



**Coastal Protection and Restoration  
Authority of Louisiana**

**Office of Coastal Protection and  
Restoration**

**2009/2010 Annual Inspection  
Report**

for

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

State Project Number CS-23  
Priority Project List 3

October 20, 2009  
Cameron Parish

Prepared by:

Dewey Billodeau, P.E.  
Darrell J. Pontiff, P.E.  
CPRA/ Office of Coastal Protection and Restoration  
Lafayette Field Office  
635 Cajundome Blvd.  
Lafayette, LA 70596

## **Table Of Contents**

I. Introduction.....	1
II. Inspection Purpose and Procedures .....	1
III. Project Description and History.....	2
IV. Summary of Past Operation and Maintenance Projects.....	3
V. Inspection Results .....	5
VI Conclusions and Recommendations .....	5

## **Appendices**

Appendix A	Project Features Map
Appendix B	Photographs
Appendix C	Three Year Budget Projections
Appendix D	Field Inspection Notes
Appendix E	Map showing areas to be monitored

## **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, 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 (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 October 20, 2009 under clear skies and cool temperatures. In attendance were Dewey Billodeau and Darrell Pontiff from OCPR, Daniel Davis with USFWS and Donald Taffi with NRCS for other inspections. The inspection began at the Hog Island Gully Structure at approximately 9:50 am and ended at the West Cove Structure at 10:20 am.

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**

**September, 2009 – A-1 American Fence, Inc.** A maintenance event was performed to correct the following:

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

Construction Cost:	\$5,500.00
Engineering Design and Construction Oversight:	\$12,550.00
<b>PROJECT TOTAL:</b>	<b>\$18,050.00</b>

### **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<sup>2</sup> 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<sup>2</sup> 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<sup>2</sup> 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: USFWS 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**

The chain link fencing has recently been replaced after Hurricane Ike. The remainder of the structure is in the same condition as post Hurricane Rita and Hurricane Ike. Some electrical repairs have been made by TVA in 2007. (Photos: Appendix B, Photos 1 - 2)

### **Headquarters' Canal**

This site went completely under water as described in General Observations above. The center gate appears to be leaning slightly. No other damages appear to be present than those that existed pre-storm and which were being worked on by TVA. (Photos: Appendix B, Photos 3-4).

### **West Cove Canal**

The chain link fencing has recently been replaced after Hurricane Ike. The remainder of the structure is in the same condition as post Hurricane Rita and Hurricane Ike. Some electrical repairs have been made by TVA in 2007. (Photos: Appendix B, Photos 5-6).

## **VI. Conclusions and Recommendations**

Overall, the Sabine Refuge Structure Replacement Project is in poor condition with all of the structures sustaining damage from Hurricane Ike. USFWS has used separate Federal funding through a third party, Tennessee Valley Authority (TVA) for some electrical system replacement. OCPR will prepare a maintenance contract for remaining O&M items not performed by TVA including actuator replacement, gate seal removal, stem gate articulation joints, pedestal alignment, stem nut replacement and possible stem thread size changes. 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. A maintenance project will be bid in summer 2010 which will include the following:

