



Announcement M13AS00014: Hurricane Sandy Coastal Recovery and Resiliency - Resource Identification, Delineation and Management Practices

Agreement M14AC00004-A4 Florida Cooperative Agreement

Modernizing the Reconnaissance Offshore Sand Search database and a review and synthesis of existing geophysical data from selected areas on the outer continental shelf along Florida's central Atlantic coast.

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Summary Report

Introduction

The work done under the Bureau of Ocean Energy Management (BOEM) Round 2 agreement with the Florida Department of Environmental Protection (DEP) follows up on the Round 1 work. In Round 1, regions within both State and Federal waters offshore of Florida were identified where geotechnical data did not exist on a reconnaissance level. These potential sand resources were investigated through review and update of information in the ROSSI (Regional Offshore Sand Source Inventory) database and the data collection effort of the BOEM ASAP (Atlantic Sand Assessment Project) project. The BOEM ASAP data were delivered to DEP at the beginning of the Round 2 project for interpretation and analysis.

In Round 1, data within ROSSI were used to quantify and qualify the extent to which beach compatible sand resources may exist throughout previously investigated state and federal waters. The existing geophysical and geological data were correlated using an interactive sub-bottom profile workstation approach to create top of rock and sediment thickness maps and potentially identify future sand sources. In Round 2, the BOEM ASAP data, existing data within ROSSI, and a final review of the permitting files at DEP were compiled, reviewed, incorporated into ROSSI as appropriate. These data were used to delineate and characterize potential sand sources in the federal waters offshore of the Atlantic coast of Florida.

Operation and Maintenance of the ROSSI database continued throughout Round 1 and Round 2, and included the incorporation of new data from delineated borrow areas being utilized for beach nourishment. This continues to build on previous studies between the DEP (the Division of Water Resource Management and the Florida Geological Survey [FGS]), the Bureau of Ocean Energy Management (BOEM) Marine Minerals Program (MMP) and the U.S. Army Corps of Engineers (USACE). Borrow areas existing in ROSSI prior to Round 2 were also reclassified according to the USACE SAND study classification scheme and their geotechnical descriptions enhanced and/or updated.

The four overarching objectives of the Round 2 project were to:

1. Process and interpret the geophysical data collected under the ASAP by BOEM contractor Aptim (previously known as CB&I).
2. Delineate sand resources based upon the ASAP data, along with existing data in the ROSSI database.
3. Reclassify the borrow areas existing in the ROSSI database on the Atlantic Coast to meet the classification scheme in from the USACE SAND project.
4. Continue the DEP ROSSI database updates and data population of existing and new geological and geophysical data offshore of Florida's Atlantic Coast, and its connectivity to federal, and regional data sites.

The objectives for this project were met. As required in the cooperative agreement, the following is a short, annotated list citing the technical reports, ROSSI database updates, and professional abstracts created to date as a result of this cooperative agreement.

Objectives 1 and 2:

The first two objectives for this project were completed by Aptim under contract to DEP. The BOEM ASAP data were analyzed and interpreted, and possible sand sources identified and characterized. This information is included in the deliverable report from Aptim dated July 2017 and transmitted to BOEM under separate cover.

Aptim under contract with BOEM for the Inventory of Potential Beach Nourishment and Coastal Restoration Sand Sources on the Atlantic Outer Continent Shelf of the United States (ASAP) collected geophysical and geotechnical reconnaissance-level data. Upon completion of the reconnaissance survey in 2015, APTIM was contracted by DEP to conduct detailed data processing and interpretation of the Florida data. This particular project involved compiling and reviewing all available BOEM ASAP data sets along Florida's Atlantic OCS to identify potential sand sources. Along the Florida east coast, geophysical survey operations took place between April 19, 2015 and May 1, 2015. Once the geophysical data were collected, the geotechnical survey took place between July 29, 2015 and August 16, 2015. The Florida component of the BOEM ASAP project resulted in the collection of 522 km of geophysical (chirp sub-bottom, sidescan sonar, magnetometer, and swath bathymetry), 11 surface grab samples, and 19 vibracores with analysis of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores) (Figure 1).

