State of Louisiana
Department of Natural Resources
Coastal Restoration Division and
Coastal Engineering Division

2005 Operations, Maintenance, and Monitoring Report

for

Sweet Lake/Willow Lake Hydrologic Restoration

State Project Number CS-11b
Priority Project List 5

June, 2005
Cameron Parish

Prepared by:

Mike Miller, Monitoring Section (CRD)
And
Melvin Guidry, Field Engineering Section (CED)
LDNR/Coastal Restoration and Management
Lafayette Field Office
635 Cajundome Boulevard
Lafayette, LA 70506

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Preface

The Operations, Maintenance, and Monitoring (OM&M) Report format is a streamlined approach which combines the Operations and Maintenance annual project inspection information with the Monitoring data and analyses on a project-specific basis. This report includes monitoring data collected through December 2004, and annual Maintenance Inspections through June 2005.

The 2005 report is the second report in a series of reports. For additional information on lessons learned, recommendations, and project effectiveness, please refer to the 2004 Operations, Maintenance, and Monitoring Report on the Louisiana Department of Natural Resources (LDNR) web site at dnr.louisiana.gov (Miller and Guidry 2007).

I. Introduction

The Sweet Lake/Willow Lake shoreline protection project is composed of approximately 6,000 ac (2,428 ha) of open water and freshwater wetlands surrounding Sweet Lake and Willow Lake in northeastern Cameron Parish (figure 1). The project area is bounded on the south and west by the Gulf Intracoastal Waterway (GIWW), and on the north and east by Pleistocene prairie formations along La. Hwy. 384 and La. Hwy. 27.

The three soil types occurring in the project area are Allemands muck, Aquents, and Udifluvents (U.S. Department of Agriculture, Soil Conservation Service [USDA/SCS] 1995; USDA/Natural Resources Conservation Service [USDA/NRCS] 1997). Allemands muck is a very poorly drained organic soil found in freshwater marshes, making up 90 % of the project area. The remaining 10% consists of frequently flooded Aquents Series and Udifluvents Series soils comprising the dredged spoil along GIWW.

The plant community in the project area is fresh marsh and is dominated by *Sagittaria lancifolia* (bulltongue), with lesser amounts of *Panicum hemitomon* (maiden cane), *Schoenoplectus californicus* (California bullwhip), *Spartina patens* (marshhay cordgrass), *Typha* sp. (cattail), *Phragmites australis* (common reed), *Colocasia esculenta* (elephant ear), and *Alternanthera philoxeroides* (alligator weed). A canopy layer of *Sesbania drummondii* (rattlebox), *Salix nigra* (black willow), *Sapium sebiferum* (Chinese tallow tree), and *Cephalanthus occidentalis* (buttonbush) is present on higher ground and on the remains of ridges formed by old levees and spoil banks in the area. Shallow open water areas support a number of aquatic plants, with stands of *Nelumbo lutea* (American lotus) and *Potamogeton diversifolius* (common pondweed) dominant. *Eichhornia crassipes* (water hyacinth) is also prevalent, with large floating mats often developing in open water areas by the summer.

When the GIWW was constructed in the early 1900's, its route lay just south of the southern shorelines of both lakes, but the high energy associated with the navigation channel has impacted and continues to impact the lakes and surrounding marshes. Erosion of the banks of the GIWW has occurred, caused by the water level drawdown effect and wave wash from the wakes created by passing boats and barges (Good et al. 1995), along with the widening and deepening of the channel from its original dimensions of 40 ft (12.2 m) wide x 5 ft (1.5 m) deep to 125 ft (38 m) wide x 12 ft (3.7 m) deep in the 1940's (United States Army Corps of Engineers [USACE] 1978). This erosion has resulted in the breaching of the narrow strip of marsh and spoil bank between the canal and the southern shoreline of both lakes.

These hydrologic connections have led to increased mechanical erosion of the lake shorelines and the surrounding organic marsh soils, followed by the suspension and transport of organic and mineral sediments from the lakes and surrounding marshes into the deeper water of the GIWW channel, resulting in a significant loss of fresh marsh in the project area. Such "blowouts," where direct connections between a channel and inland water body form, exposing

fragile organic marsh soils to high energy and increased erosion, are a common problem along navigation channels in coastal Louisiana (Good et al. 1995).

Land loss studies by Britsch (1994) indicate that in 1956, approximately 19 % of the project area was classified as open water, and 61 % was classified as fresh emergent marsh. By 1993, approximately 74 % of the project area was classified as open water, and only 26 % as fresh emergent marsh, most of which was deteriorated and converting to open water (Britsch 1994).

Between 1952 and 1975, the average shoreline erosion rate was 3.8 ft/yr (1.2 m/yr) at Willow Lake and 2.6 ft/yr (0.8 m/yr) at Sweet Lake (Adams et al. 1978). Between 1978 and 1990, this rate increased to 11 ft/yr (3.4 m/yr) along the northern and eastern shorelines of Willow Lake, and averaged 22 ft/yr (6.7 m/yr) along the Sweet Lake shoreline (Brown & Root, Inc. 1992).

In May 2001, the placement of 17,460 linear feet (5,322 m) of foreshore rock dike was completed along the GIWW. In August 2001, construction of 25,931 linear feet (7,904 m) of open water terraces north of Sweet Lake was initiated; however, due to complications with the contractor, timing of the installation of plants, and inclement weather, the contract was terminated in October 2001, after only partial completion of the terraces (figure 1). In June 2002, the construction of 20,650 linear feet (6,924 m) of shoreline terraces along the Willow Lake shoreline (figures 1 and 2) was initiated. After completion of the Willow Lake terraces, construction began on the terraces in Sweet Lake. In October 2002, construction of 29,897 linear feet (9,113 m) of terraces in Sweet Lake (figures 1 and 3) was completed.

