Coastal Protection and Restoration Authority of Louisiana

Office of Coastal Protection and Restoration

2008 Annual Inspection Report

for

GIWW/CLOVELLY HYDROLOGIC RESTORATION

State Project Number BA-02
Priority Project List 1

April 9, 2008
Lafourche Parish

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I. Introduction

The GIWW/Clovelly Hydrologic Restoration Project consists of 14,948 acres located in the Barataria Basin near the Gulf Intracoastal Waterway (GIWW) in Lafourche Parish, Louisiana. The project is bounded by the Gulf Intracoastal Waterway to the north and to the northeast, Bayou Lafourche to the west, Superior Canal to the south, Bayou Perot, Little Lake and Bayou L' Ours to the east (Appendix A – Project Features Map).

The GIWW to Clovelly project is a hydrologic restoration project consisting of four (4) fixed crest weirs, one (1) variable crest weir, four (4) canal plugs, one (1) channel plug with culvert and flap-gate, 6,000 linear feet of rock rip-rap lake rim restoration and approximately 5,000 linear feet of bankline stabilization. The purpose of the project is to protect intermediate marsh in the project area by restoring natural hydrologic conditions and promote greater use of available freshwater and nutrients, limit rapid water level exchange, slow water exchange through over-bank flow, reduce rapid salinity spikes and saltwater intrusion (Lear, E. 2003).

The GIWW to Clovelly Hydrologic Restoration Project (BA-02) is co-sponsored by the Natural Resource Conservation District (NRCS) 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 GIWW to Clovelly Project was approved on the first (1st) Priority Project List. (LDNR O&M Plan, 2002).

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the GIWW to Clovelly Hydrologic Restoration Project (BA-02) is to evaluate the constructed project features, identify any deficiencies and prepare a report detailing the condition of such features, and to recommend corrective actions needed, if any. Should it be determined that corrective actions are needed, the OCPR shall provide, in report form, a detailed cost estimate for engineering, design, supervision, inspection, construction contingencies, and an assessment of the urgency of such repairs (O&M Plan, 2002). The annual inspection report also contains a summary of maintenance projects undertaken since the constructed features were completed and an estimated project 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 GIWW to Clovelly Project are outlined in Section IV of his report.

An inspection of the GIWW to Clovely Hydrologic Restoration Project (BA-02) was held on February 26, 2008. In attendance were Brian Babin and Shane Triche from the OCPR and Brad Sticker with NRCS. The attendees met at the Clovelly Canal Public Boat Launch. The inspection began at approximately 8:45 a.m. and ended at 12:00 noon.

The field inspection included a complete visual inspection of all constructed features within the project area. Staff gauge readings and temporary benchmarks, where available, were used

to determine approximate water elevations, elevations of rock weirs, earthen embankments, lake-rim dike and other project features. A GPS unit was used to mark the locations of low areas and breaches along the earthen embankments and rock structures which may require corrective action. Photographs were taken of each project feature (Appendix B - Photographs) and field inspection notes were completed to document and record measurements and deficiencies (Appendix D – Field Inspection Notes).

III. Project Description and History

Within the GIWW to Clovelly Hydrologic Restoration Project (BA-02), the average rate of change from marsh habitat to non-marsh habitat (including wetland loss to both open water and commercial development) has been increasing since the 1950's (Lear, 2003). The main reasons for wetland deterioration in the project area as reported by NRCS in the Wetlands Value Assessment (WVA) summary are saltwater intrusion, oil field activities, subsidence, lack of sedimentation, and reduced freshwater influx.

The purpose of the GIWW to Clovelly Project is to protect intermediate marsh in the project area by restoring natural hydrologic conditions that promote greater use of available freshwater and nutrients. This will be accomplished by limiting rapid water level changes, slowing water exchange through over-bank flow, reducing rapid salinities increases, and reducing saltwater intrusion (Lear, 2003). The project objectives and specific goals as outlined in the 2003 Monitoring Plan prepared by the OCPR are as follows:

Project Objectives are:

- Protect and maintain approximately 14,948 acres of intermediate marsh. This will be achieved by restoring natural hydrologic conditions that promote greater freshwater retention and utilization, prevent rapid salinity increases, and reduce the rate of tidal exchange.
- Reduce shoreline erosion through shoreline stabilization

The specific goals for the project are:

- Increase or maintain marsh to open water ratios.
- Decrease salinity variability in the project area.
- Decrease the water level variability in the project area.
- Increase or maintain the relative abundance of intermediate marsh plants.
- Promote greater freshwater retention and utilization in the project area.
- Reduce shoreline erosion through shoreline stabilization.
- Increase or maintain the relative abundance of submerged aquatic vegetation (SAV).

The GIWW to Clovelly Hydrologic Restoraton project involves the installation and maintenance of structures in 2 phases or construction units. Construction Unit No.1 and Construction Units No.2 were completed in November 1998 and October 2000, respectively.

These structures were designed to reduce the adverse tidal effects in the project area and promote freshwater introduction to better utilize available freshwater and sediment retention. If these objectives are met, it is anticipated that the rate of shoreline erosion will be reduced and a hydrologic regime, conducive to sediment and nutrient deposition, will encourage the re-establishment of emergent and submergent vegetation in eroded areas to more historic low energy environment. (Lear, 2003)

The principle project features of Construction Unit No.1 include:

- Structure 2 – Fixed crest rock weir with boat bay.
- Structure 4 – Fixed crest rock weir with boat bay.
- Structure 7 – Fixed crest rock weir with boat bay.
- Structure 8 – Rock rip rap channel plug.
- Structure 43 – Rock rip rap channel plug.
- Structure 91 – Rock plug with culvert and flap gate.

The principle project features of Construction Unit No.2 include:

- Structure 1 – Fixed crest rock weir with boat bay.
- Structure 4B – Rock rip rap channel plug.
- Structure 14A – Fixed crest rock weir with barge bay.
- Structure 35 – Variable crest weir, water control structure.
- Structure 90 – Rock rip rap channel plug.
- 5,665 linear ft. of Lake Rim Restoration
- 5,023 linear ft. of Rock Bank Stabilization
- 11,711 linear ft. of Earthen Bank Stabilization.

Structure 35 has an operation component which consists of a ten (10) ft. wide variable crest section housing twelve (12) timber stop logs. As outlined in the special conditions of project permits, Structure 35 is operated in accordance with the following operation schedule:

- Variable Crest Weir – the stop logs will be set at 0.5 ft. BML from April to November and removed from November to April (weir sill level = 2.0 ft. BML) to allow for sediment and nutrient inflow during spring.

Construction Unit No.1 has a twenty-year (20 year) project life beginning in November 1997. The twenty-year (20 year) project life of Construction Unit No.2 began in October 2000.

IV. Summary of Past Operation and Maintenance Projects

2007 Structure Operations: In accordance with the operation schedule outlined in the Operations and Maintenance Plan and the special conditions of the permit, Structure 35 has been operated during the months of April and November of each year since April 3, 2002. Operations were suspended in November 2005 due to the movement of large sections of

marsh behind structure #35 following Hurricane Katrina, blocking water flow through the structure. However, since this time, the marsh material blocking the structure has worked itself out, opening the existing channel to the interior marsh which enabled structure operations to resume in November 2007. No maintenance dredging of the marsh plug will be required at this time.

Navigation Aids Maintenance: Below is a short description of repairs, dates and cost associated with the service of the navigational aids located at Structure 14A:

5/16/02 – Automatic Power of Larose, La. performed maintenance and service to repair navigation lights at Structure 14A. Seventeen (17) flash bulbs were replaced at a total cost of $421.50.

12/16/03 – Automatic Power performed maintenance and service to repair navigation lights at Structure 14A. The battery and flash bulbs were replaced in all four (4) navigation lights at a total cost of $2,189.80.

11/4/04 – Automatic Power performed maintenance and service to repair navigation lights at Structure 14A. One (1) lamp changer, one (1) battery and flash bulbs were replaced at a total cost of $922.23.

11/29/06 – the OCPR received public bids for a state-wide maintenance contract for inspection, diagnostic testing, and maintenance of twenty-seven (27) navigational aid systems at ten (10) separate locations state-wide. Four (4) of the twenty-seven (27) navigational aid structures included in this contract are located within the GIWW to Clovelly project area at Structure 14A. The state-wide contract was awarded to the lowest bidder, Automatic Power, Inc. of Larose, La., in the amount of $83,424. This contract is a one (1) year contract with an option to extend for another two (2) years. The notice to proceed with inspections, diagnostic testing and maintenance was issued in February 2007.

V. Inspection Results

CONSTRUCTION UNIT NO.1

Structure 2 – Fixed crest rock weir with boat bay

The rock weir appeared to be in fair condition with moderate settlement on the north side of the structure. The north section of the rock weir was at or below the water level which was estimated to be approximately +1.0’ NAVD 88 at the time of the inspection. From as-built drawings, the fixed crest section on the north and south side of the boat bay was constructed to an elevation of +2.3’ NAVD 88 and the boat bay to -5.1’ NAVD 88. Measurements taken with a hand held fathometer at the center of the boat bay indicated a depth of 7.0’ above the rock channel liner. It is estimated that the fixed crest section on the north side and the rock channel liner beneath the boat bay has settled approximately 1.3’ and 1.0’, respectively. Minor settlement was noted along the fixed crest section on the south side of the boat bay. All signs and supports were in good condition. (Appendix B: Photos 1-2).

