

DOER supports Bedload Sediment Collector High Flow Implementation Study, Eau Claire River

Impact Statement: ERDC Environmental (EL) and Coastal and Hydraulics Laboratory (CHL) scientists installed and evaluated a 12-ft bedload sediment collector with partners in USACE St. Paul District (MVP) and Lake Altoona District (taxing district) 11-14 March 2024.

Environmental conditions allowed detailed entrainment analysis with fisheries biologists on site to observe and confirm that the technology does not have suction at the intake which might impact larval fish. A 30-ft version of the technology will be tested next at this site over 2 - 3 years and the 12-ft unit will move to other rivers.

Chuck Theiling, ERDC Environmental Laboratory (EL), acquired and tested a bedload sediment collector system in FY23 with local partners from Lake Altoona District (taxing district) and USACE St. Paul District (MVP), Channel Maintenance. The Lake Altoona District is a taxing entity established to manage the Lake that has been aggressive combating sedimentation. They (Lake Altoona District) have had several past dredging events and regular mechanical dredging of 30,000 – 60,000 cu yd the last 3 years and will into the future. They spend >\$300,000 for reservoir sustainability and have entered into a Planning Assistance to States (PAS) sediment study with MVP which connected them to ERDC and concepts for passive sediment collection to augment or replace dredging for much lower cost. A series of fortunate events resulted in ERDC acquiring the 12-ft mobile test collector and their acquisition of a 30-ft collector with material handling system. These initial pilot studies are intended to demonstrate the technology and provide sediment collection rate estimates for larger systems.

Spring 2024 testing planned in coordination with Zach Tyler, ERDC Coastal and Hydraulics Laboratory (CHL), was timed around anticipated snowmelt and Wisconsin Department of Natural Resources (DNR) restrictions for working in rivers during the walleye spawning season starting 15 March to 15 May. The DNR requested we install it before the window and minimize activity in the river during the sample period we anticipated would end before 29 March depending on flow conditions. The objective was to install at ice-out as snowmelt increased river flow over 1-2 weeks of quantitative sampling to create a sediment collection rating curve. We also redesigned the collector system during January 2024 with support from the MVP Fountain City Service Base by mounting the pumps and collector on a rigid steel frame and rigid hoses (Figure 1).



Figure 1. Bedload sediment collector being installed in the Eau Claire River, Wisconsin, 12 March 2024.

The implementation went extremely well (Figure 2) with support from MVP Channel Maintenance who helped build the frame and mount the collector, supported transportation and installation, and provided a full dive team to evaluate placement on the river bottom and film its operation. A contract excavator moved the equipment around the site and dredged a hole in the river to place the collector. The manufacturer, Streamside Systems, provided site support and information about the 30-ft unit. Lake Altoona District provided local support, media coverage, and coordinated a community development grant of \$800,000 to help install the 30-ft collector. An ACE-IT video specialist documented the activity and ERDC Corporate Communications will produce video documentation.



Figure 2. Bedload sediment collector site in the Eau Claire River, Wisconsin, 12 March 2024. The generator runs the pumps through a control panel. The large sediment separation tanks are for quantitative analysis to assess sediment collection rate for a given river flow, with the objective sampling the full anticipated range of flows.

The project did suffer from the weather for the “high flow” test. There was zero snow runoff in Wisconsin and flow was lower than prior “low flow” sampling, so sediment was not moving. Making the best of things, the lake-like conditions were ideal for dye tracer testing to evaluate larval fish entrainment potential. Tracer dye stayed suspended in a ball above the sediment collector intake grates with no evidence of suction into the system. A Wisconsin DNR fisheries biologist watching the test on video from the diver helmet cam was quite impressed and will allow the system to run, with monitoring, through the spawning season when sediment transport is highest, and the technology works best.

The project garnered significant local interest with visits from the entire Lake Altoona District Board (Figure 3), Eau Claire County administrators, aides for Representative Derrick Van Orden and Senator Tammy Baldwin, and three media outlets. The local support for innovations in sediment management is strong, with many other Wisconsin lakes facing similar challenges.



