

***Strategic Beach Management Plan:***  
***Northeast Atlantic Coast Region***  
**Office of Resilience and Coastal Protection**  
**Florida Department of Environmental Protection**  
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St. Augustine Shore Protection Project at early stages of construction near R141 in February 2018, photo by W.G. Weeks.

## ***Introduction - Northeast***

The **Northeast Atlantic Coast Region** has a total of 135.7 miles of beaches of which, 62.2 miles are critically eroded and 21.6 miles are actively managed. There are also seven inlets within the Northeast Atlantic Region, where three of those inlets have an [inlet management plan](#). For additional beach management or project information, see the current [Critically Eroded Beaches Report](#), the [joint coastal permits](#) by county, or the [local government funding requests](#) by county.

Each subregion listed below will have the introductory paragraph listing miles of coastline and erosional events/ storms that have affected the subregion. Each title within the subregion will list the coastal location, the county and the range (R) survey markers for the critical erosion area. For inlets, river entrances, or passes the title, the county, and the adjacent range survey markers will be stated. In addition, there will be a subregion map highlighting the critical erosion areas and the managed project areas. Finally, references to coastal reports will also be listed at the end of each subregion.

For more specific information concerning projects or strategies along Florida’s coastline, see the following links for the other six coastal regions of Florida. For background information, see the Strategic Beach Management Plan’s Introduction.

[Strategic Beach Management Plan’s Introduction](#)

[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](#).

The State of Florida was significantly impacted by three hurricanes, Hermine, Matthew and Irma during the 2016 and 2017 hurricane seasons. 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. The post-storm survey data has been

fully analyzed and an updated list of critically eroded beaches is in the Critically Eroded Beaches Report.

### ***Sea Islands***

There are 27.7 miles of beaches in the Sea Islands subregion, which extends from the south end of Cumberland Island, Georgia, to the Duval–St. Johns County line, as shown in Figure 1. There is a total of 18.1 miles of critically eroded beaches in this subregion (7.7 miles in Nassau County and 10.4 miles in Duval County), of which 17.8 miles have been restored and are maintained.

Erosion is attributed to frequent northeasters, occasional hurricanes, and the effects of the St. Mary's River Entrance, the St. Johns River Entrance, Nassau Sound, and Ft. George Inlet. The most erosive storms have been the Thanksgiving northeaster of 1984, a series of northeasters in November and December in 1992, Hurricane Floyd (1999), Tropical Storm Gabrielle (2001), Hurricane Frances (2004), Hurricane Ophelia (2005), Tropical Storm Tammy (2005), Subtropical Storm Andrea (2007), October northeasters (2007), Tropical Storm Noel (2007), Tropical Storm Beryl (2012), Hurricane Matthew (2016) and Hurricane Irma (2017). Other events with severe impacts include the Ash Wednesday northeaster of March 1962, Hurricane Dora (1964), and the February 1973 northeaster.

### ***Strategies for Inlets and Critically Eroded Beaches***

#### **St. Marys River Entrance, Nassau County**

The St. Marys River Entrance is part of the federally authorized Fernandina Harbor Navigation Project, and is the entrance to the Port of Fernandina and Kings Bay Naval Base in St. Marys, Georgia. Maintenance dredging generally occurs on an annual basis with beach quality sand placed on the inlet shoreline at Fort Clinch State Park, on the ocean shoreline of Fernandina Beach, or in a nearshore disposal area. Dredged material containing excessive fines, but which is otherwise beach compatible, is placed in a nearshore disposal area. The U.S. Navy and the State of Florida executed a Memorandum of Understanding in 1986 that states all beach compatible material dredged from the St. Marys River is to be placed on downdrift beaches or in nearshore areas of Amelia Island.

The Florida Department of Environmental Protection (Department or DEP) adopted the [St. Marys River Entrance Inlet Management Study Implementation Plan](#) in May 1998, which established an annual bypassing objective of between 554,000 and 779,000 cubic yards (cy).

Sand tightening of the south jetty was completed in 1988 in conjunction with deepening the federal navigation channel. The improvements to the groin field at Fort Clinch as recommended in the plan were completed in April 2000. In 2004, a feasibility study was performed to investigate removal of the interior north jetty shoal of Cumberland Island. Several legal issues need to be resolved before this study's recommendations can be given further consideration. Updating the sediment budget and inlet management plan are needed for this project area when analyzing monitoring data from the last 16 years. From 2008 until April 2015, the U.S. Army Corps of Engineers (USACE) has bypassed sediment to the North Beach (R13-R16) of Fernandina, and placed approximately 465,200 cy of beach compatible material to the benefit of the Nassau County Shore Protection Project. This has allowed the maintenance of the restoration project to exceed its predicted five-year nourishment interval. The USACE report entitled, "Northeast Florida Regional Sediment Management," dated March 2016, studied this subregion and the St. Marys River Entrance. The report outlines additional opportunities that would enhance the regional sediment management (RSM) program in Northeast Florida, and it has been shown that additional investigation is needed to maximize the potential beach quality sand for use on adjacent eroding beaches.

**Strategy:** Update the sediment budget and adopt an updated inlet management plan; continue to bypass beach compatible sediment to the downdrift beaches to mitigate the effects of the inlet; place non-compatible dredge material in the nearshore.

#### **Fort Clinch, Nassau County, 2,500 feet west of R1-R9**

This is a 2.5-mile segment of critically eroded inlet shoreline of Amelia Island fronting the St. Marys River Entrance. Located within this shoreline is the historic Fort Clinch and Fort Clinch State Park. Sand placement from maintenance dredging occurred in the groin field and at the south jetty in 2007, 2009, 2010, 2012, 2015, 2017, 2018 and 2019.

**Strategy:** Maintain the groin field that protects Fort Clinch; continue strategic sand placement from the navigation project or other sources.

**Fernandina Beach, Nassau County, R9-R33**

This is a 4.4-mile segment of critically eroded beach extending from the south jetty of the St. Marys river entrance to Sadler Road in Fernandina Beach. The **Nassau County Shore Protection Project** was federally authorized in 1972 in response to Hurricane Dora (1964). Federal emergency funds were appropriated in 1965 to place granite stone revetments along 2.8 miles of shoreline between R12 to R27. Sand dredged from the St. Marys River Entrance Channel has been placed in this segment since 1978, see the project history in Table 1. The initial beach restoration was completed in 2008, using approximately 1,932,000 cy of sand from an offshore borrow site that was placed within the municipal boundary of Fernandina Beach (R13-R34.5). The City of Fernandina Beach is the local government sponsor for the project. The project design consists of a beach berm at elevation +10 ft NAVD that is intended to protect the existing dune and upland development. The nourishment interval was five years, but the project has exceeded design expectations, due to few storm impacts and the periodic bypassing of material from the St. Marys River Entrance Channel in 2011, 2013, 2014, 2015, 2016, 2017, 2018 and 2019. A total of 1,605,592 cy has been placed along North Beach between R13-R16 and in 2016, 2018 and 2019 between R25-R27. As a result of the bypassing, the federal shore protection project is performing well, and the first nourishment is to be determined. The federal project is authorized until 2058.

**Table 1.** Nassau County Shore Protection Project beach placement that includes bypassing from St. Marys Entrance Channel, since 2011.

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Source</b>	<b>Project Location (by R monument)</b>	<b>Length (mi)</b>
1978	1,000,000	St. Marys Entrance Channel	R12-R22	1.9
1982	360,000	St. Marys Entrance Channel	R19-R25	1.1
1987-1988	907,000	St. Marys Entrance Channel	R13-R22	1.7
1992-2007* (nine events)	1,988,284*	St. Marys Entrance Channel	R13-R22	1.7
September 2008	1,932,000	Offshore	R13-R34.5	3.8
2011	89,988	St. Marys Entrance Channel	R13-R16	0.6



<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Source</b>	<b>Project Location (by R monument)</b>	<b>Length (mi)</b>
2013	130,000	St. Marys Entrance Channel	R13-R16	0.6
March 2014	107,634	St. Marys Entrance Channel	R13-R16	0.6
April 2015	400,704	St. Marys Entrance Channel	R13-R16	0.6
March 2016	302,695	St. Marys Entrance Channel	R20-R27	1.3
March 2017	164,303	St. Marys Entrance Channel	R13-R15.5	0.5
March 2018	70,268	St. Marys Entrance Channel	R25-R27	0.4
2019	358,936	St. Marys Entrance Channel	R24-R34	1.9

\*Nine separate events - divided volume # by nine = 220,920 cy per bypassing event.

**Strategy:** Maintain the project through monitoring and periodic nourishment using sand from offshore and from inlet maintenance.

**South Amelia Island, Nassau County, R60-R80**

This is a 3.3-mile segment of critically eroded beach along the southern portion of Amelia Island, including the South Amelia Island Shoreline Stabilization Association (SAISSA) and the Amelia Island State Park. The alternating northern and southern migration of Nassau Sound has resulted in alternate periods of accretion and erosion at the ends of Amelia and Little Talbot Islands. The non-federal South Amelia Island Beach Nourishment Project (R60-R80) was initially constructed in 1994 using sand obtained from an offshore borrow area. The project design consists of a beach berm at elevation +10 ft NAVD. The project was designed for nourishment at eight-year intervals. Dredging of the Atlantic Intracoastal Waterway (AIWW) through Nassau Sound is scheduled for every three to five years, with placement of beach quality sand between R73 and R79. The project history for this segment of shoreline is described in Table 2. To stabilize the south end of the island, a terminal rock groin and offshore breakwater were constructed in 2004. Due to the importance of emergent shoals in Nassau Sound for migrating and resident bird populations, the terminal rock groin was designed to be

“leaky” to allow for the continued movement of sand across the Sound to feed the emergent shoals. The south end of the project within the boundaries of the state park (R76-R79) was nourished in 2006 with 400,000 cy of sand dredged from the Sawpit Creek Cut section of the AIWW. The maintenance of the Intracoastal Waterway at Sawpit Creek Cut continues to contribute sand to nourish the beaches along the South Amelia Island project. A full nourishment (R59.5-R77) followed in 2011, using 2,100,000 cy of material from an offshore source. Most recently, 580,000 cy of beach disposal material from the AIWW was placed in 2013 along the park shorefront from R75 to R77.5. SAISSA supported a reconnaissance-level field investigation that collected vibracores in offshore federal waters to identify potential sand sources in 2016. The AIWW beach disposal from Sawpit Creek occurred in April 2019 with placement of approximately 576,868 cy of sand between R75 and R77.5. The next nourishment event is scheduled for 2021.

