Thin Layer Placement Guidance Development For Coastal Resilience and Restoration in the Chesapeake Region - Christopher Overcash

Thin Layer Placement (TLP) for climate resilience and restoration of tidal marsh systems is a key potential nature-based tool in the battle against climate impacts including sea level rise (SLR) and others as well as land subsidence in the Chesapeake Bay region. The area includes extensive tidal marsh areas which exist due to the low-lying topography, especially prevalent on the eastern shore. To meet this important need in the Virginia portion of the Chesapeake Bay, the Virginia Commonwealth TLP Guidance is being developed by the Elizabeth River Project and partner Anchor QEA with National Fish and Wildlife Foundation grant funding. This effort involves a wide range of stakeholders and is leading to technical guidance for TLP implementation as well as generating cutting edge interactive GIS systems to connect beneficial use of dredged material opportunities with TLP project locations, as well as creating site specific TLP project designs. These projects will be the first TLP projects in Virginia and will serve as a benchmark to meeting the increasing changes caused by SLR in Hampton Roads, the Chesapeake region and beyond.
The project team understands that TLP can be a valuable tool aiding in the beneficial use of locally dredged sediments thus creating a wide range of benefits associated with each project. To be successful, TLP requires careful planning and design considerations which the team is defining through case study analysis and synthesis of information to create the framework for the guidance to be truly useful for practitioners and regulatory personnel alike.

Public / Private Partnership for Programmatic BUDM Implementation in Texas
Stephen McDowell

Since 2006, a public/private partnership has restored over 2,900 acres of coastal marsh using about 8.2 million cubic yards (mcy) of dredge material at the J.D. Murphree Wildlife Management Area (JDWMA), owned by Texas Parks and Wildlife Department (TPWD). TPWD partnered with local industry along the Sabine Neches waterway to obtain large quantities of dredge material. In 2006, 244 acres were restored using 1.2 mcy of new work material. In 2010 a second project restored 1,500 acres using 3.2 mcy of material, and in 2013 an additional 419 acres were restored with about 1.5 mcy. The most recent project (2019) restored 790 acres with 2.3 mcy. Each project offered a cost benefit to both partners and restored healthy marsh vegetation. In 2024 a new partnership will restore an additional 1,280 acres. Additionally, the Texas General Land Office funded a 1,867 acre engineering and design project on the JDMWMA that will use 7.26 mcy of dredged sediment. These plans have been submitted for a permit by TPWD for future implementation. The JDMWMA BUDM projects may represent one of the most continuous landscape scale attempts to programmatically implement BUDM and provides a case study example to dredging practitioners of public/private partnerships that can provide for large-scale coastal restoration in an economical manner. Lessons learned will be discussed including target elevations, use of settlement plates, on-site logistics, use of temporary containment, and the need for project planning to stay in front of the dredge and provide for future BUDM opportunities.

Balancing Regulatory Processes and Beneficial Reuse of Dredged Material - Morgan Simms

This presentation will focus on the interplay between the development of nature based solutions (NBS) using the beneficial reuse of dredged material and the permitting process in multiple east coast states including Massachusetts, North Carolina, and South Carolina. In the presented case studies, site specific resilience needs are assessed alongside federal and state permitting requirements to plan for future implementation of coastal resilience projects. Additional considerations include engaging stakeholders, underserved communities, and local indigenous knowledge in framing NBS, however, this session will focus on how permitting processes can impact the prioritization of NBS. Specifically, it will look at NBS developed for coastal salt marsh systems that are vulnerable to sea level rise. These dynamic systems are able to respond to changes in sea level, however, the anticipated acceleration of sea level rise is expected to overwhelm marsh systems, resulting in marsh loss and increased vulnerability and flooding of critical coastal areas. Developing innovative resilience alternatives with beneficially reused dredged material is critical to protect and restore these systems which provide economic, environmental, and social resources. Resilience alternatives that have a defined, straightforward permitting process are oftentimes prioritized to ensure the best use of available funds. While this promotes efficient implementation, it may ultimately slow the needed evolution of innovative resilience techniques.

