

Journal Article Documents Successful Sustainable Dredging and Sediment Beneficial Use (BU) Practices in Riverine Environments

Impact Statement: ERDC Environmental Laboratory (EL), Coastal and Hydraulics Laboratory (CHL), and USACE Huntington District (LRH) published a collaborative research paper presenting results from a 20-year monitoring effort to document successful sustainable dredging and beneficial use practices to achieve multiple benefits along the Ohio and Kanawha Rivers.

To move toward more sustainable dredging practices, there is an inherent need to expand applications for beneficial use of sediments and broaden the desired social, environmental, and economic services provided. Additionally, USACE is currently targeting an increase in Beneficial Use of Dredged Material (BUDM) to 70% from the current 30-40% by 2030 (i.e., the “70/30” goal). However, there are challenges to overcome to increase beneficial use of sediment in riverine environments beyond current levels. Over the past several decades, the US Army Corps of Engineers (USACE) Huntington District (LRH) has utilized BUDM to achieve numerous environmental, social, and ecological benefits; consistent with Engineering With Nature[®] (EWN[®]) principles.

ERDC researchers Drs. Andrew McQueen and Burton Suedel of the ERDC Environmental Laboratory (EL) collaborated with Drs. Kathleen Harris, David May, and Autumn Murry of the ERDC Coastal and Hydraulics Laboratory (CHL) and LRH (Blake Chadwick, Andy Johnson, Jamie Sunderland, David Johnston, and Jeremy Whipkey) to develop a paper titled “Sustainable Dredging Practices Produce Multiple Benefits on the Ohio and Kanawha Rivers”. The paper provided over 20 years of environmental monitoring data demonstrating the economic, environmental, and social benefits of sustainable practices used by LRH’s dredging program (Figure 1).

The case studies presented in this paper demonstrate practices in riverine environments that apply principles of sustainable dredging and EWN by leveraging natural processes, producing efficiencies, broadening benefits, and intentionally and meaningfully engaging science-based collaboration to achieve shared goals. Data and lessons learned from these projects can be applied elsewhere to enhance development of USACE sustainable dredging practices, inform data gaps in riverine projects with the goal of achieving increased sediment beneficial use, and provide inspiration for future projects.

Funding for this project was provided by the USACE Dredging Operations and Environmental Research (DOER) Program.

This research address USACE Statement of Need (SoN) 1629: “Sustainable Dredged Sediment Management Practices that Promote Keeping Sediments in Riverine Systems”.

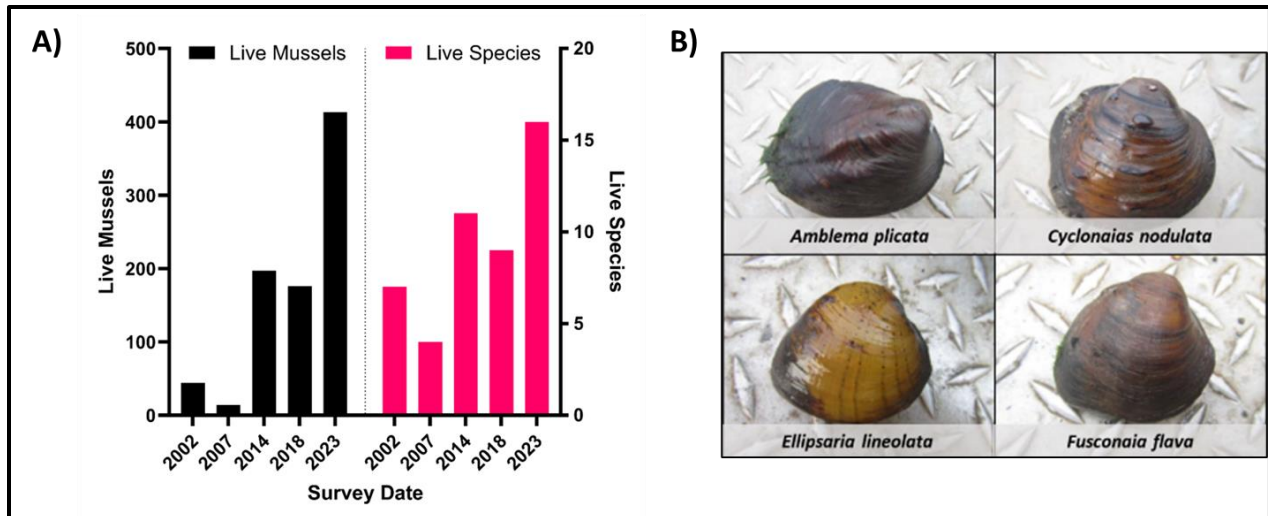


Figure 1. (A) Trends in mussels (2002–2023) present near dredging placement locations on the Kanawha River where sustainable dredging practices have targeted offsetting or improving mussel bed habitats and an improvement of total number of live mussels present with species diversity. (B) Photographs of select native mussels observed at study locations.