**Table 2.** South Amelia Island Beach Nourishment project history.

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Sand Source</b>	<b>Project Location</b>	<b>Length (mi.)</b>
August 1994	2,600,000	offshore	R60-R78	3.2
September 1997	300,000	Sawpit Creek Cut - AIWW	R73.5-R78	0.85
2001	300,000	Sawpit Creek Cut - AIWW	R73.5-R78	0.85
September 2002	1,900,000	offshore	R60-R79.5	3.4
2006	400,000	Sawpit Creek Cut - IWW	R76-R79	0.4
2011	2,100,000	offshore	R59.5-R77	3.2
2013	580,000	Sawpit Creek Cut - AIWW	R75-R77.5	0.5
April 2019	576,868	Sawpit Creek Cut - AIWW	R75-R77.5	0.5

**Strategy:** Maintain the project through monitoring and nourishment using sand from offshore; placement of beach compatible sand from maintenance dredging of the AIWW.

**Nassau Sound, Nassau County R79 to Duval County R1**

This is an undeveloped, highly variable inlet with migrating emergent shoals. A draft inlet management plan was formulated in 1993 by stakeholders but was never adopted by the Department.

### **Little Talbot Island State Park, Duval County, R21-R23**

This is a 0.3-mile segment of critically eroded beach on the southern end of Little Talbot Island, fronting the Atlantic Ocean (R21-R23), and a 0.7-mile segment of critically eroded shoreline fronting Fort George Inlet (R23 – A1A bridge). The inlet shoreline and part of the Atlantic shoreline has a rock revetment to protect the bridge abutment. In 1999, a federal shore protection project consisting of a revetment to protect the shoreline and bridge abutment on Little Talbot Island was authorized, but the federal project was not constructed. Park facilities have been relocated due to erosion from the inlet migration and storm damage. The USACE in early 2019, along with the South Amelia Island and Shore Stabilization Association (SAISSA) have initiated the process for a [Section 111](#) feasibility study to address erosion problems near the inlet and Little Talbot Island.

**Strategy:** Continue to perform physical monitoring and vertically controlled aerial photography.

### **Fort George Inlet, Duval County, R25-R26**

Fort George Inlet is a natural inlet that has not been altered or maintained for navigation but has been strongly affected by navigation improvements at the St. Johns River Entrance since the 1800s. The shoal north of the northern St. John’s River Entrance jetty has grown and is currently used as a City of Jacksonville Huguenot Memorial public park. The inlet channel has migrated north and is eroding Little Talbot Island State Park.

The Department’s Division of Recreation and Parks sponsored a study of the inlet in 1999, which recommended relocation of the inlet channel to its historic southern location and the closure of the existing inlet by the hydraulic placement of the sand derived from new channel construction. The study did not investigate the alternative of bypassing sand to the downdrift shoreline south of the St. Johns River Entrance or bypassing to the eroded northernmost segment of Talbot Island. The inlet was studied again in 2011 by the Beaches and Shores Resources Center. The USACE report entitled, “Northeast Florida Regional Sediment Management,” dated March 2016, studied this subregion and the Ft. George Inlet. The report outlines additional opportunities that would enhance the regional sediment management (RSM) program in Northeast Florida and it has been shown that additional investigation is needed to maximize the potential beach quality sand for use on adjacent eroding beaches. In early 2019, the USACE, along with the South Amelia Island and Shore Stabilization Association (SAISSA) initiated a [Section 111](#) feasibility study to address erosion problems near the inlet and Little Talbot Island.

**Strategy:** Monitor; coordinate with the USACE - RSM work to implement strategies for inlet management.

### **St. Johns River Entrance, Duval County, R30-V501**

The St. Johns River Entrance is part of the federally authorized Jacksonville Harbor Navigation Project and is the entrance to the Port of Jacksonville and Mayport Naval Station. The maintenance dredging of the entrance channel generally occurs on a semi-annual basis, with the placement of beach compatible sand on the downdrift shoreline south of the river entrance and continues to contribute sand to nourish the beaches along the Duval County Shore Protection Project. More than 1 million cy of material is dredged annually from the remaining 26 miles of the navigation channel and placed in upland disposal sites or in an Offshore Dredged Material Disposal Site. The [USACE](#) completed the Jacksonville Harbor Channel Deepening Study, and the report was signed by the Chief of Engineers in April 2014. The current depth of the channel is approximately -40 feet, and the study looked at deepening the channel to a maximum depth of -50 feet. A Joint Coastal Permit for the Jacksonville Harbor Federal Channel Expansion project has been reviewed and issued by the Department to authorize the deepening of the federal navigation channel to a depth of -47 feet or -49 feet, depending on the river section, with an allowable 2-foot overdepth dredging from mean lower low water (MLLW). The Department issued the permit for the channel expansion in July 2016. Dredging began in February 2018 for the deepening of the federal navigation channel.

The USACE completed the “Northeast Florida Regional Sediment Management” report dated March 2016, which studied this subregion and the St. Johns River to enhance the USACE-RSM program. The study showed that additional investigation is needed to maximize the potential beach quality sand for potential use on adjacent beaches.

**Strategy:** Continue to bypass suitable sediment from maintenance dredging to the downdrift beaches; adopt an inlet management plan of the St. Johns River Entrance - Fort George Inlet complex; continue to coordinate with the USACE - RSM work.

### **St. Johns River to the Duval - St. Johns County Line, Duval County, V501-R80**

This is a 10.1-mile segment of critically eroded beach from the southern jetty of the St. Johns River entrance southward to the Duval–St. Johns County line, and the project history for this segment of shoreline is described in Table 3. The federally authorized Duval County Shore Protection Project (South Jetty-R31-R80) was initiated in 1977 and completed in 1980, using sand from maintenance

dredging of the river entrance and from an offshore borrow area. Nourishments occurred in 1985, 1986, 1987, 1991, and 1995. In 2003, nourishment began using sand dredged from the river entrance. This work stopped after placement of about 120,000 cy, when it was determined the material contained excessive amounts of shell and clay and it was therefore deemed unsuitable for placement on the beach. The project was reinitiated and completed in 2005 using material from an offshore borrow area. Work included repair of 8,500 feet of dunes located between R43 and R80. In the 2011 nourishment, 689,015 cy of material was placed along Duval County’s Atlantic shoreline. The project design consists of a beach berm at elevation +8 ft NAVD to protect the existing dune and upland development. The project is authorized until 2028. The next nourishment was planned for the fall of 2016 to place approximately 682,000 cy of material along most of Atlantic Beach, all of Neptune Beach, and all of Jacksonville Beach. There were construction delays due to Hurricane Matthew, and additional post-storm work was completed in May 2017 with placement of approximately 222,088 cy. An additional 192,851 cy of material was used for dune restoration. Due to Hurricane Irma, the next beach nourishment construction event was constructed in the winter of 2018/2019. The USACE beach nourishment event placed approximately 777,847 cy for the beach berm and 90,156 cy for the dune from an offshore borrow area.

**Table 3.** Duval County Shore Protection Project history.

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Source</b>	<b>Project Location (by R monument)</b>	<b>Length (mi)</b>
September 1978	1,267,800	Offshore borrow area	R34.5-R52.7	3.3
October 1980	1,609,200	Offshore borrow area	R52.7-R80	5.0
October 1980	822,800	St. Johns River Entrance Channel	S. Jetty-R33	1.5
1985	1,284,400	St. Johns River Entrance Channel	R39-R53.7	2.8
1986	308,650	Offshore borrow area	R52.7-R67	2.4
1987	849,770	Offshore borrow area	R60 to R80	3.8
1991	300,000	Offshore borrow area	R44-R52.7	1.6
November 1995	1,187,279	Offshore borrow area	R47-R80	7.0
2003	120,000	St. Johns River Entrance Channel	R72-R80	1.5

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Source</b>	<b>Project Location (by R monument)</b>	<b>Length (mi)</b>
August 2005	615,198	Offshore borrow area	R43-R53 and R57- R80	6.0
August 2011	689,015	Offshore borrow area	R43.5–R53 and R57- R80	5.9
December 2016	682,000	Offshore borrow area	R52-R80	5.3
May 2017	192,851*	Offshore borrow area	R45-R72.5	5.2
May 2017	222,088	Offshore borrow area	R45-R80	6.6
January 2019	777,847	Offshore borrow area	R33.5-R80	9.6
January 2019	90,156*	Offshore borrow area	R39-R53 and R72.5-R80	3.9

\* Dune Only

**Strategy:** Maintain the project through monitoring, nourishment and sand bypassing.

***Regional Strategies for Beach and Inlet Management***

**Sponsors and Funding**

This subregion contains the governmental entities of Nassau County; the [City of Fernandina Beach](#); Duval County; and the Cities of Jacksonville, Atlantic Beach, Neptune Beach, and Jacksonville Beach; the [Port of Jacksonville](#); and the Florida Inland Navigation District (FIND). There are two major military installations in this area, Kings Bay Naval Base (Georgia) and Mayport Naval Station, which share navigation facilities with civilian resources and are maintained by the USACE Jacksonville District (SAJ). There are significant public park lands in this area, including the north and south ends of Amelia Island, Big Talbot Island and Little Talbot Island, administered by the Department’s [Division of Recreation and Parks](#), and Huguenot and Hanna Park administered by the City of Jacksonville.

Participants with the Department as sponsors of beach management projects include the City of Fernandina Beach, Duval County, the [City of Jacksonville](#), the Department’s Division of Recreation and Parks, the [South Amelia Island Shoreline Stabilization Association](#) (SAISSA), the [FIND](#), and the [USACE](#). Project cost estimates and schedules may be found in [Beach Management Funding Assistance Program - Long Range Budget Plan](#).