Figure 3. Lake Altoona District Board, Streamside, and ERDC inspect the 30-ft collector that ran for 3 years in the Cuyahoga River before being donated. We are standing on the collector, and the yellow box is the first step in a sand-water separating system that retains sediment in the placement site and returns water to the river.

Funding for this project is provided by the USACE Dredge Operations and Environmental Research (DOER) Program, Project 24-11, Evaluating Bedload Sediment Collectors to By-Pass Shoaling Sediment.

This research addresses Statement of Need (SoN)1854: “Evaluating Bedload Sediment Collectors to By-Pass Shoaling Sediment”, submitted by USACE St. Paul District (MVP) Channel Operations.

Media:

1. Lake Altoona Sees Latest in U.S. Army Corps of Engineers Sediment Collecting Testing
https://www.wqow.com/video/lake-altoona-sees-latest-in-u-s-army-corps-of-engineers-sediment-collecting-testing/video_76b09d55-64ce-51fb-b635-cea1a702439a.html
WQOW-TV (WI) - 3/12/2024

2. Sediment Collector Test Starts, District to Receive \$800,000

https://www.leadertelegram.com/country-today/country-life/country-life-news/sediment-collector-test-starts-district-to-receive-800-000/article_950b9f38-e205-11ee-bc26-33e6f1da7b4b.html

Leader-Telegram (WI) - 3/12/2024

3. Sediment Collector Up and Running on Lake Altoona

<https://www.weau.com/2024/03/12/sediment-collector-up-running-lake-altoona/>

WEAU-TV (WI) - 3/12/2024

4. Sediment Collector Proves Successful

<https://www.weau.com/2024/03/15/lake-altoona-sediment-collector-proves-successful/>

WEAU-TV (WI) – 3/15/2024

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ERDC Coastal and Hydraulics Laboratory (CHL) Researchers Participate in USACE Headquarters Workshop on Inclusion of Comprehensive Benefits from Beneficial Use of Dredged Material (BUDM) in Relation to the Federal Standard

Impact Statement: The Water Resources Development Act (WRDA 2020) Section 125 has directed the Corps to maximize the Beneficial Use of Dredged Material (BUDM) of water resource projects. In anticipation of potential policy and standard practice updates, this workshop intends to develop a framework for guidance to the field to bring dredging projects in all USACE Districts in line with the Corps' 70% BUDM by 2030 goal.

During 12-13 March 2024, Ben Emery and Anna Godfrey, both of the Coastal Engineering Branch (CEB) of the ERDC Coastal and Hydraulics Laboratory (CHL), attended a Federal Standard and Comprehensive Benefits Workshop at USACE HQ in Washington, D.C. The meeting was hosted by HQ Navigation, and facilitated by Dr. Katie Brutsché, Beneficial Use of Dredged Material (BUDM) Program Manager; and Kate Skelton, Coastal Navigation Program Manager. Other attendees representing HQ Navigation, HQ Planning, Regional Sediment Management Regional Center of Expertise (RCX), USACE South Atlantic Division (SAD), and USACE Institute for Water Resources (IWR) were present (Figure 1).

The overall purpose of this working meeting was to discuss benefit offset to increased costs of Beneficial Use of Dredge Material (BUDM) as directed in the Water Resources Development Act (WRDA 2020) Section 125. The discussion was focused on inclusion of comprehensive benefits provided by beneficial use projects and how these relate to the Federal Standard. The discussions and outcomes from this workshop will help inform future policy and guidance on BUDM. Addressing budgetary constraints and planning, the team is creating a path forward to meet the goal of 70% of beneficially used sediment by the year 2030.



Figure 1. Working Group team members attending the Workshop on Inclusion of Comprehensive Benefits from Beneficial Use of Dredged Material (BUDM), with USACE General Spellmon.