DEP contracted APTIM to analyze the acquired data in the eight Florida study areas, determine the potential for beach-compatible sand sources, and delineate preliminary borrow areas along the Florida shelf offshore Nassau, St. Johns, Volusia, Brevard, Indian River and Martin County. The preliminary borrow areas delineations in all six counties (eight study areas) had preliminary design criteria that included a minimum cut thickness of 3 feet after applying a two-foot buffer over incompatible material. Aptim conducted a thorough processing and interpretation of the 522 line kilometers of chirp sub-bottom, sidescan sonar and magnetometer data along with the 30 geotechnical samples and delineated 16 preliminary borrow areas.

Preliminary borrow areas consisted of beach compatible sand resources with a total net volume of 54,477,396 cubic yards (cy) of beach compatible sands. Offshore Nassau County, Aptim identified six preliminary borrow areas with a total volume of 4,928,511 cy. One preliminary borrow area was delineated offshore St. Johns County with a total volume of 20,836,060 cy. Preliminary borrow area delineation in Volusia County yielded three areas, with a total of 5,010,573 cy of sand. Data interpretation in Brevard County resulted in five preliminary borrow areas with a total volume of 6,286,051 cy. The single preliminary borrow area identified in Indian River county has a potential volume of 17,416,202 cy.

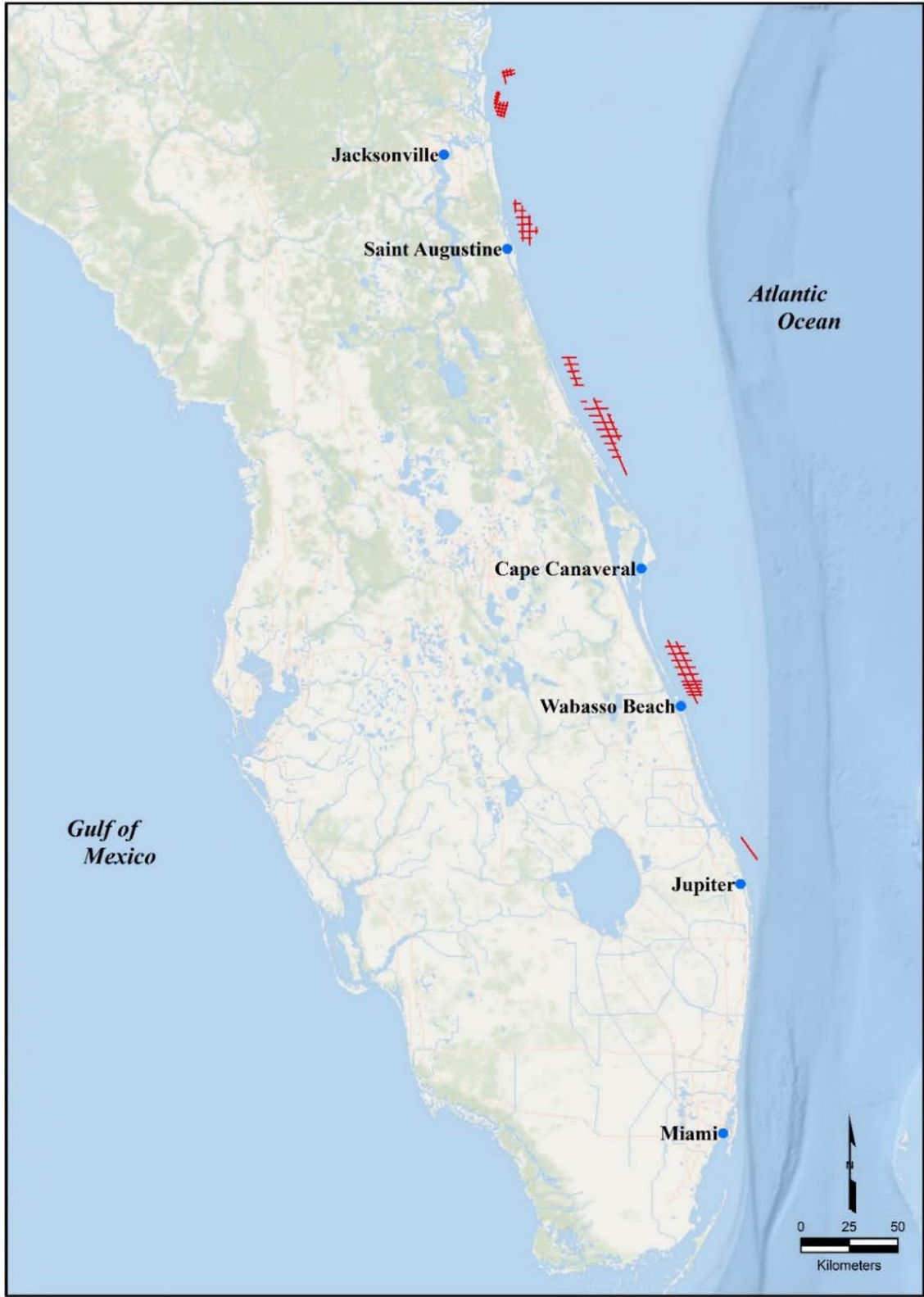


Figure 1: As-run tracklines along the Florida OCS for the BOEM ASAP project.

Finally, each preliminary borrow area was reviewed and classified as a “Potential” or “Unverified” sand resource in accordance with the Southeast Florida Assessment and Needs Determination (SAND) study conducted by the USACE and DEP (Table 1). Of all 16 delineated preliminary borrow areas, five preliminary borrow areas offshore Volusia, St. Johns and Nassau Counties received a final SAND classification of “2 Potential” yielding 27,460,426 cy of likely beach compatible sand. Five other preliminary borrow areas offshore Martin, Indian River, Volusia, and Nassau County were classified as “3A Unverified,” totaling 17,966,114 cy of likely beach-compatible sand. Eight preliminary borrow areas offshore Brevard, Volusia, and Nassau Counties were classified as “3B Unverified” with 9,050,856 cy of potentially beach-compatible sand.

