State of Louisiana
Department of Natural Resources
Coastal Restoration Division

2004 Operations, Maintenance, and Monitoring Report

For

Bayou Chevee Shoreline Protection

State Project Number PO-22
Priority Project List 5

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Orleans Parish

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Preface

The 2004 OM&M Report format is a streamlined approach which combines the Operations and Maintenance annual project inspection information with the Monitoring data and analyses on a project-specific basis. This new reporting format for 2004 includes monitoring data collected through December 2003, and annual Maintenance Inspections through June 2004. Monitoring data collected in 2004 and maintenance inspections conducted between July 2004 and June 2005 will be presented in the 2005 OM&M Report.

I. Introduction

The Bayou Chevee Shoreline Protection project is located within the northern section of the Bayou Sauvage National Wildlife Refuge, approximately 10 miles northeast of New Orleans, Louisiana (figure 1). The project area is located on the southern shoreline of Lake Pontchartrain and is divided into two areas, the north cove area and the south cove area. The north cove project area, comprising 164 acres, is located just north and west of Bayou Chevee. It extends 300 ft into the marsh from the existing shoreline of an 110 acre pond of open-water and includes 54 acres of brackish marsh. The south cove area, consisting of 48 acres, is located southeast of Bayou Chevee and northwest of Chef Menteur Pass. It extends 300 ft into the marsh from the existing shoreline around a 27 acre cove and includes 21 acres of brackish marsh. Project and reference area marshes are dominated by *Spartina patens* (marshhay cordgrass) with *Pluchea spp.* and *Cyperus spp*. present.

High wave and current energies associated with Lake Pontchartrain and Chef Menteur Pass have caused extensive shoreline erosion along the Lake Pontchartrain shoreline that has been estimated to average 15 ft/yr, or approximately 3.55 ac/yr from 1958-1983 (U.S. Army Corps of Engineers [USACE] 1997). Over the twenty year life of the project, the shoreline would be expected to erode 300 feet, without project implementation. Shoreline erosion was not a measurable problem for the interior pond of the north cove prior to 1997 when the pond was separated from Lake Pontchartrain by a 250 ft strip of marsh. However, by early 1997, this marsh had disappeared leaving the interior shoreline exposed to the wind and wave energies of Lake Pontchartrain.

The PO-22 project consists of approximately 8,875 linear feet of rock bankline protection along the shoreline of Lake Pontchartrain, extending north and south from Bayou Chevee. Construction was completed on December 12, 2001. The shore protection will allow for the enclosed shallow water areas to be colonized by a greater abundance of submerged aquatic vegetation (SAV).

