



Goose Island Marsh Restoration in Aransas Bay



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Goose Island Marsh Restoration in Aransas Bay

The Goose Island Marsh Restoration in Aransas Bay project was implemented by Texas Parks and Wildlife Department and its federal, state and local partners to restore wetland habitats that are integral parts of the Texas Gulf Coast and the Aransas Bay estuarine ecosystems.



The project completes a major component of Phase II of the Goose Island Shoreline Stabilization and Marsh Restoration project, construction of which began in 2005. Beneficial use of dredge material from the Neptune Harbor Borrow Area was employed to create marsh mounds within the 24-acre marsh restoration site to support the growth of emergent estuarine marsh. Texas Parks and Wildlife Department staff and volunteers transplanted over 11,000 smooth cordgrass (*Spartina alterniflora*) plants to restore intertidal marsh on Goose Island lost to erosion. Funding for the Goose Island Marsh Restoration in Aransas Bay project was provided through grants from the Coastal Coordination Council pursuant to National Oceanic & Atmospheric Administration Award Number NA06NOS4190219, Texas Parks and Wildlife Department Fish Kill Restitution Fund, and U.S. Fish and Wildlife Service Texas Coastal Program, and through a donation from the Neptune Harbor Canal Owners Association.



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Introduction

Goose Island is an integral part of the Goose Island State Park located on the southern tip of Lamar Peninsula, 12 miles northeast of Rockport in Aransas County, Texas (Appendix A). It is located in the northern end of Aransas Bay along the central Texas coast near the Aransas National Wildlife Refuge. The park is comprised of 321.4 acres and provides public access to Aransas and St. Charles bays. Goose Island is located within the Coastal Bend Bays & Estuaries Program area and the Mission-Aransas National Estuarine Research Reserve study site. It is a popular vacation destination because of the recreational fishing and wildlife viewing opportunities available to visitors.



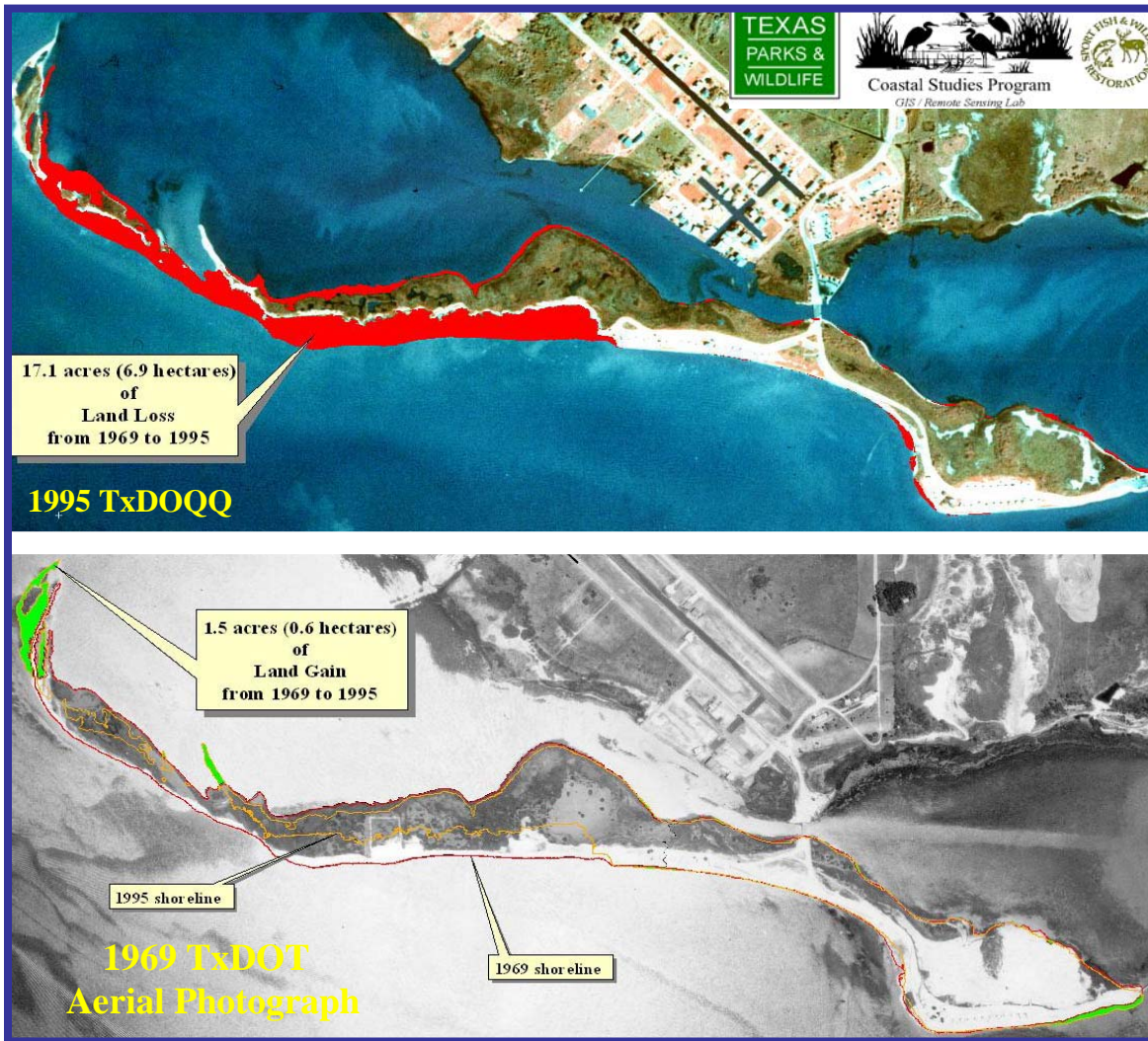
The undeveloped southern shoreline consists of a shell ridge with smooth cordgrass (*Spartina alterniflora*) marsh occurring in front of portions of it. Dominant plant species occurring on the shell ridge include sea purslane (*Sesuvium portulacastrum*), wolfberry (*Lycium carolinianum*), camphor daisy (*Haplopappus phyllocephalus*), and seashore dropseed (*Sporobolus virginicus*). Behind the shell ridge, high marsh grades into intertidal smooth cordgrass marsh and tidal flats. The high marsh vegetation consists of glasswort (*Salicornia virginica*), maritime saltwort (*Batis maritima*), marshhay cordgrass (*Spartina patens*), sea-ox-eye daisy (*Borrchia frutescens*), and saltgrass (*Distichlis spicata*). Smooth cordgrass is the dominant intertidal species. Tidal channels occur within the high marsh and intertidal marsh habitats. Breaches in the island support patchy ephemeral seagrasses comprised mostly of widgeon grass (*Ruppia maritima*).

