US Army Corps of Engineers®
Engineer Research and Development Center

Regional Sediment Management Program

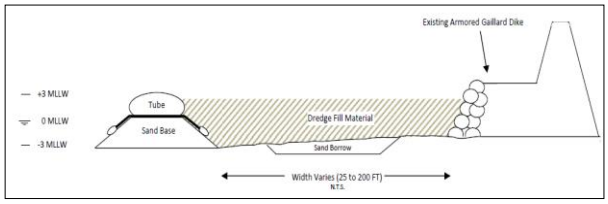
Short-Term Biodegradable Containment Structures for BU Applications

Description

The Mobile District has the responsibility for maintaining the Federally authorized navigation projects throughout its jurisdictional area. In the case of the Mobile Bay Navigation Channel, approximately 3-4 million cubic yards of material is removed at an annual cost of about $12 million. Disposal of this material has become increasingly expensive and problematic given restrictions on dredging equipment, disposal area location, and limited disposal capacity. Beneficial use (BU) of dredged material has become a popular and excepted alternative throughout the Corps' navigation program. In particular, the use of dredged material for creating and restoring environmental resources has been highly promoted as an effective BU alternative. Containment of sediment for these types of applications typically requires some type of berm or permanent structure that may result in undesirable impacts to the local hydrodynamics and environmental resources. The use of a short term biodegradable containment structure may help alleviate this problem while allowing adequate time for the sites to stabilize and become established.

The Mobile District is demonstrating the use of a suitable short term biodegradable structure for shallow water restoration applications. The southwestern corner of Gaillard Island was selected as the site of the demonstration in an area where the shoreline has been eroding. The demo project will cover about 4.5 acres and about 1,500 feet in length. A sand base is being constructed using sandy material from within the project footprint upon which biodegradable geotubes fabricated out of 10 gram jute burlap will be placed. The tubes will be filled using a sand/water slurry to an elevation on +2.5 to +3.0 MLLW. The north end of the containment feature will include a fixed-crest sand weir surrounded with a biodegradable/synthetic turbidity curtain to control the discharge water quality will also be deployed to allow non-destructive removal of the synthetic curtain and flotation components. Several interior sand spur dikes will be constructed using adjacent sand to increase the slurry's retention time allowing more fine grain particles to settle in the site. In the vicinity of the discharge, there will also be a 100% biodegradable turbidity curtain placed across the site to test how the curtain will respond to a high velocity slurry that contains fine grain and sand particles. Once all containment is constructed, the site will be filled with dredge material from the Theodore Ship Channel to an elevation of +2.5 MLLW (approximately 70,000 cy). Existing adjacent vegetation will be transplanted within the filled area.

An adaptive management approach will be utilized in the implementation of the demonstration project during the planning, construction, and monitoring phases. All reasonable efforts will be made to avoid and/or minimize impacts to the natural resources on and around the



project site. The estimated start date of the demonstration is January 15, 2013 with an estimated completion date of February 28, 2013. Monitoring will be conducted to provide an engineering assessment of the project performance.

Issue/Challenges

A recurring problem associated with this type of disposal, particularly for fine grained material, is containment within a disposal site to allow for settlement/consolidation and some level of confinement of the material to minimize potential environmental impacts.

Successes Lessons Learned

The selection of this RSM project is a result of the current dredging and disposal practices in Mobile Bay being an important issue for Mobile District's Operations Division. It is important that an RSM action have a direct benefit to the District's navigation program. The formation of an active interagency working group has been a key component towards identifying the major issues associated with in-bay disposal practices. Regular participation of this group will be a key factor in the success of this program.

Expected Products

Interagency RSM Working Meetings
Tech Note: Use of Temporary Biodegradable Containment Structures
Implementation of a BU project demonstrating short term containment
Draft Article to Shore & Beach

Potential Users

Alabama State Port Authority is Non-Federal Sponsor for the Mobile Harbor Federal Navigation Project. Additionally, the demonstration project is of great interest to other Corps Districts and state and local agencies considering restoration efforts through the beneficial use of dredged material.

Projected Benefits

The effort will establish the channels for interagency collaboration and coordination that will be required for planning and implementing BU opportunities. Having the option of establishing restoration opportunities while utilizing environmentally acceptable containment structures will promote other restoration opportunities that allow for maintaining sediment within its natural system and minimize environmental impacts associated with disposal of dredged material. Implementation of the project will demonstrate the applicability of temporary containment structures for shallow water restoration projects. This application of short term and biodegradable containment may also be applied to other larger scaled applications throughout the Corps' navigation program.

Leveraging Opportunities

This effort will take advantage of the knowledge, experiences, and recommendations gained from the upper Mobile Bay beneficial use coordinations. This effort will leverage additional funds from the District's O&M program and will incorporate the input and technologies as coordinated with the interagency stakeholders and the geotextile industry. Restoration applications using dredged material will contribute to preserving disposal capacity in existing disposal sites. This application of short term and biodegradable containment may also be applied to other larger scaled applications throughout the Corps' navigation program.

Points of Contact

Project Manager: Larry Parson, Coastal Environment Team, Planning and Environmental Division, Mobile District; Phone: 251-690-3139; e-mail larry.e.parson@usace.army.mil

Dredge Material Project Manager: Nathan Lovelace, Operations Division, Mobile District; Phone 251-694-3713; email nathan.d.lovelace@usace.army.mil

Technical Lead: Elizabeth Godsey, Jacksonville District ; Phone: 954-436-9517; email elizabeth.s.godsey@usace.army.mil

Participating Partners

Alabama Dept of Conservation and Natural Resources, State Lands Division
ADCNR, Marine Resources Division
Alabama Dept of Environmental Management
NOAA, National Marine Fisheries Service
Mobile Bay National Estuarine Program
Alabama State Port Authority
U.S. Fish and Wildlife Service
Alabama/Mississippi Sea Grant
The Nature Conservancy