A Guide to Engineering With Nature for Native Plant Community Development on Dredge Material Placement Areas

Background

Dredged material placement areas (DMPAs) and Confined disposal facilities (CDFs) provide for temporary or permanent confinement of dredged material produced during dredging of navigable channels in waters of the US, including bays, inland rivers and harbors or berthing areas. Typically a diked structure is constructed and then filled with dredge material over an extended period of time ranging from 10 – 50 years or more, until the capacity is exhausted. While construction techniques are well documented, sufficient vegetative treatments, planting regime and/or guidance to stabilize and promote ecosystem development on these placement areas are lacking. Opportunistic plant species tend to colonize DMPAs/CDFs during idle periods or following closure; these monocultures are not desirable and most active DMPAs/CDFs must be managed to prevent excessive vegetation establishment that would interfere with disposal operations. Following closure of a DMPAs/CDF, active management is needed to establish native plant communities that offer ecological benefits for area species. Native plant communities may also be beneficial in preventing the erosion of dikes and dredged material from active DMPAs/CDFs through wind and wave action, and may reduce the cost and environmental impact of more aggressive and undesirable vegetation management alternatives such as herbicide application and regular tillage. The placement areas themselves (whether nearshore DMPAs/CDFs or islands) can contribute to coastal resilience by providing protection from storm surge, adding structural integrity for living shorelines, and contributing ecological benefits such as wildlife habitat and linkage of greenways, to sustain migratory fauna on their travel along the coasts and inland waterways.

A CDF along the Gulf Intracoastal Waterway will be chosen for a field demonstration, and the first of two workshops will be hosted by Galveston District

Objectives

Guidance will be developed highlighting the use of native plant communities as vegetative treatments providing effective, low cost solutions, to stabilize DMPAs/CDFs while providing engineering and environmental benefits. Two workshops will also be held to develop case studies for the purpose of demonstrating planting techniques with native plant communities that will go into natural succession in the future. These case studies will be featured on the EWN website.

Approach

Plant communities not only survive, but adapt to changing environmental conditions as they go into natural succession, and have natural resiliency built into them by genetic and species biodiversity. The guidance developed through this research will identify and document the use of native plant communities to provide sustainable solutions for management of DMPAs/CDFs, as well as maximize the ecological and engineering benefits attainable through strategic planning, placement, management and eventual transition following closures. Different plant treatments will be developed as appropriate to the life stage of a DMPAs/CDFs and the related management objectives. Existing dredged material disposal databases will be used to identify potential sites for the case studies, and planting schemes developed based on the native plant communities identified using the National Vegetation Classification. A literature reference section will also be included to provide more information on biotechnical planting and generic construction specifications.

Outcomes

Products include: a series of three Technical Notes, and two workshops/case studies. These will be synthesized in a guidance manual “Design Guidance Incorporating Native Plant Communities for Management of Dredged Material Placement Areas”; the approach will provide self-sustaining features on DMPAs/CDFs that will require less maintenance after project implementation, and offer cost savings with greater ecological benefits to the environment. Engineering and environmental benefits include: protection from storm surge, structural integrity for living shorelines, wildlife habitat and linkage of greenways to sustain migratory fauna, recreational and aesthetic value, and prevention of invasive species by appropriate native plantings.

Point of Contact: Tosin Sekoni
Tosin.a.sekoni@usace.army.mil 601-634-3732