



**State of Louisiana
Department of Natural Resources
Coastal Engineering Division**

**2006/2007 Annual Inspection
Report**

for

**SABINE REFUGE STRUCTURE
REPLACEMENT PROJECT
(CS-23)**

State Project Number CS-23
Priority Project List 3

March 22, 2007
Cameron Parish

Prepared by:

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I. Introduction

The Replace Hog Island Gully, West Cove and Headquarters Canal Structures (CS-23) project area is located within the Sabine National Wildlife Refuge, approximately 9 mi (14.5 km) south of the town of Hackberry in Cameron Parish, Louisiana. Established on December 6, 1937, the Sabine Refuge is bound on the east by Calcasieu Lake, on the west by Sabine Lake, on the north by the North Line Canal, and on the south by the South Line Canal, pasture land and coastal ridges.

The Sabine Refuge Structure Replacement Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended and approved on the third Priority Project List. The Sabine Refuge Structure Replacement Project has a twenty –year (20 year) life, which began in February 2000. The USFWS is responsible for operations and minor maintenance.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Sabine Refuge Structure Replacement Project (CS-23) 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 activities which were completed since project completion 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 C. A summary of past operation and maintenance projects completed since completion of the Sabine Refuge Protection Project are outlined in Section IV.

An inspection of the Sabine Refuge Structure Replacement Project (CS-23) was held on March 22, 2007 under sunny skies and mild temperatures. In attendance were Dewey Billodeau and Darrell Pontiff from LDNR. Jim Ashfield was representing USFWS. The inspection began at the Hog Island Gully Structure.

The field inspection included an inspection of all three project sites. Staff gauge readings and existing temporary benchmarks where available were used to determine approximate elevations of water, rock embankments, concrete structures and other project features. Photographs were taken (see Appendix B) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix D).

III. Project Description and History

O'Neil (1949) characterized the project area wetlands as fresh to intermediate marshes dominated by *Cladium mariscus* (Jamaica sawgrass). The Black Lake area, located north of the project, experienced an 81% reduction in the acreage of emergent wetlands between 1952 and 1974 (Adams et al. 1978). By 1972, the Black Lake area was characterized as brackish marsh (Chabreck and Linscombe 1978). A number of factors such as salinity stress, erosion, subsidence, burning and hydrologic modification influenced this habitat change.

Since there are primarily three avenues for water passage (Hog Island Gully, West Cove Canal, and Headquarters Canal) in the area, water management by weirs and tainter gates was initiated by USFWS in the 1970's. By the 1990's, these structures had corroded with the continuous exposure to saline water to the extent that they were inoperable or almost inoperable.

Due to the detrimental impacts of excessive salinity on brackish and intermediate marshes, the ability to occasionally reduce or halt the inflow of saline water is critical. This level of control was not available with the original structures. The inability to manipulate gate structures jeopardized the integrity of thousands of acres of interior brackish and intermediate marshes which are lower in elevation and often occur in highly organic semifloating soils. The estimated subsidence rate in the project marshes ranges between 0.12 in/yr and 0.16 in/yr (0.32 and 0.42 cm/yr) (Penland et al. 1989).

Because of the restricted cross-sectional area of the pre-existing structures and culverts, the lower elevation interior marshes experienced longer periods of vegetative water logging stress than the marshes located east of Highway 27. The pre-existing structures afforded the primary avenues for drainage and were inadequate to provide sufficient discharge to evacuate excess water. Due to the project area not being fully enclosed, secondary drainage for the area could occur to the west through Sabine Lake via North, Central and South line canals.

In May 1999, the US Fish and Wildlife Service (USFWS) completed the environmental assessment (EA) plan addressing the Replacement of Water Control Structures at Hog Island Gully, West Cove Canal, and Headquarters Canal (CS-23). The EA plan called for the complete removal of the Hog Island Gully Structure, West Cove Canal Structure, and Headquarters Canal Structure and replacement with additional structures and culverts to provide larger cross sections for water removal and to minimize saltwater intrusion.

The replacement structures are operated to more effectively discharge excess water, increase cross sectional area for ingress and egress of estuarine dependent species and more effectively curtail saltwater intrusion into the interior marshes. Since completion of the new structures, high saline waters could be precisely controlled, water discharge capacities have been increased, and vegetative stress through water logging has been minimized, thus enhancing emergent and submergent vegetative growth.

