



**State of Louisiana  
Office of Coastal Protection and  
Restoration**

**2010 Annual Inspection Report**

for

**LAKE CHAPEAU SEDIMENT INPUT  
AND HYDROLOGIC RESTORATION  
PROJECT**

State Project Number TE-26  
Priority Project List 3

June 1, 2010  
Terrebonne Parish

Prepared by:

Shane Triche, Engineering Tech  
Office of Coastal Protection and Restoration  
Operations Division  
Thibodaux Field Office  
1440 Tiger Drive, Suite B  
Thibodaux, La. 70301

## **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.....	4
V. Inspection Results .....	5
VI. Conclusions and Recommendations .....	7

## **Appendices**

- Appendix A Project Features Map
- Appendix B Photographs
- Appendix C Three Year Budget Projections

## **I. Introduction**

The Lake Chapeau Sediment Input and Hydrologic Restoration Project encompasses 13,549 acres of intermediate and brackish marsh and open water on Point au Fer Island, in the vicinity of Lake Chapeau, located approximately 30 miles south of Morgan City, Louisiana, in Terrebonne Parish. The project area is bounded by Four League Bay to the north, Atchafalaya Bay to the west, Locust Bayou and a network of canals to the south, and Wildcat Bayou and an oil field canal to the east (Project Features Map - Appendix A).

The Lake Chapeau Marsh Creation and Hydrologic Restoration (TE-26) project is a marsh creation and hydrologic restoration project consisting of the creation of approximately 168 acres of marsh using dredge material from the Atchafalaya Bay and construction of seven (7) rock weirs across various oil field canals within the project area. The project was designed to restore the marshes west of Lake Chapeau by re-establishing a hydrologic separation between Locust Bayou and the Alligator Bayou watersheds. This was partially accomplished by hydraulically dredging sediments from the Atchafalaya Bay and filling large open water areas on the interior island near Lake Chapeau. Another objective of the Lake Chapeau project was to restore the islands natural hydrologic flow patterns by constructing weirs, spoil bank gapping and maintenance dredging of natural bayous within the project area.

The Lake Chapeau Marsh Creation and Hydrologic Restoration (TE-26) project is co-sponsored by the National Marine Fisheries Service (NMFS) and the Louisiana Office of Coastal Protection and Restoration (OCPR). The 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. The Lake Chapeau Project was approved on the third (3<sup>rd</sup>) Priority Project List (LDNR O&M Plan, 2002).

The property associated with the Lake Chapeau Project is owned by the Terrebonne Parish School Board, Point au Fer LLC, and the Roman Catholic Church - Arch Diocese of New Orleans.

## **II. Inspection Purpose and Procedures**

The purpose of the annual inspection of the Lake Chapeau Sediment Input and Hydrologic Restoration (TE-26) project is to evaluate the constructed project features and identify any deficiencies, 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 report form, a detailed cost estimate for engineering, design, supervision, inspection, construction, and contingencies and an assessment of the urgency of such repairs (O&M Plan, 2002). The annual inspection report also contains a summary of past projects completed in the maintenance phase 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 undertaken since the completion of the Lake Chapeau Project are outlined in Section IV.

The annual inspection of the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26) took place on May 4, 2010. The inspection began at approximately 10:25 a.m. at Structure No.1, on the interior of the island, and ended around 1:00 p.m. near Structure No.4 on the west shoreline of Four League Bay. The inspection included features located on the interior island (Weir sites 1, 3, 4, 5, 6, 7 & 9) and the corridor closure along the east shoreline of the Atchafalaya Bay. In attendance were Shane Triche from OCPR and Joy Merino with the National Marine Fisheries Service (NMFS).

The field inspection included a complete visual inspection of the hydrologic restoration features of the project. The interior marsh creation feature of the project was not inspected due to the remote location of the fill area and difficulty in accessing the area. The crest elevations of the rock weirs on the interior of the island were not measured because the timber barricade system in front of the structures prevented access to the rock weirs. Where available, staff gauge readings were used to determine water elevations at the time of the inspection. Photographs taken during the inspection are compiled in Appendix B.

