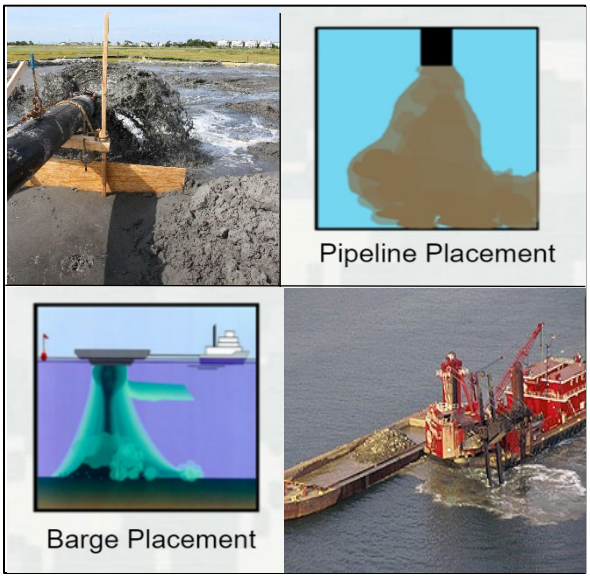
Dredged Material Placement Models for Complex Aquatic Environments

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Focus Area

Sediment and Dredging Processes



Problem

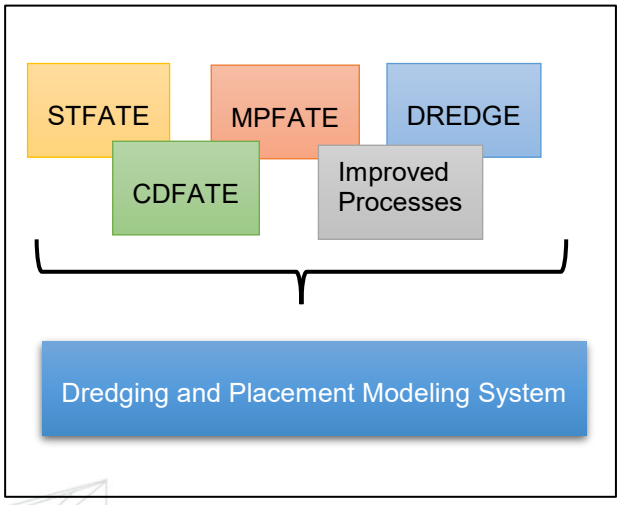
USACE applies a series of dredging models to simulate transport and loss of sediments during placement processes. These models include STFATE, MPFATE, DREDGE and CDFATE. These models were originally developed in the 1980s and early 1990s. Process descriptions and range of applicability are limited due to computational limitations of that era as well as limited understanding of dredged material placement. Understanding has increased significantly over recent decades.

Study Description

This Research Task will develop a single model to replace current dredged material placement models. The new model will simulate dynamics of two-phase flow plume descent, collapse and spreading based on advanced fluid flow numerical models which were not feasible for this type of application when previous models were developed. In addition, the new model will estimate fraction released to the water column during placement and seamlessly feed this information directly to the PTM and GSMB/LTFATE far-field fate and exposure predictions. This single model will not only expand range of model applicability and reduce uncertainty, but can be designed to connect with evolving databases supported by USACE, including sediment properties, and near-real time atmospheric, wave, and circulation data.

Products

- Dredging and Placement Modeling System (DPMS) (v1.0)
- Documentation and Guidance
- Online and In-person Training/Workshop



Summary

The product of this research task will provide a broadly applicable method to evaluate dredging and placement operations within a single user-friendly interface. The model will be able to readily access USACE databases as well as directly generate input required for far-field fate and long-term fate models. District users will no longer require of multiple model interfaces and will not have to post-process data before implementing long-term or far-field models which use dredging model output. Improved physics and process descriptions will improve model accuracy and range of applicability.

Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.

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