



Monitoring Wetland Surface Elevation Post Beneficial Use via Remote Sensing

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

Focus Area

Dredged Material Management

Problem

The beneficial use (BU) of dredged sediment to supplement wetland surface elevation supports and protects the coastal environment against threats like sea-level rise and sediment starvation while providing convenient disposal sites for dredgers during scheduled channel maintenance events. Despite the advantages that beneficial use offers over other placement strategies, much remains unknown about how the hydraulically dredged sediment placed within the site establishes over time due to the environment being inaccessible by standard monitoring methods. During this inaccessible period, the majority of sediment consolidation occurs but cannot be quantified which could cause engineers to assume incorrect settlement rates across this dynamic time period. The wetland surface elevation is a key design component because this elevation in relation to mean higher high water determines the future health and stability of the nourished natural infrastructure. Therefore, a fundamental understanding of consolidation behavior is paramount to the future success of BU placements and the USACE Districts need a cost effective and accurate monitoring method.

Study Description

This proposal seeks to evaluate the implementation of two drone-based remote sensing techniques to monitor wetland surface trajectory post beneficial use nourishment and to provide insight of spatial and temporal site establishment to dredgers and engineers. The accuracy, cost, and feasibility of both methods will be investigated. In addition, the generated consolidation curves from the recurrent elevation surveys will be compared to geotechnical analyses to gauge our model capabilities and make recommendations if inconsistencies are found.



Products

- Field demonstration and validation of best remote sensing methodology
- Webinar geared towards Districts on how to best incorporate proven methods
- Journal article on implementation and best practices (FY24)

Summary

The USACE Districts require a cost effective method to monitor the placement of beneficial use dredged sediment in back-bay environments. However, traditional use of terrestrial and satellite methods do not provide sufficient spatial or temporal resolution. A field demonstration of two drone-based remote sensing techniques (e.g., photogrammetry and LiDAR) will be conducted during an upcoming BU project in NJ to determine if they are feasible for implementation in future projects.



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