

THIN-LAYER PLACEMENT PROJECT SHEET



Mississippi Sound

August 2016

Location: Mississippi Sound

Type: Historical dredged material placement

Area: 6 areas of 300 acres

City: from Waveland, MS to the Dauphin Island, AL

County: Hancock County, MS; Harrison County, MS; Jackson County, MS; Mobile County, AL

Agencies: US Army Corps of Engineers Mobile District, US Army Engineer Research and Development Center, National Marine Fisheries Services

State/Province: Mississippi and Alabama

Country: United States



Taken from Google Earth Pro

Background

Mississippi Sound is a shallow coastal lagoon, approximately 80 miles long and 9 miles wide with a mean depth of -10 ft MLW and a tidal range of 1.5 ft. The navigation channel for Gulfport Harbor extends about 20 miles through Mississippi Sound. The channel is mainly composed of plastic clays, poorly graded sands, and silty sands. The Sound channel improvements required deepening the channel from 30 to 36 ft, which required removal of 1 MCY from the channel (maintenance material) that were placed in a thin layer with thickness ≤ 12 in. in three 300-acre disposal areas along the west side of the channel. Similarly, 1 MCY of new work material was removed and placed in a thin layer with thickness ≤ 12 in. in three 300-acre disposal areas along the east side of the channel.

Project Description

The dredged material was placed in a 12-in. thin layer with a spreader barge in each disposal area during three separate disposal events. The target speed for the movement of the discharge barge was estimated based on the predisposal bathymetry, anticipated discharge rates, the thin layer thickness, and size of the disposal area. The barge speed was monitored with a real-time positioning system. Disposal into each site occurred continuously for 10 days. Each disposal area was monitored predisposal, during disposal, short-term postdisposal, and long-term after postdisposal. Multiple parameters were monitored to examine the water quality perturbations and responses of benthic macroinvertebrates caused by thin layer placement. Monitoring for water quality was conducted for multiple samples in two areas that received maintenance material, two that received new-work material, and two reference areas. Sampling for benthic community responses was conducted at three disposal and reference areas..

Findings

The results from the water quality monitoring portion of this project showed that thin-layer placement did not consistently impact the water quality of the disposal sites. For most parameters, effects were evident in less than one-third of the comparisons between disposal and reference areas. Disposal of maintenance material affected water quality more than disposal of new-work material and effects were more evident in bottom waters than in surface or mid-depth waters. The water quality data indicates that the impacts of thin-layer placement on water quality were of short-term nature (Rees and Wilber 1994).”

The results obtained for the benthic community responses portion of the study showed that for two disposal sites the sand fraction increased and for one of the sites the grain size distribution did not change significantly as compared to the reference sites. One year postdisposal, the overall abundance of infauna increased at the disposal sites as compared to the reference sites. The two disposal sites that had a higher sand fraction had a higher infaunal abundance and recovered faster in terms of infauna. The establishment of suspension feeders such as Oweniid polychaetes may have increased due to the increase of sand availability (Wilber et al. 2007). Therefore, the disposal site similar in character to the reference sites established benthic community assemblages similar to the reference conditions. The size distributions of some taxa suggest adults recolonized the thin layer of dredged material either through vertical migration or lateral immigration of from adjacent areas (Wilber et al. 2007).

References

Rees, S.I. and Wilber, P. (1994) Effects from Thin-Layer Disposal of Dredged Material on Water Quality in Mississippi Sound. Proceedings of the Second International Conference on Dredging and Dredged Material Placement, Dredging '94, 2: 1481-1489.

Wilber, D.H.; Clarke; D.G.; Rees, S.I. (2007) Responses of benthic macroinvertebrates to thin-layer disposal of dredged material in Mississippi Sound, USA. Marine Pollution Bulletin, 54: 42-52.

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:

- Damarys Acevedo-Mackey, PE
Damarys.Acevedo-Mackey@usace.army.mil, 601-634-4845
- Trudy J. Estes, Ph.D., PE
Trudy.J.Estes@usace.army.mil, 601-634-2125



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