## **Project Coordination**

Regionalization is the funding and coordination of multiple erosion control projects and inlet management activities to take advantage of identifiable cost savings through economies of scale, reduced equipment mobilization and demobilization costs, and elimination of duplicative administrative tasks. Opportunities in this subregion include:

1. The Department and the USACE have completed a regional sediment management demonstration project in the Sea Islands and St. Johns Beaches subregions. Tasks included designation of government liaisons to coordinate beach management activities, development of methods and techniques for exchange and dissemination of planning and project information, coordination of USACE input, review and comment on the Strategic Beach Management Plan and Long-Range Budget Plan, and monthly updates on USACE activities pertinent to statewide sediment management opportunities and issues. The USACE is currently pursuing ways to implement this project's recommendations.
2. The maintenance of the navigation project at St. Johns River Entrance should be coordinated with beach nourishment of the beach erosion control project for Duval County if material is determined to be beach compatible.
3. The maintenance of the Intracoastal Waterway at Sawpit Creek Cut is coordinated with beach nourishment of the South Amelia Island project.

## **Environmental Protection**

The protection of marine turtles, right whales, beach mice, shorebirds, and their habitats are primary environmental concerns within this subregion. Sensitive areas for shorebirds include Ft. Clinch, south Amelia Island, Sawpit and the Talbot Islands and Huguenot Park. Additionally, emergent shoals within the Nassau Sound are utilized by resident and migrating birds and must be maintained or restored. These areas are subject to change as conditions change, and coordination with [FWC shorebird staff](#) is encouraged during project development. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31, but activities must be monitored. Project design and method of construction may be restricted to avoid or minimize adverse impacts to the listed species and their habitat. Fort Clinch on Amelia Island is a significant historical resource where material from maintenance dredging has been placed and shore protection

structures have been constructed. The [Nassau River - St. Johns River Marshes and Fort Clinch Aquatic Preserves](#) are located within the Sea Islands Subregion, and encompass critically eroded beaches. Projects located within and near the Aquatic Preserve boundaries require additional protection, including meeting more stringent anti-degradation water quality standards.

### **Sand Sources**

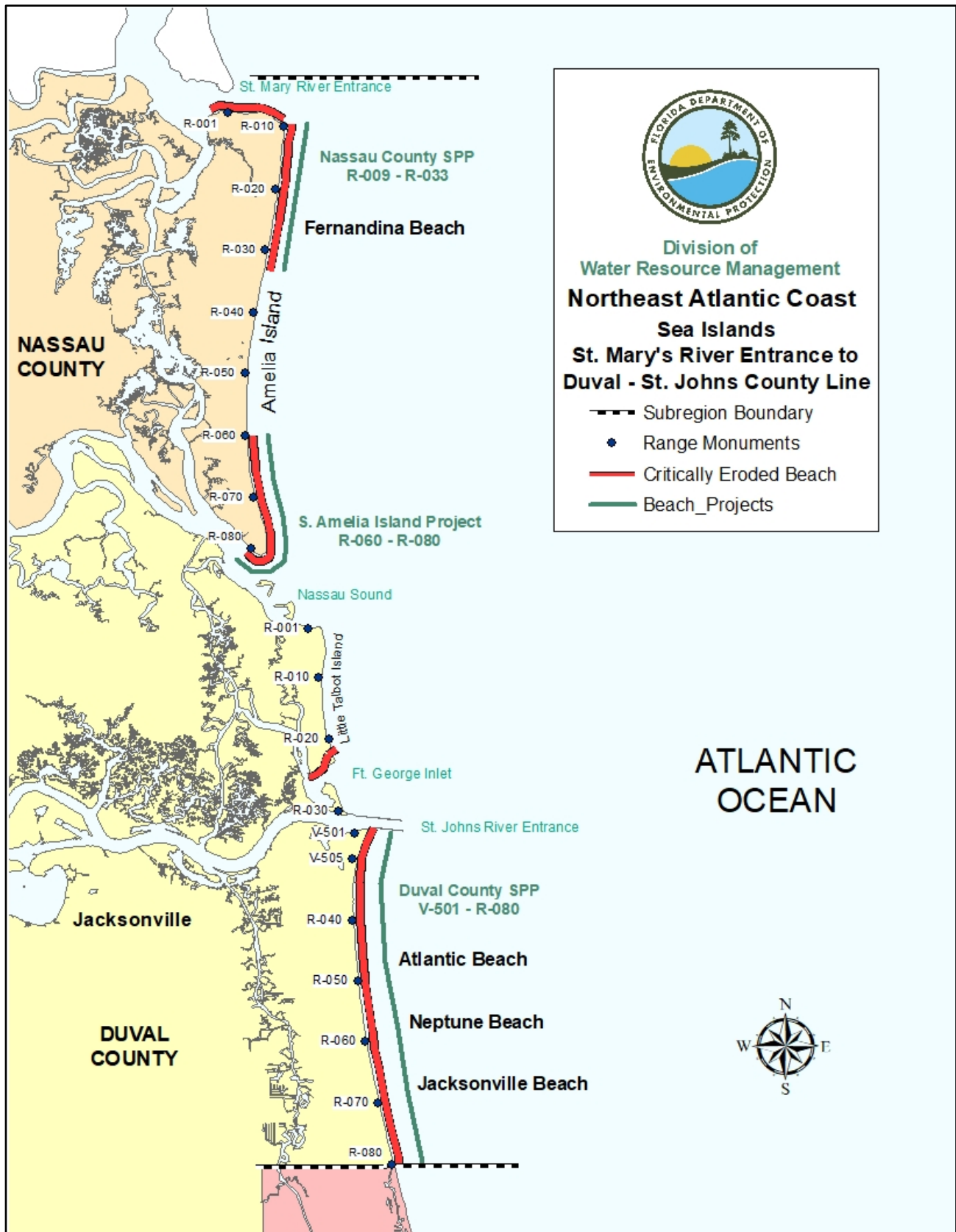
Sufficient sand sources for beach nourishment over the next 15 years have been identified for all projects. A regional sediment management (RSM) strategy that uses beach quality sand from upland dredged material management areas and the maintenance dredging of navigation projects should be incorporated into the maintenance of the projects. The Department has outlined various RSM strategies in its inlet management plans and strategic beach management plans. The USACE, Jacksonville District (SAJ) RSM work effort through the South Atlantic Division's Center of Expertise (CX) aids the Department in updating these plans. The USACE-SAJ published an RSM technical report in FY 2015, by their Engineer and Research Development Center (ERDC), to better jointly manage navigation, coastal storm damage reduction and ecosystem restoration projects. It is the goal of the Department to coordinate with the USACE-SAJ and implement strategies mutually beneficial to the USACE and the Department's missions by leveraging federal authorities, permits, and funding. For additional information on sand sources, the Department manages a database named the [Regional Offshore Sand Source Inventory \(ROSSI\)](#).

### **Additional Information**

The introduction of the State's Strategic Beach Management Plan provides additional background information on the Department's Beach Management Programs and includes overviews of:

- The principles and statutes followed to help guide the State's management strategies
- Comprehensive list of Florida's inlets
- The miles of critically eroded beaches under active management
- Statewide sand source studies
- Statewide monitoring programs
- Innovative technologies examined
- Basic suggestions for emergency response plan





**Figure 1.** Map of the Sea Islands subregion of the North Atlantic Region of Florida. View an [interactive map](#) or [COASTS imagery](#).

## **References**

- Balsillie, J. H., 1985. *Post-Storm Report: The Florida East Coast Thanksgiving Holiday Storm of 21-24 November 1984*, Florida Department of Natural Resources, Division of Beaches and Shores, Post-Storm Report No. 85-1, 74 p.
- Clark, R.R., LaGrone, J.W., Brantly, R., 2004. *Hurricane Frances & Hurricane Jeanne: Post-Storm Beach Conditions and Coastal Impact Report with Recommendations for Recovery and Modifications of Beach Management Strategies*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 93 p.
- Clark, R.R., 2000. *The Impact of Hurricanes Floyd and Irene on the Florida East Coast*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-01, 55 p.
- 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.
- Florida Department of Environmental Protection. *2004 Hurricane Recovery Plan for Florida's Beach and Dune System*, 65 p.
- Florida Department of Environmental Protection, 2019. *Critically Eroded Beaches in Florida*, Division of Water Resource Management, 89 p.
- Florida Department of Environmental Protection, 1998. *St. Mary's River Entrance Inlet Management Study Implementation Plan*, May 1998, 12 p.
- Florida State University's Beaches and Shores Resource Center, 2011. *Inlet Management Plan and Sediment Budget for St. Johns River Entrance / Ft George Inlet, Florida, St. Johns County, Florida*

- Foster, E.R., Spurgeon, D.L., and Cheng, J., 2000. *Shoreline Change Rate Estimates, Duval County*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-01, 56 p.
- Foster, E.R., Spurgeon, D.L., and Cheng, J., 1999. *Shoreline Change Rate Estimates, Nassau County*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-99-04, 54 p.
- Kraus, N.C., Gorman, L.T., Pope, J., 1993. *Kings Bay Coastal and Estuarine Physical Monitoring and Evaluation Program: Coastal Studies*, U.S. Army Corps of Engineers, Waterways Experiment Station, Technical Report CERC-93-xx, 286 p.
- Olsen Associates, Inc., 1997. *St. Marys River Entrance Inlet Management Plan*
- Olsen Associates, Inc., 2004. *Cumberland Shoals Dredging Feasibility Study*
- Olsen Associates, Inc., 2011. *Nassau County Shore Protection Project, Year 3-Monitoring Report*
- Olsen Associates, Inc., 2013. *Nassau County Shore Protection Project, Fernandina Beach, Florida, Year 5 Monitoring Report*, November 2013, 41 p. plus appendices.
- Olsen Associates, Inc., 2004. *South Amelia Island Shore Stabilization Project, Phase I - Beach Restoration, Year 1 Monitoring Report*
- Olsen Associates, Inc., 2011. *South Amelia Island Shore Stabilization Project, Post-Construction Report*
- Olsen Associates, Inc., 1994. *Nassau Sound Inlet Management Plan*
- Olsen Associates, Inc., 2011. *Duval County Shore Protection Project, Project Completion Report*
- Olsen Associates, Inc., 1997. *Amelia Island, Florida, SAISSA Beach Restoration Project, Monitoring Report No. 3*, December 1997
- Olsen Associates, Inc., 2000. *Amelia Island, Florida, SAISSA Terminal Groin Field, Monitoring Report No. 5*, October 2000

Olsen Associates, Inc., 2016. *Amelia Island, Nassau County Florida, Marine Geological Field Investigation for Offshore Geologic Model Support & BOEM Notice of Scientific Research NA15-001*, May 2016

Olsen Associates, Inc., 1999. *Fort George Inlet Shoreline Erosion Plan*

Olsen Associates, Inc., 2019. *Nassau County Shore Protection Project, Post-2019 Beach Renourishment Monitoring Report*, 34 p., plus appendices.

