



Coastal Protection and
Restoration Authority of Louisiana

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

2017 Annual Inspection Report

for

**BRADY CANAL HYDROLOGIC
RESTORATION PROJECT (TE-28)**

State Project Number TE-28
Priority Project List 3

July 11, 2017
Terrebonne Parish

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I. Introduction

The Brady Canal Hydrologic Restoration Project consists of 7,653 acres located in the Terrebonne Basin, within the Bayou Penchant - Lake Penchant watershed in Terrebonne Parish, Louisiana. The project is bounded by Bayou Penchant, Brady Canal, and Little Carencro Bayou to the north, Bayou Decade and Turtle Bayou to the south, Superior canal to the east, and Little Carencro Bayou and Voss Canal to the west (Appendix A – Project Features Map).

The Brady Canal Project is a hydrologic restoration project consisting of the installation and maintenance of a fixed crest weir with barge bay, a rock plug, several variable crest weir structures, earthen embankments and overflow banks, rock dikes, rock armored earthen embankments and rock armored channel liners. These structures were designed to reduce the adverse tidal affects and saltwater intrusion into the project area and to promote freshwater introduction for better utilization of available freshwater, and retain sediments, as well as to encourage re-establishment of emergent and sub-aquatic vegetation in eroded areas (Folse, August 2003)

The Brady Canal Hydrologic Restoration Project (TE-28) is co-sponsored by the Natural Resource Conservation Service (NRCS) and the Coastal Protection and Restoration Authority (CPRA) of Louisiana. 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 and approved on the third (3rd) Priority Project List.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Brady Canal Hydrologic Restoration Project (TE-28) is to evaluate the constructed project features, identify any deficiencies, and prepare a report detailing the condition of the project features including recommendations for corrective actions, as needed. Should it be determined that corrective actions are required, CPRA shall provide in the inspection report, a detailed cost estimate for engineering, design, bidding, construction oversight and supervision, project contingencies, and an assessment of the urgency of such repairs (LDNR_CRD; Pyburn and Odom, 2002 OM&R Plan). The annual inspection report also contains a summary of the completed maintenance projects and an estimated projected budget for the upcoming three (3) years for operations, maintenance and rehabilitation. The three (3) year projected operations and maintenance budget is shown in Appendix C. A summary of completed operation and maintenance projects are outlined in Section IV of this report.

An inspection of the Brady Canal Hydrologic Restoration Project (TE-28) was held on April 11, 2017. In attendance for the inspection were Brian Babin, Adam Ledet and Josh Sylvest from CPRA, Quin Kinler from NRCS, and Francis Fields with Apache Minerals, Inc. The inspection began at the intersection of Bayou Decade and Turtle Bayou at 9:30 a.m., progressed along the perimeter of the project area including the lake rim of Jug Lake, and concluded along Brady Canal near the Apache Camp around noon.

The field inspection included a complete visual inspection of all constructed features within the project area. Photographs of all project features were taken during the field inspection and are shown in Appendix B. Staff gauge readings, where available, were documented and used to estimate approximate water elevations, elevations of rock weirs, earthen embankments, and other project features. The only gauge reading referenced during the inspection was located on the marsh side of Structure 6 and the elevation was approximately 1.6' NAVD (Geoid 99).

III. Project Description and History

The Brady Canal Hydrologic Restoration project is bisected by the Mauvais Bois Ridge, resulting in different hydrologic regimes to the north and south of the ridge. The northern section of the project area receives freshwater and sediments which are provided by over-bank flow from Bayou Penchant, Little Carencro Bayou, and Brady Canal (USDA/NRCS 1995). The Mauvais Bois Ridge forms a barrier through the project area reducing the outflow of freshwater to the southern portion of the project area. Freshwater and sediment retention in the southern portion of the project area has diminished due to unimpeded through-flow and tidal exchange combined with a lack of freshwater introduction from the north (USDA/NRCS 1995). In addition, oilfield access canals extending from within the project area to the Bayou Decade levee ridge have also increased tidal exchange and provided direct routes for saltwater intrusion and a reduction in freshwater and sediment retention (USDA/NRCS 1995).

Major changes to the hydrology of the Penchant Basin, both natural and human induced, have resulted in a complex hydrologic setting (USDA/NRCS 1995). Under natural hydrologic conditions, the Penchant Basin is confined by natural levee ridges and is open to the west and southwest where it connects with the Lower Atchafalaya River, Atchafalaya Bay, and Fourleague Bay. Historically, this hydrologic setting produced an estuarine system created by freshwater introduction in the upper basin and tidal exchange with the bays. Over time, hydrologic conditions in the Penchant Basin were altered by the construction of numerous canals, levees, local water management structures, and major public works projects. Some of the major projects that have contributed to the change in the hydrologic conditions of the basin are the Atchafalaya Basin Floodway, the Avoca Island Levee project along the Lower Atchafalaya River, the Gulf Intracoastal Waterway (GIWW), the Bayou Chene, Boeuf, and Black Projects, the rock weir at Wax Lake, and the Houma Navigation Canal (USDA/NRCS 1995).

