State of Louisiana
Department of Natural Resources
Coastal Engineering Division

2005/2006 Annual Inspection Report

for

EAST MUD LAKE MARSH MANAGEMENT PROJECT (CS-20)

State Project Number CS-20
Priority Project List 2

November 3, 2005
Cameron Parish

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I. Introduction

The East Mud Lake Marsh Management project area consists of 8,054 acres (3,222 ha) located in the Calcasieu/Sabine Basin in Cameron Parish, Louisiana. The project is bounded by the southern Apache Louisiana Minerals, Inc. Company property line to the south, La. Hwy. 27 to the west, the Sabine National Wildlife Refuge north of Magnolia Road, and an existing step levee and property line near Oyster Bayou to the (See Appendix A).

The East Mud Lake Marsh Management 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 Mud Lake Project has a twenty –year (20 year) economic life, which began in April 1996.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the East Mud Lake Marsh Management Project (CS-20) 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, 2004). 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 C. A summary of past operation and maintenance projects completed since completion of the Mud Lake Project are outlined in Section IV.

In 2003, the CWPPRA Task Force determined, due to the fact that LDNR was responsible for the operation and maintenance phase of the vast majority of CWPPRA projects, that LDNR would be the responsible party for all Post Storm/Hurricane Assessments. After Hurricanes Katrina and Rita, every project 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 East Mud Lake Marsh Management Project (CS-20) was held on November 3, 2005 under sunny skies and mild temperatures. In attendance were Stan Aucoin, Darrell Pontiff, Dona Weifenbach, and Patrick Landry from LDNR, Troy Mallach representing NRCS, Chad Courville representing Ducks Unlimited, and Scott Rosteet representing Apache Minerals, Inc. The annual inspection began at approximately 11:00 a.m. at Structure #11 and ended at Structure #13 at approximately 2:00 p.m.

The field inspection included a complete visual inspection of most of the project features. Conditions of features not inspected on this visit were verified by Mr. Scott Rosteet of Apache Louisiana Minerals, Inc. Staff gauge readings were used to determine approximate elevations of water, rock weirs, earthen embankments, steel bulkhead structures and other project features. Photographs were taken at each project feature (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

The East Mud Lake Marsh Management Project (CS-20) was completed in April 1996 and involved the installation and maintenance of six variable crest culverts with flap gates, three variable crest culverts with slots, one gated culvert, five culverts with flap gates, one variable crest box structure, two earthen plugs, approximately 5,000 linear feet of shoreline repair on E. Mud Lake, and approximately 40,600 linear feet of levee repair along part of the project area boundary (the step canal). These structures are designed to assist drainage, stabilize salinity and water levels and allow ingress and egress of fisheries species. The principle project features of the East Mud Lake Marsh Management Project include the following:

ES-6- 2- 36" x 40' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side. The weir inlet has 2- 4" vertical slots, each with a 3" x 6" x 6' vertical timber stop log. The weir inlet has a total of 52- 3" x 6" x 4'-7" timber stop logs. ES-#6 replaces an existing structure.

ES-7- 2- 36" x 40' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side . The weir inlet has 2- 4" vertical slots, each with a 3" x 6" x 6' vertical timber stop log. The weir inlet has a total of 52- 3" x 6" x 4'-7" timber stop logs. ES-#7 replaces an existing structure.

ES-8- 2 -36" x 40' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side. The weir inlet has 2- 4" vertical slots, each with a 3" x 6" x 6' vertical timber stop log. The weir inlet has a total of 52- 3" x 6" x 4'-7" timber stop logs. ES-#8 replaces an existing structure.

ES-9a- 1- 36" x 25' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side and aluminum flap gate on the north side. The weir inlet has a total of 26- 3" x 6" x 4'-11" timber stop logs. ES-# 9A replaces an existing structure.

ES-9b- 1- 48" x 30' corrugated aluminum pipe (8 gauge), with aluminum canal gate on the south side and aluminum flap gate on the north side. ES-# 9B replaces an existing structure.

ES-5- 1 - 36" x 35' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side. The weir inlet has a total of 26 -3" x 6" x 4'-11" timber stop logs. ES-#5 replaces an existing structure.

ES-11- 1 -36" x 35' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the south side and aluminum flap gate on the north side. The weir inlet has a total of 26- 3" x 6" x 4'-11" timber stop logs. ES-# 11 replaces an existing structure

ES-4 - 5 - 36" corrugated aluminum pipe with aluminum variable crest weir on the west side and aluminum flap gate on the east side. ES-#4 is an existing structure installed by FINA.