The approximately 100 acres of Aransas Bay north of Goose Island support scattered living oysters, active oyster reefs and smooth cordgrass marsh. The shallow bay water on the southern side of the island supports expansive beds of shoal grass (*Halodule wrightii*) as well as scattered eastern oysters. The seagrasses, salt marshes, and oyster reefs associated with Goose Island

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provide important feeding habitat for waterfowl, shorebirds, and wading birds, and provide important nursery areas for commercially and recreationally important finfish and shellfish.

Coastal wetland loss in Texas is significant and is a continuing concern because of the essential roles that wetlands perform in providing fish and wildlife habitat, stabilizing shorelines and sediments, and improving water quality.



Texas Parks and Wildlife Department (TPWD) staff compared aerial photography from 1969 and 1995 and determined that 17.1 acres of Goose Island eroded from the southern shoreline, while 1.5 acres accreted on the island during that time period. Shoreline mapping efforts using GPS equipment by TPWD staff and contractors indicated that an additional 8.5 acres of Goose Island's shoreline eroded between 1995 and 2002. Most of the 25 acres of Goose Island that has become submerged since 1969 was originally high marsh and intertidal emergent marsh habitats. Continued erosion and submergence of Goose Island threatened the remaining seven acres of smooth cordgrass marsh and ten acres of associated high marsh on the island and degradation of valuable oyster reef habitat and marsh habitats along the mainland shoreline.