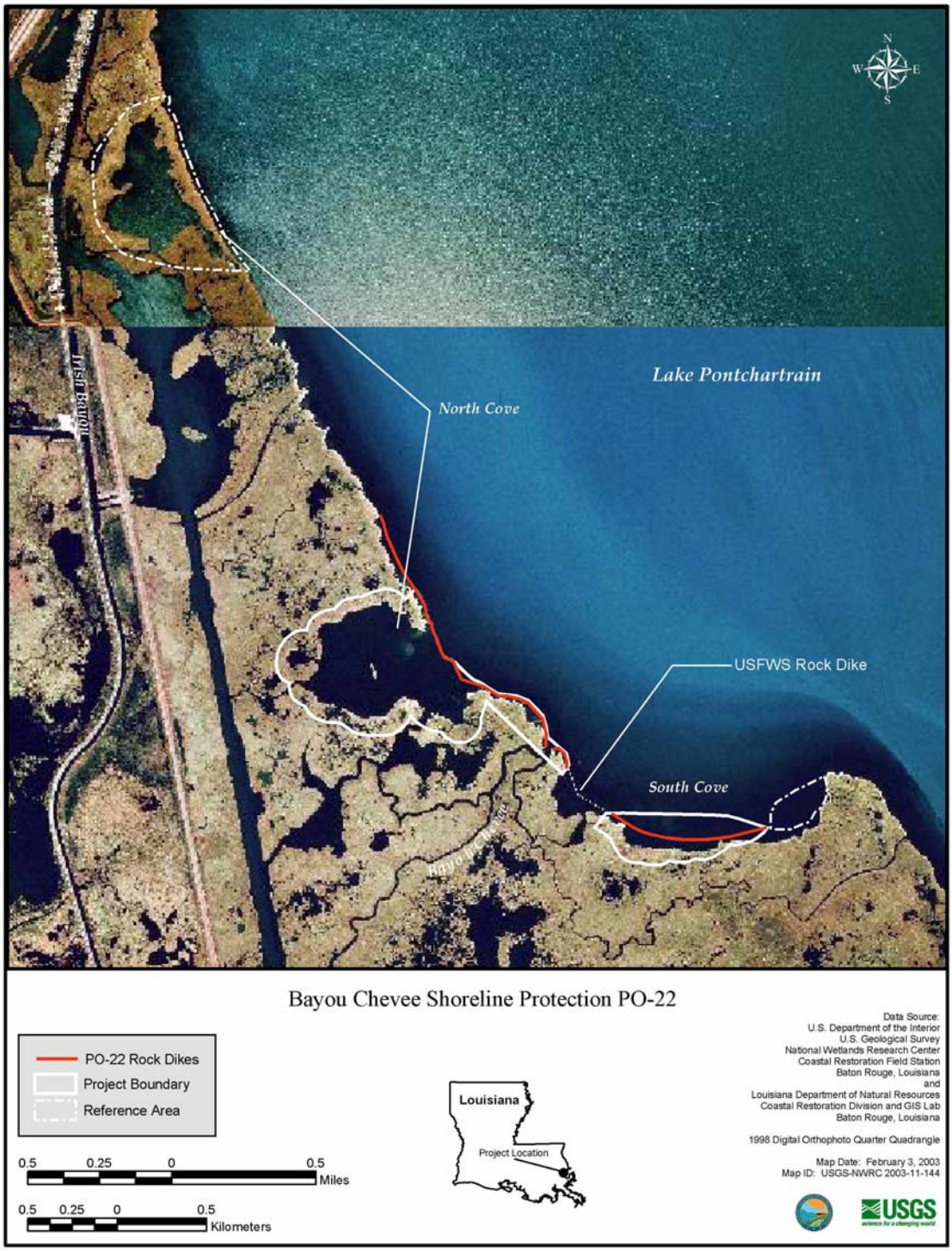

Figure 1. Location of Bayou Chevee Shoreline Protection (PO-22) project boundaries, features and reference area.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The site was inspected on July 2, 2003 by Van Cook, Thomas Bernard, and George Boddie from LDNR, after the passage of Tropical Storm Bill. The field inspection included a complete visual inspection of the project feature.

b. Inspection Results

No damage from the passage of the tropical system was discovered, however, some sections of the rock structure appear to be subsiding faster than other sections. Overall the condition of the structure was good.

c. Maintenance Recommendations

i. Immediate/Emergency Repairs

No immediate repairs are suggested.

ii. Programmatic/Routine Repairs

No repairs are required.

III. Operation Activity

a. Operation Plan

This project requires no operations, therefore no operation plan has been generated.

b. Actual Operations

This project requires no operations, therefore no structure operations have been conducted.

IV. Monitoring Activity

This is a comprehensive report and includes all data collected from the pre-construction period and the post-construction period through December 2003.

a. Monitoring Goals

The objective of the Bayou Chevee Shoreline Protection project is to provide shore protection for the north cove and south cove areas of the Bayou Sauvage National Wildlife Refuge and enhance the establishment of submerged aquatic vegetation in

the south cove area while maintaining or enhancing their establishment in the north cove area.

The following goals will contribute to the evaluation of the above objective:

1. Decrease the mean rate of shoreline erosion in both the north and south cove areas.
2. Maintain (north cove) or maintain/increase (south cove) mean abundance of submerged aquatic vegetation in the ponds behind the rock dikes.

b. Monitoring Elements

Shoreline Change

Using GPS, shoreline position was documented as-built in 2001, and will be documented in 2004, 2007, 2010, 2013, 2016, and 2019 post-construction for mapping shoreline change and movement over time. Shoreline erosion rates for the project areas will be compared to the shoreline erosion rates of the reference areas, and with historical rates of shoreline erosion collected by Gagliano et al. (1988).