Table 1: Preliminary borrow area composite statistics and classification based upon BOEM ASAP data.

Preliminary Borrow Area	Area (ft²)	Volume (cy)	Mean grain size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
NA10-R011	20,522,330.10	499,899	N/A	N/A	N/A	N/A	3B Unverified
NA6-R010	101,059,815.21	2,428,049	0.18	2.91	0.50	9.21	2 Potential
NA9-R010	19,743,626.14	312,591	N/A	N/A	N/A	N/A	2 Potential
NA8-R010	9,242,912.21	141,570	0.23	2.35	0.46	11.57	2 Potential
NA5-R076	10,551,560.98	182,534	0.21	1.99	0.60	6.62	3A Unverified
NA7-R070	64,413,291.97	1,363,868	N/A	N/A	N/A	N/A	3B Unverified
SJ7-R093	924,419,058.55	20,836,060	0.21	2.82	0.54	9.73	2 Potential
VO7-R065	27,711,273.86	367,378	0.24	2.39	0.49	17.45	3A Unverified
VO5-V317	43,210,268.78	901,038	N/A	N/A	N/A	N/A	3B Unverified
VO6-R179	221,095,705.17	3,742,156	0.27	0.53	0.52	14.63	2 Potential
BE4-R202	71,833,189.23	1,009,660	N/A	N/A	N/A	N/A	3B Unverified
BE4-R178	25,914,319.24	343,834	N/A	N/A	N/A	N/A	3B Unverified
BE5-R165	112,449,533.11	1,378,075	N/A	N/A	N/A	N/A	3B Unverified
BE8-R181	222,757,575.73	2,706,416	N/A	N/A	N/A	N/A	3B Unverified
BE8-R210	67,174,329.25	848,066	N/A	N/A	N/A	N/A	3B Unverified
IR7-R214	713,485,638.20	17,416,202	0.56	2.58	0.41	67.22	3A Unverified

Based off Aptim’s interpretation of the geophysical and geotechnical data collected for the BOEM ASAP project, it is evident that there are several viable sand sources along the Florida Atlantic OCS which would benefit from additional data coverage to further delineate and design preliminary borrow areas. In order to refine, design, permit, and/or lease any of these actual sand resources, additional phased (reconnaissance-level and design-level) geophysical and geotechnical data would need to be collected over a study area under consideration for final design and usage.

Reference: Aptim Environmental & Infrastructure, Inc., July 2017. Bureau of Ocean Energy Management Atlantic Sand Assessment Project Reconnaissance Data Processing and Interpretation.