ES-3- 1 - 36" corrugated aluminum pipe with aluminum variable crest weir on the north side and aluminum flap gate on the south side. ES-#3 is an existing structure installed by FINA.

ES-1- 1 - 36" x 40' corrugated aluminum pipe (10 gauge), with 10' aluminum variable crest weir inlet on the north side and aluminum flap gate on the south side. The weir inlet has a total of 26- 3" x 6" x 4'-11" timber stop logs. ES-#1 is a new structure.

ES-17- 1 - 65' sheetpile structure with one (1) 7' wide variable crest weir/boat bay. The weir has a total of 12- 4" x 6" x 6'-11" timber stop logs. ES-#17 is a new structure.

ES-13- 1 - 160' steel sheetpile bulkhead with two (2) 7' wide variable crest weirs and two (2) 7' aluminum flap gates. The weir inlet has a total of 26- 4" x 6" x 6'-11" timber stop logs. ES-#13 is a new structure.

ES-14-15- approximately 5,000 linear feet of earthen embankment constructed along the Mud Lake Shoreline.

ES-16- earthen plug

ES-19- 1 - 24" x 30' corrugated aluminum pipe (12 gauge), with aluminum flap gate on the west side. ES-#19 replaces an existing structure.

ES-20- 1 - 24" x 30' corrugated aluminum pipe (12 gauge), with aluminum flap gate on the west side. ES-#19 replaces an existing structure.

ES-21- 1 - 24" x 30' corrugated aluminum pipe (12 gauge), with aluminum flap gate on the west side. ES-#19 replaces an existing structure.

ES-22- 1 - 24" x 30' corrugated aluminum pipe (12 gauge), with aluminum flap gate on the west side. ES-#19 replaces an existing structure.

ES-29- 1 - 24" x 30' corrugated aluminum pipe (12 gauge), with aluminum flap gate on the west side. ES-#19 replaces an existing structure.

ES-29a- earthen plug

40,600 linear ft. – levee refurbishment along the Step Canal

The Calcasieu Ship Channel is 1 mi (1.6 km) east of the project area and provides an avenue for high salinity water (4–32 ppt) and rapid water movement into the East Mud Lake project area via West Cove, Oyster Bayou, and Mud Bayou. These connections facilitate increases in turbidity and scouring within the project area. The construction of La. Hwy 27 in 1936 reduced the input of freshwater from the west (USDA-SCS 1994). In the 1950's, portions of the project area were impounded by construction of Magnolia Road and a levee system on the north, east, and south (figure 1). Analysis of aerial photos of the project area indicates a marsh loss rate of 76 ac/yr (30.4 ha/yr) from 1953 to 1983 (USDA-SCS 1992). Excluding Mud Lake, the land to open water ratio deteriorated from 99:1 in 1953 to 70:30 by 1983.

Another problem in the project area is flooding of the marsh for prolonged time periods. Construction of La. Hwy. 27 to the west and La. Hwy. 82 to the south have decreased avenues for drainage from the western and southern areas of the project. This has lead to prolonged periods of high water levels and "ponding," which has resulted in the deterioration of the

vegetation (USDA-SCS 1994). Subsidence and sea level rise have also exacerbated the problem, resulting in a relative water level increase of 0.25 in/yr (0.64 cm/yr) from 1942 to 1988 (Penland et al. 1989). The East Mud Lake project addresses these problems by increasing the total number of drainage outlets for the area.

The project area has been divided into two hydrologically separate Conservation Treatment Units (CTUs) that are managed independently (figure 1). CTU 1 contains Mud Lake and is managed passively. Structures and features in CTU 1 consist of vegetative plantings, earthen plugs, culverts with flap gates and variable-crest culverts. The variable-crest culverts at stations 6, 7, and 8 are set at 6 in (15 cm) below marsh level with vertical slots open except when salinities exceed 15 ppt. The variable-crest culvert at station 13 is set at 6 in (15 cm) below marsh level (BML) with flap gates locked open except when salinities exceed 7 ppt.

