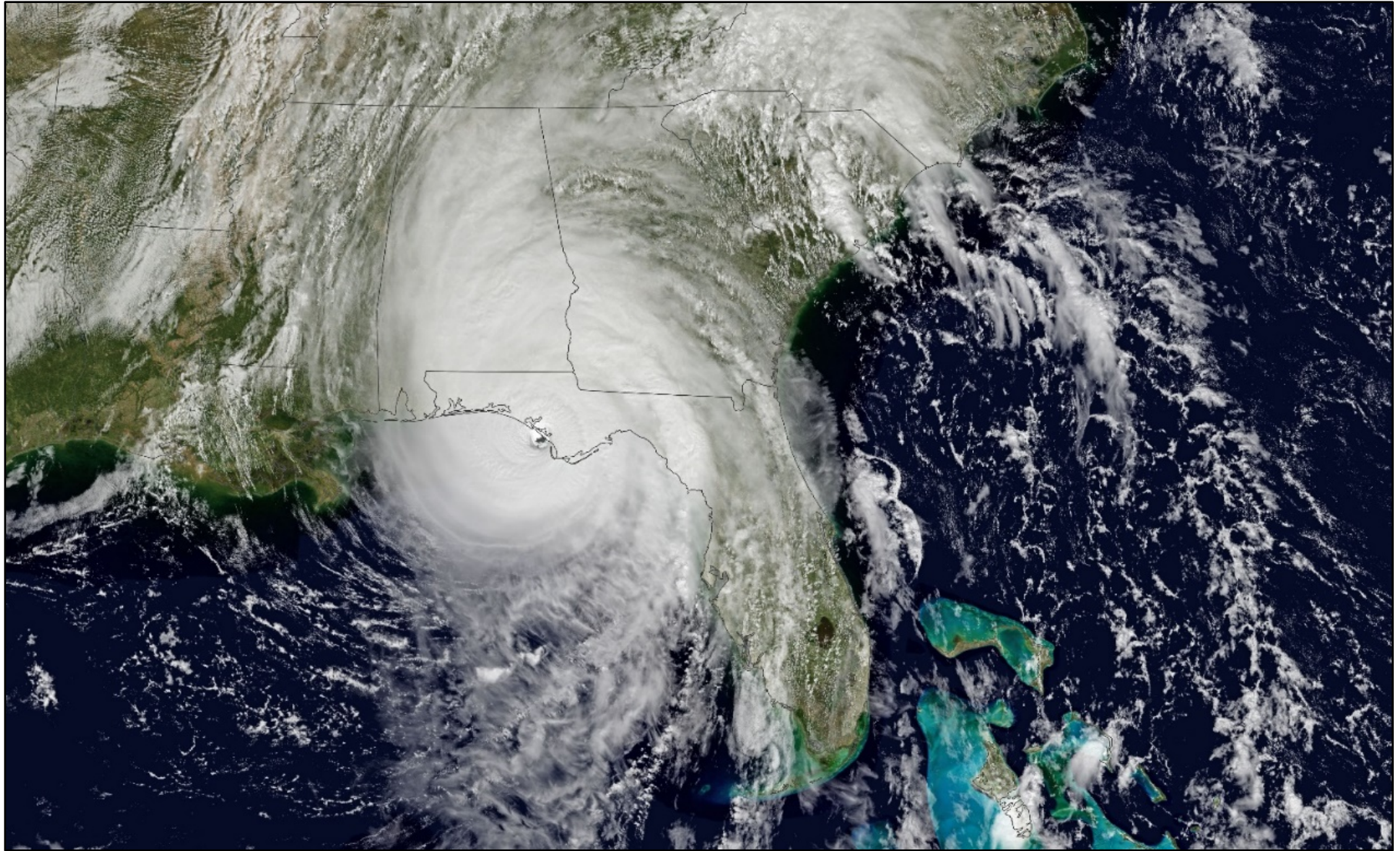


Figure 7. NASA/ NOAA image of Hurricane Michael on Oct. 10, 2018, as it moved toward Florida's panhandle coast. Image: NASA Earth Observatory images by Joshua Stevens, using data from NOAA's Geostationary Operational Environmental Satellite, GOES-16.



Figure 8. Mexico Beach, with a newly constructed FEMA dune/berm in 2019, post-Hurricane Michael (2018). The FEMA dune/berm is located between the inlet (R128) and the Bay/Gulf County line (R144). DEP file photo taken in October 2019 by W.G. Weeks.

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, Table 4 and Figure 9. [IMP's](#) adopted by the Department are incorporated into the SBMP by reference along with other inlet management strategies. Florida's IMP strategies are governed by Sections 161.142 and 161.143, F.S., with the intent of balancing the inlet's sediment budget and replicating the natural flow of sand (Figure 10). All elements of inlet management studies conducted for local governments by consultants are reviewed by the Department before being adopted into an IMP. The Department has adopted 24 IMP's. While certain inlets have IMP's adopted by the Department, other inlets may have special inlet management strategies in the SBMP that were derived outside of a formal inlet management study. Inlet bypassing projects take sand from one side of the inlet, or from within the inlet or its shoals, and places the material along the shorelines adjacent to the inlet to mitigate the erosive effects of the inlet.

Table 1. Florida Atlantic Coast managed inlets.

Managed Inlet	County	Inlet Management Plan Adopted by DEP	Year Inlet Management Plan Adopted by DEP
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	Updated in 2020
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	Updated in 2016
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	2018
Bakers Haulover Inlet*	Dade	Yes	1997
Government Cut*	Dade	No	N/A

* Denotes that the inlet has a federally funded navigational project managed by the U.S. Army Corps of Engineers (USACE); therefore, coordination is necessary between the State, local inlet authority and the USACE.