Objective 3:

As the ASAP data was being interpreted and analyzed, AECOM was beginning the process of enhancing the borrow area descriptions for the borrow areas in both state and federal waters off the Atlantic coast of Florida. AECOM began by reviewing the geotechnical data housed at DEP to make sure it was included in ROSSI and incorporated what wasn't previously included. Once ROSSI was updated with those data, the task of enhancing the geologic descriptions of the borrow areas was completed. In addition, the borrow areas included in ROSSI and the borrow areas delineated from the ASAP data were characterized according to the classification scheme set in the SAND study. The borrow areas were also renamed to make the naming convention consistent with the SAND study. During this process, AECOM also went through the database to make sure there were no duplicate borrow areas.

Once Aptim completed the interpretation and analysis of the ASAP data, they created shapefiles of the data to be incorporated into ROSSI. AECOM took the data and shapefiles created, entered and incorporated it into the ROSSI database, and added this information to the interactive mapping tool. The report was also added to the Reports page (<http://rossi.urs-tally.com/Home/Reports>).

At the completion of this task, 61 borrow areas were renamed, reclassified and the borrow area description enhanced. This information is available through the ROSSI website. The interactive map feature shows this enhancement when a borrow area is identified on the map. Figure 2 shows as example for a potential borrow area offshore of Martin County in federal waters named MI4-R042. As indicated by the name, the centroid of this borrow area is located roughly four miles offshore of DEP range monument R-42 in Martin County. Figure 3 shows the information provided when the "More Info" link is clicked in the dialog box in Figure 2.

Once all of the data was incorporated, an updated set of shapefiles was created for download and made available at <http://rossi.urs-tally.com/Home/Shapefiles>. This is a zipped set of shapefiles including the entire database of samples, cores and borrow area data for the entire state. This information has been provided for inclusion in Data.gov and the BOEM MMP GIS.

Objective 4:

Just as in Round 1, the work under Round 2 included the continued maintenance and hosting of the ROSSI database by AECOM. The database can be found at <http://rossi.urs-tally.com/>. Throughout the period of performance, ROSSI database updates have been made to accommodate the BOEM ASAP data and present it in a usable manner. Data population of new geological and geophysical data offshore of Florida's Atlantic Coast has continued as new data is received by DEP. To maintain its connectivity to federal, and regional data sites, AECOM has worked with the registering and continued data sharing with the data.gov website. Dr. Steele has worked to make sure that the ROSSI database is also being made available to those creating the BOEM Marine Minerals Program (MMP) geographic information system (GIS) database.