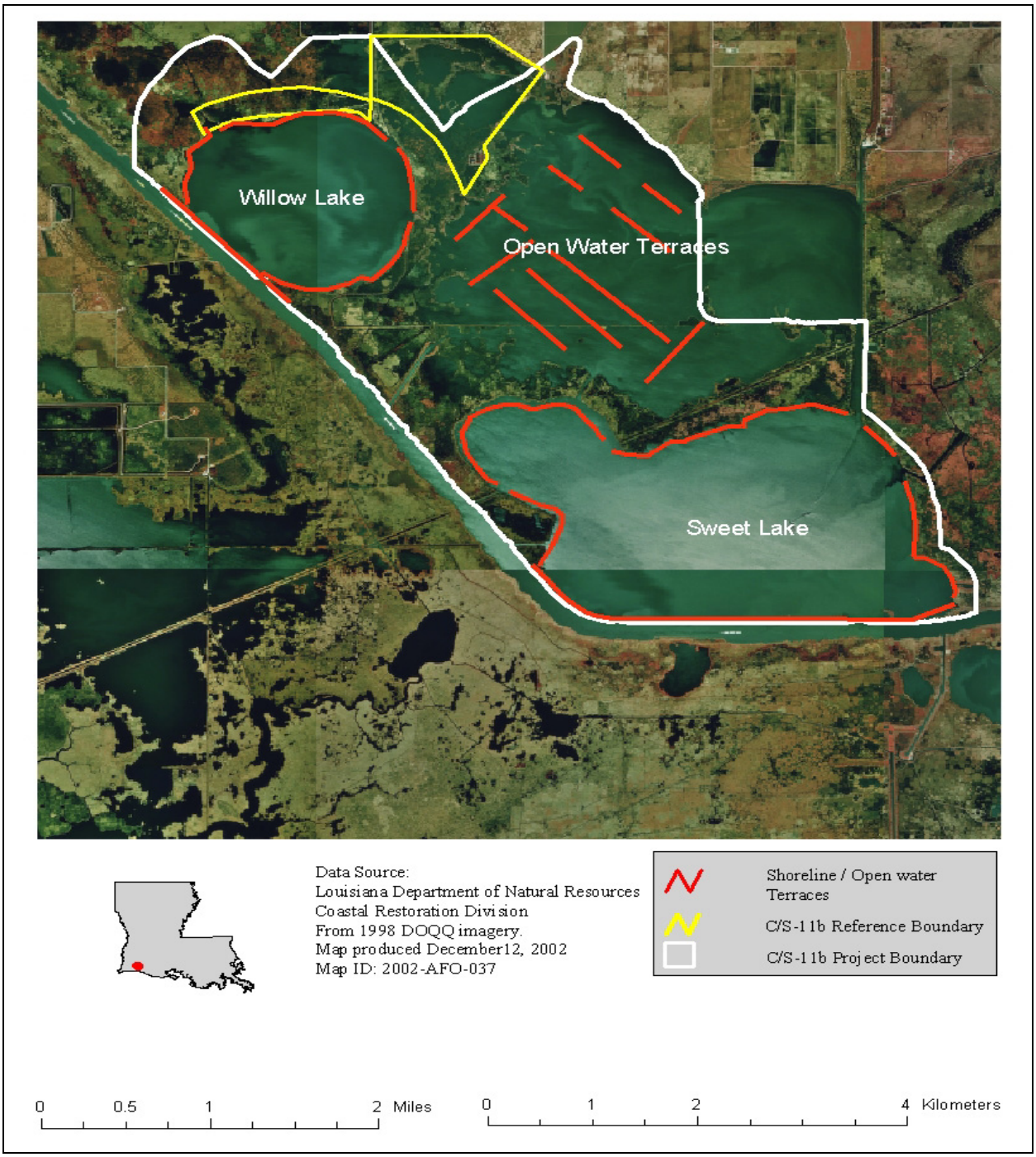

Figure 1. Sweet Lake/Willow Lake (CS-11b) proposed project features, project area boundaries and reference area boundaries. Refer to as-built diagrams (figures 2 and 3) for exact dimensions and features.

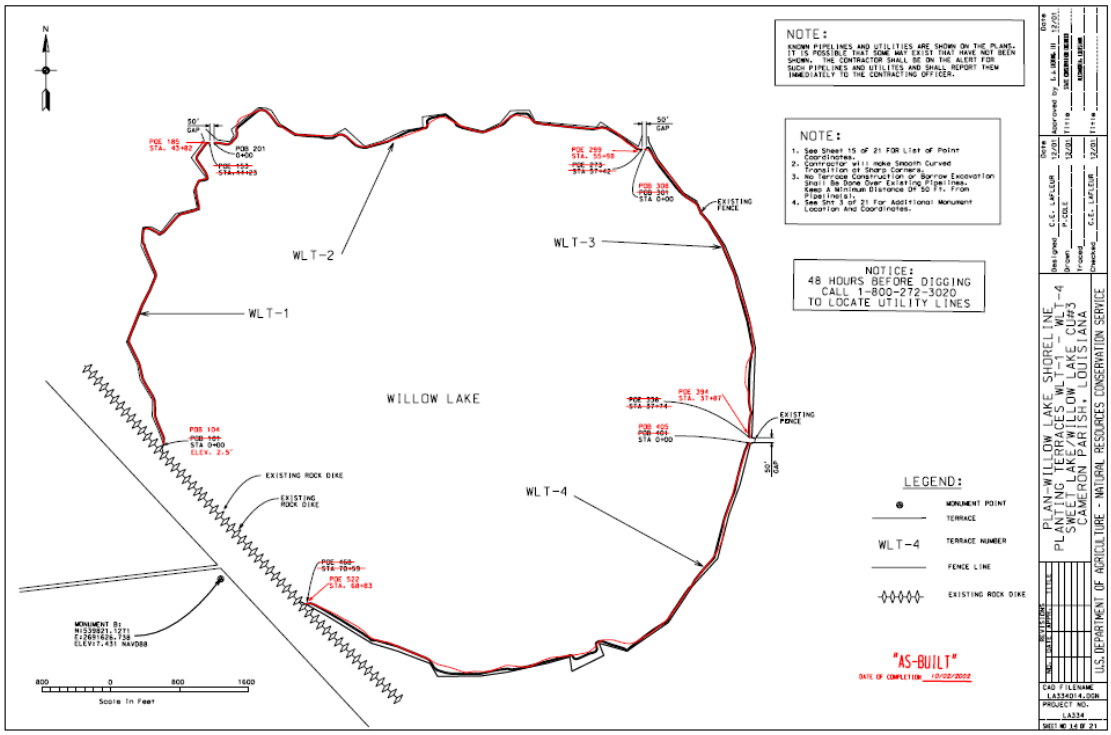

Figure 2. As-built location of shoreline terraces within the Willow Lake area of the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area.

