State of Louisiana
Coastal Protection and Restoration Authority

2011 Operations, Maintenance, and Monitoring Report

for

Barataria Bay Waterway West Side Shoreline Protection (BA-23)

State Project Number BA-23
Priority Project List 4

October 2011
Jefferson Parish

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Operations, Maintenance, and Monitoring Report
For
Barataria Bay Waterway West Side Shoreline Protection
(BA-23)

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Preface

This report includes monitoring data collected through December 2009, and annual Maintenance Inspections through May 2011.

The 2011 report is the 3rd report in a series. Because all of the monitoring elements outlined in the monitoring plan have been completed, this will be the final Operations, Maintenance, and Monitoring Report and as such, data and figures from previous reports have been included in order to consolidate them into one final report. Annual inspection reports will continue to be generated. For additional information on lessons learned, recommendations and project effectiveness please refer to the 2004 and 2007 Operations, Maintenance, and Monitoring Reports on the LDNR web site (Barmore and Babin 2004, Barmore et al. 2007).

I. Introduction

The Barataria Bay Waterway West Side Shoreline Protection Project (BA-23) is located in Jefferson Parish, Louisiana, approximately 4.5 mi (7.2 km) south of the town of Lafitte on the west side of the Dupre Cut portion of the Barataria Bay Waterway (BBW). The project area is east of Bayou Rigolettes, north of the Lafitte Oil and Gas Field, and southwest of The Pen (Fig. 1).

Project area wetlands were formed in a protective curve of the natural ridge of Bayou Barataria. The east-west orientation of the ridge, which serves as the southern boundary of the project area, protected the wetlands from the direct influence of salinities and tidal action of the Gulf of Mexico through Barataria Bay. Construction of the Dupre Cut portion of the BBW established a direct conduit linking project wetlands with Barataria Bay. Initially, Dupre Cut spoil banks protected the project area from salinity and tidal fluctuations in the waterway. The combination of subsidence and wave erosion from marine traffic, however, caused a breaching of the spoil banks which resulted in increased water exchange and salinity fluctuations within the project wetlands.

Land loss maps (Britsch and Dunbar 1993) of the area indicate that by the late 1950's and 1960's a majority of the project wetlands had converted to open-water. The land loss rate, used in the 1994 Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) Wetland Value Assessment analysis, was 1.89% per year for the years 1983 to 1994 (Louisiana Coastal Wetlands Conservation and Restoration Task Force 1994).

Conversion to open-water is but one of the processes affecting the project area. Subsidence of the ridge forming the northern, western, and southern boundaries has changed the ridge from a forested wetland to more of a shrub-scrub environment. Once solid emergent marshes have converted to broken fringe marshes, it is very difficult to reverse the process. In 1949, O'Neil classified the marshes in the project area as fresh *Schoenoplectus americanus* (three-cornered grass) marsh. Thirty years later, those remaining marsh areas were classified by Chabreck and Linscombe (1978 and 1988) as brackish.

The BA-23 project consists of approximately 9,400 linear feet (2,865 m) of rock bankline protection (foreshore rock dike) along the west bank of the BBW to protect the adjacent marsh from excessive water exchange and subsequent erosion (Fig. 1). The project supplemented a dredge-and-fill operation previously completed by the U.S. Army Corps of Engineers (USACE). The Natural Resources Conservation Service (NRCS) filled in gaps in the dike excluded from the USACE operation, thereupon reinforcing and forming a continuous foreshore rock dike.

The USACE dedicated dredging operation in the BBW utilized sediments taken from the waterway in an attempt to create new marsh within the project area. The USACE deposited approximately 750,000 cubic yards (555,556 m^3) of cutterhead dredged material in semi-confined, shallow open-water areas adjacent to the BBW. This one-time operation was designed to create conditions conducive to the establishment of emergent marsh. As part of the BA-23 project, marsh water levels are being managed through the use of a water control structure (weir) placed in the southern portion of the project area. The structure is required by permit conditions to remain open most of the year, allowing unimpeded ingress and egress of marine organisms. During waterfowl hunting season (November through January), however, water levels are managed to a height not exceeding 6 in (15 cm) below marsh elevation.

Project Objective

The primary objective of this project is to re-establish a hydrologic barrier, which will protect approximately 2,200 ac (880 ha) of combined marsh and open-water from excessive wave energy, water level fluctuations, and saltwater intrusion from the BBW.

The project features include approximately 9,400 linear feet (2,865 m) of foreshore rock dike combined with a water control structure consisting of two 48 in (1.22 m) corrugated pipe culverts with two 5’ stop log bays to allow for management of water levels and the movement of marine organisms within the project area.

Construction Dates

Start Construction:	June 1, 2000
End Construction:	November 15, 2000

Figure 1. Barataria Bay Waterway West Side Shoreline Protection (BA-23) project features.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Barataria Bay Waterway West Side Protection Project (BA-23) is to evaluate the constructed project features, to identify any deficiencies, and to prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, the OCPR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (LDNR 2002). The annual inspection report also contains a summary of maintenance projects and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix B.

An inspection of the Barataria Bay Waterway West Bank Protection Project (BA-23) was held on April 21, 2011, by Barry Richard of OCPR and Quin Kinler and Mike Trusclair of NRCS. Photographs of that inspection are included in Appendix A of this report.

b. Inspection Results

Rock Riprap

The rock structure appeared to be in good condition at the time of the inspection (Photo #1). There are some sections of settlement, but the structure is still functioning as designed. These sections will continue to be monitored for maintenance needs.

Water Control Structure

The structure was opened for the first time since the oil spill on March 23, 2011. Everything is still in good condition. Some of the stop logs need repairs and the slots need to be cleaned, but no major repairs are required at this time. The landowner has stated that the test oil and gas well that was drilled was successful and a more permanent well structure will be placed at the mouth of the canal, to one side. The access dredging for the well disturbed little of the 2007 maintenance marsh creation inside the channel. The marsh created within the project as part of the well access dredging appears to be a little low in elevation in spots, but appears healthy overall (Photo #2).

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

- There are no immediate repairs scheduled at this time.

ii. Programmatic/ Routine Repairs

- Continue to check the water control structure during operational procedures.
- Continue to observe rock structure for settlement.
- Repair stop logs and clean slots.

d. Maintenance History

In December 2005, a contract to raise settled portions of the rock structure was awarded and resulted in the placement of 5,143 tons of rock riprap on the settled sections of the structure. The work was completed on January 24, 2006.

In May 2007, a contract for dredging the access channel, which leads to the water control structure, was awarded. Approximately 4,400 cubic yards of material was dredged and placed within the channel to be used beneficially. This work was completed on June 19, 2007.

III. Operation Activity

a. Operation Plan

The water control structure remains open most of the year, allowing unimpeded ingress and egress of marine organisms. During waterfowl hunting season, which is also low water season (November through January), the structure is closed to retain water within the southern project area. Water levels are managed to a height not to exceed 6 inches (15 cm) below marsh elevation in the southern project area.

