Coastal Protection and Restoration Authority of Louisiana

Office of Coastal Protection and Restoration

2009/2010 Annual Inspection Report

for

EAST SABINE LAKE HYDROLOGIC RESTORATION PROJECT (CS-32)

State Project Number CS-32
Priority Project List 10

March 11 & 18, 2010
Cameron Parish

Prepared by:

Dewey Billodeau, P.E., Engineer 4
Darrell Pontiff, P.E., Engineer 4
CPRA/ Office of Coastal Protection and Restoration
Lafayette Field Office
635 Cajundome Blvd.
Lafayette, LA 70596

Table Of Contents

Appendices

I. Introduction

The proposed project is located in the western third of the Sabine National Wildlife Refuge (NWR) in Cameron Parish, Louisiana. The project area is bounded on the east by the Burton Sutton Canal, to the south by Starks South Canal, to the west by the eastern Sabine Lake shoreline, and to the north by the approximate northern boundary of Sabine NWR. (See Appendix A).

The East Sabine Lake Hydrologic Restoration 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 first Priority Project List. The East Sabine Lake Hydrologic Restoration Project has a twenty–year (20 year) economic life, which began in June 2009.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the East Sabine Lake Hydrologic Restoration Project (CS-32) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, OCPR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan, 2002). The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C. A summary of past operation and maintenance projects completed since completion of the East Sabine Lake Hydrologic Restoration Project are outlined in Section IV.

An inspection of the East Sabine Lake Hydrologic Restoration Project (CS-32) was held on two different dates. The inspection of the structures was held on March 11, 2020 under partly cloudy skies and cool temperatures. In attendance was Dewey Billodeau, from OCPR, and Dale Garber from NRCS. Representatives from USFWS were invited but could not attend. The inspection began at the southern end the rock dike on Sabine Lake and concluded at the Bridge Bayou Culverts. The terrace field in Green's Lake was inspected on March 18, 2010 under sunny skies and cool temperatures. In attendance were Dewey Billodeau, Darrell Pontiff, Mark Mouledous and Mike Miller with OCPR, and Cindy Steyer and Dale Garber with NRCS. Representatives from USFWS were invited but could not attend. The inspection began on the north end of the terrace field and concluded on the southern end.

The field inspection included an inspection of all of the project features. Staff gage readings and existing temporary benchmarks where available were used to determine approximate elevations

of water, rock, embankments, and other project features. Photographs were taken (see Appendix B) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix D).

III. Project Description and History

The lower salinity marshes in the project area are converting to shallow, open water due to elevated salinity events and subsidence. Navigation channels provide a direct route for salt water to infiltrate the marsh, disrupt natural water circulation, and allow rapid runoff of fresh water. The larger Sabine-Neches Waterway and the Gulf Intracoastal Waterway (GIWW) have allowed saltwater intrusion into the project area's fresh and intermediate marshes. Elevated tidal fluctuations in these channels have led to increased water flow, which has increased the conversion of marsh to open water. Marsh loss within the project area is also caused by wave action along Sabine Lake and interior marsh shorelines and other natural causes (i.e., subsidence).

To prevent further marsh loss and restore intermediate and brackish marshes, the project features will include: installing a rock weir at Pines Ridge Bayou; installing culverts with stop logs and flap gates at Bridge Bayou; installing rock rip-rap breakwater along the Sabine Lake shoreline at Willow Bayou; installing a weir at the opening at Starks South Canal Section 16 levee; and installing 230,000 linear feet of vegetated earthen terraces in the vicinity of Green's Lake.

Project Objectives

1. Protect and restore intermediate and brackish marshes within the project area.

Specific Goals

The following measurable goals were established to evaluate project effectiveness:

1. Reducing excessive elevated salinities within the Double Island Gully, Pines Ridge, and Green's Lake portions of the project area.

2. Reducing water level variability within the Double Island Gully and Pines Ridge portions of the project area.

3. Reducing the erosion rate along the Sabine Lake shoreline by 50% from Johnson's Bayou to a point north of Pines Ridge.

4. Stopping erosion of the Sabine Lake shoreline from the mouth of Willow Bayou to a point approximately 2,955 feet to the north.

5. Creating 68 acres of marsh in shallow open water areas by the end of the 20 year project life.

6. Increase fisheries and estuarine organism access without adversely affecting salinity levels in the western portion of Sabine NWR.

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since June 2009, the construction completion date of the East Sabine Lake Hydrologic Restoration Project (CS-32).