CTU 2 is actively managed and has drawdown capabilities in order to encourage shallow water areas to revert to emergent vegetation. Two drawdown events were planned for the first five years of the project. Structures and features present in CTU 2 consist of vegetative plantings, variable crest culverts with flap gates, a gated culvert, and a variable-crest box structure (figure 1). Phase I emphasizes curtailing marsh erosion and reclaiming emergent marsh by implementing a partial drawdown from February 15-July 15. All flap gates at variable-crest culverts 1, 3, 4, 5, 9a, and 11 are allowed to operate with all stop logs removed. Stoplogs are set at 12 in (30.48 cm) above marsh level (AML) on the variable crest box structure at station 17. The screw gate at station 9 is opened and the flap gate allowed to operate.

Phase II, the maintenance phase, emphasizes stabilization of salinity and water levels while ensuring ingress and egress of fisheries species. During this phase of operation, flap gates at stations 3, 4, 5, 9a, 9b, and 11 are locked open. Stoplogs are set at 6 in (15 cm) below marsh level at stations 1, 3, 4, 9a, and 11 while at station 5, one bay is set at 6 in (15 cm) BML and one bay at 12 in (30.48 cm) BML. The screw gate at station 9b is opened and all stop logs removed from station 17. To protect marsh vegetation during periods of high salinity, the ingress gates are closed when salinity inside the project area exceeds 15 ppt at stations 3 or 5.

Vegetation plantings were installed through a cooperative effort by the Louisiana Department of Natural Resources (LDNR), Soil and Water Conservation District, and Natural Resource Conservation Service (NRCS) from June 5 through July 8, 1995. A total of 7,200 *Spartina alterniflora* (smooth cord grass) trade gallons were planted along the step levee in CTU 2 (figure 2). The cut bank configuration of most of the Mud Lake shoreline limited plantings to 480 plants in areas adjacent to structures 17, 13, and the earthen plug west of structure 17 in CTU 1.

Construction was completed May 1, 1996. The project objectives are to prevent wetland degradation by reducing vegetative stress, thereby improving the abundance of emergent and submergent vegetation and to stabilize the shoreline of Mud Lake through vegetative plantings. Specific goals are to (1) decrease the rate of marsh loss, (2) increase vegetative cover along the shoreline of East Mud Lake, (3) increase percent cover of emergent vegetation in shallow open-water areas, (4) increase abundance of vegetation in presently

vegetated portions of the project area, (5) reduce water-level fluctuations to within 6 in (15 cm) BML to 2 in (5.08 cm) AML and salinity levels to 15 ppt or less, (6) decrease the duration and frequency of flooding over emergent marsh, (7) decrease the mean salinity in CTU 2, and (8) increase vertical accretion in CTU 2. Maintaining fisheries abundance is not a specific goal as addressed in the project documentation. However, because of concerns regarding potential fishery impacts, it has been included in the monitoring plan.

The area east of CTU 2, south of Oyster Bayou and Mud Bayou (reference area 1), was selected as the best reference area for the evaluation of the water level, salinity, and fisheries monitoring elements. The area north of Magnolia Road (reference area 2) is a suitable reference area for the evaluation of the vegetative, accretion, water-level, salinity, fisheries, and soil monitoring elements. The project area and both reference areas are classified as brackish marsh (Chabreck and Linscombe 1988) and contain mainly organic Bancker and Creole soils with ridges of Mermentau soils (USDA-NRCS 1995). All are directly influenced hydrologically by the CSC and are dominated by *Spartina patens* (marsh hay cord grass).

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since April 1996, the construction completion date of the East Mud Lake Marsh Management Project (CS-20).

Maintenance Project – LDNR: This maintenance project included the installation of approximately 600 tons of stone riprap around Structure #4, aluminum fabrication and installation of flap gate lifting devices and a stop log channel repair at Structure #4, approximately 950 linear feet of earthen levee repair, and placement of approximately 100 tons of stone riprap at Structures 6, 7, 8, 9a & 9b. Construction was completed in December 1999. The costs associated with the engineering, design and construction of the East Mud Lake Maintenance Project are as follows:

Construction:	$113,848.21
Engineering & Design:	$ In house
Construction Oversight/As built surveys:	$ 11,902.28
Project Total:	**$125,750.49**

(Does not include costs associated with in-house design.)

Structure Operations: In accordance with the operation schedule outlined in the Operation and Maintenance Plan, structures were manipulated as required by Apache personnel at no cost to LDNR.