United States Department of the Navy and the State of Florida., 1986. *Memorandum of Understanding Concerning Dredging of the St. Marys Inlet Channel*

U.S. Army Corps of Engineers, 1999. *Duval County, Florida, November 1995 Beach Renourishment Monitoring Report #3*, December 1999

U.S. Army Corps of Engineers, 1998. *Duval County, Florida, November 1995 Beach Renourishment Monitoring Report #1*, March 1998

U.S. Army Corps of Engineers, 1998. *Nassau County, FL Shore Protection Project: General Reevaluation Report with Draft Environmental Assessment*

U.S. Army Corps of Engineers, 1998. *Water Resources Development in Florida*

U.S. Army Corps of Engineers, 1984. *Feasibility Report with Environmental Impact Study for Beach Erosion Control - Nassau County, Florida (Amelia Island)*

U.S. Army Corps of Engineers, 1964. *Beach Erosion Control Study on Duval County, Florida*

U.S. Army Corps of Engineers, 2010. *Duval County, Florida, August 2005 Beach Renourishment Monitoring Report #5*, October 2010

U.S. Army Corps of Engineers, 2014. *Jacksonville Harbor Navigation Study – Final Integrated General Reevaluation Report II and Supplemental Environmental Impact Statement*, April 2014, 289 p.

U.S. Army Corps of Engineers, 2016. *Northeast Florida Regional Sediment Management; Implementation Strategies and Recommendations for Nassau County and Duval County, Florida*, March 2016, 68 p.

## ***St. Johns Beaches***

There are 43.7 miles of beaches in the St. Johns Beaches subregion, which extends from the Duval–St. Johns County line to just south of Marineland in Flagler County (R15), as shown on Figure 2. There are 16.9 miles of critically eroded beaches in this subregion (16.3 miles in St. Johns County and 0.6 mile in northern Flagler County), of which 3.8 miles have been restored and maintained.

Erosion is attributed to frequent winter northeasters, occasional tropical storms and hurricanes, and the effects of St. Augustine Inlet and Matanzas Inlet. The most erosive storms in recent years were a February 1973 northeaster, the Thanksgiving Day northeaster of 1984, Hurricane Floyd (1999), Hurricane Irene (1999), Tropical Storm Gabrielle (2001), Hurricanes Frances and Jeanne (2004), Hurricane Ophelia and Tropical Storm Tammy (2005), Subtropical Storm Andrea (2007), October northeaster (2007), Tropical Storm Noel (2007), Tropical Storm Fay (2008), Hurricane Matthew (2016), Hurricane Irma (2017), and Hurricane Dorian (2019). Other events with severe impacts include the Ash Wednesday northeaster of March 1962 and Hurricane Dora (1964), which made landfall at St. Augustine.

### ***Strategies for Inlets and Critically Eroded Beaches***

#### **Ponte Vedra, St. Johns County, R26-R31**

This is a 0.9-mile segment of critically eroded beach in the Ponte Vedra area. This area was impacted by Hurricane Matthew (2016) and Hurricane Irma (2017), leaving residential development vulnerable to future high frequency storm erosion. The USACE is seeking funds to conduct a Coastal Storm Risk Management feasibility study for the North Ponte Vedra area between R1 to R46. A local homeowners' group is considering design and permitting tasks for construction of a beach or dune restoration project.

***Strategy:*** Conduct feasibility study and physical monitoring; perform post-storm dune restoration.

#### **South Ponte Vedra Beach and Vilano Beach, St. Johns County, R76–R117.5**

This is an 8.2-mile segment of critically eroded beach located north of St. Augustine Inlet and within the area of inlet influence. A federal feasibility study was initiated in 2005 to evaluate erosion control alternatives, but funding availability delayed completion of the study for many years. Design alternatives were considered for dune restoration in 2008 at the local level, but the project was never constructed.

Hurricane Sandy (2012) and northeasters accelerated erosion in this area. An additional 0.7-segment of critical erosion was added to the critically eroded list for South Ponte Vedra in 2014. Another 2.2 miles was added to the critically eroded list between South Ponte Vedra and Vilano Beach in 2015. Hurricane Matthew caused severe damage and erosion throughout this segment in October 2016, resulting in another 1.6 miles of critical erosion being added to the north end of South Ponte Vedra in 2017. Funding was secured in 2015 to continue the federal feasibility study. This area is eligible for receiving inlet dredge material in accordance with the updated St. Augustine Inlet Management Plan (2014). Dredged material from St. Augustine Inlet in the amount of 165,226 cy was placed in the designated nearshore disposal area of Vilano Beach in the summer of 2015. An additional amount of dredged material from the Intracoastal Waterway (123,344 cy) and St. Augustine Inlet (13,937 cy) was placed on Vilano Beach between R113 to R117, totaling of 137,281 cy, and work was completed in April 2017. Additional major damage and erosion was caused by Hurricane Irma in September 2017.

In response to Hurricane Matthew (2016), the County is pursuing a dune restoration project between R76 and R101.5. Emergency funds for constructing the dune restoration project have been secured. Design and permitting the dune restoration project has taken additional time due to securing a BOEM permit for use of an offshore borrow site in federal waters. The dune restoration project is expected to place approximately 573,000 cy of sand (20 cy per ft. on average) and is to be constructed in 2020/2021.

The [USACE](#) released the feasibility study and environmental assessment for the South Ponte Vedra Beach, Vilano Beach and Summer Haven Reaches in February of 2016. The selected plan for this coastal storm risk feasibility study is located north of St. Augustine Inlet of three miles of shoreline between R102.5 and R117.5 at Vilano Beach and a small portion of southern South Ponte Vedra. The initial beach and dune restoration is expected to place approximately 1.3 million cy of beach compatible sand with a 60-ft seaward berm extension and maintenance of the existing dune. In addition, there would be an additional placement of 866,000 cy of beach compatible sand in four periodic nourishment events at 12-year intervals. The initial restoration is currently being designed with an anticipated construction date of summer of 2020.

**Strategy:** Design and construct the selected plan from the USACE feasibility study for the South Ponte Vedra/ Vilano Beach segment; monitor; conduct dune restoration; conduct inlet sediment bypassing consistent with the updated St. Augustine Inlet Management Plan (2014).

### **St. Augustine Inlet, St. Johns County, R122-R123**

St. Augustine Inlet was created by dredging a new inlet in 1940 north of the historic St. Augustine Inlet, located near the current location of Salt Run. The north jetty was constructed in 1941 and a south jetty was completed in 1957. The inlet is part of the federal St. Augustine Harbor Navigation Project. Maintenance dredging of the inlet channel follows the best natural alignment across the inlet bar that exists at the time. Between 1940 and 1986, 1,373,000 cy of material were dredged from the inlet. Maintenance dredging occurred frequently during the 1970s, but the channel was only dredged in 1986 and 1996 due to reductions in the authorized channel depth and changes in shoaling patterns. Dredged material was typically disposed of offshore, until the 1996 dredging event placed 170,000 cy of sand on the beaches both north and south of the revetment at St. Augustine Beach. The St. Augustine Inlet Management Study Implementation Plan was approved for adoption in 1998. Periodic maintenance dredging of the Intracoastal Waterway near St. Augustine Inlet and the Salt Run navigation channel was initiated in 1999, with beach placement of dredged material at Anastasia State Park and St. Augustine Beach. The federally authorized St. Johns County Shore Protection Project (R137-R150) used sand from the St. Augustine Inlet ebb shoal as the sand source in 2003 and 2005. The project dredged sand from Vilano Point, the St. Augustine inlet channel and the inlet ebb shoal to nourish the beach again in 2012. The [St. Augustine Inlet Management Implementation Plan](#) was updated in 2014. The USACE dredged the inlet navigation channel in 2018 and the south lobe of the ebb shoal to provide sand for the nourishment of the St. Johns County Shore Protection Project.

**Strategy:** Bypass sediment to the adjacent beaches to meet an average annual placement objective of 278,000 cy; conduct study of the inlet structures for possible improvements to facilitate sediment bypassing; implement the state’s updated Inlet Management Plan (2014), which includes balancing the sediment budget by placing one-third of inlet sediment to the north beaches of the inlet and two-thirds of the inlet sediment to the south beaches of the inlet; continue to coordinate with the USACE in developing and implementing the RSM study.

### **Anastasia State Park and St. Augustine Beach, St. Johns County, R123-R128 and R132–R152**

This is a combined 4.8-mile segment of critically eroded beach located south of St. Augustine Inlet and within the area of influence of the inlet. This segment includes a one-mile portion at the northern end of Anastasia State Park (R123-R128) and then a 3.8-mile segment of Anastasia State Park and the City of St. Augustine Beach (R132-R152). In 1973, a spur groin was built at Anastasia State Park, and a coquina revetment was built along the south end of St. Augustine Beach. In 1988, an additional

spur groin was built at the northern end of the historic seawall. Since 1996, maintenance dredging of the St. Augustine Inlet has placed sand on the beaches within this area.

Initially authorized in 1986, the federal St. Johns County Shore Protection Project (R137-R151) was reauthorized in 1999 to add mitigation of the effects of the navigation project as a new project purpose. The project history of nourishment for this segment of shoreline is described in Table 4. Initial restoration was completed in January 2003, with sand excavated from the St. Augustine Inlet ebb shoal. The project included the local option extension of the restoration project 4,600 feet north into Anastasia State Park to R132. Following Hurricanes Frances and Jeanne in 2004, which caused severe erosion in this area, the nourishment schedule was accelerated, and construction of a nourishment project was completed in September of 2005 using sand excavated from the St. Augustine Inlet ebb shoal. Construction occurred again in August 2012 for the St. Johns County Shore Protection Project, with sand excavated from Vilano Point, the St. Augustine inlet channel, and the inlet ebb shoal. The project design consists of a beach berm at elevation +9 ft NAVD to protect the existing dune and upland development. The project is authorized until 2051. Nourishment was completed again in June 2018 and placed approximately 747,185 cy of sand along St. Augustine Beach between R139.7 and R144.4.

