



State of Louisiana

**Coastal Protection and Restoration
Authority of Louisiana (CPRA)**

2014 Operations, Maintenance, and Monitoring and Final Close Out Report

for

Sabine Refuge Protection (CS-18)

State Project Number CS-18
Priority Project List 1

June, 2014
Cameron Parish

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2014 Operations, Maintenance, and Monitoring Report
For
Sabine Refuge Protection (CS-18)

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Preface

This report includes monitoring data collected through December 2004, and annual Maintenance Inspections through March 2010.

The 2014 report is the 3rd report in a series of reports. For additional information on lessons learned, recommendations and project effectiveness, please refer to previous OM&M reports (2004 and 2005) on the CPRA web site (<http://lacoast.gov/new/Projects/Info.aspx?num=CS-18>).

This will be the final OM&M report for this project. The project was constructed in March, 1995 and reaches the end of its 20 year monitoring and maintenance life in March, 2015. The project was considered a success in 2005 and monitoring and reporting ceased at that time.

I. Introduction

The Sabine Refuge Protection project is located approximately 20 mi (32 km) west-southwest of Hackberry, Louisiana (Figure 1) on the west levee of Impoundment 3 adjacent to the Sabine National Wildlife Refuge Impoundment 3, a 27,000 ac (10,927 ha) freshwater impoundment that provides habitat for freshwater game fish, alligator, furbearers, and migratory and resident waterfowl. The impoundment supports freshwater vegetation including *Zizaniopsis aquatica* (giant cutgrass) and *Nelumbo lutea* (American lotus). The existing west levee along Impoundment 3, which was constructed in 1951, deteriorated due to boat wake erosion and subsequent sloughing of levee material into the BSC. Continued erosion would have resulted in multiple breaches of the levee, allowing higher salinity waters from the Calcasieu Ship Channel and Sabine Lake to enter the impoundment via the BSC. Since much of the freshwater marsh within the impoundment was highly organic and floating, saltwater intrusion and increased tidal exchange would likely convert as much as 13,000 ac (5,261 ha) of the impoundment to shallow open water (LCWCRTF 1998; USFWS 1991). The loss of floating and submersed vegetation would result in greater wind-induced wave erosion of the remaining marsh within the impoundment.

To prevent further bank erosion, 5.5 mi (8.9 km) of free-standing rock breakwater was constructed on the canal side of the west levee of the Impoundment 3 (Figure 1) and the levee was restored where it had been degraded using dredge material from the canal in January, 1995.