V. Inspection Results

ES-6 –2-36" culverts with flap gates, stop logs, and a 4" fish slot

The overall condition of Structure No. 6 appears to be very good. Water level gauges weren't available near the structure but read +1.7 NAVD at Structure No. 7 just east of Structure No. 6. The timber piles, stop logs, grating, etc. are in good condition. Rock placed around the outlet side of the structure has held up well and stabilized the shoreline. Some minor erosion has occurred on the westerly pipe structure near the grating along the road. The end of the outlet pipes are clogged with marsh and other debris. The padlocks on the stop log locking devices have rusted, but since these structures are seldom operated, it was decided not to replace them at this time. As a result of the inspection of Structure No. 6, LDNR and NRCS agree that stone needs to be added around grating near the access roadway, and clean out ends of both outfall pipes of marsh debris. (Photos: Appendix B, Photo 1).

ES-7 – 2-36" culverts with flap gates, stop logs, and a 4" fish slot

Structure No. 7 appears to be in very good condition. Water level gage on the inside was leaning and not readable and the outside gage was +1.7. Both ends of this structure are clogged with marsh debris and have silted up. Minor erosion also has occurred at the end of the grating along the road. LDNR and NRCS agree that stone needs to be added around grating near access roadway, clean out marsh debris from the inlet and outlet sides of the structure and replace staff gage on the inside of the structure. (Photos: Appendix B, Photo 2).

ES-8 – 2-36" culverts with flap gates, stop logs, and a 4" fish slot

Structure No. 8 appears to be in very good condition. Water level gauges were unavailable. The end of the outlet pipes need to be cleaned out. It appears very little flow is going through the pipes due to washover of the access road rock material into the water. LDNR and NRCS agree that this structure requires clean out of the ends of outlet pipes, and replace staff gages inside and outside of the structure. (Photos: Appendix B, Photos 3).

ES-9a – 1- 36" culvert w/ stop logs & flap gate

Structure No. 9a is in good condition. The staff gage on the inside was leaning and not readable and the gage on the outside was +1.1 NAVD. Salinity on the inside was 20.8 ppt and 25.0 ppt on the outside. A section of corrugated metal culvert debris has been lodged up against this structure. The handle on the outlet pipe flapgate has been broken off. Upon visual inspection, we noticed that there was slight erosion on the earthen wing-walls of the structure. LDNR and NRCS agree that this structure requires removal of the metal pipe and repair of the flapgate handle. (Photos: Appendix B, Photos 4 & 5).

ES-9b – 1- 48" culvert w/ sluice gate and flap gate

Structure No. 9b is in good condition. The staff gage on the inside was leaning and not readable and the gage on the outside was +1.1 NAVD. Salinity on the inside was 20.8 ppt and 25.0 ppt on the outside. A section of corrugated metal culvert debris has been lodged up against this structure. The handle on the outlet pipe flapgate has been broken off. The gear box on the sluice gate is showing signs of rust and the stem cover is missing. Apache personnel have reported that it, so far, is not a problem; however it will probably need to be addressed. LDNR and NRCS agree that this structure is in operable condition and minor maintenance will be required to sandblast, clean up, paint the gearbox and replace the plastic stem cover, and repair flapgate handle. (Photos: Appendix B, Photos 4 & 5).

ES-11 – 1- 36" culvert w/ stop logs & flap gate

The structure is in good condition. Water level was +1.0 NAVD on the outside. The staff gage on the inside of the structure is missing. Salinity readings were 23.6 ppt on the inside and 23.0 ppt on the outside. There is some erosion of the bank on both the inlet and discharge sides of the structure. Approximately 270 tons of man size rip rap will be required to reinforce the bank around the structure. No additional damage noted from the storm. LDNR and NRCS agree that maintenance work is required to add rip rap and replace staff gage. (Photos: Appendix B, Photo 6).

ES-5 –1- 36" culvert w/ stop logs & flap gate

The structure itself is in good condition. Staff gauges inside and outside of the structure are damaged and not readable. Salinity inside the marsh was 23.5 ppt. Erosion was noted along the bank on both the inlet and discharge sides of the structure. The erosion extends on the inlet side from the eastern end of the structure southerly along the step canal for approximately 20 linear feet each side of the structure. Approximately 90 tons of rock will be needed to reinforce the bank around this structure. Additional erosion was noted along the bank on the inlet side of the structure due to Hurricane Rita. LDNR and NRCS agree that maintenance work is required to add rip rap and replace staff gages. (Photos: Appendix B, Photos 7 & 8).