Predicting the outcomes of sediment addition in Florida's changing coastal landscape - Britney Hay

Tidal saltmarshes provide critical ecosystem services that depend on the marsh's ability to maintain its position in the intertidal zone. However, in some areas, saltmarsh accretion rates are being outpaced by sea level rise and driving marsh fragmentation and loss. Thin-layer sediment placement has successfully restored elevational losses in temperate saltmarshes by applying a layer of dredged material to the marsh surface. In the state of Florida where saltmarshes face similar challenges, however, the outcomes of this strategy are less predictable. Subtropical conditions and mangrove encroachment along Florida's northern Atlantic and Gulf coasts add unique ecological variables that are lacking in existing studies, making the outcomes of sediment amendments in these habitats largely unknown. We address these knowledge gaps with a pilot-scale study in a degrading saltmarsh on Florida's north-eastern coast with an expanding mangrove presence. In July 2022, we manipulated sediment quantity and composition in experimental plots dominated by Black mangroves (Avicennia germinans) or Smooth cordgrass (Spartina alterniflora) to understand how sediment application and underlying vegetation influence early restoration outcomes. The responses to sediment addition two years after experiment initiation show that while initial plant and invertebrate densities decline in all plots in the months immediately following addition due to a combination of burial and death, the characteristics of the added sediment shape the timeline of species recovery.

Monitoring Large-Scale Morphodynamic Changes of a Barrier Spit Following Beneficial Reuse of Dredged Materials - Samantha Lewis

The Shippagan habitat compensation project uses sand engine techniques to increase the resiliency of a Barrier Spit in Northern New Brunswick, Canada and restore important beach and dune habitat. As part of long-term monitoring for the project, beach morphodynamics are being measured using Remotely Piloted Aircraft Systems (RPAS), which provide multi-temporal, hyperspatial elevation models and orthomosaic imagery of the Spit following a standard photogrammetric processing workflow. The study area includes both the beach nourishment area and the dredge material laydown area which make up the sand engine. Aerial surveys have been conducted 2-3 times per year since fall 2022, using three models of RPAS: DJI Phantom 4 RTK, WingtraOne PPK and DJI Matrice 300 with MicaSense RedEdge-P sensor. RPAS data were georeferenced using a well-distributed network of Ground Control Points (GCPs), as well as Post-Processed Kinematic (PPK) positioning of aircraft photo locations for WingtraOne PPK surveys. Site-scale vertical and volumetric change analyses were conducted to monitor morphological change of the beach, determine the efficacy of the implemented sand engine, and assess storm recovery following the impacts of Hurricane Fiona in September 2022. Over the first year following dredged material deposition and the construction of a breakwater in winter 2021, surface elevation change showed a loss of sediment from sand engine and a net gain of sediment on beach, indicating that sediments are successfully being transported via longshore drift and trapped by the newly constructed breakwater.

A Texas Sized Effort for Beneficial Use of Dredged Material – Win-Win-Win for Habitat Restoration, Coastal Resiliency, and Maritime Commerce - Todd Merendino

This Texas Sized effort will focus on development of a programmatic effort to implement the Beneficial Use of Dredge Material (BUDM) throughout the Texas Coast. This project will support the U.S. Army Corps of Engineers 70/30 initiative and the Texas General Land Office's Texas Coastal Resiliency Master Plan, and will restore wildlife habitat, thus representing a win-win-win opportunity for the Texas Coast. Battered by sea-level rise, subsidence, coastal erosion, and tropical storms, habitat loss is an ongoing threat to coastal wetlands of critical importance to migratory waterfowl, shorebirds, and estuarine dependent fish species. The Texas Coast is home to 3 of the nation's top 10 ports, including the Gulf Intracoastal Waterway with millions of cubic yards of sediment annually dredged from federally maintained navigation channels and port facilities. This project will focus on project site identification, logistics, and concept designs, with some higher priority restoration sites being pushed to 60% designs and project implementation. BUDM has been successfully implemented locally in several coastal areas. This project will build on the success of ongoing BUDM efforts and address the coastwide opportunity and need for BUDM via a multi-agency and partner effort involving funding from Deepwater Horizon (Texas TIG), RESTORE Act, and the Texas General Land Office, as well as the Port of Corpus Christi, Orange County Navigation and Port District, Galveston Bay Foundation, and the Coastal Bend and Bays Estuaries Program.