State of Louisiana

Coastal Protection and Restoration of Louisiana

Office of Coastal Protection and Restoration

2009 Operations, Maintenance, and Monitoring Report

for

Boston Canal/Vermilion Bay Shoreline Stabilization Project (TV-09)

State Project Number TV-09
Priority Project List 2

June, 2009
Vermilion Parish

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2009 Operations, Maintenance and Monitoring Report
For
Boston Canal/ Vermilion Shoreline Stabilization (TV-09)

Table of Contents

Preface

The 2009 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 new reporting format includes monitoring data collected through December 2008, and annual Maintenance Inspections through October 2008.

The 2009 report is the 3rd report in a series of reports. For additional information on lessons learned, recommendations and project effectiveness please refer to the 2004 and 2005 Operations, Maintenance, and Monitoring Report on the LDNR web site (LDNR 2004).

I. Introduction

The Boston Canal/Vermilion Shoreline Stabilization project is located in the Teche-Vermilion Basin, which is included in Region 3 of the Coast 2050 Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). Shoreline erosion is a major cause of land loss in this basin and shoreline maintenance provides important protection to interior marshes. The project area consists of approximately 466 ac (186 ha) of brackish marsh and open water. It is located in Vermilion Parish, approximately 12 mi (19.3 km) south of Delcambre, Louisiana (figure 1). The project boundaries extend from Mud Point on the western end to Oaks Canal on the eastern end. The northern boundary is brackish marsh and the southern boundary is Vermilion Bay. *Spartina patens* (marshhay cordgrass) and *Schoenoplectus americanus* (chairmaker's bulrush) together make up 64% of the marsh vegetation. *Spartina cynosuriodes* (big cordgrass) makes up 19% of the area and is typically found on elevated bayou banks. The interior open water areas contain submerged and floating aquatics which are confined to a narrow band along the pond edge due to the tidal influence.

The shoreline retreat from 1948 to 1972 for Vermilion Bay (Mud Point to Lake Cleodis) as estimated by the Louisiana Department of Transportation and Development was 2.6 ft/yr (0.8 m/yr). Shoreline change in Vermilion Bay in the vicinity of Four Mile Canal calculated by USGS in 2003 was 2.86 ft/yr (0.87 m/yr). The Barrier Island Comprehensive Program (BICM) near term shoreline change rates for 2004-2005 indicates accretion of 19.2 ft/yr (5.85 m/yr) along most of the shoreline of the Boston Canal/Vermilion shoreline in their Vermilion Beach reach (figure 2). The easternmost part of the shoreline east of Boston Canal in the Avery Island reach had an erosion rate of 10.3 ft/yr (3.11 m/yr).

The project was designed to stabilize the Boston Canal and Vermilion Bay shorelines to prevent further regression of the shorelines into the adjacent marsh. Vegetation was planted along approximately 13.25 mi (21.3 km) of the Vermilion Bay north shoreline bounded on the west by Mud Point and on the east by Oaks Canal. The transplants, 34,090 trade-gallon pots of *Spartina alterniflora* (saltmarsh cordgrass), were planted parallel to the shoreline on five-foot centers in two rows west of Boston Canal and in three rows east of Boston Canal. Planting was completed in September 1995. To document planting success, the planting area was divided into four land types, based on topography. Land type 1 is a straight mineral shoreline with a gradual slope. The shoreline of land type 2 is deeply scalloped, consisting of cutbanks and gently sloped inlets with high organic content. Land type 3 is a gently scalloped shoreline with a mineral soil. Land type 4 is gently scalloped with a mineral soil, but is recognized as a different land type due to its north-south orientation.

Rock dikes were constructed parallel to the banks of Boston Canal, extending into Vermilion Bay and then turning 90^{o} to re-establish the shoreline. The structures are designed to prevent the banks at the mouth of the Boston Canal from widening into the adjacent marshes. Sediment fences were installed behind each rock dike to trap sediments during times of overwash. This increased sedimentation will subsequently encourage revegetation of the area behind the dikes. Construction was completed on September 1, 1995.

