## Focus Area

Dredged Material Management

## Problem

A significant knowledge gap exists regarding sedimentation and movement of sediments placed, especially hydraulically, in shallow water environments. As a result, complete confinement is often presumed necessary to retain fine-grained dredged sediments and meet water quality requirements. Traditional retention structures are expensive and may inhibit important ecological connections. This project will develop a model for shallow water placement of fine-grained dredged sediment that will allow a quantitative evaluation of sediment retention and water quality conditions during placement. The model will allow the effectiveness of confinement designs for thin layer placement that are cost effective, functional, and compatible with ecological restoration to be evaluated.

## Study Description

This research will link physical sediment properties and column settling test results to predict sediment surface profiles and water column TSS concentrations when dredged sediments are discharged into shallow water environments with limited or no confinement. A 2D time-varying, depth averaged flow model will be developed to predict flow patterns associated with hydraulic dredge discharge into a shallow-water environment. Transport and settling properties will be modeled to quantify sediment movement across the TLP area, sediment accretion over time, and suspended sediment concentrations in the water column. The TLP model will focus on the placement site as its spatial domain and the time while dredged material is being actively discharged to the placement site as its temporal domain. Results will provide a starting point for long-term consolidation modeling (e.g. by PSDDF).

## Products

This research project will produce at least 4 products:

- DOER Tech Note and/or Journal Article on design procedures for partial confinement methods.

- Journal article summarizing sedimentation and transport during TLP.

- Computational tool implementing the modeling approach.

- Conference paper/DOER Tech Note on strategic placement for TLP projects.

## Summary

This research project will provide guidance to optimize confinement requirements for TLP projects. A range of innovative retention structures will be tested and guidance provided on their application in lieu of traditional dikes.
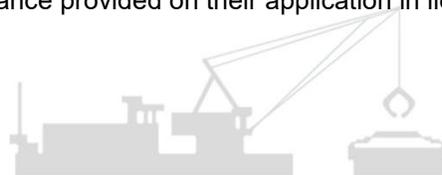
*Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.*