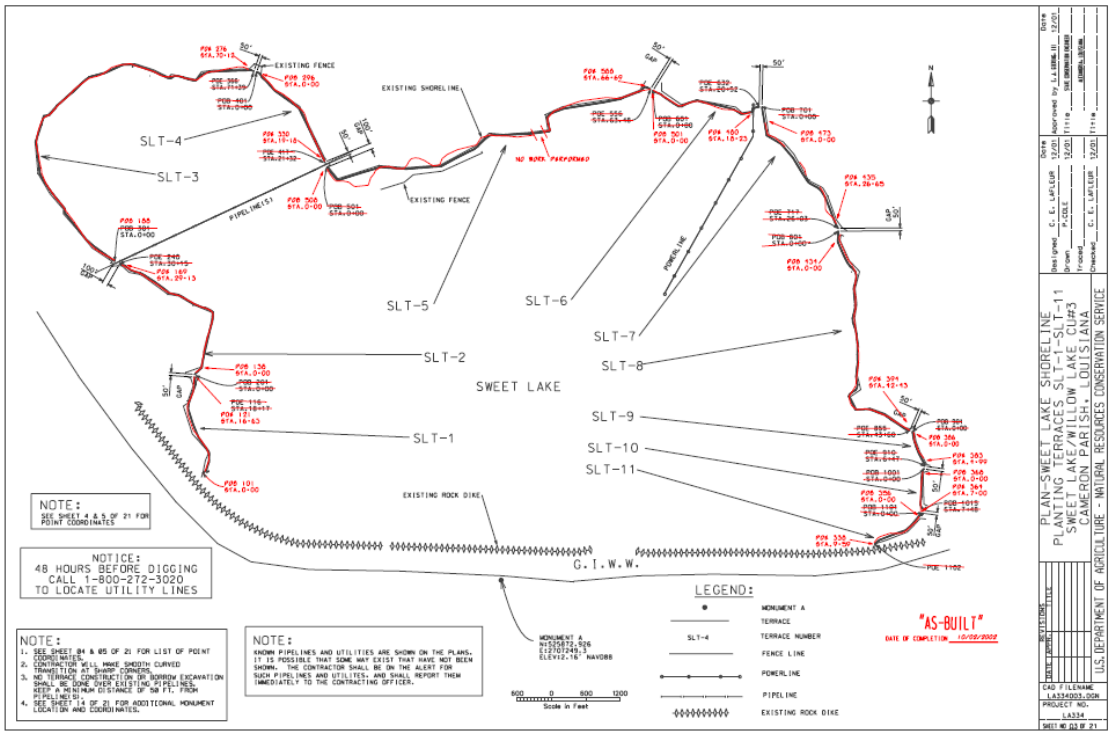

Figure 3. As-built location of shoreline terraces within the Sweet Lake area of the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Sweet Lake/Willow Lake Hydrologic Restoration Project (CS-11b) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects, if any, 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. Photographs taken as part of the inspection are presented in Appendix A. The three-year projected operation and maintenance budget is shown in Appendix B.

An inspection of the Sweet Lake/Willow Lake Hydrologic Restoration Project (CS-11b) was held on December 14, 2004, under clear skies and cold temperatures with a 10-15 mph NE wind. In attendance were Stan Aucoin, Dewey Billodeau, and Patrick Landry from LDNR, and Brad Sticker and Cindy Steyer from the Natural Resources Conservation Service (NRCS). The annual inspection began at approximately 9:00 a.m. on the eastern boundary of the project area.

The field inspection included a complete visual inspection of the entire length of rock dike along the GIWW. Staff gauge readings were not available to be used to determine approximate elevations of water and rock dikes. Photographs were taken (see Appendix A) and a Field Inspection form was completed in the field to record measurements and deficiencies (see Appendix C). Although vegetative plantings and earthen terraces were a component of construction, they are items that are not budgeted to be maintained; however, a visual inspection of the terraces was made during the inspection, and condition of the terraces and plantings varied depending on location.

b. Inspection Results

The dikes are in reasonably good condition. There are a few low places along the length of the rock dike, with the most significant stretches along the open water areas adjacent to Sweet Lake. There is an area approximately 50 ft (15.2 m)wide along the very eastern end of the project area in which the dike appears to have been “pushed back” 10-12 ft, (3.0-3.7 m) apparently by a barge. There is another area approximately 4 ft (1.2 m) wide in which the dike appears to have been removed by hunters or fishermen. Several settlement plates are either broken or leaning and are of no use. No gauges were available in the vicinity to determine water levels. The terraces north of Sweet Lake experienced significant erosion.

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs
None

ii. Programmatic/ Routine Repairs
None

d. Maintenance History
There have been no past maintenance projects.

III. Operation Activity

a. Operation Plan

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

b. Actual Operations

There are no water control structures associated with this project, therefore no required structural operations.

IV. Monitoring Activity

Pursuant to a Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Task Force decision on August 14, 2003, to adopt the Coastwide Reference Monitoring System-*Wetlands* (CRMS-*Wetlands*) for CWPPRA, updates were made to the CS-11b Monitoring Plan to merge it with CRMS-*Wetlands* and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act.

a. Project Objective and Goals

The objectives of the Sweet Lake/Willow Lake Hydrologic Restoration Project are to protect the emergent marsh by reducing shoreline erosion and to increase the acreage of emergent and submerged aquatic vegetation (SAV) within the project area.

The following goals will contribute to the evaluation of the above objectives:

1. Reduce the erosion rate along lake shorelines adjacent to the terraces with vegetative plantings of *Zizaniopsis miliaceae*.

2. Decrease the rate of marsh loss in the project area.

3. Increase the coverage of emergent wetland vegetation and submerged aquatic vegetation (SAV) in the shallow open water areas in the terracing/vegetative planting section of the project.

b. Monitoring Elements

Aerial Photography

Near-vertical, color-infrared aerial photography (1:12,000 scale) was obtained in 1998 prior to construction to document land and open water areas, and marsh loss/gain rates. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by U.S. Geological Survey/National Wetlands Research Center (USGS/NWRC) personnel according to standard operating procedures documented in Steyer et al. (1995, revised 2000) for determining land-to-water ratios and corresponding acreage through GIS analysis.

Shoreline Change

To document shoreline movement of Sweet Lake and Willow Lake, GPS surveys of a sample of each lake's shoreline adjacent to the planted terraces were conducted in August 2001, at the vegetative edge of the bank. A survey monument established in the vicinity of the rock dike was used to establish a GPS control point at the beginning and end of each day of surveying. GPS readings taken at this control point were used as an accuracy check and for determining error

associated with each GPS shoreline survey. Future shoreline surveys will be conducted post-construction in 2005, 2009, and 2016.

Vegetative Plantings

The survival and general condition of the *Z. miliaceae* plantings along the Sweet Lake and Willow Lake shorelines were documented by monitoring a 5 % subsample of the plantings randomly selected from areas where GPS surveys were conducted. Each sampling plot consists of 16 plants. The locations were marked with a labeled post and a GPS reading. Within each sampling plot, survival was determined as a percentage of the number of live plants to the number planted (percent survival = no. plants/no. planted x 100), after Mendelssohn and Hester (1988) and Mendelssohn et al. (1991). Survival was monitored 1 month post-planting in 2001 and 1 year post-planting in 2002. Data will be collected in 2005, 2009, and 2016, or until the individual plantings become indistinguishable. These data will be used to determine if the plantings have an effect on the Sweet Lake shoreline erosion rate, as compared with rates similarly estimated along Willow Lake shoreline in reference area 1, as described above.

In order to determine planting success, and to estimate the amount (acreage) of emergent vegetation that becomes established on the terraces, random sampling plots of 16 plants were established to include a 3 % sub-sample of the *Z. miliaceae* plantings on the terraces constructed in the open water area north of Sweet Lake. Each plot includes 16 plants, and consists of a rectangular section of terrace with eight plantings that parallel each side of the terrace section. The area of each plot was determined by measuring the length and width of the terrace for each plot. Ocular estimates of percent canopy cover were recorded for each plot. The percent cover for each plot was broken down into the percent cover provided by the *Z. miliaceae* plantings, by other wetland and upland species. Monitoring of the terrace plantings was discontinued due to low survival rates observed.