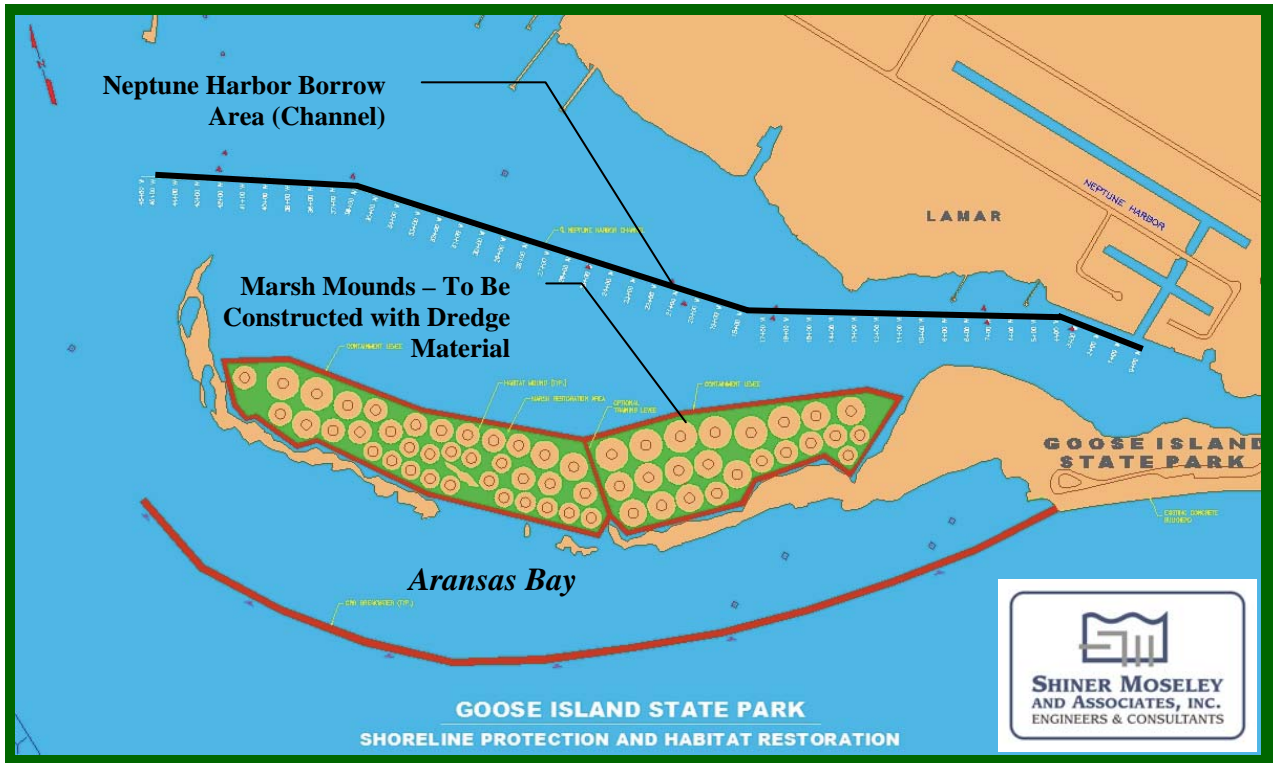


Based on the results of a feasibility study and analysis of potential shoreline protection and marsh restoration alternatives for Goose Island, funded in part by a CEPR grant from the Texas General Land Office and a grant from the Coastal Bend Bays and Estuaries Program, Texas Parks and Wildlife Department began implementation of the Goose Island Shoreline Stabilization and Marsh Restoration Project. Phase I of the project, completed in 2005, consisted of the construction of a 4,400-foot-long offshore rock breakwater to stabilize the southern shoreline of Goose Island and the construction of 7,260 linear feet of levees using in situ material to outline a 24-acre marsh restoration site and to contain future dredge material that would be used to raise the elevation of the bay bottom within the marsh restoration site to a suitable elevation to support smooth cordgrass marsh. Funding for Phase I of the Goose Island Shoreline Stabilization and Marsh Restoration project was provided through a CEPR grant from the Texas General Land Office, a CIAP grant from NOAA NMFS, administered by the Coastal Coordination Council and the Texas General Land Office, a CIAP grant from Aransas County, Fish Kill Restitution funds from Texas Parks and Wildlife Department, an EPA Gulf of Mexico Program and NOAA funded community-based restoration grant from the Gulf of Mexico Foundation, a grant from the Coastal Bend Bays and Estuaries Program and donations from Occidental Petroleum Corporation and St. Mary Energy Company.

Workplan and Results

The Goose Island Marsh Restoration in Aransas Bay project was implemented to initiate Phase II of the Goose Island Shoreline Stabilization Project and the approved workplan included the following tasks.

- 1: Prepare Final Bid Documents
- 2: Dredge boat channel known as the Neptune Harbor Channel
- 3: Plant smooth cordgrass plants in the marsh restoration site



Task 1 – Although the engineering design of the dredging and marsh restoration site components of the Goose Island Shoreline Stabilization and Marsh Restoration project were 95% complete from the implementation of Phase I, Texas Parks and Wildlife Department contracted with a professional services provider to complete the final engineering design and prepare the bid documents for implementation of Phase II because it appeared that some erosion had occurred on the containment levees since completion of Phase I. Task 1 began in December 2006 when Texas Park and Wildlife Department staff began regular monitoring of the condition of the containment levees at the marsh restoration site. HDR Shiner Moseley was contracted in September 2007 to complete the construction documents for the Goose Island Marsh Restoration in Aransas Bay project. HDR Shiner Moseley acquired a new aerial photograph of the project site, surveyed the project site as well as an adjacent reference marsh and prepared preliminary final plans and a preliminary opinion of cost in November 2007. After review and approval from TPWD project team members, HDR Shiner Moseley submitted the final engineering, bid packages and specifications to Texas Parks and Wildlife Department in January 2008.