### **III. History and Project Description**

Marsh loss rates throughout Point au Fer Island between 1932 and 1974 peaked at 45 acres per year and occurred as a direct result of oil exploration activities (NMFS, n.d.). The rate of interior marsh loss has decreased since that time and is currently estimated to be approximately 20 acres per year (NMFS, n.d.). Shoreline erosion along Lake Chapeau was estimated to be approximately 3 ft/yr. between 1932 and 1983 (NMFS, n.d.). Oil and gas access canals cut into the interior of Point au Fer Island have deteriorated the hydrologic separation between the Locust Bayou and Alligator Bayou watersheds and dramatically altered the island's natural drainage pattern. Sheet flow and over bank flow were drastically reduced by artificial levees, which in turn impounded marsh and led to degradation due to soil water logging (NMFS, n.d.). Due to unnatural hydrologic patterns, the abundant sediment load generated by the Atchafalaya River circulating through the island's interior have not been effectively utilized. Some other causes of land loss in this area can be contributed to natural subsidence and natural shoreline erosion (NMFS, n.d.).

The Lake Chapeau Hydrologic Restoration and Marsh Creation Project (TE-26) project was designed to restore the marshes west of Lake Chapeau and partially re-establish a hydrologic separation (land bridge) between the Locust Bayou and Alligator Bayou watersheds by utilizing sediment input by means of dredging and fill operations and restoring the islands hydrology through the construction of plugs/weirs, spoil bank gapping, and maintenance dredging of a natural bayou (NMFS, n.d.).

The final design of the Lake Chapeau project consisted of three (3) components, with additional project features added to address problems encountered during and after construction:

1. To re-establish a land bridge between Locust Bayou and Alligator Bayou, the first component was to hydraulically dredge approximately 721,931 cubic yards of material

from the Atchafalaya Bay and spread to an average of two (2) feet thick to create approximately 168 acres of marsh between these two bayous (D. Burkholder, Final Report n.d.).

2. The second component of the project (hydrologic restoration) consisted of the construction of seven (7) rock weirs in manmade canals around the perimeter of Lake Chapeau and gapping existing spoil banks in one channel. The rock weirs and spoil bank gappings are designed to help restore the natural circulation and drainage pattern within the central portion of Point au Fer Island (D. Burkholder, Final Report n.d.). The principle project features of this component are:

- Site No. 1 – Rock weir – 150 linear feet (LF)
- Site No. 3 – Rock weir – 229 LF
- Site No. 4 – Rock weir – 174 LF
- Site No. 5 – Rock weir – 70 LF
- Site No. 6 – Rock weir – 145 LF
- Site No. 7 – Rock weir – 157 LF
- Site No. 9 – Rock weir – 240 LF

3. The third component of the project consisted of dredging a 6,700 foot long silted section of Locust Bayou to its original navigable depth. This was done to accommodate the increase flows resulting from the re-establishment of the island's natural drainage patterns. A total of 59,218 cubic yards of material was dredged and placed in 1.5 ft. high by 80 ft. wide spoil banks on both sides of the bayou. The spoil banks were gapped periodically so not to impede the flow of natural waterways and drainage (D. Burkholder, Final Report n.d.)

Engineering, Design and Construction Administration for the Lake Chapeau project was performed by Burk-Kleinpeter (BKI) of New Orleans, La. under contract to the Department of Natural Resources (LDNR). BKI utilized two subcontractors during the design phase of the project. T. Baker Smith, Inc. of Houma, La. performed the field surveys and Eustice Engineering Company, Inc. of Metairie, La. performed the geotechnical investigation of the weir sites. The sediment coring and geotechnical analysis of the borrow site in the Atchafalaya Bay were performed by C-K Associates, Inc. of Baton Rouge, La. and was completed through an indefinite delivery contract with NMFS. Landrights necessary for construction of the project were obtained by the LDNR and included servitude agreements with three (3) landowners: Point au Fer LLC/Archdiocese of New Orleans; Terrebonne Parish School Board; and the Louisiana Department of Wildlife and Fisheries. A letter of no objection was also obtained from the Louisiana State Lands Office for the dredging and placement of spoil material on state lands (D. Burkholder, Final Report n.d.).

