



# Improving Aquatic Placement Practices for Beneficial Use of Dredged Material in the Great Lakes

## Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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### Focus Area

Sediment and Dredging Processes

### Problem

Nearshore placement of dredged sediment on the open coast is increasingly becoming the preferred option to other placement alternatives in the Great Lakes (confined disposal or open water placement) due to changes in policy or other factors. Nearshore placement offers a myriad of benefits including shoreline protection, habitat restoration opportunities, and social benefits; however, numerous design and engineering challenges remain to successfully achieve these outcomes in the face of climate change. USACE currently needs updated tools, approaches, and guidelines for achieving these desired engineering goals (i.e., slope and dimensions) and environmental management objectives during and after nearshore placement (i.e., achieving desired turbidity goals, elevation profiles, and plant communities), particularly in the Great Lakes. Therefore, there is a critical need to identify proof-of-principle designs for sediment management as nature-based solutions to support nearshore placement of dredged sediment to enhance future beneficial use of dredged material opportunities. The impacts of turbidity during nearshore placement should be put into context of natural turbidity-generating processes. This would support the design and stakeholder/partner approval of innovative nearshore placements which utilize natural features which may not sequester sediments in the same manner as hardened engineered structures.

### Study Description

The primary objective is to develop innovative engineering designs and features for sediment management to support nearshore placement operations. This research task will build on lessons learned from other pertinent USACE nearshore placement projects (e.g., 21<sup>st</sup> Avenue West, Duluth-Superior Harbor, Illinois Beach State Park). Nearshore sediment management techniques will be evaluated based on numerous performance criteria, including scalability, efficacy, and cost. Extensive monitoring of turbidity before, during, and after nearshore placement of dredged sediment near Fairport Harbor Ohio in Lake Erie will be used to evaluate the turbidity generated from dredged material placement in conjunction with natural sediment transport processes taking place over the same duration.

### Products

- Technical Report surveying existing dredged material management approaches, identifying opportunities and limitations associated with engineered vs. natural and nature based features (NNBF).
- Journal Manuscript presenting the extensive turbidity monitoring recently conducted at Fairport Harbor, Ohio, and providing discussion of numeric models to support proof-of-principle design options in various nearshore freshwater environments in Great Lakes and elsewhere.
- Presentation of findings to the Great Lakes Dredging Team.

### Summary

This research would aid USACE by removing the ambiguity and uncertainty regarding nearshore placement opportunities and approaches in freshwater systems. It would complement and build upon recently completed USACE-ERDC research exploring nearshore placement techniques. By leveraging prior Great Lakes ecosystem restoration projects and supporting future projects, the outcomes of this research task would have wide-reaching benefits not only to the USACE but also numerous state and federal resource management agencies and stakeholders.



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

