Starvation Gap Wetland and Water Quality Protection Project
West Bay,
Galveston County, Texas

TCEQ Contract No. 582-8-84956

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Executive Summary

The Starvation Cove area, as with most other near shore areas within West Bay, has been suffering severe habitat losses. The loss of shoreline features such as vegetated land spits, shoreline ridges, and oyster reefs that formerly protected intertidal marshes from erosion is one reason for the areas loss of wetland habitats. Others reasons include stream channelization, sediment diversion, hydrologic alterations, increased channel dredging, dredge and fill activities, residential development, and subsidence. Because of the tremendous natural and economic values of these habitats, allowing them to disappear is not acceptable. This loss has prompted Texas Parks and Wildlife Department, along with our many partners, to proactively seek the knowledge and funding to protect and restore shoreline habitats in West Bay and the entire Texas Gulf Coast.

The Delehide Cove Wetland and Water Quality Protection Project (Delehide Cove Project), completed in 2003, and the Starvation Cove Wetland and Water Quality Protection Project (Starvation Cove Project), completed in 2005, were the impetus of the Starvation Gap Wetland and Water Quality Protection Project (the Gap Project). The Gap project was conceptually envisioned to close a "gap" between the two projects and expand marsh restoration efforts directly adjacent to each of the two projects. Funding was sought after through a partnership between the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Envionmantal Quality (TCEQ), and Texas Parks and Wildlife Department (TPWD). Funding was successfully obtained from TCEQ through the Natural Resources Uses Subcommittee (NRU) of the Galveston Bay Council and the 2007 funding cycle of the Coastal Impact Assistance Program (CIAP). However, to date, none of the $900,000 of funding from the CIAP has been released to the project and the only funds expended toward the project have been TCEQ funds. The TCEQ funds were utilized to move the project forward by procuring engineering design services.

Introduction

Texas coastal wetlands possess tremendous biological and economic value. They serve as nursery grounds for over 95 percent of the recreational and commercial fish species found in the Gulf of Mexico. These wetlands provide breeding, nesting, and feeding grounds for more than a third of all threatened and endangered animal species as well as supporting many endangered plant species, and provide permanent and seasonal habitat for a great variety of wildlife, including 75 percent of North America's bird species.

Located on the south shoreline of West Bay, east of Galveston Island State Park approximately midway between San Luis Pass and Bolivar Roads the approximately 450 acres of the Starvation cove project area includes estuarine waters, tidal flats, seagrass beds, estuarine to fresh marshes, and coastal prairie uplands. The project area has experienced significant habitat losses and changes over the past 50 years including: increases in open water, losses of seagrass beds, losses of coastal prairie uplands, conversion of freshwater swales to brackish open water and marshes, degradation of estuarine marshes, and migration of estuarine marshes inland (National Wetlands Inventory (NWI), 1956-2002).

Once common on the majority of the west end of Galveston Island, brackish to freshwater marshes paralleled the beach and dune complex stretching from directly behind the dune line to the middle of the Island and to just off the shores of West Bay. This ridge-swale complex has largely disappeared on the Island due to agricultural practices and development, with one of the last stretches remaining in the southern arm of the project area. Additionally, patches of submerged aquatic vegetation (SAV) are found in Starvation Cove and the embayment off Eckerts Bayou.

Coastal wetland loss in Texas and in the Galveston Bay system is significant and is a continuing concern because of the essential roles that wetlands perform. Wetland loss in coastal Texas has been rated by the Environmental Protection Agency (EPA) as severe (EPA, 1999). Estimates of loss for the entire coast show that estuarine emergent wetlands decreased by 9.5% between the mid-1950s and the early 1990s (Moulton et al., 1997). Wetland loss in the Galveston Bay system is greater than in many other areas of the state.

Many causes have contributed to wetland and seagrass loss in the Galveston Bay system including dredging, stream channelization and filling, subsidence, sediment diversion, saltwater intrusion, erosion, and hydrologic alteration (White et al., 1993). Sea grass has virtually disappeared from West Bay because of development, dredging, discharges, runoff, and erosion (Pulich and White, 1991). Dredged channels physically displaced many acres of sea grass during the 20-year period between 1956 and 1976. Activities associated with development contributing to sea grass loss include increased boat traffic, channel maintenance, discharges of toxic materials, wastewater discharge, and runoff containing high nutrient levels, herbicides, and pesticides.