Table 2. Florida Atlantic Coast unmanaged inlets.

Unmanaged Inlet	County	Inlet Management Plan Adopted by DEP	Year Inlet Management Plan Adopted by DEP
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	Inlet Management Plan Adopted by DEP	Year Inlet Management Plan Adopted by DEP
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	Yes	2018
Blind Pass	Pinellas	Yes	2017
Pass-a-Grille*	Pinellas	Yes	2019
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	Yes	2016
Boca Grande Pass*	Lee	No	N/A
Redfish Pass	Lee	Yes	2020
Blind Pass	Lee	Yes	2019
Matanzas Pass	Lee	No	N/A
Big Carlos Pass	Lee	No	N/A
New Pass	Lee	No	N/A
Wiggins Pass	Collier	Yes	2018
Clam Pass	Collier	No	N/A
Doctors Pass	Collier	Yes	1997
Gordon Pass*	Collier	No	N/A

*Denotes that the inlet has a federally funded navigational project managed by the USACE; therefore, coordination is necessary between the State, local inlet authority and the USACE.

Table 4. Florida Gulf Coast unmanaged inlets.

Unmanaged Inlet	County	Inlet Management Plan Adopted by DEP	Year Inlet Management Plan Adopted by DEP
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
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
San Carlos Bay Entrance	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

*Denotes that the inlet has a federally funded navigational project managed by the USACE; therefore, coordination is necessary between the State, local inlet authority and the USACE.

Florida also has 14 [seaports](#) in the state that foster waterborne commerce.



Figure 9. Florida's managed inlets. Inlets denoted with a green star have an [IMP](#) adopted by the Department. View an [interactive map](#).



Figure 10. This photo of the Sebastian Inlet from 2005 illustrates how inlets can impede the natural flow of sand along the littoral zone and shows the offset of the coastline on either side of the inlet. DEP project file photo.

Project Management Overview

As of October 2019, approximately 420 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), pursuant to Sections 161.101 and 161.161, F.S. Managed miles (Figure 11) is defined by the Department as, **“beach restoration and beach nourishment, or inlet sand bypassing (collectively, “active management”) are being conducted along 249.7 miles of sandy beaches in Florida.”** A listing of the critically eroded beaches that are under active management is provided in Table 6, with a total of 82 listed projects.

When describing beach construction projects throughout the SBMP, the initial beach project adding sand to the beach is described as a “beach restoration” project. Any project that adds sand to the beach after the beach restoration is described as a “beach nourishment” project. Federally authorized shore protection projects are authorized by the U.S. Congress for federal funding assistance for up to a 50-

year time period and the projects may be reauthorized at the end of the 50-year time period, if deemed necessary.

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

Region	Critically Eroded Beaches (Miles)	Critically Eroded Beaches that are Actively Managed (Miles)	Percentage of Critically Eroded Beaches that are Actively Managed
Northeast Atlantic Coast	63.5	24.6	39%
Central Atlantic Coast	82.9	57.2	69%
Southeast Atlantic Coast	71.9	51.1	71%
Florida Keys	13.7	1.5	11%
Panhandle Gulf	82.7	46.3	56%
Big Bend Gulf	2.3	0.2	9%
Southwest Gulf	105.6	66.7	63%
TOTAL	422.7	247.6	59%

*Note: pages 16, 18, 19 and 24 were modified on June 23/ August 27, 2020 to include the Mid Reach Project and South Reach extension in Brevard County, the Vero Beach Project in Indian River County and Manasota Key Project in Sarasota and Charlotte Counties for managed miles by the State.



Figure 11. Locations of Florida's managed beaches and shoreline lengths in statute miles. View an [interactive map](#).

Table 6. Miles of critically eroded beaches under active management, by project name.

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Northeast Atlantic Coast Region				
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				
St. Johns Coastal Storm Risk Management Project - SPV & Vilano Beach	St. Johns	R102.5-R117.5	3.0	Yes
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
Central Atlantic Coast Region				
Cape Canaveral Subregion				
Brevard County Shore Protection Project – North Reach	Brevard	R1-R53	9.4	Yes
Patrick Air Force Base Beach Nourishment Project	Brevard	R53-R75.3	4.0	Yes
Brevard County Shore Protection Project – Mid Reach	Brevard	R75.4-R118.2	7.7	Yes

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Brevard County Shore Protection Project – South Reach	Brevard	R118-R141.2	4.2	Yes
Indian River Coast Subregion				
Ambersand Beach Nourishment Project	Indian River	R3-R17	2.7	No
Wabasso Beach Restoration Project – Sector Three	Indian River	R20-R51.3	6.1	No
Vero Beach – Sector Five	Indian River	R70-R86	3.1	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	Yes
Treasure Coast Subregion				
South St. Lucie Beach Restoration Project	St. Lucie	R98-R115	3.4	No
Martin County Shore Protection Project	Martin	R1-R25.6	4.2	Yes
Bathtub Beach and Sailfish Point Beach Nourishment Project	Martin	R34.3-R40	0.9	No
St. Lucie Inlet Management Plan	Martin	R50-R55	1.0	Yes
Jupiter Island Beach Nourishment Project	Martin	R73-R111	6.5	No

