

Project Name: La Quinta Aquatic Habitat Mitigation Project

Project Location: Corpus Christi Ship Channel, Corpus Christi, TX, USA

Award Category: Mitigation and Adaptation to Climate Change

Team Members: Luis M. Maristany, P.E.¹, Aaron G. Horine, P.E.² and Paul D. Carangelo, REM, CESM, PWS³

Date Completed: March 2017



Located in the Corpus Christi Bay next to the La Quinta Ship Channel, Beneficial Use Site No. 6 exceeds its goals for habitat mitigation offsetting project impacts. After enduring Hurricane Harvey, it flourishes today as home to Smooth Cordgrass, Shoal Grass, and various types of aquatic wildlife that have colonized the island.

¹ Coastal Engineer IV, Mott MacDonald, 10415 Morado Circle, Suite 300, Austin, TX 78759, USA, T: 512-777-3066, Email: luis.maristany@mottmac.com. WEDA Member.

² Principal Coastal Engineer, Mott MacDonald, 711 North Carancahua, Suite 1610, Corpus Christi, TX 78401, USA, T: 361-661-3061, Email: aaron.horine@mottmac.com. WEDA Member.

³ Coastal Environmental Planner, Port of Corpus Christi Authority, 222 Power Street, Corpus Christi, TX, 78401, USA, 361-885-6137, paul@pocca.com.

Summary

Project Description: The US Army Corps of Engineers (USACE) has adopted, as a part of the 404-permit process, a policy that requires project impacts to be offset through in-kind mitigation. To address these requirements, the Port of Corpus Christi Authority (PCCA) was tasked with creating 6.6 acres of Smooth Cordgrass (*Spartina alterniflora*) habitat and 19.2 acres of Shoal Grass (*Halodule wrightii*) habitat as mitigation for the PCCA La Quinta Terminal Project. Meeting these mitigation requirements in semi-arid South Texas was a challenge which required careful planning, design, and construction by the PCCA and Mott MacDonald. This challenge was approached by constructing the 200-acre Beneficial Use Site 6 (BUS-6) using new work (non-maintenance) dredged material through several phases. Throughout the course of the project, dredged material was placed into BUS-6 and reworked, dredged material from an upland dredged material placement area (DMPA) was reused, and 12.6 acres of marsh vegetation and 25.3 acres of Shoal Grass were planted. The success of the project made it one of the largest known actively planted Shoal Grass mitigation projects in Texas.