Vegetation (SAV)

Methods described in Nyman and Chabreck (1996) were used to determine the frequency of occurrence of SAV along two transects established in each of the north and south cove project and reference areas (figure 2). SAV was sampled for pre-construction years 1998 and 2001, and will be collected in years 2004, 2007, 2010, 2013, 2016, and 2019 post-construction.

c. Preliminary Monitoring Results and Discussion

Shoreline Change

To date, only an as-built survey has been completed. After shoreline position is documented in 2004, the data will be analyzed and the shoreline change quantified. However, as determined by overlay of 2001 shoreline data over the 1998 DOQQ image, shoreline position has retreated considerably since 1998 (figure 3). In the South cove project area, shoreline position has retreated past the original project boundary.

Vegetation (SAV)

In 1998 *Vallisneria americana*, *Myriophyllum spicatum* and R*uppia maritima* (south cove reference only) occurred at an average frequency of 33%, 10%, and 13% respectively, within the south cove area (table 1). The south cove project and reference areas were completely devoid of SAV in 2001.

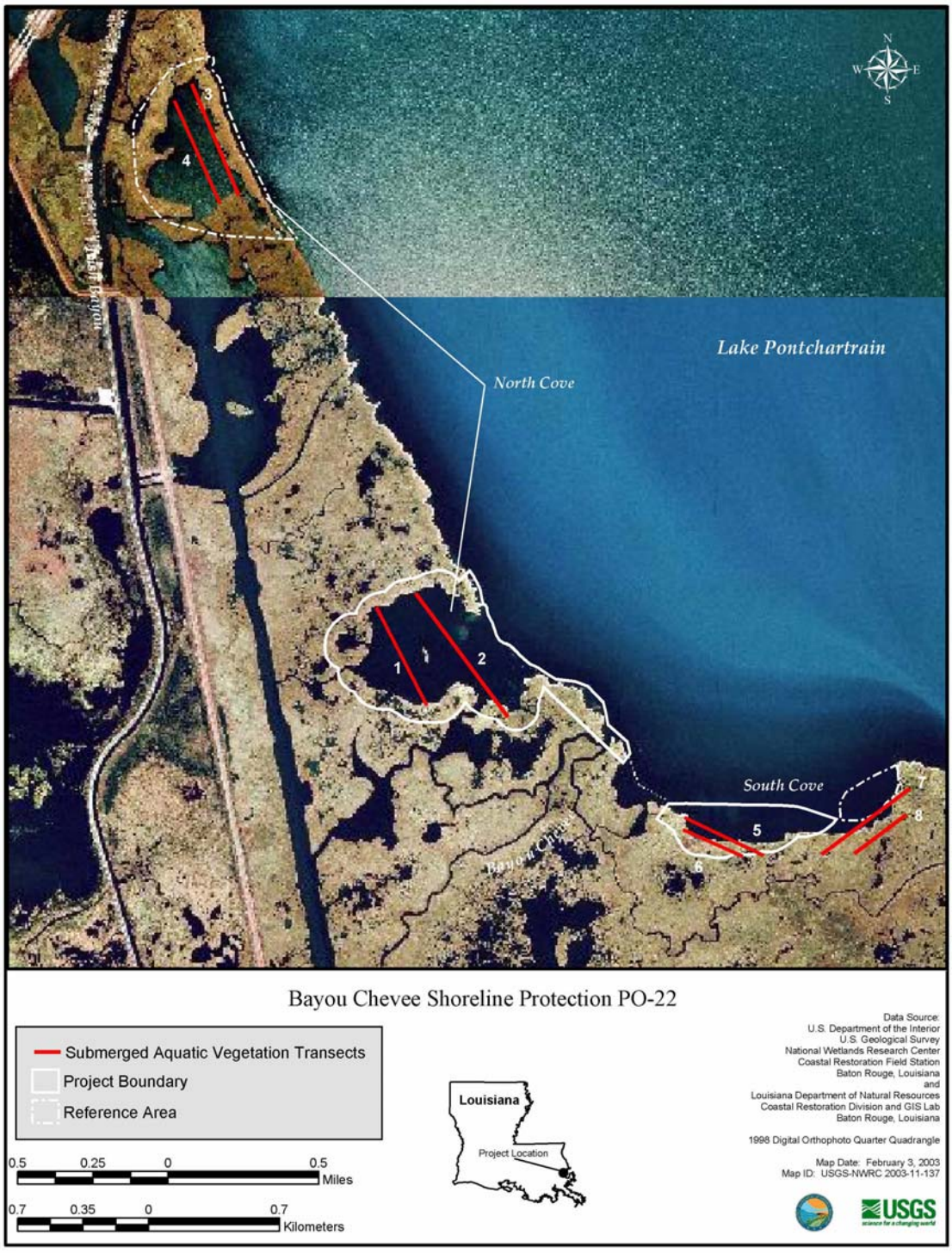

Figure 2. Location of Bayou Chevee Shoreline Protection (PO-22) submerged aquatic vegetation transects.