ES-4 – 5- 48" culverts w/ stop logs & flap gates

This structure is a pre-existing structure that was incorporated into the CS-20 Project. It is in disrepair and needs to be replaced. A new structure was let out for bids on February 10, 2005, however it was over budget and the bid was rejected. This structure will be replaced with a structure similar to ES-13, and the existing structure will be abandoned in place. Staff gauge reading inside was +1.1 and +0.5 on the outside. Salinity reading on the inside was 23.4 ppt. The structure appeared to be in same condition as pre-storm. (Photos: Appendix B, Photo 9).

ES-3 – 1- 36" culvert w/ stop logs & flap gates

This is also a pre-existing structure that was incorporated into the CS-20 Project. The walkways on the outside and the inside of the structure are missing. The structure is silted up with marsh debris and the stop logs could not be pulled. The bank, however, is showing signs of some erosion and will require approximately 270 tons of man-size rip rap for reinforcement. The bank has additional erosion occurring from the storm. The staff gage on the outside of the structure is missing. LDNR and NRCS agree that maintenance work is required to add rip rap, clean out debris, replace walkway, and replace staff gage. (Photos: Appendix B, Photos 10, 11 & 12).

ES-1 – 1- 36" culvert w/ stop logs & flap gates

Vandals have stolen the ramp grating on the inlet side of the structure and needs to be replaced. The structure is in mint condition and in no need of any repairs. No water was flowing through the pipe. Water levels were +1.3 inside and +1.4 NAVD outside. LDNR and NRCS agree that no maintenance work required other than replacing the grating. (Photo: Appendix B, Photos 13).

ES-17 – variable crest weir w/ boat bay

Some rusting of the pile cap is present. The locking tabs on the landing side of the stop log slots are gone and will need to be replaced. The warning sign has been knocked down and in the process has pulled up the pile cap that was supporting it. The staff gauge is leaning and not readable. Salinity on the lake side of the structure was 24.3 ppt. Other features of this structure are in the same condition as pre-storm. LDNR and NRCS agree that maintenance work is required to repair sign and pile cap, replace staff gage, and replace locking tabs. (Photos: Appendix B, Photos 14).

ES-13 – sheet pile bulkhead w/ 2 variable crested weirs & flap gates

Water was flowing into this structure from First Bayou. The warning sign is missing as well as the staff gauge inside. Staff gauge reading outside was +1.67NAVD88. Salinity inside the marsh was 25.0 ppt and 21.5 ppt on the outside. Remaining project features are in same condition as pre-storm. LDNR and NRCS agree that minor maintenance is required to replace the warning sign. (Photos: Appendix B, Photo 15).

ES-19, 20, 21, 22, & 29 – 24” culverts w/ flap gates

These structures were not directly inspected on this inspection as agreed jointly by LDNR and NRCS personnel. According to Mr. Rosteet, they are in working order and functioning as designed. LDNR and NRCS agree that no maintenance is required at this time.

ES-29a – earthen plug

Due to logistics, this plug also was not directly inspected on this trip. According to Mr. Rosteet, it is stable and functioning as designed. LDNR and NRCS agree that no maintenance is required at this time.

ES-14 - 15 – 5,000 linear feet of earthen embankment on E. Mud Lake

See ES-29a comments.

40,600 linear feet of Levee Refurbishment along the Step Canal

The inspection of the earthen levee consisted of a visual inspection of the entire length of levee along the Step Canal. In addition to the erosion noted at Structures No. 5 and 3, the storm surge has eroded portions of the levee in various locations. In addition the storm surged has placed large amounts of marsh and other debris into the east-west sections of the Step Canal. In these areas of the canal, the water depth was very shallow. The north-south sections appear to be relatively free of any obstructions. LDNR and NRCS agree that maintenance is required to repair the levees and remove trash from the canal. (Photos: Appendix B, Photos 16, 17 & 18).

VI. Conclusions and Recommendations

Overall, the East Mud Lake Marsh Management Project is in good condition and functioning as designed with only the problems noted above. Plans and specifications will be prepared for replacement of structure ES-4 and to address maintenance of the other structures in Fiscal 2006/2007.

Appendix A

Project Features Map

East Mud Lake Marsh Management (CS-20)

Water Control Structure

Project Boundary

USGS science for a changing world

N

0.5 0 0.5 1 Miles

0.5 0 0.5 1 Kilometers

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
1998 Digital Orthophoto Quarter Quadrangle

Map Date: September 23, 2002
Map ID: 2002-11-739
Data accurate as of: September 23, 2002

Appendix B

Photographs

Photo 1, Structure No. 6 showing erosion at end of grating.