Funding for participating in the Workshop on Inclusion of Comprehensive Benefits from Beneficial Use of Dredged Material (BUDM) in Relation to the Federal Standard was provided by the USACE Dredging Research Programs.

This Workshop did not address any specific USACE Statement of Need (SoN). It did, however, fully support the Technical Support Mission of the USACE Dredging Program.

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ERDC and the U.S. Forest Service (USFS) Collaborate in the Fire and Smoke Model Evaluation Experiment (FASMEE)

Impact Statement: Cooperation between ERDC and the U.S. Forest Service (USFS) permits unprecedented measurement and data collection opportunities for the USACE Post-wildfire Flood Risk Management Program team in planned, large, stand-replacing fires. The project allows for sampling catchments pre- and post-fire under known fire conditions to improve USACE flood, sediment, debris flow modeling for emergency response and long-term recovery, and improve risk assessment for installation and water resource planning and management under changing climate and societal conditions.

One of the difficult aspects of wildfire research—like other disaster events—is the lack of prior knowledge about when and where a wildfire will occur as well as the intensity and extent of the fire. The U.S. Forest Service (USFS) has initiated the Fire and Smoke Model Evaluation Experiment (FASMEE) in which large, stand-replacing, high intensity prescribed burns approximating wildfires are planned, ignited, and controlled by trained USFS personnel. Figure 1 is an example of a FASMEE fire at Fishlake National Forest, Utah, October 2023. FASMEE is a nationwide, multiagency effort that identifies and collects critical measurements that will be used to advance fire and smoke science and modeling capabilities, improve firefighting strategies, enhance smoke forecasts, and better assess carbon stores and fire-climate interactions (Figure 2). FASMEE also provides unparalleled opportunities to introduce new technology in the largest coordinated fire project in the U.S. to date. Focus areas include the Western U.S. and the Southeastern U.S.



Figure 1. Day 1 of the Fire and Smoke Model Evaluation Experiment (FASMEE) fire at Fishlake National Forest, Utah, October 2023.

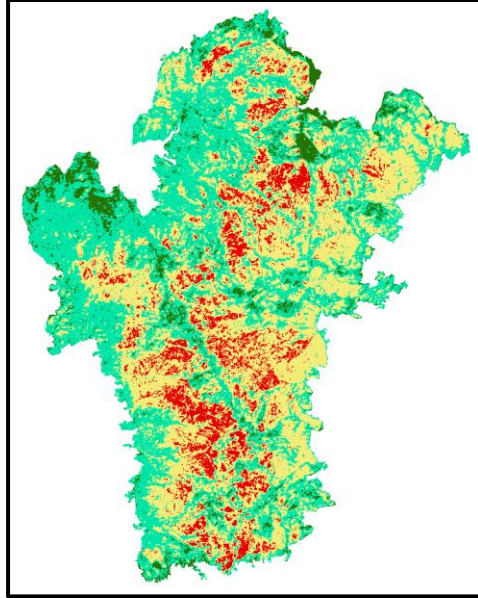


Figure 2. Example of a soil burn severity map used in post-fire modeling to represent fire effects on the landscape. Including geolocation data, this is the only representation of a wildfire available for modeling.

On 6 March 2024, Dr. Adam Watts (USFS), Director of FASMEE visited the ERDC campus in Vicksburg, MS, while scouting future fire sites. The visit was hosted by Dr. Rose Shillito and Dr. Ian Floyd, members of the ERDC Post-Wildfire Flood Risk Management (FRM) Program. After meeting with CHL Director Dr. Ty Wamsley and meeting with the entire Post-wildfire FRM team, Dr. Watts appreciated the real, immediate, and long-term applications of wildfire research currently underway by the ERDC team and welcomed the collaboration.

Funding for this research is provided by the USACE Post-Wildfire Flood Risk Management Program by a Congressional Add.

This research does not address a specific USACE Statement of Need (SoN). It does, however, support the Technology Support Mission of the USACE Post-Wildfire Flood Risk Management Program.

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