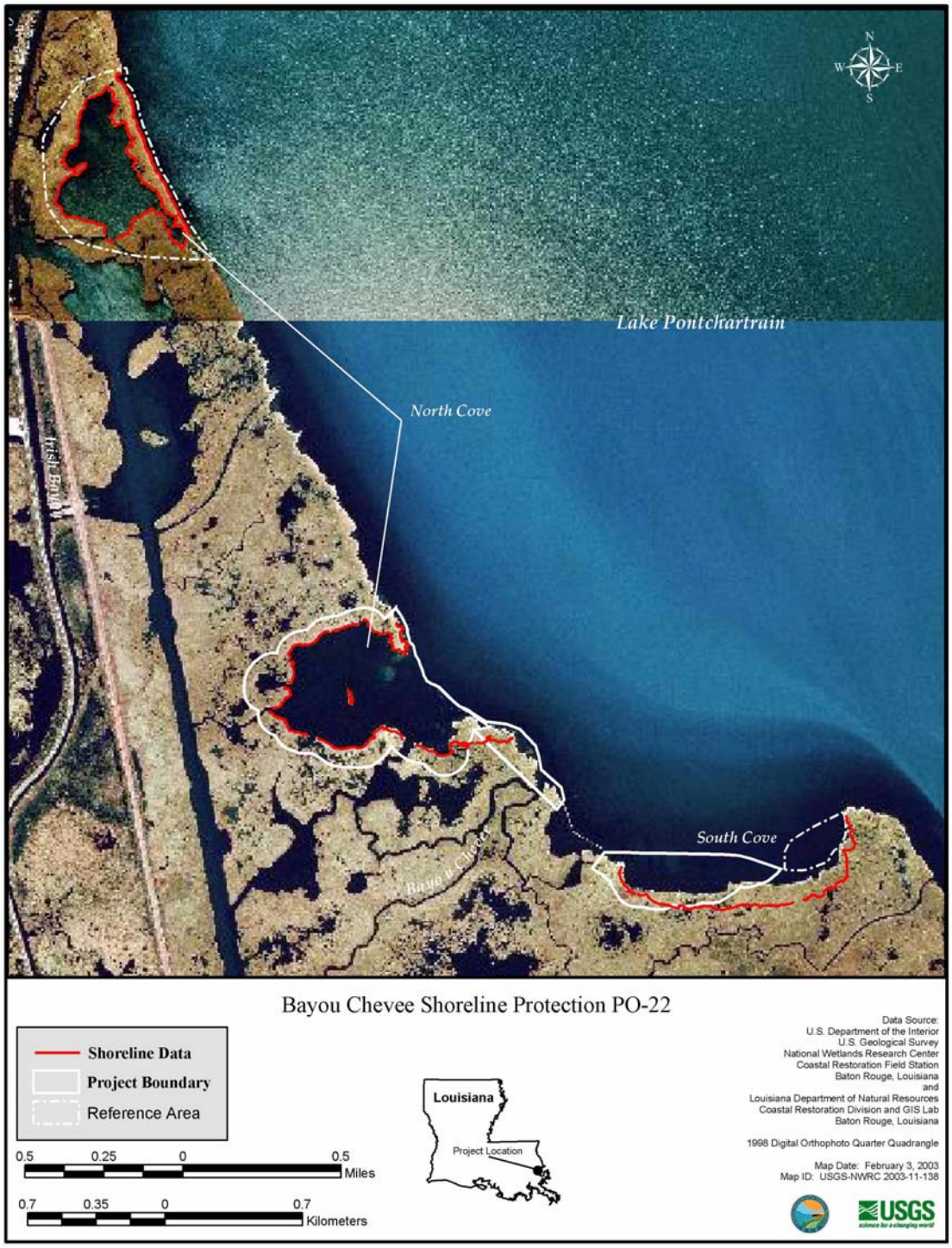

Figure 3. 2001 Shoreline position overlaid on 1998 DOQQ image of the Bayou Chevee Shoreline Protection (PO-22) project.