IV. Monitoring Activity

Pursuant to a CWPPRA Task Force decision on August 14, 2003 to adopt the Coastwide Reference Monitoring System-*Wetlands* (CRMS-*Wetlands*) for CWPPRA, updates were made to the BA-23 Monitoring Plan to merge it with CRMS-*Wetlands* and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act. There are 0 CRMS sites located in the project area.

a. Monitoring Goals

The primary objective of this project is to re-establish a hydrologic barrier to protect approximately 2,200 ac (880 ha) of combined marsh and open-water from excessive wave energy, water level fluctuations, and saltwater intrusion from the BBW.

The specific measurable goal established to evaluate the effectiveness of the project is:

1. Maintain or increase marsh to open-water ratios in the project area.

b. Monitoring Elements

The following monitoring elements will provide the information necessary to evaluate the specific goal listed above:

Aerial Photography

To evaluate land to water ratios in the project area, near vertical, color infrared aerial photography (1:12,000 scale, with ground controls) was obtained in 1997 (pre-construction), 2003 and 2009 (post-construction).

Vegetation

Plant species composition and relative abundance of wetland vegetation was documented in the project area in 1997 (pre-construction) and in 2003 (post-construction). Utilizing random stratified sampling with two strata of ten stations each (20 stations total), a modification of the Braun-Blanquet technique (Mueller-Dombois and Ellenberg 1974) was used to sample emergent vegetation (Fig. 1). The "rake" method used to sample submergent vegetation (Nyman and Chabreck 1996). Strata were defined as northern and southern sections divided by a pipeline canal that essentially bisects the project area. Expected changes in land to open-water ratios require flexibility in vegetative sampling. Current open-water stations were sampled for submergent vegetation. If these stations subsequently converted to emergent marsh, they were sampled accordingly. The converse also occurred. Vegetation surveys were conducted in early fall, prior to the first frost. All procedures followed methods outlined in Steyer et al. (1995).

Water Level

To monitor water level variability, one continuous recorder was located within the project area and one recorder was located in the Barataria Bay Waterway (Fig. 1). Hourly water level data were collected continuously prior to construction in 1998-2000, and after construction in 2001-2003. Continuous recorders were removed in 2003 due to changes in the monitoring plan as a result of the implementation of the CRMS program.

Salinity

To monitor salinity variability, one continuous recorder was located within the project area and one recorder was located in the Barataria Bay Waterway (Fig. 1). Hourly salinity data were collected continuously prior to construction in 1998-2000, and after construction in 2001-2003.

c. Monitoring Results

<u>Aerial Photography</u>

Color infrared aerial photography was obtained in 1997 (Fig. 2, pre-construction), 2003 and 2009 (Figs. 3 and 4, post-construction). The aerial photography was used to determine land:water ratios within the project area (Table 1).

Table 1. Results of land/water analysis for 1997, 2003, and 2009 aerial photography. Project boundaries were adjusted between the 1997 and 2003 analyses, accounting for the difference in total acreage.

Year	Land (ac.)	Water (ac.)	Total (ac.)
1997	392	1523.9	1915.9
2003	761	1405	2166
2009	752	1414	2166

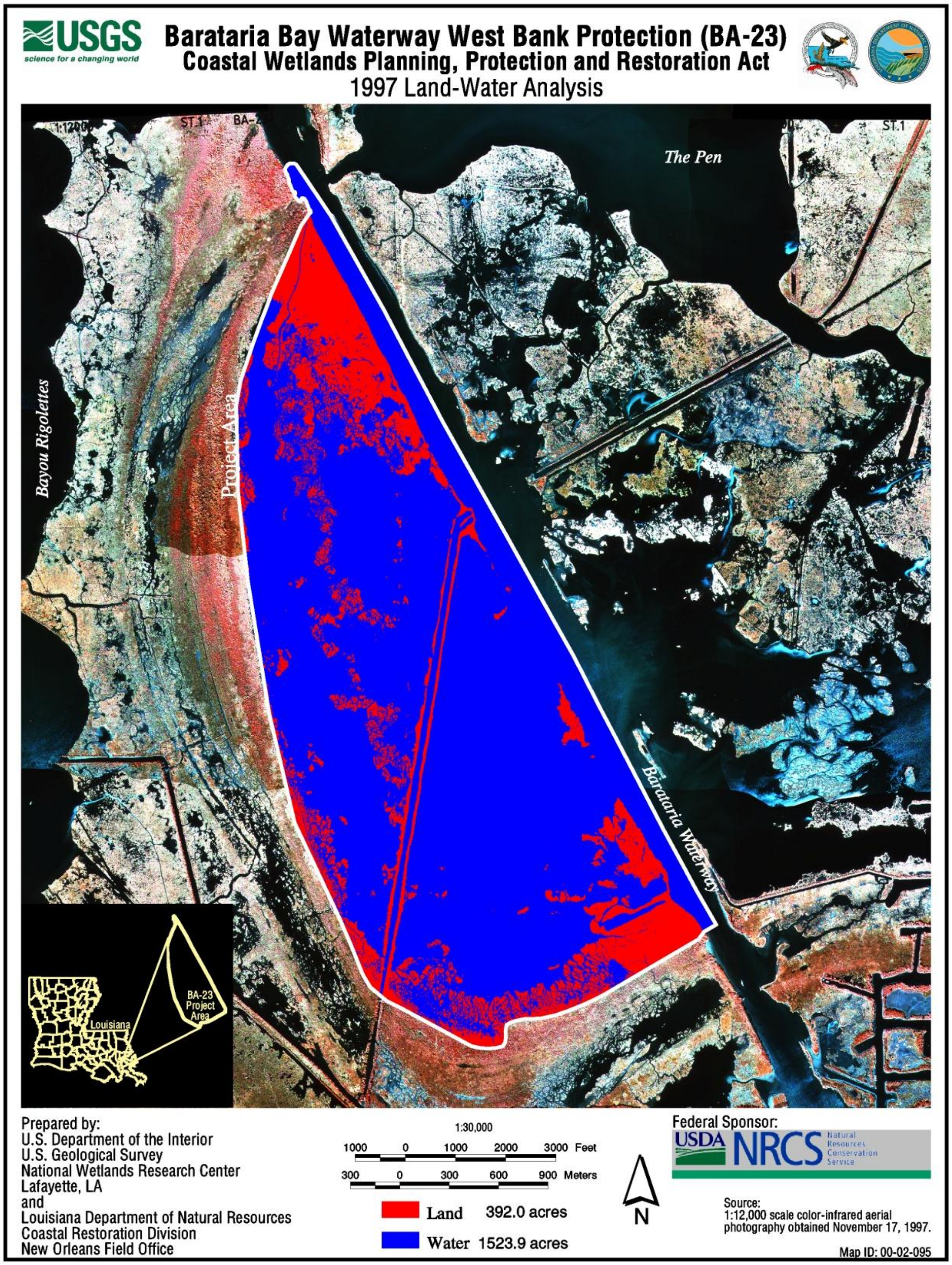

Figure 2. Land-water analysis of 1997 aerial photography for BA-23 Barataria Bay Waterway West Side Shoreline Protection.

