



Preliminary Risk-Based Guidance for the assessment of PFAS in Dredged Material

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

Focus Area

Risk management



Problem

A number of states have developed state water quality standards for PFAS and a few have initiated efforts to establish levels for biosolids, soils and sediments based on limited information. Consequently, many USACE Districts have an urgent need to understand fate and effects of PFAS in dredged material to respond to anticipated request from States relating to 401 Certifications for aquatic placement of dredged material. Interpretive guidance for the assessment and management of PFAS in sediment, surface water, and dredged material is urgently needed so that Districts have a technically sound and defensible basis for responding to the presence of PFAS in dredged materials. Measurable levels of PFAS were present in every sediment sample evaluated in a recent preliminary survey of 26 representative sediments and dredged materials collected throughout the US. However, these measurable concentrations do not necessarily pose an unacceptable ecological or human health risk. An understanding of the bioavailability and ecotoxicity of these sediment-associated PFAS constituents is required to determine whether there is potential risk and what sediment concentrations warrant further analysis/action.

Study Description

This three-year effort will start with a comprehensive literature review (year 1) to summarize available relevant information on potential bioavailability and risk posed by sediment-associated PFAS. Beginning in the latter half of year 1 and continuing into year 2, a series of laboratory studies will be conducted using representative freshwater and marine sediments to 1) conduct toxicity and bioaccumulation tests to determine the potential for adverse impacts potential of PFAS to the benthos and to higher-trophic-level biota in the aquatic food webs, and 2) prepare sediment elutriates for biological and chemical testing to determine the potential for adverse impacts to the water column. These studies would involve selection of 2-3 marine/estuarine field-collected sediments and 2-3 freshwater field-collected sediments containing elevated levels of PFOS and PFOA (as well as other PFAS constituents of concern) for adverse effects assessment employing standard biological and chemical tests. Beginning in year 3, a subset of these sediments (e.g. 2-3) will be selected for a follow-on study evaluating effectiveness of potential treatment options. Treatments will include application of loose activated carbon and zeolite powders in comparison to 3D printed deployable devices consisting of composites of the AC and zeolite. A zeolite form that supports substantial adsorption of PFAS compounds will be used.

Products

Results of the PFAS toxicity, bioaccumulation and treatment studies will be published in the peer reviewed literature for broad dissemination. In addition, critical findings and resulting recommended interpretative guidance and management approach will also be published in a technical note. Results will also be communicated via technical presentations at international conferences such as the Society of Environmental Toxicology and Chemistry (SETAC) conference, the Western Environmental Dredging Association conference and PIANC.

Summary

Interpretive guidance for the assessment and management of PFAS in sediment, surface water, and dredged material is urgently needed so that Districts to address the presence of PFAS in dredged materials. A series of laboratory studies will be conducted using representative freshwater and marine sediments to determine the potential for adverse impacts potential of PFAS to the benthos and to higher-trophic-level biota in the aquatic food webs. We will also conduct an evaluation of the effectiveness of potential treatment options for sediment-associated PFAS.



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