

## Environmental Studies Program: Ongoing Study

Field	Study Information
Title	Sediment Sorting During Coastal Restoration Projects (Phase II): Implications for Resource Management, Environmental Impacts, and Multiple Use Conflicts (MM-19-x05)
Administered by	Marine Minerals Program
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Procurement Type(s)	Interagency Agreement
Conducting Organization(s)	U.S. Army Corps of Engineers (USACE) Jacksonville District
Total BOEM Cost	\$499,000
Performance Period	FY 2019–2024
Final Report Due	June 2024
Date Revised	October 19, 2023
Problem	State sediment compatibility guidelines for coastal restoration projects do not take into consideration the degree of fine-sediment separation by dredging and placement operations. Absent a quantitative analysis of the loss and fate of fine sediment at varying stages of the dredging and placement process, a significant volume of OCS sand resources suitable for beach construction may be prematurely removed from consideration.
Intervention	This study will develop and implement appropriate sampling methodologies and data analysis techniques necessary to quantify and ground truth previous assumptions regarding the difference in the percentage of fine sediment from offshore in-situ samples to what is placed on the beach and where the significant loss points are.
Comparison	This study aims to quantify the difference between in-situ fines content compared to the percent fines on the beach. The fate of fine sediment within the water column adjacent to dredging operations and offshore of the placement locations will be monitored and compared to ambient conditions.
Outcome	Results from this study will inform BOEM's ongoing National Sand Inventory investment by gathering necessary data needed to inform state compatibility standards. These data may support use of previously discounted sand resource areas; thus, increasing the available volume of OCS sand resources available to support coastal restoration projects. Understanding the loss and fate of fine sediment during dredging and placement operations will support BOEM's resource stewardship responsibility and facilitate environmental tradeoff decisions associated with negotiated lease agreements.
Context	Atlantic and Gulf of Mexico planning areas.

BOEM Information Need(s): Understanding the degree of sediment coarsening during dredging and placement operations could inform BOEM's offshore sediment resource management decisions and the

potential for environmental impacts. Under the umbrella of the “National Sand Inventory” initiative, BOEM’s Marine Minerals Program is ultimately interested in maximizing the available volume of offshore sediment resources in support of identified coastal restoration needs while avoiding and/or minimizing environmental effects to the maximum extent practicable. Results from this study will inform environmental compliance documentation associated with future sand lease requests and facilitate informed environmental tradeoff analyses among offshore sand resource options.

**Background:** Coastal restoration project managers must ensure that borrow area sediments are compatible with native beach sediments with regard to sediment grain size, distribution, composition, sorting, and sometimes color. These requirements exist because sediment characteristics influence beach fill performance, recreational experience, and the environmental response along the beach during and after nourishment. For example, use of sediment that is too fine-grained could result in: early and significant erosion due to the wave climate of a particular stretch of coastline, potential impacts to the recovery rate and species composition of macro-benthic invertebrate communities and subsequent forage base for shorebirds, and potential impacts to the incubation environment of sea turtle nests.

The current methods for assessing sediment compatibility do not adequately reflect the percentage of these fine-grained sediments (i.e., <#200 sieve) ultimately retained in the hopper and subsequently pumped out, placed, and retained on the beach. A prior Phase I study investment (NT-15-05) was executed via an Interagency Agreement (IA) (M16PG00023) between BOEM and the USACE Jacksonville District. Results from this study indicate that the hopper overflow process removed 61% of the fine sediment mass contained in the borrow area, and beach outwash removed 67% of the fines contained in the hopper. These two losses combined accounted for a removal of 87% of the fines dredged from the borrow area. Of the fine sediment mass removed, 70% was removed by the overflow process and 30% was removed by beach outwash. The Phase I report recommended several considerations and next steps for follow-on research.

**Objectives:** The purpose of this Phase II study is to implement an additional field sampling initiative that leverages developed methodologies and incorporates lessons learned from the Phase I effort. This additional field initiative will increase the sample size and introduce a field site containing a higher percentage of fines than previously studied. Additionally, this study will implement innovative techniques to track the fate of fines lost during the overflow and/or outwash processes and subsequent implications (i.e., decreased water quality, sedimentation on adjacent benthic resources, etc.).

**Methods:** Expand upon the Phase I literature review with a particular emphasis on the previous broad body of work (i.e., peer reviewed publications, FDEP water quality monitoring reports, etc.) directly or indirectly related to the fate of fine sediment associated with overflow and outwash operations (i.e., sediment plume dynamics modeling, water quality monitoring techniques, sediment tracer studies, etc.). Develop a field sampling plan to specifically address the fate of fine sediments at the overflow and outwash and potential water quality implications in coordination and consultation with BOEM, FDEP, and appropriate dredging industry representatives. The sampling plan will also consider requirements necessary for documenting water chemistry and physical parameters that are needed to support sediment tracking models (i.e., bottom currents, surface currents, thermocline). Field sampling efforts will be implemented concurrent with previously established Phase I methodologies for evaluating changes in sediment characteristics from borrow to placement.

**Specific Research Question(s):** What is the degree and fate of fine-sediment separation during dredging and placement operations?

Current Status: The final field sampling plan was submitted in July 2020 following extensive coordination and review by the Florida Department of Environmental Protection, BOEM and the U.S. Army Corps of Engineers originally identified the Duval County, FL Coastal Storm Risk Management Project as best suited for project field operations based on schedule, study constraints, and knowledge of available borrow area sand with fines content on the order of 15%. Unfortunately, following more detailed sediment compatibility review of the alternative study borrow area, the Duval County project was removed from consideration due to concerns from the project sponsor regarding compatibility of sediment placed on the beach. The study team continues to evaluate alternative projects to conduct field operations but continues to encounter technical and political obstacles. As of October 2023, a project has not been identified to support field operations.

Publications Completed: None

Affiliated WWW Sites: None

References: None