Table 1. Relative frequency of submerged aquatic vegetation species for south cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection (PO-22) project. The symbol (--) denotes the species was not documented in that area.

Scientific Name	South Cove Project 1998	South Cove Project 2001	South Cove Reference 1998	South Cove Reference 2001
Empty Sample	56.67	100	56.67	100
Alga	--	--	--	--
Myriophyllum spicatum	13.33	--	6.67	--
Ruppia maritima	--	--	13.33	--
Vallisneria americana	36.67	--	30	--

The north cove project area showed a similar decline between 1998 and 2001, with only algae and a small amount of *R. maritima* (6.19%) recorded during 2001 sampling compared to a high abundance and diversity of SAV in 1998 (table 2). The north cove reference area showed a high occurrence of algae (81%) and *R. maritima* (61%) in 2001, but had lost the diversity and overall abundance of SAV species recorded during the 1998 sampling (table 2). Overall, a significant decline in SAV frequency and occurrence was realized across all areas between the 1998 and 2001 SAV surveys (figures 4 and 5). This loss was most likely due to drought conditions that prevailed during the 2000 growing season. During the drought salinities at the Fritchie Marsh monitoring station (PO06-06) in Salt Bayou, located northeast of the project area on the north shore of Lake Pontchartratin, averaged 10ppt, which is more than twice the normal average of 4 ppt and exceedes the tolerance levels of *C. demersum*, *M. spicatum*, *N. guadalupensis*, and *V. americana*. *Ruppia maritima*, which can withstand a broad range of salinity levels, was the only plant species observed during the 2001 sampling. However, the total loss of SAV noted in the south cove area was probably a result of both increased salinity levels and unabated wave action. The south cove shoreline retreated considerably between 1998 and 2002 (figure3), and the high wave energies which caused this retreat likely contributed to the demise of the SAV.

Table 2. . Relative frequency of submerged aquatic vegetation species for north cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection (PO-22) project. The symbol (--) denotes the species was not documented in that area.

Scientific Name	North Cove Project 1998	North Cove Project 2001	North Cove Reference 1998	North Cove Reference 2001
Empty Sample	3.33	50.44	--	9.80
Alga	--	46.02	--	81.37
Ceratophyllum demersum	16.67	--	--	--
Myriophyllum spicatum	88.33	--	100	--
Najas guadalupensis	30	--	100	--
Ruppia maritima	81.67	6.19	78.33	60.78
Vallisneria americana	46.67	--	--	--

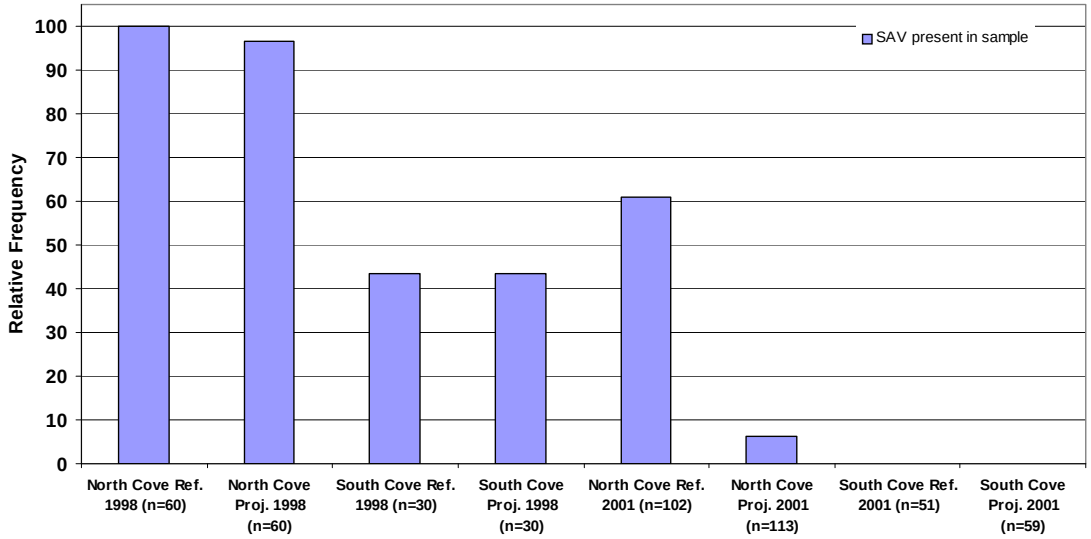

Figure 4. Frequency of occurrence of submerged aquatic vegetation in samples for North and South cove project and reference areas 1998 and 2001 for the Bayou Chevee Shoreline Protection (PO-22) project.