The Starvation Cove wetlands and adjacent habitats have also undergone significant loss. Based on USFWS National Wetlands Inventory (NWI) information and on wetland status and trends information in White et al. (1993) for the Lake Como 7.5 minute quadrangle, an area that includes Starvation Cove and adjacent marshes, 364 acres of estuarine emergent marsh, 534 acres of palustrine emergent marsh, and 650 acres of sea grass were lost between 1956 and 1989. Updated NWI information, specifically for the Starvation Cove area, shows that between 1956 and 2002 there has been a loss of approximately 80 acres of fringing, estuarine emergent marsh, 11 acres of palustrine emergent marsh, and 35 acres of sea grass over the last 46 years. Overall, erosion, subsidence, and saltwater intrusion have contributed to wetland and adjacent habitat loss in the project area. Some of the localized wetland losses can be also attributed to over-grazing of cattle that has taken place within the project area. Recent aerial photographs of the site show that fences have restricted cattle movement in some of the marshes, which has helped to restore wetland vegetation.

Erosion poses a significant threat to the marshes and adjacent habitats of Starvation Cove. Between 1852 and 1982, erosion in the Starvation Cove area was from 1.3 to 2.9 ft/yr or up to 377 ft of erosion (Paine and Morton, 1986). Average rates of erosion along West Bay shorelines have increased from 0.8 ft/yr during the historical period of 1852 to 1930 to 2.1 ft/yr during the recent period of 1930 to 1982 (Pulich and White, 1991). Shoreline

ridges, vegetated land spits, and other features, such as those at Starvation Point, which once protected intertidal marshes from erosional forces, are disappearing at a more rapid rate than protected inlets. In addition, subsidence of approximately one to two feet between 1906 and 1987 (White et al., 1993) has rendered the marsh systems more vulnerable to erosion during winter, as well as during tropical storms. Continued erosion of the shorelines and uplands separating more saline bay waters from palustrine and brackish marshes also threatens important fresh to brackish water habitats that occur in swales more to the interior, including some within the project area.

Engineering and Design Selection Process

The following detailed information would not typically be included in a Final Report however, it is being included here to demonstrate the difficulties encountered with this project due to one of the funding mechanisms, and the effect it had on the project's timeline, its budget, and the overall project.

The contract between TPWD and TCEQ was finalized (signed) on August 22, 2008 and the Notice to Proceed received on September 4, 2008. A Request for Qualifications (RFQ) solicitation was issued April 4, 2009 and ended June 11, 2009. A project committee reviewed RFQ's from eight qualified respondents. This evaluation and selection process was completed and identified the top four respondents. The top ranked respondent was put forward as the team's selection however due to administrative reasons Texas Parks and Wildlife Department was prohibited from entering into a contract with this company.

The second ranked respondent was then notified by a letter dated August 5, 2009 that they were the qualified professional design firm selected for the project. After being notified, of the selection, the company indicated it had undergone some organization changes to the project team listed in their Statement of Qualifications for this solicitation. The project manager had resigned from the company, and therefore no longer available to manage this project. This change required another qualifications review by the project team. The team still felt that the firm was the most qualified professional design firm for the project and sent a letter dated September 4, 2009 requesting the firm to submit a fee proposal. The first cost proposal that the firm submitted was approximately $63,000 over the budgetary control dollar amount of $139,500 for engineering services. After a discussion with the selection team, a meeting was scheduled with the firm to discuss their fee proposal. On October 19, the firm submitted a second fee proposal. However it still exceeded the budgetary control dollar amount for engineering by $15,249. We provided the firm the amount available for engineering and on October 23rd the selection team's contract specialist received a voice mail from the firm's project manager stating they declined to lower their fee proposal any further thus ending negotiations.

The firm selected as the next most qualified professional design firm for the project was notified on their selection and submitted a fee proposal, also exceeding the budgetary control dollar amount for engineering. A meeting was scheduled to discuss the fee proposal with the firm the first week of December. In January 2010, the firm did reduce their fees to a level appropriate for our budget. In February 2010 a Notice of Award and

Authorization to proceed was issued to Professional Engineering and Environmental Consultants for professional design services for the Starvation Gap Wetland and Water Quality Protection Project. A site visit with the selected engineer and subcontractors (surveying and sediment analysis) was also conducted in February to discuss the project goals with the subcontractors, their scope of work, and their time line for work completion.

