State of Louisiana
Department of Natural Resources
Coastal Engineering Division

2005/2006 Annual Inspection Report

for

SABINE REFUGE STRUCTURE REPLACEMENT PROJECT (CS-23)

State Project Number CS-23
Priority Project List 3

October 13, 2005
Cameron Parish

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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.

In 2003, the CWPPRA Task Force determined, because LDNR was responsible for the operation and maintenance phase of the vast majority of CWPPRA projects, LDNR would be the responsible party for all Post Storm/Hurricane Assessments. After Hurricanes Katrina and Rita, most projects appeared to have been impacted by the storms; therefore, LDNR determined that all projects should be assessed for damages (Broussard, 2006). With concurrence from the federal sponsor, LDNR has decided to use the information obtained during this post hurricane assessment in this Annual Maintenance Inspection.

An inspection of the Sabine Refuge Structure Replacement Project (CS-23) was held on October 13, 2005 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 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 tainer 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:

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**

2005 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 ft^2 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 ft^2 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 ft^2 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.

V. Inspection Results

Hog Island Gully Canal

The chain link security fence was demolished on both the north and south sides of the structure. The posts were bent and can be unbolted from the structure and new posts installed. The mesh has to be replaced.

The electrical power panels were completely submerged and will have to be changed. These panels should be relocated to the top of the platform. The variable frequency drive enclosure had grass debris inside of it indicating it had been under water, so it will have to be replaced. A cover on an electronic actuator controller was removed and there was an indication of moisture inside. The bottom drain plug was removed and a considerable quantity of water drained out. All of the actuators will have to be taken apart and determined if they can be salvaged.

The aluminum brace bolted between the gate guides and the concrete structure was bent, which indicates the gates were twisted. The braces should be replaced and stems realigned with the gate and operating nut. This may require that the pedestal flanges be machined to make sure that the two flanges are parallel. (Photos: Appendix B, Photos 1 - 2)

Headquarters' Canal

This structure was completely submerged. The electrical power panel had grass debris and water inside. It will have to be changed and should be installed at a higher elevation. The cover on the electronic actuator controller was removed and there was an indication of moisture inside. The actuator will have to be dismantled to determine if it can be salvaged. Walkways, platforms and structures were all in good condition. (Photos: Appendix B, Photos 3-4).

West Cove Canal

The chain link security fence was demolished on both the north and south sides of the structure. The posts were bent and can be unbolted from the structure and new posts installed. The mesh has to be replaced.

The electrical power panels were completely submerged and will have to be changed. These panels should be relocated to the top of the platform. The variable frequency drive enclosure had grass debris inside of it indicating it had been under water, so it will have to be replaced. A cover on an electronic actuator controller was removed and there was an indication of moisture inside. The bottom drain plug was removed and a considerable quantity of water drained out. All of the actuators will have to be taken apart and determined if they can be salvaged.

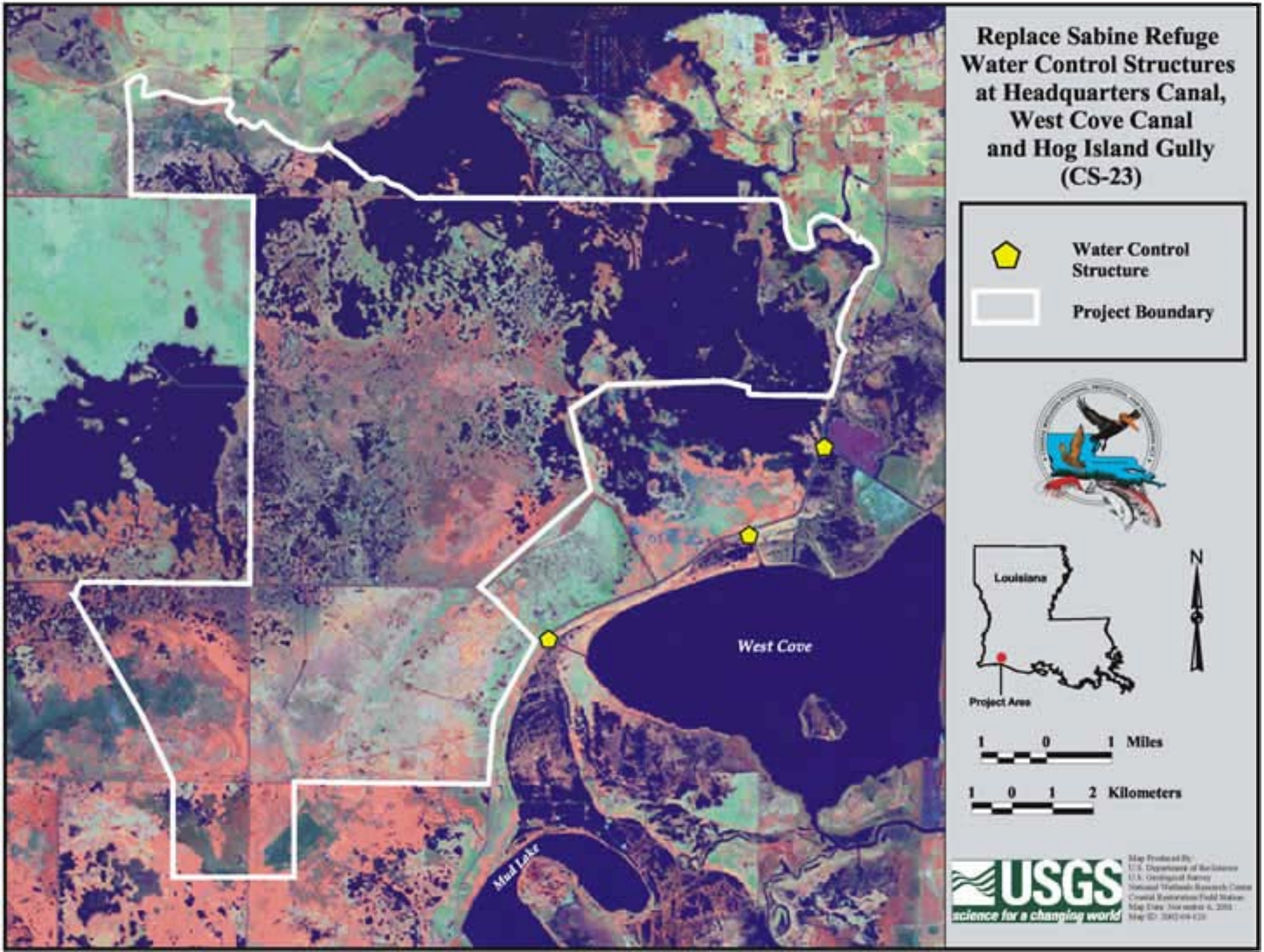
Alignment of the stem with the gate and operating nut should be checked. Realignment may require that the pedestal flanges be machined to make sure that the two are parallel. There is no damage to the fishing piers or boat launches. (Photos: Appendix B, Photos 5-8).

