

Civil Works Researchers Monitored On-Going Beneficial Use of Dredged Material (BUDM) Placement and Updated Guidance on Construction Elevations

Impact Statement: Many of our Nation's wetlands are degrading due to a combination of anthropogenic and natural forces and require an influx of sediment to support a robust ecosystem. Researchers from the ERDC Coastal and Hydraulics Laboratory (CHL) and the Environmental Laboratory (EL) traveled to an on-going Beneficial Use of Dredged Material (BUDM) placement site to meet with District partners and other stakeholders to discuss project progress and update modeling efforts to provide updated design guidance.

Large swaths of New Jersey coastal wetlands are on the verge of converting to open water due to lowering elevation that has not been keeping pace with changing sea levels. The USACE Philadelphia District (NAP, in collaboration with The Wetland Institute (TWI) and New Jersey's Department of Environmental Protection (NJDEP), has moved forward with a Beneficial Use of Dredged Material (BUDM) project to bolster a section of degrading wetlands. The wetland elevations at Scotch Bonnet, an area adjacent to The Wetlands Institute, were too low to support an optimal environment and have been rapidly degrading. The site at Scotch Bonnet was completely inundated an unprecedented 21 days this January 2024, so this project sought to elevate the marsh platform. Dredged material is currently being extracted from the Atlantic Intracoastal Waterway (AIWW) and hydraulically dredged onto the marsh.

A team from the ERDC Coastal and Hydraulics Laboratory (CHL) and the Environmental Laboratory (EL) traveled to New Jersey to monitor the on-going progress of the BUDM placement at Scotch Bonnet (Figure 1). The team consisted of Dr. Brian Harris, Dr. David Perkey, Dr. Anthony Priestas, Daniel Gallegos, Kathryn Smith, and Steven Bailey (all from CHL), and Susan Bailey (EL) (Figure 2). During the visit Barnegat Bay Dredging Company, contracted by NAP, had already placed approximately 4,000 cubic yards of dredged material onto the marsh, which consisted of high concentrations of sand resulting in rapid elevation gains.



Figure 1. Signage outside of the Scotch Bonnet BUDM project site.



Figure 2. NAP and NAO staff touring the Scotch Bonnet BUDM placement area.

In addition to monitoring the BUDM placement, the ERDC team participated in a discussion among The Wetland Institute, NAP, NJDEP, and the USACE Norfolk District (NAO) to discuss current progress and address stakeholder concerns for Scotch Bonnet and upcoming BUDM placements (Figure 3). While on site, data from geotechnical instrumentation deployed prior to the BUDM were downloaded to monitor the development of surface stresses and underlying pore pressures. These data, in conjunction with field observations, allowed Dr. Brian Harris and Susan Bailey to work closely with NAP and TWI to revise their consolidation models to determine updated construction elevations. Wetland surface elevation is a controlling factor behind future wetland productivity, so it is imperative to accurately model anticipated consolidation magnitudes and rates. These geotechnical sensors are part of a larger, multi-platform approach to monitor back-bay BUDM projects accurately and efficiently.



Figure 3. (Left) Daniel Gallegos, Dr. Brian Harris, and Dr. Anthony Priestas reviewing data from deployed geotechnical sensors. (Photo provided by Steven Bailey.) Geotechnical sensors (Middle) pre-BUDM, and (Right) during BUDM. (Photos provided by Brian Harris and Dr. Lenore Tedesco [TWI], respectively.)

Funding for Dr. Harris's research was provided by the USACE Engineering with Nature[®] (EWN[®]) Program, and by the Dredging Operations and Environmental Research (DOER) Program.

PoC: Brian Harris Brian.D.Harris@usace.army.mil