Gull Rock, North Carolina

Draft August 2016

Location: Gull Rock

Type: Dredged material disposal/marsh nourishment

Area: 28 acres that were part of an 80 acre area of concern

City: Swanquarter

County: Hyde

Agencies: North Carolina Department of Natural Resources and Community Development, US Army Corps of Engineers

State/Province: North Carolina

Country: United States

Taken from Wilber 1992

Background

In 1982, maintenance dredging was required in Lake Landing and Boundary Canals which are located in Gull Rock, NC. Also, a new access channel to Lake Landing was constructed in Wysocking Bay. The material resulting from these dredging operations was placed in two different marsh areas located close to the dredged sites, which will be referred as the island site and the canal site in this factsheet. Both marshes have low salinity and flat surfaces. The most common type of vegetation in the marsh areas is black needle rush, saltgrass, smooth cordgrass, and saltmeadow cordgrass. The objective of this project was to dredge material and place it in two different marsh areas to evaluate physical and environmental effects 9 years after dredged material placement.

Project Description

Approximately 10,000 to 20,000 CY of dredged material consisting of clay, silt, and fine sand were removed from the two dredging areas. The maintenance material was removed with a barge-mounted, high pressure hydraulic dredged with a multiple auger and rotating blade cutterhead. The material was then sprayed on the canal site with a 6-in. pipeline that split to feed two 3-in. independent discharge nozzles which achieved the best dispersal range. The approximate range of the spray was 150 ft. The thin layer thickness ranged from 0.4 to 4 in., but was generally 2 in.

The new works material was removed using an auger type cutterhead with an 8 in. intake and a 6-in. discharge pump connected to 3.5 in. nozzle. The new works material was sprayed at the island site in a thin layer ranging from 0.4 to 8 in., which was generally 4 in. Variations in thickness resulted from the logistics of the dredging operations and effects of winds on the placement technique (Wilber 1992).

Nine years after thin layer placement, the canal and marsh site were monitored to capture the long-term effects of the placement activities. Two reference sites were also

monitored, the reference 1 site was adjacent to the canal site and the reference 2 site was adjacent to the island site. The characteristics evaluated quantitatively included plant biomass, plant density, relative elevation, bulk density, organic content, and macroinfauna density. The sites were evaluated qualitatively for fiddler crab abundance, fish abundance, and soil layering.

Findings

All the evaluated sites had robust stands of marsh vegetation (Wilber 1992). In terms of biomass, the most common species at the canal and reference sites was black needle rush, and at the island site was smooth cordgrass. In terms of plant density, the most common species was black needle rush at the canal and reference 1 sites, and saltgrass at the island and reference 2 sites. The mean elevation at the canal site was 1 in. higher than the reference 1 site, and at the island site was 3 in. higher than the reference 2 site. No soil layering was observed at the canal site, which was unexpected. Soil layering was observed at the island site approximately 2 to 3 in. below the sediment surface. The soils at all sites had low bulk densities and high organic contents, which is typical of marsh areas. Abundances of macroinfauna were low at all sites as compared to other North Carolina marshes. A broad spectrum of natural variability was observed at all sites; however, the lack of pre-placement monitoring data makes hard to identify the effects of thin layer placement and the differences observed between the placement and reference areas. All the parameters evaluated in the long term are indicative of productive marshes. Thin layer placement at the marsh sites reduced or eliminated adverse impacts to habitat and smothering of existing vegetation as compared to conventional placement in marshes. Some smothering of vegetation occurred during placement due to the large volume of water involved in the spraying operations; however, revegetation occurred relatively quickly.

References

Wilber, P. (1992) Case studies of the thin-layer disposal of dredged material – Gull Rock, North Carolina. Environmental Effects of Dredging, Vol D-92-3, pp 1-6, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Points of Contact

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). POCs for the Thin Layer Placement Website and Map-Portal are:

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