VI. Conclusions and Recommendations

Overall, the Sabine Refuge Structure Replacement Project is in fair 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 close to $900,000. USFWS may use separate Federal funding to repair the structures. 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. It is recommended that dual operating stems be installed on all gates to eliminate the problem of striping of the operating nuts and gates hanging up.

Appendix A

Project Features Map



Replace Sabine Refuge Water Control Structures at Headquarters Canal, West Cove Canal and Hog Island Gully (CS-23)

Water Control Structure

Project Boundary

Louisiana

Project Area

N

1 0 1 Miles

1 0 1 2 Kilometers

USGS
science for a changing world

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station
Map Date: November 6, 2008
Map ID: 2002-09-020

Appendix B

Photographs

Photo 1, North Walkway On Hog Island Gully Structure

Photo 2, South Walkway On Hog Island Gully Structure

Photo 3, Headquarters' Canal Structure

Photo 4, Grass and Water Inside Panel Box Headquarters' Canal Structure

Photo 5, North Walkway On West Cove Canal Structure

Photo 6, South Walkway On West Cove Canal Structure

Photo 7, Grass And Debris Inside Variable Frequency Drive Enclosure West Cove Canal Structure

Photo 8, Storm Surge Topped The Top Platform At West Cove Canal Structure

Appendix C

Three Year Budget Projection

SNWR STRUCTURES/ CS-23 / PPL 3

Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/2008

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Pat Landry	*Dewey Billodeau*	*USFWS*	*Dewey Billodeau*

	2005/2006	2006/2007	2007/2008
Maintenance Inspection	$ 4,955.00	$ 5,250.00	$ 5,407.00
Structure Operation	$ 10,000.00	$ 10,000.00	$ 10,000.00
Administration		$ 20,000.00	$ -
Maintenance/Rehabilitation			

05/06 Description:

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

06/07 Description: Repair Structures from Hurricane Rita Damages ***NOTE**: USFWS will take responsibility for cost associated with construction ($655,650.00) and oversight ($25,200.00) through TVA and not through O&M budget.

E&D	$ 75,650.00
*Construction **	
*Construction Oversight**	
Sub Total - Maint. And Rehab.	$ 75,650.00

07/08 Description:

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

	2005/2006	2006/2007	2007/2008
Total O&M Budgets	$ 14,955.00	$ 110,900.00	$ 15,407.00

O &M Budget (3 yr Total)	**$ 141,262.00**
Existing O & M Budget	**$ 498,452.00**
Remaining O & M Budget (Projected)	**$ 357,190.00**

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

Appendix D

Field Inspection Form

MAINTENANCE INSPECTION REPORT CHECK SHEET

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

Date of Inspection: October 13, 2005 Time: 10:00 a.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			Alignment problems.
Electrical	Poor	Yes			All electrical components demolished.
Hardware Fencing	Poor	Yes		1 & 2	Chain link fence and posts demolished.
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 W.W. Reinf.	Good				
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?

MAINTENANCE INSPECTION REPORT CHECK SHEET

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

Date of Inspection: October 13, 2005 Time: 10:00 a.m.

Structure No. Headquarters' 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	Probable		3	Possible alignment problems with gates and/or stems.
Electrical	Poor	Yes		4	All electrical components demolished.
Hardware	Good				
Timber Piles	Good				
Timber Wales	Good				
Actuators	Fair	Yes			The actuator will have to be taken apart and serviced.
Cables	N/A				
Signage /Supports	N/A				
Rip Rap Rock Dike W.W. Reinf.	Good				
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?

MAINTENANCE INSPECTION REPORT CHECK SHEET

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

Date of Inspection: October 13, 2005 Time: 10:00 a.m.

Structure No. West Cove 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			Alignment problems.
Electrical	Poor	Yes		6 & 7	All electrical components demolished.
Hardware/Stairs	Good	No		8	Trash and debris to top of structure.
Fencing	Poor	Yes		5 & 6	Chain link fence and posts demolished.
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 W.W. Reinf.	Good				
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?

Appendix E

Locations to be Monitored