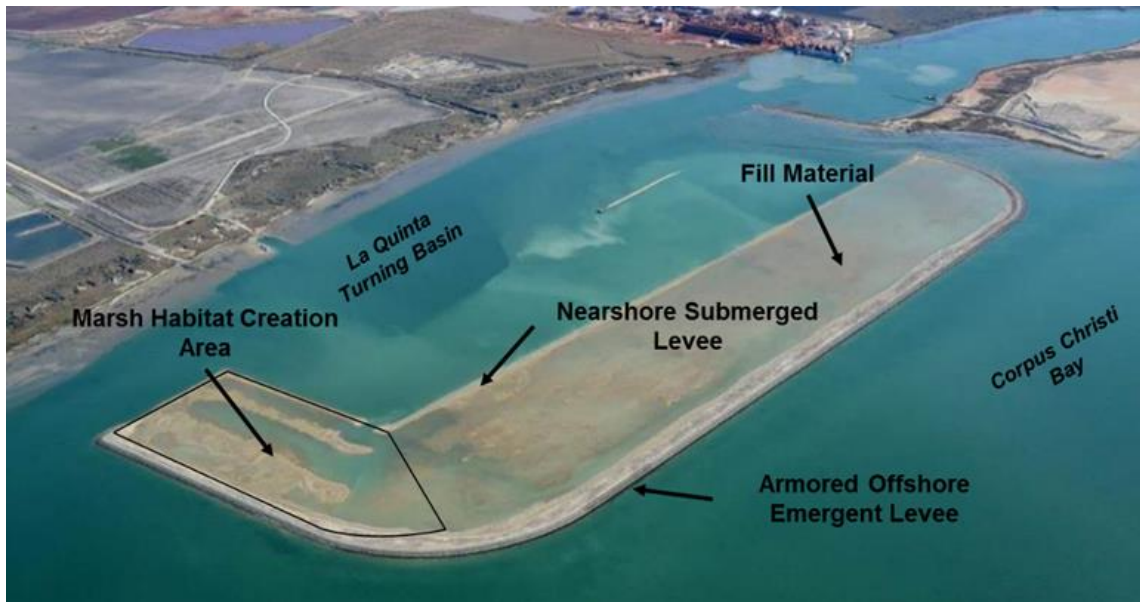


Figure 1. BUS-6 aerial

Goals:

There were several main goals for this project. The first was to maximize the beneficial use of material dredged from the La Quinta Channel Expansion Project. BUS-6 was constructed to satisfy this goal by utilizing the dredged material to protect the adjacent shoreline from waves and create over 200 acres of new land so estuarine marsh and Shoal Grass habitat could be created in the future. An aerial of BUS-6 is shown in Figure 1.

Objectives:

Phase I and II project objectives were to exceed regulatory requirements by creating over 6.6 acres of marsh habitat and 19.2 acres of Shoal Grass habitat.

Accomplishments:

Approximately 38.5 acres of wetland/marsh was established to offset project impacts, creating a large habitat for various species of aquatic and plant life and an excellent carbon sink. According to a December 2018 Site Monitoring Report the goal of creating 19.2 acres of Shoal Grass/Manatee Grass habitat at 50% cover was met and then exceeded by a surplus of 18.1 acres. The goal of creating 6.6 acres of Smooth Cord Grass/Black Mangrove intertidal habitat at 70% cover was also met and exceeded by a surplus of 5.1 acres. Site monitoring continues to show increase in percent cover and acreage of habitat area and several diverse species of aquatic life have been seen utilizing the site which points the site towards a thriving future.

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Environmental Benefits: The environmental benefits correspond to the main purpose of this project to create Shoal Grass and Smooth Cordgrass habitat. While the project was meant to compensate for wetland and Shoal Grass impacts from the adjacent La Quinta Terminal project, the project was determined to impact only 2.4 acres of low density Shoal Grass and 4 acres of marsh habitat. Accounting for these impacts, the project directly resulted in a net increase of 9.2 acres of marsh habitat and 22.9 acres of Shoal Grass. These habitat results are summarized in Table 1. An aerial of the completed marsh habitat area is shown in Figure 1. Figure 2 **Error! Reference source not found.** shows the project marsh areas immediately after initial planting and full colonization of the area within 2 years of initial planting. Texas Gulf Coast salt marsh habitats similar to the site are capable of carbon sequestration rates of 2.1 tons per hectare per year. With a total of 15.6 hectares of marsh creation this results in 32.8 tons of carbon sequestration annually. While only a portion of the 200 acre BUS-6 site was planted for this project, if the marsh continues to endure and flourish as it has, the entire site has potential to be a sink for over 420 tons of carbon per year. The project also reduces channel and turning basin siltation, which reduces maintenance dredging frequency, resulting in lower carbon emissions.



Figure 2. Marsh grass (*Spartina alterniflora*) initial planting (Left) and complete colonization (Right) within 2 years

Table 1. Resulting increase in marsh and Shoal Grass habitats

Habitat	Construction Impacts [ac]	Habitat Created [ac]	Net Increase in Habitat [ac]
Smooth Cordgrass	4.0	13.2	9.2
Shoal Grass	2.4	25.3	22.9



Figure 3. BUS-6 Natural Shoal Grass

Furthermore, the material within most of BUS-6 was placed at elevations conducive to the natural propagation of seagrass. Surveys of the area during construction of Phase II saw large areas of Shoal Grass throughout BUS-6 which have naturally established throughout most of the 200-acre area (Figure 3). BUS-6 has also become a habitat for several other species. Seabirds have been observed nesting on the protection berm, and the marsh and seagrass habitats are ideal habitat for several marine species (Figure 4).