Below is a timeline of significant events:

September 1995	Engineering design activities began.
September 1996	Preliminary design report and deliverables submitted by BKI
June 1997	Final Design Completed

April 1998	All landrights necessary to proceed with construction completed.
June 1998	Advertising for bids.
July 1998	Bids for construction opened.
September 1998	Notice to Proceed with construction issued to River Road Construction.
January 1999	Breach 3 repaired/ safety buoy installed (Change Order)
October 1999	Notice of Acceptance was issued by LDNR.

#### **IV. Summary of Past Operation and Maintenance Projects**

Below is a summary of maintenance projects completed since October 1999, the Notice of Acceptance date for the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26).

**June 2000** – Repair of spoil bank breach by constructing a rock weir (breach site 3) and the repair and maintenance of five spoil bank areas by bucket dredging material in a canal located southwest of Lake Chapeau just west of plug Site No. 9. This work was performed by Johnny F. Smith Truck & Dragline Service, Inc. of Slidell, LA as part of the Point au Fer Project (TE-22) Phase III construction contract. Notice of Acceptance for this work was issued by LDNR in September 2000.

**October 2004** – the first maintenance project on the Lake Chapeau project consisted of the removal and replacement of existing warning buoy system. The purpose of this project was to provide a more rigid barricade system at six (6) of the seven (7) weir sites for navigation safety and to prevent passage around the structure. The timber barricade system included timber piles driven every 20 ft across the existing channel with 4” diameter horizontal steel piping connecting the vertical timber piling. Each structure was marked with warning signs and reflective tape to allow visibility at night. The project was designed by Piciolla and Associates of Larose, La. and constructed by Dupre Brothers Construction Co., Inc. of Houma, La. The project was completed in October 2004 at a total cost of \$330,745.50 (Includes: Engineering, Design, Bidding, Construction Administration, Inspection and Construction)

**September 2005** – the second maintenance project included a breach repair on the south side of Structure No.3. The purpose of the project was to extend the rock weir by 50 linear feet on the south side of the structure. Articulated concrete mats were also used on the south side to slow future shoreline erosion and potential breaching. This work was performed in conjunction with maintenance work on the Point au Fer Project (TE-22), which consisted of breach closures adjacent to the rock dikes along Mobil and Transco Canals and the extension of the bulkhead at Structure No. 8. This work was performed by Luhr Bros., Inc. with construction oversight services provided by Picciolla and Associates, Inc. of Larose.

#### **Other Non-Maintenance Projects constructed within the Lake Chapeau project area**

**November 2007 – Dedicated Dredge Program – Point au Fer Island**

The Department of Natural Resources Dedicated Dredge Program was initiated in FY 98/99 and is funded 100% by the State of Louisiana through its statutorily dedicated Wetlands Conservation and Restoration Fund. The goal of this program is to use a small, mobile hydraulic dredge to move sediment from small inland waterways within the coastal zone of Louisiana and deposit the material to nourish and/or rebuild the threatened coastal marsh that are located immediately adjacent to those waterways.

