



## Jacksonville District: Northeast Florida

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**ISSUE:** Northeast Florida was chosen as a demonstration region based on the number of navigation projects, shore protection projects, U.S. Naval bases, and public parks located in the counties of Nassau, Duval, and St. Johns.

**RSM DEMONSTRATION PROJECT GOALS:** The U.S. Army Corps of Engineers, Jacksonville District, has three Regional Sediment Management (RSM) regions (northeast, central-east, and southwest Florida). The Jacksonville District and the Florida Department of Environmental Protection conducted workshops involving all of the regional interest organizations to identify and develop RSM demonstration programs in the northeast Florida region.

**SUMMARY AND STATUS:** Specific initiatives identified during workshops resulted in six potential RSM demonstration projects described in the following paragraphs.

**South End of Amelia Island Stabilization.** The southern tip of South Amelia Island was experiencing chronic erosion. Short-term efforts to stabilize the south end of Amelia Island have been phased in by placing beach quality material from Operation and Maintenance (O&M) dredging of the Atlantic Intracoastal Waterway (IWW) and by placement of geotextile shoreline stabilization tubes.

**Bypassing Sand at St. Mary's Entrance.** The demonstration project at St. Mary's Entrance consists of dredging the southern spit at Cumberland Island for placement on the Nassau County Shore Protection Project. Efforts involve bypassing of material that is intercepted to the north of the north jetty. This demonstration project has multistate, multi-agency, and inter-District consensus. This major initiative will result in reduced Federal navigation and shore protection project costs and will identify solutions to a number of broad-based RSM issues. Updrift interests are unconcerned about bypassing sand.

**Backpassing/Bypassing at Ft. George and St. Johns Entrance.** The Diagnostics Modeling System (DMS) was applied to the Jacksonville Harbor Federal Navigation Project to assess the impacts of further deepening on the hydraulics of the system and future O&M activities. RSM funds from the national program were used in this modeling effort to include the areas at Ft. George and the south end of Amelia Island.

**Offloading Sand onto Summer Haven Shoreline.** In FY01, a disposal area designated as SJ-1 was offloaded, and beach quality material was placed south of Matanzas Inlet on Summer

Haven Beach. A total of 850,000 cu yd<sup>1</sup> was placed under a Corps contract for the Florida Inland Navigation District. Two benefits were derived from offloading the disposal site including:

- (a) introducing sand back into the littoral system otherwise lost from the south beaches, and
- (b) restoring capacity in the existing disposal area in lieu of establishing another site. A significant cost-savings (estimated on the order of \$1 million) can be attributed to the use of an RSM approach for this project.

**Bypassing at St. Augustine Inlet.** The project consists of dredging the ebb shoal and navigation channel at St. Augustine Inlet (Figure 1). When completed, a total of 3,700,000 cu yd of material will have been placed along the south beaches of Anastasia Island and St. Augustine. Cost-savings are realized by combining projects (estimated on the order of \$1 million). Funding restrictions resulted in two mobilizations. This approach is also being implemented in the St. Johns County Shore Protection Project.



Figure 1. Dredging at St. Augustine Inlet, Florida

**Maximizing Beach Placement.** In a similar manner, construction of Jacksonville Harbor Navigation Project and the Duval County Shore Protection Project was combined in December 2002. This RSM demonstration project uses material dredged from the maintenance and deepening of the navigation channel to renourish the beaches south and within the limits of the shore protection project. Cost-savings to the Duval County Shore Protection Project could potentially be millions of dollars.

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<sup>1</sup> To convert cubic yards to cubic meters, multiply number of cubic yards by 0.76.

**STATUS:** A regional sediment budget was established for the northern portion of the northeast region in 2003. It was further refined and extended to cover the entire northeast region in 2005. An important part of RSM is the development of a regional sediment budget (Figure 2). As part of the Northeast Florida RSM Program, the U.S. Army Corps of Engineers (USACE) and the Florida Department of Environmental Protection (FDEP), the two program participants, requested Taylor Engineering of Jacksonville, Florida, to develop a sediment budget that covers the northeast Florida region. The software tool SBAS2001, developed by the U.S. Army Engineer Research and Development Center (ERDC), provided the means to develop the sediment budget for northeast Florida. The results of the efforts are available at <https://rsm.saj.usace.army.mil/index2.html>.