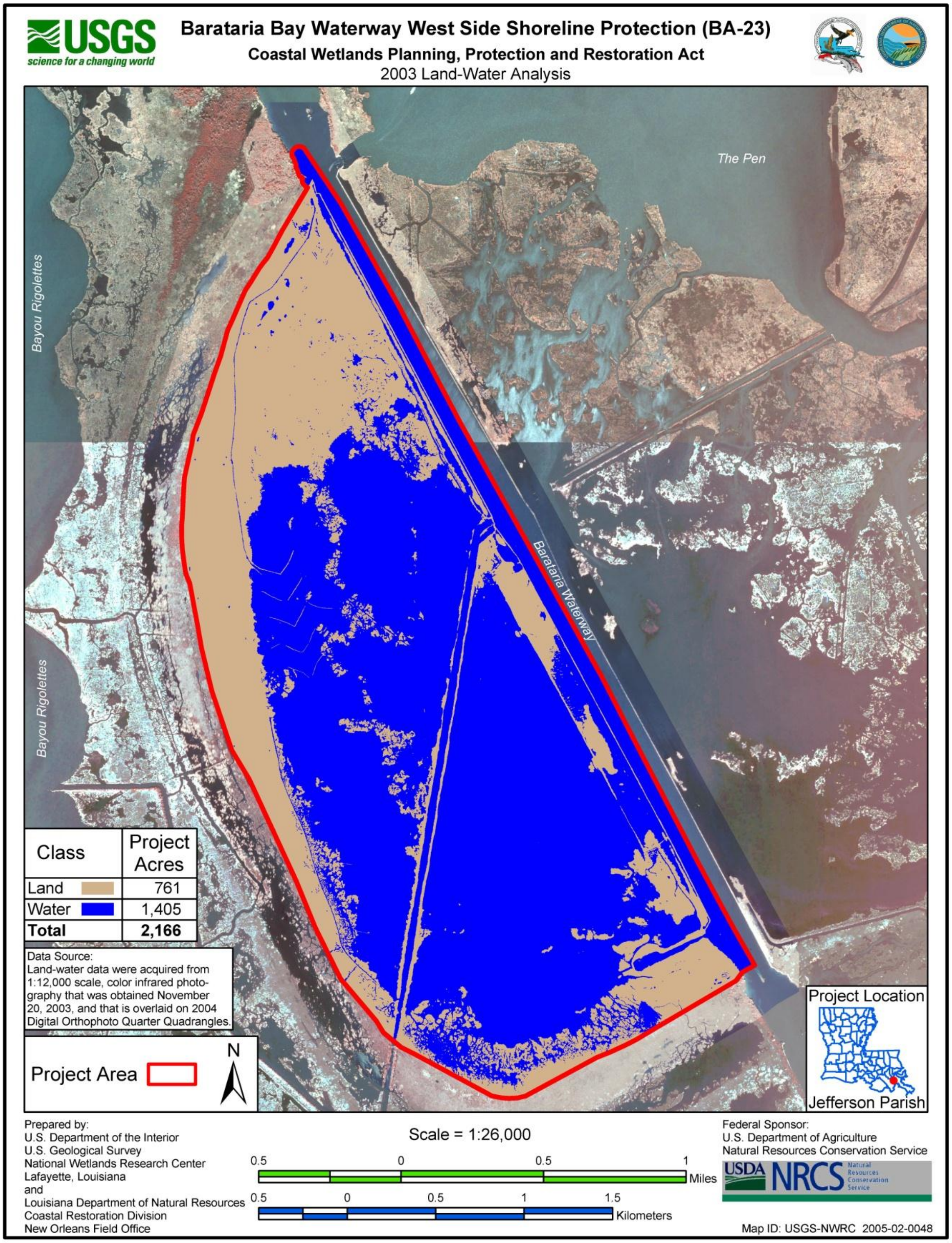

Figure 3. Land-water analysis of 2003 aerial photography for BA-23 Barataria Bay Waterway West Side Shoreline Protection.