Structure 4 – Fixed crest rock weir with boat bay

A visual inspection of Structure 4 revealed moderated to severe settlement of the fixed crest rock weir. Severe settlement was noted on the north side of the structure where the rock weir had subsided below the water line estimated at +1.0 NAVD 88 at the time of the inspection. The south side appeared to have settled slightly with the top portion of the rock weir exposed above the water line. Measurements were taken with a hand-held fathometer at the center of the boat bay where it was determined, based on estimated water levels, that the elevation of the rock rip-rap channel liner was approximately -4.5' NAVD 88. Comparing the as-built elevation (-3.9 NAVD 88) with the measured depths, it is estimated that the boat bay section of the structure has settled over 0.5'. According to the as-built drawings, the north and south fixed crest sections were constructed to an elevation of 2.4' NAVD 88. Comparing the as-built elevations with visual observations in the field, we estimate that the fixed crest weir section has settled over a foot on the south side and approximately 2' on the north. The warning sign on the north side of the structure is missing. After reviewing photos from previous inspections prior to the storm, we are confident that this warning sign was destroyed during Hurricane Katrina. Replacement of this sign shall be included in the project plan for the upcoming maintenance event. (Appendix B, Photos 3-4)

Structure 7– Fixed crest rock weir w/ boat bay

Structure No.7 appeared to be in good condition with no apparent settlement of the fixed crest rock sections. The as-built drawings indicate that the fixed crest rock weir was constructed to elevations of -4.4 NAVD 88 at the boat bay and +2.4' NAVD 88 on the north and south sides. From visual observations, minor settlement is suspected on the north side of the structure. Field measurements using a hand-held fathometer revealed a depth of 6.4' at the center of the boat bay. Based on as-built elevations, we estimate that the rock lined boat bay is currently at an elevation of -5.4' NAVD 88, which indicates settlement of approximately 1.0'. All signs, supports and earthen embankment tie-ins appear to be in good condition. (Appendix B: Photos 5-6)

Structure 8– Rock rip-rap weir

The small rock weir with boat bay and steel gate closure located at the mouth of a small marsh channel adjacent to Structure 7 appears to be in very good condition. The warning sign, steel gate and earthen embankment tie-ins are in good condition. (Appendix B: Photo 7)

Structure 43 – Rock rip-rap channel plug

As indicated on previous inspection reports, there is a 5 to 7 ft. wide shallow breach in the embankment on the east side of the structure. It appeared that the breach has not increased in width or depth from previous inspections. It is possible that water may by-passes the structure on high tides since the crest of the structure is only slightly above the existing marsh. The crest of the weir plug was originally constructed to an elevation of +2.45' NAVD 88. At this time, we do not recommend maintenance to close the small breach. The OCPR will re-evaluate the condition of Structure 43 on future site visits. (Appendix B: Photos 8-10)

Structure 91 – Rock plug with culvert and flap gate

The rock plug structure with flap-gate appeared to be in very good condition with no visible indication of settlement or breaching around the structure. The culvert, flap gate, signs,

timber supports and earthen embankments were also in good condition. The sheet metal covering the tops of the timber piles supporting the corrugated metal pipe were rusted and corroded. Although corrosion was present, we did not observe any deterioration of the tops of the timber piles. We did notice excessive barnacle growth in and around the flap-gated structure below the waterline. The barnacle growth does not appear to be having an adverse affect on gate operations. (Appendix B: Photo 11)

CONSTRUCTION UNIT NO.2

Structure 1 – Fixed crest rock weir w/ barge bay

The rock weir with barge bay was in good condition with no apparent settlement. The rock weir was constructed to a -6.4' NAVD 88 at the barge bay and +4.0' NAVD 88 along the crest on each side of the structure. Staff gauge readings from a CRMS station just north of the structure indicated a water elevation of 0.8' NAVD 88 at the time of the inspection. Using the water elevation, we estimated that the rock weir section on both sides of the structure to be approximately +3.5' to 4.0' NAVD 88 reinforcing our observations that no settlement has occurred. Over the years, we have noticed increasing damage to the timber piles supporting the warning signs at the entrance to the barge bay. Several vertical piles are split, the batter piles are off center and the surface of all the piles are worn or scarred from vessels rubbing the timbers while accessing the barge bay. Although visible damage is evident on the surface of the piles, we do not believe that structural failure of the timber dolphin system is imminent. The OCPR will continue to monitor the condition of the timber pile supports and pursue corrective action if needed. (Appendix B: 12-16)

Structure 4 A & 4B – Rock rip-rap channel plug

Structures 4A & 4B appeared to be in fair condition with no noticeable settlement of the rock riprap plug. We did observe significant erosion on both sides of the structure near the marsh tie-ins. Moderate erosion was present on the north side of the structure with visible cut banks along the face of the existing shoreline. We are hoping that erosion on the north side of the structure will stabilize due to the abundance of marsh shrubs (Baccharis) in the area protecting exposed organic marsh material. The area of most concern is the south side of the structure where the rock plug meets the existing marsh. The remaining shoreline in this area was very thin with only a small trip of marsh material remaining between Little Lake and the adjacent interior marsh channel. This is due in large part to Hurricanes Katrina and Rita which eroded a large section of marsh from the intersection of Bayou Des Amoreax at the mouth of Little Lake to the south side Structures 4A & 4B. The potential for breaching is this area remains very high. (Appendix B: Photos 17-18)

Structure 14A – Fixed crest rock weir with barge bay

The fixed crest weir with barge bay was in good condition with no apparent settling or displacement of rock rip-rap. Based on initial reports from the landowner and NRCS regarding erosion problems on the south side of the structure, we focused our inspection on these locations. We found that the shoreline in this location had eroded back past the internal toe of the rock weir as indicated in a field trip report prepared by NRCS on June 19, 2006. Although erosion is prevalent, it appears that there is no immediate threat of breaching which would compromise the hydrology of the project. However, to slow future erosion in this area,

NRCS has recommended that planting additional smooth cordgrass on the lake side to buffer the wave action along the shoreline. The OCPR agrees that this is the most logical and cost effective method of protecting the shoreline in this area. A copy of NRCS's inspection report and assessment of erosion along the shoreline of Little Lake dated June 19, 2006 is provided in Appendix E. The timber navigational aid supports were in fair condition with visible damage on the northwest support structure. Longitudinal cracks, scrapes and abrasions were noted on the face of the timber dolphin on the northeast side of the structure. There is no indication that the structural integrity of the timber dolphin is compromised by the existing damage. Inspection, diagnostic testing and maintenance of the navigational lights at Structure 14A have been contracted to Automatic Power, Inc. of Larose through the OCPR which began in January 2007. (Appendix B: Photos 19-26)

Structure 35 – Variable crest weir , water control structure

Other than minor corrosion and paint chipping along the channel cap of the bulkhead, handrails and movable boom deck, the structure was in good condition. The stop logs, cables, signs, supports and other hardware appear to be operable and in good condition. The stop logs were installed in the variable crest weir section in November 2007. From September 2005 to November 2007, the structure operations were suspended due to a large marsh mat that had floated against the structure during Hurricane Katrina, blocking the water exchange to the interior marsh. Over this time period, the marsh material had dissolved or decayed, sinking to the bottom of the channel, allowing the flow of water though the structure to resume. The operations of the water control structure will continue to be contracted through OCPR's indefinite delivery contracts (Appendix B: Photos 27-29)

Structure 90 – Rock rip-rap channel plug

The rock riprap channel plug appeared to be in very good condition with no apparent settlement or breaching around the ends of the structure. The signs and supports were also in good condition. (Appendix B: No Photos available)

Lake Rim Restoration

An inspection of the foreshore rock dike along the lake rim of Bay L' Ours revealed several low areas along the length of the structure. As indicated on previous inspections, low areas of the rock dike included segments between Stations 7+00 and 13+00, 36+00 and 41+00, and the intersection near the mouth of Breton Canal. Under intense wave action, it is difficult to identify areas of settlement by visual inspection. Therefore, with concurrence from NRCS, OCPR has initiated a topographic survey including a centerline profile and cross sections of the structure. Initial concerns with maintenance of the foreshore dike were that shallow waters adjacent to the foreshore dike would prevent barges from working in the area without temporarily dredging access channels. However, field measurements indicated that the water depths adjacent to the rock dike ranged from 5' to 7' deep, which is adequate to float barge equipment to facilitate any required maintenance. Once the topographic survey is completed, a determination of maintenance needs will be made. (Appendix B: Photos 30-37)

Earthen bank stabilization

The earthen embankments located near the southern boundary of the project appear to be in a similar condition as observed during the 2007 inspections. There are six (6) breaches identified for repairs and/or refurbishment during the next maintenance cycle. Breach 1 is

located along the north bank of Breton Canal just southwest of the first location canal from Bay L' Ours and is approximately 15' wide (Appendix B: Photo 38). Breach 2 is located along the northeast bank of the second location canal north of Breton Canal and is approximately 10' wide (Photos not available). Breach 3 is located on the south bank of the same location canal as Breach 2 and is approximately 15' wide (Appendix B: Photo 39). Breach 4 is located on the west bank of a location canal that intersects Superior Canal east of Structure No. 1 and is approximately 30' wide (Appendix B: Photo 40). Another breach, designated as Breach 6, was discovered at the end of a dead end channel south of Breach 4. (Appendix B: Photos 41-42). Breach 5 is located along the northeast bank of Bay L' Ours south of Structures 4A & 4B and is approximately 30' wide (Appendix B: Photo 43). A map identifying these six (6) breach locations is provided in Appendix F.

