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Innovation Supporting Beneficial Use (BU)

1. USACE has advanced BU of Dredged Sediment through Science and Technology Development. USACE has advanced BU of sediment through a sustained commitment to innovation, over more than 40 years, across multiple research programs. Over this period, USACE has invested $100s of millions to advance the science and technology applied to sediment management, including $10s millions on BU.

2. The USACE Engineering With Nature® (EWN®) Initiative Capitalizes on BU. EWN was established in 2010 to support the readiness of USACE to deliver 21st century engineering and infrastructure solutions (www.engineeringwithnature.org). Modern infrastructure engineering will *"intentionally align natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaboration"* (the definition of EWN). The four key elements of the EWN approach are: 1) using science and engineering to produce efficiency, 2) using natural processes to maximum benefit, 3) diversifying and expanding the benefits and value of infrastructure, and 4) using collaboration and partnering to make it happen.

3. EWN Atlases Document USACE BU Projects. EWN Atlas Vol 1 and EWN Atlas Vol 2 document 118 built projects around the world that illustrate EWN in practice. 50 of the 118 projects are USACE projects. 28 of the 50 USACE projects are BU projects. EWN Atlas Vol 1 https://ewn.el.erdc.dren.mil/atlas.html; EWN Atlas Vol 2 https://ewn.el.erdc.dren.mil/atlasv2.html.

4. Progress on BU is Being Made Through Collaboration Across the USACE Enterprise. Collaboration among USACE HQ, Divisions, Districts, and Research and Development is delivering BU projects across the country. For example, the USACE EWN Initiative has organized and conducted >50 workshops and working meetings across USACE and with stakeholders where advancing BU has been a key objective and outcome of the engagements https://ewn.el.erdc.dren.mil/workshops.html).

5. Informing the Application of BU to Support Coastal Resilience. Innovative designs and operations have been and are being documented by USACE PDTs, e.g., BU to build nature-based features in New Jersey Back Bays to reduce flood risk and enhance coastal resilience. (https://ewn.el.erdc.dren.mil/renderings/reports/20200605_NJBB_Report_v3_pages-for-printing_lo-res.pdf),

6. USACE EWN is Leading Development of International Guidelines on Nature-Based Solutions for Flood Risk Management. BU is integral to developing nature-based solutions in the form of beaches, dunes, islands, wetlands, and other to support flood risk management. The 900-page technical guideline was developed by >180 authors and contributors from around the world. The Guidelines will be published summer 2021 (https://ewn.el.erdc.dren.mil/nnbf-guidelines.html).

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7. Documenting BU projects and the Multi-Purpose Benefits They Provide. USACE is documenting progress on value creation through BU. EWN has worked across USACE Districts and stakeholders to document BU projects and best practices in order to accelerate progress, e.g.: construction of Horseshoe Bend Island in the Atchafalaya River (pictured; https://ewn.el.erdc.dren.mil/pub/Pub_2_Terra_et_Aqua_September2015.pdf), numerous projects in Baltimore District https://erdc-library.erdc.dren.mil/jspui/handle/11681/32288, nearshore placement in Florida https://ewn.el.erdc.dren.mil/pub/ERDC_TN-EWN-17-1.pdf, among many others, (https://ewn.el.erdc.dren.mil/publications.html).

8. Building Relationships, Collaboration, and Partnerships that Deliver BU Projects. USACE is working strategically across the country to engage, collaborate and partner across all sectors to advance practice and deliver sustainable infrastructure. For example, EWN has worked for several years to support Philadelphia District (https://ewn.el.erdc.dren.mil/pg-philadelphia.html) to build several first-ever nature-based projects in NJ through BU. This progress led to the formation of the Seven Mile Island Innovation Laboratory in NJ (https://wetlandsinstitute.org/smiil/), a partnership that includes multiple state and federal agencies, the private sector, academia, and NGOs, that is expanding BU and EWN across NJ to support coastal resilience.

Mordecai Island, NJ	Avalon, NJ	Stone Harbor, NJ
		

9. Developing Innovative Science and Tools that Directly Support BU. EWN partnered with the Natural Infrastructure Initiative, a private-sector consortium of organizations led by Caterpillar, to develop the Natural Infrastructure Opportunities Tool to support partnership development for projects, including BU projects (https://ewn.el.erdc.dren.mil/tools.html). The EWN program demonstrated the use of activated carbon to reduce risks from PCBs in sediments from Ashtabula Harbor in Ohio that would expand BU applications (https://ewn.el.erdc.dren.mil/projectarchives.html). EWN is demonstrating the use of new equipment and techniques to accomplish BU, e.g., the Sediment Distribution Pipe (https://ewn.el.erdc.dren.mil/videos.html).

10. Communicating Strategically about Innovation, Delivery, and Progress on BU. Providing information and engagement through the EWN website (www.engineeringwithnature.org) and the BU website (https://budm.el.erdc.dren.mil/) on numerous topics supporting BU. USACE launched the EWN Podcast in 2020 to elevate communication with practitioners and the public about innovative practices including BU (the EWN Podcast is available at https://ewn.el.erdc.dren.mil/podcasts.html and through Apple).