The ERDC Environmental Laboratory submits Review of Factors Influencing Fish Near Open Water Placement of Dredged Material Sites: Path Toward Sustainable

This effort supports evaluation of bioeffects at open-water placement (OWP) sites in the Great Lakes, exploring how dredged material might enhance habitat complexity and provide substrate for lower trophic-level productivity. If validated, these ecological benefits could position OWP as a form of beneficial use, aiding USACE's goal of achieving 70% beneficial use by broadening reuse options across the Chicago, Detroit, and Buffalo Districts. Points of contact for the effort are David Schulenberg and Melissa Bosman. The project also aligns with efforts to support fish production via enhanced food-web support.

Additionally, on May 19, 2025, Dr. Andrew McQueen, ERDC-EL research biologist, submitted a manuscript to Frontiers in Ecology and Evolution (section: Conservation and Restoration Ecology). Co-authors include Brett Hayhurst, Justin Wilkens, Karen Keil (emeritus), and Scott Pickard (USACE Buffalo District). Their work reviews factors influencing fish communities at OWP sites and characterizes potential environmental benefits from bathymetric relief created by dredged sediment, with implications for improving dredging cost efficiency.

There is a growing recognition that sediments dredged to maintain navigation and port infrastructure are valuable resources that can be placed in the aquatic environment to achieve ecological benefits if managed appropriately. However, specific interactions and long-term influences of placement on local aquatic ecosystems, particularly fisheries, remain to be fully explored. Therefore, the aim of this research is to conduct a literature review to identify and synthesize key factors influencing the outcomes of open water placement (OWP) of dredged sediments on fish habitat. Emphasizing ecological, biological, and artificial habitat perspectives, the review explored historic OWP techniques, their habitat alterations, and identified reported physical, chemical, or biological factors that influence fish. Results from this review suggest that OWP can in many cases positively influence factors that would benefit fisheries over time. Notable factors include changes to the physical benthic habitat structure, including upwelling currents and velocity shelters, structure for cover and refuge, and greater productivity in opportunistic benthic infauna. Knowledge of these factors can improve understanding of the complex interactions between OWP dredged sediment management practices and fish habitat to inform future research needs and improve approaches for designing field-based surveys, toward the goal of developing effective and sustainable dredged sediment management strategies that enhance aquatic ecosystems.

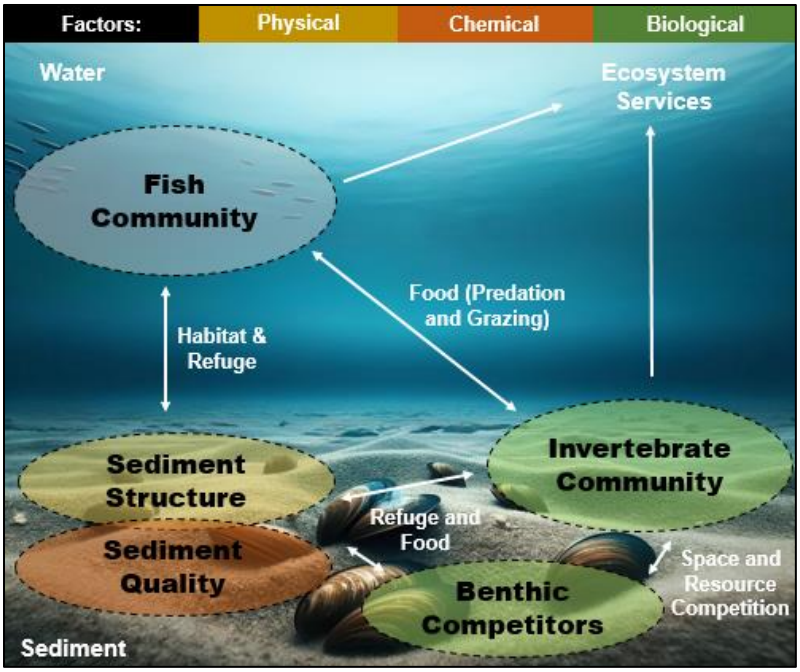

Figure 1. Conceptual model of the literature review organization focused on physical, chemical, and biological factors associated with dredge placement in open water environments.

Funding for this study was provided by the USACE Dredging Operations and Environmental Research (DOER) Program through the Environmental Resource Management Focus Area.

PoC: Brett Hayhurst Brett.Hayhurst@usace.army.mil, ERDC Environmental Laboratory (EL)