The Point au Fer Island Dedicated Dredge Project is located on Point au Fer Island between the Atchafalaya Bay and Lake Chapeau in Terrebonne Parish. The project consisted of dredging approximately 295,000 cubic yards to fill a 60 acre site adjacent to the original Lake Chapeau dredge site and the linear corridor connecting the proposed fill area to the Atchafalaya Bay. Below is the construction cost estimate involved with the Point au Fer Island Dedicated Dredge Project:

Construction Cost:	\$2,461,650
Construction Administration:	<u>\$ 107,000</u>
Total:	\$2,568,650

## **V. Inspection Results**

### **Site No. 1 – Rock Weir**

Due to a floating gate across the canal approximately 500' before Site No. 1 (Appendix B, Photo 4), a close inspection of the Rock Weir and Timber Barricade was not possible. Overall, the rock weir appeared to be in good condition with no apparent erosion or breaching around the ends of the weir. The timber barricade system and warning signs also appeared to be in good condition with no visible damage or corrosion. Because we could not get close to the structure, we were unable to determine if the two (2) timber piles that were missing their galvanized metal caps last year were being degraded by the weather.

The latest elevation data available from the 2004 survey profile of the structure indicates that the crest of the rock weir has settled approximately 1.39' since 1999. The newly set TE26-07 data recorder station, located approximately 600' from the structure, was reading a tide level of 0.5' NAVD88 at the time of the inspection of Site No. 1. (Appendix B, Photos 1 - 4)

### **Site No. 3 – Rock Weir with Boat Bay**

The rock weir appeared to be in good condition however, there was a significant breach at the north tie-in and a small breach developing at the southern tie-in. It was previously determined that repairing the structure was no longer an option due to the amount of land loss occurring along the shoreline north of the structure. With erosion rates in this area exceeding 60 ft/year, it is no longer feasible to maintain Structure No.3. Currently, the OCPR is in the process of designing plans and specifications to degrade the structure to an -8' NAVD 88 elevation. The permitting and plans and specifications are expected to be completed by late fall and construction of the project should be completed by January 2011.

#### **Site No. 4 – Rock Weir**

The rock weir appeared to be in good condition with no breaching around the ends. As in previous inspections, we found that the existing marsh connecting the structure to land on the south side of the weir was thin. However it didn't seem that there was any significant erosion since the last inspection.

The timber barricade system and signage appeared to be in good condition. As reported in previous inspections, the two (2) center pilings were found to be slightly unstable. A combination of the inadequate embedment depths and poor soil conditions could have caused the instability in these piles. With the lateral support provided by the two (2) horizontal steel pipe members, we do not believe that minor instability in the center piles is a cause for concern at this time. Also a 10' section of the lower pipe on the northern side of the western barricade was cut out by vandals. (Appendix B, Photo 12). We do not believe that this missing section of pipe will have any detrimental effect on the barricade system and we are not recommending any repairs at this time. The inspection team will continue to monitor the stability of the timber pile supports and the cut section of pipe on future field trips. (Appendix B, Photos 9 - 12).

#### **Site No. 5 – Rock Weir**

The rock plug, tie-ins, earthen embankments, barricade system, warning signs and supports appeared to be in good condition with no visible signs of marsh erosion adjacent to the structure or damage to the barricade system. The latest elevation data from the 2004 survey profile of Structure No.5 indicates that the structure has settled on average of 0.14' from the designed elevation. (Appendix B, Photos 13 - 15)

#### **Site No. 6 – Rock Weir**

It was discovered during the 2008 Annual Inspection that the timber barricade system in from of the structure had been vandalized. A ten (10) foot section of the two (2) steel pipe cross members between the center piles had been cut with a torch and were missing. It remains our opinion that any attempt to repair the damage to the barricade system, preventing access across the weir, would be unsuccessful; therefore, we are not recommending repairs to the steel pipe cross members. Other than the damage to the barricade system, the rock weir, earthen embankments, warning signs and supports were in very good condition. From the 2004 profile survey of the structure, it was determined that the rock weir had settled an average of approximately 1.1 ft. (Appendix B, Photos 16 - 18)

#### **Site No. 7 – Rock Weir**

The rock weir, earthen embankments, timber barricade system and signs and supports were all in very good condition with no apparent structure damage or erosion problems. Based on a survey profile of the rock weir in 2004, the structure has settled approximately 1.7' from its designed elevation. (Appendix B, Photos 19 - 21).