Submerged Aquatic Vegetation

The rake method (Nyman and Chabreck 1996) was used to document changes in the relative frequency of SAV in the project and reference areas. Transects were established in the shallow open water area north of Sweet Lake where the terraces and plantings were installed. For comparison and use as a reference, transects were similarly established in an open water area in the marsh northeast of Willow Lake. Open water areas were sampled for presence or absence of SAV at 25-100 random points along each transect line, depending on the size of the water body. Species composition and relative frequency of occurrence (frequency = number of occurrences/number of samples taken x 100) were determined. Because extensive colonies of *Eichhornia crassipes* are likely to be present in the open water areas during the fall season, SAV was monitored during May in 2000, pre-construction. SAV monitoring was discontinued.

c. Preliminary Monitoring Results and Discussion

Aerial Photography

Pre-construction land to water classification from photography obtained December 17, 1998, indicated 23.0 % land and 77.0 % water within the project area versus 44.0 % land and 56.0 % water within reference area (figure 4).

Shoreline Change

Data were collected in August 2001 (pre-construction) as baseline data and will be used to verify shoreline position over time (figure 5).

Vegetative Plantings

Mean survival of *Z. miliaceae* plantings on the open water terraces north of Sweet Lake decreased from 80.2 % to 33.7 % from 1 month post-planting in December 2001 to 1 year post-planting in November 2002 (figures 6 and 7).

Mean initial survival (1 month after planting in October 2002) of *Z. miliaceae* plantings on shoreline terraces along the Sweet Lake and Willow Lake perimeters was 83.4 % and 94.1 %, respectively (figures 8 and 9).

Submerged Aquatic Vegetation

Data collected pre-construction in May 2000 indicate that unvegetated areas within the project and reference areas were 50.9 % and 27.2 %, respectively (figures 10 and 11). *Ruppia maritima* (widgeon grass) was found only in the project area, while *Nelumbo lutea* (water lily) was found only in the reference area. Species present in both the project and reference areas included *Vallisneria americana* (water celery), *Ceratophyllum demersum* (coontail), and an unidentified green alga.

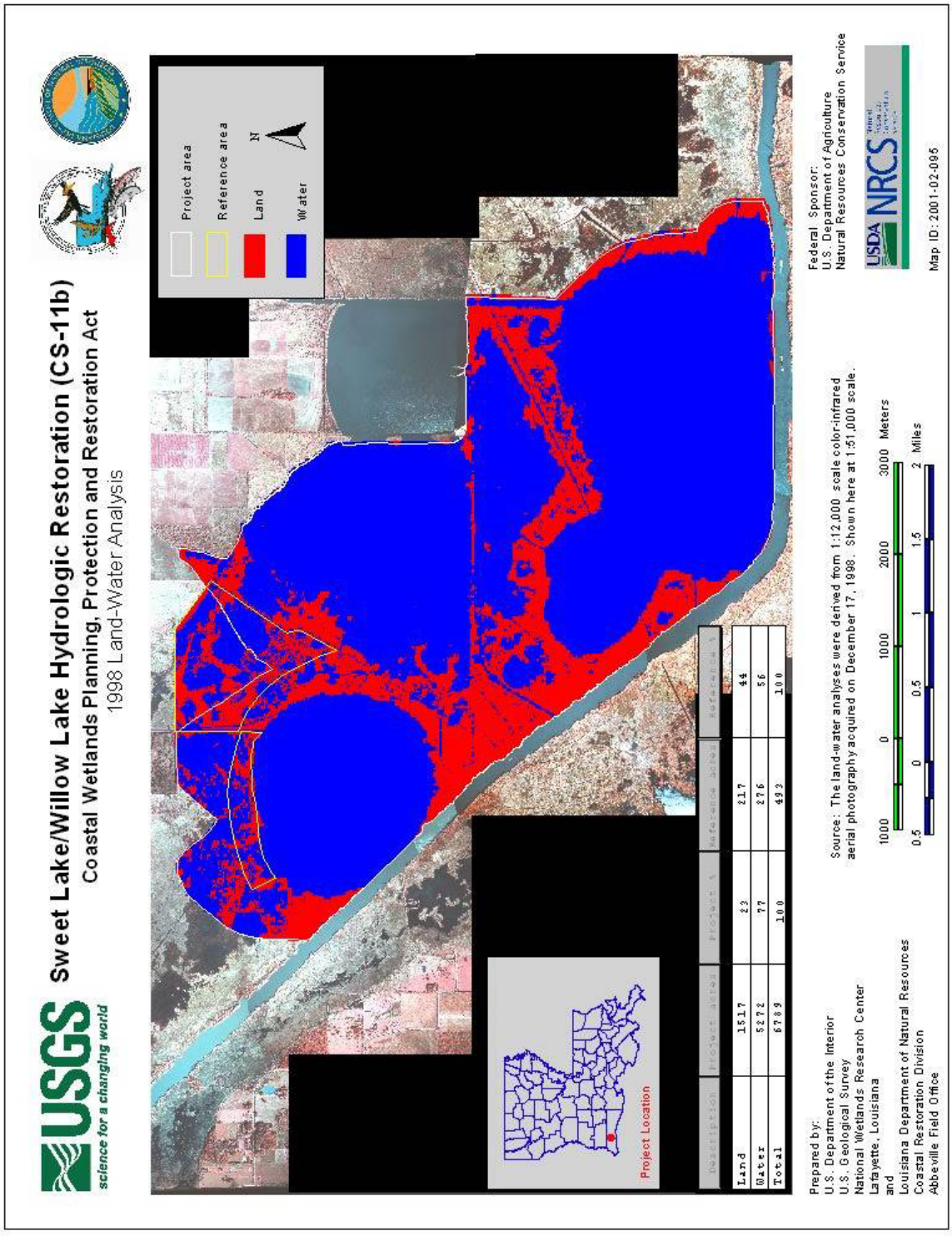

Figure 4. Land to water analysis of the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area from photography obtained December 17, 1998.

