

## **Sediment Management Work Group Workshop on Beneficial Use of Contaminated Sediments**

*Impact Statement: ERDC cohosted a Workshop, in collaboration with industry, on the treatment and management of contaminated sediments to enable expanded opportunities for beneficial use. The Workshop brought together technical experts and other key regulatory and resource trustee stakeholders to identify critical research needs and important policy, and legal and regulatory considerations.*

Dr. David W. Moore (ERDC Environmental Laboratory [EL]) helped organize and lead a Workshop on the treatment and management of contaminated sediments to support expanded beneficial use opportunities. The Workshop was sponsored by the Sediment Management Work Group (SMWG), a coalition of private companies. It was held in collaboration with the USACE ERDC as part of a public/private partnership (PPP) initiative launched in 2023 supporting research and development of technologies for the treatment and management of contaminated sediments to enable beneficial use. The 2-day Workshop held 26-27 March 2024 in Washington, D.C., focused on high priority research and policy needs relating to the treatment and management of contaminated sediments to enable expanded opportunities for beneficial use. The Workshop included an overview of ongoing projects funded under the FY23 public/private partnership initiative as well as other direct funded research supported through the USACE Dredging Operations and Environmental Research (DOER) Program. Topics included expert panel discussions on technology needs for treatment and management of contaminated sediments, application of decision-support tools (Net Environmental Benefits and Life-Cycle Cost Analysis), and regulatory and policy considerations surrounding treatment and management of contaminated sediments to support beneficial use.

The Workshop brought together 70 invited experts representing Federal and State Agencies/stakeholders, including the US Environmental Protection Agency (USEPA); USACE; US Navy (US); District of Columbia, Department of Energy and Environment (DOEE); National Oceanic and Atmospheric Administration (NOAA); New Jersey Department of Transportation (NJDOT); California Marine Affairs and Navigation Conference (CMANC); Private Industry (DOW, Chevron, ExxonMobil, Northwest Natural, Georgia Pacific, The Greenbrier Companies [GBRX], National Grid, and British Petroleum); Consulting (Architecture, Engineering, Construction, Operation, and Maintenance [AECOM], Anchor QEA, Barr Engineering, De Maximus, EHS, Haley and Aldrich, Integral, Montrose, Ramboll, TRC, Tipping Point, Jacobs, and Windward Environmental); Dredging Companies (J.F. Brennan, and Severson); Academia (Texas Tech University, University of Georgia, University of Maryland, Rutgers University), and European Researchers (Deltares). ERDC participants included Drs. David Moore, Al Kennedy, Karen Keil, and Paul Schroeder (all of EL) and Dave Perkey (ERDC Coastal and Hydraulics Laboratory [CHL]). In addition, Dr. Katie Brutsche (USACE HQ Beneficial Use Program Lead) provided an overview of USACE's Beneficial Use Program and participated as a panelist regarding regulatory and policy considerations.

Dr. Moore facilitated the Workshop and presented an overview of current state of the practice and recent advances relating to beneficial use of contaminated sediments. Dr. Kennedy presented ongoing ERDC-led, USACE Engineering with Nature® (EWN®)/DOER funded

research relating to 3-D printing of dredged material to facilitate beneficial use of contaminated sediments. Drs. Moore, Kennedy, Keil, Schroeder, and Perkey also helped facilitate breakout sessions on technology, economics, and policy/regulatory considerations. Photos of Workshop presentations are shown in Figure 1 through Figure 4.

The Workshop was a tremendous success in facilitating exchange of the latest technical information with front line regulators, resource trustees, and other stakeholders on this important topic. A number of high priority critical research gaps were identified as well as important policy and regulatory considerations. Results of the Workshop are to be summarized in an ERDC Technical Note that will be used to inform future research and policy needs.

Funding for ERDC participation in the Workshop was provided through the USACE Dredging Operations and Environmental Research (DOER) Program, and the USACE Advanced Materials and Substances of Emerging Environmental Concern (AMSEEC) Programs.

POC: Dr. David Moore [david.w.moore@usace.army.mil](mailto:david.w.moore@usace.army.mil)



Figure 1: Dr. Moore (EL) presented an overview of the current state of the science and highlighted critical knowledge and technology gaps.



Figure 2: The Workshop included some 70 participants representing government, industry, and academia.

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AM-EEEC

### Motivation Why AM for Environmental Applications???

Functional polymer composites → Processing (3D printing) → Contaminant reduction → Toxicity reduction → In-situ deployable structures

Polymer-filler compound → In-situ deployable structures

Consideration	Traditional	AM
Complex geometry Overlapping structure	0	++
Design Freedom Customization, prototypes, iteration	--	++
On-site, On-demand Printing on vessels at sea	--	++
Multi-material/functionality Adsorption & destruction	-	+
Porosity H <sub>2</sub> O & chemical absorption	--	++
Scale up	++	--

Proportion Surviving vs Log<sub>10</sub> exposure (mg UAL/L)

Kennedy, A. J.; Ballentine, M. L.; May, L. R.; Das, A.; Bednar, A. J.; Griggs, C. S.; Hull, M. S.; Bortner, M. J. Simplifying Complex Contaminant Mixtures: Selective Ammonia Adsorption and Toxicity Reduction using 3D Printable Polymer-Zeolite. *Water, Air and Soil Pollution* 2022, 233 (5), 148.

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Figure 3: Dr. Al Kennedy (EL) presented ongoing research in the area of 3-D printing to support treatment and beneficial use of contaminated sediments.



Figure 4: Dr. Katie Brutsche (USACE HQ Beneficial Use Program Manager) presented an overview of the USACE Beneficial USE Program as part of a Regulatory and Policy Panel discussion.