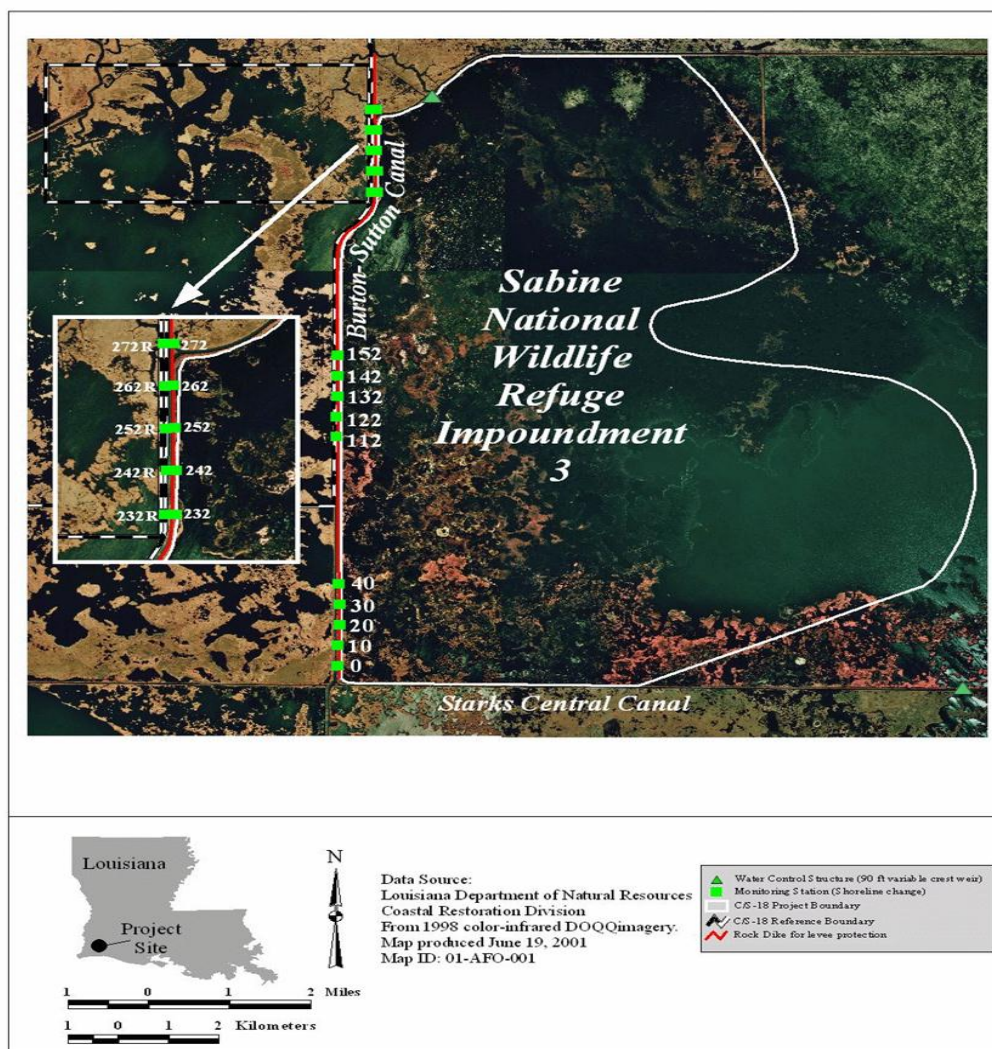


Figure 1. Sabine Refuge Protection (CS-18) project boundary, reference boundary, rock dike along the Burton-Sutton Canal and western Impoundment (or Unit) 3 levee, and shoreline change monitoring station locations.



II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Sabine Refuge Protection Project (CS-18) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR 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 (O&M Plan, 2002). The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features 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.

This report includes information from the two most recent inspection events to provide information on all of the project features of the Sabine Refuge Protection Project (CS-18). The first inspection was held on December 6, 2007 under sunny skies and cool temperatures. In attendance was Dewey Billodeau, from OCPD and Reuben LaBauve and Darryl Clark from USFWS. The second inspection was held on March 18, 2010 under sunny skies and mild temperatures. Dewey Billodeau, Darrell Pontiff and Mark Mouldous from CPRA were in attendance. Representatives from USFWS were invited but could not attend. Each inspection began at the southern end of the rock dike along Burton Sutton Canal.

The field inspections included a complete visual inspection of the entire project site. Staff gauge readings and existing temporary benchmarks were used to determine approximate elevations of water, rock weirs, earthen embankments, steel bulkhead structures and other project features. Photographs were taken (see Appendix A) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix C).

b. Inspection Results

Foreshore Rock Dike (Burton Sutton Canal)

The rock breakwater along the Burton Sutton Canal was inspected along its entire reach. The water level in the Burton Sutton Canal was estimated to be +0.75 NAVD88. The dike is in excellent post construction condition. No need for any maintenance in the foreseeable future. (Photos 1 – 2; March 2010)

Reinforcement of wingwalls at 3 water control structures



The weirs at Beach Canal Structure No. 2, Northline Canal Structure No. 3, and Stark's Central Canal Structure No. 4 were inspected for rock reinforcement at each wingwall. No maintenance was required at that time. (Photos 3-8; December 2007)

Alligator crossings

The alligator crossings were not distinguishable from the surrounding levee; therefore, it is assumed that the alligators are no longer using them. (December, 2007)

Stark's Central Canal

During the 2007 inspection, the Stark's Canal was found to be clogged with wrack and debris resulting from Hurricane Rita. USFWS chose at that time to leave the material in place to help control water flow in the refuge. (Photo 9; December 2007)

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

None

ii. Programmatic/ Routine Repairs

None

d. Maintenance History

There has been no required maintenance on this project.

III. Operation Activity

a. Operation Plan

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

Field Code Changed

b. Actual Operations

There are no water control structures associated with this project, therefore no required structural operations.



IV. Monitoring Activity

a. Monitoring Goals

The objective of the Sabine Refuge Protection Project is to protect the existing freshwater vegetation within Impoundment 3 of Sabine NWR adjacent to the Burton-Sutton Canal and to prevent the encroachment of the Burton-Sutton Canal into the impoundment.