Innovation:

The PCCA has implemented a strategic plan to ensure its continued economic success while ensuring its operations and activities are conducted in a manner conducive to environmental sustainability and resiliency. The La Quinta Aquatic Habitat Mitigation Project is the culmination of this plan applied to the dredging of the La Quinta Channel and disposal of the dredged materials. This project provides a new methodology to develop multi-use dredge disposal areas with ecological benefits to the area.

In addition, Smooth Cordgrass often grows as a narrow strip of vegetation (fringe) extending from the higher marsh to the water, but can grow in large fields near the heads of tidal creeks, the latter being more common in the Corpus Christi area. The mitigation berm design was optimized to create large fields of Smooth Cordgrass through careful planning and analysis of conditions onsite. The project has produced a large area where this vegetation is growing in volumes and densities not typically seen in the area.



Figure 4. Seabirds Usage of Site

Economic Benefits:

Economic benefits are realized in several ways. By beneficially using the dredge material to construct BUS-6 during the La Quinta Channel Extension, dredge pumping distances were reduced because material did not need to be pumped greater distances to upland dredge disposal areas. This dramatically reduced dredging costs and increased efficiency during construction. Also, by not utilizing existing dredge disposal areas and utilizing unused material previously placed within an upland placement area, placement area capacity for future dredging projects is preserved which reduces costs for future maintenance dredging operations. The project also reduces channel and turning basin siltation, which reduces maintenance dredging costs and impacts to existing placement areas.

In addition, the project allowed for the development of the La Quinta Trade Gateway. The La Quinta Trade Gateway is a major component of the PCCA's long-term development plan. Located on a 1,100-acre greenfield site on the north side of Corpus Christi Bay. When completed, the project will include deep-water access (-45'), provide a state-of-the-art multi-purpose cargo dock and container facility, multi-slip ship dock with heavy lift capabilities, ship-to-shore cranes, 150 acres adjacent to container/general cargo storage yard, and an on-site intermodal rail yard. The facility will have the capacity to handle approximately 1 million TEUs annually.

Transferability:

The methodologies used to develop this project can be easily transferred to the beneficial use of dredged materials for navigation projects throughout the world. In addition, the successful methodologies and insights applied for the design and construction of marsh and Shoal Grass habitat are easily transferrable to marsh and Shoal Grass habitat restoration or creation projects throughout the Gulf of Mexico and similar environments around the world.

Outreach & Education:

The PCCA has earned the 2018 Texas Environmental Excellence Award (TEEA) in Pollution Prevention, presented by the Texas Commission on Environmental Quality (TCEQ). TEEA is an annual awards program that honors achievements in environmental preservation and protection and is considered the state's highest environmental honor.

TEEA also noted several milestones Port Corpus Christi has achieved in finding balance between the environment, community, and the economy, from dredge material reuse, to its impressive green energy utilization. Cited among the most impressive, however, “is its strong educational, training, and outreach components.”

In addition, project representatives has presented the following paper at the Western Dredging Association’s Dredging Summit & Expo ’18 in Norfolk, Virginia June 25,2018:

Maristany, L.M., Horine, A., Carangelo, P., “La Quinta Terminal Mitigation Project: Large Scale Dredged Material Beneficial Re-Use Facility for Estuarine Habitat Creation in Corpus Christi Bay, TX.” *Proceedings of the Western Dredging Association Dredging Summit & Expo ‘18, Norfolk, VA, USA, June 25 – 28, 2018.*

Also, the project team have presented the project at the following conferences:

- Texas Branch of the American Shore and Beach Preservation Association (ASBPA) 2018 Symposium on April 24, 2018 in Port Aransas, Texas.
- State of the Coast Conference 2018 on May 30, 2018 in New Orleans, Louisiana.