Construction began in November 1999 and was completed on the Hog Island Gully, West Cove, and Headquarters Canal structures in August 2000, June 2001, and February 2000, respectively.

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since February 2000, the construction completion date of Sabine Refuge Structure Replacement Project (CS-23).

June, 2005 – F. Miller & Sons, Inc. A maintenance event was performed to correct the following:

1. Install operating nut in gate 6A, Hog Island Gully.
2. Free gate 6b that is jammed, Hog Island Gully.
3. Replace operation nut in gate 3A, West Cove.
4. Replace batteries in all Rotork Actuators and re-calibrate.

Construction (Item Nos. 1, 2 & 3):	\$ 7,800.00
Construction (Item No. 4):	\$ 5,416.45

PROJECT TOTAL: \$13,216.45

June, 2006 – U.S. Fence & Gate, Inc. A maintenance event was performed to correct the following:

1. Remove existing fence and posts damaged by Hurricane RITA at both Hog Island Gully and West Cove Structures and replace with new chain link fence material and new posts.

Construction Cost:	\$8,360.00
Engineering Design and Construction Oversight:	In-House

PROJECT TOTAL: \$8,360.00

Structure Operations:

Structure A-Hog Island Gully Canal

This structure has four 7.5 foot wide gates (HG1, HG2, HG5, and HG6) and two 3.0 foot wide gates (HG3 and HG 4) [306 ft² total area]. Each gate is 8 foot deep,

assuming that water level is at marsh elevation (1.0' NGVD). Each opening is equipped with slide gates that may be used to preclude all water flow. Of the four 7.5 foot wide gates, three have exterior flap gates, (HG1, HG2, and HG6).

Structure B- Headquarters Canal

This structure has three 5 foot wide diameter culverts (HQ1, HQ2, and HQ3) [59ft total area]. The top of each culvert is at marsh level (1.0' NGVD). Each culvert is equipped with an exterior flap gate that may be raised and locked closed. The center culvert has a sluice gate.

Structure C – West Cove Canal

This structure has three 7.5 foot wide gates (WC1, WC3, and WC5) and two 3.0 foot wide gates (WC2 and WC4) [242 ft² total area]. Each gate is 8 foot deep, assuming that water level is at marsh elevation (1.0' NGVD). Each is equipped with slide gates that may be used to preclude all water flow. Two of the four 7.5 foot gates have exterior flap gates (WC1 and WC5).

Normal Operation: The structures are controlled by salinity and water levels at targeted levels set out in the permitted Operational Plan. Water exchange will be provided through open bays having approximately the same cross-sectional area as that provided by the old structures' fully open gates [182 ft² total area]. The slide/sluice gates of the flapgated bays may be adjusted by the refuge manager at his discretions, except for the middle Headquarters' Canal Structure culvert (HQ2) which will remain 50 percent open.

However, the Hog Island Gully and West Cove structures were not fully operational prior to Hurricane Rita due to an electrical service problem as well as gate alignment problems.

Note: USWFS is responsible for structure operations and small maintenance. Actual operation data may be obtained from the Sabine Refuge Headquarters Office.

V. Inspection Results

Hog Island Gully Canal

This structure is still not operable due to damage from Hurricane RITA in 2005. The security chain link fence has been replaced as described in the maintenance section above. The trash and debris on and around the structure has been cleaned up by others. The structure will require maintenance work to repair the gates with dual stem operation, repair the actuators,

add reinforcement to flanges, update electrical system, install bird excluder devices, and install lighting. (Photos: Appendix B, Photos 1 - 2)

Headquarters' Canal

This structure is still not operable due to damage from Hurricane RITA in 2005. The trash on and around the structure has been cleaned up by others. The structure will require maintenance work to replace the electrical controls and repair the actuator on one of the gates. (Photos: Appendix B, Photos 5-6).

West Cove Canal

This structure is still not operable due to damage from Hurricane RITA in 2005. The security chain link fence has been replaced as described in the maintenance section above. The trash and debris on and around the structure has been cleaned up by others. The structure will require maintenance work to repair the gates with dual stem operation, repair the actuators, add reinforcement to flanges, update electrical system, install bird excluder devices, and install lighting. (Photos: Appendix B, Photos 3-4).