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Southeast Atlantic Coast Region				
Northern Palm Beaches Subregion				
Jupiter Carlin Shore Protection Project	Palm Beach	R13.5-R19	1.1	Yes
Juno Beach Nourishment Project	Palm Beach	R26-R38	2.4	No
Palm Beaches Subregion				
Lake Worth Inlet Management Plan Implementation	Palm Beach	R76-79.5	0.7	Yes
Mid-Town Beach Nourishment Project	Palm Beach	R89-R102	2.8	No
Phipps Ocean Park Beach Nourishment Project	Palm Beach	R118.8- R127.6	1.8	No
Reach 8 Project	Palm Beach	R128.8- R134.1	1.1	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

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
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 Shore Protection Project-Segment II	Broward	R25-R72	8.8	Yes
Dr. Von D. Mizell-Eula Johnson State Park Beach Nourishment Project	Broward	R86-R93	1.4	Yes
Broward County Beach Shore Protection Project-Segment III	Broward	R98.3-R128	5.8	Yes
Dade County Shore Protection Project, Sunny Isles	Miami-Dade	R7-R20	2.6	Yes
Dade County Shore Protection Project, Baker's Haulover Beach 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	No
Florida Keys Region				
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

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Fort Zachary Taylor Historical State Park Beach Nourishment Project	Monroe	na	0.3	No
Panhandle Gulf Region				
Western Barriers Subregion				
Pensacola Beach Nourishment Project	Escambia	R107-R151	8.2	No
Navarre Beach Nourishment Project	Santa Rosa	R192-R213.5	4.1	No
Western Destin	Okaloosa	R17-R20.7 and R23.5-R25.5	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	4.8	No
St. Andrews Reach Subregion				
Carillon Beach and Pinnacle Port Beach Restoration Project	Bay	R1-R5	1.0	Yes
Panama City Beach Shore Protection Project	Bay	R5-R91.5	16.4	Yes
St. Andrews Inlet Management Plan Implementation	Bay	R91.5-R97	0.9	Yes
St. Joseph Peninsula Beach Nourishment Project	Gulf	R67-R105.5	7.5	No
Ochlocknee Barriers				

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Shell Point Beach Restoration Project (County Beach Park)	Wakulla	na	0.1	No
Big Bend Gulf Coast Region				
Sun Coast Subregion				
Fort Island Gulf Park Beach Restoration Project	Citrus	N/A	0.2	No
Southwest Gulf Coast Region				
Pinellas Barriers Subregion				
Honeymoon Island State Park Beach Nourishment Project	Pinellas	R7-R10.5	0.7	No
Pinellas County Shore Protection Project-Sand Key	Pinellas	R56-R66	1.8	Yes
Pinellas County Shore Protection Project-Sand Key	Pinellas	R71-R108.7	7.2	Yes
Pinellas County Shore Protection Project-Treasure Island	Pinellas	R126-R143	3.5	Yes
Pinellas County Shore Protection Project-Long Key, Upham Beach	Pinellas	R144-R148	0.7	Yes
Pinellas County Beach Shore Protection 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 Island Beach Nourishment and Coquina Beach Nourishment Project	Manatee	R7-R10 and R36-R41	1.5	No

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Longboat Key Beach Nourishment Project	Manatee	R44-R67	4.4	No
Longboat Key Beach Nourishment Project	Sarasota	R1-R29	5.4	No
Lido Key Shore Protection Project	Sarasota	R34-R44.2	1.8	Yes
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				
Manasota Key Beach Restoration Project	Sarasota	R173.5-R177.5 & R180.7-R183.7	1.9	No
Manasota Key Beach Restoration Project	Charlotte	R1-R13.2 & R14.4-R21.2	3.6	No
Charlotte County Beach Nourishment Project	Charlotte	R28-R40.5	2.0	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 Nourishment Project	Lee	R110-R118	1.5	No

Region, Subregion and Project	County	Project Location (by R monument)	Managed Miles	Federal Authorization & Cost Share
Estero Barriers Subregion				
Lee County Shore Protection/ Beach Nourishment Project, Estero Island	Lee	R174.6-R181.5	1.2	No
Lovers Key State Park Beach Nourishment Project	Lee	R214.5-R220.5	1.1	No
Big Hickory Island Beach Project	Lee	R222.3-R225.5	0.8	No
Bonita Beach Nourishment Project	Lee	R226-R230.4	0.9	No
Naples Coast				
Collier County Beach Nourishment Project, Vanderbilt Beach	Collier	R22.3-R30.5	1.6	No
Collier County Beach Nourishment Project, Park Shore	Collier	R50.6-R57.5	1.0	No
Collier County Beach Nourishment 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 Nourishment Project	Collier	R134.5-R139	0.8	No
South Marco Island Beach Nourishment Project	Collier	R143-148	0.9	No

Assessment of Sand Sources

The Department's [Regional Offshore Sand Source Inventory \(ROSSI\)](#) is a publicly available computer application that stores data regarding the location, nature and volume of marine sand sources for beach nourishment activities. ROSSI is used by coastal engineers, managers, and researchers for identifying supplies of beach-compatible sand in the planning, construction and maintenance of beach nourishment activities.

The federal Bureau of Ocean Energy Management's (BOEM) Minerals Management Program (MMP) is responsible for the management of offshore sand resources located outside of state waters and within federal waters on the Outer Continental Shelf. The MMP has initiated regional management strategies, 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 Department and the USACE evaluated the demand for sand in five southeast Florida counties (St. Lucie, Martin, Palm Beach, Broward, and Miami-Dade) and the potential sand supplies in regional offshore locations (state and federal waters). The study concluded the regional offshore sand supply is more than adequate to meet the needs of all the beach nourishment projects in the five southeastern coastal counties through 2062. (Ousley et al., 2014).

