

Time-Sensitive Surveys Performed at Back-Bay Beneficial Use of Dredged Material (BUDM) Nourishment

Impact Statement: In collaboration with the National Science Foundation's RAPID Facility, ERDC's Coastal Hydraulics Laboratory (CHL) performed lidar and multispectral imagery surveys of an on-going back-bay Beneficial Use of Dredged Material (BUDM) placement while the dredge was offline.

The USACE Philadelphia District (NAP), in collaboration with The Wetland Institute (TWI) and New Jersey's Department of Environmental Protection (NJDEP), is currently nourishing a degraded section of back-bay wetland via the Beneficial Use of Dredged Material (BUDM). The wetland elevations at Scotch Bonnet, NJ, an area adjacent to TWI, were rapidly transitioning from vegetated marsh to mudflat so sediment from the Atlantic Intracoastal Waterway (AICWW) is being dredged and placed on the marsh to elevate the marsh platform.

In collaboration with the University of Washington NSF Natural Hazards Engineering Research Infrastructure (NHERI) Reconnaissance Experimental Facility (RAPID), ERDC's Coastal and Hydraulics Laboratory (CHL) performed multiple lidar and multispectral surveys of the nourished areas (Figures 1 through 4). BUDM sites can be extremely difficult to access during and immediately following the placement of dredged material so uncrewed aerial systems (UASs) are ideal to collect high-resolution surveys of the placement area that capture the micro topographies of the site.



Figure 1. (Left) Initial set up. (Right) take-off of the Freefly Alta-X outfitted with the Phoenix Lidar Systems MiniRanger. From left to right are Dr. Michael Grilliot (RAPID), Dr. Brian Harris (CHL), and Andrew Lyda (RAPID). (Left photo taken by Devin Griffiths [TWI]).



Figure 2. (Left) Calibration of the multispectral camera on the Quantum Systems Trinity Pro. (Right) View of the BUDM nourishment area from TWI's tower.



Figure 3. Dr. Mike Grilliot and Andrew Lyda (UW-RAPID) reviewing flight lines ahead of a lidar survey.



Figure 4. Andrew Lyda and Dr. Michael Grilliot (both RAPID) touring the BUDM placement site.

The surface elevation of a wetland is a controlling factor of future health and stability; thus it is imperative to determine appropriate design elevations that will yield sufficient future surface elevations for back-bay BUDM nourishments. The current state of practice of back-bay BUDM and marsh creation projects incorporates modeled consolidation of the deposited dredged material and underlying foundation. However, the projected surface elevations from the models are seldom verified with field data from back-bay settings. The data generated within this work unit via UAS deployments is essential in the verification of geotechnical practices and may highlight areas of future improvement.

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