

THIN-LAYER PLACEMENT PROJECT SHEET



Freeman Creek, NC

July 2017

Location: Marine Corps Base Camp Lejeune

Type: Marsh restoration

Area: 75 m²

City: Jacksonville

County: Onslow

Main Agencies: National Oceanic and Atmospheric Administration, US Army Corps of Engineers, Department of Defense

State/Province: North Carolina

Country: United States



From: Jenny Davis – NOAA/NCCOS

Background

Marine Corps Base Camp Lejeune (MCBCL), located near Jacksonville, NC, occupies over 153,439 acres, including over 2600 acres of coastal wetlands. NOAA has participated in a ten-year Department of Defense-funded program to develop an ecosystem management plan to support the Base's military training mission (<https://dcerp.rti.org/#/>). As part of that effort, the Coastal Wetland team assessed the risk of sea level rise to the integrity of salt marshes in the region, particularly those whose natural sediment delivery regimes have been altered by creation of the Atlantic Intracoastal Waterway (AIWW). The results of the Coastal Wetland monitoring program indicate that the marsh platform at the project site is 20-25 cm below "optimal" growth elevations for *Spartina alterniflora*. Output from the Marsh Equilibrium Model (MEM; Morris et al 2002) suggest that this marsh is in danger of drowning by the end of the century due to its low elevation and limited sediment supply.

The application of dredged material to coastal ecosystems to provide resilience to sea level rise and coastal storms is of growing interest in the Southeast region. A primary goal of this demonstration project is to provide the foundation for use of thin layer placement of dredged material in similar locations by developing a list of parameters and model predictions that are necessary for applying this technology to coastal wetlands.

Project Description

The project site is located adjacent to the AIWW as it traverses MCBCL behind the Onslow Beach barrier island. Natural fiber coir logs were used to establish experimental plots (three treatment and three control). Three natural marsh plots outside the experimental area will also be sampled. All plots were 3 m x 8 m. Diaphragm pumps were used to pump dredged material from the adjacent AIWW into the treatment plots in March/April of 2017. Average elevation of treatment plots was increased by 5-10 cm. Marsh surface elevation, *Spartina alterniflora* biomass, sediment grain size, carbon content, and percent

organic matter were measured in all plots before sediment addition, and will be monitored every two months for the first two years, and then annually. Pore water sampling devices were installed in all plots for analysis of inorganic nutrient concentrations and water level sensors were installed on-site for generation of site-specific tidal datums.

The success of thin layer placement of dredged material as a marsh nourishment strategy is dependent not only upon the final elevation achieved, but also on the impact of sediment addition to site-specific edaphic factors that influence plant growth. The data generated through controlled thin layer placement experiments like this one will lead to a better understanding of how to best target thin-layer placement of dredged material to achieve optimum success. The experimental design also provides an assessment of coir log installations on plant growth and sediment accretion.

Findings

Will be available at coastalscience.noaa.gov beginning in spring 2018.

References

Defense Coastal/Estuarine Research Program (DCERP). 2017. <https://dcerp.rti.org/#/> (Accessed June 2017)

Morris, J.T., P.V. Sundareshwar, C.T. Nietch, B. Kjerfve, and D.R. Cahoon. 2002. Responses of coastal wetlands to rising sea level. *Ecology* 83(10):2869–2877.

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Main Agencies:

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Information on thin layer placement (TLP) case studies has been compiled as part of a DOTS/EWN project to provide a source of information, knowledge, and experience on TLP of sediment or dredged material in aquatic environments. The Thin Layer Placement Website and Map-Portal are funded by the US Army Engineer Research and Development Center (ERDC). The POC for the Thin Layer Placement Website and Map-Portal is:

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