Photo 2, Structure No.7 showing marsh debris/siltation and minor erosion at grating.

Photo 3, Structure No.8, view looking south.

Photo 4, Structure 9a & 9b, showing metal culvert debris lodged on structures.

Photo 5, Structure 9b, showing broken flapgate handle.

Photo 6, Structure No. 11, view looking south.

Photo 7, Structure No. 5, March – 2005, showing bankline erosion.

Photo 8, Structure No. 5, November -2005, showing additional bankline erosion along structure and on eastern levee.

Photo 9, Structure No. 4, view looking north.

Photo 10, Structure No.3, March – 2005, showing bankline erosion.

Photo 11, Structure No. 3, November – 2005, showing additional erosion along structure and eastern levee.

Photo 12, Structure No. 3, showing marsh debris/siltation in and around the structure.

Photo 13, Structure No. 1, view looking south.

Photo 14, Structure No. 17, showing bent warning sign and damaged pile cap.

Photo 15, Structure No. 13, view looking south, flap gates open.

Photo 16, North Levee, looking east, showing washout of top portion of levee.

Photo 17, Step Canal, view looking west, showing marsh/siltation and other debris in the canal.

Photo 18, Step Canal, view looking west, again showing heavy marsh siltation in the canal.

Appendix C

Three Year Budget Projection

E. MUD LAKE/ CS-20 / PPL 2

Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/08

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Pat Landry	*Pat Landry*	*NRCS*	*Pat Landry*

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

05/06 Description:

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

06/07 Description:Maintenance Work on Structures/Replace Structure No. 4/Repair of Hurricane Rita Damages

E&D	$ 81,895.00
Construction	$ 820,820.00
Construction Oversight	$ 70,845.00
Sub Total - Maint. And Rehab.	$ 973,560.00

07/08 Description:

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

	2005/2006	2006/2007	2007/2008
Total O&M Budgets	**$ 4,955.00**	**$ 988,810.00**	**$ 5,407.00**

O &M Budget (3 yr Total)	**$ 999,172.00**
Existing O & M Budget	**$ 999,975.00**
Remaining O & M Budget (Projected)	**$ 803.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET

E. MUD LAKE / PROJECT NO. CS-20 / PPL NO. 2

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,250.00	**$5,250.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$81,895.00	**$81,895.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$70,845.00	**$70,845.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	1	$5,000.00	$5,000.00
FEDERAL SPONSOR Admin.	LUMP	1	$5,000.00	$5,000.00
SURVEY Admin.	LUMP	0	$2,000.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$10,000.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	10	$500.00	$5,000.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$5,000.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$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	898	$90.00	$80,820.00
	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
Navigation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$50,000.00	$50,000.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$4,000.00	$4,000.00
Replace Structure No. 4		LUMP	1	$632,000.00	$632,000.00
Levee Repair		LUMP	1	$24,000.00	$24,000.00
Clean Wrack & Debris		LUMP	1	$25,000.00	$25,000.00
				TOTAL CONSTRUCTION COSTS:	**$815,820.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$988,810.00**

Appendix D

Field Inspection Form

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-20 E. Mud Lake

Date of Inspection: 11/3/2005 Time: 11:45am

Structure No. 1

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach Scott Rosteet,Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside:1.3 Outside: 1.4

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Fair			13	Replace one section of grating that is missing.
Stop Logs	Good				**NOTE**: There was no water flowing through the structure at the time of the inspection.
Hardware	Fair		Yes	13	Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Good				
Rip Rap (fill)	N/A				
Earthen Embankment					

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? Yes

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name:CS-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 11:35am

Structure No. 3

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside:? Outside: ?

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good				
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles/ Walkway	Fair				Walkways on the inside and outside of the structure are missing.
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Fair				Replace staff gage on inside and outside of the structure.
Rip Rap (fill)	N/A				
Earthen Embankment	Fair	Yes		10, 11	Bank erosion on inside of structure, 75 feet on left side and 25 feet on right .
				10, 11	Bank erosion on outside of structure, 20 feet (Approximately 270 tons of rock total).
Channel	Poor			12	Inlet side of the structure is silted up with marsh debris.