2007 - Hurricane Rita Repairs to Pines Ridge Bayou Weir and Willow Bayou Rock Realignment – F. Miller Construction - This maintenance project included placing 146 tons of R-300 rock rip-rap along with 794 LF of PVC sheet pile wall at Pines Ridge Bayou Weir. Rock realignment was performed at each end of the dike and rock gaps were placed in two other locations along the shoreline. This maintenance project was a result of damages sustained from Hurricane Rita in 2005 and other maintenance work required. The costs associated with the engineering, design and construction of the Pines Ridge Bayou and Willow Bayou Maintenance Project are as follows:

Construction (CWPPRA)	$ 74,700.00
Construction (FEMA)	$143,032.00
E & D, construction oversight, as-builts	$ 35,026.65
Project Total	**$252,758.65**

Structure Operations: There are no active operations associated with this project.

V. Inspection Results

Foreshore Rock Dike

The rock dike is good condition since completion of construction. There are a few low areas of rock dike that were identified with GPS coordinates and which will be monitored in future inspections for any changes that may be detrimental to the project and require maintenance. Areas behind the rock dike are beginning to show signs of accretion. Vegetation behind the rock dike along the northern reaches has grown out and is touching the back side of the dike. (Photos: Appendix B, Photos 1 - 3)

Rock Weir at Pines Ridge

The rock weir is in good condition after being rebuilt after Hurricane Rita. No signs of erosion are evident around the bank slopes. (Photos: Appendix B, Photo 4).

Double Island Plug

This site was not inspected on this trip due to logistics problems.

Earthen Terraces (report submitted by Cindy Steyer with NRCS)

Background: The CS-32 East Sabine Hydrologic Restoration Project lies east of Sabine Lake in Cameron Parish, Louisiana. The project area lies within brackish marsh habitat where the typical average monthly water salinity normally ranges from 3 to 8 ppt throughout the year. This report summarizes a field check of the vegetation component of this project, particularly of the most recent Construction Unit 1B planting installed in July 2009 to complete or replace the CU 1A terrace (Figures 1 and 2) vegetation damaged or destroyed by hurricane Ike (see Feb 2009 Trip Report, Subject: *CU-1A Post-Hurricane Damage Assessment of Terrace Vegetation*).

The Sabine Lake area was severely impacted by Hurricane Ike in September 2008. The project area was inundated by storm surge exceeding 10 feet, and then remained submerged under unusually high water levels for over a month following landfall. In addition, elevated salinities well above normal persisted in the project area until the fall of 2009. Smooth cordgrass, including the 'Vermilion' ecotype, is very flood and salt tolerant, and naturally occurs in the intertidal zones (approx. between mean high and mean low water) of brackish and saline wetland habitats. Nevertheless, the combination of a significant abrupt increase in salinity and prolonged elevation of water levels can severely impact smooth cordgrass plants, causing die-back of plant portions or complete mortality. The specific effects of any particular event are influenced by the degree and duration of the increase in water and soil salinity, depth and duration of flooding, temperature, season, and condition of the plants (for example, recently transplanted vs. established).