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

1. Restore and protect the west levee of Impoundment 3 using dredge material and a free-standing rock breakwater.
2. Protect existing freshwater vegetation in Impoundment 3 from saltwater intrusion via the Burton-Sutton Canal.

b. Monitoring Elements

Aerial Photography:

Near-vertical color-infrared aerial photography (1:24,000 scale) was used to measure vegetated and non-vegetated areas for the project and reference areas. The photography was obtained on November 1, 1993 prior to construction and on January 7, 1997, two years after project construction. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by USGS/NWRC personnel according to standard operating procedures (Steyer et al. 1995, revised 2000).

Shoreline Change:

To document shoreline movement, shoreline markers were placed on the vegetated marsh edge along the east bank of the BSC (and in a reference area along the west bank of the BSC, opposite the northernmost mile of the rock dike) adjacent to the northernmost, central, and southernmost miles of the rock dike, at 1,000 ft (305 m) intervals. Shoreline position relative to the shoreline markers was documented by direct measurement in 1995 (pre-construction), and post-construction in 2000. No additional shoreline data was collected. Inspections of the project area were conducted by CPRA engineers at regular intervals to document the condition of the rock breakwater and any required maintenance.

c. Monitoring Results and Discussion

Aerial photography:

Land to water ratios in the project area were 51.8% land to 48.2% water pre-construction in 1993 and 45.9% land to 54.1% water in 1997 post construction. In the reference area in 1993,



ratios were 38.5% land to 61.5% water and in 1997, ratios were 37.9% land to 62.1% water. It was determined that the 1997 post construction aerial photography was flown when water levels in Impoundment 3 were much higher than during pre-construction photography (1993). Because the reference area is not impounded, water levels were lower than in the impoundment, and land to water ratios did not reflect those in the project area. The land loss in Impoundment 3 (Figures 2 and 3) is not as high as it appears. Field observations through 1997 suggested that little or no land loss had occurred.

Shoreline change:

Shoreline survey results, presented in Figures 4, shows shoreline position change during the study period differing by less than 8.5 ft (2.6 m) at any one station for both the project and reference areas. Shoreline advance was detected at all project stations except stations 30 and 112 and for all reference stations except 252R during the period between 1995 and 2000 (Figure 5). Mean shoreline advance rates were calculated to be 1.3 +/- 1.1 ft/yr (0.4 + 0.3 m/yr) and 0.9 +/-1.9 ft/yr (0.3 + 0.6 m/yr) for the project and reference areas, respectively. The results of the two-sample t-test indicated that there was no significant difference in shoreline change rate detected between the project and reference areas ($P = 0.90$).