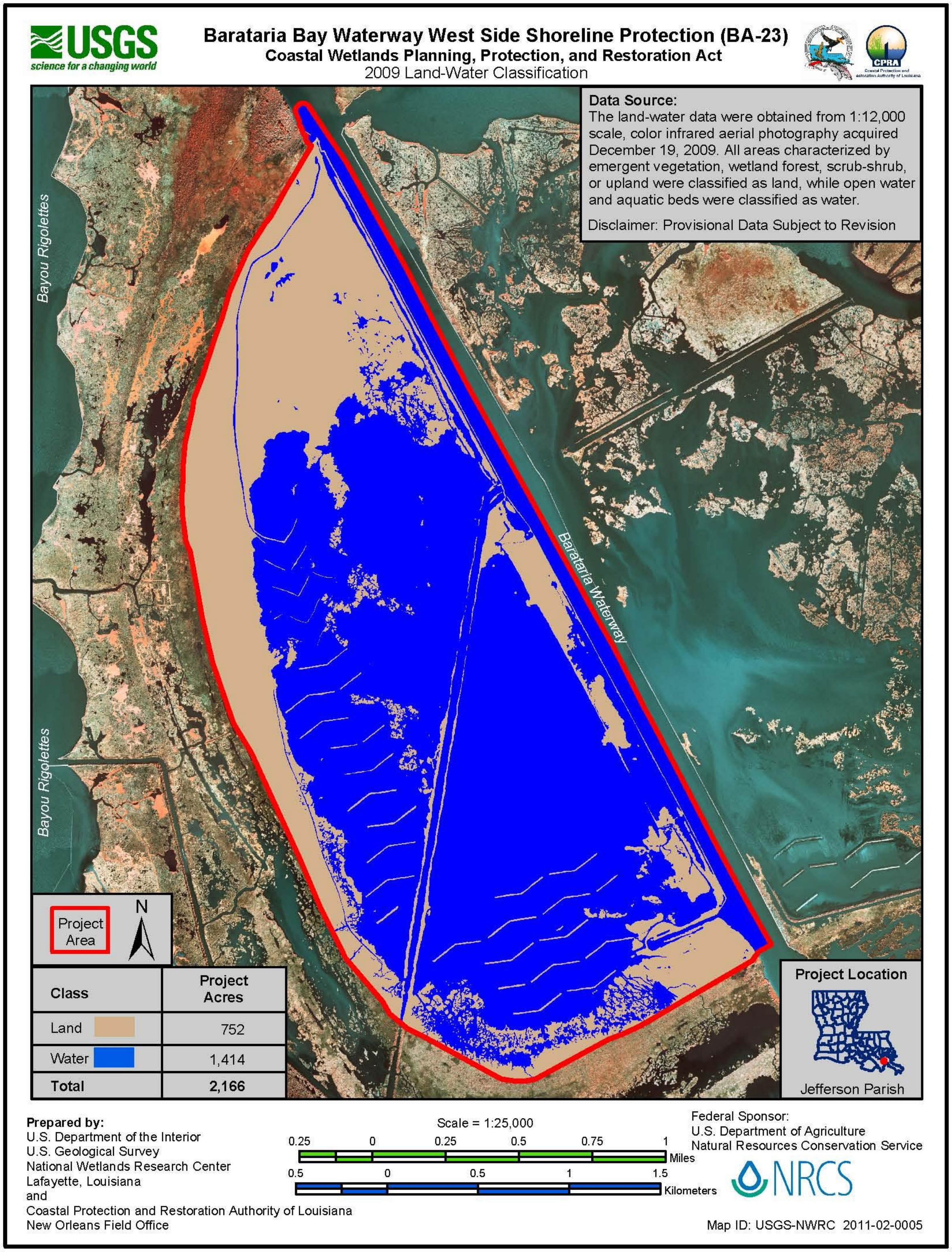

Figure 4. Land-water analysis of 2009 aerial photography for BA-23 Barataria Bay Waterway West Side Shoreline Protection.

Vegetation

Vegetation surveys were conducted in November 1997 (N=20 plots) pre-construction and September 2003 (N=20 plots) post-construction. *Spartina patens* (marshhay cordgrass) was the dominant species of vegetation in both 1997 and 2003 (Fig. 5). *Spartina alterniflora* (smooth cordgrass) was also widespread in both pre- and post-construction surveys. *Schoenoplectus pungens* (common threesquare), the second most abundant species in 1997, was absent from the 2003 survey. The diversity of species observed in 2003 was less than that recorded in 1997 (Fig. 5). Additionally, the abundance of fresh marsh species was lower in 2003 than it was in 1997.

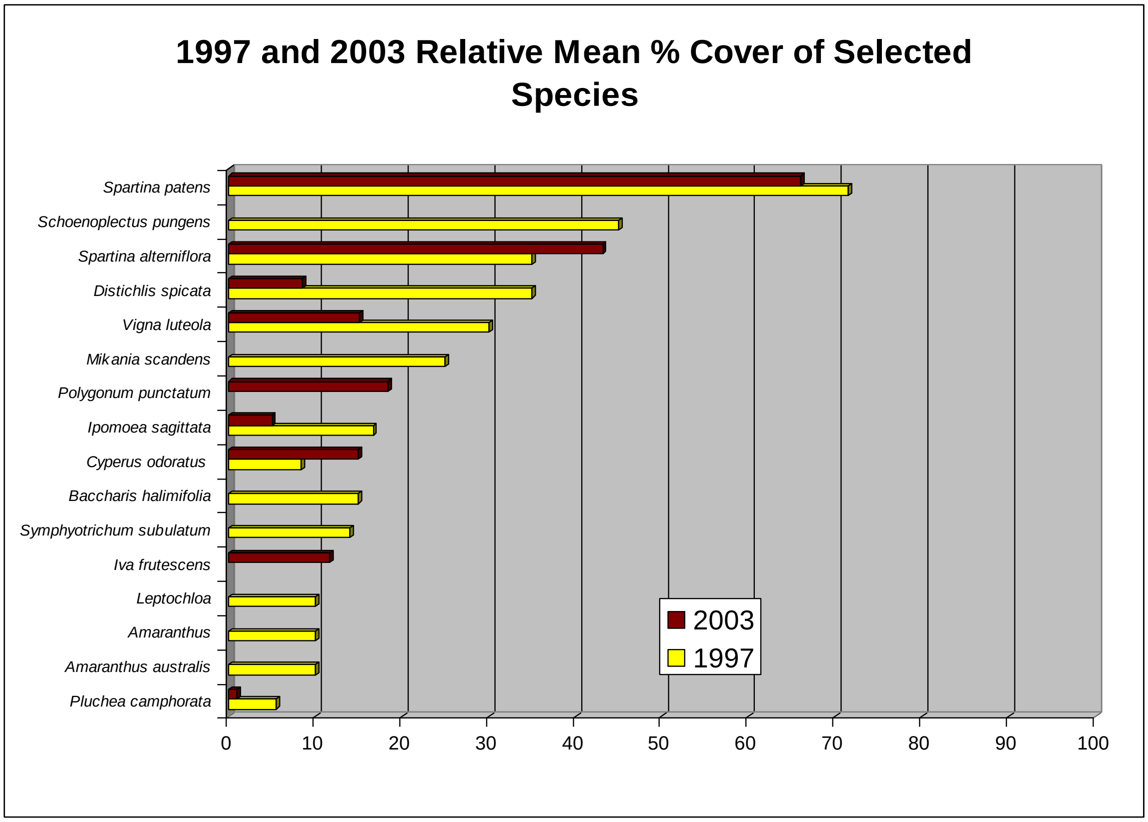

Figure 5. Mean % cover of selected species across all 4-m^2 plots with that species present within the BA-23 project area during November 1997 (N=20 plots) and September 2003 (N=20 plots). Vegetation was sampled using the modified Braun-Blanquet method.

Salinity and Water Level

Hourly salinity and water level data were collected at the following continuous recorder stations:

Station	Data collection period
BA23-01	9/9/1998 – 9/24/2003
BA23-02	8/13/1998 – 7/17/2003

A multivariate analysis of variance (MANOVA) was run for the entire project comparing the changes in water level and salinity from two locations across three time periods. Monitoring station BA23-01 was inside the project area (Impact) and station BA23-02 was outside the project area (Control). The three time periods are Pre-construction (Sep 1998-Nov 2000), Post-construction (Nov 2000-Mar 2002), and Post-weir (Mar 2002–Jul 2003). Pre-construction time is defined as the time period before any construction took place on the project. It is characterized by complete unimpeded exchange of water on the project's east side (the side bordering the Barataria Bay Waterway). Post-construction time is defined as the time period after the rock dike was constructed on the eastern edge of the project. It is characterized by a separation of the main body of the project and the Barataria Bay Waterway. Post-weir time is defined as the time period after the construction of the rock dike and after the construction and operation of the water control structure on the project's southeastern side. It is characterized by limited flow of water through the control structure during a three month period (November through January) and a free flowing water control structure during the remainder of the year.

A BACI (Before-After Control-Impact) design (Underwood 1992) was constructed to analyze the salinity data using BA23-01 as the Impact site, BA23-02 as the Control site, and Before-After was broken into the three previously stated periods (Pre-construction, Post-construction, and Post-weir). Prior to analysis, salinity data for the project were heavily skewed, so a Box-Cox Y transformation was necessary to normalize it. Water level data were sufficiently normal to allow analysis without transformation.