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Task 2 – Texas Parks and Wildlife Department staff issued a notice to offerors on March 19, 2008 requesting competitive sealed proposals for a general contractor for dredging the designated borrow areas (Neptune Harbor channel and the Goose Island State Park boat ramp channel) and for constructing the marsh restoration site. A pre-proposal conference and site visit on site at Goose Island State Park was held on March 31, 2008 for interested dredging contractors. A bid opening was held on April 18, 2008 at TPWD headquarters in Austin and on May 19, 2008 TPWD issued a notice of award/authorization to proceed with the dredging and marsh restoration project to JND Thomas Co. Inc. of Riverdale California. Texas Parks and Wildlife Department staff, HDR Shiner Moseley staff and JND Thomas, Inc. staff met in a pre-construction meeting on May 23, 2008.



Staff from JND Thomas Co. Inc. began assembling the dredge pipes and making containment levee modifications on May 29, 2008. JND Thomas Co. Inc. began dredging the Neptune Harbor Borrow Area in June 2008.



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Approximately 32,000 cubic yards of dredge material from the Neptune Harbor Borrow Area was used to create 15 marsh mounds in the marsh restoration site during implementation of the Goose Island Marsh Restoration in Aransas Bay project. Dredging of the Neptune Harbor Borrow Area was completed in September 2008 with the work in September paid for with project funds unrelated to the Coastal Coordination Council grant.



In preparation for the dredging of the Goose Island boat ramp channel that started in October 2008, Texas Parks and Wildlife Department staff harvested oysters and oyster shell from the boat ramp channel and placed them on existing reefs located outside of the channel dredging area in June 2008.

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Task 3 – Beginning in October 2007, Texas Parks and Wildlife Department staff and volunteers moved smooth cordgrass (*Spartina alterniflora*) plants that were growing on the interior slopes of the containment levees to the exterior side slopes so that the plants would not be buried by the dredge material and to further stabilize the north side of the levees from erosion.



Five planting efforts were made by TPWD staff, school groups, Boy Scouts, community volunteers and non-profit organizations and over 11,000 smooth cordgrass plants were transplanted. Planting days were conducted in October 2007, November 2007, January 2008, February 2008 and May 2008. The transplanted plants thrived in their new location and helped buffer the northern slope of the levees during the winter of 2007-2008.



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Project Costs

The total cost of the Goose Island Marsh Restoration in Aransas Bay project was \$400,000.00. The \$198,000.00 in Coastal Management Program grant funds were used for contractual services for preparing the final engineering designs, bid packages, and project oversight and for dredging work. Local match was made up of personnel salaries (\$18,134.97), fringe benefits (\$4,970.43), travel (\$60.00), contractual services (engineering and dredging - \$58,000.00 of Fish Kill Restitution funds), and supplies and other (\$35,834.60). Finally, \$70,000.00 from a U.S. Fish and Wildlife Service grant and \$15,000.00 from a donation from the Neptune Harbor Canal Owners Association were also used for contractual services.

Future Work

Dredging continues in the Goose Island boat ramp channel using additional federal and state funds to complete the marsh restoration goals of the overarching Goose Island Shoreline Stabilization and Marsh Restoration project.

Project Team

TPWD Project Managers:	Kay Jenkins, State Parks Division, Rockport Walter Moldenhauer, Jr., Infrastructure Division, Austin Chris Greer, Infrastructure Division, Austin
Contract Manager:	Sofie Johnson, Infrastructure Division, Austin
Project Accountant:	Lorraine Galvan, Infrastructure Division, Austin
Park Superintendent:	Stormy Reeves, Goose Island State Park
Engineering Contractor:	HDR Shiner Moseley, Corpus Christi
Engineering Project Manager:	Robert Thomas
General Contractor:	JND Thomas Co., Inc., Riverdale, California
Project Manager for the Contractor:	Keith Ayers

Acknowledgements

Goose Island State Park staff including Mike Mullenweg, Bill Wilson, Stacy Westlake, Wanda Wright, Tom Breuer and Adam Jarrett, as well as Russell Fishbeck and Cappy Smith from Region 2, helped make the project a huge success. Dennis Pridgen with Coastal Fisheries Division, Aransas Bay Ecosystem, provided valuable logistic and technical support to several of the project components. Volunteers from the Neptune Harbor Canal Owners Association, Coastal Conservation Association, Boy Scouts of America, Rockport-Fulton High School, and the Gulf of Mexico Foundation Spanish and Science Clubs from Sinton, Ingleside and Corpus Christi contributed numerous hours to marsh planting efforts.

**Appendix A. Location Map of the Goose Island Marsh Restoration in
Aransas Bay Project**

