Characterization of Biological Effects of Open Water Placement Sites

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Focus Area

Environmental Resource Management

Problem

Dredged sediments are frequently placed at specified open water ("disposal") sites in national inland and marine waters. Site selection is rigorously informed by data indicating significant adverse environmental effects are unlikely. However, any potential positive environmental effects of these sites are typically not considered. Placement of dredged sediment at these sites creates new bathymetric relief relative to the surrounding bed and can influence local ecology. The hypothesis guiding ongoing research posits that placing dredged sediments of sufficient quality in areas with similar sediment characteristics according to promulgated guidelines can either enhance the ecological quality of the lake or seabed, or at the very least, fulfill the original objective of not adversely affecting the environment. This hypothesis, rooted in preliminary observations, seeks to lay the groundwork for evidence-based dredged sediment management practices, underscoring the critical role of long-term environmental monitoring in definitively assessing impacts.

Study Description

This research effort proposes collecting multiple lines of evidence to identify potential environmental effects of bathymetric relief created by the open water placement of dredged sediment. These would include (i) data mining and literature review of existing relevant data sets, (ii) physical, chemical, and biological characterization of the placement sites as compared to reference sites, and (iii) use of the data and monitoring results to model the resulting differences in fish population dynamics and aquatic community health at open water placement vs. reference sites.

Products

- Journal article summarizing results of data mining and literature review efforts
- Monitoring plan
- Journal article reporting monitoring results
- Technical note presenting ecological model and modeling results
- Journal article and Technical Report summarizing literature and data review, monitoring results and ecological modeling output

Summary

This research will be conducted by collecting multiple lines of evidence, including

- Engagements with resource agencies.
- Data mining and literature review.
- Physical characterization of open water placement sites.
- Monitoring of fish behavior near open water placement sites.
- Modeling of ecosystem benefits compared to reference sites based on data collected.

If positive long-term environmental effects are identified in association with traditional open water placement of dredged sediment, the management of dredged sediment will become more cost effective and efficient. Moreover, this would provide a scientifically sound basis to inform and optimize the management of dredged sediment at open water sites to further enhance and benefit the aquatic ecosystem.

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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Research Products

Product Type	Product Title
Presentation	From Disposal to Beneficial Use: Key Factors Influencing Fish Habitat Following Open Water Placement. Presentation to Western Dredging Association Dredging Summit and Exposition, June 2024.
Journal Article	McQueen, A. D., Hayhurst, B., Pickard, S., Wilkens, J., & Keil, K. (2025). Focused Review of Factors Influencing Fish at Underwater Features Created with Dredged Sediments: Path Toward Expanding Beneficial Use? Integrated Environmental Assessment and Management, vjaf152. https://doi.org/10.1093/inteam/vjaf152
Data Mapper	Great Lakes DOER OWP Data Layer

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