Non-Federal construction efforts at the south end of Amelia Island Stabilization Project are close to completion. The status is as follows:

- Phase I - Characterize existing conditions – completed.

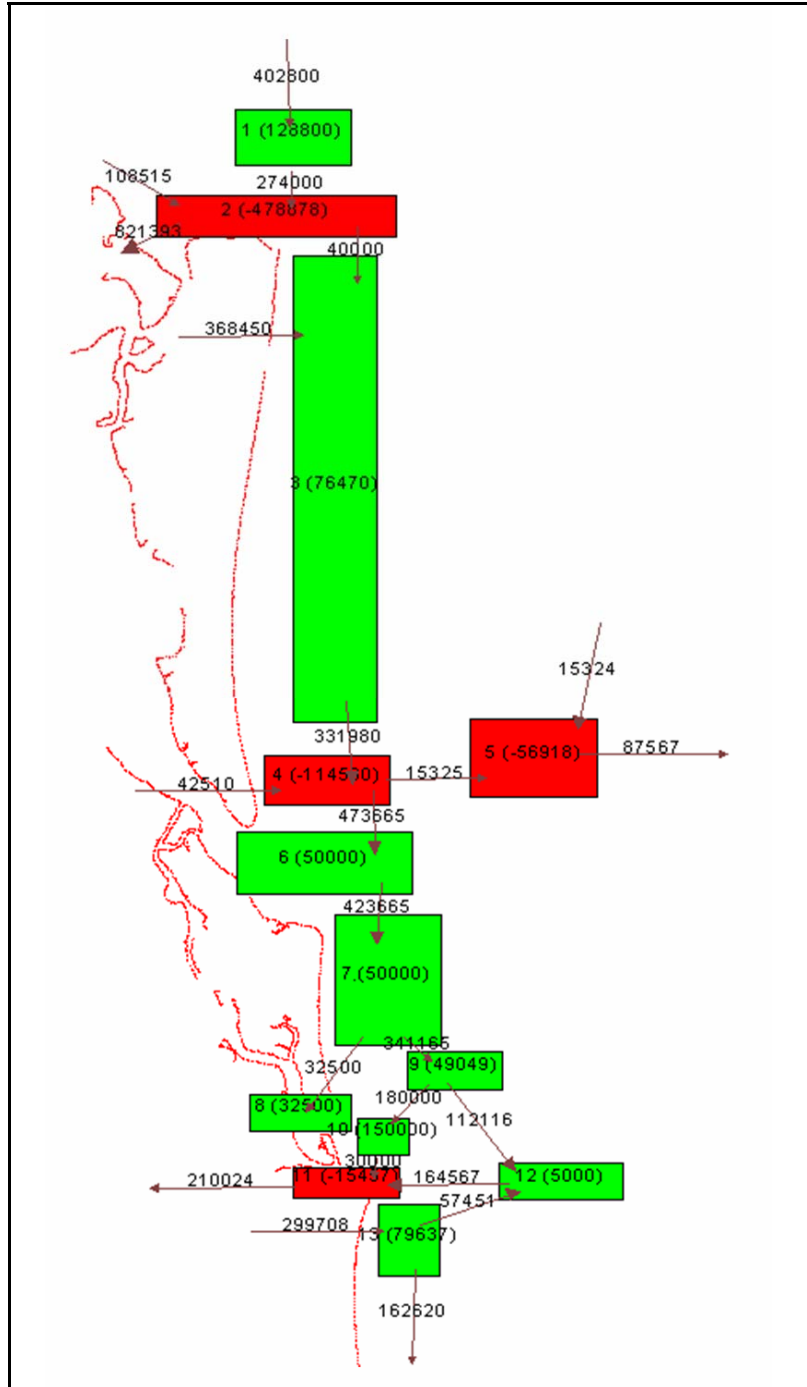


Figure 2. Sediment budget for south end of Amelia Island. Each cell represents a separate component of sand storage in units expressed as cu yd/year. Arrows across any cell represent a sediment flux either into the cell (sediment gain) or out of the cell (sediment loss). The sum of the fluxes affecting each cell determines the net storage (accretion – green) or removal (erosion – red) of sediment within the cell