An overall maintenance permit for the GIWW to Clovelly (BA-02) project was obtained from the Corps of Engineers to maintain all constructed features through March 31, 2013, at which time a permit extension shall be required. Breaches 1 through 4 and 6 are included in the provisions of this permit since these overflow banks were refurbished during the original construction contract. However, since Breach 5 was not a constructed feature of the original project, these repairs are not included in the overall maintenance permit. An evaluation of all maintenance repairs will be made, leading up to the next maintenance event, to determine if additional permit authorizations are required.

Through a memorandum prepared by NRCS dated July 19, 2006, we were notified of erosion problems along the east bank of Little Lake south of Structure 14A on Clovelly Farms property. NRCS's field investigation on June 15, 2006 revealed four (4) areas of concern along this stretch of shoreline that could potentially affect the hydrology of the project. In this memorandum, NRCS has proposed several possible alternatives for addressing these areas of the shoreline. The most logical and cost effective alternative is to implement a small plantings project in areas that are conducive to plant growth. The vegetative plantings would provide some level of protection by dampening the wave actions from the lake. The memorandum prepared by NRCS regarding shoreline erosion in this area is provided in Appendix E. The inspection team revisited the specific locations outlined in NRCS's memorandum on February 26, 2008. In comparing the photos and descriptions of the four (4) locations outlined in NRCS's memorandum with visual conditions during the annual inspection, we concluded that the shoreline erosion reported south of Structure 14A did not appear to have worsened since the June 15, 2006 inspection. (Appendix B: Photos 44-45). The condition of the suspected alligator crossing did appear to be deeper with water exchanging through a small breach that had developed. (Appendix B: Photo 46). Other areas south of Structure 14A along the shoreline of Little Lake where erosion and cut banks were visible were also visited (Appendix B: Photos 47-51). We are in agreement with the assessment outlined in NRCS's memorandum. As the erosion continues, the areas of most concern are the locations where small interior ponds are in close proximity to the existing shoreline, causing a higher probability of breaching in the future.

VI. Conclusions and Recommendations

An overview of all the project features of the GIWW to Clovelly project revealed a number of deficiencies, as noted in Section V of this report, which will require repairs and/or rehabilitation. In order to accurately assess the condition of structures where suspected settlement has occurred, we are recommending a field survey be conducted prior to developing a maintenance plan. The topographic survey shall include a centerline profile and cross sections of Structures 2, 4, 4A, 4B, 8, 14A and the foreshore rock dike along the lake rim of Bay L' Ours. Below is a description of the identified structural deficiencies and recommended methods of repair:

Structure No.2
Moderate settlement was noted along the fixed crest section on the north side of the structure and the rip rap channel lining at the bottom of the canal. It is recommended that rock riprap be installed on the north side and channel bottom to re-establish designed crest elevations. Although the method of repair is relatively simple, access to the structure may present challenges. Shallow depths along the shoreline of Bay L' Ours near the mouth of the channel where the structure in located may prevent rock barge from accessing the site. Temporary access dredging will be required from the structure to deeper waters in Bay L' Ours. The maintenance costs outlined in Appendix C reflect these conditions.

Structure No.4
Structure No.4 was found to be in fair to poor condition with severe settlement on the north side of the structure and moderate to minor settlement of the boat bay and rock weir section on the south side. The warning sign on the north side of the structure was also missing. Recommendation for refurbishing this structure includes installation of rock riprap along the entire structure to raise the crest to design elevations and replacement of the missing warning sign. As in the case of Structure No.2, temporary access dredging may be required to complete maintenance of this structure. Detailed cost estimates to complete these repairs are shown in Appendix C.

Structure No. 4A & 4B
The rock plug structures appeared to be in good condition with no visible settlement. The critical areas of concern associated with this structure are the tie-ins where the rock terminates near the existing marsh on both sides of the structure. The existing marsh is this area sustained high erosion rates from Hurricanes Katrina and Rita and is very thin, exposing the structure to potential breaching. Due to very little marsh remaining between the Bay L' Ours shoreline and Bayou Des Amoreaux, we recommend that the rock plug be extended approximately 200' on the south side and 100' on the north side, to a location where the marsh is stable. It is anticipated that access dredging will be required to complete this work. Detailed cost estimates for extending the rock plug are outlined in Appendix C.

Lake Rim Restoration

As indicated in the inspection results and on previous inspections, there are several segments along the lake rim that appear to have settled below the constructed crest elevation. From depths reading taken at random locations on the lake side of the structure, it was determined that access dredging is unlikely since depths are adequate to float barges. A preliminary cost estimate based on raising the crest elevation to the original grade along the entire lake rim is outlined in Appendix C.

Earthen bank stabilization

In all, six (6) breaches ranging from 10' to 30' wide were identified within the project area which will require refurbishment. A map showing the location of these breaches is shown in Appendix F. It is recommended that breaches 1 through 4 and 6 be constructed to design elevations utilizing available insitu material from adjacent channel bottoms. Breach 5 is approximately 30' wide and is located along the shoreline of Bay L' Ours. Due to its location, where wave intensities and shoreline erosion are high, it is recommended that a rock riprap plug be constructed across the breach to provide adequate protection along the shoreline in this area. It is anticipated that access dredging will be required to close Breach 5.

Other deficiencies noted during this inspection included moderate erosion and large cut banks along the shoreline of Little Lake south of Structure 14A. Since there are no major breaches in the shoreline, that is currently jeopardizing the internal hydraulics of the project, we are not recommending any improvements or maintenance at this time. However, OCPR will assist NRCS in facilitating a possible plantings project along the shoreline in critical locations where plantings are favorable The inspection team will closely monitor the shoreline in this area on future site visits to determine if conditions have changed.

References:

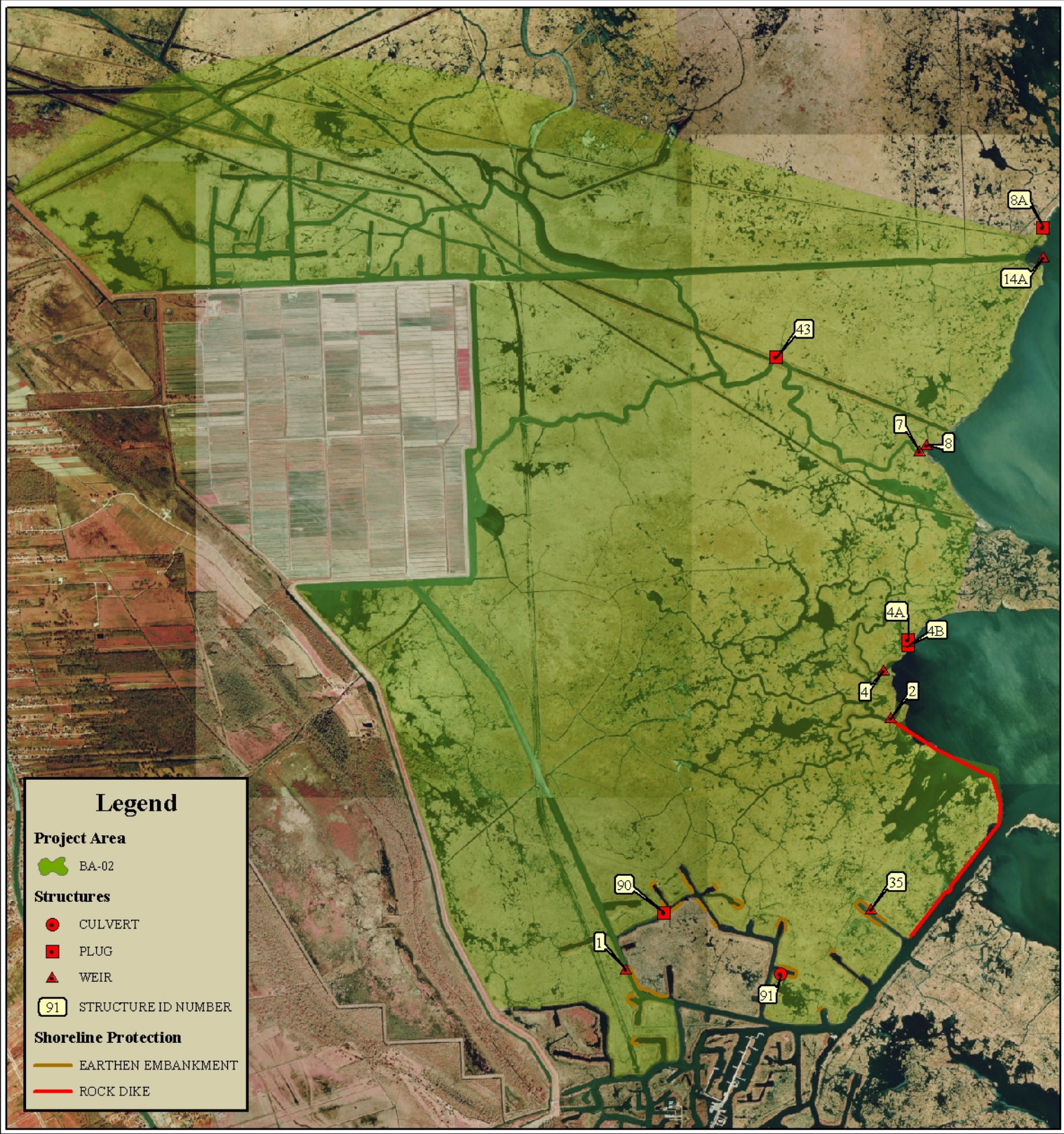
Lear, E. 2003. *Monitoring Plan for the GIWW (Gulf Intracoastal Waterway) to Clovelly Project (BA-02)*, Louisiana Department of Natural Resources, Coastal Restoration Division, 24 pp.