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

Offshore Sand Sources and Upland Sand Sources

Historically, large volume beach nourishments have used sand from offshore sources and smaller volume beach nourishments or post-storm recovery activities have used sand from upland sand mines. Offshore sand is transported using ocean-going dredge vessels and upland sand is transported using large trucks (“truck hauls”). The high cost of mobilization of a dredge vessel is spread over the larger volume of transported material, which typically reduces the unit cost per cubic yard of sand for this construction method. While the unit cost per cubic yard of sand placed on the beach tends to be higher for truck hauls from an upland sand mine, there are some cost-saving benefits of truck hauls that help reduce overall, long term cost of project maintenance. Whether used for post-storm recovery or for placement in “hotspots” where accelerated beach erosion is occurring within a small section of the larger project area, truck hauls of upland sand can extend the time interval between major beach nourishments using offshore sand. Recently, beach nourishment using upland sand has been selected for maintenance of projects by the Town of Longboat Key and by Collier County. In these cases, smaller volumes of sand incrementally placed within segments of the project area are sufficient to maintain the project and avoid the high cost of mobilization of an ocean-going dredge vessel.

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 12, account for approximately 5% of the total beach nourishment activities from the listed projects below in Table 7. Offshore dredging projects, as shown in Figure 13, account for approximately 95% of total beach nourishment activities for the listed projects below in Table 7. A comparison of the volumes of sand from upland sources and offshore sources (including inlet channel dredging, inlet bypassing and offshore dredging) for beach projects during the period 1960 through 2019 is shown in Figure 14. The list excludes projects that used sand from both offshore dredging and upland sources and excludes years that had only projects using offshore sand. It should be noted that most of the upland truck haul projects are associated with dune restoration and nourishment projects conducted by local governments that are described further in Figure 14, Table 7, and within the subregions of the Strategic Beach Management Plan.



Figure 12. Wabasso Beach (Indian River County) nourishment project (Sector 3) using sand from upland sources. DEP project file photo (2010).



Figure 13. South Boca Raton beach nourishment project (2013) using sand from offshore sources. Photo courtesy of Peter Seidle, P.E.