The objective of the Brady Canal Hydrologic Restoration Project is to maintain and enhance existing marshes in the project area by reducing the rate of tidal exchange and improving the retention of introduced freshwater and sediment (Folse T., 1998). Specific goals of the project are to (1) decrease the rate of marsh loss, (2) maintain or increase the abundance of plant species typical of a freshwater and intermediate marsh, (3) decrease variability in water level within the project area, (4) decrease variability in salinities in the southern portion of the project, (5) increase vertical accretion within the project area and (6) increase the frequency of occurrence of SAV within the project area. (Folse T., 1998)

The Brady Canal Hydrologic Restoration Project (TE-28) was completed in July 2000 and involved the installation of the following project features:

Structure 6 – fixed crest weir with barge bay
Structure 7 – rock plug
Structure 10 – stabilization rock armored channel liner
Structure 14 – fixed crest weir with variable crest section
Structure 20 – stabilization rock armored channel liner
Structure 21 – fixed crest weir with three (3) variable crest sections
Structure 23 – fixed crest weir with two (2) variable crest sections
Structure 24 – fixed crest weir
4,405 linear ft. – rock armored earth embankment
3,660 linear ft. – rock dike
8,531 linear ft. – Earthen embankment
Maintenance of existing over-flow banks (21,600 ft.)

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Below is a summary of maintenance projects and operation tasks performed since the completion of the Brady Canal Hydrologic Restoration (TE-28) project.

Under Article II of the Brady Canal Cost Share Agreement, the landowners, ConocoPhillips, formerly Burlington Resources, and the Apache Minerals Corporation were granted in-kind service credits to repair existing earthen embankments within the project area. Below is a description of work and cost associated with the maintenance performed by the landowners:

In Kind Service Credits

7/30/2007 – Apache Corporation contracted Dupre Brothers Construction, Inc. of Houma, La. to repair several breaches along the east bank of Jug Lake and reinforce earthen embankment tie-ins adjacent to variable crest weir structures #21, #23, and #24. The repairs were completed on 7/30/2008 at a total cost of \$9,103.12

9/30/2006 – Conoco Phillips contracted Dupre Brothers, Inc. of Houma, La. to repair several breaches along Carencro Bayou, Little Carencro Bayou and Brady Canal using material from adjacent bayous. The total cost for refurbishment and repair of these breaches was \$25,890.

9/20/2006 - Apache Corporation contracted Frisco Construction Co. Inc. of Houma, La. to repair breaches and refurbish low areas of the spoil banks along the east bank of Jug Lake and embankment tie-ins adjacent to structures #21, #23 and #24. The repairs were completed on 9/20/2006 at a total cost of \$9,265.

10/31/2003 - Apache Corporation contracted Berry Bros. General Contractors to completed 5,050 linear feet of levee refurbishment along the west bank of Jug Lake. The cost for the levee refurbishment including construction oversight was \$34,284.87. Following the levee refurbishment, Shaw Coastal performed an as-built survey of the repairs at a cost of \$5,100.60. The total project cost for this maintenance event was \$39,385.47.

8/15/2003 – ConocoPhillips, formerly Burlington Resources, completed the repair of two (2) large breaches along Little Carencro Bayou following Hurricane Lili. The maintenance project was completed on 8/15/2003 at a total cost of \$31,642.57, including construction oversight and administration.

10/21/2002 - Apache Corporation contracted Frisco Construction Co. to repair and restore the existing levee embankment along Turtle Bayou, Superior Canal, and along the west bank of Jug Lake. This work was completed at a total cost of \$5,310,.

Brady Canal Breach Repair Project (2003) – LDNR: This maintenance project was completed on August 13, 2003 and included the installation of approximately 9,667 tons of riprap along the north bank of Bayou Decade, 2,325 linear feet of levee refurbishment and earthen breach repair along Turtle Bayou and Superior Canal, and replacement of a timber pile on the navigational aid structure at Weir 6. The cost associated with the engineering, design and construction of the 2003 Brady Canal Breach Repair Project is as follows:

Construction:	\$471,329.65
Engineering & Design:	\$ 54,473.00
Bidding:	\$ 4,100.00
Construction Administration:	\$ 8,020.00
Construction Oversight:	\$ 49,635.00
As-built Survey and Drawings:	<u>\$ 12,873.00</u>
Project Total:	\$600,430.65