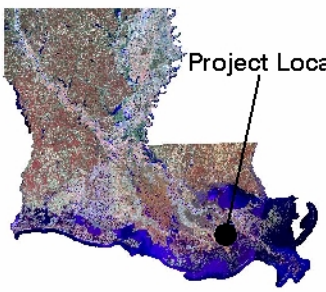
LDNR, Pyburn & Odom, Inc. 2002. *Operation, Maintenance and Rehabilitation Plan for the GIWW to Clovelly Hydrologic Restoration Project (BA-02)*. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana, Pyburn & Odom, Inc. Baton Rouge. 8 pp plus Attachments.

Kinler, 2006. *Memorandum, GIWW to Clovelly (BA-02) – Inspection of Little Lake Shoreline South of Site 14A.* Natural Resource Conservation Service, Baton Rouge, La. 5 pp.

Appendix A

Project Features Map





BA02 - GIWW to Clovelly Hydrologic Restoration

PROJECT FEATURES MAP

0 1 2 Miles

0 2.5 5 Kilometers

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Data Source:

LA Dept. Natural Resources
Coastal Engineering Division
Thibodaux Field Office

1998 DOQQ

Date: May 26, 2005

Map ID: 2005-TFO-029

Appendix B

Photographs

Photo No. 1 (0792) – the south side of rock weir with boat bay (Structure 2) located along the west bank of Bay L' Ours.

Photo No. 2 (0793) – view of rock weir with boat bay (Structure 2) and signage looking east.

Photo No.3 (0790) – the north side of the rock weir (Structure 4) located along the west bank of Bay L' Ours.

Photo No.4 (0791) – the south side of the rock weir (Structure 4) located along the west bank of Bay L' Ours.

Photo No. 5 (0825) – the south side of the rock weir section (Structure 7) located looking east toward Little Lake.

Photo No. 6 (0826) – view of fixed crest rock weir with boat bay (Structure 7) looking west.

Photo No. 7 (0827) – view of rock weir and gate (Structure 8) looking north.

Photo No. 8 (0822) – rock plug (Structure 43) looking north.

Photo No. 9 (0823) – the east side of Structure 43 looking northeast.

Photo No. 10 (0824) – a view of the shallow area on the east side of the rock plug (Structure 43).

Photo No. 11 (0816) – a view of timber supports and flap gate at Structure 91.

Photo No. 12 (0817) – northeast section of rock weir with barge bay (Structure 1).

Photo No. 13 (0818) – timber dolphin support and signage on southwest side of Structure 1.

Photo No. 14 (0819) – timber dolphin support and sign on northeast side of Structure 1.

Photo No. 15 (0820) – timber dolphin and sign on northwest side of Structure 1.

Photo No. 16 (0821) – the timber dolphin and sign on northwest side of Structure 1.

Photo No. 17 (0787) – marsh tie-in on the north side of Structures 4A and 4B showing some marsh erosion where the rock plugs meet the existing marsh.

Photo No. 18 (0788) – the marsh tie-in on the south side of Structures 4A and 4B showing a thin strip of marsh remaining behind the structure.

Photo No.19 (0769) – timber dolphin and navigational aid located on the northwest side of rock weir with boat bay (Structure 14A).

Photo No.20 (0770) – timber dolphin and navigational aid located on the southwest side of the rock weir with boat bay (Structure 14A).

Photo No.21 (0771) – timber pile cluster and navigational aid located on the northeast side of Structure 14A repaired in 2006.

Photo No.22 (0772) – timber dolphin and navigational aid located on the southeast side of Structure 14A.

Photo No. 23 (0774) – earthen embankment tie-in located on the north end of Structure 14A.

Photo No. 24 (0775) – rock weir north of barge bay along Structure 14A looking northeast

Photo No. 25 (0776) - the southern earthen embankment tie –in along the rock weir with boat bay (Structure 14A)

Photo No. 26 (0777) – the southern section of the rock weir with barge bay (Structure 14A).

Photo No. 27 (0806) - variable crest weir structure (Structure 35) located on north bank of the first location canal along Brenton Canal from Bay L' Ours.

Photo No. 28 (0807) – the south bank tie-in of Structure 35 looking northeast.

Photo No. 29 (0808) – the north bank tie-in of Structure 35 looking northeast.

Photo No. 30 (0794) - the north end of the rock dike lake rim along the west bank of Bay L' Ours.

Photo No.31 (0795) – the rock dike lake rim along the shoreline of Bay L' Ours looking south towards Brenton Canal.

Photo No. 32 (0796) – rock dike lake rim along the west bank of Bay L' Ours looking south.

Photo No. 33 (0797) – view of the rock lake rim near the mouth of Breton Canal looking south.

Photo No. 34 (0799) – rock lake rim at the mouth of Breton Canal along west bank of Bay L' Ours looking south.

Photo No. 35 (0802) - view along the centerline of rock lake rim near Breton Canal looking north.

Photo No. 36 (0803) – rock lake rim near Breton Canal looking southward.

Photo No. 37 (0805) – lake rim looking southwest up the Breton Canal.

Photo No. 38 (0810) – breach 1 located on the north bank of the second location canal off of Breton Canal from Bay L' Ours.

Photo No. 39 (0811) – breach 3 located along the south bank of the second location canal off of Breton Canal from Bay L' Ours.

Photo No. 40 (0813) – breach 4 located along west bank of location canal that intersects Superior Canal east of Structure 1.

Photo No. 41 (0814) – Breach 6 at the end of the first dead end canal on the left that intersects Superior Canal east of Structure 1.

Photo No. 42 (0815) - Breach 6 at the end of the first dead end canal on the left that intersects Superior Canal east of Structure 1.

Photo No. 43 (0789) – breach 5 consists of a large opening in the shoreline along the west bank of Bay L'Ours south of Structures 4A & 4B.

Photo No. 44 (0778) - erosion noted on the southern of the Structure 14A where the rock dike tie-ins to the existing marsh.

Photo No. 45 (0779) – erosion of the marsh along the shoreline of Little Lake on the southern end of Structure 14A.

Photo No. 46 (0784) - small breach along the shoreline of Little Lake north of Structure 8.

Photo No. 47 (0781) – erosion of the marsh along the shoreline of Little Lake. This type of erosion is typical along the shoreline in areas south of Structure 14A.

Photo No. 48 (0782) – erosion along the shoreline of Little Lake south of Structure 14A.

Photo No. 49 (0783) – erosion along the shoreline of Little Lake between Structures 14A and 8.

Photo No. 50 (0785) – erosion along the shoreline of Little Lake between Structures 14A and 8.

Photo No. 51 (0786) – an area of erosion along the shoreline of Little Lake between Structures 14A and 8.

