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Dredged Sediment in an Uncontrolled Diversion



from **Engineering With Nature: An Atlas, Volume 1.**

by **US Army Engineer Research and Development Center**



West Bay, Louisiana, United States

The U.S. Army Corps of Engineers (USACE) New Orleans District (MVN) is using Engineering With Nature (EWN) concepts and adaptive management to strategically place dredged sediment from the Mississippi River federal navigation channel and an adjacent non-federal anchorage area. The sediment placement will improve the functionality of the West Bay River Diversion Project, restore coastal marshes, and reinforce degraded banklines. Banklines are necessary in the federal navigation channel for maintaining the channel's integrity, and marshes are required behind the banklines to ensure bankline stability over time. Berms, or artificially created ridges, were constructed from sediment dredged from the channel and were used to adaptively manage the river's flow through the diversion to promote sediment deposition in the bay, thereby creating marsh habitat behind the banklines. The success of earlier berms was evaluated and additional berms were constructed based on lessons learned. The construction of the river diversion project was completed in 2003; the strategic placement of dredged material continues today. The project is

reversing coastal loss in the bay and ensuring integrity of the federal navigation channel.

Article cover: The construction of SREDs is creating shallow water habitat for native species such as the American lotus. (Photo by USACE New Orleans District)

Producing Efficiencies

The West Bay dredged sediment placement area located just above the Mississippi River's head of passes—the point where the river splits into three separate directions—is unique in that it is within the receiving basin of an active river diversion project. After its construction in 2003, the diversion mimicked a natural crevasse, or a fissure in the river embankment, and substantially scoured West Bay while developing an underwater network of distributary channels. Dredging actions between 2003 and 2017 employed innovative sediment placement practices that worked in concert with the river diversion towards development of an artificial subdelta. The practices and diversion also reinforced the bankline between the river and bay through the development of marsh habitat whose expanse can be measured in square miles.

Using Natural Processes

The project is utilizing EWN by taking advantage of natural processes in concert with sound engineering principles to maximize benefits and improve operational efficiencies. As part of the strategic placement of sediment in West Bay, the MVN has installed islands made from dredged sediment, referring to them as “Sediment Retention and Enhancement Devices” (SREDs). The SREDs are being used as strategically constructed berms to adaptively manage the river's flow through the diversion and to encourage settling of sediment in the bay. The MVN also strategically placed sediment at the lower corner of the diversion and elsewhere in the bay to utilize the diversion's energy to relocate the sediment and shore up the bay side of the bankline by restoring marsh habitat. Another SRED was installed to the south to help protect the bay from wave energy originating from the Gulf of Mexico, thereby increasing the effectiveness by which wetland habitat is being restored.





An artificial sub-delta was developed with marsh habitat by strategic placement of dredged sediment.

(Photo by USACE New Orleans District)

Broadening Benefits

Because of the bay's size (approximately 12 square miles), it has the potential to provide dredged material capacity for the foreseeable future, increasing value to the USACE. Monitoring has confirmed the bankline has been successfully stabilized with sediment through the creation of adjacent marsh habitat and distributary channels that formed in the roughly 3 square miles on the north end of the bay. The project has substantially broadened the environmental benefits associated with marsh-associated vegetation, fish, birds and other animals living in the project area. These benefits will likely lead to increased recreational fishing and bird-watching opportunities in direct support of local economies.



Emergent marsh colonizing the area creates habitat for diverse species while ensuring bankline stability over time.

(Photo by USACE New Orleans District)

Promoting Collaboration

The USACE MVN worked with various sponsors between 2003 and 2017 to fund the project's dredging actions. Sponsors included the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), federal Operations and Maintenance (O&M) authority, and the Louisiana Coastal Area Beneficial Use of Dredged Material program (LCA-BUDMAT). The collaborative process of leveraging Plaquemines Parish and Louisiana state funding through the LCA-BUDMAT program has helped focus stakeholder interests.



The marsh being created is also providing habitat for colonial waterbirds.

(Photo by USACE New Orleans District)



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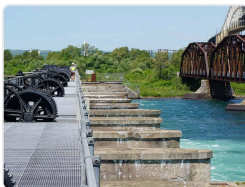
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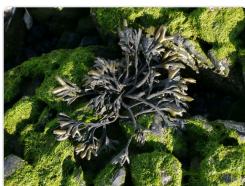
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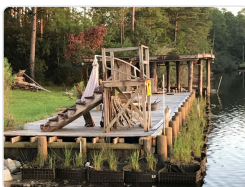
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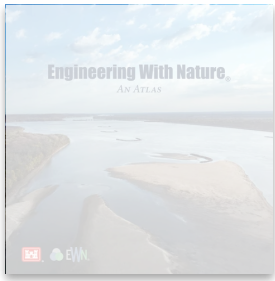


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