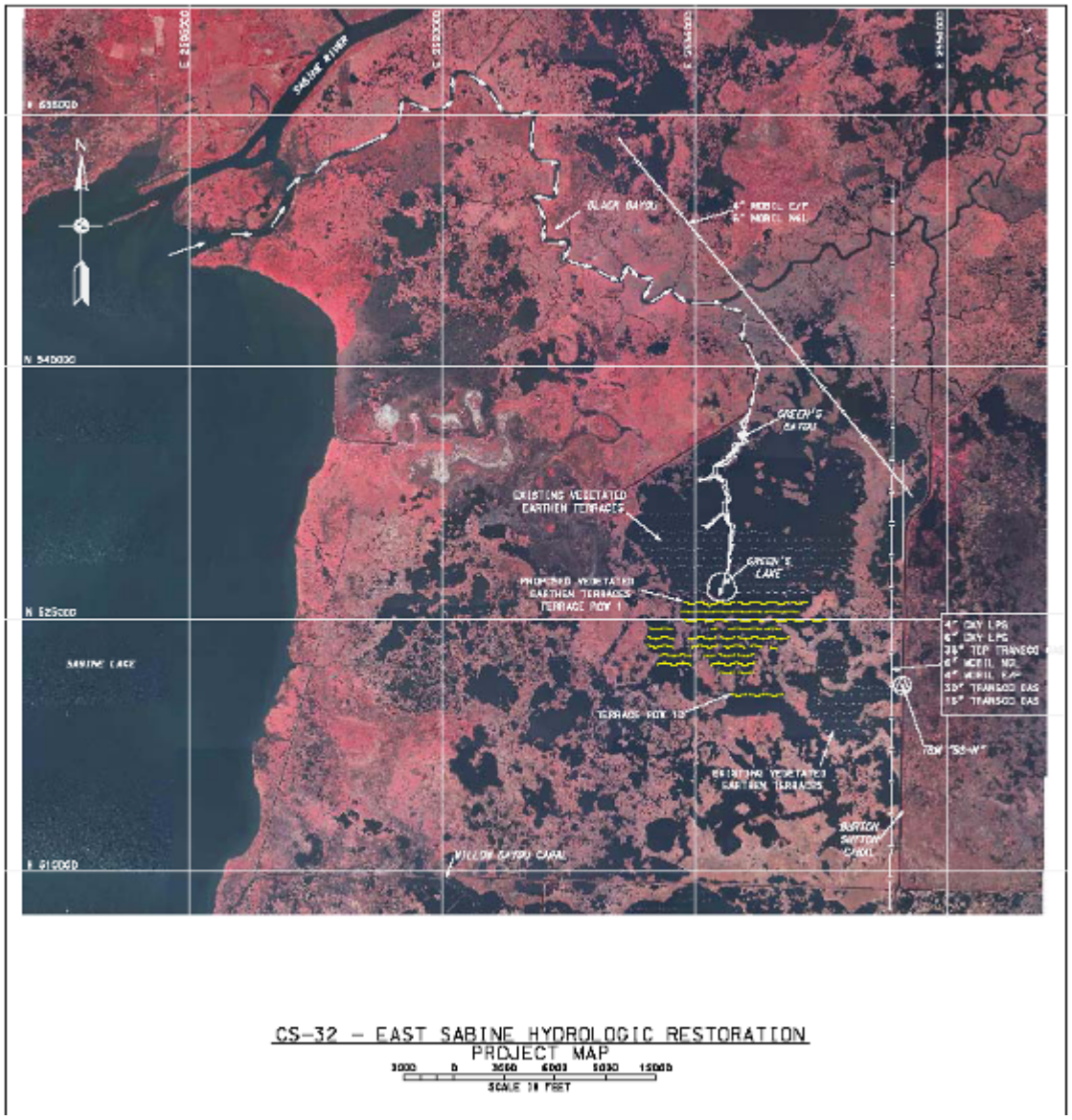


Figure 1. CS-32 East Sabine Hydrologic Restoration Project Plan Map – CU-1A.