**Table 4.** St. Johns County Shore Protection Project history.

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Sand Source</b>	<b>Project Location</b>	<b>Length (mi.)</b>
January 2003	4,200,000	Inlet channel and ebb shoal	R132 to R151	3.7
September 2005	2,800,000	Inlet channel and ebb shoal	R137 to R151	2.7
August 2012	2,199,340	Vilano Point, inlet channel and ebb shoal	R139 to R147	1.5
June 2018	747,185	Inlet channel and ebb shoal	R139.7 to R144.4	0.9

**Strategy:** Maintain the project through monitoring and nourishment; consider alternative sand sources for the project that include a sand search investigation on the relic shoal off Anastasia Island between the active ebb shoal and the county pier; continue to coordinate with the USACE in developing and implementing the RSM study.



### **Matanzas Inlet, St. John’s County, R196-R197**

Matanzas Inlet is a natural inlet that is strongly affected by a bridge abutment and revetment on the south shoreline, the dredging of the Intracoastal Waterway and stabilization of Rattlesnake Island. The Intracoastal Waterway, separated from the inlet by Rattlesnake Island, is dredged about every three years, and the sand is placed at Summer Haven, south of the inlet.

**Strategy:** Develop a sediment budget and adopt an inlet management plan.

### **Summer Haven, St. Johns County, R197-R209**

This is a 2.4-mile segment of critically eroded beach in unincorporated Summer Haven, and is within the area of influence of Matanzas Inlet. Sand from the Intracoastal Waterway dredging is placed by FIND on the Summer Haven beaches when available. Dredging has resulted in beach placement of dredge material during the following events, and the project history for this segment of shoreline is described in Table 5. The 1992 event placed 191,502 cy; 1999 event placed 222,000 cy; 2004 event placed 214,475 cy; and 2007 event placed 187,862 cy. In 2002 and 2003, sand was truck-hauled from upland sites to construct small emergency protective berms and partially restore sand lost during Tropical Storm Gabrielle and Hurricane Floyd, using funds from FEMA. A federal reconnaissance study has been completed, and a federal feasibility study was initiated in 2005 for Summer Haven.

Barrier island overwash has historically been a problem in Summer Haven, but in 2008 Tropical Storm Fay produced an overwash and a breach at R200. From 2009 to 2010, the breach allowed the Matanzas River to be filled with beach sand in the vicinity of Summer Haven, inhibiting the flow of the river from just east of the A1A bridge to approximately R203. The St. Augustine Port, Waterway, and Beach District was issued a permit by the Department in February 2014 to excavate approximately 216,000 cy of sand from the Matanzas River, with placement on the adjacent beach and dune between R200 and R208, which restored flow to the river. Summer Haven had 1,280 cy of material from the Intracoastal Waterway placed on the beach in 2015. The [USACE](#) released the draft feasibility study and environmental assessment for the South Ponte Vedra Beach, Vilano Beach and Summer Haven Reaches in February of 2016. The selected plan did not include any of the Summer Haven Reaches for several reasons: a non-federal sponsor was not identified; limited public access; previous relocation of State Road A1A; minimal number of structures in southern portion; limited road access and damage susceptibility; county purchases of properties when able; the cost-benefit-ratio would not justify a 50- year federal project; and limited alternatives due to the Coastal Barrier

Resources Act (CBRA) unit in three-quarters of the reach. Due to Hurricane Matthew (2016), another breach occurred near R204.5. The county filled the breach by dredging the river adjacent to the breach (this was outside of the originally authorized river restoration project’s dredge area). In addition, both Hurricane Irma (2017) and Dorian (2019) caused tidal over-topping between R203.5 and R204.5. The USACE completed dredging of the Intracoastal Waterway in April 2017, with placement in Summer Haven between R204 and R207.5. The River Restoration Project commenced in November 2016 and was mostly completed by November 2017, but additional time was needed to fully complete the project in July 2019 with approximately 390,000 cy of material placed onto the beach between R200 and R203.5 from the river. The river restoration project was a separate project funded through a special appropriation and is not part of the selected plan of the federal feasibility study. In 2019, the USACE placed maintenance dredged material from the Intercoastal Waterway between R202 and R205 at Summer Haven and the county plans to conduct further dune and berm restoration between R203 and R204.

**Table 5.** Summer Haven Beach Placement history.

<b>Date Completed</b>	<b>Volume (cy)</b>	<b>Sand Source</b>	<b>Project Location (by R monument)</b>	<b>Length (mi.)</b>
1992	191,502	Intracoastal Waterway	R200-R208	1.8
1999	765,000	Intracoastal Waterway	R200-R208	1.8
2004	214,475	Intracoastal Waterway	R200-R208	1.8
2007	187,862	Intracoastal Waterway	R200-R208	1.8
2015	1,280	Intracoastal Waterway	R204-R208	0.8
April 2017	432,487	Intracoastal Waterway	R204-R207.5	0.7
September 2017	275,000	River	R200-R204	0.8
February 2018	67,000	River	R200-R202	0.4
April 2019	47,000	River	R200-R202	0.4
December 2019	394,028	Intracoastal Waterway	R200-R208	1.5

**Strategy:** Conduct beach restoration using overwash material from the Matanzas River or a supplemental sand source (ICW) for beach placement; maintain dunes.

## **Marineland, Flagler County, R1-R4**

This is a 0.6-mile segment of critically eroded beach (R1-R4) and is threatening development and recreational interests at Marineland. Marineland is within the area of influence of Matanzas Inlet. This area has rock revetment and coquina rock groins. Following storm damage by Hurricane Floyd in 1999, the revetment was restored, and new revetment was constructed to the south at a more landward alignment with dune restoration. The Flagler County Hurricane and Storm Damage Reduction Project Draft Integrated Feasibility Study and Environmental Assessment (USACE-SAJ, 2014) did not recommend a project for this area.

**Strategy:** Maintain dune and monitor.

## ***Regional Strategies for Beach and Inlet Management***

### **Sponsors and Funding**

This subregion contains the governmental entities of [St. Johns County](#); [Flagler County](#); the [St. Augustine Port, Waterway and Beach District](#); the City of St. Augustine Beach; the Towns of Marineland and Flagler Beach; the [Florida Inland Navigation District](#); and the [USACE](#). All but St. Augustine Beach and the Town of Marineland are sponsors of beach management projects. There are significant public park lands in this area, including the Guana River Marsh Aquatic Preserve, the Guana- Tolomato-Matanzas National Estuarine Research Reserve, Anastasia State Park, Ft. Matanzas National Monument, and Washington Oaks Gardens State Park. Project cost estimates and schedules may be found in the Department's [Beach Management Funding Assistance Program - Long Range Budget Plan](#).

### **Project Coordination**

Regionalization is the funding and coordination of multiple erosion control projects and inlet management activities to take advantage of identifiable cost savings through economies of scale, reduced equipment mobilization and demobilization costs, and elimination of duplicative administrative tasks. Opportunities in this subregion include:

1. The Department and the USACE have completed an RSM demonstration project in the Sea Islands and St. Johns Beaches subregions. Tasks included designation of government liaisons to coordinate beach management activities, development of methods and techniques for exchange and dissemination of planning and project information, coordination of USACE input, review and comment on the Strategic Beach Management Plan and Long-Range Budget

Plan, and monthly updates on USACE activities pertinent to statewide sediment management opportunities and issues. The USACE is currently pursuing ways to implement the RSM initiatives.

2. The maintenance of the navigation project at St. Augustine Harbor should be coordinated with nourishment of Anastasia State Park shoreline and South Ponte Vedra/Vilano Beach shorelines.
3. The maintenance dredging material from the Intracoastal Waterway near St. Augustine Inlet and Matanzas Inlet should be coordinated with FIND and utilized for nourishment at Anastasia State Park and Summer Haven, respectively.

### **Environmental Protection**

The protection of marine turtles, right whales, beach mice, shorebirds, and their habitats are the primary environmental concerns within this subregion. Sensitive areas for shorebirds include St. Augustine Inlet (Bird Island, north end of Anastasia State Park, and Porpoise Point when habitat is present), Anastasia State Park, Fort Matanzas National Monument, and Summer Haven beaches. Sensitive areas for beach mice include Anastasia State Park, Ocean Hammock Park, Butler County Park, Crescent Beach Park, and Fort Matanzas National Monument. Within those sensitive areas, natural communities identified as primary and secondary dunes as well as scrub dunes, back dunes, coastal scrub and or coastal strand all provide essential habitat for beach mouse populations. Additionally, primary dunes and secondary dunes that occur on private lands are important for resilience of those developed lands and sustaining wildlife populations and should be maintained or restored. These areas can be subject to change as conditions change, and coordination with the FWC Regional Species Conservation Biologist for the FWC region for the project is encouraged during project development. Construction activities during the marine turtle nesting season of May 1 through October 31 were not approved in the permit for sand transfer from the Matanzas/SJ-1 Dredged Material Management Site to the beach at Summer Haven but were approved for the St. Johns County Shore Protection Project. Project design and method of construction may be restricted to avoid or minimize adverse impacts to the listed species and their habitat. The beaches located within the boundaries of the [Guana River Marsh Aquatic Preserve](#) and the [Guana Tolomato Matanzas National Estuarine Research Reserve](#) have not been declared critically eroded. Projects located within and near the Aquatic Preserve boundaries require additional protection, including meeting more stringent water quality standards than outside the Aquatic Preserve's water boundaries.