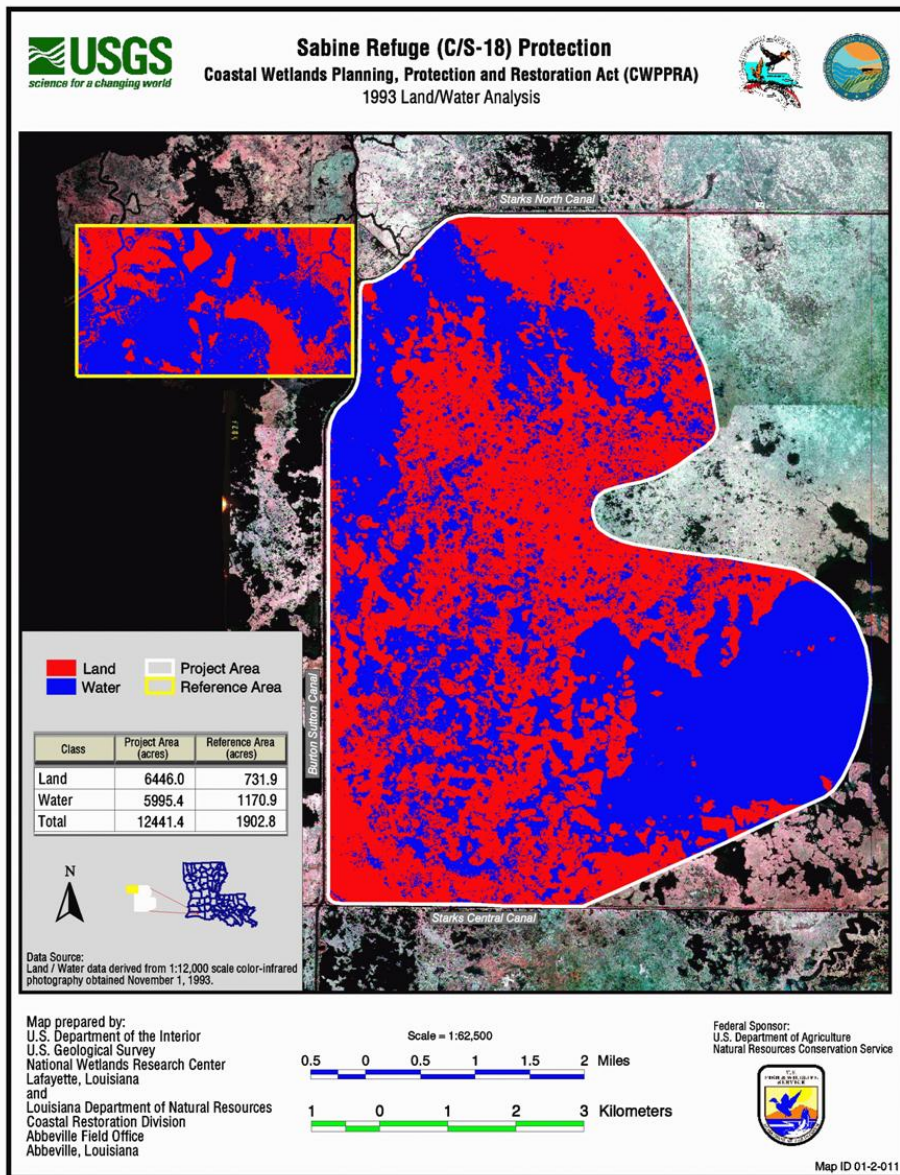


Figure 2. Sabine Refuge Protection (CS-18) GIS analysis of project and reference area pre-construction aerial photography (1993).