VI. Conclusions and Recommendations

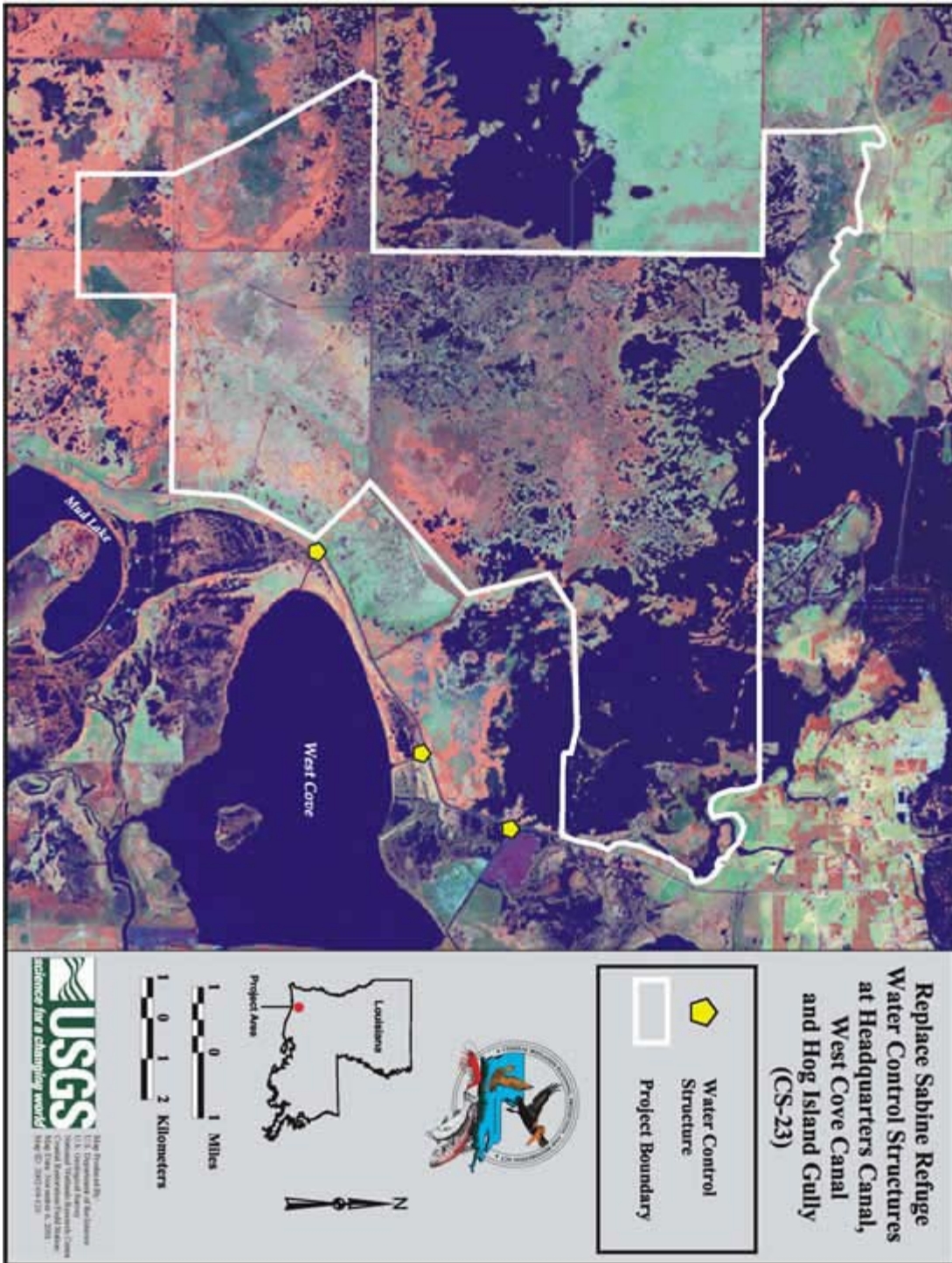
Overall, the Sabine Refuge Structure Replacement Project is in poor condition with all of the structures sustaining damage from Hurricane Rita. Several field trips have already been conducted with FEMA representatives to acquire federal approval on necessary repairs/replacement of equipment as noted above. FEMA approved only \$144,185.24 for structure repairs while the estimated repair cost is \$756,500. USFWS will use separate Federal funding to repair the structures through a third party, Tennessee Valley Authority (TVA). Engineering Consultant for LDNR, Lonnie Harper, has prepared plans and specifications for repair of these structures and has delivered to TVA in February, 2007 with an anticipated bid date early summer of 2007. Jeff Davis Electrical restored service to the area with true three phase power. This eliminates the need for the rotary converters which should eliminate the electrical problems.