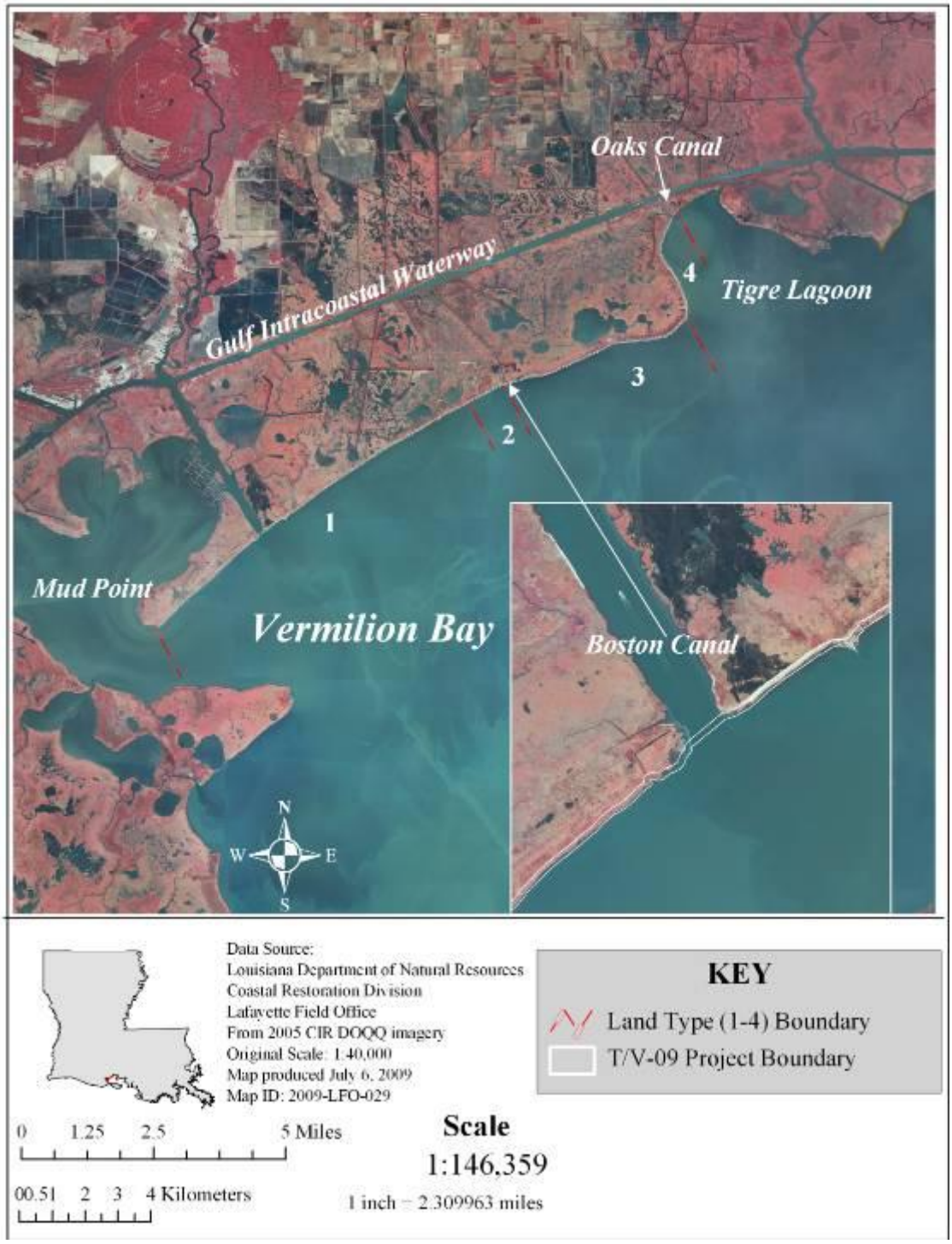

Figure 1. Boston Canal/Vermilion Bay Shoreline Stabilization (TV-09) project area, and land type boundaries.