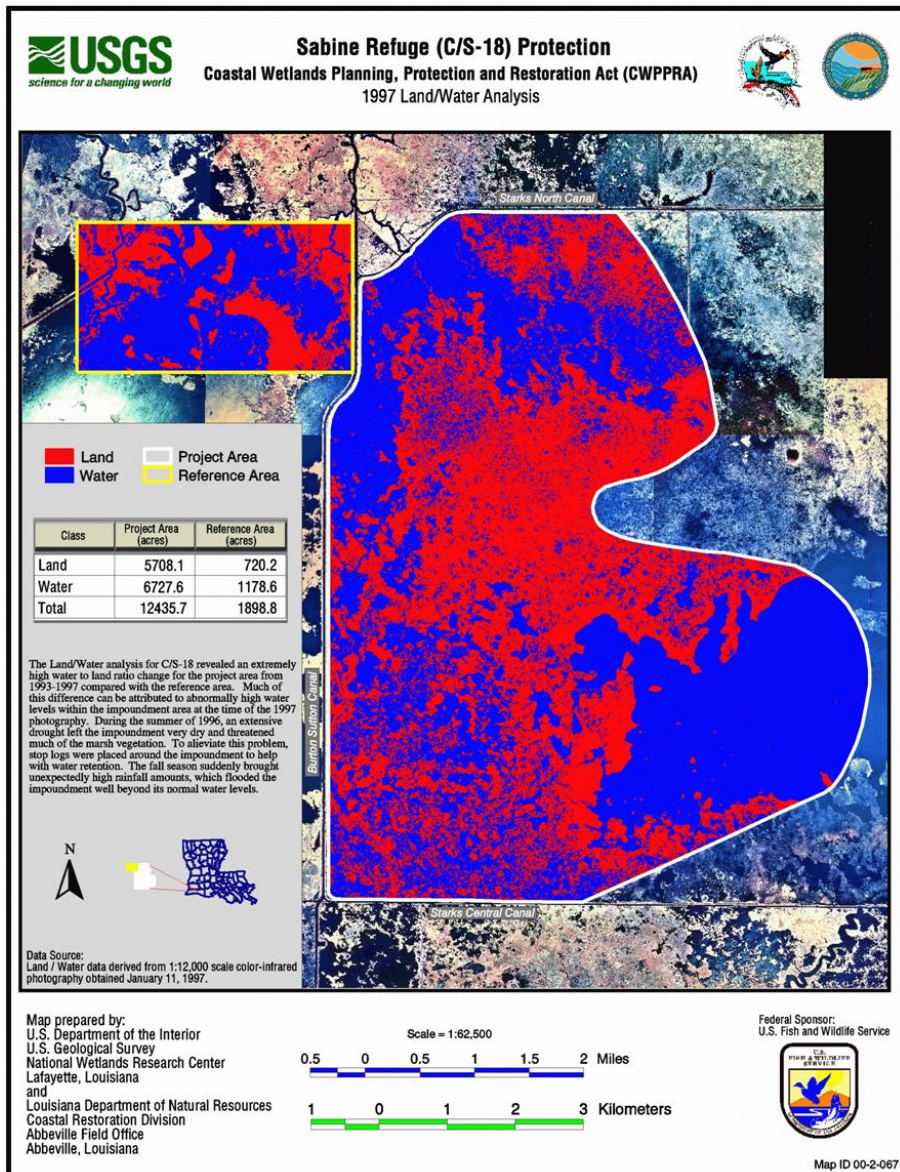


Figure 3. Sabine Refuge Protection (CS-18) GIS analysis of project and reference area post-construction aerial photography (1997).



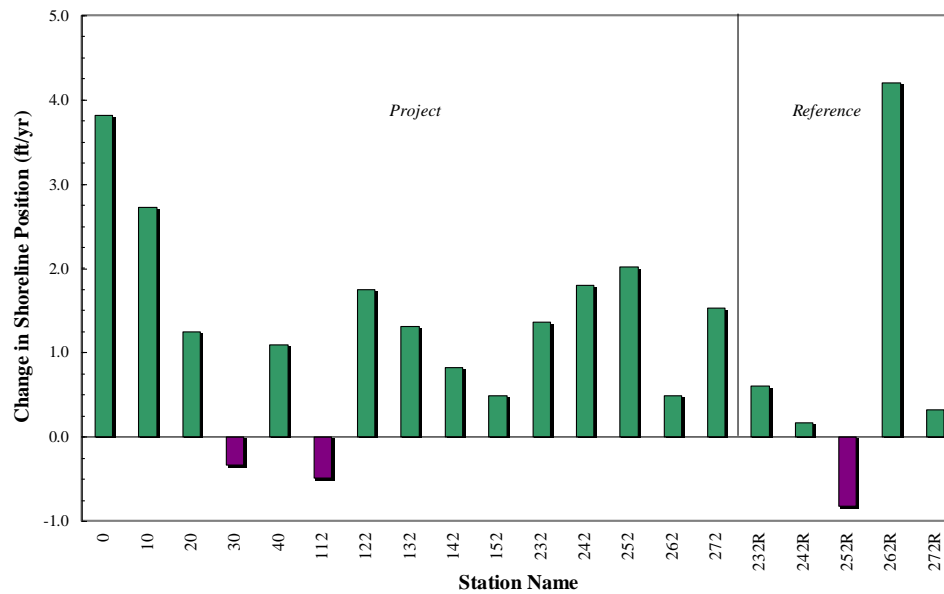


Figure 4. Sabine Refuge Protection (CS-18) shoreline change for the project and reference area from 1995 to 2000. Rates are calculated in ft/yr.

Comment [DC1]: You might want to explain the large > 4 feet/yr increase at 262R above, as well as the losses at 30 and 112 in the project area.