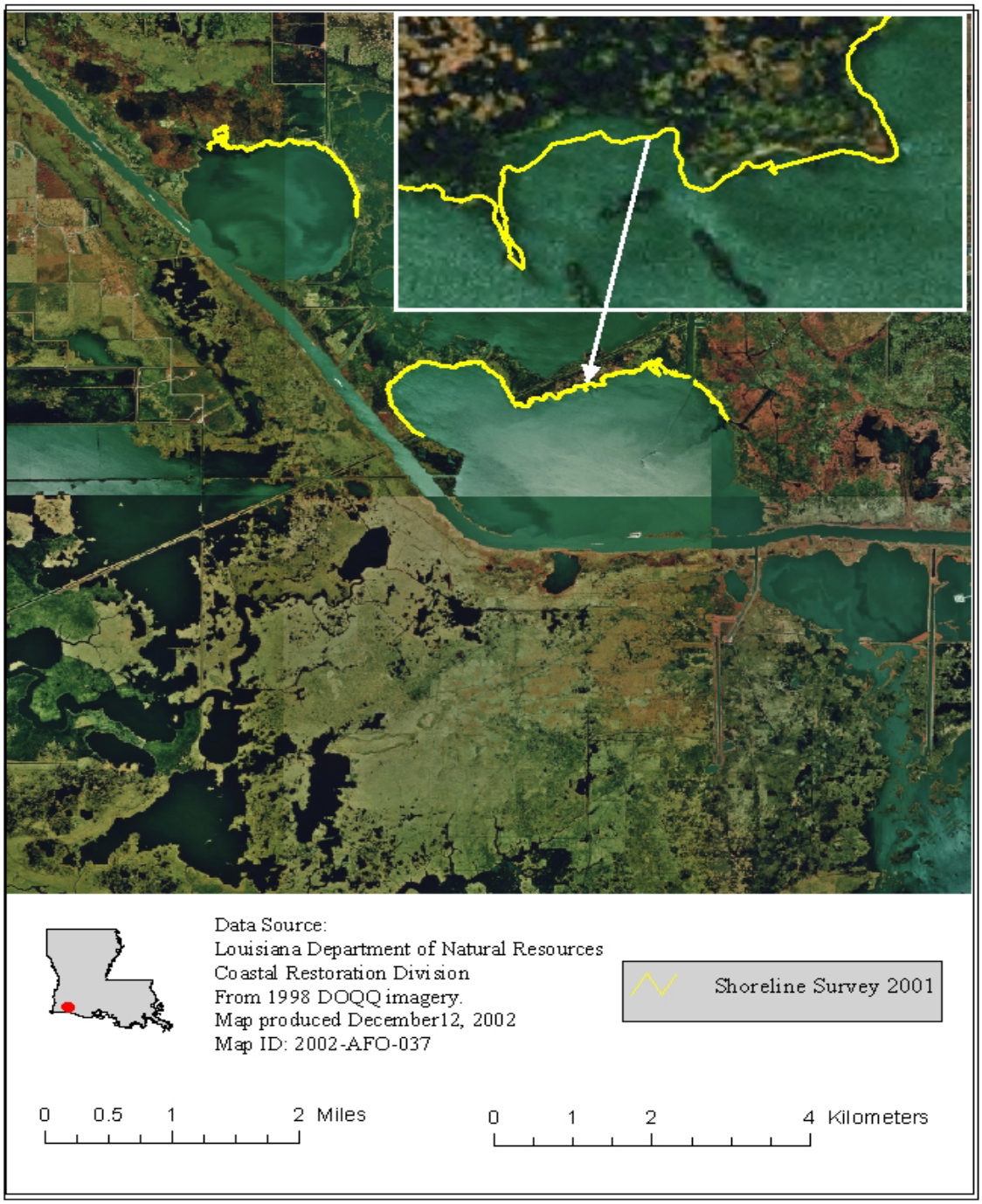

Figure 5. Baseline shoreline position survey of the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area from data obtained August 2001.

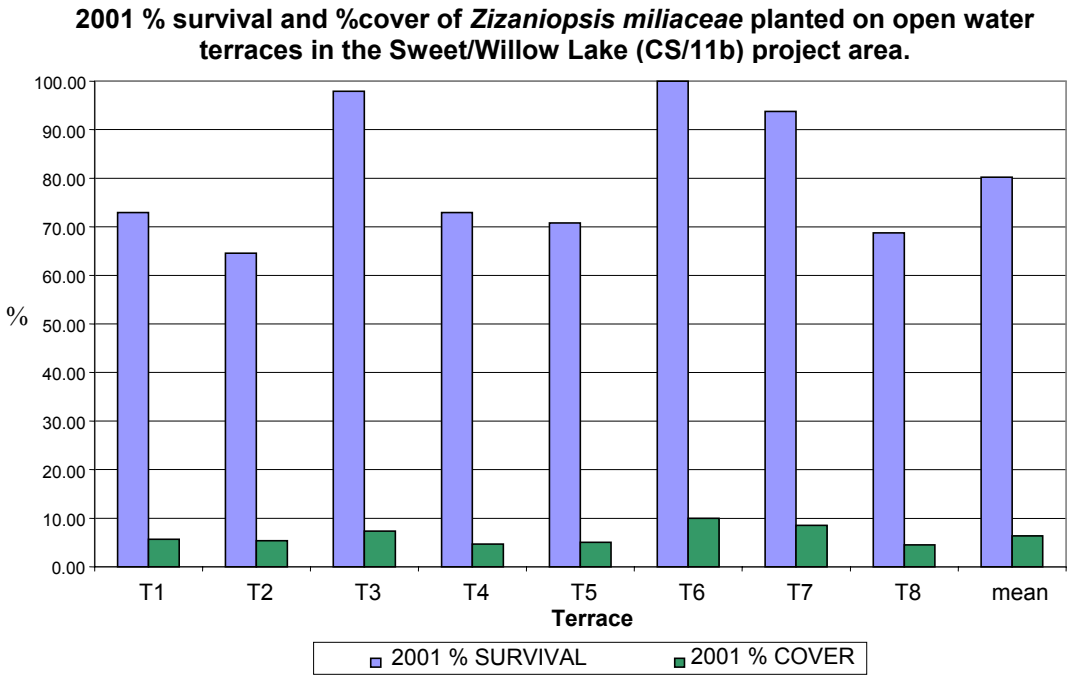

Figure 6. Percent survival and percent cover of vegetative plantings on the open water terraces located north of Sweet Lake in the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area sampled 1 month post-planting in December 2001.

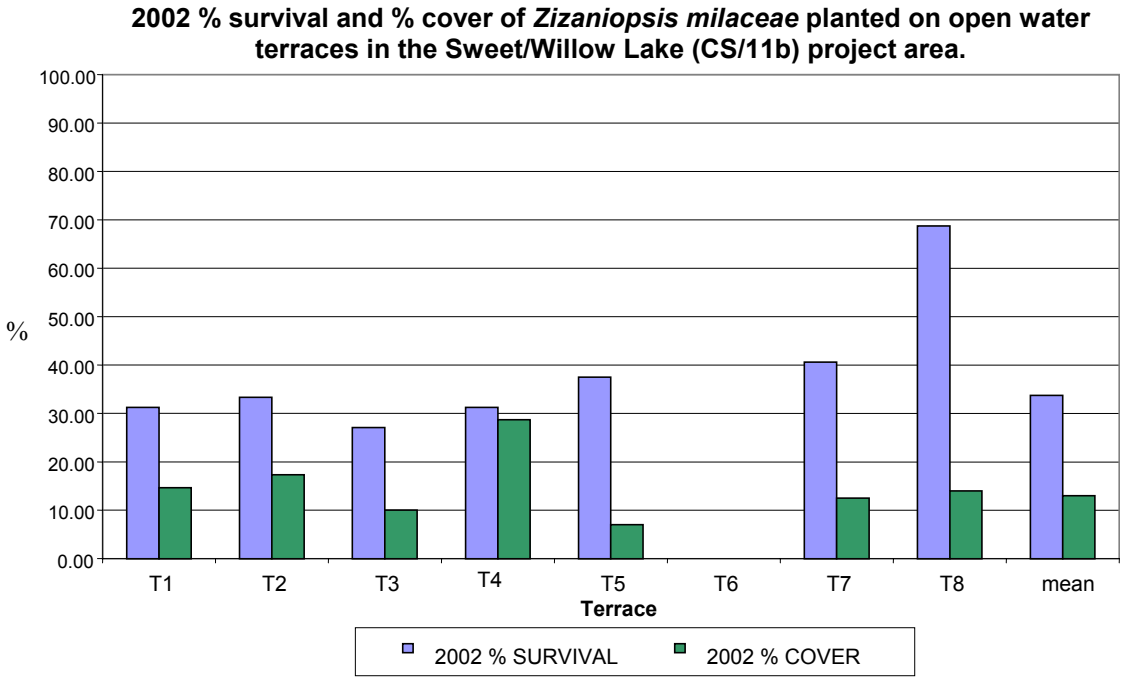

Figure 7. Percent survival and percent cover of vegetative plantings on the open water terraces located north of Sweet Lake in the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area sampled 1 year post-planting in November 2002.