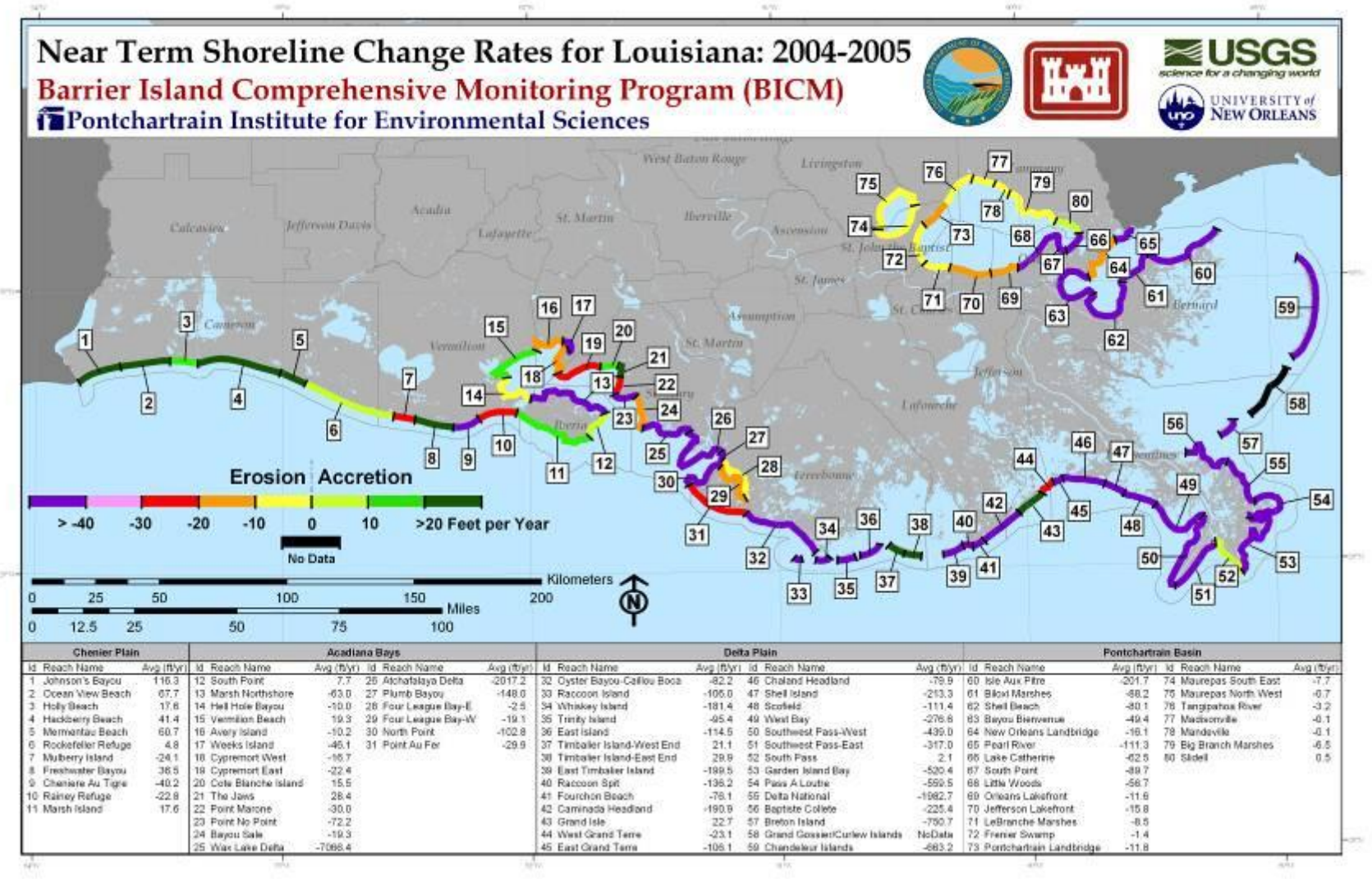

Figure 2. Barrier Island Comprehensive Monitoring Program (BICM) near term shoreline change rates. Boston Canal/ Vermilion Shoreline Stabilization project is located in the Acadiana Bays area in reach 15 Vermilion Beach and reach 16 Avery Island.