Appendix C

Three Year Budget Projection

GIWW TO CLOVELLY, PHASES 1 & 2 / BAO2 / PPL1

Three-Year Operations & Maintenance Budgets 07/01/2008 - 06/30/11

Project Manager	O & M Manager	Federal Sponsor	Prepared By
	B. Babin	*NRCS*	*B. Babin*

	2008/2009	2009/2010	2010/2011
Maintenance Inspection	$ 5,569.00	$ 5,736.00	$ 5,908.00
Structure Operation	$ 8,000.00	$ 8,000.00	$ 8,000.00
Administration	$ 23,500.00	$ 3,500.00	$ 3,500.00
Maintenance/Rehabilitation			
08/09 Description	Major maintenance: rock refurbishment of Structures 2, 4, 4A, 4B, Breach 5 and the lake ri		
	repairs of earthen embankment breaches, nav. Aid maintenance, structure operations. Assessment Survey		
E&D	$ 131,350.00		
Construction	$ 1,005,653.00		
Construction Oversight	$ 59,200.00		
Sub Total - Maint. And Rehab.	$ 1,196,203.00		
09/10 Description:	Routine Maintenance: navigation aid maintenace and structure operations		
E&D		$ -	
Construction		$ 3,000.00	
Construction Oversight		$ -	
	Sub Total - Maint. And Rehab.	$ 3,000.00	
10/11 Description:	Routine Maintenance: navigation aid maintenance and structure operations		
E&D			$ -
Construction			$ 3,000.00
Construction Oversight			$ -
		Sub Total - Maint. And Rehab.	$ 3,000.00

	2008/2009	2009/2010	2010/2011
Total O&M Budgets	**$ 1,233,272.00**	**$ 20,236.00**	**$ 20,408.00**
Total O&M Budget 2008 through 2011			**$ 1,273,916.00**
Unexpended O&M Budget			**$ 986,991.21**
Remaining O&M Budget (Projected)			**$ (286,924.00)**

Note: 2008-2011 Unexpeded O&M budgets includes a deduction of $86,456 for MIPR O&M funds allocated for NRCS (see attached worksheet for 08-11 accounting)

OPERATIONS & MAINTENANCE BUDGET WORKSHEET

Project: <u>BA-02 GIWW to Clovelly Hydrologic Restoration Ph. 1 &2</u>

FY 08/09 –

Administration		$ 23,500*
O&M Inspection & Report		$ 5,569
Operation:		$ 8,000
Maintenance:		$1,196,203
E&D and Surveying:	$ 131,350**	
Construction:	$1,002,653***	
Construction Oversight:	$ 59,200****	
General Maintenance:	$ 3,000*****	

Operation and Maintenance Assumptions:

Structure Operations: water control structure operated twice annually for a total of $4,000 per operation. (2)($4,000) = $8,000 plus ($2,000 for LDNR administration.)*

General Maintenance: Water control structure, navigation aids repair. (Construction : $3,000)*****. (Administration: $1,500)*

<u>Maintenance:</u> Refurbishment of rock structures Nos.2, 4, 4A, 4B and the Lake Rim and repair of six (6) earthen embankment breaches. The estimated construction costs for the proposed 08/09 maintenance project are detailed below:

<u>Structure No.2</u>

Assumptions: Rock riprap replenishment:
2’ cap of riprap along entire structure (200 linear ft.)
9’ top width; 3:1 side slopes on rock refurbishment
Access Dredging:
1,500 ft. access channel
40’ flotation channel with 2:1 side slopes; 6’ depth
Mobilization included in overall construction budget

Rock Replenishment:
30 sq.ft. x 200ft. = 6,000 cu. ft. /27 = 222 cu. yds. x 1.5 = 333 tons

333 tons x (25% contingency) = 416 tons; use 420 tons @ $60/ton = $25,200

Access Dredging:
312 sq.ft. x 1,500 ft. = 156,000 cu. ft./27 = 5,778 c.y.. @ $8.00/cu. yd = $69,332

Estimated Construction Cost: $94,532

Structure No.4

Assumptions: Rock riprap refurbishment:
North side: 3' cap; South Side: 2' cap; Boat bay: 2' cap
4' top width, 3:1 side slopes on
9' top width; 3:1 side slopes

Access dredging:
500 ft. access channel
40' flotation channel with 2:1 side slopes; 6' depth
Mobilization included in overall construction budget

Rock Replenishment:
North side: 54 sq.ft. x 60' = 3,240 cu.ft.
South side: 30 sq.ft. x 60' = 1,800 cu.ft.
Boat bay: 30 sq. ft. x 60' = 1,800 cu.ft.
6,840 cu.ft./27 = 253 cu.yds. x 1.5 = 380 tons

380 tons x (25% contingency0 = 475 tons @ $60/ton = $28,500

Access Dredging:
312 sq.ft. x 500 ft. = 156,000 cu. ft./27 = 5,778 cu. yds. @ $4.00/cu. yd = $23,112

Estimated construction cost: $51,612

Structure No.4A & 4B and Breach 5

Assumptions: Rock riprap extension:
200ft. extension on north and south side of structure
4 ft. top width; 3:1 side slopes; +3.5 ' NAVD crest elev.
Estimated water bottom at -1.5' NAVD.
geotextile fabric beneath rock plug extension

Access dredging
1,200 ft. access channel
40' flotation channel with 2:1 side slopes; 6' depth
Mobilization included in overall construction budget

Rock plug extension:
95 sq.ft. x 400ft. = 38,000 cu. ft. /27 = 1,407 cu. yds. x 1.5 = 2,110 tons

2,110 tons x (25% contingency) = 2,638 tons; use 2,640 tons @ $60/ton = $158,400

Access Dredging:
312 sq.ft. x 1,200 ft. = 374,400 c.f./27 = 13,866 cu. yds. @ $4.00/c.y. = $55,464

Geotextile Fabric: 16,800 sq.ft. /9 = 1,866 sq.yd. @ $8.00/sq.yd. = $14,928

Estimated construction cost: $228,792

Lake Rim Restoration

Assumptions: Lake rim restoration:
5,665 linear ft.
4’ top width; 3:1 side slopes
average 2’ cap on foreshore dike
No access dredging required

20 sq.ft. x 5,665 ft. = 113,300 cu.ft./27 = 4,196 cu.yds. x 1.5 = 6,294 tons

6,294 tons @ $60/ton = $377,640

Estimated construction cost: $377,640

Breach 5 Repair

Assumptions: Crest elevation: +3.5’ NAVD
Estimated water bottom: -4’ NAVD
4’ top width; 3:1 side slopes
50’ long plug

199 sq.ft. x 50’ = 9,950 cu.ft./27 = 368 cu.yds. x 1.5 = 552 tons
552 tons x (25% contingency) = 690 tons @ $60/ton = $41,400
Geotextile Fabric: 350 s.y. @ $8.00/ s.y. = $2,667

Estimated construction cost: $44,067

Breach Repairs 1 through 4 and 6

Assumptions: insitu material from adjacent channels
2’ above marsh elevation (approx. +3.0’ NAVD)
average breach bottom: -5.0’
1:6 side slopes; 14’ top width
550 linear feet total

496 sq.ft. x 550 ft. = 272,800 cu.ft./27 = 10,103 @ $3.00/yd. = $30,309

Estimated construction cost: $30,309

Overall Estimated Budget of 08/09 Maintenance Project:

Mobilization & Demob:	$ 50,000	
Access Dredging:	$147,900	
Geotextile Fabric:	$ 17,595	
Repair of Rock Structures:	$589,740	
Earthen embankment refurbishment:	$ 30,309	
	$835,544	
Contengency (20%)	$167,109	
Total Construction Cost:		$1,002,653***
Additional Surveying:	$ 20,000**	
Engineering & Design:	$ 75,000**	
Construction Inspection:	$ 52,000****	
(IDIQ Contract: 800 hrs @ $65/hr.)		
Construction Admin:	$ 7,200****	
(80 hrs @ $90/hr.)		
LDNR Admin:	$ 15,000*	
NRCS Admin:	$ 5,000*	
		$ 174,200
Overall Project Budget:		**$1,176,853**

Assessment Survey – Survey of the lake rim and rock weir structures along Little Lake.

Field Crew	15 days @ $1250/day	$18,750
Equipment	15 days @ $800/day	$12,000
Prof. Land Surveyor	10 hrs @ 80/hr.	$ 800
Survey Tech.	40 hrs @ 45/rh	$ 1,800
Report Prep		$ 3,000
Total Survey Cost:		**$36,350****

FY 09/10 –

Administration		$ 3,500
O&M Inspection & Report		$ 5,736
Operation:		$ 8,000
Maintenance:		$ 3,000
E&D:	$ 0	
Construction:	$ 0	
Construction Oversight:	$ 0	
General Maintenance:	$3,000	

Operation and Maintenance Assumptions:

Structure Operations: water control structure operated twice annually for a total of $4,000 per operation. (2)($4,000) = $8,000 plus $2,000 for LDNR administration.

General Maintenance: Water control structure, navigation aids repair. Construction: $3000. Administration: $1,500

FY 10/11 –

Administration		$ 3,500
O&M Inspection & Report		$ 5,908
Operation:		$ 8,000
Maintenance:		$ 3,000
E&D:	$ 0	
Construction:	$ 0	
Construction Oversight:	$ 0	
General Maintenance:	$ 3,000	

Operation and Maintenance Assumptions:

Structure Operations: water control structure operated twice annually for a total of $4,000 per operation. (2)($4,000) = $8,000 plus $2,000 for LDNR administration.