- Convert single stem gates to dual stem
- Install structural steel platform

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

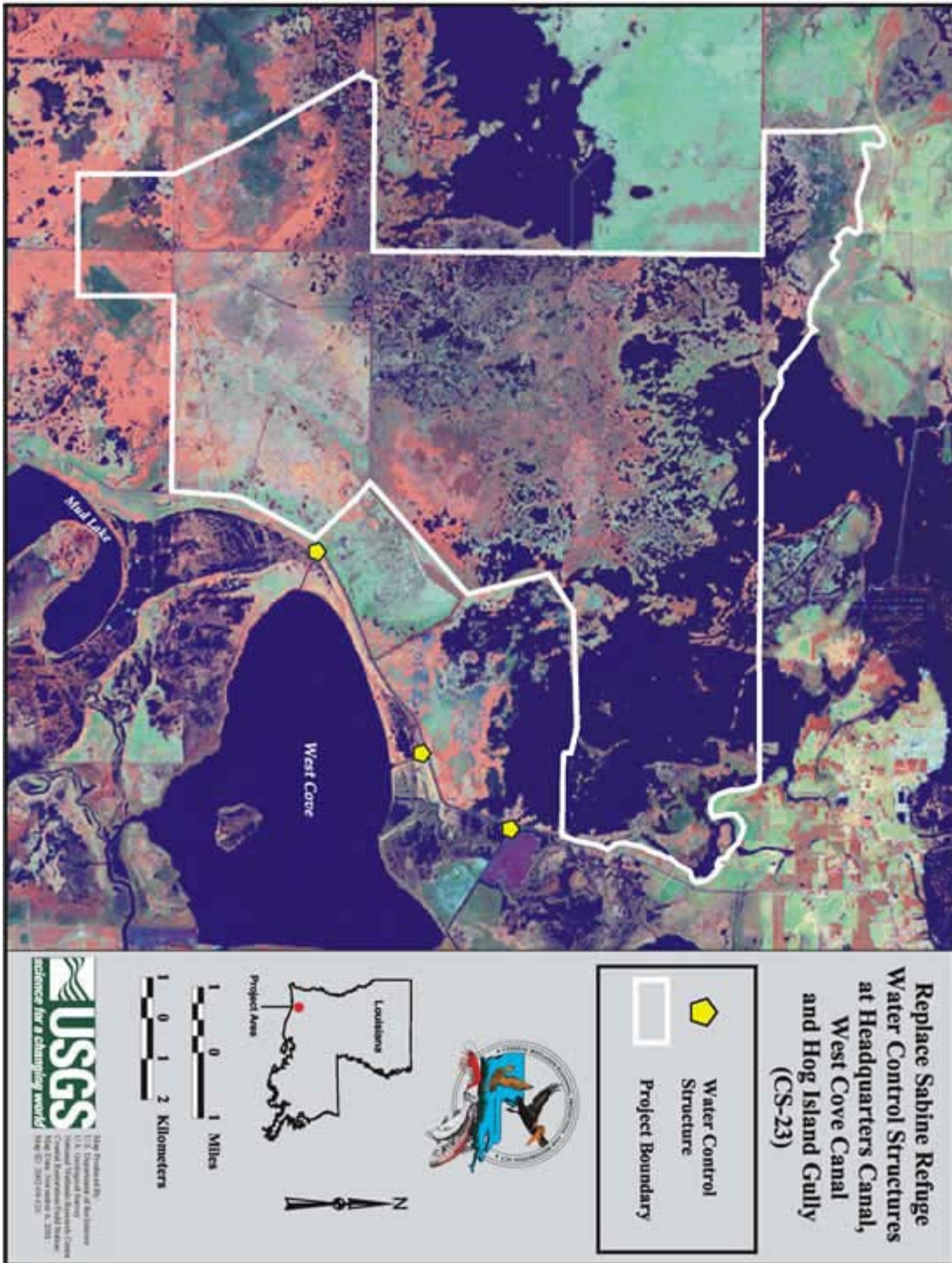
- Install new Rotork actuators and gear boxes
- Reinstall electrical components



Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

**Appendix A**  
**Project Features Map**

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23



Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

**Appendix B**  
**Photographs**

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23



**Photo No. 1, Hog Island Gully Structure**



**Photo No. 2, Hog Island Gully Structure**

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23



**Photo No. 3, Headquarters Structure**

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

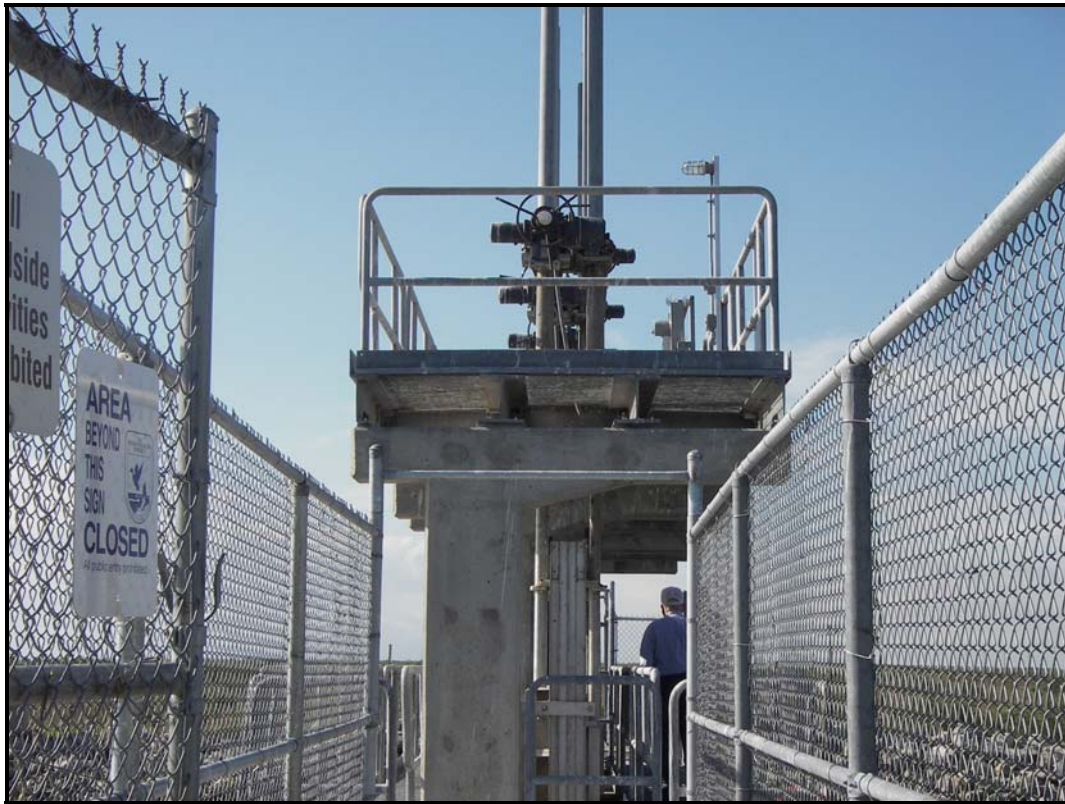


**Photo No. 4, Headquarters Structure**



**Photo No. 5, West Cove Canal**

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23



**Photo No. 6** West Cove Canal

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

## **Appendix C**

### **Three Year Budget Projection**



Annual Inspection Report  
 SABINE REFUGE STRUCTURE  
 REPLACEMENT  
 State Project No. CS-23

**SNWR STRUCTURES/ CS-23 / PPL 3**  
**Three-Year Operations & Maintenance Budgets 07/01/2010 - 06/30/2013**

<u>Project Manager</u>	<u>O &amp; M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Pat Landry	Dewey Billodeau	USFWS	Dewey Billodeau

	2010/2011	2011/2012	2012/2013
<b>Maintenance Inspection</b>	\$ 5,909.00	\$ 6,086.00	\$ 6,269.00
<b>Structure Operation</b>	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
<b>Administration</b>	\$ 10,000.00		\$ -

**Maintenance/Rehabilitation**

10/11 Description: Rehabilitate the three controls structures, dual stems and controls.

E&D	\$ -
Construction	\$ 1,127,500.00
Construction Oversight	\$ 100,928.00
<i>Sub Total - Maint. And Rehab.</i>	<u>\$ 1,228,428.00</u>

11/12 Description:

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

12/13 Description:

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

	2010/2011	2011/2012	2012/2013
<b>Total O&amp;M Budgets</b>	<u>\$ 1,254,337.00</u>	<u>\$ 16,086.00</u>	<u>\$ 16,269.00</u>

<b>O &amp; M Budget (3 yr Total)</b>	<u>\$ 1,286,692.00</u>
<b>Unexpended O &amp; M Budget</b>	<u>\$ 1,369,824.00</u>
<b>Remaining O &amp; M Budget (Projected)</b>	<u>\$ 83,132.00</u>

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

## **Appendix D**

### **Field Inspection Form**

Annual Inspection Report  
 SABINE REFUGE STRUCTURE  
 REPLACEMENT  
 State Project No. CS-23

**MAINTENANCE INSPECTION REPORT CHECK SHEET**

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

Date of Inspection: October 20, 2009 Time: 10:10 a.m.

Structure No. Hog Island Gully Canal

Inspector(s): Dewey Billodeau, Darrell Pontiff (OCPR)  
 Daniel Davis (USFWS), Donald Taffi (NRCS)

Structure Description: Control Structure

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

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	Good				
Gates	Fair	Yes		1 & 2	Alignment problems.
Electrical	Good				All electrical components recently upgraded by TVA.
Hardware	Poor				
Fencing					
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	Good				
Rock Dike					
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?

Annual Inspection Report  
 SABINE REFUGE STRUCTURE  
 REPLACEMENT  
 State Project No. CS-23

MAINTENANCE INSPECTION REPORT CHECK SHEET

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

Date of Inspection: October 20, 2009 Time: 10:10 a.m.

Structure No. Headquarters' Canal

Inspector(s): Dewey Billodeau, Darrell Pontiff (OCPR)  
 Daniel Davis (USFWS), Donald Taffi (NRCS)

Structure Description: Control Structure

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

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	Good				
Gates	Fair	Probable		3 & 4	Possible alignment problems with gates and/or stems.
Electrical	Poor	Yes			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	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?

Annual Inspection Report  
 SABINE REFUGE STRUCTURE  
 REPLACEMENT  
 State Project No. CS-23

MAINTENANCE INSPECTION REPORT CHECK SHEET

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

Date of Inspection: October 20, 2009 Time: 10:20 a.m.

Structure No. West Cove Canal

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

Daniel Davis (USFWS), Donald Taffi (NRCS)

Structure Description: Control Structure

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

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	Good				
Gates	Fair	Yes		5 & 6	Alignment problems.
Electrical	Good	Yes			All electrical components recently upgraded by TVA.
Hardware/Stairs	Good				
Fencing	Poor				
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?

Annual Inspection Report  
SABINE REFUGE STRUCTURE  
REPLACEMENT  
State Project No. CS-23

## **Appendix E**

### **Locations to be Monitored**