A BACI design tests for the interaction of both elements (location and time), therefore any significance found between Control-Impact or Pre-Post-Weir will not be analyzed. The only significant result will be the interaction of those factors (Underwood 1992). A difference between Control and Impact could be explained by natural difference in the two environments. Any difference between Pre-construction, Post-construction, and Post-weir could be explained by regional environmental factors such as weather and water table fluctuations. A significant interaction between these two factors will demonstrate that the change over time is not equal between the two locations. This "difference in change" should be the result of a third factor, the project.

Using Wilk's lambda, the MANOVA was significant, showing a project effect ($p<.001$, $F=96.1128$ $df=10$) with a significant interaction ($p<.0001$, $F=36.9737$, $df=4$).

The BACI (2x3 ANOVA) of salinity revealed a significant project effect across period ($p<.0001$, $F=32.4317$ $df=2$), location ($p<.0001$, $F=432.5441$ $df=1$), and a significant interaction effect ($p<.0001$, $F=9.1179$ $df=2$). However, differences in actual mean salinity values between project and reference areas for the three time periods were quite small (Fig. 6). The greatest difference (1.02 ppt) occurred during the Post-Construction period (11/1/00 – 3/1/02). The remaining two time periods have differences of less than .2 ppt.

Monthly variance in hourly salinity readings were compared to help evaluate whether the project helped decrease fluctuations. Monthly variance was used to help reduce time lag artifacts in the data without loss of statistical power. While fluctuations are less frequent and of lower intensity in the project area than in the reference area, these differences seemed to exist prior to construction of the project (Fig. 8).

The 2x3 ANOVA of water level revealed a significant project effect across period ($p<.0001$, $F=31.5261$ $df=2$), location ($p<.0001$, $F=18.1784$ $df=1$), and a significant interaction effect ($p<.0001$, $F=49.3094$ $df=2$). The water levels of the project area did not change significantly across time periods. However, the water levels of the reference area did change significantly across time periods, increasing during construction, and then finally decreasing to higher than pre-construction levels (Fig. 9).

Monthly variance in hourly water depth readings (adjusted to datum NAVD 88) of the project area and reference area were also compared. Fluctuations appear to be of lower intensity in the project area than in the reference area (Fig. 11).

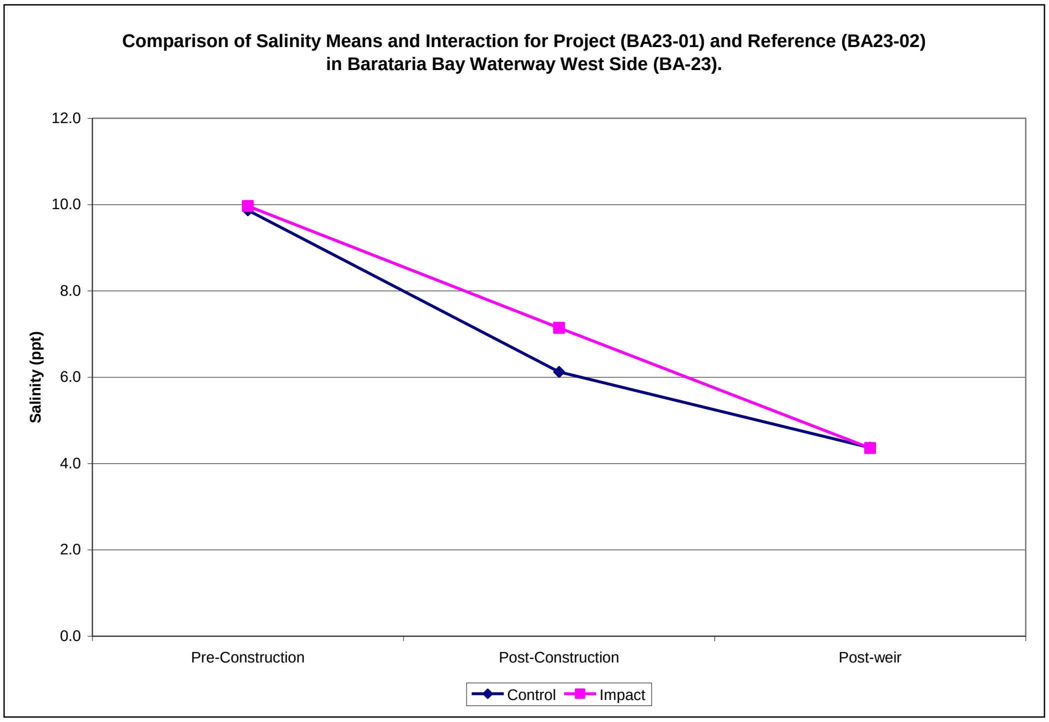

Figure 6. Mean hourly salinity at two YSI continuous recorder stations located in the Barataria Bay Waterway West Side Shoreline Protection (BA-23) project and reference area during pre-construction (8/98 – 11/00), post-construction (12/00 – 2/02), and post weir opening (3/02 – 9/03) periods.

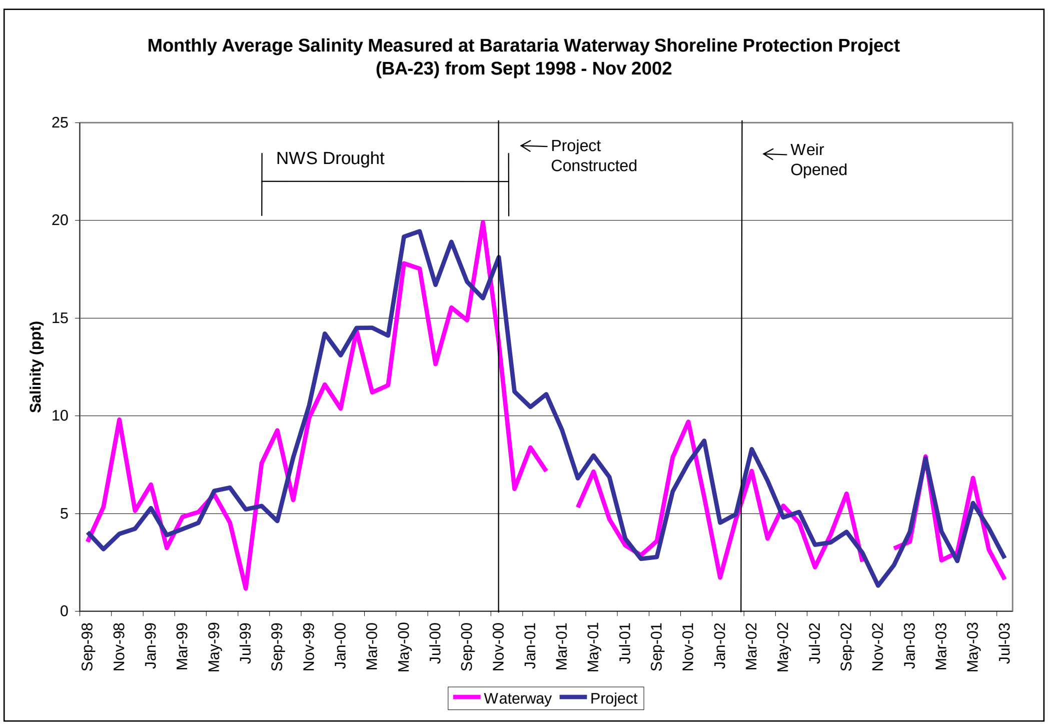

Figure 7. Monthly mean salinity at two YSI continuous recorder stations located in the Barataria Bay Waterway West Side Shoreline Protection (BA-23) project and reference area during pre-construction (8/98 – 11/00), post-construction (12/00 – 2/02), and post weir opening (3/02 – 9/03) periods.