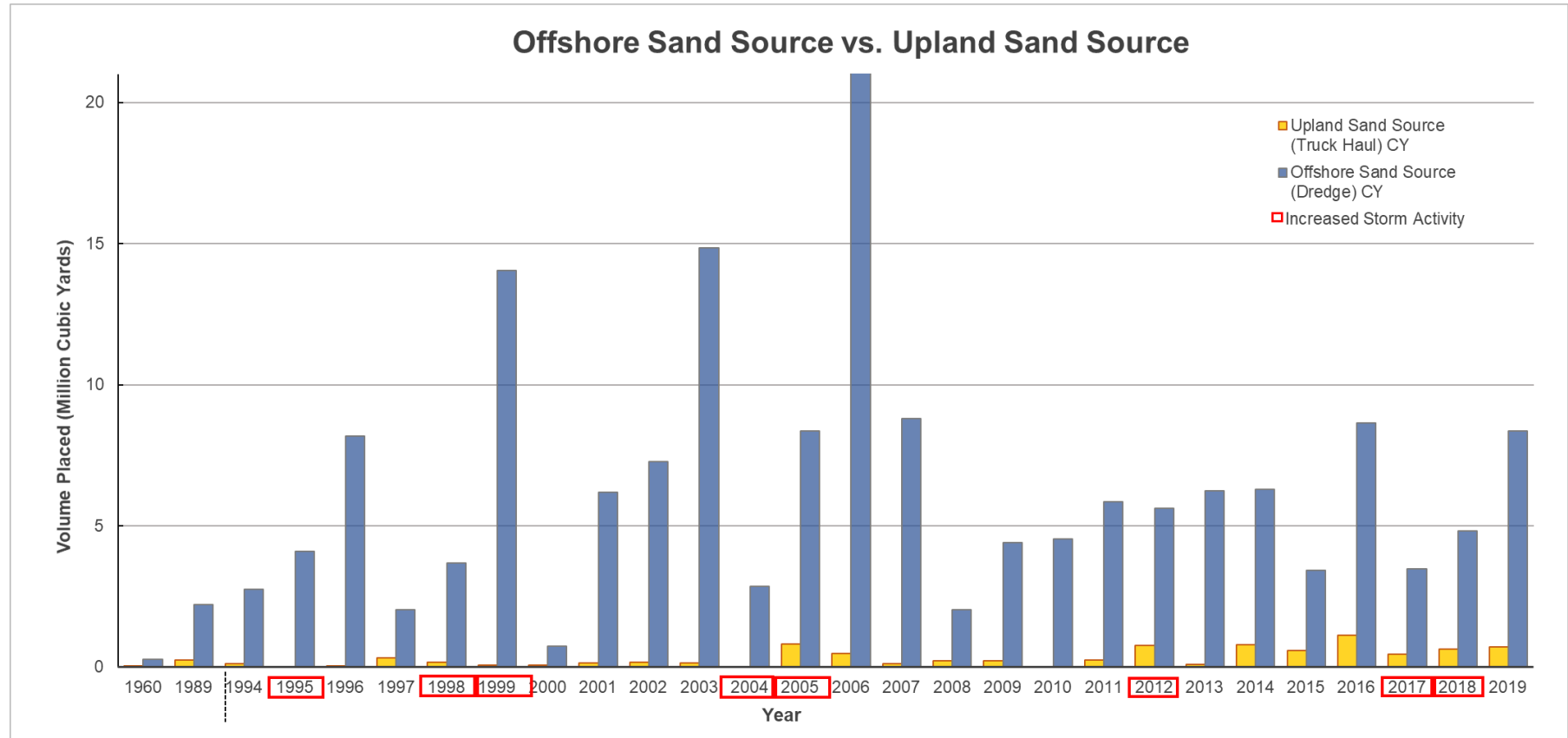


Figure 14. The bar graph is comparing the volumes of offshore sand (dredged) to upland sand (truck hauled) used in beach nourishment or dune restoration projects (excluding placement of sand in nearshore areas) between 1960 through 2019. Red boxes highlighting years 1995, 1998, 1999, 2004, 2005, 2012, 2016, 2017, and 2018 indicate heightened storm activity. There were only two years prior to 1995 (1960 and 1989) with actual upland sand mine (truck haul) activities to compare to the offshore (dredge) activities. Data from year 2019 is based on the data submitted to the Department at the time of this report and 2020 data is still being processed. **Note:** the volumes shown below reflect only the volume numbers described in the SBMPs regions (2020 edition) and the offshore numbers reflect any sandy material that was dredged below the mean high-water line (inlet or offshore).

Table 7. Summary of upland sand source (truck haul) and offshore sand source (dredge) volumes by project location.

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
1960	30,000	Smathers Beach (30,000) City of Key West	266,000	Dade
1989	240,000	Honeymoon Island S.P. (230,000) Pinellas County & Ft. Zachary Taylor SP (10,000) Monroe County	2,215,000	Broward, Lee & Monroe
1994	130,000	Cape Canaveral Beach (100,000) Canaveral Port Authority & Miami Bch. (30,000) Dade County	2,753,656	Dade, Nassau & Pinellas
1995	3,299	Rest Beach (2,600 pre-Hurricane Opal and 699 post H. Opal) City of Key West	4,075,279	Brevard, Charlotte, Duval, Lee & Palm Beach
1996	40,000	Cocoa Beach (40,000) Brevard County	8,170,434	Collier, Dade, Lee, Martin, Palm Beach, Pinellas & Sarasota
1997	330,240	Sebastian Inlet (236,240) Indian River County, Sunny Isles & Haulover Bch. (9,000) Dade County & Miami Bch. (85,000) Dade County	2,030,068	Dade, Manatee & Nassau

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
1998	182,188	Patrick AFB (163,000) DOD, Rest Beach (1,188) City of Key West & Miami Beach (18,000) Dade County	3,676,152	Brevard, Broward, Charlotte, Dade, Palm Beach & Sarasota
1999	78,678	Bathtub Beach (28,000) Martin County, Sebastian Inlet (50,032) Indian River County, Rest Beach (646) City of Key West	14,044,166	Bay, Dade, Pinellas, St. Johns & St. Lucie
2000	73,677	Sebastian Inlet (50,077) Indian River County, Smathers Beach (23,600) City of Key West	747,622	Martin, Palm Beach & Pinellas
2001	154,211	Sebastian Inlet (114,611) Indian River County, Singer Island (10,000) Palm Beach County, Smathers Beach (4,600) City of Key West & Segment III (25,000) Broward County	6,183,280	Brevard, Manatee, Martin, Nassau, Palm Beach & Sarasota
2002	175,035	Sebastian Inlet (50,035) Indian River County & 32nd St., Miami Beach (125,000) Dade County	7,274,814	Dade, Manatee, Martin, Nassau & Palm Beach

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2003	153,500	Collier from upland mine (truck hauls 1996-2003 for Park Shore and Naples)	14,857,261	Collier from Doctor's Pass (100,000 inlet bypassing 1996-2003), Dade, Duval, Escambia, Palm Beach, Martin, Nassau, Okaloosa, St. Johns & St. Lucie
2004	13,000	Singer Island (13,000) Palm Beach County	2,867,477	Lee, Martin, Nassau, Palm Beach, Pinellas, St. Johns & St. Lucie
2005	807,700	Patrick Air Force Base (63,200) Brevard County, Mid Reach; (307,300) and South Beaches; (252,200) Brevard County, Hutchinson Island (94,000) Martin County, Singer Island (56,000) Palm Beach County & Miami Bch. (35,000) Dade County	8,374,316	Brevard, Collier, Dade, Duval, Martin, Palm Beach, Sarasota, St. Johns & St. Lucie
2006	491,938	Mid Reach (127,584) and South Beaches (47,770) Brevard County, Panama City Beach (17,000) Bay	21,751,687	Bay, Broward, Charlotte, Collier, Escambia, Hillsborough, Manatee,

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2006		County, Singer Island (30,000) Palm Beach County, Reach 8 (25,000) Palm Beach County, Miami Bch. (80,000) 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		Nassau, Okaloosa, Palm Beach, Pinellas & Santa Rosa
2007	129,293	Singer Island (99,293) Palm Beach County & Miami Bch. (30,000) Dade County	8,800,254	Brevard, Dade, Indian River, Lee, Martin, Nassau, Okaloosa, Pinellas, Sarasota, St. Johns, St. Lucie & Walton
2008	219,391	Mid Reach (95,777) Brevard County and South Beaches (30,948) Brevard County, Bathtub Beach (2,855) Martin County, Singer Island (50,697) Palm Beach County, Deerfield Bch. (8,314) Broward County, Hillsboro Beach (10,350) Broward County, Key Biscayne (2,400) Dade County, Little	2,032,280	Lee, Nassau & St. Johns