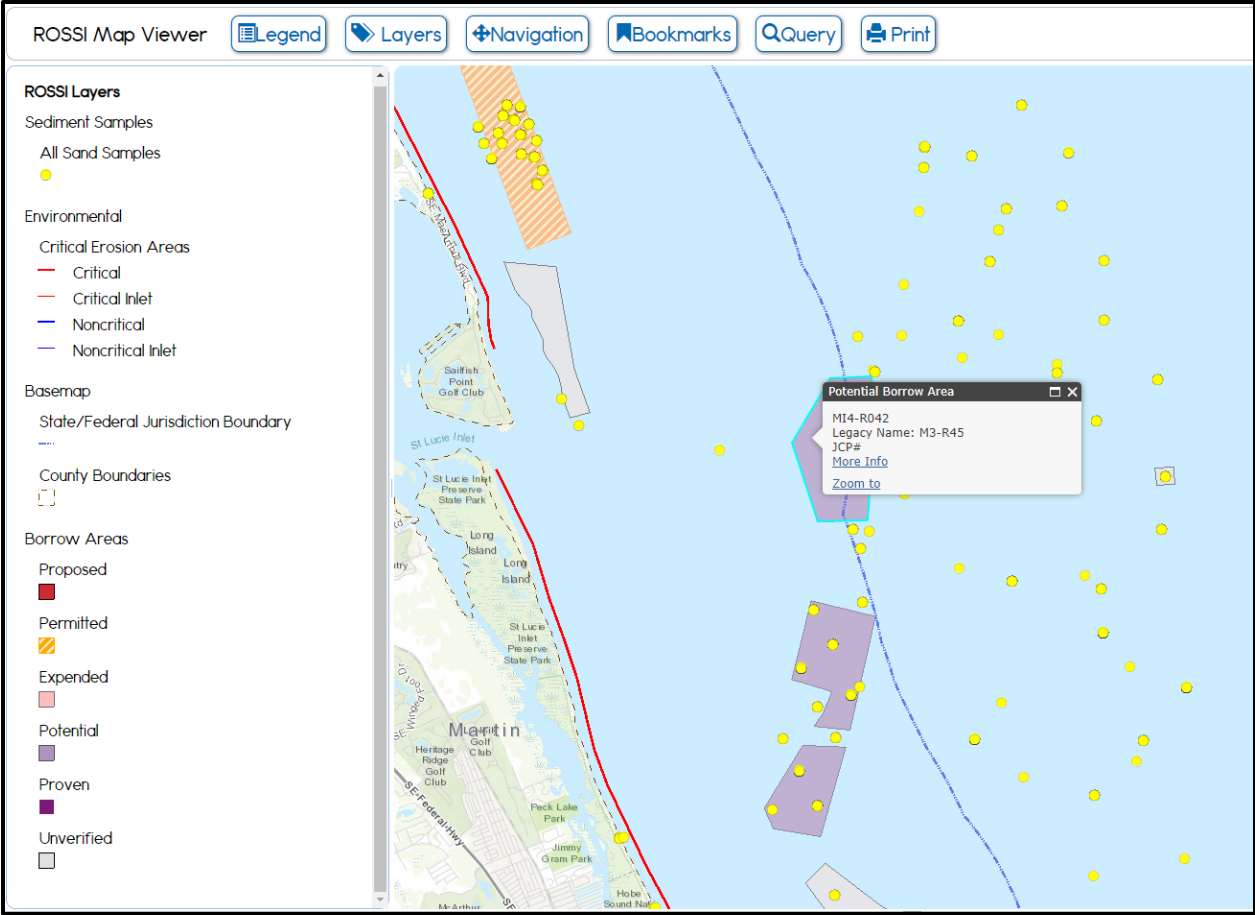


Figure 2: Identification of borrow area MI4-R042 in the ROSSI Map feature.

ROSSI Inventory Report: Potential Borrow Area

PROJECT INFORMATION

County: Martin

Project Name: Southeast Florida SAND Study

Project Date: 07/04/2012

Project ID: 349

JCP#:

Borrow Area Name: MI4-R042

Legacy Borrow Area Name: M3-R45

Borrow Area ID: 2080

Polygon Centroid: Latitude: 27.16503672 N Longitude: -80.09523685 W

Borrow Area Polygon Location:
The centroid of the borrow area is located at a bearing of 176° and a distance of 1794 feet from Range Monument R042.

County Utilizing Borrow Area: Martin

BORROW AREA CHARACTERISTICS

Geologic Description:

A potential borrow area that was previously designated MI-6. The sediment source was originally delineated in the FDEP ROSS Phase II Central Sand Search. Vibracore data were obtained from G and B Sand Search 1989 Jupiter Island Beach Renourishment Program. The deposit was refined using bathymetric and seismic evidence with 2012 SAND Study borings. Mean sediment grain sizes are 0.35 to 0.58 mm, have Munsell Values of 4 (wet) and 5 (dry), and are tan in color. The material is medium to coarse shell sand with quartz sand. The boundary has a minimum thickness of 4 ft and the average thicknesses are 6.4 ft with a 2-ft vertical buffer and 8.4 ft with no buffer. Estimated volumes range from 261,076,055 cf (no buffer) to 198,791,509 cf (2-ft vertical buffer). Tracklines M2, M3, MI04_NW_00, and MI05_E001 intersect the borrow area.

Mean Grain size (mm): 0.35-0.58

Sorting (ϕ):

Percent Silt:

Percent Gravel:

Sand Volume (CY): 261076055

Figure 3: Portion of information on borrow area MI4-R042 in the ROSSI database.

Cooperative Agreement Outputs including Project Deliverables:

Regional Offshore Sand Source Inventory (ROSSI) <http://rossi.urs-tally.com/>

Updates on the work performed on the ROSSI online database and the interpretation of the BOEM ASAP data have been provided to BOEM through Quarterly Reports and the Hurricane Sandy Co-op stakeholder teleconferences. The BOEM Florida Sand Management Working Group has not met during the Round 2 project period of performance. The BOEM meetings also involved discussions of the ROSSI database and its inclusion in the BOEM MMP GIS database under construction. This information has been presented at the Coastal Sediments 2019 conference. An abstract and paper were written for Coastal Sediments 2019 in addition to the presentation.