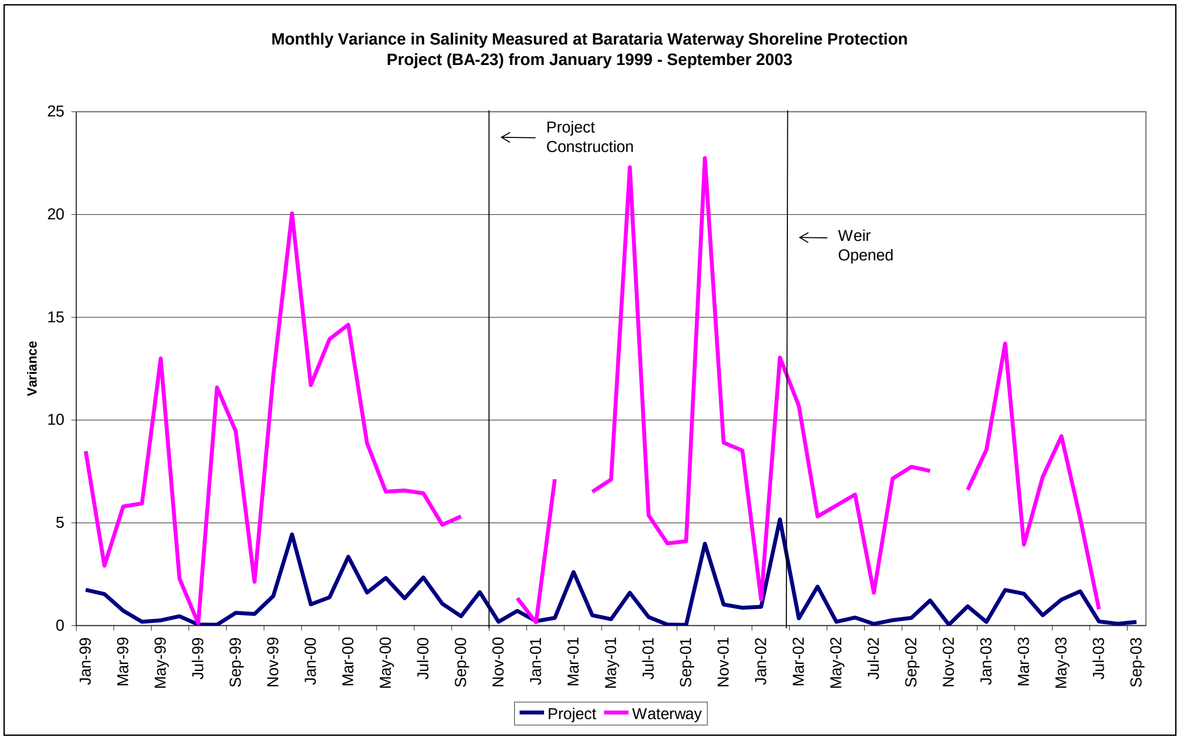

Figure 8. Variance in monthly mean salinity during the entire monitoring period of the BA-23 project (1999-2003) between the project area (BA23-01) and the reference area (BA23-02).

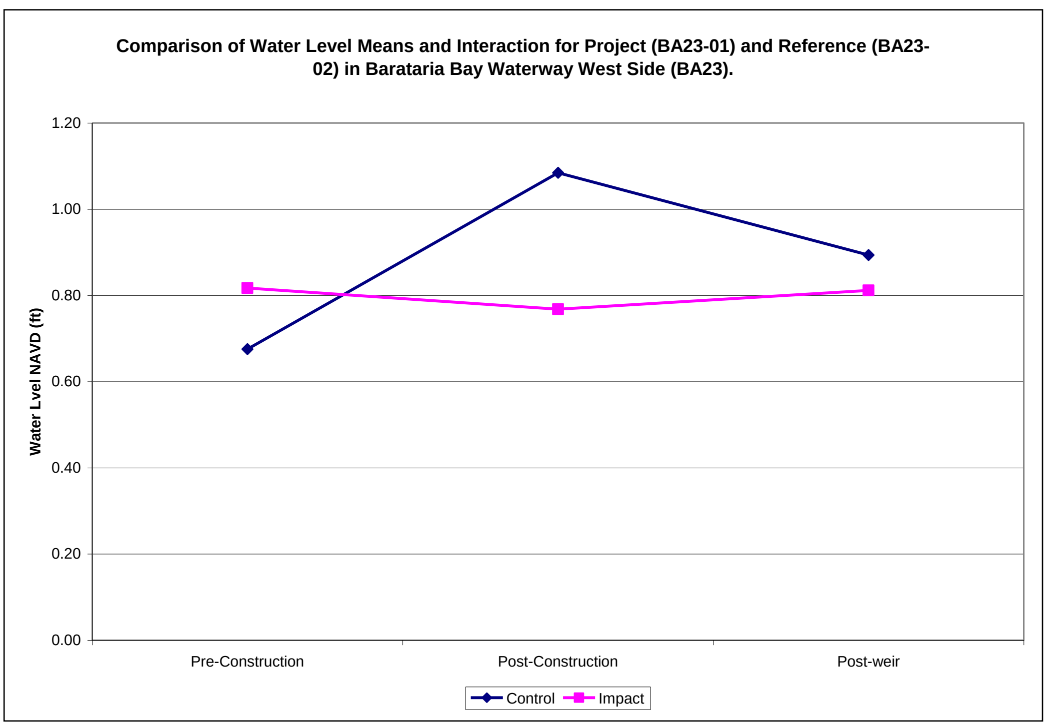

Figure 9. Mean hourly water level (ft, NAVD 88) at two YSI continuous recorder stations located in the Barataria Bay Waterway West Side Protection (BA-23) project and reference area during pre-construction (8/98 – 11/00), post-construction (12/00 – 2/02), and post weir opening (3/02 – 9/03) periods.

