



# Development of Dredge Outfall Seeding Method for Rapid Establishment of BU Projects

## Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

### Focus Area

Innovation in Sediment Management - Innovative Construction and Operations Technologies

### Problem

Marsh habitat restoration and creation are some of the major applications for Beneficial Use of Dredged Material within USACE. As these areas are generally located along rivers or within the coastal zone they are subject to rapidly changing water levels and/or wave wash from storm activity. Recently dredged material can become washed out if one of these events happens too soon after placement. This can severely hinder or delay the projects' success, as well as drive up costs if another dredging/placement event is required to re-fill these washed out zones. Low spots within marshes can lead to ponding and reduce the ability for vegetative success. In addition, many districts rely on hand planting aquatic vegetation for these marsh restoration activities which can become tedious and expensive due to the amount of person hours required for hand plantings. If a large storm or higher than usual tide hits prior to these plants root systems being fully established, there is a good chance they will be wiped out and need to be replanted. Rapid sediment stability and vegetation succession is needed to increase the likelihood of successful marsh/habitat creation/restoration.

### Description

The overall study will look at the potential for using rapidly germinating seeds, deployed to the marsh area in slurry during the final lift of dredging. CHL/CRREL will perform an in-depth literature review on standard and non-standard marsh restoration and creation techniques. From information in the literature, the team will assess an array of plant species to identify which will perform the best and how to deliver them (i.e., lone seeds, capsules, etc.), as well as look at dredging considerations. "Best" will include estimates of factors such as establishment times, root strength and likelihood of sediment capture for further, natural land building. Results will inform greenhouse studies for Year 2 to optimize establishment success and performance. The review will compare the establishment times for hand plantings versus natural recruitment, and if possible, estimates for seed slurry plantings. Data regarding seed slurry establishment rates may not be available until greenhouse studies are completed. The results of this project are intended to be used for Beneficial Use O&M projects, and not solely for environmental projects, so dredging costs/productivity will also to be considered.

### Products

Published Literature Review

Presentation at conference, TBD

### Summary

Recently placed Dredged Sediments used for Beneficial Use purposes in Coastal, Marsh, and Riverine settings can be subject to flooding/wave wash/and high velocity flows that risk washing away these soils. Mixing select rapid growth seed variations into the dredged slurry at the time of placement could help stabilize the dredged sediment sooner, as well as reduce costs from direct plantings. CHL/CRREL will look to identify rapidly germinating seeds with strong root systems that are native and/or can be overtaken by native species. This proposed work will identify which plant species are best suited for thin layer placement by examining the thresholds (velocities) that these seeds can withstand in slurry, along with dredging velocity outputs for various sized dredges to determine the optimal dredge size/production needed to maintain O&M needs while being able to deliver seeds to marsh.



*Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.*