## **Sand Sources**

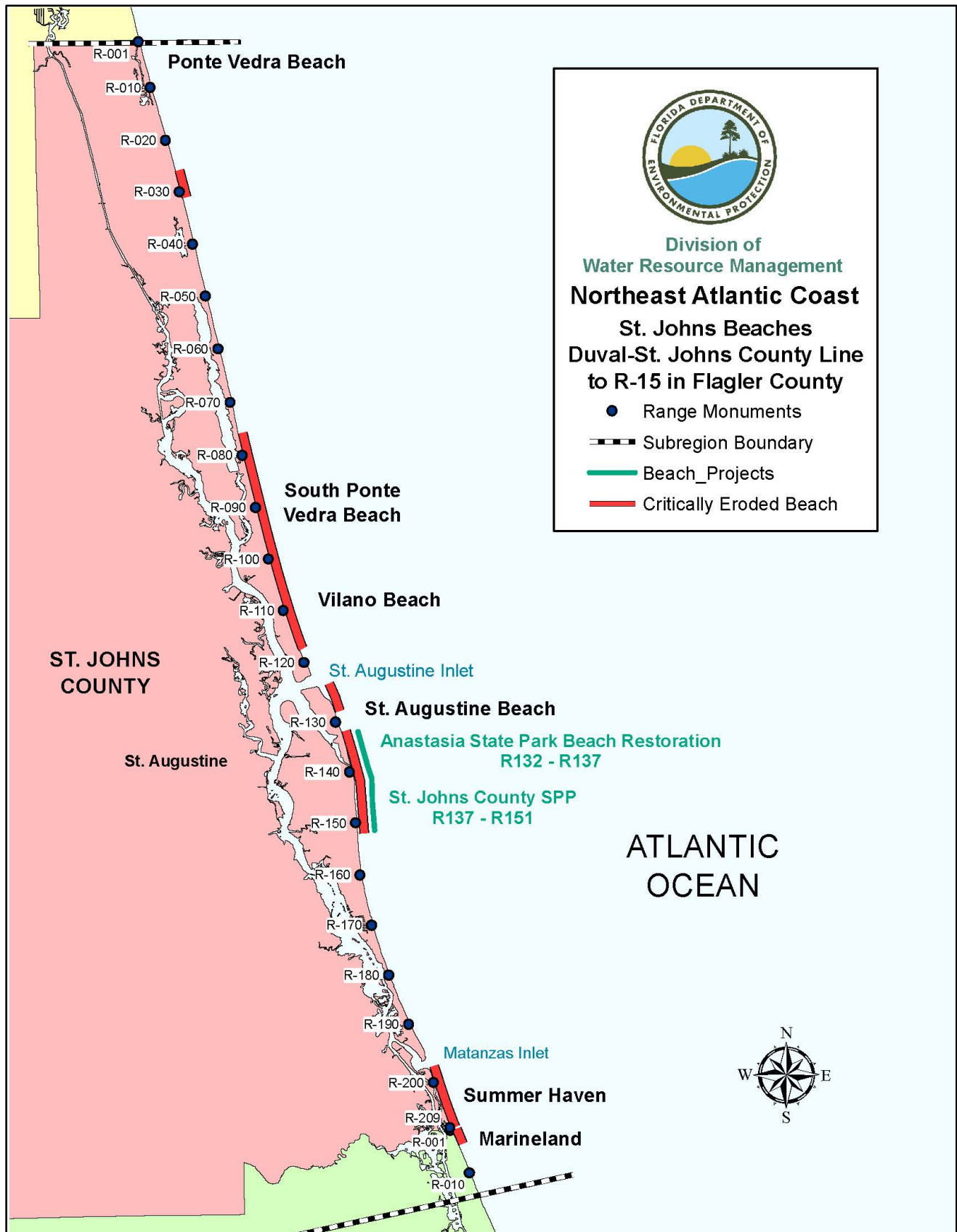
Sand sources in the vicinity of St. Augustine Inlet and St. Augustine Beach have been investigated. The volume of available sand in the inlet ebb tidal shoal has been reevaluated by the Department and USACE for the needs of the St. Johns County shore protection project during the next 15 years. Additionally, the USACE has identified a possible sand source north of St. Augustine Inlet to be used as an alternative borrow source for the St. Johns Shore Protection Project. For the next 15 years, sand could be used from the Vilano Point inlet channel, eastern inlet channel, ebb shoal and the new alternative shoal complex A6/A7. Sand sources for Vilano Beach and South Ponte Vedra have been identified in Vilano Point inlet channel, the St. Augustine inlet channel, IWW Shoal, North Flood Shoal, and South Flood Shoal. Strategy 5 implementation that is listed in the [St. Augustine Inlet Management Plan](#) makes reference to a relic shoal south of the inlet that has been investigated by the USACE as a possible supplemental sand source for the federal project. Initial results of this investigation determined this shoal not a viable sand source option. St. Johns County is permitting a borrow source (N-3) through BOEM that is seven miles offshore of northern St. Johns County coastline. Adequate sand sources for the next 15 years have not been adequately identified for Summer Haven. The Department has outlined various regional sediment management (RSM) strategies in its Inlet Management Plans and Strategic Beach Management Plans. The USACE-SAJ RSM work aids the Department in updating these plans. It is the goal of the Department to coordinate with the USACE-SAJ and implement strategies mutually beneficial to USACE's and the Department's missions by leveraging federal authorities, permits, and funding. For additional information on sand sources, the Department the [Regional Offshore Sand Source Inventory \(ROSSI\)](#) database.

## **Additional Information**

The introduction of the State's Strategic Beach Management Plan provides additional background information on the Department's Beach Management Programs and includes overviews of:

- The principles and statutes followed to help guide the State's management strategies
- Comprehensive list of Florida's inlets
- The miles of critically eroded beaches under active management
- Statewide sand source studies
- Statewide monitoring programs

- Innovative technologies examined
- Basic suggestions for emergency response plans



**Figure 2.** Map of St. Johns Beaches subregion of the North Atlantic Region of Florida. View an [interactive map](#) or [COASTS imagery](#).

## **References**

- Albada, E., and Craig, K.R., 2005. *St. Johns County Shore Protection Project, St. Johns County, Florida, 2005 Monitoring Report*, Taylor Engineering, Inc., Report No. C2005-037, 54 p.
- Balsillie, J. H., 1985. *Post-Storm Report: the Florida East Coast Thanksgiving Holiday Storm of 21-24 November 1984*, Florida Department of Natural Resources, Division of Beaches and Shores, Post-Storm Report No. 85-1, 74 p.
- Clark, R.R., LaGrone, J.W., Brantly, R., 2004. *Hurricane Frances & Hurricane Jeanne: Post-Storm Beach Conditions and Coastal Impact Report with Recommendations for Recovery and Modifications of Beach Management Strategies*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 93 p.
- Clark, R.R., 2000. *The Impact of Hurricanes Floyd and Irene on the Florida East Coast*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-01, 55 p.
- 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.
- Donohue, K.A., and Dean, R.G., 1997. *St. Augustine Beach Nourishment Project, Anastasia State Park, St. Augustine Beach*, University of Florida, Coastal and Oceanographic Engineering Department, 50 p.
- Florida Department of Environmental Protection. *2004 Hurricane Recovery Plan for Florida's Beach and Dune System*, 65 p.
- Florida Department of Environmental Protection, 2019. *Critically Eroded Beaches in Florida*, Division of Water Resource Management, 89 p.
- Florida Department of Environmental Protection, 1998. *St. Augustine Inlet Management Study*



*Implementation Plan*, August 1998, 9 p.

Florida Department of Environmental Protection, 2014. *St. Augustine Inlet Management Implementation Plan*, January 2014, 14 p.

Florida State University's Beaches and Shores Resource Center, 2011. *Inlet Management Restudy for St. Augustine Inlet*, St. Johns County, Florida.

Foster, E.R., Spurgeon, D.L., and Cheng, J., 2000. *Shoreline Change Rate Estimates, St. Johns County*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-03, 76 p.

Hadley, L., and Legault, K., 2009. *Influence of St. Augustine Ebb Shoal Excavation on Nearshore Wave Climate and Sediment Pathways, St. Johns County, Florida*, U.S. Army Corps of Engineers, Jacksonville District, 109 p.

PBS&J (ATKINS), 2009. *St. Johns County Shore Stabilization Feasibility Study for South Ponte Vedra and Vilano Beach Regions*, 176 p.

Taylor Engineering, Inc., 1997. *St. Augustine Inlet Management Plan*.

Taylor Engineering, Inc., 2003. *St. Johns County Shore Protection Project, St. Johns County, Florida, Post-Fill Monitoring Report*.

Taylor, R.B., and Abramian, J.E., 1993. *St. Augustine Port, Waterway, and Beach District Master Plan*, Taylor Engineering, Inc., 78 p.

Taylor Engineering, Inc., 2009. *Matanzas Inlet Sedimentation Study*, St. Johns County, FL, 156 p.

Taylor Engineering, Inc., 2012. *Summer Haven River Restoration Design Details, Construction Narrative and Permit Drawings*, 31.

U. S. Army Corps of Engineers, 1998. *St. Johns County, Florida, Shore Protection Project, General Reevaluation Report with Final Environmental Assessment*.

U.S. Army Corps of Engineers, 1998. *Water Resources Development in Florida*.

U.S. Army Corps of Engineers, 2009. *Influence of St. Augustine Ebb Shoal Excavation on Nearshore*

*Wave Climate and Sediment Pathways.*

U.S. Army Corps of Engineers, 2010. *Regional Morphology in the Vicinity of St. Augustine Inlet, St. Johns County, Florida*, U.S. Army Corps of Engineers, Jacksonville District, 156 p.

U.S. Army Corps of Engineers, 2012. *Regional Sediment Budget for St. Augustine Inlet and St. Johns County, FL, 1998/1999-2010*, Jacksonville District (CESAJ/ERDC/CHL), Letter Report, 21 p.

U.S. Army Corps of Engineers, 2016. *St. Johns County, Florida – South Ponte Vedra Beach, Vilano Beach and Summer Haven Reaches Coastal Storm Risk Management Project - Draft Integrated Feasibility Study and Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 189 p. plus appendices.

Walton, T.L. et al, 2011. *Inlet Management Restudy for St. Augustine Inlet, St. Johns County, Florida*, Beaches and Shores Resource Center, Florida State University, 130 p.