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
		Crawl Key (14,450) City of Marathon & Ft. Zachary Taylor SP (3,600) Monroe County		
2009	216,837	Mid Reach (91,822) Brevard County, South Beaches (69,132) Brevard County, Deerfield Beach (7,378) Broward County, Sunny Isles (10,000) Dade County, Bal Harbor (15,000) Dade County, Miami Beach (10,000) Dade County #1, Miami Beach (10,000) Dade County #2, Miami Beach (3,000) Dade County #3 & Rest Beach (505) City of Key West	4,397,746	Gulf, Lee, Sarasota & St. Lucie
2010	18,425	Navarre Beach (11,881) Santa Rosa County & Bathtub Bch. (6,544) Martin County	4,528,634	Brevard, Dade, Okaloosa, Palm Beach & Pinellas
2011	245,377	Mid-Town/ Reach 4 (52,000) Town of Palm Beach, Phipps Ocean Park (56,000) Town of Palm Beach,	5,859,728	Bay, Brevard, Broward, Charlotte, Collier, Duval, Lee, Manatee & Nassau

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
		Singer Island (30,313) Palm Beach County, Reach 8 (25,000) Palm Beach County, Ft Pierce Bch. (62,000) St. Lucie County, Bathtub Bch. (6,664) Martin County Smathers Beach (12,800) City of Key West & Little Crawl Key (600) City of Marathon		
2012	768,204	Sector 3 (560,592) Indian River County, Naples (10,700) Collier County, Vanderbilt Bch. (12,000) Collier County, Hallandale Bch. (69,400) Broward County, Key Biscayne (37,500) Village of Key Biscayne & Fort Island (5,250) Citrus County, Bathtub Bch. (22,617) Martin County, Blowing Rocks (8,800) Martin County, Jupiter-Carlin (41,145) Palm Beach County, Rest Beach (200) City of Key West	5,630,350	Dade, Indian River, Lee, Martin, Pinellas, St. Johns & St. Lucie

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2013	97,092	Smathers Beach, Key West (4,740) City of Key West, Bathtub Bch. (2,554) Martin County, Sector 3 (23,100) Indian River County, Jupiter-Carlin (10,000) Palm Beach County, Singer Island (55,581) Palm Beach County & Coco Plum Beach (1,117) City of Marathon	6,246,761	Broward, Collier, Lee, Martin, Nassau, Okaloosa, Palm Beach & St. Lucie
2014	798,964	Naples (69,993) Collier County, Naples (52,350) Collier County, Park Shore (81,690) Collier County, Vanderbilt Bch. (59,952) Collier County, Vanderbilt Bch. (22,862) Collier County, Segment II (130,000) Broward County, Sombrero Beach (1,064) City of Marathon, Patrick AFB (17,000) AFB, Kennedy Space Center (85,000) NASA, Mid Reach (191,770) Brevard, South Beaches (47,262) Brevard County, Bathtub Beach (1,295) Martin County, Coral Cove (25,926) Palm Beach County & CCCL project (12,800) Dade County	6,237,056	Brevard, Dade, Indian River, Lee, Manatee, Nassau, Palm Beach, Pinellas & St. Lucie

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2015	579,642	(865) @ R71 Broward County, (2,600) @ R7 to R9 Dade County, Miami Bch. (19,259) Dade County, Sector 3 (182,431) Indian River County, Jupiter-Carlin (282,084) Palm Beach, Singer Island (46,803) Palm Beach County, Hillsboro Beach (45,600) Broward County	3,434,453	Hillsborough, Indian River, Manatee, Martin, Nassau, Palm Beach, Pinellas, Sarasota & St. Lucie
2016	1,130,273	Emergency Dune Project (112,500) Indian River County, Town of Jupiter (3,530) Palm Beach County, Singer Island (11,822) Palm Beach County, Segment II (693,244) Broward County, Curry Hammock SP (150) Monroe County, Ft. Zachary Taylor, SP (200) Monroe County, Longboat Key (238,300) Sarasota County and Vanderbilt & Park Shore (70,527) Collier County.	8,671,947	Collier, Duval, Escambia, Martin, Manatee, Nassau, Palm Beach, Santa Rosa and Sarasota

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2017	467,381	South Beaches (99,384) Brevard County, Singer Island (54,829) Palm Beach County, Miami Beach (233,330) Dade County, Sector 3 (46,341) Indian River County, Bathtub Bch. (27,477) Martin County & Hollywood Bch. (6,020) Broward County	3,485,710	Bay, Charlotte, Dade, Duval, Lee, Martin, Nassau, Palm Beach, Pinellas, St. Johns & St. Lucie
2018	623,240	North Flagler (116,500) Flagler County, Mid Reach (156,590) Brevard County, South Beaches (78,828) Brevard County, Mid-Town (6,000) Palm Beach County, Hillsboro Beach (33,613) Broward County, Hollywood Beach (59,840) Broward County, Sunny Isles (122,269) Dade County & Miami Beach (25,000) Dade County, North Longboat Key (22,000) Manatee County & Shell Point (2,600) Wakulla County	4,834,504	Nassau, Brevard, Collier, St. Lucie, Martin, Palm Beach, Pinellas & St. Johns

Year	Upland Volume (CY)	Upland Sand Source (Truck Haul) Project Location (Local Sponsor)	Offshore Volume (CY)	Offshore Sand Source Project Location (County)
2019	707,160	North Flagler (286,787) Flagler County, Mexico Beach (95,000) City of Mexico Beach, Dr. Von Johnson State Park (134,810) State Park, Sunny Isles (18,764) City of Sunny Isles, Sunny Isles (24,934) City of Sunny Isles, Park Shore (122,222) Collier County, Smathers Beach (23,740) City of Key West, South Beach (582) City of Key West, Dog Beach (95) City of Key West & Simonton Beach (226) City of Key West	8,365,269	Brevard, Collier, Duval, Gulf, Indian River, Lee, Martin, Nassau, Palm Beach, Pinellas, Sarasota & St. Johns
Total	Upland Volume (CY) 8,904,745		Offshore Volume (CY) 171,861,496	

Innovative Technologies

The Department 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. The Department 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. In ranking annual funding priorities of the beach erosion control program, the Department considers the use of innovative, cost-effective, and environmentally sensitive applications to reduce erosion.