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Link to article:

http://www.westernredging.org/index.php?subid=11986&option=com_acymailing&ctrl=url&urlid=3142&mailid=1088

- McQueen, A. D., B. C. Suedel, K. E. Harris, A. S. Murray, D. P. May, C. B. Chadwick, A. N. Johnson, J. L. Sunderland, D. L. Johnston, and J. T. Whipkey. 2024. Sustainable Dredging Practices Produce Multiple Benefits on the Ohio and Kanawha Rivers. *WEDA Journal of Dredging*. 21(1). 26-46 p.

Upper Mississippi River System (UMRS) Riverine Aquatic Sediment Placement Workshop

Impact Statement: The Riverine Aquatic Sediment Placement Workshop was supported by the USACE Dredging Operations and Environmental Research (DOER) Program, Research Task (RT) 22-02 “Riverine Placement”, to explore beneficial use of dredged material in aquatic environments in the Upper Mississippi River System (UMRS) 9-ft channel project in the USACE St. Paul District (MVP), Rock Island District (MVR), and St. Louis District (MVS). More than 30 participants from the US Fish and Wildlife Service (USFWS) and state natural resource agencies gathered at MVP offices 24-25 January 2024. The workshop identified potential opportunities and risks related to aquatic placement, and methods to reduce these risks. Participants appreciated an opportunity to share ideas in an open forum.

The USACE Dredging Operations and Environmental Research (DOER) Program, Research Task (RT) 22-02 “Riverine Placement”, has supported several Beneficial Use of Dredged

Material (BUDM) investigations in the Ohio and Upper Mississippi Rivers. The Upper Mississippi River System (UMRS) Navigation Operations managers are particularly challenged by a lack of areas to place and store dredged sediment, so aquatic placement in renewable sites or beneficial structures can increase BUDM opportunities and keep sediment in the system. Chuck Theiling, ERDC Environmental Laboratory (ERDC-EL), led the UMRS Riverine Aquatic Sediment Placement Workshop during 24-25 January 2024 with Megan McGuire, USACE St. Paul District (MVP), facilitating the meeting (Figure 1). Burton Suedel (ERDC-EL), Delta Newman (ERDC-EL), and Ben Emery, ERDC Coastal and Hydraulics Laboratory (ERDC-CHL), supported break-out groups and helped gather and disseminate information.

Bre Popkin, USACE Rock Island District (MVR), and Daniel DeVaney, MVP, reviewed Corps dredging history, policy, and practices in the 3 Upper Mississippi River (UMR) Districts. Burton Suedel introduced Engineering With Nature[®] (EWN[®]) and Natural and Nature-Based Features (NNBF) BUDM concepts from other river systems as examples of the outcomes that can be achieved. Chuck Theiling introduced the types of aquatic placement that have been or could be used in different river reaches to achieve specific outcomes. Understanding sediment transport in different locations within navigation pools and in different seasons of the years was an important point to emphasize. Some sites are predictable and renewable on a frequent basis, but agencies expressed concern that some sites accumulate sediment over repeated use. The conversation was an introduction to a conceptual modeling exercise to identify impacts of sediment placement on ecosystem structure and function. A common impact-stressor-outcome model used previously on the UMRS was used to identify affected metrics in the USACE Ecosystem Goods and Service Framework as incorporated into the Beneficial Use Comprehensive Benefits Calculator (DOER RT 24-04).

The second day of the Workshop started with a review of the impacts identified on conceptual models and research about aquatic placement. The session was a free-flowing conversation that identified preferred placement activities and those to be avoided. It led well into the final breakout session using an ArcGIS platform to identify project opportunities for specific locations in each District. The Workshop concluded with closing comments that highlighted the importance of having an open forum and non-programmatic conversation which freed participants to think freely. A proceedings document will be developed to document the Workshop.

Funding for this research is provided by the USACE Dredging Operations and Environmental Research (DOER) Program, Research Task (RT) 22-02 and RT 24-04.

This research addressed Statement of Need (SoN) 1629: “Sustainable Dredged Sediment Management Practices that Promote Keeping Sediments in Riverine Systems”.

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