## ***Flagler-Volusia Beaches***

There are 64.3 miles of beaches in the Flagler-Volusia Beaches subregion, which extends from just south of Marineland in Flagler County (R15) to the Volusia–Brevard County line, as shown on Figure 3. In this subregion, there are a total of 27.5 miles of critically eroded beaches (6.8 miles in Flagler County and 21.0 miles in Volusia County), none of which have been restored. Erosion is attributed to winter northeasters, occasional tropical storms and hurricanes, and the effects of Ponce de Leon Inlet. The most erosive storms in recent years were Hurricane Dora (1964), the November and December northeasters of 1981, the Thanksgiving Day Storm of 1984, Hurricanes Floyd and Irene (1999), Tropical Storm Gabrielle (2001), Hurricanes Charley, Frances, and Jeanne (2004), Hurricanes Ophelia and Wilma (2005), Subtropical Storm Andrea (2007), October northeasters (2007), Tropical Storm Noel (2007), Hurricane Matthew (2016), Hurricane Irma (2017) and, Hurricane Dorian (2018). Phase I dune reconstruction activities were conducted by Flagler County following the 2016/2017 hurricane seasons between R12 and R35 with placement of approximately 116,500 cy of material and the dune work was completed in early 2018. Phase I and phase II placed a total of 403,287 cy of material along 11.4 miles of dune in Flagler County from R2 to R65 starting in November 2017 and completion in March 2019 using an upland sand source. Beach restoration is expected in the southern portion (R65 to R100) of Flagler County in 2020/2021 using an offshore sand source. In Volusia County, dune reconstruction activities were conducted following the 2004 hurricane season. Projects in critically eroded areas included sand fence installation at North Peninsula State Park (R1-R6, Volusia County). This area was removed from the critically eroded beaches list in 2012 after recovery of the beaches due to FEMA berm construction activities that included vegetative plantings between R40-R145 and R161-R208, Volusia County. The Florida Department of Transportation has done extensive dune repairs following Hurricane Matthew (2016) using an upland sand source that has restored damaged dunes north of R65 in Volusia County.

### ***Strategies for Inlets and Critically Eroded Beaches***

#### **Area Wide Studies**

A [federal feasibility study](#) for Flagler County was finalized in September 2014 by the USACE. The federal feasibility study for Flagler County has four reaches listed (Reach A through Reach D). Only Reach A (R50-R60) and Reach C (R80 -R94) met the cost-benefit ratio for pursuing a federal project. However, Reach A in Flagler County was not classified as critically eroded by the state at the time of the study. Reach C continues to be classified as critically eroded by the state. Another federal

feasibility study was initiated by the USACE for north Volusia County in 2006; however, the north Volusia County feasibility study has been put on hold awaiting local funding.

#### **Painters Hill, Flagler County, R50-R57**

This is a 1.1-mile segment of critically eroded beach in the Painters Hill area. This area was severely impacted by Hurricane Matthew (2016) and Hurricane Irma (2017), leaving residential development vulnerable to future high frequency storm erosion.

The Flagler County Hurricane and Storm Damage Reduction Project Final Integrated Feasibility Study and Environmental Assessment (USACE-SAJ, 2014), which was conducted before Hurricane Matthew (2016), did not recommend a project for this area. The study recommended monitoring and post-storm dune restoration activity. Post-storm dune restoration occurred in summer of 2018 for this area. Additional responses due to Hurricane Matthew induced erosion, the County constructed two seawalls made of vinyl sheet pile with a concrete cap. The contiguous seawalls were constructed between R55 and R57, with the first seawall being 434 ft long and the second seawall is 805 ft long.

**Strategy:** Conduct physical monitoring and perform post-storm dune restoration.

#### **Northern Flagler Beach, Flagler County, R65.2-R72**

This is a 1.2-mile segment of critically eroded beach in northern Flagler Beach. This area was severely impacted by Tropical Storm Gabrielle (2001), Hurricane Jeanne (2004) and Hurricane Matthew (2016). The Flagler County Hurricane and Storm Damage Reduction Project Final Integrated Feasibility Study and Environmental Assessment (USACE-SAJ, 2014) did not recommend a project for this area. The study recommends monitoring and post-storm dune restoration activity. The Florida Department of Transportation (FDOT) in 2019 constructed a Low-Impact Secant-Pile Seawall seaward of A1A between R65 (Osprey Dr.) to R70.1 (N. 18<sup>th</sup> St.) that is 4,902 feet in length. The County is pursuing a local plan for a beach and dune restoration project north of the pier (R65.2 to R79) and is obtaining the necessary permits at the state and federal level. The beach restoration project is scheduled for early 2021.

**Strategy:** Design and construct a beach or dune restoration project; monitor.

#### **Flagler Beach, Flagler County, R76-R94.8**

This is a 3.3-mile segment of critically eroded beach along southern Flagler Beach. Most of this area has been armored with a rock revetment constructed by the Florida Department of Transportation

following the named storms above. In 2006, the Florida Department of Transportation (DOT) constructed a segment of vertical seawall in this area. The [Flagler County Hurricane and Storm Damage Reduction Project Final Integrated Feasibility Study and Environmental Assessment \(USACE-SAJ, 2014\)](#) has been approved by the Civil Works Review Board and authorization by the U.S. Congress occurred in December of 2016 through the Water Resources Development Act (WRDA). The selected plan from the federal feasibility study for Flagler County at Flagler Beach resulted in a construction concept of a 10- foot seaward extension of the existing dune and beach profile between R80 to R94 (2.6 miles), known as Reach C using an offshore borrow site. The County is also planning to move forward with a local plan for a beach/dune project north of the pier (R65.2 to R76) by pursuing the necessary permits at the state and federal level, once funding is secured for permitting and construction activities. This area was severely impacted by Hurricane Matthew (2016) which damaged approximately 3,350 ft. of State Road A1A and approximately 7,920 of rock revetment. Construction is scheduled for fall of 2020.

**Strategy:** Design, construct and maintain the selected federal project plan recommended by the Flagler County Hurricane and Storm Damage Reduction Project Final Integrated Feasibility Study and Environmental Assessment (USACE-SAJ, 2014); monitor.

#### **Southern Flagler Beach, Flagler County, R98-R100/south county line**

This is a 0.6-mile segment of critically eroded beach in southern Flagler County. This area was impacted by Hurricane Matthew (2016) with dune erosion that threatened State Road A1A. Design and permitting are currently being conducted by the County. Beach restoration is scheduled for early 2021.

**Strategy:** Design and construct a beach or dune restoration project; monitor.

#### **Northern Volusia and Ormond-By-The-Sea, Volusia County, R24-R33**

This is a 1.6-mile segment of critically eroded beach in northern Volusia County and in Ormond-By-The-Sea. This area was impacted by Hurricane Matthew (2016) with dune erosion that threatened State Road A1A.

**Strategy:** Conduct physical monitoring and perform post-storm dune restoration.

#### **Ormond Beach to Wilbur-by-the-Sea, Volusia County, R57–R118**

This is an 11-mile segment of critically eroded beach in Ormond Beach, Daytona Beach, Daytona Beach Shores, and Wilbur-by-the-Sea. Beach erosion has been progressing with each major storm

followed by partial recovery. Hurricane Frances (2004) caused minor beach and dune erosion; however, Hurricane Jeanne followed in 2004 with major beach and dune erosion, leaving much of this area with little recreational beach. The USACE initiated a federal feasibility study in 2006, but the local sponsor has chosen not to pursue the study further.

**Strategy:** Monitor: complete a feasibility study.

### **Ponce de Leon Inlet, Volusia County, R148-R149**

Ponce de Leon Inlet is a natural tidal inlet near the center of Volusia County that has the federally authorized Ponce de Leon Inlet navigation channel and two granite boulder jetties. The north shore (0.6mile) of the inlet is critically eroded and threatens the Lighthouse Point County Park. Maintenance dredging of the entrance channel has occurred annually since 2008, with the sediment bypassing occurring on the north or south sides of the inlet in the nearshore. Sediment bypassing placed material on the beach in 2005 and 2009. Maintenance dredging or bypassing did not occur in 2011. Modification of the north jetty has stabilized the shoreline north of the inlet, and future maintenance dredging events are anticipated to place material on the downdrift shoreline south of the inlet. The south jetty has been authorized for a 1000-ft extension and alignment change, with construction pending receipt of federal funding. Neither federal nor local funding has materialized for many years for the 1000-ft. extension of the south jetty.

The Department adopted the [Ponce de Leon Inlet Management Study Implementation Plan](#) in March 1997, that defines corrective measures to mitigate the adverse impacts of Ponce de Leon Inlet, including establishing an average annual bypassing objective of 43,000 cy. The 1997 IMP strategies do not balance the sediment budget for the inlet, nor do they accurately mitigate erosion of beaches adjacent to the inlet. Therefore, they are not consistent with 2008 amendments to Section 161.142, Florida Statutes. An updated inlet sediment budget and final report was submitted to the Department in October 2019. The Department is developing an updated IMP.

**Strategy:** Continue to bypass material from the inlet to the adjacent eroding beaches; obtain updated beach and offshore profiles within the area of inlet influence; update the sediment budget and adopt an updated inlet management plan.

## **New Smyrna Beach and Bethune Beach, Volusia County, R160.8 – R207.8**

This is an 8.4-mile segment of critically eroded beach south of Ponce de Leon Inlet along New Smyrna Beach and Bethune Beach. The northern portion of this segment to R165 is located within the area of influence of Ponce de Leon Inlet. Much of New Smyrna Beach has vertical seawalls and bulkheads, and much of Bethune Beach has rock revetments. Beach erosion has been progressing with each major storm followed by partial recovery. Hurricanes Frances and Jeanne (2004) damaged 5,145 ft. of seawalls and inflicted severe beach and dune erosion, leaving much of this area with little recreational beach. Hurricane Wilma (2005) caused additional cumulative erosion and wall damage. Following the impacts of Hurricanes Frances, Jeanne, and Wilma, the New Smyrna Beach Emergency Beach and Dune Restoration Project was constructed between January and September 2006. Approximately 745,000 cy of fill material from the FIND dredged material management area MSA 434 (an upland spoil island inside Ponce de Leon Inlet) was placed between R161 and R187. An additional 22,000 cy of material was truck-hauled from another FIND site (Cut V-26 in Edgewater) to fill the template from R187 to R189. Two years later, between February and October 2008, FIND and the USACE dredged the Intracoastal Waterway near Ponce de Leon Inlet between Cuts V-22 and V-35, and placed approximately 432,000 cy of sand between R161 and R174. This additional dredge material has resulted in approximately 1.2 million cy of nourishment for the project area.

