

Engineering With Nature

Project Fact Sheet



Title

Evaluation of Bioaccumulation Control in Aquatic Sites Using Activated Carbon

Background

Sediments in the urban harbors often exhibit elevated levels of PCBs bioaccumulation, limiting their suitability for beneficial use or placement in aquatic sites. Amendment of dredged material in the bioactive zone with activated carbon has the potential to provide bioaccumulation control, permitting expanded use of aquatic placement where CDF capacity is being exhausted. Prior to this study, an application of activated carbon in a conventional mechanical dredging operation has never been demonstrated in a navigation dredging project.



Placement of activated carbon into a barge of mechanically dredged material.

Objectives

Demonstrate effectiveness of activated carbon in managing PCBs bioaccumulation from dredged material placed in open water. Demonstrate that implementation can be performed within the normal dredging operation using conventional equipment available in a navigation dredging project. Gather information on dispersion of both powder and granular activated carbon during placement, spreading of diluted dredged material, and coverage of dredged material mound. Evaluate dosage screening protocols for design.



Mixing of dredged material with activated carbon in dump scow.

Approach

The general scope of work consists of 1) characterizing the chemical and physical properties of several sediments and their corresponding bioaccumulation with and without application of activated carbon, PAC and/or GAC; 2) sampling amended dredged material from a mechanical dredging operation performed at Ashtabula, OH to characterize activated carbon content, placement losses and distribution, and to evaluate the efficacy of mixing operations; and 3) examining reduction in bioavailability by passive pore water sampling and bioaccumulation testing for several fine-grained sediments to evaluate design dosage protocols.

Outcomes

Efficacy of In-Barge Mixing Conference Paper	March 2016
Bioaccumulation Control at Open Water Placement Site Conference Papers	January 2017
Potential Activated Carbon Losses during Placement Technical Note	November 2017
Ashtabula Bioaccumulation Control Demonstration Technical Report	December 2017
Activated Carbon Dosage Requirements Technical Note	January 2018
Bioaccumulation Control at Dredged Material Placement Sites Journal Paper	May 2018

Point of Contact: Paul R. Schroeder

Paul.R.Schroeder@usace.army.mil

601-634-3709