Brady Canal 2012 Maintenance Project – This maintenance project began in October 2013. It included the refurbishment of 13,900 linear feet of earthen embankment along the perimeter of Jug Lake, rock armoring of the embankment tie-ins adjacent to the three (3) water control structures in Jug Lake, replacement of two (2) timber dolphins at Structure No. 6, three (3) warning signs at Structure No. 10, and a breach repair/closure adjacent to an existing timber bulkhead at the intersection of Carencro Bayou and Brady Canal. The total project costs associated with surveying, engineering, design, and construction of the 2012 maintenance project are as follows:

Construction:	\$1,353,636.25
Surveying:	\$ 60,303.00
Engineering & Design:	\$ 99,958.76

Construction Admin/Inspections:	<u>\$ 179,386.38</u>
Total Project Cost:	\$1,693,284.39

Structure Operations: In accordance with the operation schedule outlined in the Operation and Maintenance Plan, Structures #14, #21, and #23 have been operated twice annually beginning in April 2002. Below is a summary of costs incurred for structure operations:

03/02	Pyburn & Odom	\$9,772.50
09/02	CEEC	\$4,674.00
03/03	CEEC	\$4,022.58
09/03	CEEC	\$3,612.93
03/04	Shaw Coastal	\$4,676.18
09/04	Shaw Coastal	\$5,365.25
03/05	T. Baker Smith	\$8,804.83
09/05	T. Baker Smith	\$8,886.60
03/06	T. Baker Smith	\$7,668.59
09/06	T. Baker Smith	\$9,970.37
03/07	T. Baker Smith	\$8,602.12
09/07	T. Baker Smith	\$9,203.61
03/08	T. Baker Smith	\$7,595.99

Prior to the scheduled operations in September 2008, the CPRA entered into an agreement with Apache Minerals for the landowner to assume responsibility of operating all water control structures associated with the Brady Canal (TE-28) project. Apache has been providing structure operations services in accordance with terms of their agreement with CPRA for \$12,000, annually, through 2017. Apache Minerals has indicated that they are interested in continuing operations of the three (3) water control structures on the project. CPRA is currently working on a sole-source contract to grant authorization to Apache for structure operations which would extend their contract through 2020.

Navigational Aids Maintenance:

Currently, CPRA has an agreement with Pharo Marine – Automatic Power, Inc. for inspections, diagnostic testing and repair of the navigation aid lights at Structure No.6. The lights are inspected quarterly and repaired as needed. This current contract with Pharo Marine – Automatic Power, Inc. expires in October 2017. CPRA has prepared a scope of work and will be bidding services for the State-wide Navigational Aid Maintenance contact this summer.

V. Inspection Results

Structure 6 – Fixed Crest Weir with Barge Bay

Structure 6 appears to be in good condition. The bank tie-ins are stable and there are no signs of erosion or breaching around the steel bulkhead or rock tie-ins. The timber navigational aid supports, signs and lights are visible and appear to be in good condition. The navigational aid structures are inspected quarterly through a state-wide contract with Pharo-Marine Automatic Power, Inc. and no major maintenance has been reported. The gauge reading from the CPRA continuous recorder, located just north of Structure 6 indicated that the water elevation was approximately +1.6' NAVD88 at 10:30 a.m. No maintenance will be required at Structure No.6. (See Appendix B, Photos 32 - 35)

Structure 7 – Rock Plug

Structure 7 appears to be in good condition with no obvious settlement, breaches, or defects other than heavy vegetation on and around the rock plug. The warning signs and supports located on both sides of the structure are in good condition. Currently, there are no recommendations for maintenance (Appendix B, Photos 38 - 39).

Structure 10 – Stabilization Rock Armored Channel Liner

Structure 10 appears to be in fair condition. The rock tie-ins to the bank on both sides of the structure appear to be thin and were mostly submerged which is attributed to minor settlement and higher than normal water levels during the inspection. Depths along the center of the rock channel liner were not taken at the time of the inspection. The most recent water depths measurements taken in 2015 and 2016 revealed that the center elevation was approximately -5.5' NAVD. The constructed sill elevation was -4.75', indicating that structure has settled approximately 1 foot since it was constructed. All of the timber piling and warning signs appear to be in good condition (See Appendix B, Photo 43)

Structure 14 – Fixed Crest Weir w/ Variable Crest Section

Structure 14 appears to be in fair condition. There was no visible damage to the railings, platform, steel bulkhead or warning signs. The bank tie-in on the north side of the structure is still thin with very little material between the existing bank and the steel bulkhead. The south side of the steel bulkhead connects to a vinyl bulkhead installed by the adjacent camp owner and is in good condition. ConocoPhillips has indicated that they are willing to assist the maintenance efforts by placing additional material on the north side of the structure during their regular maintenance cycle. Other than the erosion near the north end of the bulkhead, the structure remains in fair condition. (See Appendix B, Photos 45 - 48)