**Strategy:** Obtain updated beach and offshore profiles within the area of inlet influence.

### ***Regional Strategies for Beach and Inlet Management***

#### **Sponsors and Funding**

This subregion contains the governmental entities of [Flagler County](#), Volusia County, Flagler Beach, Ormond Beach, Daytona Beach, Daytona Beach Shores, New Smyrna Beach, the FIND, and the USACE. Participants with the Department as sponsors of beach management projects include the [Coastal Division of Volusia County](#), the [Florida Inland Navigation District](#) and the [USACE](#). Project cost estimates may be found in the [Beach Management Funding Assistance Program – Long Range Budget Plan](#).

## **Project Coordination**

Regionalization is the funding and coordination of multiple erosion control projects and inlet management activities to take advantage of identifiable cost savings through economies of scale, reduced equipment mobilization and demobilization costs, and elimination of duplicative administrative tasks. Opportunities in this subregion include:

1. Development of beach erosion control projects within this subregion was initiated in 2005 through feasibility studies of beach restoration. This provides an opportunity to implement projects on a regional basis, including sand source investigations, design, and awarding construction contracts to a single contractor to reduce mobilization costs and reap economies of scale.
2. The future maintenance dredging of Ponce de Leon Inlet and the Atlantic Intracoastal Waterway may be coordinated with maintenance of a New Smyrna-Bethune Beach restoration project planned for the future.

## **Environmental Protection**

The protection of marine turtles, right whales, beach mice, shorebirds, and their habitats, as well as nearshore hardbottom are primary environmental concerns within this subregion. Sensitive areas for shorebirds include Ponce Inlet (Smyrna Dunes Park, Disappearing Island) and Bethune Beach. Sensitive areas for beach mice include Smyrna Dunes Park. Within that area, natural communities identified as primary and secondary dunes as well as scrub dunes, back dunes, coastal scrub and or coastal strand all provide essential habitat for beach mouse populations. Additionally, primary dunes and secondary dunes that occur on private lands are important for resilience of those developed lands and sustaining wildlife populations and should be maintained or restored. These areas can be subject to change as conditions change, and coordination with the FWC Regional Species Conservation Biologist for the FWC region where your project is occurring is encouraged during project development. This is the northernmost subregion where hardbottom habitat may occur. Construction activities during the marine turtle nesting season of May 1 through October 31 were authorized in the permit for placement of dredged material from maintenance of Ponce de Leon Inlet on the downdrift beach. Project design and method of construction may be restricted to avoid or minimize adverse impacts to marine turtles and their habitat.



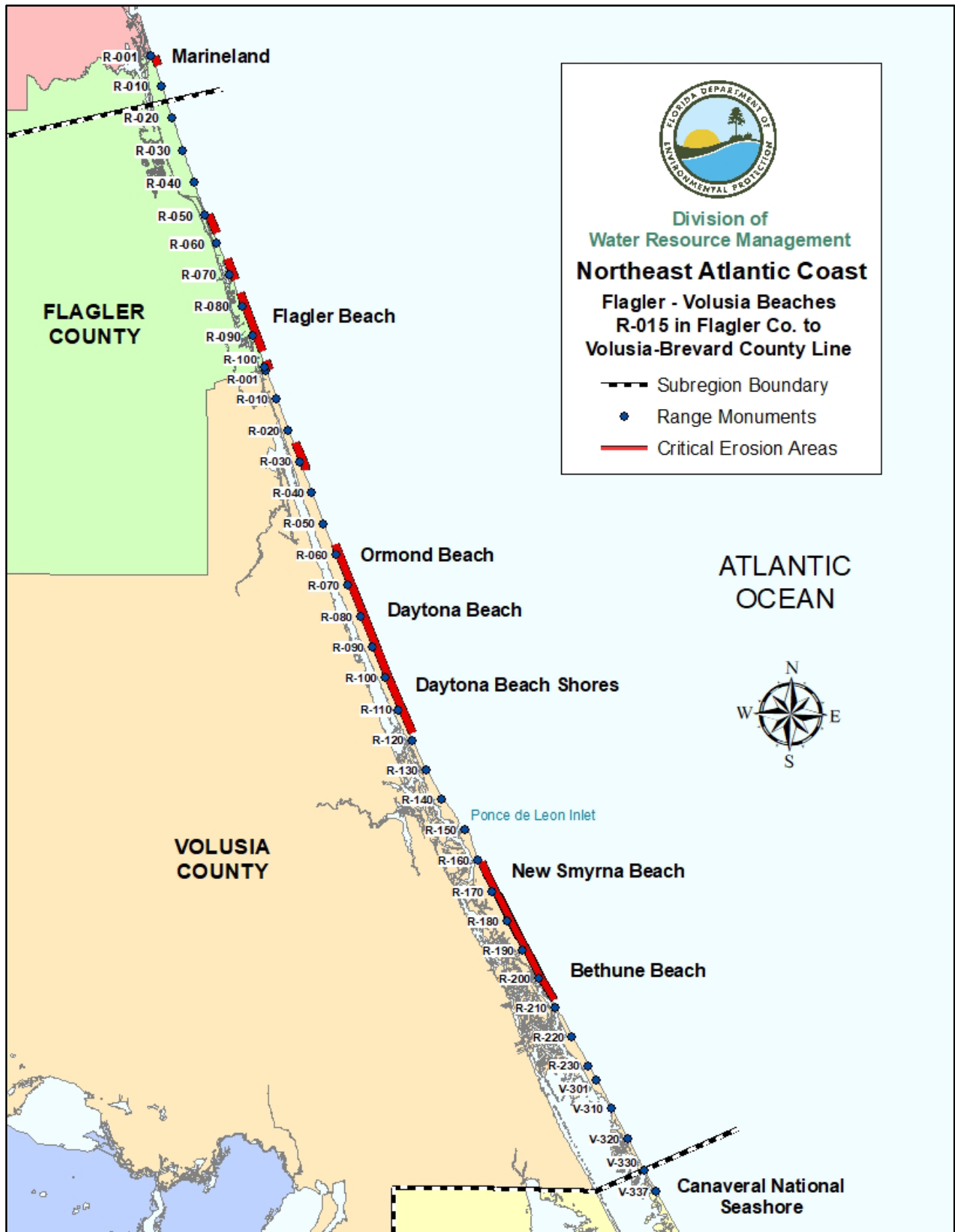
## **Sand Sources**

Initial design of the South Peninsula Beach and Dune Restoration Project identified sufficient sand sources for the restoration project. The USACE conducted a sand search in conjunction with the federal feasibility study that has identified borrow area 3A as a sufficient sand source for beach nourishment activities at Flagler Beach for the next 50 years. A regional sediment management strategy that uses beach quality sand from upland dredged material management areas and the maintenance dredging of the navigation projects should be incorporated into the maintenance of any future beach restoration projects. The Florida Department of Transportation has done extensive dune repairs following Hurricane Matthew (2016) using an upland sand source that has restored damaged dunes north of R65 in Volusia County. For additional information on sand sources, the Department manages the [Regional Offshore Sand Source Inventory \(ROSSI\)](#) database.

## **Additional Information**

The introduction of the State's Strategic Beach Management Plan provides additional background information on the Department's Beach Management Programs and includes overviews of:

- The principles and statutes followed to help guide the State's management strategies
- Comprehensive list of Florida's inlets
- The miles of critically eroded beaches under active management
- Statewide sand source studies
- Statewide monitoring programs
- Innovative technologies examined
- Basic suggestions for emergency response plan



**Figure 3.** Map of Flagler/Volusia subregion of the North Atlantic Region of Florida. View an [interactive map](#) or [COASTS imagery](#).

## **References**

- Balsillie, J. H., 1985. *Post-Storm Report: the Florida East Coast Thanksgiving Holiday Storm of 21-24 November 1984*, Florida Department of Natural Resources, Division of Beaches and Shores, Post-Storm Report No. 85-1, 74 p.
- Clark, R.R., LaGrone, J.W., Brantly R., 2004. *Hurricane Frances & Hurricane Jeanne: Post-Storm Beach Conditions and Coastal Impact Report with Recommendations for Recovery and Modifications of Beach Management Strategies*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 93 p.
- Clark, R.R., LaGrone, J.W., and Koch, J.L., 2006. *Hurricane Wilma: Post-Storm Beach Conditions and Coastal Impact Report*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 98 p.
- Clark, R.R., 2000. *The Impact of Hurricanes Floyd and Irene on the Florida East Coast*, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-01, 55 p.
- 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.
- Florida Department of Environmental Protection. *2004 Hurricane Recovery Plan for Florida's Beach and Dune System*, 65 p.
- Florida Department of Environmental Protection, 2019. *Critically Eroded Beaches in Florida*, Division of Water Resource Management, 89 p.
- Florida Department of Environmental Protection, 1997. *Ponce de Leon Inlet Management Study Implementation Plan*, March 1997, 9 p.
- Foster, E.R., Spurgeon, D.L., and Cheng, J., 1999. *Shoreline Change Rate Estimates, Flagler*

County, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-99-02, 47 p.

Foster, E.R., and Cheng, J., 2000. *Shoreline Change Rate Estimates, Volusia County, Florida* Department of Environmental Protection, Bureau of Beaches and Coastal Systems, Report No. BCS-00-04, 84 p.

Malick, L., and Hodgens, E.H., 2009. *New Smyrna Beach Emergency Dune Restoration Project, Volusia County, Florida, Three-Year Post-Construction Monitoring Report*, Taylor Engineering, Inc., 43 p., plus appendices.

Taylor, R.B., and Yanez, M.A., 1994. *Ponce de Leon Inlet Management Plan*, Taylor Engineering, Inc., 226 p.

Trudnak, M.E., Laurent, W., and Craig, K., 2019. *Ponce de Leon Inlet Sediment Budget Update*, Taylor Engineering, Inc., 67p.

U.S. Army Corps of Engineers, 1998. *Water Resources Development in Florida*.

U.S. Army Corps of Engineers, 2014. *Flagler County Hurricane and Storm Damage Reduction Project Final Integrated Feasibility Study and Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 290 p. plus appendices.

Water Infrastructure Improvements Act for the Nation (WINN), 2016. *Water Resources Development Act ([WRDA](#))*, 728 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
- CSRSM – 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 Survey 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