- Phase II - Evaluate impacts of past engineering actions (offshore borrow site, non-Federal shore protection project, geotextile groin field) – completed.
- Phase III - Evaluate stabilization alternatives (no action, tidal channel stabilization through dredging, T-head groin field), tidal circulation modeling, and evaluation of tidal channel oscillation - completed.
- Phase IV - Perform wave transformation modeling and final evaluation, and report results - completed. Florida Inland Navigation District is a valuable partner.

The South Amelia Island Shore Stabilization Project was completed in January 2005. The project, contracted through the Florida Park Service and funded by the state of Florida Beach Management Program, consisted of a 457.2-m- (1,500-ft-) long terminal groin and a 91.4-m- (300-ft-) long detached breakwater. Both structures are intended to reduce end losses from the 2 million cu yd Phase I non-Federal beach fill completed in 2002 as a concerted effort between Florida Park Service and the South Amelia Island Shore Stabilization Association. The project coastal engineer for this phase of shoreline improvements is Olsen Associates Inc. of Jacksonville, Florida. The Corps and the Florida Inland Navigation District periodically dispose beach quality maintenance material within the limits of the non-Federal beach fill.

The status of the Ft. George ([Figure 3](#)) phasing process is as follows:

- Phase I – collect survey data, develop model grid, perform wave transformation, and model existing conditions – completed.
- Phase II – model alternatives at Ft. George, including relocating the inlet, removing interior shoals, and implementing a settling basin inside the inlet adjacent to the north jetty. Objectives of the alternatives include reducing the recession rate at the south end of Little Talbot Island, bypassing/backpassing sand, unclogging channels, and restoring flow in Timucuan National Park. Phase II also includes modeling the effects of a recently excavated borrow area and a geotube groin field on regional coastal processes.
- Phase III – to be undertaken to model specific design alternatives for the stabilization of the south end of the island. Resource agencies can be receptive to inlet relocation.

Work continues on this effort. In July 2004, the National Park Service obtained a bathymetric and side scan survey of the inlet and river in addition to taking sediment samples. The District took sand samples in an effort to determine compatibility with the Duval County Federal Shore Protection Project, but costs for the offshore areas were still lower.

The project to bypass and/or backpass sand from north of the St. Johns River Entrance has proceeded on the assumption that conventional dredging methods would be utilized. The effects of dredging at the northern tip of the Wards Bank spit to backpass and/or bypass approximately 250,000 cu yd of material were also investigated. The initial disposal area would be Little Talbot Island and therefore would entail sand backpassing. This backpassing would alleviate a number of issues such as interfering with the planned Jacksonville Harbor deepening and removing sand from a Coastal Barrier Resource Act parcel. Backpassing will also provide much needed sand to the eroding beaches of Little Talbot Island as well as slow the migration of Ft. George Inlet to



Figure 3. Fort George Inlet

the north. These demonstration projects contain cross-mission objectives and result in multi-project cost-savings. Too much sand in the system can be a major issue.

**LESSONS LEARNED:** Two completed initiatives, St. Augustine and offloading the Matanzas Inlet disposal site, demonstrated the benefits of combining navigation (O&M) and shore protection Construction General (CG) funding, with cost-savings of \$1 million each.

Brainstorming and coordinating with all regional stakeholders through workshops were essential in establishing cost-effective and innovative regional approaches. Economic and environmental benefits were also derived in these group sessions.

**KEY WORDS:** Groin, oscillation, spit, wave transformation, backpassing, bypassing, settling basin

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