Structure 20 – Stabilization Rock Armored Channel Liner

This structure is in good overall condition. As noted in previous annual inspections, there has been some settlement of the rock riprap on the bank tie-ins and submerged crest of the

structure. During the 2016 inspection, the depth of water at the center of the rock channel liner was approximately 8.5', which translates into crest elevation of -6.1' elevation. The water levels at the time of the inspection was +2.4' NAVD. From our calculations, Structure 20 has experienced approximately 1.35' settlement since the structure was constructed in 1998. All other warning signs and timber supports are in good condition. At this time, Structure 20 is in good condition and no maintenance will be required. (See Appendix B, Photo 28 - 30)

Structure 21 – Fixed Crest Weir w/ Three (3) Variable Crest Sections

Overall, Structure 21 is in very good condition. There is no visible damage to the steel bulkhead, railings, platform or the warning signs and their timber supports. As part of the 2012 Maintenance Project, Structure 21 had both of its embankment tie-ins refurbished and then armored with 50 linear feet of rock riprap to prevent any further erosion around the ends of the structure. There has not been any visual settlement of the riprap following the completion of the maintenance project. Structure 21 will not require maintenance. (See Appendix B, Photos 22 - 24)

Structure 23 – Fixed Crest Weir w/ Two (2) Variable Crest Sections

Structure 23 appears to be in good condition as well. There is no visible damage to the steel bulkhead, railings, platform, or the warning signs and their timber supports. As part of the 2012 Maintenance Project, Structure 23 had both of its embankment tie-ins refurbished and then armored with 50 linear feet of rock riprap in each direction to prevent any further erosion around the ends of the structure. There has not been any visual settlement of the riprap following the completion of the maintenance project. Structure 23 has been restored to its original constructed condition and will not require maintenance. (See Appendix B, Photos 16 - 18)

Structure 24 – Fixed Crest Weir

Overall, Structure 24 is in fair condition. There is no visible damage to the steel bulkhead, platform, or the warning signs and their timber supports. However, we did note that one section of the steel handrail had sheared at the welded seam. It is not clear whether the steel pipe had been intentionally cut or if the damage was caused by corrosion (Photo 14). The handrail is welded to the top of the steel bulkhead and does not affect the structure integrity of the weir. As noted on previous inspections, there was a hull of a small recreational fishing vessel is lodged against the structure. The hull doesn't seem to be causing any damage to the structure (Photo 12). As part of the 2012 Maintenance Project, Structure No. 24 had both of its embankment tie-ins refurbished and armored with rock riprap on both sides to prevent any further erosion around the ends of the structure. There has not been any visual settlement of the riprap following the completion of the maintenance project. Structure No. 24 has been restored to its original constructed condition and will not require maintenance. (See Appendix B, Photos 11 - 14)

Bulkhead at head of Brady Canal

The timber bulkhead at the head of Brady Canal is an old existing oilfield structure that is not an original feature of the Brady Canal project. Over time, a small breach had developed on the southern end of the bulkhead. The breach was repaired during the 2012 Maintenance Project with rock riprap to close off the flow around the structure. The riprap material appeared to have settled below the top of the bulkhead just below the water surface. We do not believe that this requires immediate remedial action and will continue to monitor this location on future site visits. (See Appendix B, Photo 51)

Earthen Embankments

The inspection of the earthen embankments began with the west bank of Turtle Bayou (Appendix B, Photo 1) and progressed along Superior Canal, the dead end canal off of Superior Canal, Bayou Decade (Appendix B, Photos 4 - 8), Jug Lake (Appendix B, Photos 9, 10, 15, 19-21, 25 -27), through Voss Canal (Appendix B, Photo 24), Bayou Carencro (Appendix B, Photo 49-50), and concluded along Brady Canal at the Apache Camp location. The earthen embankments along Turtle Bayou and Superior Canal are in good condition. There are visual variations in the elevation and various vegetative species, but no noticeable breaches in the embankment. However, we did note a small breach, approximately 10' wide, in the bankline as reported on previous inspections (See Appendix B, Photos 1). We also noted a large breach along the west bank of Jug Lake between Structures 21 and 20. The breach appeared to be approximately 100' long and very shallow (See Appendix B, Photo 25 - 27). Earthen embankments along Bayou DeCade, Voss Canal and Carencro Bayou are in good condition with only a single breach noted along Carencro Bayou that was approximately 15' wide (See Appendix B, Photos 49 - 50). ConcoPhillips has indicated that they will repair this breach during their regular bank maintenance cycle.

