



Quantifying Variability/Uncertainty in Lab Based Bioaccumulation Tests

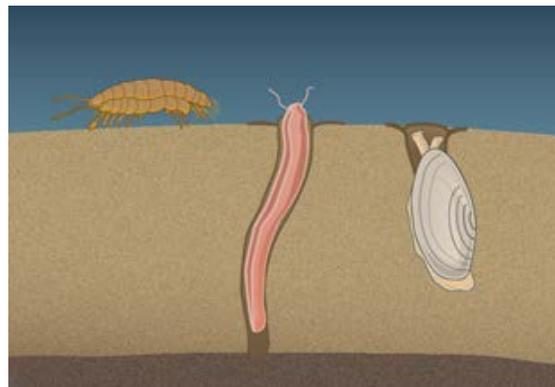
Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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Problem

Dredged material bioaccumulation tests are a critical component of tier III dredging evaluations utilized under both the CWA and MPRSA. These tests are designed to enhance the ability to detect statistical differences in tissue residues in organisms exposed to dredged and reference material for purposes of establishing how the material maybe managed (e.g., open water disposal, placement in a confined disposal facility, etc.). However, simple statistical differences can in some instances be an artifact of the test as opposed to an accurate reflection of meaningful differences in contaminant uptake. Simple statistical differences often do not equate to meaningful, biologically relevant ones, therefore it is important to understand the role of variability associated with experimental design (exposure and analysis) and provide guidance to ensure appropriate expenditure of resources for additional analysis and interpretation only in those instances where a meaningful, biologically relevant, difference has been established. Understanding the variance associated with bioassay test system (both within test and analytical) is critical for accurately assessing potential bioaccumulation risks of dredged material. Although many labs have demonstrated capability to conduct bioassays using recommended species and many chemistry labs have demonstrated capability to the quantify concentrations in tissue samples, the inter-laboratory variability associated with the conducting the bioassay and quantifying body residues for those species has never been determined. Understanding this variability is critical to establishing when differences in tissue residues of reference and project material exposed organisms warrant further, more expensive evaluation to ascertain the appropriate disposition of the material for purposes of placement/management.



Study Description

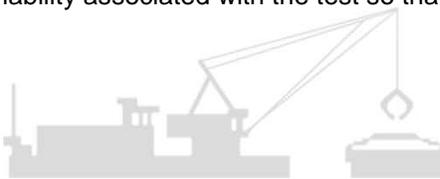
This project will quantify variability inherent to bioaccumulation bioassays and chemical analysis of the tissue samples they generate. Knowledge of such variabilities will allow the consideration of uncertainty associated with meaningful exposure risk relating to bioaccumulation of contaminants from dredged material.

Products

Results of an inter-laboratory bioaccumulation study will be summarized and published in the peer reviewed literature. In addition, critical findings and resulting recommended interpretative guidance will also be summarized in a technical note. Ultimately guidance based on this work will be incorporated into updated version of the testing manuals and disseminated to the field via training seminars.

Summary

Improved interpretative guidance better enabling discernment of meaningful differences in bioaccumulation test results will streamline dredged material assessments and reduce unnecessary expenditure of resources when it is not warranted. The proposed work will establish variability inherent to the bioaccumulation test and enable development of improved interpretative guidance that accounts for variability associated with the test so that biologically meaningful differences can be established.



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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