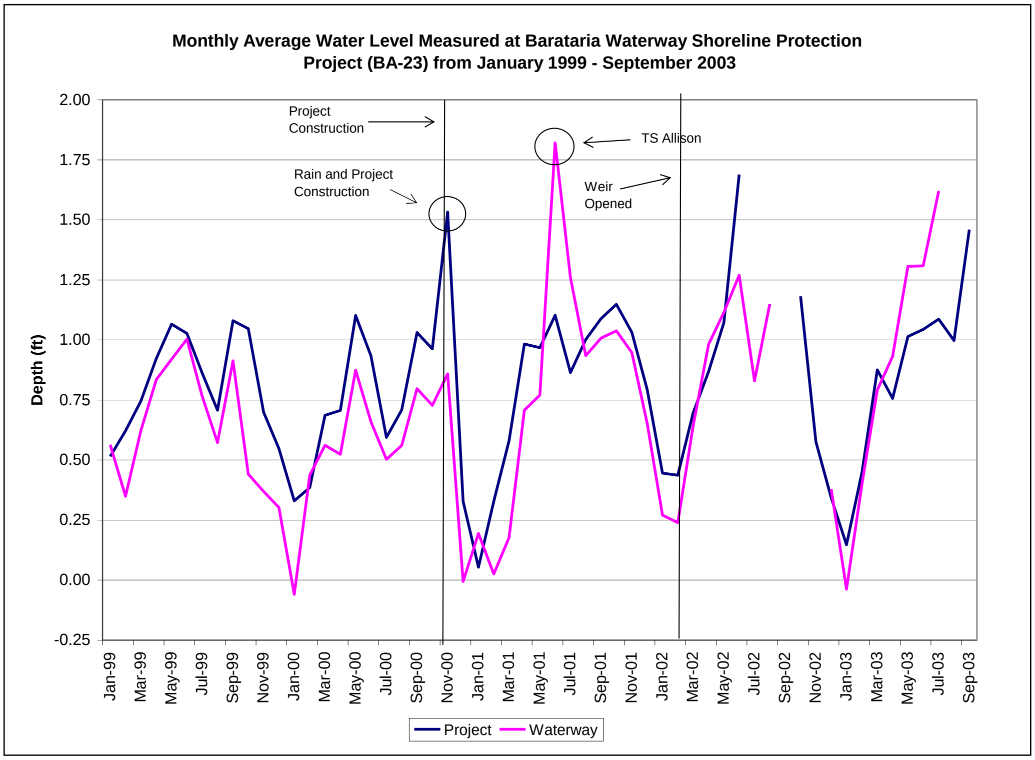

Figure 10. Comparison of monthly mean water level (ft, NAVD 88) during the entire monitoring period of the project (1999-2003) between the project area (BA23-01) and the reference area (BA23-02).

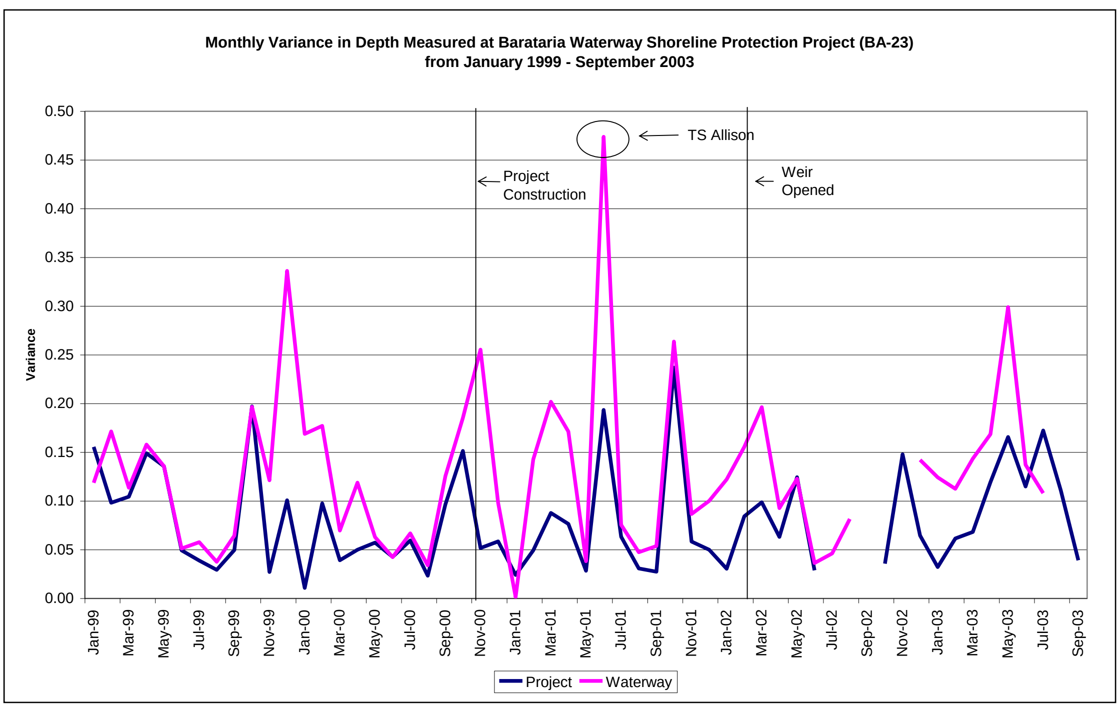

Figure 11. Variance in monthly mean water level (ft, NAVD 88) during the entire monitoring period of the BA-23 project (1999-2003) between the project area (BA23-01) and the reference area (BA23-02).

d. Discussion

Aerial Photography

The post-1997 alteration of the project boundary resulted in an increase of 250 ac of land between the 1997 and 2003 land water analysis. However, there was an additional increase of 118 ac from 1997 to 2003 that can be attributed to the construction of wetlands using dredged material during project construction. A small amount of land gain can also be attributed to the construction of earthen terraces within the project area following project construction. The terraces were constructed by the landowner and are not associated with the BA-23 project. Nine acres of land were lost between 2003 and 2009, a rate of 1.5 ac/yr for the 6 yr period. This equates to a land loss rate of 0.20% annually. Pre-construction land loss rates were calculated at 1.89% annually (Louisiana Coastal Wetlands Conservation and Restoration Task Force 1994). Based on the comparison of pre- and post-construction land loss rates, we can conclude that the project has been effective in reducing the rate of land loss.

Vegetation

Mean percent cover of the dominant vegetation species was similar in the 1998 and 2003 surveys. However, the overall species diversity and abundance of fresh marsh species was lower in 2003 than 1998. It is difficult to say with certainty what may have caused this decline. Salinity conditions in the project area were fairly similar during both survey years (Fig. 7). Potential explanations for the decrease in fresh marsh species in 2003 include lingering effects of the 2000 drought and impacts from high-salinity dredge material used in marsh creation. Coastwide vegetation classification maps from 1997 classify the project area as intermediate (Chabreck and Linscombe 1997); however' by 2001 the southern portion of the project area had changed to brackish (Linscombe and Chabreck n.d.). This is consistent with the results seen in the BA-23 vegetation data. The vegetation classification maps suggest that the change to brackish marsh was not an effect of the project, but rather the result of a general northward shift in the intermediate/brackish boundary in this portion of the Barataria Basin.