Rock Armored Embankments

The rock plug known as "Breach 7" is located along an existing oil field access canal connected to Superior canal is in good condition. There was no observed settlement along the length of the embankment and no erosion or washouts around the embankment tie-ins. There are no recommendations for corrective action at this time, but it will continue to be monitored on future inspections. (See Appendix B, Photos 2-3)

The rock closure adjacent to an existing timber bulkhead at the intersection of Carencro Bayou and Brady Canal identified as Breach 6 was closed as part of the 2012 Maintenance Project (Appendix B, Photo 51). A geotextile fabric was used to line the breach before it was filled with rock riprap. There was no visual settlement of the riprap or erosion of the bank tie-in at the time of the inspection. Landowners did not request to stop at this site. No maintenance will be required at this location.

The rock armored embankments and rock dikes along the north bank of Bayou Decade (Appendix B, Photos 4-8) and Voss Canal (Photos 41-42, 44) are in good condition. The rock dike along Bayou Decade between Jug Lake and Turtle Bayou appear to be in fair condition with isolated low areas and moderate displacement of rock riprap. The earthen embankment with rock revetment west of Structure 7 along Bayou Decade appears to be in good condition

with no apparent settlement. The earthen embankment with rock revetment beginning at the intersection of Bayou Decade and Voss Canal had some initial settlement after construction but has experienced little change since previous inspections. Despite some minor deficiencies, the rock armored embankments appear to be functioning as intended and no maintenance will be required at this time.

VI. Conclusions and Recommendations

Overall, as noted in Section 5 above, the condition of the Brady Canal Hydrologic Restoration (TE-28) project was good with only minor defects such as the eroded bank tie-in on the north side of the steel bulkhead at Structure 14, minor settlement of the rock liners (Structures 10 and 20), cut banks along the face of the earthen embankment along the rim of Jug Lake, small breach along Turtle Bayou, moderate breach along west bank of Jug Lake and minor settlement and displacement of the rock dike along the north bank of Bayou Decade. These noted defects are not considered severe and are not altering the function of the project. No maintenance is recommended at this time; however, we will continue to monitor these areas of concern on future site visits to determine if any changes have occurred.

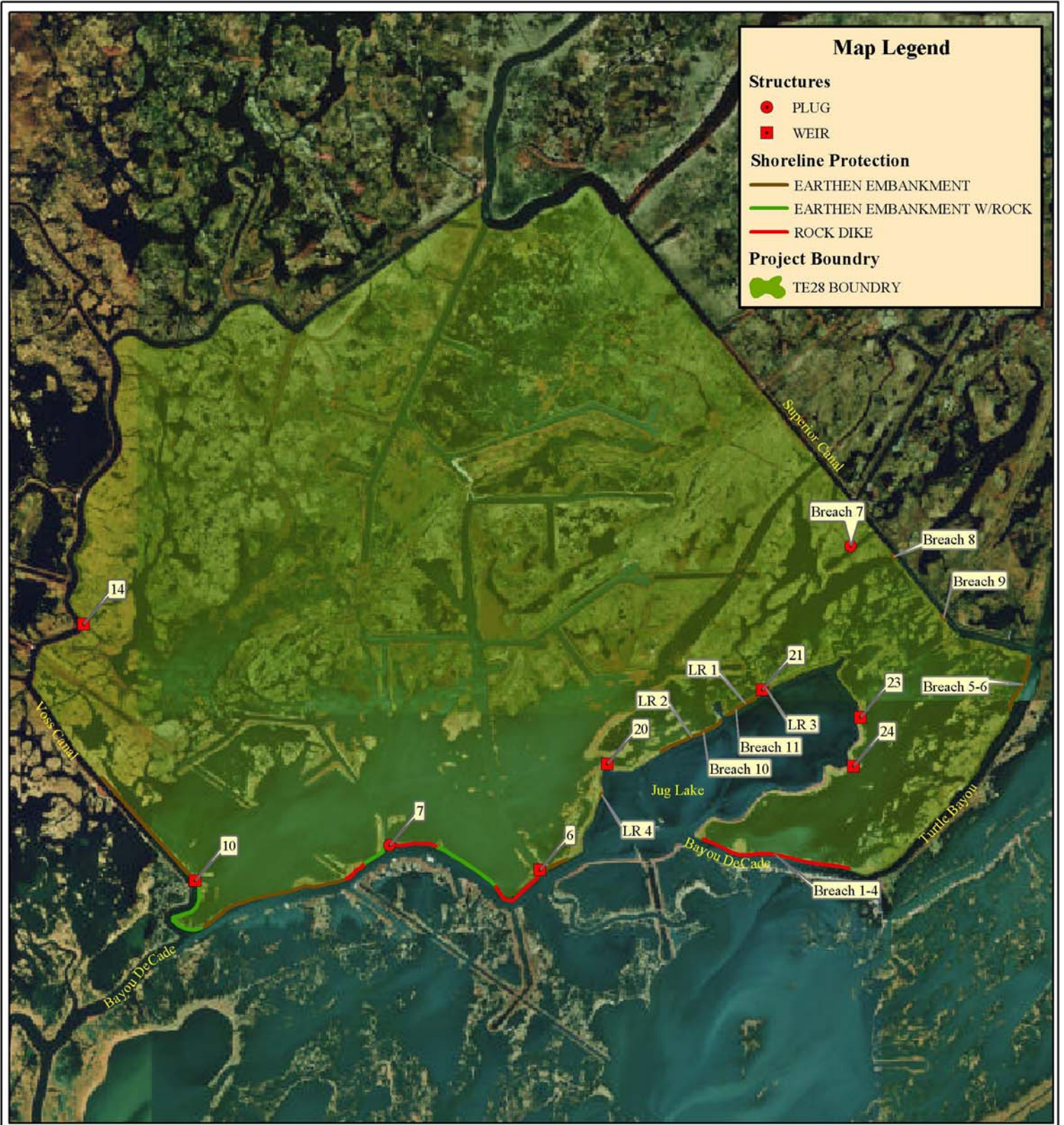
References:

