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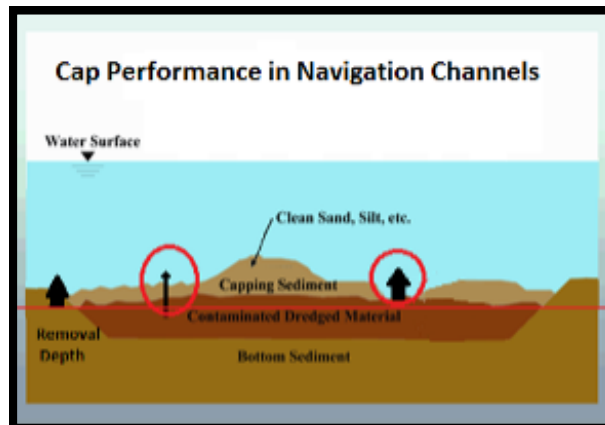
Innovative Capping for Navigation Channels



US Army Corps of Engineers®

Problem

Current designs for capping in or near active waterways often require removal of a large depth of sediment to provide for the thickness of an armored cap with many filter layers while preserving the authorized depth of the channel for navigation, along with a buffer layer to accommodate future maintenance dredging. The opportunity exists to develop innovative capping strategies and materials have the potential to greatly reduce the thickness and costs of capping navigation environs. Specific strategies include mobile caps that would be replenished by the existing bed load; use of geocells to restrict the resuspension by prop wash, limit transport of cap materials, and enhance capture of bed load to replenish the cap; and use of low permeability, cohesive material such as Aquablok® protected by a shallower depth of capping media to reduce/eliminate erosion of the sediment bed. Opportunities also include development of amendment matrices for high energy environments that could be incorporated in these capping strategies as needed.



Study Description

The approach is to perform a literature review to characterize the navigation environs and existing amendment performance, laboratory testing to establish the performance range of materials being considered for use in mobile caps, and modeling to evaluate effectiveness of mobile cap alternatives. Research tasks will test innovative concepts for design/development of mobile caps that rely on amendments, bed load and erosion controls to 1) refresh the cap and maintain chemical isolation, 2) reduce and maintain low dissolved contaminant concentrations and 3) restore or preserve physical isolation (potentially aided by a cohesive liner or geocell to limit scour depth). Objectives of this research include demonstration that amendments placed in mobile caps could offset the effects of prop wash on cap performance by sequestering the contaminants mixed into the cap. Development of new forms of amendments or matrices that are less mobile and identification of amendments or matrices that achieve these objectives will be performed in this research project.

Products

The products of this study will include technical guidelines for the evaluation, design and implementation of mobile caps for navigation regions with or without amendments. Additional products of this study could be joint business ventures and patents.



Summary

Current capping designs for these high energy sites often require removal of a large depth of sediment to provide for the thickness of an armored cap with many filter layers to preserve the authorized depth of the channel for navigation. A tool to address the effectiveness of a thinner, mobile cap and guidance for design and implementation of these thinner caps will help the public and regulatory agencies maintain their trust in the capping technology resulting in greater acceptance of projects by environmental groups.



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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