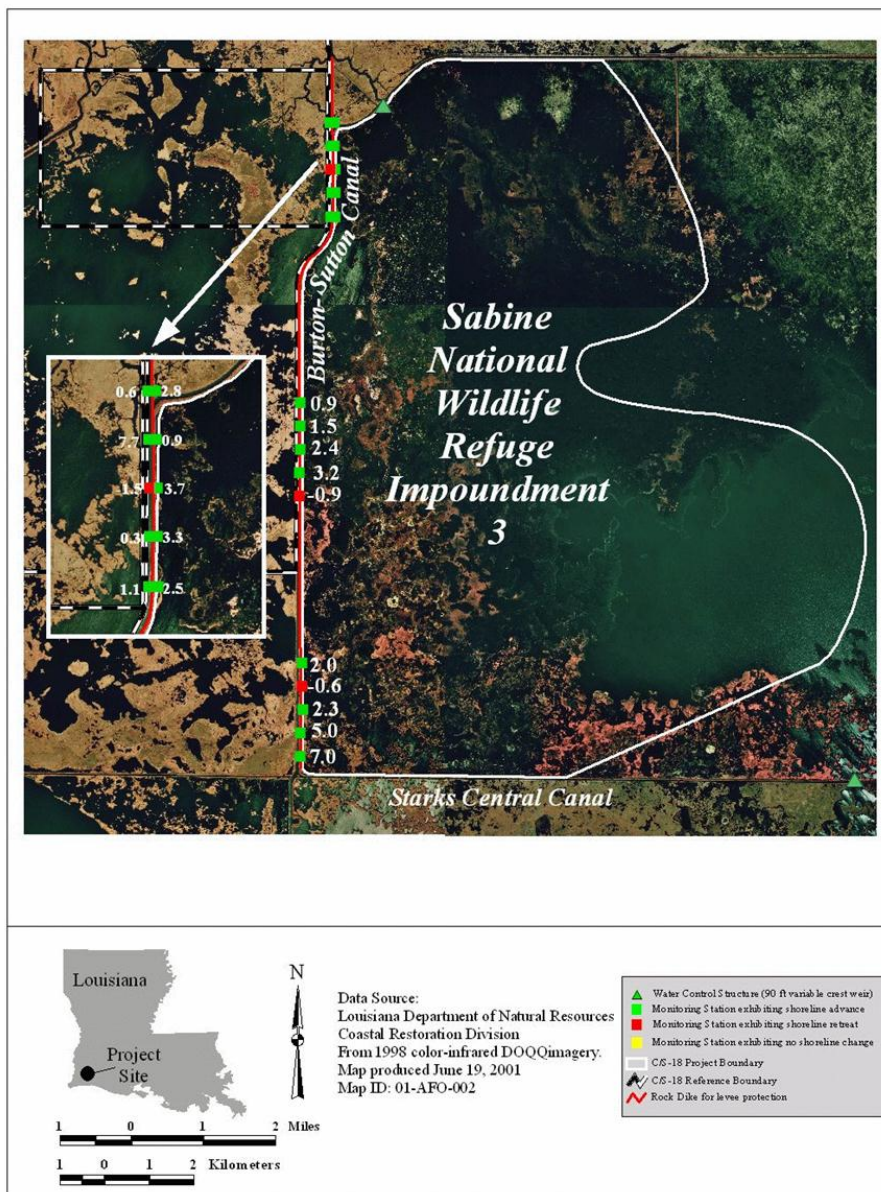


Figure 5. Sabine Refuge Protection (CS-18) shoreline change (ft) at project and reference area monitoring station locations between October 1995 and August 2000.



V. Conclusions

a. Project Effectiveness

The Sabine Refuge Protection project has been successful in stabilizing bank erosion of the western Impoundment 3 (or Unit 3) levee located on the east side of the Burton Sutton Canal, thus preventing land loss in Impoundment 3 on Sabine Refuge. Visual observation indicates vertical accretion of the wetland area at many locations between the foreshore rock dike and the shoreline. No additional monitoring data will be collected.

b. Recommended Improvements

There are no recommendations for this project.

c. Lessons Learned

N/A

d. End of Project Life

The Sabine Refuge Protection Project should continue to provide shoreline protection well beyond it's 20 year project life without future maintenance. It is in good shape, never required maintenance, and achieved it's performance goals shortly after project construction.



VI. Literature Cited

- Louisiana Coastal Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority. 1998. *Coast 2050: Toward a Sustainable Coastal Louisiana*. Louisiana Department of Natural Resources, Baton Rouge, La. 161pp.
- Louisiana Department of Natural Resources – Coastal Restoration and Management Division, Coastal Engineering Division, and Coastal Restoration Division. 2004. *2004 Operations, Maintenance and Monitoring Report for Sabine Refuge Protection Project (CS-18)*. Louisiana Department of Natural Resources, Coastal Restoration Division.
- Steyer, G. D., R. C. Raynie, D. L. Steller, D. Fuller, and E. Swenson. 1995, revised 2000. *Quality Management Plan for Coastal Wetlands Planning, Protection, and Restoration Act Monitoring Program*. Open-file report no. 95-01. Department of Natural Resources, Coastal Restoration Division, Baton Rouge, LA. 97 pp.
- U.S. Fish and Wildlife Service 1991. *Cameron Prairie National Wildlife Refuge Erosion Protection and Marsh Management Design Memorandum*. Gibbstown, Louisiana: U.S. Fish and Wildlife Service, Cameron Prairie National Wildlife Refuge. 7 pp.



