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## Restoration of the Nueces Delta

Corpus Christi, TX- The Nueces River meanders through 315 miles of south Texas brush country before it meets the salty waters of Nueces Bay. Its clear head waters hold native freshwater species like the Guadalupe Bass and are shouldered by high rocky bluffs that hold a stark contrast to the landscape of its lower reaches. The watershed of the Nueces covers close to 17 thousand square miles and provides water and recreation for many communities along the way. As the saying goes, everything runs downstream and the furthest point downstream, the delta, is bearing the brunt of impacts.

The health of the Nueces River and Nueces Bay was historically an ecosystem to marvel. Native tribes like the Karankawa Kadla, Lipan Apache, Mexica, Comanche and Coahuiltecan were some of the earliest groups to live and thrive along the banks of the Nueces, teeming with wildlife and supporting a bountiful fishery full of drum and oysters. A healthy estuary system is vibrant with wildlife and serves as an important nursery habitat but relies on a fine balance of inputs and stressors to function properly and a small change in one of those inputs can influence the entire system. A delta is a fertile landmass formed by the accumulation of alluvial deposits at the mouth of a river. The foundation of a delta itself is built on sediment and fresh water that is washed down river from the watershed and deposited near the mouth of the river, creating the meandering maze of channels and ponds leading to the bay. This intermediate area between salt and freshwater is an incredibly important piece of habitat, no matter where it's located.



Over the past 100 years though, the natural path of the Nueces has been altered with dams and reservoirs put in place upriver to provide water supply for growing communities. The manmade structures have greatly reduced the amount of sediment deposition in the delta as it collects in the reservoirs and is held up by the dams. This decline in both freshwater and sediment input coupled with relative sea level rise and coastal erosion has diminished the integrity of the Nueces

Delta and the valuable habitat within. Since 2002, the shoreline has receded over 800 feet and the pockets of water have expanded, causing the loss of valuable marsh habitat that helps slow the impact of wind driven erosion. The issue of erosion in the delta is one that compounds upon itself, with increased erosion leaving less resistance to further erosion impacts. Aside from the visual difference noticeable from satellite imagery, CBBEP has been funding several long-term monitoring projects in the delta focusing on relative sea-level rise, the health of wetlands, and the impacts of climate change. The full publications and data gathered during these monitoring efforts are available on [our website](#), and ultimately show that the overall healthy and stability of the Nueces Delta system to be declining.



With the data available from the monitoring projects, including one study that showed around 14 ft of erosion per year, the need to protect and replenish the delta was given high priority by CBBEP. In 2008, we contracted with an engineering firm to develop several conceptual alternatives for how to best protect the shoreline. This was followed by a more detailed feasibility study and alternatives analysis; wetland, oyster, and seagrass survey; preliminary design; and an individual permit application to the US Army Corps of Engineers (USACE), paid for with funds from the Texas General Land Office through the Coastal Erosion Planning and Response Act. The USACE permit was approved in 2016 for the installation of 0.74 miles of breakwater system, but

it would take several more years and another permit amendment before CBBEP could begin construction. Eventually, CBBEP would receive the \$4,995,000 needed to build the rock breakwater system – with \$3,036,968 coming from the National Fish and Wildlife Foundation - Gulf Environmental Benefit Fund and \$1,958,031 coming from the Texas General Land Office - Coastal Erosion Planning and Response Act Program. CBBEP’s contractor completed the construction of the 0.74 miles of rock breakwater in 2023. This breakwater structure is built with a crest elevation of 3.5 feet and width of 10 feet meandering down the shoreline with a break in the rock every 200 – 300 feet to allow necessary tidal flushing and not obstruct fish movement.

With the breakwater in place, CBBEP turned our efforts to replacing the sediment that had been lost over the years of erosion and building back the disappearing marsh habitat. The timing could not have been better, with the USACE looking for opportunities to beneficially use dredged sediments from the final phase of the Corpus Christi Ship Channel Improvement Project, the deepening of the Port of Corpus Christi’s Inner Harbor. Through numerous meetings and conversations with the USACE and other resource agency partners, CBBEP identified the most beneficial locations to focus the placement of material within the Delta. We also worked with the USACE to identify target elevations for the sediment that would be ideal for reestablishing the marsh habitat that had been lost. These conversations also led to the USACE agreeing to add to the protection of the shoreline by constructing their own breakwater of the same design, essentially extending CBBEP’s breakwater by another 2,000 feet. The combination of these structures will help hold the sediment in the delta and keep it from washing into the bay, while also shielding the delta from wind driven erosion impacts coming across the bay. The construction of the entire breakwater complex was completed near the end of 2024.

With the full breakwater system in place, placement of material behind the breakwaters began in late 2024 and will continue through early 2025, focusing in areas that were historic wetlands that have been lost to erosion. When complete, nearly 850,000 cubic yards of material will be placed along this stretch of the shoreline. Prior to placing the sediment in the delta, the USACE tested the dredge material for contaminants to confirm that all contaminants were below the accepted screening guidelines and could be used for wetland restoration.



CBBEP is closely monitoring the project to ensure that the placement of material occurs in the designated areas and contractors hit the right elevation. Drone imagery will be captured post-construction along with surveys of both elevation and vegetation to assess the project’s success and allow CBBEP to adapt our management efforts as needed. Though the scene during construction may seem barren, this project is playing the long game. While there won’t be much vegetation immediately after the sediment is introduced, plans for planting efforts that will jump start native species in the marsh are taking shape with the support of Buckeye Partners.



To see a good example of how successful these types of projects can be, we just have to look up the coast a bit to Texas Parks and Wildlife Department's JD Murphee Wildlife Management Area. At the WMA located near Port Arthur, Ducks Unlimited partnered with TPWD to beneficially use dredged sediment to rebuild lost habitat, restoring 1,500 acres of marsh that had been battered by a busy hurricane season. The difference of the landscape just days after the sediment was placed compared to several years later is incredible, with native vegetation and wildlife returning to the area and public recreation growing along with them.



Left Photo - JD Murphee WMA in 2010, immediately following placement of dredge material (photo credit Ducks Unlimited)

Right Photo - JD Murphee WMA in 2024, 14 years following placement of dredge material (photo credit Ducks Unlimited)



It's important to realize that the Nueces Delta that exists today is not in an ideal state and has been incrementally declining for nearly 50 years without much intervention. With 14 ft of shoreline disappearing every year, there wouldn't be much of a delta left for future generations unless action was taken. Both the shoreline protection breakwater structures and sediment replenishment projects have the potential to give the delta a fighting chance against the ongoing threats it faces, but the recovery efforts will take time. The CBBEP is dedicated to continued monitoring of this restoration effort and adjusting our management strategies as necessary to ensure the habitat is restored and preserved.

The Coastal Bend Bays & Estuaries Program is a non-profit organization dedicated to protecting and restoring bays and estuaries in the 12-county region of Texas Coastal Bend. CBBEP is partially funded by the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency. For more information about the Coastal Bend Bays & Estuaries Program, contact Quinn Hendrick, 361-336-0305 or [qhendrick@cbbep.org](mailto:qhendrick@cbbep.org). Published in May 2023.

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