

ERDC CW R&D Researchers begin Collaboration with US Geological Survey (USGS), Ducks Unlimited (DU), and US Fish and Wildlife Service (USFWS) to support State of Texas Beneficial Use of Dredged Material (BUDM) Master Plan

Impact Statement: The ERDC Coastal and Hydraulics Laboratory (CHL), and the ERDC Environmental Laboratory (EL) kick-off collaboration with the US Geological Survey (USGS), Ducks Unlimited (DU), US Fish and Wildlife Service (USFWS), and the Texas Parks and Wildlife Department (TPWD) to develop a BUDM master plan. CHL researchers traveled to Texas to assist in the identification of study sites within the McFaddin National Wildlife Refuge and J. D. Murphree State Wildlife Management Area.

Coastal wetland loss is a serious concern along the Gulf of Mexico, especially along the Texas and Louisiana coastlines where rates of wetland loss and relative sea-level rise are among the highest in the world. Here extreme storms are becoming more frequent, and flooding events are intensifying. Marsh resilience to sea-level rise and extreme flooding is dependent upon biogeomorphic feedbacks between inundation, sedimentation, and plant growth, which allow marshes to adjust their surface elevation in response to increased flooding. Restoration efforts often seek to maximize these feedbacks and increase marsh elevation capital to help coastal marshes adapt to rising sea levels and extreme flooding events. One option for producing immediate gains in elevation capital is to add sediment layers with Beneficial Use of Dredged Material (BUDM), thus helping the USACE reach its 70/30 goal. However much remains unknown about the design and long-term viability of these sites.

In recent years, the Ducks Unlimited Conservation Staff has been working with partners to develop a state-wide Texas Beneficial Use of Dredge Material (BUDM) Master Plan, which identifies coastal marsh sites for restoration and prioritizes those sites based on past change, future risk to habitats, and opportunity for restoration actions. Although this technique is widely applied, natural resource decision makers have identified two key questions to improve the outcomes of restoration with BUDM: (1) “*How high?*” What elevation supports optimal marsh function; and (2) “*How long?*” What is the lifespan of the restored marsh? How long does it take to reach full functionality, and how long is optimal function maintained before additional material placement is necessary or submergence occurs as sea levels rise?

Dr. Brian Harris (ERDC-CHL) recently traveled to Texas to participate in the identification of study sites. The sites are located across the McFaddin National Wildlife Refuge and the J. D. Murphree State Wildlife Management Area (Figure 1) which are both within the Chenier Plain, a geomorphological region sculpted by the Mississippi River that spans roughly 320 kilometers (km) from the southeastern coast of Texas to the central coast of Louisiana. These two managed lands are adjacent to each other and contain long-term study sites maintained by the larger team and active restoration projects using dredge materials. ERDC’s primary role in the multi-agency collaboration is to provide geotechnical experience in the form of assessing sediment characteristics, and performing shear strength and consolidation testing, and developing consolidation models.



Figure 1. Members from USGS, DU, and USFWS visit one of the upland sites in the J. D. Murphree State Wildlife Management Area where dredged material was previously deposited. Photographer: Dr. Brian Harris (CHL).

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