CPRA
Coastal Protection and Restoration Authority of Louisiana

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Boston Canal/Vermilion Bay Shore Restoration Project (TV-09) 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. The annual inspection report also contains a summary of maintenance projects, if any, which were completed since project feature construction 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 B.

In 2003, the CWPPRA Task Force determined, due to the fact that OCPR was responsible for the operation and maintenance phase of the vast majority of CWPPRA projects, that OCPR would be the responsible party for all Post Storm/Hurricane Assessments. After Hurricane Ike, every project appeared to have been impacted by the storms; therefore, OCPR determined that all projects should be assessed for damages (Broussard, 2006). With concurrence from the federal sponsor, OCPR has decided to use the information obtained during this post hurricane assessment in this Annual Maintenance Inspection.

An inspection of the Boston Canal/Vermilion Bay Shore Restoration Project (TV-09) was held on October 30, 2008 under partly cloudy skies and mild temperatures. In attendance were Stan Aucoin, Troy Barrilleaux and Darrell Pontiff of (OCPR). NRCS was represented by Loland Broussard and Donald Taffi. Parties met at the Lafayette Field Office of CED and proceeded to the TV-09 project area. The annual inspection began at approximately 11:35 am.

The field inspection included a complete visual inspection of all constructed features. Staff gauge readings were used, when available, to determine approximate elevations of water, and rock structures. Photographs were taken at each project feature (see Appendix A) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix C).

b. Inspection Results

Rock breakwaters

For the most part, the breakwaters are in excellent post construction condition and do not appear to have suffered any damages from Hurricane Ike. There is no apparent toe scour or rock displacement. The western end of the dike where it ties into the Vermilion Bay shoreline has not significantly worsened erosion in this area. A small gap left during original construction appears to have caused this problem. While the situation is similar on the SE tie-in, it is not as severe. No gap was left on this end during construction. Recommendations made to repair these gaps during the O & M inspection of June 2003 have been reconsidered

due to costs and logistics associated with such repairs. These areas have been and will continue to be closely monitored, and should the situation significantly worsen, steps will be taken to close/stabilize these areas. Signage and associated pilings are stable and functioning. (Photos: Appendix A, Photos 1 - 2)

Sediment Fencing

The sediment fencing inside the rock breakwaters has been removed.

Smooth Cordgrass plantings

The shoreline plantings were not directly inspected on this trip due to time and wave constraints. There were some pockets of eroded shoreline where the smooth cordgrass is missing near the mouth of Boston Canal as a result of the storm and it is expected that this condition was typical along the remainder of the bay shore. All vegetation in the area adjacent to the mouth of the Boston Canal, including the vegetation behind the rock dikes, is in good condition. (Photos: Appendix A, Photos 3-4)

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

None

ii. Programmatic/ Routine Repairs

Install a staff gage, replace vegetative plantings in eroded pockets along shoreline.

d. Maintenance History

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since October 1995, the construction completion date of the Boston Canal/Vermilion Bay Shore Protection Project.

Maintenance Project – Loland Broussard: This maintenance project included the modification of the sediment trapping fences constructed behind the rock dikes by Loland Broussard of NRCS in concurrence with LDNR and at no cost to CWPPRA on March 7, 2002. Modification of the fences involved cutting the geotextile panels from the top of the fence down to approx. 6" below the mud line (~ 30") and removing the panel. The 4x4 wooden posts were not disturbed and left intact. The reinforcement wire behind each panel was severely deteriorated and virtually non-existent. The southern-most fences were preventing sediment from filling the entire area behind the dikes. Since the fences have been removed, sediment has been more evenly distributed. Vegetation cover continues to expand over the accreted sediment behind the dikes.

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 Structural Operation Plan is required.