Folse, T. August 2003. Monitoring Plan for the Brady Canal Hydrologic Restoration Project (TE-28), Louisiana Department of Natural Resources, Coastal Restoration Division, 16pp.

Louisiana Department of Natural Resources – Coastal Restoration Division and Pyburn and Odom, Inc. 2002. Operation, Maintenance and Rehabilitation Plan for the Brady Canal Hydrologic Restoration Project (TE-28)

United States Department of Agriculture – Natural Resources Conservation Service 1995. Project Plan and Environmental Assessment for the Brady Canal Hydrologic Restoration Project.

Appendix A
Project Features Map



Map Legend

Structures

- PLUG
- WEIR

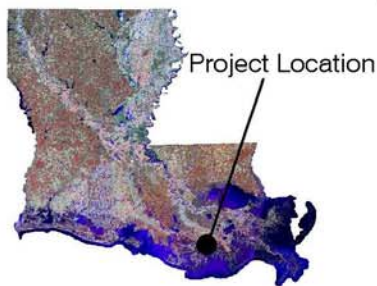
Shoreline Protection

- EARTHEN EMBANKMENT
- EARTHEN EMBANKMENT W/ROCK
- ROCK DIKE

Project Boundry

- TE28 BOUNDRY

TE28 - Brady Canal Hydrologic Restoration



PROJECT FEATURES MAP



Data Source:
 LA Dept. Natural Resources
 Coastal Engineering Division
 Thibodaux Field Office

1998 DOQQ AERIAL

Date: March 2, 2005

Map ID: 2005-TFO-010

Appendix B
Photographs



Photo No.1 – view of small opening in the bank line along Turtle Bayou between Bayou De Cade and Superior Canal.



Photo No.2 – view of bank tie-in of rock plug on the northeast side of the structure. This structure was completed in 2003 and is designated as Breach 7 on the project map.



Photo No.3 – view of bank tie-in of rock plug on the southwest side of the structure. This structure constructed in 2003 and is designated as Breach 7 repair on the project map.



Photo No.4 – view of east section of the rock dike shoreline repair constructed in 2003 along the north bank of Bayou de Cade. This structure is designated as Breach 1-4 on the project map.



Photo No.5 – view of the rock dike shoreline repair (Breach Repair 1-4) located along the north bank of Bayou de Cade.



Photo No.6 – view of the rock dike shoreline repair (Breach Repair 1-4) located along the north bank of Bayou de Cade.



Photo No.7 – view of the rock dike shoreline repair (Breach Repair 1-4) located along the north bank of Bayou de Cade.



Photo No.8 – view of the rock dike shoreline repair (Breach Repair 1-4) located along the north bank of Bayou de Cade.



Photo No.9 – view of the earthen embankment along the south bank of Jug Lake.



Photo No.10 – view of the earthen embankment along the south bank of Jug Lake.



Photo No.11 – view of the south bank rip rap tie-in of Structure 24.



Photo No.12 – view of the south bank rip rap tie-in of Structure 24 and abandoned boat hull.



Photo No.13 – view of the north bank rip rap tie-in of Structure 24.



Photo No.14 – view of a break in the steel pipe hand rail on the south side of Structure 24.



Photo No.15 – view of the earthen embankment along the south bank of Jug Lake between Structure 24 and 23.



Photo No.16 – view of Structure 23 located along the east bank of Jug Lake.



Photo No. 17 – view of the north bank riprap tie-in of Structure.23.



Photo No. 18 – view of the south bank riprap tie-in of Structure 23.



Photo No.19 – view of the earthen embankment along the north bank of Jug Lake east of Structure 21.



Photo No.20 – view of the earthen embankment along the north bank of Jug Lake east of Structure 21.