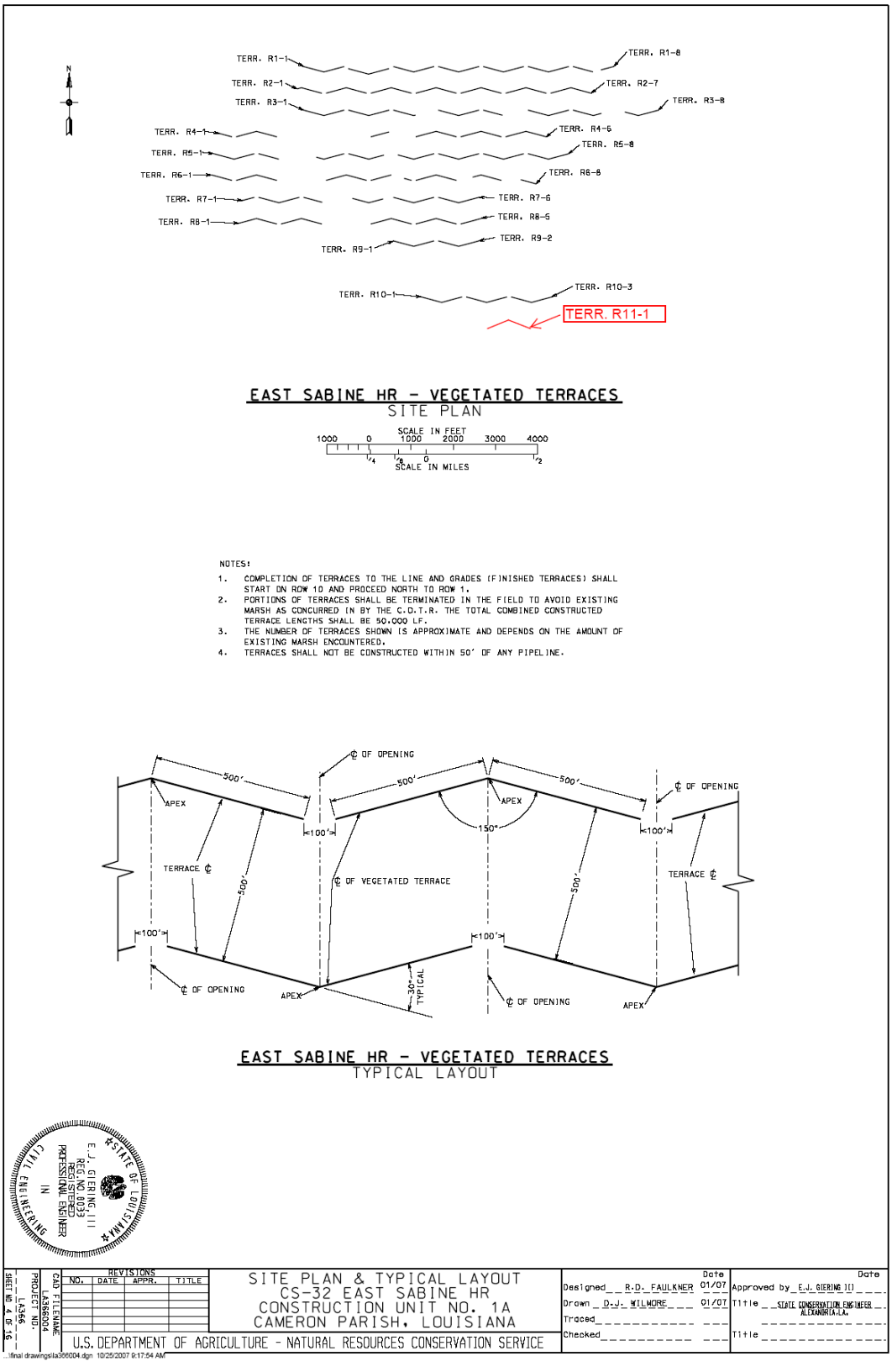


Figure 2. CS-32 East Sabine Hydrologic Restoration Project CU-1A Terrace Layout.

Findings: The team of above attendees traveled to the project site on March 18, 2010 to check the condition of the terraces and plantings. While traveling to the project area from the Cameron-Meadows boat launch, the area marshes were observed to be characteristic of very brown, late-winter vegetation, likely due to the especially severe winter season which was still persisting with frequent, unusually low minimum temperatures. Salinities within the project area on that date ranged from 2.9 ppt to 3.3 ppt from south to north respectively. The condition of the newest CU-1B plantings appeared very poor and severely browned – surprisingly similar to that of the CU-1 and CU-1A plantings following hurricanes Ike and Rita (see 2006 and 2008 Trip Reports). Many contract plants appeared missing or dead without having produced any new stems prior to winter. A very few stems of just emerging, tender growth were observed at the base of a small percentage of newest contract plants. But also, severe die-back of the above-ground plant tissue was evident throughout most of the earlier plantings that had previously recovered well and were spreading, as well as in the natural adjacent herbaceous marsh.

Condition of existing natural emergent marsh next to terraces:

Examples of condition of older plantings when appeared to be recovering well in August 2009:

Contrast above with the appearance of the condition of those older plantings in March 2010:

March 2010 condition of terrace segments with combination of older and recent plantings:

March 2010 condition of newest plantings:

For the newest CU-1B plantings, it is not likely that the source of the plants is a factor contributing to their current state, as the contract plants came from two different nurseries, one in Cameron Parish and one in Lafourche Parish, and all of the remaining plants from the other CU's generally appeared to be in the same condition on the date of this field trip.