Appendix A (Inspection Photographs)





Photo 1—southern tie-in on Burton Sutton Canal (2010)



Photo 2—northern tie-in on Burton Sutton Canal (2010)





Photo 3—northern wingwall rock on Beach Canal Structure No. 2 (December 6, 2007)



Photo 4—southern wingwall rock on Beach Canal Structure No. 2 (December 6, 2007)





Photo 5 – southwest wingwall rock on Northline Canal Structure No. 3 (Dec. 6, 2007)



Photo 6 – northeast wingwall rock on Northline Canal Structure No. 3 (Dec. 6, 2007)





Photo 7 – eastern wingwall rock on Stark's Central Canal Structure No. 4 (Dec. 6 2007)

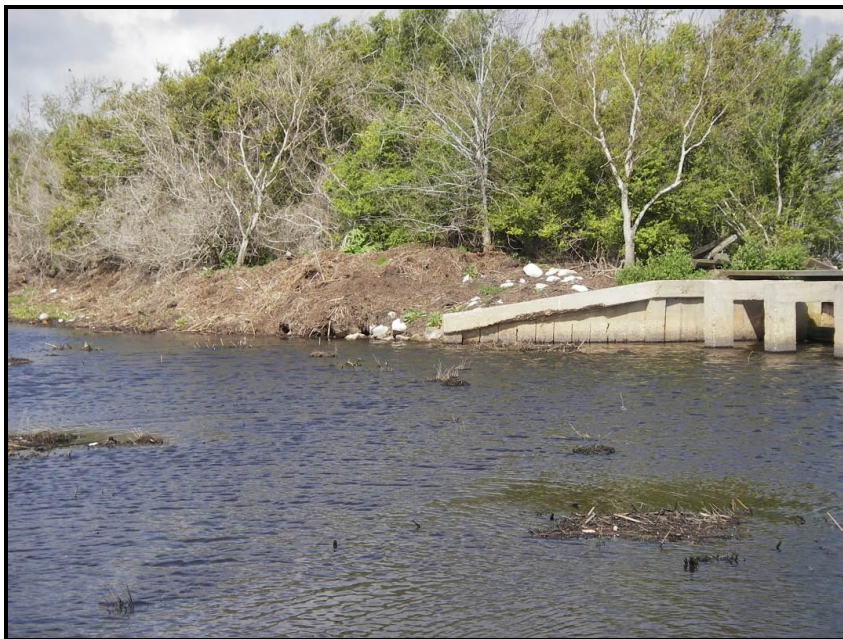


Photo 8 – western wingwall rock on Stark's Central Canal Structure No. 4 (Dec. 6, 2007)





Photo 9 – Central Canal, view looking east, showing canal clogged with wrack and debris from Hurricane RITA which will remain in place. (Dec. 6, 2007)

Appendix B
(Three Year Budget Projection)



SNWR EROSION PROTECTION/ CS-18 / PPL 1
Three-Year Operations & Maintenance Budgets 07/01/2014 - 06/30/2017

<u>Project Manager</u>	<u>O & M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Pat Landry	Dion Broussard	USFWS	Dion Broussard

	2014/2015 (-19)	2015/2016 (-20)	2016/2017 (-21)
Maintenance Inspection	\$ 6,651.00	\$ 6,851.00	\$ 7,057.00
Structure Operation			
State Administration		\$ -	\$ -
Federal Administration		\$ -	\$ -

Maintenance/Rehabilitation

14/15 Description:

E&D	
Construction	
Construction Oversight	
Sub Total - Maint. And Rehab.	\$ -

15/16 Description

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

16/17 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2014/2015 (-19)	2015/2016 (-20)	2016/2017 (-21)
Total O&M Budgets	\$ 6,651.00	\$ 6,851.00	\$ 7,057.00

O & M Budget (3 yr Total)	\$ 20,559.00
Unexpended O & M Budget	\$ 278,231.00
Remaining O & M Budget (Projected)	\$ 257,672.00

Comment [DC2]: The 2016 to 2017 budgets should be \$0.00 because the project ends its 20-year life in 2015.