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 11:25am

Structure No. 4

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside:1.1 Outside: 0.5
Salinity 23.4 ppt

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A			9	**GENERAL NOTE**: Due to severe settlement of the overall structure, it is beyond repair and needs to be abandoned in place, and a new structure built along side.
Steel Grating	Poor				
Stop Logs	Fair				
Hardware	Fair				
Timber Piles	Poor				
Timber Wales	Poor				
Galv. Pile Caps	Good				
Cables	N/A				
Signage /Supports	Good				
Rip Rap (fill)	Fair				
Earthen Embankment	Fair	Yes			

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 11:15am

Structure No. 5

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside: Outside:
Salinity 23.5 ppt

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good				
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Good				
Staff Gages	Poor				Staff gages inside and outside of the structure are damaged and not readable.
Rip Rap (fill)	N/A				
Earthen Embankment	Fair	Yes		7, 8	Bank erosion noticeable on outside of structure. Add rock armor 20 feet either side of pipe outlet, and 20 feet wide, 2 feet thick (Approximately 90 tons).

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 1:15pm

Structure No. 6

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

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

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			1	Some erosion near end of grating along roadside.
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Fair				**General Note:** There are no staff gages at this structure.
Outlet Pipes	Fair			1	The ends of both outlet pipes are clogged with marsh debris.
Earthen Embankment	Good				

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 1:10pm

Structure No. 7

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside: Outside: 1.7

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good				Minor erosion at end of grating along roadside.
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Good				
Satff Gages	Fair				Inside gage was leaning and not readable.
Inlet/Outlet Pipe	Fair			2	Inlet and outlet pipes are clogged with marsh debris.
Earthen Embankment	Good				

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 1:00pm

Structure No. 8

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

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

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good				
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Good				
Staff Gages	Poor				Staff gages inside and outside of the structure are missing.
Inlet/Outlet Pipe	Fair			3	Very little flow through pipes, clogged with washover of rock from roadway.
Earthen Embankment	Good				

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 12:50pm

Structure No. 9A & 9B

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside: Outside: 1.1
Salinity 20.8 ppt Inside, 25.0 ppt Outside

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				**GENERAL NOTE**: (1) Replace plastic stem cover on sluice gate.
Steel Grating	Good			4, 5	(2) Sandblast/cleanup gear drive on sluice gate. (3) Metal culvert debris lodged against the structure.
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks, handle on outlet pipe broken..
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Good				
Staff Gages	Poor				Staff gage on inside leaning and not readable.
Rip Rap (fill)	Good				
Earthen Embankment	Good				Slight erosion on the earthen wing walls of the structure.

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 11:10am

Structure No. 11

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside:? Outside: 1.0

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good				
Stop Logs	Good				
Hardware	Fair		Yes		Corrosion on padlocks.
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Fair			6	Add staff gage on inside.
Rip Rap (fill)	N/A				
Earthen Embankment	Fair	Yes		6	Bank erosion on inside of structure, 50 feet on right side (east) and 30 feet on left (west). Bank erosion on outside of structure, 20 feet either side of pipe (Approximately 270 tons of rock total).

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 1:30pm

Structure No. 13

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside: Outside: 1.67

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	Fair			15	Some rusting of pile cap is present.
Steel Grating	Good				
Stop Logs	Good				**Note:** Water was flowing into project from First Bayou.
Hardware	Good				
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables					
Signage /Supports	Fair				Warning sign is missing.
Staff Gage	Fair				Staff gage inside is missing.
Rip Rap (fill)					
Earthen Embankment					

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-20 E. Mud Lake

Date of Inspection: 11/3/05 Time: 12:00pm

Structure No. 17

Inspector(s):Stan Aucoin, Pat Landry, Darrell Pontiff, Troy Mallach
Scott Rosteet, Dona Weifenbach, Chad Courville

Structure Description:

Water Level Inside: Outside:

Type of Inspection: Annual

Weather Conditions: Sunny

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	Fair			14	Steel sheet pile and cap show signs of corrosion.
Steel Grating	Good				
Stop Logs	N/A				The locking tabs on the stop log slots are missing.
Hardware	Good				
Timber Piles	Good				
Timber Wales	Good				
Galv. Pile Caps	Good				
Cables	Good				
Signage /Supports	Fair			14	Warning sign has been knocked down.
Staff Gages	Poor				Staff gage is leaning and not readable. Salinity on the lake side of the structure was 24.3 ppt.
Rip Rap (fill)	N/A				
Earthen Embankment	Good				

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