Although mainly conjecture, weather could have played a causative role in the overall plant condition we observed. Installation of the CU-1B plantings was completed in July 2009 which turned out to be less than an ideal time for bare-root plant establishment. Following the extreme and prolonged saltwater inundation from hurricane Ike surge in September 2008, southwest LA experienced severe drought conditions in the first half of 2009, with a precipitation deficit persisting until October. In addition, discreet and continuous measurements during the summer revealed that salinities in the project area were significantly higher than normal - greater than 12ppt, and with water temperatures remaining around 85ºF until September (CRMS). This may have led to stagnant or phytotoxic soil conditions until precipitation levels returned to normal in October, but by that time it was already at the end of the growing season when plants are beginning to senesce. This period was then followed by an unusually cold winter pattern that began in late November and persisted throughout south Louisiana. Minimum temperatures frequently dropped into the 30's or below for at least half of Jan and Feb 2010 dates (NWS monthly summaries for the Lake Charles/Port Arthur area). It is possible that the newest plantings experienced higher mortality or dieback of aboveground tissue from the combination of elevated stress during initial acclimation and then additional impact by the ensuing cold temperatures to any new shoot growth that did occur. Further, following a typical winter season, robust new growth is not usually seen in smooth cordgrass until March when warmer spring temperatures become entrenched. So it is also possible that this year's new growth expected for all plants in the area may still be absent because it's been retarded by the persistent winter weather pattern and the late freeze in early March.

Because of the high uncertainty at this date of what below-ground tissue remains viable, a mortality rate or pattern cannot reasonably be determined for any of the plantings, regardless of age. I recommend returning to the project site in September near the end of this year's growing season when a much more accurate assessment of the extent of plant survival can be made. Collection and analysis of soil samples may also provide additional insight in discerning actual causes of the apparent poor performance of all the plants.

Bridge Bayou Culverts

The culverts at this location are in good condition. No erosion was evident at this site. There was difficulty in getting to and from this site by cabin boat. Future inspections will require the use of an airboat. (Photos: Appendix B, Photo 5).

