



Strategic Placement at Marsh Edge as Sediment Source to Marsh Interior

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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Focus Area

Sediment and Dredging Processes

Problem

Coastal wetlands benefit from mineral sediment input, which supports root biomass production and allows wetlands to gain elevation with increasing sea levels. Strategic placement of dredged material along the marsh edge generates several potential benefits against wetland loss such as reduction of edge erosion and increased sediment supply to tidal creeks. Increased sediment supply through the tidal creek network has the potential to deliver mineral sediment far from the wetland edge to the marsh interior and to distribute sediments widely over the marsh surface. This favorable outcome is strongly dependent upon tidal hydrodynamics of the tidal creeks and transport characteristics of the dredged material, and general guidance of the anticipated outcomes of marsh-edge strategic placement are not presently available to practitioners.



Study Description

The study develops improved understanding and tools to evaluate conditions for which strategic placement of muddy sediment near marsh edges delivers sediment to the marsh interior. Field observations and numerical simulation will determine site and sediment characteristics favorable for marsh-edge strategic placement. In FY23, the study team will establish instrumented platforms and a model domain at a pilot study site. The coupled field observations and numerical simulations will drive a deeper understanding of physical processes at the site. In FY24-25, numerical simulations will be expanded to explore the broader range of physical settings present in the United States coastal zone to develop recommendations for conditions favorable to sediment delivery to the marsh interior through strategic placement at the marsh edge.

Products

The study will produce a field-validated modeling capability for dredged sediment transport in tidal wetlands, a testbed model domain with field observations for future model development, and guidelines for operational site parameters favoring strategic placement at marsh edge. The modeling capability will be applied by ERDC researchers, district personnel, academia, and district contractors. Guidelines for site parameters favoring strategic placement will be developed for future application by district personnel in scoping-level assessments of BU opportunities. The research findings will be communicated through ERDC TR, TN, a peer-reviewed journal article, conference proceedings, and technical briefings.

Summary

To expand beneficial use of fine-grained dredged sediment, the USACE must develop innovative and cost-effective practices for strategic placement near coastal marshes. Strategic placement near the marsh edge is one such cost effective measure. This project develops observational and modeling approaches to define conditions under which strategic placement at the marsh edge can deliver sediment deep into marsh interiors without the expensive and often intrusive practice of direct placement onto the marsh surface.



Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.



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