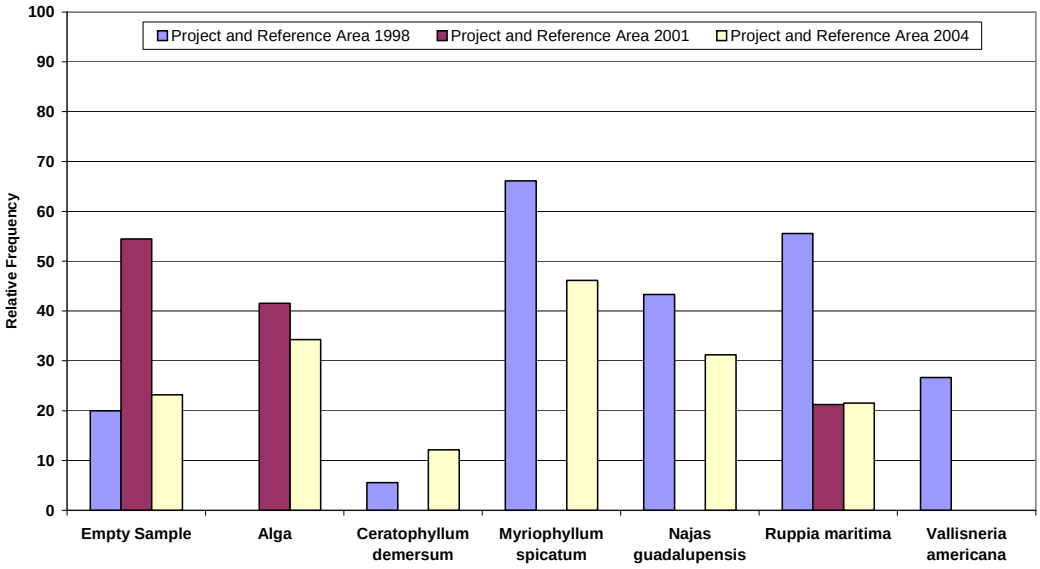

Figure 5. Relative frequency of submerged aquatic vegetation species for project and reference area July 1998 and April 2001 for the Bayou Chevee Shoreline Protection (PO-22) project.

V. Conclusions

a. Project Effectiveness

Although no post-construction DGPS shoreline data have yet been collected, it is evident from the combination of the 2001 shoreline data with the 1998 DOQQ photography that substantial areas along the shoreline were lost during the three years that construction of this project was delayed. During this time, we also saw a dramatic reduction in SAV abundance in both the project and reference areas mostly due to drought conditions.

To date, all of the data collected for this project have been during the pre-construction period, so evaluation of project effectiveness at this time is impossible. However, the 2004 SAV data was recently collected and preliminary results show a good concentration of SAV species in both the north and south cove project areas. Once these data are analyzed and the shoreline data collected, the results will be presented in the next report.

b. Recommended Improvements

Without data for the post-construction period, no improvements can be recommended at this time.

c. Lessons Learned

This project shows how dynamic and vulnerable wetlands are. In just three short years, the shoreline retreated considerably and the SAV community changed drastically. Efforts should be taken in the future to minimize construction delays.

VI. Literature Cited

Gagliano, S.M, D.W. Roberts, and R.J. Sauvage, Jr. 1988. Evaluation of the Wetlands of Eastern Orleans Parish, Louisiana. Baton Rouge, Louisiana: Coastal Environments, Inc. 53 pp.

Nyman, J. A and R. H. Chabreck. 1996. Some Effects of 30 Years of Weir Management on Coastal Marsh Aquatic Vegetation - Implications to WaterfowlManagement. Gulf of Mexico Science 1: 16-25.

U.S. Army Corps of Engineers (USACE) 1997. Environmental Assessment (EA #261-A) CWPRRA Project XPO-69 Shore Protection at Bayou Chevee, Orleans Parish, Louisiana. New Orleans: U.S. Army Corps of Engineers. 13 pp.