#### **Site No. 9 – Rock Weir**

The rock weir at this location was in good condition with no noticeable damage to the timber barricade system or erosion around the ends of the weir. Based on the 2004 survey profile of the structure, it was determined that the rock weir had settled an average of 1.7' from the



designed elevation. (Appendix B, Photos 22 - 24).

## **VI. Conclusions and Recommendations**

Overall, the structural components of the project (Structures No. 1, 5, 6, 7 & 9) located on the interior of island seemed to be in good condition. The rock structures appear to be in good condition with no indication of settlement, erosion around the structures or rock displacement. The timber barricade system and signage at each site was also in good condition. As previously reported, the timber barricade system at Structure 6 was vandalized in late 2007 resulting in an opening in the horizontal steel pipe in the center of the structure.

Structure No.4, located on the west bank of Four League Bay, seemed to be in good condition. Based on field observations and photo assessments it seems as though no noticeable erosion has taken place since the last inspection in September 2008. Based on the current short-term shoreline erosion rates from 1998 to 2008, there is a possibility that shoreline adjacent to structure No.4 may remain intact for the remainder of the project life, barring any extreme storm events. Based on the newly acquired erosion data, we are not recommending maintenance, corrective actions or removal of Structure No.4. The inspection team will continue to monitor the condition of the marsh platform adjacent to Structure No.4 on future site visits.

In the case of Structure No.3, there did not seem to be any widening of the breach on the northern side of the structure. The breach remains to be approximately 350' wide. Also the southern side of the structure has eroded and is very near breaching. The OCPR is in the process of designing a project to degrade the structure. This project is anticipated to be completed by January 2011.

### **References:**

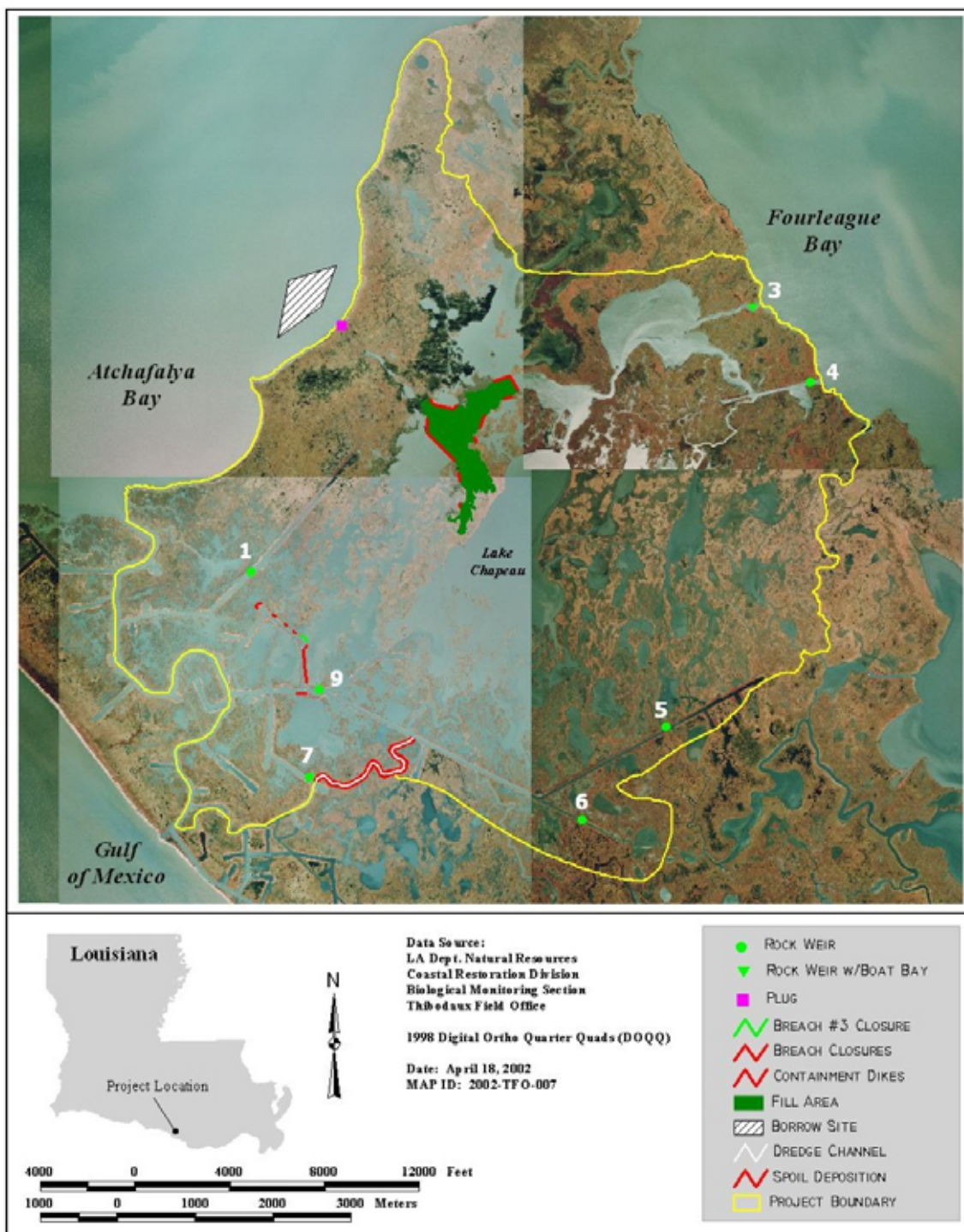
D. Burkholder, n.d., Final Report, the Louisiana Department of Natural Resources, Baton Rouge, Louisiana.