OPERATION AND MAINTENANCE BUDGET 07/01/2014-06/30/2015
SABINE REFUGE SHORELINE PROTECTION/CS-18/PPL1

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$6,651.00	\$6,651.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00
Engineering and Design	LUMP	0	\$0.00	\$0.00
Operations Contract	LUMP	0	\$0.00	\$0.00
Construction Oversight	LUMP	0	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	\$0.00
Navigation Aid	EACH	0	\$0.00	\$0.00	\$0.00
Signage	EACH	0	\$0.00	\$0.00	\$0.00
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	\$0.00
Dredging	CU YD	0	\$0.00	\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	\$0.00
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Timber Members (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Hardware	LUMP	1	\$0.00	\$0.00	\$0.00
Materials	LUMP	1	\$0.00	\$0.00	\$0.00
Mob / Demob	LUMP	1	\$0.00	\$0.00	\$0.00
Contingency	LUMP	1	\$0.00	\$0.00	\$0.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$6,651.00**



OPERATION AND MAINTENANCE BUDGET 07/01/2015-06/30/2016
SABINE REFUGE SHORELINE PROTECTION/CS-18/PPL1

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$6,851.00	\$6,851.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00
Engineering and Design	LUMP	0	\$0.00	\$0.00
Operations Contract	LUMP	0	\$0.00	\$0.00
Construction Oversight	LUMP	0	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	\$0.00
Navigation Aid	EACH	0	\$0.00	\$0.00	\$0.00
Signage	EACH	0	\$0.00	\$0.00	\$0.00
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	\$0.00
Dredging	CU YD	0	\$0.00	\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	\$0.00
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Timber Members (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Hardware	LUMP	0	\$0.00	\$0.00	\$0.00
Materials	LUMP	0	\$0.00	\$0.00	\$0.00
Mob / Demob	LUMP	0	\$0.00	\$0.00	\$0.00
Contingency	LUMP	0	\$0.00	\$0.00	\$0.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: \$6,851.00

Comment [DC3]: 2015-2016 budget should be deleted because project is being closed out in 2015.



OPERATION AND MAINTENANCE BUDGET 07/01/2016-06/30/2017
SABINE REFUGE SHORELINE PROTECTION/CS-18/PPL1

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$7,057.00	\$7,057.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00
Engineering and Design	LUMP	0	\$0.00	\$0.00
Operations Contract	LUMP	0	\$0.00	\$0.00
Construction Oversight	LUMP	0	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	\$0.00
Navigation Aid	EACH	0	\$0.00	\$0.00	\$0.00
Signage	EACH	0	\$0.00	\$0.00	\$0.00
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	\$0.00
Dredging	CU YD	0	\$0.00	\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	\$0.00
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Timber Members (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Hardware	LUMP	0	\$0.00	\$0.00	\$0.00
Materials	LUMP	0	\$0.00	\$0.00	\$0.00
Mob / Demob	LUMP	0	\$0.00	\$0.00	\$0.00
Contingency	LUMP	0	\$0.00	\$0.00	\$0.00
General Structure Maintenance	LUMP	0	\$0.00	\$0.00	\$0.00
OTHER		0	\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$7,057.00**

Comment [DC4]: Delete 2016-2017 budget due to project close-out.



Appendix C

(Field Inspection Notes)



MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-18 Sabine National Wildlife Refuge

Date of Inspection: December 6, 2007 Time: 12:35 PM

Structure No. Impoundment Area 3

Inspector(s): Dewey Billodeau, LDNR

Rueben LaBauve - USFWS

Structure Description: Rock Dike

Water Level Inside: N/A Outside: +1.0

Type of Inspection: Annual

Weather Conditions: Sunny and mild

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage / Supports	N/A				
Rip Rap	Good				
Rock Dike	Good			3 to 8	
W.W. Reinf.	Good				
Earthen Embankment	Good				

What are the conditions of the existing levees? Good
 Are there any noticeable breaches? Yes
 Settlement of rock plugs and rock weirs? No
 Position of stoplogs at the time of the inspection? N/A
 Are there any signs of vandalism? No



MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-18 Sabine National Wildlife Refuge

Date of Inspection: March 18, 2010 Time: 10:35 AM

Structure No. Impoundment Area 3

Inspector(s): Dewey Billodeau, Darrell Pontiff, Mark Mouledous (OCPR)

Structure Description: Rock Dike

Water Level Inside: N/A Outside: +0.75

Type of Inspection: Annual

Weather Conditions: Sunny and cool

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage / Supports	N/A				
Rip Rap Rock Dike W.W. Reinf.	Good			1 & 2	
Earthen Embankment	Good				

What are the conditions of the existing levees? Good
 Are there any noticeable breaches? No
 Settlement of rock plugs and rock weirs? No
 Position of stoplogs at the time of the inspection? N/A
 Are there any signs of vandalism? No