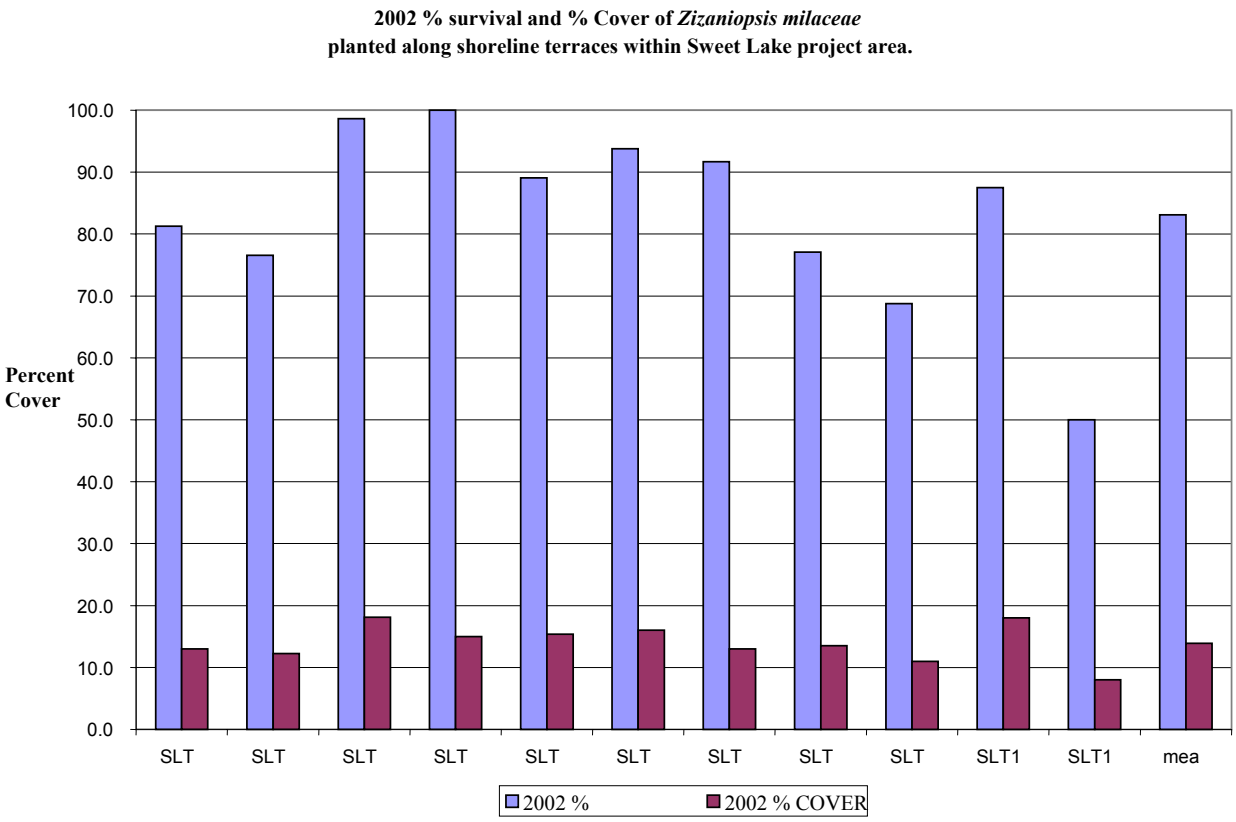

Figure 8. Percent survival and percent cover of vegetative plantings along the Sweet Lake shoreline terraces located in the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area sampled 1 month post-planting in October 2002.

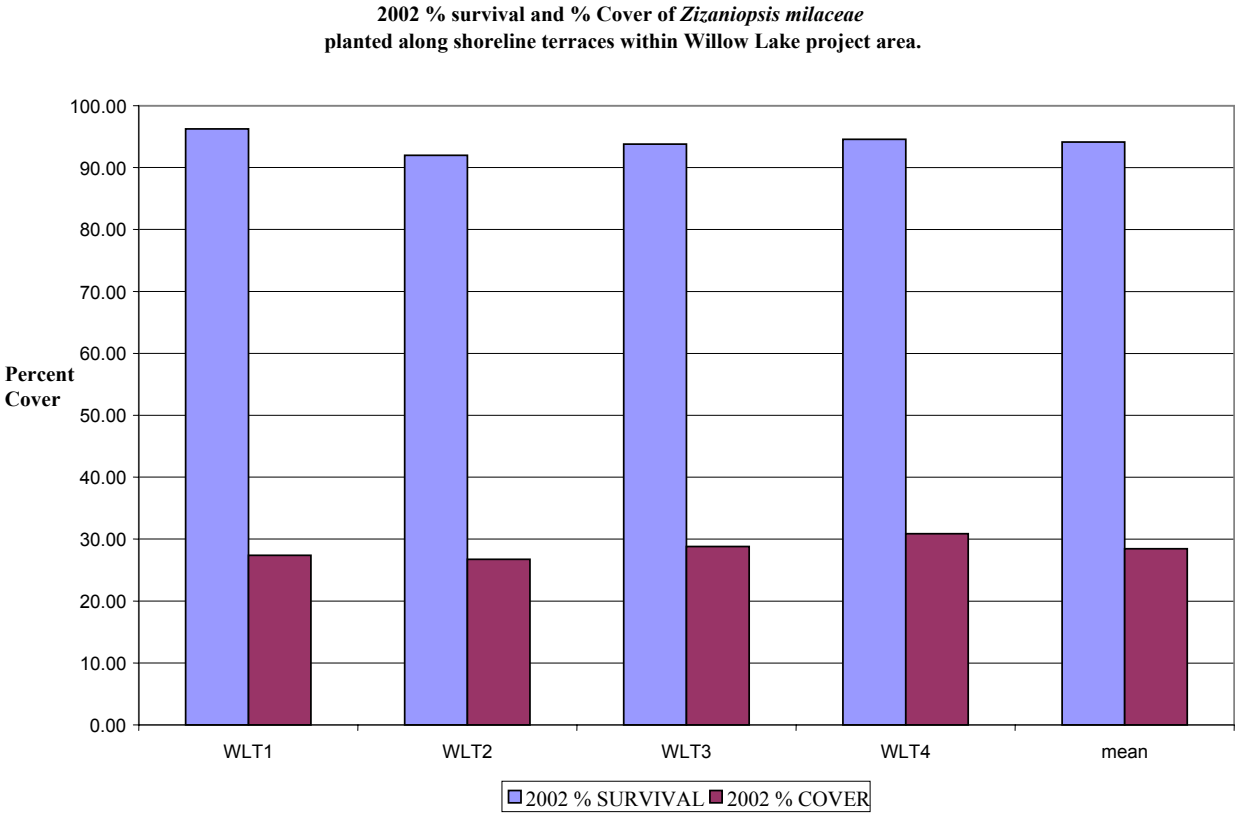

Figure 9. Percent survival and percent cover of vegetative plantings along the Willow Lake shoreline terraces located in the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project area sampled 1 month post-planting in October 2002.