Lear, E., T. Folse, and B. Babin. 2007. *2007 Operations, Maintenance, and Monitoring Report for Lake Chapeau Sediment Input and Hydrologic Restoration, Point Au Fer Island (TE-26), Louisiana Department of Natural Resources, Coastal Restoration Division and Coastal Engineering Division, Thibodaux, Louisiana. 48 pp. plus appendices.*

National Marine Fisheries n.d., Coastal Wetlands Planning, Protection, and Restoration Act: Proposed Project Information Sheet. 9 pp.

**Appendix A**

**Project Features Map**



## **Appendix B**

### **Photographs**



Photo No.1 –View of barrage system and rock weir at the center of Structure No.1



Photo No.2 – View of the barrage system and rock weir tie-in on the west end of Structure No.1



Photo No.3 – View of the barrage system and rock weir tie-in on the east side of Structure No.1



Photo No.4 – View of the gate blocking access to Structure No. 1





Photo No. 5 – View of center of Structure No.3.



Photo No. 6 – View of north tie-in of Structure No.3.



Photo No. 7 – View of the southern tie-in of Structure No.3.



Photo No. 8 - View of breach at northern tie-in of Structure No.3. Photo taken from southern tie-in.





Photo No.9 – View of the northern tie-in of Structure No.4.



Photo No. 10 – View of the barricade system and rock weir at Structure No.4 looking southwest.



Photo No. 11 – View of the southern tie-in of Structure No.4



Photo No. 12 – View of the cut pipe in the barricade system at the north tie-in of Structure No. 4.



Photo No. 13 – View of the western tie-in of Structure No.5.



Photo No.14 – View of the eastern tie-in of Structure No.5.



Photo No. 15 – Overall view of the Structure No.5 weir and barrage system looking east.



Photo No. 16 – View of the southern tie-in of Structure No.6.





Photo No. 17 – View of the northern tie-in of Structure No.6.



Photo No.18 – Overall view of Structure No.6 weir and barrage system looking east.



Photo No. 19 – View of southern tie-in of Structure No.7.