Photo No.21 – view of the earthen embankment along the north bank of Jug Lake east of Structure 21.



Photo No.22 – view of the north bank riprap tie-in on Structure 21.



Photo No.23 – view of the variable crest weir Structure 21.



Photo No.24 – view of the south bank riprap tie-in on Structure 21.



Photo No.25 – view of the existing shoreline along the north bank of Jug Lake between Structures 21 and 20.



Photo No.26 – view of the existing shoreline along the north bank of Jug Lake between Structures 21 and 20.



Photo No.27 – view of the existing shoreline along the north bank of Jug Lake between Structures 21 and 20.



Photo No.28 – view of the north riprap to bank tie-in on Structure 20.



Photo No. 29 – view of warning signs at Structure 20



Photo No.30 – view of the south riprap to bank tie-in on Structure 20.



Photo No. 31 – view of the rock revetment along north bank of Bayou Decade west of Jug Lake.



Photo No.32- view of the steel sheetpile to bank tie-in on the east side of Structure 6.



Photo No. 33 – view of the warning signs and navigational aids at the entrance of the barge bay at Structure 6.



Photo No. 34 – view of the steel sheetpile to bank tie-in on the west end of Structure 6



Photo No. 35 – view of the staff gauge on the CRMS data recorder just north of Structure 6.



Photo No.36 – view of rock revetment along the north bank of Bayou de Cade between Structures 6 and 7.



Photo No.37 – view of rock revetment along the north bank of Bayou de Cade between Structures 6 and 7.



Photo No.38 – view of rock plug 7 along the north bank of Bayou de Cade.



Photo No.39 – view of rock plug 7 along the north bank of Bayou de Cade.



Photo No.40 – view of existing shoreline along the north bank of Bayou de Cade between Structure 7 and Voss Canal.



Photo No.41 – view of rock revetment along the north bank of Bayou de Cade at Voss Canal.



Photo No.42 – view of rock revetment along the east bank of Voss Canal south of Structure 10.



Photo No.43 – view of rock channel liner and warning signs at Structure 10 along the east bank of Voss Canal.



Photo No. 44- view of existing embankment along the east bank of Voss Canal .



Photo No.45 – view of southern end of steel sheetpile wall at Structure 14.



Photo No.46 – view of variable crest weir structure 14 and interior marsh.



Photo No.47 – view of variable crest weir structure 14 and interior marsh.



Photo No.48 – view of northern end bank tie-in of steel sheetpile wall at Structure 14.



Photo No.49 – view of a breach in the overflow bank along Carencro Bayou north of Structure 14.



Photo No.50 – view of a breach in the overflow bank along Carencro Bayou north of Structure 14.



Photo No.51 – view of the existing timber bulkhead along the oilfield canal at the intersection of Brady Canal and Carencro Bayou.

Appendix C

Three Year Budget Projection and Worksheets

Brady Canal/ TE-28 / PPL 3 (2017-2020)
Three-Year Operations & Maintenance Budgets

<u>Project Manager</u>	<u>O & M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
	<i>Adam Ledet</i>	<i>NRCS</i>	<i>B. Babin</i>

	2017/2018	2018/2019	2019/2020
<i>Maintenance Inspection</i>	\$ 13,306.00	\$ 13,705.00	\$ 14,112.00
<i>Structure Ops/ Nav Aid</i>	\$ 22,000.00	\$ 22,000.00	\$ 22,000.00
<i>CPRA Administration</i>	\$ 17,385.00	\$ 6,314.00	\$ 6,506.00
<i>Maintenance/Rehabilitation</i>		\$ -	\$ -

17/18 Description: Structure operations, nav.aid maintenance and overflow bank repairs.

<i>E&D</i>	
<i>Construction</i>	\$30,000.00
<i>Construction Oversight</i>	
<i>Sub Total - Maint. And Rehab.</i>	\$ 30,000.00

18/19 Description: Structure operations, nav aid maintenance.

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

19/20 Description: Structure operations and nav aid maintenance.

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

	2017/2018	2018/2019	2019/2020
<u>Annual O&M Budgets</u>	\$ 82,691.00	\$ 42,019.00	\$ 42,618.00

<u>2017 - 2020 O &M Budget (3 yr Total)</u>	\$ 167,328
<u>Unexpended O & M Funds</u>	\$1,001,401
<u>Remaining O & M Budget (Projected)</u>	\$834,073

OPERATIONS & MAINTENANCE BUDGET WORKSHEET

Project: TE-28 Brady Canal Hydrologic Restoration

FY 17/18 –

CPRA Administration		\$ 30,691
Operation/Navigational Aid:		\$ 22,000**
Maintenance:		\$ 30,000
E&D:	\$ 0	
Construction:	\$ 30,000	
Construction Oversight:	\$ 0	