Salinity

The severe drought of 2000 caused large spikes in salinity levels throughout the region, affecting all data collected during that period. Consequently, much of the decrease in salinity during the post-construction period was due to drought relief and not the immediate impact of the project, as salinity of the project and reference areas both decreased over time (Figs. 6 & 7).

Although statistically significant differences were observed, upon inspection of the salinity means, it can be seen that during each of the three time periods the difference in average salinity is so small that there are unlikely to be any significant ecological effects (Fig. 6). The greatest difference in salinity for any of the three time periods was 1.02 ppt; and during this period mean salinity was actually higher in the project area than the reference. When considering variance in salinity between project and reference sites, the data again does not support a conclusion of project effectiveness on salinity reduction. Salinity variance was reduced in the project area compared to the channel; however this difference was present before construction (Fig. 8).

Water Level

Combined with the significant interaction in the BACI analysis, the data lead us to the conclusion that the project had a significant effect on stabilizing the water level inside the project area.

After project construction, there were a few abnormal spikes in water depth in the reference area that did not occur in the project area (Fig. 10). There is a strong possibility that this buffering effect is a result of the project itself. More of these data points would be needed to perform any statistical analysis of the effect.

Unlike the salinity data, the effects seen on water level appear to be ecologically significant. Differences in mean water level between the project area and the reference area range as high as .3 ft. This alone could be enough water to enhance growth of fresh marsh in a restoration area.

V. Conclusions

a. Project Effectiveness

The objective of the BA-23 project is to re-establish a hydrologic barrier to protect the marsh and open-water in the project area from excessive wave energy, water level fluctuations, and saltwater intrusion from the BBW. The monitoring results indicate that the project has been effective in meeting this objective.

Marsh creation efforts in the project area have resulted in an increase in total land acreage. Land loss continues to occur, however the rate of land loss has been reduced greatly when compared to pre-construction rates. The shift in the vegetative community appears to part of a trend in this portion of the Barataria Basin rather than an effect of the project. Although there was little noticeable effect on salinity levels or variability, mean water level and variability in water level in the project area were reduced. The water control structure has been effective in retaining water during winter months, increasing available habitat for wintering waterfowl.

b. Recommended Improvements

Monitoring funds are limited for projects classified as "shoreline protection." This has made it very difficult to collect enough monitoring data to accurately determine whether this project was successful as a hydrologic barrier. Future projects should be carefully classified according to the monitoring needs of the entire project.

c. Lessons Learned

In the past, O&M inspections of this project have focused on the physical integrity of the constructed project features and not on the project as a whole. While this project is classified as a shoreline protection project, there is also a hydrologic component. The water control structure at the southern end of the project relies on the integrity of the entire hydrologic boundary to function correctly. The breaching of the existing hydrologic boundary may affect the overall goals and objectives of the project and should have been included in the annual inspections.

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Appendix A
(Inspection Photographs)

Photo 1. Rock structure. Note low spot on left.

Photo 2. Beneficial use marsh creation using material from oil and gas well access channel.

Appendix B
(Three Year Budget Projection)

Barataria Bay Waterway West Bank Protection (BA-23)
Federal Sponsor: NRCS
Construction Completed : 11/7/2000
PPL 4

Current Approved O&M Budget June 2009	Year 0 FY01	Year - 1 FY02	Year -2 FY03	Year -3 FY04	Year -4 FY05	Year -5 FY06	Year -6 FY07	Year -7 FY08	Year -8 FY09	Year -9 FY10	Year -10 FY11	Year -11 FY12	Year -12 FY13	Year -13 FY14	Year -14 FY15	Year -15 FY16	Year -16 FY17	Year - 17 FY18	Year -18 FY19	Year -19 FY20	Project Life Budget	Currently Funded
State O&M																					$746,260	$746,260
Corps Admin																					$0	$0
Federal S&A																					$0	$0
Total																					$746,260	$746,260

Projected O&M Expenditures	Year 0 FY01	Year - 1 FY02	Year -2 FY03	Year -3 FY04	Year -4 FY05	Year -5 FY06	Year -6 FY07	Year -7 FY08	Year -8 FY09	Year -9 FY10	Year -10 FY11	Year -11 FY12	Year -12 FY13	Year -13 FY14	Year -14 FY15	Year -15 FY16	Year -16 FY17	Year - 17 FY18	Year -18 FY19	Year -19 FY20	Remaining Project Life	Current 3 year Request
Maintenance Inspection												$3,614	$3,708	$3,804	$3,903	$4,005	$4,109	$4,216	$4,325	$4,438	$36,122	$11,126
General Maintenance																					$0	$0
Operations												$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$18,000	$6,000
Surveys														$65,000							$65,000	$65,000
Sign Replacement																					$0	$0
Federal S&A																					$0	$0
Maintenance/Rehabilitation																					$0	$0
E&D															$12,000						$12,000	$0
Construction															$300,002						$300,002	$0
Construction Oversight															$75,001						$75,001	$0
Total												$5,614	$5,708	$70,804	$392,906	$6,005	$6,109	$6,216	$6,325	$6,438	$506,125	$82,126

O&M Expenditures from COE Report	$513,773	Current O&M Budget less COE Admin	$746,260	Current Project Life Budget less COE Admin	$746,260
State O&M Expenditures not submitted for in-kind credit	$0	Remaining Available O&M Budget	$232,487	Total Projected Project Life Budget	$1,019,897
Federal Sponsor MIPRs (if applicable)	$0	**Incremental Funding Request Amount FY12-FY14**	**-$150,361**	**Project Life Budget Request Amount**	**$273,637**
Total Estimated O&M Expenditures (as of April 2010)	$513,773				

Appendix C
(Field Inspection Notes)

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-23 Barataria Waterway (West) Shoreline Protection** Date of Inspection: 4/21/2011 Time: 9:30 am

Structure No. ______________________________ Inspector(s): Richard, Kinler, Trusclair

Structure Description: _______________________ Water Level Inside: N/A Outside: 0.80'

Type of Inspection: Annual Weater Conditions: Partly Cloudy, Moderate Wind

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
CMP culverts	Good	None	None		
Weir Bays - logs locks, hoist, supports	Good	None	Some		Some stop logs need repairs and /or replacement.
Handrails Grating Hardware etc.	Good	None	None		
Timber Piles	Good	None	None		
Timber Wales	Good	None	None		
Galv. Pile Caps	Good	None	None		
Signage /Supports	Good	None	None		
Riprap	Good	None	None		
Silt/Fill	Fair	None	None		The area in front of the Water Control Structure access canal is silting in.
Foreshore Rock Dike	Good	None	None		

Position of stoplogs at the time of the inspection? Out
Are there any signs of vandalism? No
Conditions of existing levees? Good
Settlement of rock plugs and weirs? Minor, continue to observe
Noticable breaches? One, not significant, man made.