



The Corps

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Environment

BUILDING STRONG!

Corps of Engineers
constructs
state-of-the-art
school for
21st century
education

6

Environmental Operating Principle #1

Foster sustainability as a way of life throughout the organization.



The Corps Environment

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Send articles, photos, events, letters or questions to the editor, The Corps Environment, at CEHNC-PA@usace.army.mil.

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The USACE Philadelphia District and its contractor, Barnegat Bay Dredging Company, construct a dredging and habitat creation project at Great Flats (previously part of Ring Island) near Stone Harbor, New Jersey, in December 2018. Work involved dredging a portion of the federal channel of the New Jersey Intracoastal Waterway and using the material to create habitat on marshland owned by the New Jersey Division of Fish and Wildlife. (Photo by Gary Paul)

SEDIMENT AS CURRENCY



Corps' dredged sediment management methods protect infrastructure, provide economic value

By Holly Kuzmitski
Engineer Research & Development Center

In a continuous cycle, marshes and other coastal systems lose sediment into waterways through processes associated with sea level rise, erosive tides, vessel wakes and extreme storms.

The U.S. Army Corps of Engineers dredges waterways to remove sedimentation, providing safe and reliable navigation channels for the nation.

So how does one keep a greater percentage of the sediment in the same coastal system it comes from and why is it important?

"Sediment moves through a system naturally," said Dr. Katie Brutsche, research geologist at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory, and the Regional Sediment Management program manager.

She explained that when sediment is taken

out of navigation channels and disposed of in offshore dredged material placement sites, combined placement facilities, or upland placement sites, it's taken completely out of the system.

"We're taking it completely, which means there is going to be erosion near where that sediment otherwise would have deposited," she said. "Through the use of RSM and Engineering With Nature concepts, including beneficial use of dredged sediment (BUDS), we strive to keep sediment in the system and maintain the overall sediment budget."

According to Monica Chasten, project manager with USACE, Philadelphia District, for years, dredged sediment was spoken about as waste, something we needed to dispose of.

"We had confined disposal facilities, and then things started evolving and we started to look at sediment differently, saying

'placement' instead of 'disposal,'" she said. "We now regard sediment as currency, and you don't throw currency away, because you can use it; it is valuable."

The dredged sediment researchers and project managers use in projects is clean, or uncontaminated, material.

"The Corps dredges between 200 to 250 million cubic yards of sediment a year from the nation's waterways," said Dr. Todd Bridges, national lead for the EWN initiative. "There are different methods for quantifying how much of this is clean, but the estimates are typically around 90%."

He added that there is an array of potential applications for this clean sediment.

"We can create aquatic features, islands, mudflats, and beaches and dunes," he said. "Using sediment to build beaches and dunes for recreation contributes social value; the material performs engineering functions by attenuating waves and protecting

infrastructure from storm surge, which provides economic value."

"The real challenge for USACE is determining what stands in our way from using 100% of our dredged sediment in beneficial use projects," Bridges added.

"The answer is affordability, affordability, affordability," he said. "Projects have to be affordable, or they will not happen."

Brutsche cites examples of districts integrating BUDS into ongoing navigation and flood risk management projects, a practice she thinks can potentially save districts money in the short and long term.

"The (USACE) Mobile District regularly dredges the Mobile Harbor navigation channel, but through the Water Resources Development Act of 1986, it was restricted to disposing of sediment at an offshore site," she said. "This led to erosion throughout the bay, and nearly tripled the cost of dredging due to the long-haul distance."

In 2012, that changed when it was able to pursue a one-time demonstration of thin-layer placement.

"Along with ERDC and other stakeholders, the Mobile District took the opportunity to monitor the project through data collection and the use of numerical models," Brutsche said. "The results of the monitoring and modeling effort brought a unanimous decision from the team to support in-bay placement as an environmentally acceptable alternative to ocean disposal."

In 2014, WRDA 1986 was reversed and sediment was allowed to be placed in the bay, resulting in an annual cost savings of approximately \$6 million.

Chasten thinks it should be standard business practice to think about how we can incorporate dredged sediment into projects. The Philadelphia District was one of the six coastal districts involved early on in the

RSM program and is now one of the three EWN proving grounds.

"The RSM program was established in 1999. The EWN initiative took off in 2010," she said. "From 2002 to 2012, the Philadelphia District made slow but steady progress towards more sustainable approaches to managing sediment."

Then in October 2012, Superstorm Sandy hit.

"The damage sustained by that event on multiple fronts—the shoaling in the New Jersey Intracoastal Waterway, the impaired beaches—was the impetus for us to advance BUDS practices very quickly," she said. "We know how valuable wetlands are to protecting shorelines, so we focused on multiple wetland restoration and habitat creation projects using NJIWW dredged sediments of varying grain size: Mordecai Island, Avalon and Ring Island."