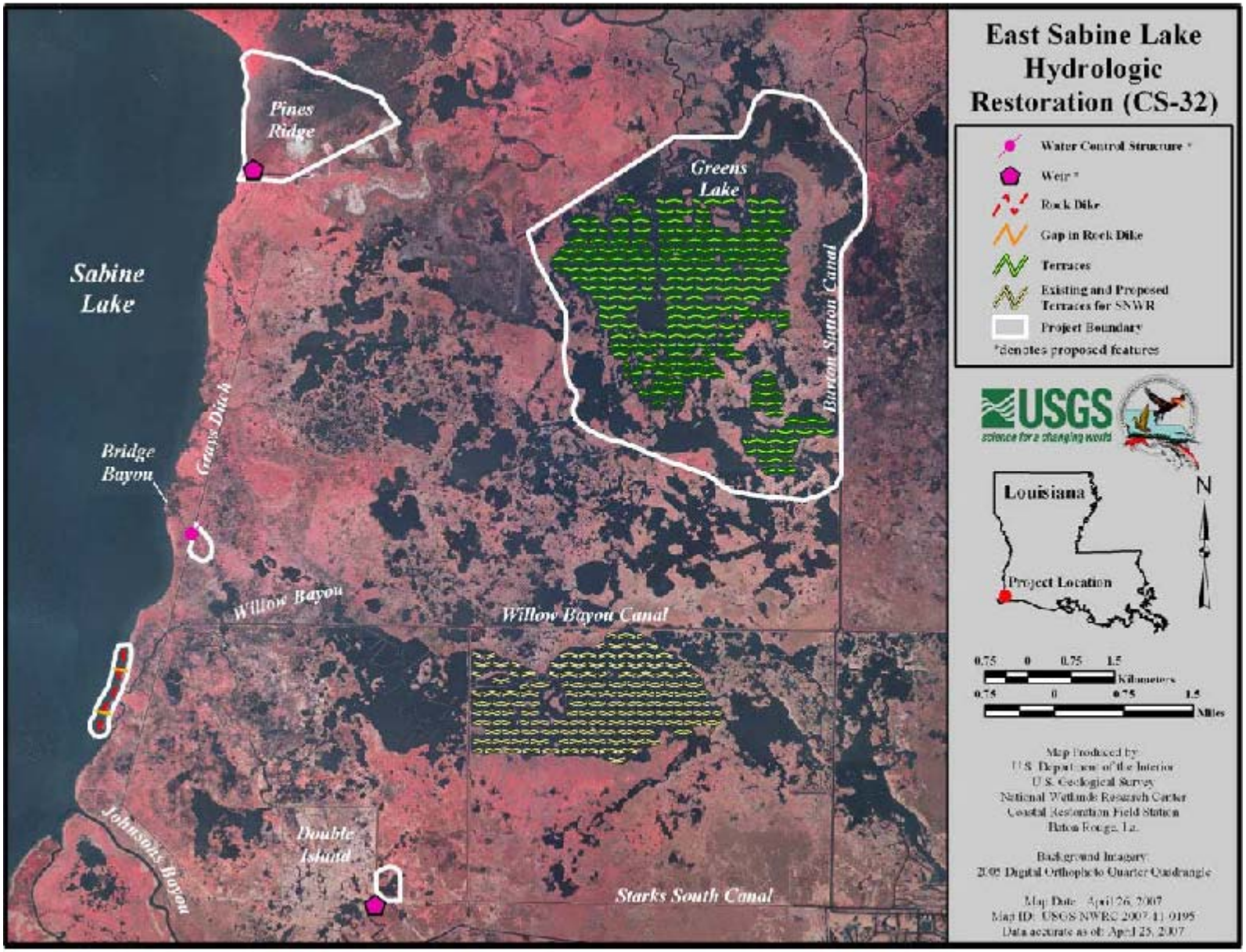
VI. Conclusions and Recommendations

Overall, the East Sabine Lake Hydrologic Restoration Project is in good condition with structures functioning as designed. Some of the vegetation on the terrace field in Green's

Lake has not performed well and has left the terraces bare. As discussed above, a return trip to the project site will be conducted in late fall to further assess the condition of the vegetative plants on the terraces.

Appendix A

Project Features Map



East Sabine Lake Hydrologic Restoration (CS-32)

- Water Control Structure *
- Weir *
- Rock Dike
- Gap in Rock Dike
- Terraces
- Existing and Proposed Terraces for SNWR
- Project Boundary

*denotes proposed features

USGS science for a changing world

Louisiana

Project Location

N

0.75 0 0.75 1.5 Kilometers

0.75 0 0.75 1.5 Miles

Map Produced by:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station
Baton Rouge, La.

Background Imagery:
2005 Digital Orthophoto Quarter Quadrangle

Map Date: April 26, 2007
Map ID: USGS NWRC 2007-11-0195
Data accurate as of: April 25, 2007

Appendix B

Photographs

Photo No.1 -Typical fish dip along rock dike with warning sign

Photo No. 2 -Typical rock dike showing accretion between dike and shoreline

Photo No. 3 – Rock dike along northern reach with vegetation touching back side of dike

Photo No. 4 – Pines Ridge Weir

Photo No. 5 – Bridge Bayou Culverts

Appendix C

Three Year Budget Projection

EAST SABINE LAKE HR/ CS-32 / PPL 10

Three-Year Operations & Maintenance Budgets 07/01/2010 - 06/30/2013

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Pat Landry	*Dewey Billodeau*	*USFWS*	*Dewey Billodeau*

	2010/2011	2011/2012	2012/2013
Maintenance Inspection	$ 5,909.00	$ 6,086.00	$ 6,269.00
Structure Operation			
Administration		$ -	$ -
Maintenance/Rehabilitation			

10/11 Description:

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

11/12 Description

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

12/13 Description:

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

	2010/2011	2011/2012	2012/2013
Total O&M Budgets	**$ 5,909.00**	**$ 6,086.00**	**$ 6,269.00**

O &M Budget (3 yr Total)	**$ 18,264.00**
Unexpended O & M Budget	**$ 253,923.00**
Remaining O & M Budget (Projected)	**$ 235,659.00**

Appendix D

Field Inspection Form

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name:CS-32 East Sabine Lake HR

Date of Inspection: March 11, 2010 Time:
March 18, 2010

Structure No.

Inspector(s):Dewey Billodeau, Darrell Pontiff, Mike Miller (OCPR)
Mark Mouledous (OCPR), Dale Garber and Cindy Steyer (NRCS)

Structure Description: Rock Dike, Terraces, Culverts, Rock Weir

Water Level Inside: +0.75 Outside:

Type of Inspection: Annual

Weather Conditions: Partly Cloudy and Cool (3/11)
Sunny and Cool (3/18)

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Bridge Bayou Culverts	Good			5	
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Pines Ridge Weir	Good			4	
Signage /Supports	Good				
Foreshore Rock Dike	Good			1,2,3	
Earthen Terraces	Fair				Some of the vegetation has not faired well and may need to be replanted. Salinity ranged between 2-3 ppt

What are the conditions of the existing levees?	N/A
Are there any noticeable breaches?	No
Settlement of rock plugs and rock weirs?	No
Position of stoplogs at the time of the inspection?	N/A
Are there any signs of vandalism?	No

Appendix E

Locations to be Monitored