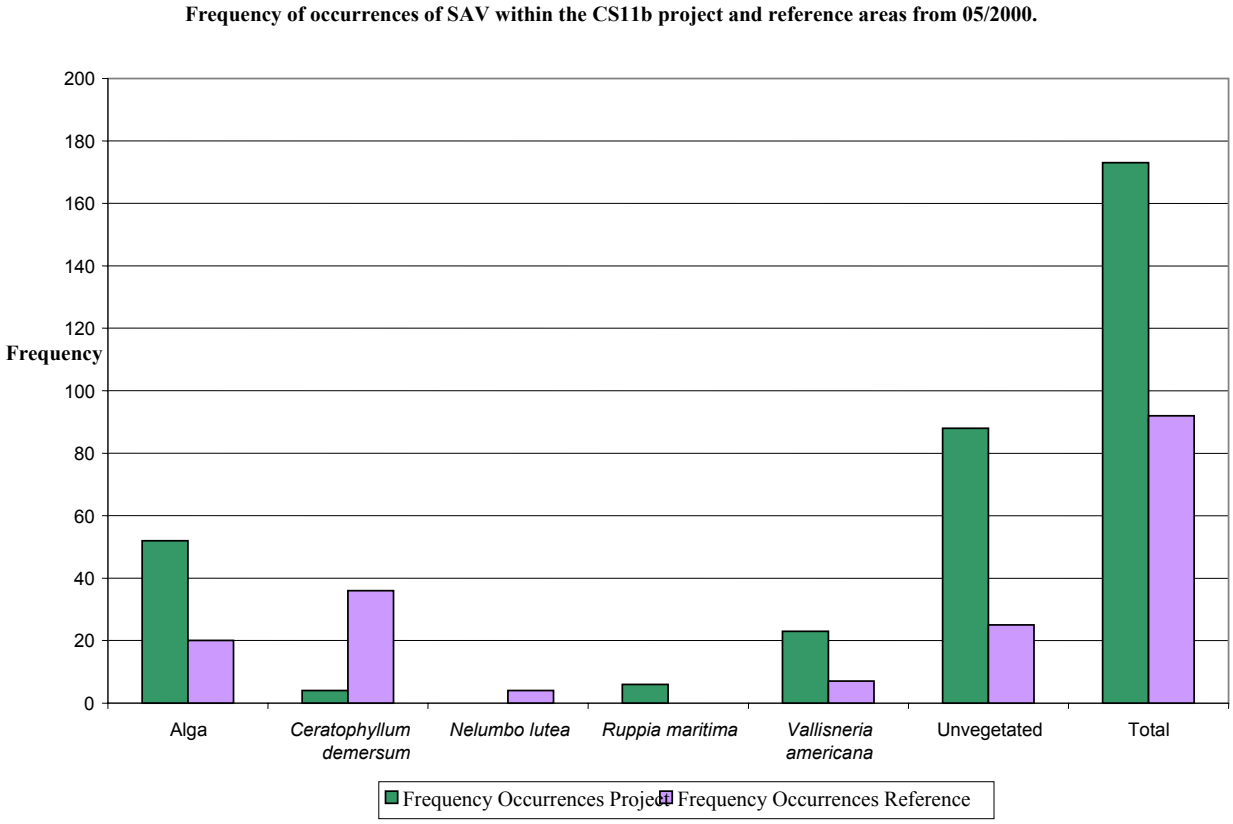

Figure 10. Frequency of occurrence of submerged aquatic vegetation in the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project and reference areas, sampled pre-construction in May 2000. Frequency = number of occurrences species present from the total number of samples taken. (project n = 173, reference n = 92)