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Chasten explained that the Philadelphia District looked at Mordecai Island and teamed up with stakeholders and ERDC to develop sustainable strategies, thinking about recovery in the short term and resilience in the long term.

“In November 2015, approximately 30,000 cubic yards of sediment was dredged from the NJIWW and placed in a breach area that separated two segments of Mordecai Island,” she said. “We used innovative placement techniques, and in 2016, marsh vegetation was planted to accelerate revegetation and anchor the sediment in place. We also adaptively managed the area by raising the elevation with a small amount of sediment in 2017.”

The Philadelphia District and its partners, including Mordecai Land Trust, the state of New Jersey, U.S. Fish and Wildlife Service and ERDC, continue to monitor the island.

In addition to the protective or economic benefits the restored wetlands offer, habitat was increased for diamond back terrapins and colonial nesting birds, which provides environmental and social benefits.

“Now we’re incorporating the lessons we learned on this and the other two projects into the Seven Mile Island Living Laboratory, a collaborative effort with ERDC, New Jersey Department of Environmental Protection, The Wetlands Institute, and others,” Chasten said. “This is where we take innovation to the next step by managing adaptively and exploring how to further harness natural processes to do most of the work for us. The idea is to refrain from over-engineering projects, so that they’re priced affordably and mimic nature as closely as possible.”

Bridges believes that sparking dialogue about how USACE can get to 100%

BUDS would be a useful process.

“What, besides affordability, is keeping us from getting there?” he said. “Is it technology, engineering practices, policy, habitual business practices, or effective partnerships with others? Of these, partnering with local sponsors and finding ways of cost sharing are going to help us broaden and expand.”

Dr. Edmond Russo, deputy district engineer for programs and project management, USACE, Galveston District agrees.

“Cultivating connections and working with environmental agencies to meet expectations is the best approach for developing BUDS projects; each agency has a slightly different interest and concern,” he said. “We formed the Houston Ship Channel Beneficial Use Group for the Houston-Galveston Navigation Channel project. The BUG is comprised of the Galveston District, the Port of Houston Authority, Texas General Land Office, Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, U.S. Fish and Wildlife Service; Natural Resources Conservation Service; and National Marine Fisheries Service, National Oceanic and Atmospheric Administration and U.S. Environmental Protection Agency.

“The BUG’s work resulted in a large array of BUDS in Galveston Bay in connection with Houston Ship Channel maintenance and channel improvement projects, providing significant resources for fish and wildlife inhabitation,” he said.

The federal standard, as described in Engineer Regulation 1105-2-100, the Planning Guidance Notebook, stipulates that the dredged material placement alternative must represent the least-

costly alternative consistent with sound engineering practices, which also must meet outlined environmental standards established in 404(b)(1) guidelines in the 40 Code of Federal Regulations 230.

“Under the federal standard, we can’t always select BUDS over upland confined and offshore placement,” Russo said. “Consequently, the Galveston District works with state and federal agencies to receive funds and perform reimbursable work for BUDS efforts through the International and Interagency Services program. The results speak for themselves: successes such as the Houston-Galveston Navigation Channel project and a steady increase in the number of BUDS projects that we’ve been able to perform over time above the federal standard.”

Brutsche thinks that RSM and EWN concepts are now valued both inside and outside of the Corps.

“I think we’ve started and will continue to look at projects in a regional context and throughout the project life cycle to determine the best RSM alternatives to employ, executing projects more efficiently while maintaining sustainable systems,” she said.

“The Corps is always looking to make our practices more sustainable over time, and a large part of that is making our sediment management practices more sustainable,” Bridges said.

For information about EWN initiatives, visit www.engineeringwithnature.org.

For more information about RSM, visit <https://rsm.usace.army.mil>.

The beneficial use of dredged material website, through a Dredging Operations Technical Support-funded effort, is a useful source of information: <https://budm.el.erd.c.dren.mil>.

EWN initiative captures sustainability award for USACE



By Holly Kuzmitski
U.S. Army Engineer & Research Center

The Engineering With Nature initiative has been selected as the Renewable Natural Resources Foundation’s recipient of the 2019 Outstanding Achievement Award.

“I think it’s a great honor,” said Dr. Todd Bridges, national lead for EWN. “It stands out in the respect that an outside, non-government body is

drawing attention to the U.S. Army Corps of Engineers’ commitment and progress in leveraging nature and natural resources to develop better infrastructure projects.”

Bridges was informed of the RNR’s decision July 30, 2019.

The EWN initiative was nominated for the award by the Coasts, Oceans, Ports and Rivers Institute Coastal Zone Management Committee, an institute of the American Society of Civil Engineers.