General Maintenance: Water control structure, navigation aids repair. Construction: $3,000. Administration: $1,500

2008-2011 Accounting

Unexpended funds from Lana Report:	$1,097,458.90
FY08 Expenditures by LDNR	$ -24,011.69
MIPR O&M for NRCS	$ -86,456.00
Estimated Unexpended Funds:	$ 986,991.21

Appendix D

Field Inspection Form

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 2

Inspector(s): B.Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Fixed Crest Rock Weir w/ Boat Bay

Water Level Inside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			1 thru 2	The rock weir with boat bay appeared to be in fair condition with moderate settlment on both sides of the structure. Measurements taken at the centerline of the boat bay showed a depth of 7.0'. It is estimated that the elevation of the rock weir at the center of the boat bay is approximately -6.0' NAVD.
Eathern Embankment	Good				
Rock Weir	Fair				The earthen tie-ins on each side of the structure were in good conditon.

Construction Unit No. 1

Structure Description: 200 linear ft. rock rip-rap fixed crest weir with a 15 ft. barge bay located south of Clovelly Canal, west of Bay L'Ours and northeast of Superior Canal and Site 91. The crest is set at an elevaiton of 2.3 ft. The invert of the boat bay is set at -5.1 ft. Aluminum warning signs are located on either side of the structure.

Marsh elevation: 1.36 ft.

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 4

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Fixed Crest Rock Weir w/ Boat Bay

Water Level Inside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Fair	Warning Sign on north side missing		3 thru 4	We observed significant settlement on the north side of the structure. The rock weir had settled below the water line which was estimated to be approximately 1.0 NAVD at the time of the inspection.
Eathern Embankment	Good	Good			The warning sign on the north side of the structure was also missing.
Rock Weir	Fair	significant settlement on north side			the south side of the rock weir was in good condition. The depth of water above the center of the boat bay was 5.3' to 5.7' deep. The elevation of the rock weir at the centerline of the boat bay is estimated to be +4.5'

Construction Unit No.1

Structure Description: 160 linear ft. rip-rap fixed crest weir with a 20 ft. boat bay located shouth of Clovelly Canal, west of Bay L'Ours, just north of Site 2, and northeast of Superior Canal and Site 91. The crest of the weir was set at 2.4 ft. The invert of the boat bay is set at -3.9'. Aluminum warning signs are located in the center of the rock weir sections.

Marsh Level: +1.35'

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 7

Inspector(s): B.Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Fixed Crest Rock Weir w/ Boat Bay

Water Level Inside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			5 thru 6	**Observation:**
					The north side of the rock weir has experienced slight settlement since placement.
Eathern Embankment	Good				of rip-rap. Overall, the rock weir was in good condition with only minor settlement noted. The signs and supports were also in good condition.
					No maintenance will be required at this time.
Rock Weir	Fair				

Construction Unit No. 1

Structure Description: 200 linear ft. rip-rap fixed crest weir with a 20 ft. boat bay located south of Clovelly Canal, west of Little Lake and north of Site 4 in Bayou De La Gauche. The crest of the weir is set at and elevation of 2.4 ft. The invert of the boat bay is set at and elevation of -4.4'. Aluminum warning signs are located in the center of the rock weir sections.

Marsh Level: +1.42'

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 13, 23007

Structure No. Site No.8

Inspector(s): B. Babin, S. Triche, E. Lear, W. Blanchard, B. Payton

Structure Description: Rock Lined Channel

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

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: M. Cloudy and Windy

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
				7	
					Observation:
Signage /Supports	Good				The small rock weir adjacent to Structure No.7 was in good condition with no indication of damage or settlement. The gate and signage was also in good condtion.
					No maintenance required at this time.
Eathern Embankment	Good				
Rock rip rap weir	Good				

Construction Unit No.1

Structure Description: 65 linear ft. rock rip-rap fixed crest weir with a 8' wide boat bay located in a pipeline channel south of the Clovelly Canal and west of Little Lake. The crest of the weir was set at +1.0 ft. AML (above marsh level). Marsh level was determined to be 1.8 ft. The invert of the boat bay was constructed at an elevation of -3.5 ft. Aluminum warning signs supported by galvanized pipes are located at the entrance of the pipeline canal.

Marsh Level: +1.8'

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 43

Inspector(s): B.Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Rock rip-rap channel plug

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

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Clear and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			8 thru 10	The rock weir was in good condition with a 5 to 7' section of the rock plug on the east side was low. We did not notice any water flow over the plug at this location.
Eathern Embankment	Fair	10' section on east side is low			The low area on the east side of the plug has been reported on previous reports and does not appear to have worsened.
Rip Rap Channel Plug	Fair	low and thin			The earthen embankment tie-ins on both side of the plug were in fair condition with no breaching. The earthen tie-ins did appear to be low and thin in areas.

Construction Unit No.1

Structure Description: 85 linear ft. rock rip-rap channel plug located in a pipeline channel south of the Clovelly Canal, east of Clovelly Farms, and west of Little Lake. The crest of the plug is set at elevation of 2.45 ft. Aluminum warning signs are located through the rock embankment on both sides of the structure.

Marsh elevation: +1.47'

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 91

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Rip-Rap Cannel Plug

Water Level Inside: Outside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			11	The rock riprap channel plug was in good condition with no visual settlement. The earthen emabankments were in good condition with no apparent erosion problems All signs and supports were also in good condition.
Eathern Embankment	Good				
Rip Rap Channel Plug	Good				We did note minor corrosion and barnacle gowth on the flap-gatted structure and culvert. The sheet metal covering the tops of the timber piles were corroded and there was moderate to severe barnacle growth on the flap gate. In the lieu of these conditions, the flap gate appeared to be operational.
Culvert / Flap Gate	Fair	corrosion of sheet metal pile covers	moderate barnacle growth		

Construction Unit No.1

Structure Description: 120 linear ft. rock rip-rap channel plug located in a pipeline canal off of Superior Canal, south of Clovelly Canal, west of Brenton Canal and east of Superior Canal. The structure consist of a 10 gauge corrugated aluminum pipe (36" dia.) through the plug embankment. The invert of the pipe is set at elevation -2.87' The pipe is approximately 44 ft. long supported by 8-12" diameter creosote timber piles 50 ft. long. The aluminum flap gate is attached to the canal side of the structure. A 16' x 21' rock rip-rap scour pad 2' thick is located at the opening of the canal.

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 1

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Rip-Rap Cannel Plug

Water Level Inside: Outside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			12 thru 16	The rock weir with barge bay was in good condition with no evidence of settlment.
Eathern Embankment	Good				The four (4) timber pile dolphins supporting signs at the intrance of the barge bay were in poor condition. Vertical cracks and scarring on the surface of the timber pile were distinctly visible on all four timber structures. It is apparent that large barge vessels are rubbing and scrapping the timber pile structures as they access the barge bay.
Rip Rap Weir	Good				water level: 0.8' NAVD (from monitoring station north of structure 1)
Timber piling and hardware	Fair	moderate damage to timber piling and loose cable wraps			

Construction Unit No.2

Structure Description: 259 linear ft. rock rip-rap fixed crest weir with a 20 ft. boat bay across Superior Canal located east of the west fork of Bayou L'Ours, south of Clovelly Farms, Clovelly Canal and Site No.90, and west of Brusle Lake. The crest of the weir is set at 3.0 ft. elevation. The invert of the boat bay is set at -5.0' elevation. Two (2) navigation aid and warning signs are located on each side of the structure at the entrance of the boat bay.

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 4A & 4B

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Rock Rip-Rap Channel Plug

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

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Clear and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Timber Piles / Timber Wales Galv. Pile Caps	Good			17 thru 18	The rock plug appeared to be in good condition with no visual signs of settlement. It is apparent that significant erosion was taken place on both sides of the structure
Signage /Supports	Good				this time. We will continue to monitor the condition of the tie-ins.
Eathern Embankment	Poor	marsh erosion both sides. More severe on south side.			The rock channel plug itself appeared to be in good condition with no apparent settlement. Significant marsh erosion was noted on each side of the structure.
Rip Rap Channel Plug	Good				Although significant cut banks were noted on the north side of the structure, thick patches of shrub scrub seem to be stabilizing the marsh in this area. No breaches were found. On the other hand, the south side has only a thin strip of marsh remaining from the structure to the current shoreline. It is apparent that the remaining marsh is very unstable and could breach should erosion continue.

Construction Unit No. 1

Structure Description: 90 linear ft. rock rip-rap channel plug located along the bank of Little Lake northeast of Site No.4. The Channel plug has an 8 ft. wide crest with 3:1 side slopes. The crest is set at +2.0 ft. AML (above marsh level). Marsh level was determined to be +1.47 ft. Prior to placement of rip-rap, the existing channel bottom was lined with a 84ft. X 30ft. Geogrid mat.