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Appendix A

Project Features Map

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Appendix B

Photographs

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Photo No.1, Inside view of Hog Island Gully Structure. (2007-03-22)



Photo No. 2, Lake side view of Hog Island Gully Structure. (2007-03-22)

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Photo No. 3, Inside view of West Cove Structure. (2007-03-22)



Photo No. 4, Lake side view of West Cove Structure. (2007-03-22)

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Photo No. 5, Inlet side of Headquarters Structure. (2007-03-22)



Photo No. 6, Outlet side of Headquarters Structure. (2007-03-22)

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Appendix C

Three Year Budget Projection

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SNWR STRUCTURES/ CS-23 / PPL 3
Three-Year Operations & Maintenance Budgets 07/01/2007 - 06/30/2010

<u>Project Manager</u> Pat Landry	<u>O & M Manager</u> Dewey Billodeau	<u>Federal Sponsor</u> USFWS	<u>Prepared By</u> Dewey Billodeau
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	2007/2008	2008/2009	2009/2010
Maintenance Inspection	\$ 5,407.00	\$ 5,570.00	\$ 5,737.00
Structure Operation	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
Administration	\$ 20,000.00		\$ -

Maintenance/Rehabilitation

07/08 Description: Repair Structures from Hurricane Rita Damages *NOTE: USFWS will take responsibility for cost associated with construction (\$1,059,101.00) and oversight (\$25,200.00) through TVA and not through O&M budget.

E&D	\$ 23,100.00
Construction	
Construction Oversight	
<i>Sub Total - Maint. And Rehab.</i>	<u>\$ 23,100.00</u>

08/09 Description:

E&D	
Construction	
Construction Oversight	
<i>Sub Total - Maint. And Rehab.</i>	<u>\$ -</u>

09/10 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
<i>Sub Total - Maint. And Rehab.</i>	<u>\$ -</u>

	2007/2008	2008/2009	2009/2010
<u>Total O&M Budgets</u>	\$ 58,507.00	\$ 15,570.00	\$ 15,737.00

<u>O & M Budget (3 yr Total)</u>	\$ 89,814.00
<u>Unexpended O & M Budget</u>	\$ 444,172.88
<u>Remaining O & M Budget (Projected)</u>	\$ 354,358.88

Note: FEMA has approved reimbursement of \$144,184.00 for Hurricane RITA damages.

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Appendix D

Field Inspection Form

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MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-23 Sabine Refuge Structure Replacement

Date of Inspection: March 22, 2007 Time: 12:45 p.m.

Structure No. Hog Island Gully Canal

Inspector(s): Dewey Billodeau, Darrell Pontiff (LDNR)

Jim Ashfield (USFWS)

Structure Description: Control Structure

Water Level Inside: N/A Outside: N/A

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	Good				
Gates	Fair	Yes		1 & 2	Alignment problems.
Electrical	Poor	Yes			All electrical components demolished.
Hardware					
Fencing	Good				Chain link fence and posts replaced in June 2006.
Timber Piles	Good				
Timber Wales	N/A				
Actuators	Fair				All actuators will have to be taken apart and serviced.
Cables	Good				
Signage / Supports	Good				
Rip Rap					
Rock Dike	Good				
W.W. Reinf.					
Earthen Embankment	N/A				

What are the conditions of the existing levees?
 Are there any noticeable breaches?
 Settlement of rock plugs and rock weirs?
 Position of stoplogs at the time of the inspection?
 Are there any signs of vandalism?

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Appendix E

Locations to be Monitored