Photo No. 20 – View of northern tie-in of Structure No.7.



Photo No. 21 – Overall view of Structure No.7 weir and barrage system looking east.



Photo No.22 – View of the northern tie-in of Structure No.9



Photo No.23 – View of the southern tie-in of Structure No.9.



Photo No.24 – View of the center of Structure No.9 weir and barricade system looking east.



## **Appendix C**

### **Three Year Budget Projection**

**Lake Chapeau Marsh Creation/ Hydrologic Restortaion/ TE-26 / PPL 3**  
**Three-Year Operations & Maintenance Budgets 07/01/2010 - 06/30/13**

<u>Project Manager</u>	<u>O &amp; M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Brian Babin	Shane Triche	NMFS	Shane Triche

	2010/2011	2011/2012	2012/2013
<b>Maintenance Inspection</b>	\$ 6,085.00	\$ 6,268.00	\$ 6,456.00
<b>Structure Operation</b>			
<b>Administration</b>	\$9,080.00	\$ 2,251.00	\$ 2,319.00
<b>Maintenance/Rehabilitation</b>			

10/11 Description: Removal of Structure No.3

E&D	\$15,000.00
Construction	\$283,750.00
Construction Oversight	\$6,000.00
Sub Total - Maint. And Rehab.	\$ 304,750.00

11/12 Description: Annual Inspection

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

12/13 Description: Annual Inspection

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

	2010/2011	2011/2012	2012/2013
<b>Annual O&amp;M Budgets</b>	\$ 319,915.00	\$ 8,519.00	\$ 8,775.00

<b>O &amp;M Budget (3 yr Total)</b>	<b>\$ 337,209.00</b>
<b>Unexpended O &amp; M Funds</b>	<b>\$ 519,684.00</b>
<b>Remaining O &amp; M Budget (Projected)</b>	<b>\$ 182,475.00</b>

## OPERATIONS & MAINTENANCE BUDGET WORKSHEET

**Project:** TE-26 Lake Chapeau Marsh Creation and Hydrologic Restoration

### **FY 10/11 –**

Administration	\$ 9,080
O&M Inspection & Report	\$ 6,085
Operation:	\$ 0
Maintenance:	\$304,750

**Operation and Maintenance Assumptions:** Includes an unplanned maintenance event to remove Structure No.3 entirely. Method of construction includes removing all signage and supports and degrading the rock weir by spreading rip rap material along the bottom of the channel and bay to an elevation that would not interfere with navigation.

Construction Cost:	Mobilization and Demobilization:	\$150,000
	Degrading weir:	<u>\$ 70,000</u>
	Survey:	\$ 7,000

Sub-Total Construction:	\$227,000
25% contingency:	<u>\$ 56,750</u>
<b>Total Estimated Construction Cost:</b>	<b>\$283,750</b>

Engineering and Design:	\$ 10,000
Construction Oversight:	\$ 6,000
LDNR Construction Administration:	<u>\$ 5,000</u>

**Overall Project Budget for Structure No.3 Removal:** **\$304,750**

### **FY 11/12 –**

Administration	\$ 2,251
O&M Inspection & Report	\$ 6,268
Operation:	\$ 0
Maintenance:	\$ 0

### **Operation and Maintenance Assumptions:**

2011/2012 Annual Inspection and Report

NMFS administration: \$2,251 from Beast Report.

**FY 12/13 –**

Administration	\$ 2,319
O&M Inspection & Report	\$ 6,456
Operation:	\$ 0
Maintenance:	\$ 0

**Operation and Maintenance Assumptions:**

2012/2013 Annual Inspection and Report

NMFS Administration: \$2,319 from Beast Report

Unexpended funds from Lana Report (Thru 2/22/2010):	\$ 519,793
<b>FY10 Expenditures by LDNR</b>	<b><u>\$ -109</u></b>

Estimated Unexpended Funds:	\$ 519,684
-----------------------------	------------