An innovative technology workshop was conducted by the Department in February of 2006. The Department explained the applicable rules and statutes and presented the procedures for obtaining regulatory approval to those who presented their technologies. During 2006 and 2007, the Department 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 the proposed projects, funds were used for the design, permitting, construction, and monitoring of demonstration projects. The 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. Beach erosion control projects utilizing innovative technologies (1980s through 2008).

Project Name	Project Location	Date	Status
Artificial Seaweed	Collier County, Manatee County, and Palm Beach County	Early 1980s	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.

Project Name	Project Location	Date	Status
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 profile remained stable.
Longard Tubes	Sand Key, Pinellas County	1992	Project performed (R60) 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 County	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 County	2005	Resulted in shoreline retreat and was ordered removed.
Recycled glass sand demonstration project	Broward County	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. 2005 Study Report.
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.

Project Name	Project Location	Date	Status
Multi-Purpose Artificial Surfing Reef	Brevard County	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.

Conclusion

The SBMP summarizes strategies the State of Florida uses to manage the coastline in critically eroded beach segments. The plan also describes the historical and present beach nourishment activities taken to restore and manage Florida’s beaches to protect upland property, restore habitat for wildlife and provide recreational opportunities for citizens, tourists and future generations. Additional information concerning projects or strategies along Florida’s coastline is available at the following links:

[Northeast Atlantic Coast Region](#)

[Central Atlantic Coast Region](#)

[Southeast Atlantic Coast Region](#)

[Florida Keys Region](#)

[Southwest Gulf Coast Region](#)

[Big Bend Gulf Coast Region](#)

[Panhandle Gulf Coast Region](#)

For additional information pertaining to beach and ocean conditions, coastal associations, educational institutions or government agencies, see the following [related coastal sites](#).

References

Aaron L. Shalowitz, 1964. *Shore and Sea Boundaries*, Vol. 2, 749 p.

American Shore & Beach Preservation Association, [*National Beach Nourishment Database*](#)

American Shore & Beach Preservation Association, *Sea Level Rise*, Vol. 77, # 4, Fall 2009

Catanese Center for Urban and Environmental Solutions, Florida Atlantic University, 2003. *Economics of Florida's Beaches: The Impact of Beach Restoration*.

Catanese Center for Urban and Environmental Solutions, Florida Atlantic University, 2005. *Economics of Beach Tourism in Florida*.

Catanese Center for Urban and Environmental Solutions, Florida Atlantic University, 2006. *The Protection of Property Values by Nourished Beaches: The 2004 Hurricane Season*.

Clark, R.R., 1993. *Beach Conditions in Florida: A Statewide Inventory and Identification of the Beach Erosion Problem Areas in Florida*, Florida Department of Environmental Protection, Division of Beaches and Shores, Beaches and Shores Technical and Design Memorandum 89-1, 5th Edition.

Clark, R.R., Steele, J.K., Weeks, W.G., Brantly, R.F., and Manausa, M., 2017. *Hurricane Damage Assessment Report for 2016: Florida's Beaches and Dunes*, Florida Department of Environmental Protection, Engineering, Hydrology and Geology Program, 55 p.

Clark, R.R., Wang, R., Weeks, W.G., Bacopoulos, P., Manausa, M., 2018. *Hurricane Irma: Post-storm Beach Conditions and Coastal Impact in Florida*, Florida Department of Environmental Protection, Engineering, Hydrology and Geology Program, 107 p.

Clark, R.R., Manausa, M., Steele, J., Wang, S.Y., and Weeks, W.G., 2019. *Hurricane Michael Post-Storm Beach Conditions and Coastal Impact Report*, Division of Water Resource Management, Florida Department of Environmental Protection, 88 p.

Florida Department of Environmental Protection. *2004 Hurricane Recovery Plan for Florida's Beach and Dune System*.

Florida Department of Environmental Protection, 2019. *Critically Eroded Beaches in Florida*, Division

of Water Resource Management, 89 p.

Houston, J.R. 2013. “*The Economic Value of Beaches – 2013 Update*,” Shore & Beach, 81(1), 3-11.

Leadon, M.E., Foster, E., Nguyen, N., Cook, G., Brantly, R., Clark, R., As-Salek, J., LaGrone, J., Koch, J., Sanders, P., Fokes, B., Roberts, S., 2004. *Hurricane Ivan: Beach and Dune Erosion and Structural Damage Assessment and Post-Storm Recovery Plan for the Panhandle Coast of Florida*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 64 p.

Leadon, M.E., Clark, R.R., and Nguyen, N.T., 1999. *Hurricane Earl and Hurricane Georges, Beach and Dune Erosion and Structural Damage Assessment and Post-Storm Recovery Plan for the Panhandle Coast of Florida*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems Report No. BCS-99-01, 43 p.

