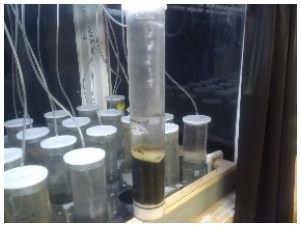
Use of Dredged Material to Facilitate Contaminant Source Control

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Problem



Navigation channels, turning basins, and other U.S. Army Corps of Engineers (USACE) managed navigation infrastructure often serve as repositories for contaminated sediment originating from offsite sources. Approximately 10% of the material that the USACE dredges annually is contaminated to the extent that it requires additional and more costly management (e.g., re-handling and placement in managed confined disposal facilities). Presence of contaminated sediments constrain potential management options resulting in additional costs as well as opportunity loss resulting from the inability to beneficially use the material. One potential solution is the application of clean dredged material to stabilize and isolate contaminated sediment sources preventing further transport and introduction to USACE managed infrastructure.

Study Description

An initial comprehensive literature review was performed to identify an initial set of biophysical parameters and engineering requirements for the successful application of dredged material in stabilizing and isolating contaminated sediment sources under a variety of conditions. Results of the literature review were used to inform design of subsequent bench scale assessments to be conducted with clean dredged material under a variety of environmental conditions to establish the range of conditions and likely engineering controls required for successful implementation.

Products

Results of the literature have been summarized in a technical report titled “Application of Clean Dredged Material to Facilitate Contaminated Sediment Source Control” (Moore et al. 2018, In review). A number of data gaps (e.g., quantifying uncertainty in prediction of post-placement K_d and shear strength, formation of biofilms to increase shear strength, novel engineering technologies to improve placement and consolidation) were identified through the literature review. A bench scale laboratory study evaluating resiliency of thin layer placement of different types of dredged along with a parallel leveraged field effort funded by the US Navy examining efficacy of different dredged material types in reducing availability of sediment associated contaminants are being conducted to address some of these gaps. Findings and recommendations developed from the bench scale and the parallel field effort will be reported in a technical guidance document. The guidance document will provide an overview of the key parameters governing feasibility of the approach and highlight engineering requirements for successful implementation. Results of the bench scale tests will be summarized in at least one peer reviewed publication, “Opportunities and constraints for the application of clean dredged to stabilize and isolate contaminated sediment sources”.

Summary

The goal of this project is to identify the critical biophysical parameters governing the use of clean dredged material to stabilize and isolate contaminant sediment sources and the engineering requirements for successful and cost effective implementation. The application of clean dredged material to contaminated sediment source stabilization/isolation will prevent contaminated sediments from entering USACE managed navigation infrastructure (e.g., channels, turning basins, etc.) potentially yielding significant savings resulting from less costly management requirements. In addition, any reduction in management of contaminated materials in the USACE Operations and Management program will result in reduced long-term environmental liability as a consequence of less material requiring sequestration and management in USACE owned confined disposal facilities (CDFs) and enable a larger percentage of material to be used beneficially.

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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