



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

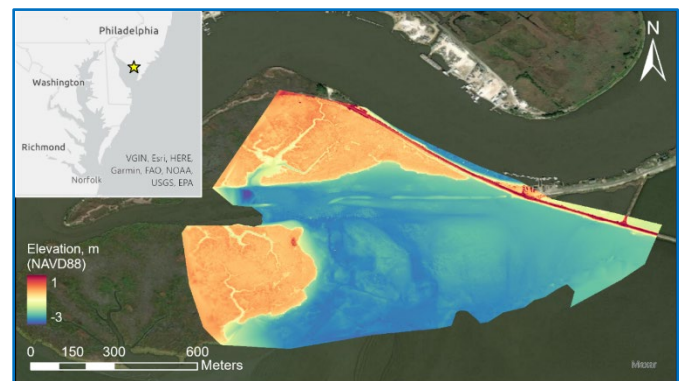
Dredged Material Management

Problem

The beneficial use dredged material (BUDM) to supplement degraded wetlands supports 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 BUDM offers, much remains unknown about how the hydraulically dredged sediment establishes over time due to the environment being inaccessible by standard monitoring methods for months post placement. During this inaccessible period, the majority of consolidation occurs but cannot be quantified which inhibits quality control of our geotechnical modeling. The wetland surface elevation is a key design component because elevation in relation to mean higher high water determines the future health and stability of a natural infrastructure. To more accurately gauge the long-term stability of nourished wetlands, it is crucial for USACE Districts to have an accessible and accurate means on monitoring wetland surfaces post BUDM.

Study Description

This proposal seeks to evaluate the implementation of two drone-based remote sensing techniques (LiDAR and Photogrammetry) to monitor wetland surface trajectory post BUDM 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
- Journal article on implementation and best practices
- Webinar geared towards Districts on how to best incorporate proven methods

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.