The unforeseen obstacles in selecting a qualified professional design firm affected the TPWD's ability to spend the allotted entire $139,500 on engineering. Per our contract with TCEQ, this amount was required to be spent by May 31, 2010. This contract was amended to allow an additional 30 days to continue the work and to submit reimbursement costs. Therefore, a portion of the Coastal Impact Assistance Program (CIAP) funds that were initially to be spent on construction will be used to supplement engineering costs for the bidding and award phase, construction phase, record and other associated costs. Another consequence of these delays that impacted this grant agreement is that there will be $27,214 that could not be spent by the contract deadline. These funds will ultimately go back into the general revenue fund and will be lost as a source of funding for this project and other similar restoration projects.

While unforeseen circumstances are usually a part of every project, most should be easy to overcome and not cause problems or delays for a project. The delay in the release of CIAP funds had major impacts on the project schedule and budget. Because of the delay in the release of the funding, the budgetary control amount for engineering was reduced. This reduction led to the breakdown in negotiations with the second ranked respondent and the delays in the project schedule. This delay will also result in an increase in the overall amount of CIAP funds needed for engineering services and ultimately a reduction in the amount of funds available for on the ground habitat restoration.

Project Methodology and Objectives

The Gap Restoration Project objectives are to restore new intertidal marsh habitat utilizing dredge material from a designated borrow area and/or access channels in nearby canal subdivisions. A breakwater system will be designed to protect existing habitats and the newly restored marsh habitats at the three areas in and adjacent to the Starvation Cove area that make up the Starvation Gap Project; Hoeckers Cut, The Gap, and Tube Extension.

Construction Methods: There are two separate construction activities associated with this project; the construction of the marsh mounds and the installation of the geo-textile tubes. Both activities will require the use of a hydraulic dredge. The following construction activities are planned:

Hoeckers Cut. Installation of a breakwater to protect the existing marsh and proposed restored marsh. An intertidal marsh complex will be restored behind this breakwater.

The Gap. Marsh will be restored behind an existing breakwater that closes the gap between the Delehide and Starvation Cove restoration projects. The marsh at this area will be constructed from material dredged from a designated borrow area.

Tube Extension. A breakwater will be installed to protect the existing marsh and proposed restored marsh. The newly constructed breakwater will connect with an existing breakwater from the Starvation Cove Project. Intertidal marsh complex will be created behind this breakwater.

The marsh mounds will be constructed utilizing a hydraulic dredge that will dredge material from a designated nearby, open water borrow site or beneficially use dredge material from access channels of nearby canal subdivisions. The mounds will be pumped to an elevation slightly above intertidal elevations, 2.4 NAVD 88. This elevation was selected so that after dewatering and bulking, the mound would still be slightly above inter-tidal elevation and will have sufficient elevation to accommodate some future relative sea-level rise. Installation of the geo-textile tube will also be constructed with a hydraulic dredge and will utilize dredge material from a designated nearby open water borrow site.

Planting Techniques: All of the constructed mounds will be planted with *Spartina alterniflora* sprigs or seeded with *S. alterniflora* or a combination of both. While a donation of plants was not established as a funding commitment, TPWD will approach the NRG EcoCenter manager for plants and seeds as a donation to the project. If we are unable to secure a plant donation, a plant borrow are within the Starvation Cove Project will be designated as the plant source.

Expected Project Results

The proposed mound technique has been used at several other restoration and mitigation projects and has been proven a successful method. This project will result in the restoration of additional marsh habitat in the Starvation Cove/Delehide Cove region of West Bay. For more specific project plans, please refer to the Layout of the Mounds Using 3D Section of the Draft Final Starvation Gap Cove Marsh Restoration Project packet included as Attachment 1 to this Final Report.

Project Conclusions and Lessons Learned

To date (prior to construction activities), lessons learned have mostly been related to CIAP as a funding source. In my opinion, CIAP is solely a funding source and not a project partner. At first, CIAP as a funding source was an exciting source of funds; it was federal money that did not require a match. However, receiving these funds ended up more like a catch 22 and a moving target. Even though CIAP does not require match (we did have a $150,000 match for this project), the program required much of the work (and hence expenditures) to be completed upfront before they would release any of the CIAP funds to the project. First, the Mineral Management Services (MMS) required that we have our Section 404 of the Clean Water Act in place. After we received our permit the MMS then required the engineering to be substantially complete before they would release any of the CIAP funds to the project. While a match is not a requirement of the

funding source, MMS's operating procedures, requiring Section 404 permitting and engineering to be done before they release any funds, necessitates that the project have other sources of funding. None of these requirements were in place when the funds were applied for.

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Attachment 1