Marsh Level: +1.51'

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site 14A

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Fixed crest rock weir with barge bay

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

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: clear and cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Timber Piles / Timber Wales Galv. Pile Caps	Fair	Damage to timber dolphin system NW side		19 thru 26	**Observation:** Rock weir with barge bay was in good condition with no apparent settlement along the length of the structure.
Cable / Hardware etc.	Fair	Loss cables on several dolphins			The timber pile dolphin supporting the navigational aids on the northwest side of the strucure was damaged. The timber batter pile is split vertically with visible scapes or abrasions on the surface of the piling. The steel cable wraps were loose from an apparent collision from a barge vessel accessing the barge bay. The damage appears to be superficial with no indication that the structure integrity of the structure is compromised.
Signage /Supports	Good				
Eathern Embankment	Fair	moderate erosion both sides of the rock dike			Large cut banks were noted on the north side of the structure where the rock dike ties into the existing marsh. The marsh appears to be stable in this area with no breaching.
Rock Weir	Good				the elevation of the marsh near the south tie-in is very low and has eroded past the interior toe of the rock dike. Although erosion is evident, the existing marsh is stable with no signs of imminent breaching. Erosion reduction measures such as planting of smooth cord grass on the lake side should be considered.
					The inspection, diagnostic testing and maintenance of all four (4) navigation lights at this structure has been contracted to Automatic Power, Inc. of Larose, La. The contract time began in February 2007 and runs for three (3) years.

Construction Unit No.2

Structure Description: 1,644 linear ft. rock rip-rap weir with 80 ft. barge bay crossing Clovelly Canal west of Little Lake. The crest of the weir is set at 3.0 ft. The invert of the 80 ft. barge bay is set at -6.5'. Galvanized warning signs and navigation lights supported by timber piles are located at the entrance of the barge bay.

Marsh elevation:

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. Site No. 35

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Variable Crest Weir Structure

Water Level Inside: Outside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	Good	None	Minor Paint Chipping	27 thru 29	Structure 35 appeared to be in good conditon with only superficial paint chipping and corrosion of channel caps, handrails, bulkhead and walkways. The lifitng boom to raise the stop logs were also in good condition.
Stop Logs	Good	None			The channel on the interior marsh leading to the structure that was clogged with floating marsh debris following the hurricanes of 2005 has worked loose leaving a small, but adequate, channel for water flow. With the opening of this channel, normal strucure operations resumed in November 2007.
Handrails Grating Hardware etc.	Good		Minor Paint Chipping		
Timber Piles / Timber Wales Galv. Pile Caps	Good				
Cable / Hardware etc.	Good				
Signage /Supports	Good				
Eathern Embankment	Good				

Construction Unit No.2

Structure Description: 80 linear ft. sheet pile variable crest weir with an eitght (8) ft. wide variable crest weir section located in a pipeline canal off of the Brenton Canal, south of Clovelly Canal, east of Superior Canal. The structure consist of an eight (8) ft. wide stop log bay with eight (8) 4" x 6" stop logs secured by guide channels. The stop logs can be adjusted from 1.0 ft. to -3.0 ft. On either side of the variable crest section is steel bulkhead set at an elevation of 3.0' along with steel deck and rotatable crane and winch to remove and replace stop logs.

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 13, 2007

Structure No. Site No. 90

Inspector(s): B. Babin, S. Triche and B. Sticker (NRCS)

Structure Description: Rip-Rap Cannel Plug

Water Level Inside: _____ Outside: _____

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Clear and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			not available	The rock plug at this location was in very good condition with no noticeable defects or settlement. The earthen embankments were stable with no apparent erosion.
Eathern Embankment	Good				The signs and supports were also in good condition.
Rip Rap Channel Plug	Good				

Construction Unit No.2

213 linear ft. rock rip-rap channel plug located across a pipline channel north of Site No. 1, south of Clovelly Farms and Clovelly Canal, and west of Brusle Lake. The crest of the plug is set at an elevation of 3.0 ft. Three (3) aluminum warning signs are located adjacent to the structure.

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 26, 2008

Structure No. No number assigned

Inspector(s): B.Babin, S Triche, and B. Sticker (NRCS)

Structure Description: Lake Rim Stabilization

Water Level Inside:

Type of Inspection: Annual, Post Storm, other Annual

Weater Conditions: Sunny and Cool

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Signage /Supports	Good			30 thru 37	An inspection of the lake rim (foreshore rock dike) revealed similar findings at the previous annual inspecitons. There were several areas which appeared to have settled. These include areas near Sta. 9+00, Sta. 13+00, Sta. 36+00 and Sta. 41+00.
Rock Armored Embankment	Fair to Good	Low in several locations			In reviewing the as-built drawings, we noticed that the final crest elevation of the lake rim was not a consistent elevation and flucuated along the length of the structure.
Settlement Plates	Good				It is recommeded that a profile survey be performed to determine if these areas have settled. NRCS has concurred with this survey.

Construction Unit No. 2

Structure Description: 18,400 linear ft. of rock armored earthen embankment along Brenton Canal, Bay L Ours and various oil field canals.

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **BA-02 GIWW / Clovelly Hydrologic Restoration**

Date of Inspection: February 13, 2007

Structure No. No number assigned

Inspector(s): B.Babin, S Triche, B. Sticker

Structure Description: Earthen Embankment Stabilization

Water Level _____ Inside: _____

Type of Inspection: Annual, Post Storm, other Annual

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Earthen					
Embankment	Fair	6 breaches			Six (6) breaches were identified and shall be included in the upcoming maintenance
					repairs.
					Below are the coordinates for each locations.
					Coordinates in State Plane (ft.)
					Breach 1
				38	3,631,076 (Easting)
					360,907 (Northing)
					Breach 2
				not	3,629,808 (Easting)
				available	360,153 (Northing)
				39	Breach 3
					3,629,556 (Easting)
					359,963 (Northing)
					Breach 4
				40	3,626,317 (Easting)
					359,652 (Northing)
				43	Breach 5
					3,631,367 (Easting)
					371,318 (Northing)
				41 thur 42	Breach 6
					3,625,910 (Easting)
Construction Unit No. 2					359,262 (Northing)
Structure Description: 18,400 linear ft. of rock armored earthen embankment					
along Brenton Canal, Bay L Ours and various oil field canals.					With exception to the six 96) breaches, the overall condition of the eathern
					embankments were good.

Appendix E

NRCS Memorandum

USDA NRCS
Natural Resources Conservation Service

UNITED STATES
DEPARTMENT OF
AGRICULTURE

P.O. BOX 16030
UNIVERSITY STATION
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June 19, 2006

To: Brad Sticker, NRCS Alexandria
Brian Babin, DNR, Thibodaux
Michael Trusclair, NRCS, Thibodaux
Warren Blanchard, NRCS, Thibodaux
Cindy Steyer, NRCS, Baton Rouge
Britt Paul, NRCS, Alexandria
Randy Moertle, Randy Moertle and Associates, Lockport
George Guttner

From: Quin Kinler, Resource Conservationist

Subject: GIWW to Clovelly (BA-02)
Inspection of Little Lake Shoreline South of Site 14A

You will recall the emails earlier this month regarding the shoreline erosion along Little Lake to the south of Structure 14A on Clovelly Farms property. A few of you have been to the site and/or seen some photographs. This memorandum documents the findings of a site visit made by Mike Trusclair and me on June 15, 2006, plus some ideas about how to proceed. Figure 1 shows the general area and identifies four areas of specific concern.

Area A. At the southern terminus of the structure, there is a 12 to 15 foot area where the shoreline has receded past the interior toe of the structure (Figure 2), but then there is a robust stand of smooth cordgrass followed by a length of shoreline with a flat slope and firm bottom (Figure 3). The erosion in this area does not appear to pose an immediate threat to the hydrology of the BA-02 project, but based on the condition of the existing smooth cordgrass stand, Mike and I are of the opinion that planting of smooth cordgrass may be an appropriate way to address this area. Mike will look into options for a small planting project, including having the landowner purchase plants and recruiting volunteers to assist with planting.

Area B. In this area, there is a series of small (10 to 30 feet wide) "notches" or indentations in the shoreline (Figure 4). The erosion here is of particular interest because of the small interior ponds near the shoreline. Continued erosion in this area could pose a threat to the hydrology of the BA-02 project. Planting for shoreline protection could be tried, but the conditions are much less conducive than for Area A. There is more of a cut bank, with deeper water and softer soils. It may be worth a try, but success is not as likely here. This area needs to be watched closely, and should be specifically included as part of the annual O&M inspection.

Area C. Of all the shoreline that Mike and I visited, this is the most problematic area. This site (29° 32' 48.6"; 90°13' 6.9") appears to be an alligator crossing, with there being only about 10 to 12 feet of land between the lake and interior pond (Figure 5). On the lake side, conditions are not favorable for planting, although there is a very small triangle-shaped area where it might worth a try to plant a few smooth cordgrass plants. On the interior, if marsh salinities have returned to normal after the storms, Mike and I are of the opinion that a few rows of California

bulrush should be planted in an attempt to widen the strip of marsh between the lake and pond. However, continued crossing by the alligator is likely to reduce the effectiveness of the plantings. This area needs to be watched closely, and should be specifically included as part of the annual O&M inspection. If vegetation does not work, rock armoring of the shoreline may be needed as part of the BA-02 maintenance.

Area D. This area is very representative of the remaining BA-2 Little Lake shoreline as you travel south. It includes a pronounced "notch" or indentation. On-site observations and review of periodic aerial photography should continue so as to identify areas where shoreline breaches could affect the hydrology of BA-02.