Operation and Maintenance Assumptions:

Structure Operations: 3 – structures are operated twice annually by landowner for a total \$15,000**, OCPR Navigational Aid inspection, maintenance and repairs: \$7,000**

CPRA Direct Costs

Structure Operations and Nav-Aid Maintenance:

Engineer 4 – 30 hrs @ \$68/hr. =	\$ 2,040
Engineer 6 – 10 hrs @ \$78/hr. =	<u>780</u>
	\$ 2,820

Inspection:

CPRA Engineer 3 – 12 hrs @ \$68/hr.:	\$ 816
CPRA Engineer 6 – 12 hrs @ \$78/hr.	\$ 936
CPRA Scientist 4 – 10 hrs @ \$56/hr.	<u>560</u>
	\$ 2,312

Report:

CPRA Engineer 6 – 30 hrs. @ \$78/hr.	\$ 2,340
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Total Direct CPRA Costs: **\$ 7,472**

CPRA Indirect Costs

Structure Operations and Nav-Aid Maintenance:

Engineer 4 – 30 hrs @ \$127/hr. =	\$ 3,810
Engineer 6 – 10 hrs @ \$145/hr. =	<u>1,450</u>
	\$ 5,260

Inspection:

CPRA Engineer 3 – 12 hrs @ \$127/hr.:	\$ 1,528
CPRA Engineer 6 – 12 hrs @ \$145/hr.	\$ 1,740
CPRA Scientist 4 – 10 hrs @ \$104/hr.	<u>1,040</u>
	\$ 4,304

Report:

CPRA Engineer 6 – 30 hrs. @ \$145/hr. \$ 4,350

Total Indirect CPRA Costs: **\$13,914**

Overflow Bank Maintenance

Construction Allowance: **\$30,000**

CPRA Coordination: **\$ 9,305**

CPRA Direct Costs

Engineer Intern 2 – 40 hrs @ \$52/hr. = \$ 2,080

Engineer 6 – 15 hrs @ \$78/hr. = \$ 1,170

\$ 3,250

CPRA Indirect Costs

Engineer Intern 2 – 40 hrs @ \$97/hr. = \$ 3,880

Engineer 6 – 15 hrs @ \$145/hr. = \$ 2,175

\$ 6,055

FY 18/19 –

CPRA Administration \$ 21,019

Operation/Navigational Aid: \$ 22,000**

Maintenance: \$ 0

 E&D: \$ 0

 Construction: \$ 0

 Construction Oversight: \$ 0

Operation and Maintenance Assumptions:

Structure Operations: 3 – structures are operated twice annually by landowner for a total \$15,000**, OCPR Navigational Aid inspection, maintenance and repairs: \$7,000**

CPRA Direct Costs

Structure Operations and Nav-Aid Maintenance:

\$ 2,820 x 3% Inflation = \$2,905

Inspection:

\$2,312 x 3% Inflation = \$2,381

Report:

\$2,340 x 3% Inflation = \$2,410

Total Direct CPRA Costs: **\$7,696**

CPRA Indirect Costs

Structure Operations and Nav-Aid Maintenance:

\$ 3,810 x 3% Inflation = \$ 3,409

Inspection:

\$ 4,304 x 3% Inflation = \$ 4,433

Report:

\$ 4,350 x 3% Inflation = \$ 4,481

Total Indirect CPRA Costs: **\$12,323**

FY 19/20 –

CPRA Administration		\$ 20,618
Operation/Navigational Aid:		\$ 22,000**
Maintenance:		\$
E&D:	\$ 0	
Construction:	\$ 0	
Construction Oversight:	\$ 0	

Operation and Maintenance Assumptions:

Structure Operations: 3 – structures are operated twice annually by landowner for a total \$15,000**, OCPR Navigational Aid inspection, maintenance and repairs: \$7,000**

CPRA Direct Costs

Structure Operations and Nav-Aid Maintenance:

\$ 2,905 x 3% Inflation = \$ 2,992

Inspection:

\$ 2,381 x 3% Inflation = \$ 2,452

Report:

\$2,410 x 3% Inflation = \$ 2,482

Total Direct CPRA Costs: **\$ 7,926**

CPRA Indirect Costs

Structure Operations and Nav-Aid Maintenance:

\$ 3,409 x 3% Inflation = \$ 3,511

Inspection:

\$ 4,433 x 3% Inflation = \$ 4,566

Report:

\$ 4,481 x 3% Inflation = \$ 4,615

Total Indirect CPRA Costs: **\$12,692**

2017-2020 Accounting

Current O&M Funding (LANA Report): **\$3,417,158**

Expenditures (LaGov): \$2,321,674

NRCS MIPR: \$ 94,083

Total Expenditures: **\$2,415,757**

Current Unexpended O&M Funds: **\$1,001,401**