Leadon, M.E., Nguyen, N.T., and Clark, R.R., 1998. *Hurricane Opal: Beach and Dune Erosion and Structural Damage Along the Panhandle Coast of Florida*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems Report No. BCS-98-01, 102 p.

Michel, J., 2004. *Regional management strategies for federal offshore borrow areas, U.S. east and Gulf of Mexico coasts*. Journal of Coastal Research, 20(1), 149–154. West Palm Beach (Florida), ISSN 0749-0208.

Milliman, Inc., 2010. *A Report on the Economic Impact of a 1-in-100 Year Hurricane on the State of Florida*, 77 p.

Office of Economic and Demographic Research, 2015. *Economic Evaluation of Florida’s Investment in Beaches*, 23 p.

Ousley, J.D., Kromhout, E., Schrader, M.H., Lillycrop, L., 2014. *Southeast Florida sediment assessment and needs determination (SAND) study*, Final Report, ERDC/CHL TR-14-10, U.S. Army Corps of Engineers, 322 p.

U.S. Department of Commerce, NOAA, 1975. [*The Coastline of the United States*](#), NOAA/PA 71046, 6 p.

USACE, 2013. [*Incorporating Sea Level Change in Civil Works Programs - ER*](#), 13 p.

USACE, 2014. [*Procedures to Evaluate Sea Level Change: Impacts, Responses and Adaptation - ETL*](#), 254 p.

Appendix - Acronyms

Acronyms associated with the Florida Department of Environmental Protection’s Strategic Beach Management Plan:

Coastal Associations Acronyms:

- ASBPA – American Shore & Beach Preservation Association
- FSBPA – Florida Shore & Beach Preservation Association
- DCA – Dredging Contractors of America

Federal Agencies Acronyms:

- BOEM – Bureau of Ocean Energy Management
- CBRA – Coastal Barrier Resources Act
- CHL – Coastal and Hydraulics Laboratory
- CIRP – Coastal Inlets Research Program
- CMS – Coastal Modeling System
- CSRM – Coastal Storm Risk Management
- CZMA – Coastal Zone Management Act
- EA – Environmental Assessment
- EIS – Environmental Impact Statement
- ERDC - Engineer Research and Development Center
- FCCE – Flood Control and Coastal Emergency
- FEMA – Federal Emergency Management Agency
- FRF – Field Research Facility
- GRR – General Reevaluation Report
- HSDR – Hurricane and Storm Damage Reduction
- LPP – Locally Preferred Plan
- LRR – Limited Reevaluation Report
- MMP – Marine Minerals Program
- NGVD 29 – National Geodetic Vertical Datum of 1929
- NAVD 88 – National American Vertical Datum of 1988
- NPS – National Park Service
- NWF – National Wildlife Refuge

- NEPA – National Environmental Policy Act
- NOAA – National Oceanic and Atmospheric Administration
- NHC – National Hurricane Center
- NWF – National Wildlife Refuge
- ODMDS - Ocean Dredge Material Disposal Site
- OCS – Outer Continental Shelf
- RSM – Regional Sediment Management
- SAJ – South Atlantic District, Jacksonville
- SPP – Shore Protection Project
- SLC – Sea Level Change
- SLR – Sea Level Rise
- TSP – Tentatively Selected Plan
- USACE – United States Army Corps of Engineers
- USFWS – United States Fish and Wildlife Service
- WRDA – Water Resources Development Act

State Agencies Acronyms:

- AIWW - Atlantic Intracoastal Waterway
- BCS – Beaches and Coastal Systems
- BIPP – Beaches, Inlets and Ports Program
- BMA – Beach Management Agreement
- BMFA – Beaches and Mines Funding Assistance Program
- BMP – Best Management Practices
- BSM – Bureau of Survey and Mapping
- CCCL – Coastal Construction Control Line
- COASTS – Collection of Aerials and Shoreline Trends Systems
- DEP – Department of Environmental Protection
- DMMA – Dredge Material Management Area
- DSL – Division of State Lands
- DWRM – Division of Water Resource Management
- ECL – Erosion Control Line
- EOC – Emergency Operation Center

- FAC – Florida Administrative Code
- FAR – Florida Administrative Register
- FDEM – Florida Department of Emergency Management
- FDFS – Florida Department of Financial Services
- FDOT – Florida Department of Transportation
- FHCF - Florida Hurricane Catastrophe Fund
- FIND – Florida Inland Navigation District
- FPS – Florida Park Service
- FS – Florida Statutes
- FWC – Florida Wildlife Commission
- IMP – Inlet Management Plan
- IWW – Intracoastal Waterway
- JCP – Joint Coastal Permit
- LABINS – Land Boundary Information System
- LGFR – Local Government Funding Request
- LRBP – Long Range Budget Plans
- MHWL – Mean High Water Line
- MLLW – Mean Lower Low Water
- MLW – Mean Low Water
- MOA – Memorandum of Agreements
- MOU – Memorandum of Understandings
- OCULUS – DEP’s Electronic Document Management System
- OGC – Office of General Counsel
- R – Range or Reference Monument/Survey Marker
- RCP – Resilience and Coastal Protection
- ROSSI – Regional Offshore Sand Source Inventory
- SAND – Sediment Assessment and Needs Determination Study
- SBMP – Strategic Beach Management Plan
- SOP – Standard Operating Procedures
- SOW – Scope of Work
- TAC – Technical Advisory Committee
- TIITF – Trustees of the Internal Improvement Trust Fund
- WCIND – West Coast Inland Navigation District