In summary, Mike Trusclair will look for an opportunity to try 1) shoreline plantings of smooth cordgrass at Areas A, B, and C, and 2) interior pond plantings of California bulrush at Area C. Additionally, all areas should be inspected as part the annual O&M inspection and by review of periodic aerial photography. Area C, in particular, should be watched closely because of the immediate threat to BA-02 hydrology; if vegetative plantings do not succeed, rock armoring of the shoreline may be needed as part of the BA-02 maintenance.

Figure 1. General erosion problem area and four areas of specific concern.

Figure 2. Area A. Southern terminus of Structure 14A where shoreline has receded past the interior toe of the structure.

Figure 3. Area A. Robust stand of smooth cordgrass and length of shoreline with a flat slope and firm bottom.

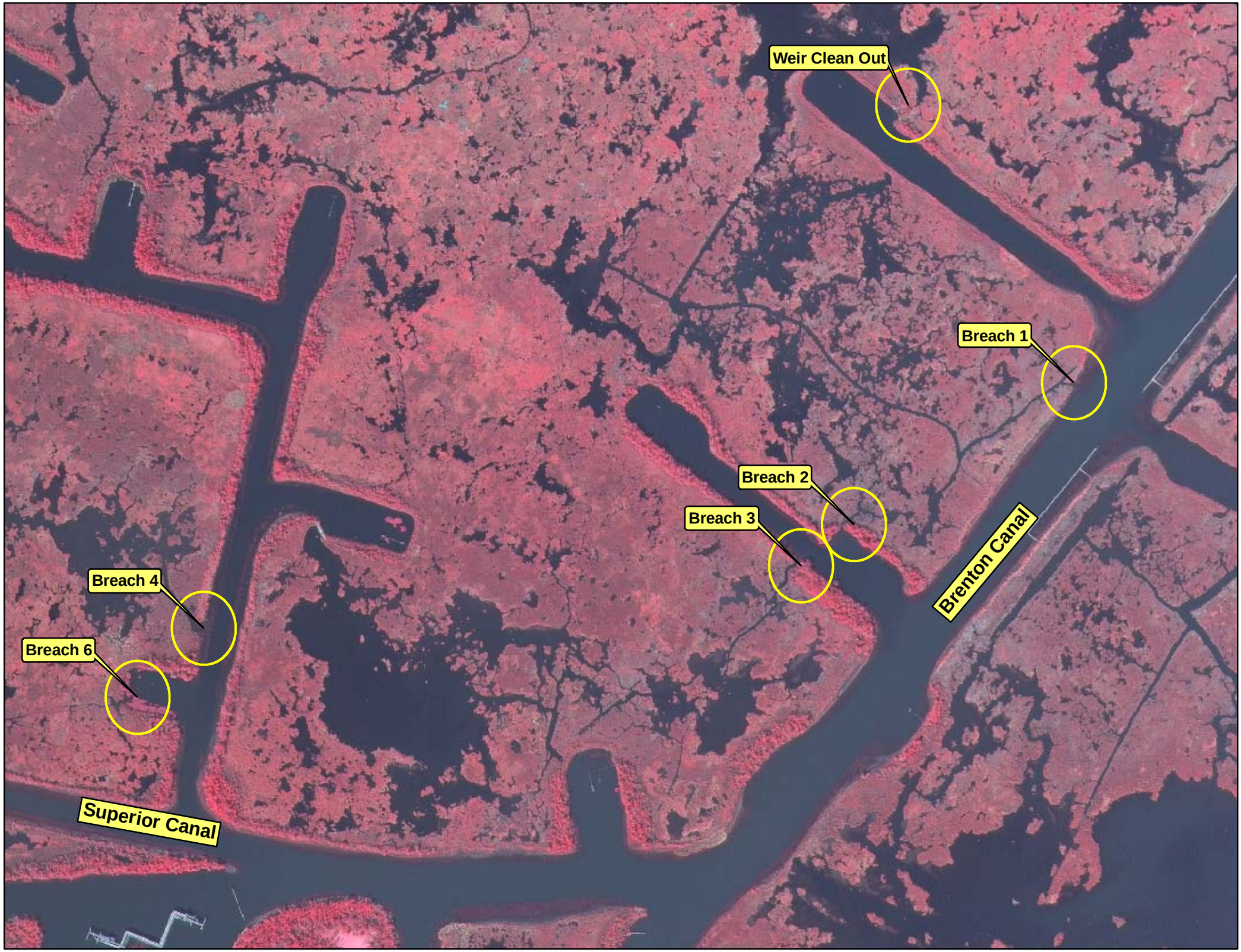
Figure 4. Area B. Small (10 to 30 feet wide) “notches” or indentations in the shoreline.

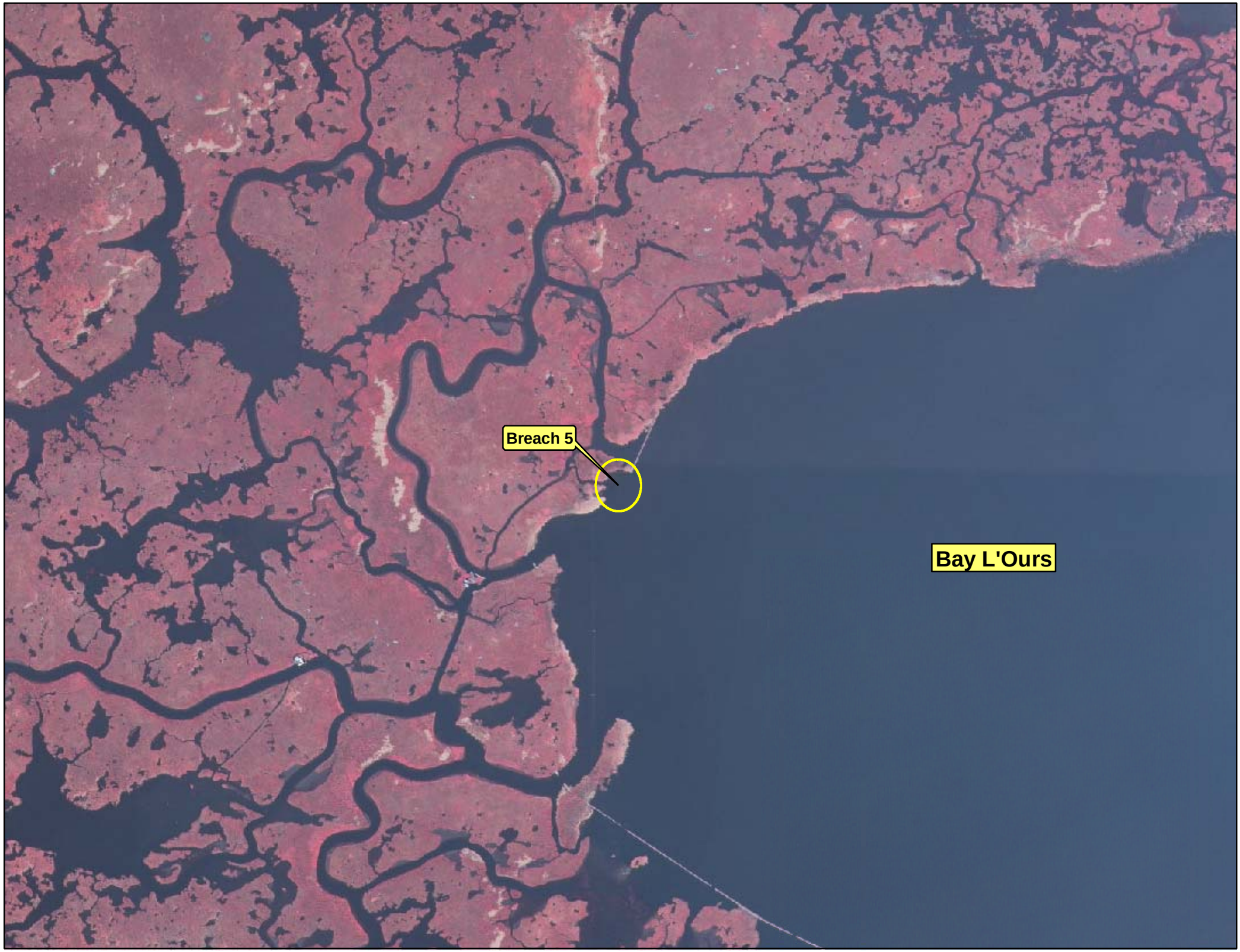
Figure 5. Area C. This site appears to be an alligator crossing, with there being only about 10 to 12 feet of land between the lake and interior pond.

Figure 6. Area D. Pronounced “notch” or indentation in the shoreline that is very representative of the remaining BA-2 Little Lake shoreline as you travel south.

Appendix F

Breach Locations Map


Weir Clean Out
Breach 1
Breach 2
Breach 3
Breach 4
Breach 6
Brenton Canal
Superior Canal


Breach 5
Bay L'Ours