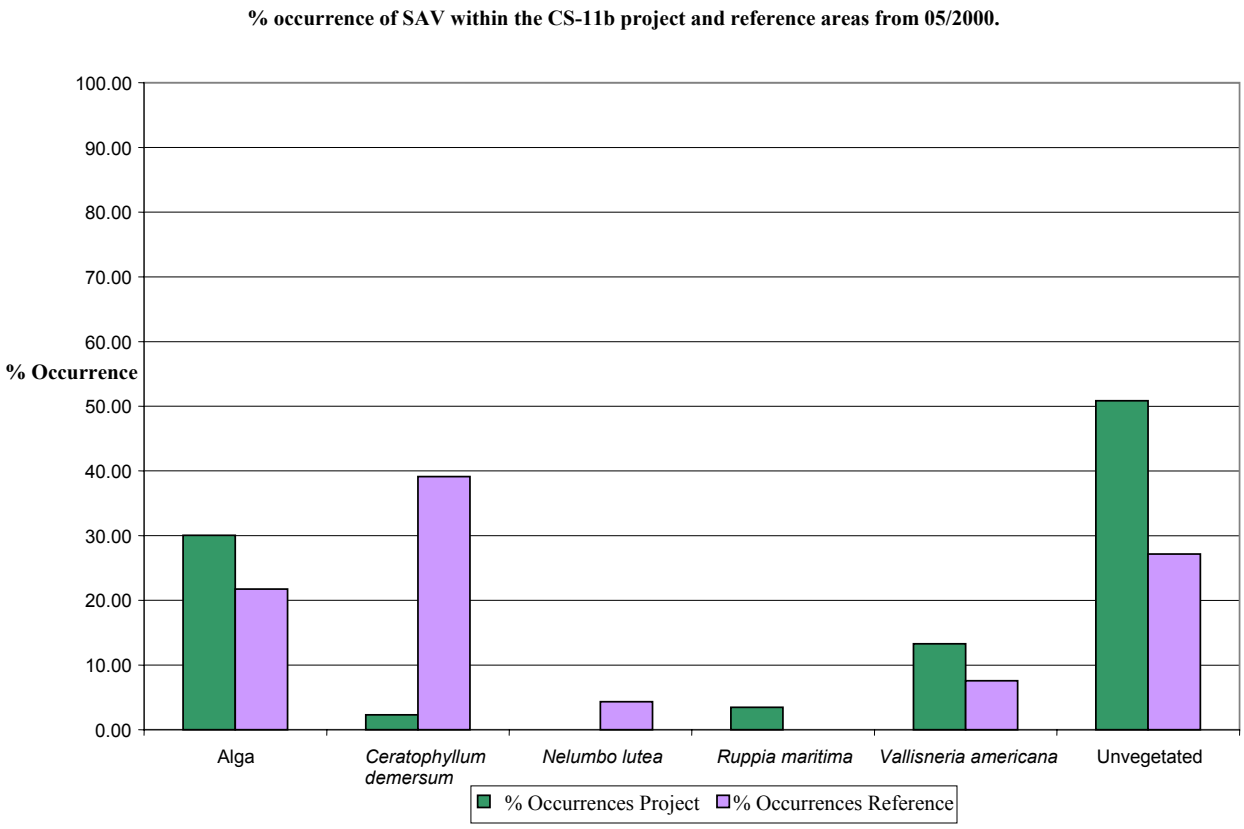

Figure 11. 2000 preconstruction data for percent occurrences of submerged aquatic vegetation within the Sweet Lake/Willow Lake Hydrologic Restoration (CS-11b) project and reference areas. Percentage = number of occurrences/number of samples taken x 100.

V. Conclusions

a. Project Effectiveness

The rock portion of the Sweet Lake/Willow Lake Hydrologic Restoration Project is in good condition and functioning as designed. The rock dike is very effective at restraining the volume of water and suspended sediments that once flowed into the GIWW. This will allow interior sediment deposition over time, thus allowing for the interior marshes to be revived. No additional shoreline data was collected in 2004. The next shoreline survey is scheduled for the summer of 2005.

The open water terraces north of Sweet Lake were ineffective at reducing wave energy. The lack of consolidated material and high water events during construction caused the terraces to deteriorate rapidly, leaving little or no subaerial mass to buffer waves. The vegetative plantings installed along the unconsolidated open water terraces did not grow well. The lack of suitable planting medium and rapid terrace deterioration did not allow enough time for the plantings to become established. Further data collection should help to determine if the plantings will ever overcome the poor initial establishment and be effective at binding terrace substrates. No additional planting data was collected in 2004.

The shoreline terraces in Sweet Lake and Willow Lake were moderately effective at reducing wave energy. High water during construction and the long fetch generated wave erosion, causing the crowns of the terraces to deteriorate until the water levels subsided. Initial data collected for *Z. mileaceae* plantings on the Sweet Lake terraces indicated high but somewhat variable percent survival with low cover values similar to data recorded at 1 month post-construction for the terraces north of Sweet Lake. The percent survival of plantings on the Willow Lake terraces was more consistent and greater than the other plantings. Further data collection will determine if these plantings will be more effective at one year than those on the terraces north of Sweet Lake.

b. Recommended Improvements

Establish staff gages in the project area.

c. Lessons Learned

Vegetative plantings should be installed as early as possible within the growing season to allow time for the plantings to become established. The terraces north of Sweet Lake experienced significant erosion due in large part to the water depth at the site location. Also contributing to the erosion was the terraces being spaced too far apart and the typical section of the terrace (crown, side slopes) not being large enough. These factors should be considered in the design of any future terraces.

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Appendix A
(Inspection Photographs)

Photo 1—Typical section of dike

Photo 2—Bank tie-in and leaning settlement plate

Photo 3—Low section adjacent to Sweet Lake

Photo 4—Area of dike displaced by barge

Photo 5—Terrace along Sweet Lake

Photo 6—Terrace along Willow Lake

Appendix B
(Three-Year Budget Projection)

SWEET LAKE / CS11b / PPL 5

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

Project Manager	O & M Manager	Federal Sponsor	Prepared By
		NRCS	

	2005/2006	2006/2007	2007/2008
Maintenance Inspection	$ 4,955.00	$ 5,119.00	$ 5,288.00
Structure Operation	$ -	$ -	$ -
Administration	$ 2,000.00	$ -	$ -
Maintenance/Rehabilitation			

05/06 Description:Staff Gage Installation

E&D	$ 20,000.00
Construction	$ -
Construction Oversight	$ -
Sub Total - Maint. And Rehab.	$ 20,000.00

06/07 Description

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

07/08 Description:

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

	2005/2006	2006/2007	2007/2008
Total O&M Budgets	**$ 26,955.00**	**$ 5,119.00**	**$ 5,288.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2005-06/30/2006

SWEET LAKE/CS-11b/PPL5

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$4,955.00	**$4,955.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

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

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
	Secondary Monument	EACH	0	$0.00	$0.00
	Staff Gauge / Recorders	EACH	1	$20,000.00	$20,000.00
	Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
	TBM Installation	EACH	0	$0.00	$0.00
	OTHER				$0.00
				TOTAL SURVEY COSTS:	**$20,000.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
	Borings	EACH	0	$0.00	$0.00
	OTHER				$0.00
				TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:						
	Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
		0	0.0	0	$0.00	$0.00
		0	0.0	0	$0.00	$0.00
		0	0.0	0	$0.00	$0.00
	Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
	Navagation Aid		EACH	0	$0.00	$0.00
	Signage		EACH	0	$0.00	$0.00
	General Excavation / Fill		CU YD	0	$0.00	$0.00
	Dredging		CU YD	0	$0.00	$0.00
	Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
	Timber Piles (each or lump sum)			0	$0.00	$0.00
	Timber Members (each or lump sum)			0	$0.00	$0.00
	Hardware		LUMP	1	$0.00	$0.00
	Materials		LUMP	1	$0.00	$0.00
	Mob / Demob		LUMP	1	$0.00	$0.00
	Contingency		LUMP	1	$0.00	$0.00
	General Structure Maintenance		LUMP	1	$0.00	$0.00
	OTHER				$0.00	$0.00
	OTHER				$0.00	$0.00
	OTHER				$0.00	$0.00
					TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$26,955.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2006-06/30/2007

SWEET LAKE/CS-11b/PPL5

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,119.00	**$5,119.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

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

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$0.00	$0.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,119.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2007-06/30/2008

SWEET LAKE/CS-11b/PPL5

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,288.00	**$5,288.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	1	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	1	$0.00	$0.00
SURVEY Admin.	LUMP	1	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

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

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$0.00	$0.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,288.00**

Appendix C
(Field Inspection Notes)

FIELD INSPECTION CHECK SHEET

Project No. / Name: Sweet Lake/Willow Lake HR CS-11B

Date of Inspection: 12/14/2004 Time: 9:00 AM

Structure No.

Inspector(s): Stan Aucoin, Pat Landry, Dewey Billodeau, Garrett Broussard Brad Sticker, Cindy Steyer

Structure Description: Rock Dike

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

Type of Inspection: Annual

Weather Conditions: Clear and Cool

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	NA				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage/Support	N/A				
Rip Rap(fill)	N/A				
Earthen Embankment	N/A				
Foreshore Dike	Good				300 Linear feet of dike on eastern edge of Willow is low,. Also, there is a 50 foot section of rock dike that has apparently been pushed back. Another 4 foot section is missing in another area.

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?