IV. Monitoring Activity

Pursuant to a 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 TV-09 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. Monitoring Goals

The objectives for the Boston Canal/Vermilion Bay Shoreline Stabilization project are:

1. Protect approximately 466 ac (186 ha) of wetlands between Mud Point and Oaks Canal from physical erosion from Vermilion Bay through shoreline stabilization.

2. Stabilize 13.25 mi (21.3 km) of the Vermilion Bay shoreline and prevent further regression of the Boston Canal banks.

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

1. Decrease the rate of shoreline erosion at the intersection of the Boston Canal and Vermilion Bay by armoring the corners of the canal with rock bulkheads.

2. Decrease the rate of shoreline erosion and maintain the integrity of approximately 466 ac (186 ha) of shoreline and interior marsh on the northern edge of Vermilion Bay by establishing *S. alterniflora* along the shoreline.

b. Monitoring Elements

Aerial Photography:
To document vegetated and non-vegetated areas, near vertical color-infrared aerial photography (1:24,000 scale with ground controls) were obtained in 1994 (pre-construction) and post construction in 1997. The original photographs were checked for flight accuracy, color correctness, and clarity and were subsequently archived. Aerial photographs were scanned, mosaicked, and georectified by USGS/NWRC personnel according to standard operating procedures (Steyer et al. 1995, revised 2000).

Vegetation:
The condition of the vegetation plantings was documented using an accepted methodology similar to Mendelssohn and Hester (1988), Coastal Vegetation Project, Timbalier Island. Species composition and % cover were monitored in 1 m^2 plots marked by the installation of a 4x4 wooden post. Percent survival of planted vegetation was determined in plots that originally contained 16 live stems. Three percent of plantings were randomly sampled among the four groups that represent the variable topography of the shoreline. These data were

IV. Monitoring Activity (continued)

collected at 6, 12 and 36 months post-construction, in 1995, 1996, and 1999 respectively. Herbivore damage was to be recorded if observed.

Shoreline Change:

To document shoreline movement continuous differential GPS was established at the mean high water line along the original shoreline adjacent to vegetative plantings in the project area. The reference shoreline site located east of Avery Canal was subsequently found to have been planted by the landowner prior to the project plantings. The vegetative plantings effectively made the reference shoreline similar to the project shoreline and therefore not a valid reference. Only project area shoreline data are presented here. The shoreline was mapped in post-construction years 1998, 2001, 2004, and 2008. The final survey is scheduled for 2013. In future reports, shoreline positions will be compared to historical datasets available in digitized format for 1956, 1978, and 1988 shorelines.

c. Preliminary Monitoring Results and Discussion

Aerial Photography:

Land/Water analysis of the project area indicated an increase of 57.4 acres (23.2 ha) from 1994 to 1997 (figures 3 and 4). Some of the land gain is in the interior part of the project area, unrelated to project features; however, there were gains in the areas behind the rock dikes and among the plantings on the bay shoreline indicating effective protection and sediment trapping (figure 4). There were no breaches in the shoreline indicating that the interior marsh has remained protected from potential bay wave erosion.

Vegetation:

Percent survival of *S. alterniflora* at the 36 month post-planting averaged 90.6 % among all land types (figure 5). The high average percent survival and percent cover of the *S. alterniflora* on the shoreline indicate that the plants have become established (figure 6). Percent survival of *S. alterniflora* at the 36 month post-planting in the high, medium and low *P. australis* coverage was 12.5 %, 62.5 %, and 89.1 %, respectively (figure 7). Percent cover of *S. alterniflora* at the 36 month post-planting in high, medium, and low *P. australis* coverage was 5.6 %, 56.9 %, and 75.9 %, respectively (figure 8). Survivorship and percent cover of *S. alterniflora* was lessened in established stands of *P. australis*. Data collection on vegetation is complete as per the 1999 vegetation survey because individual plants in the plots were indistinguishable. During the 2004 shoreline mapping the vegetation along some of the shoreline was photographed and appeared to be in good condition (figure 9 and 10).

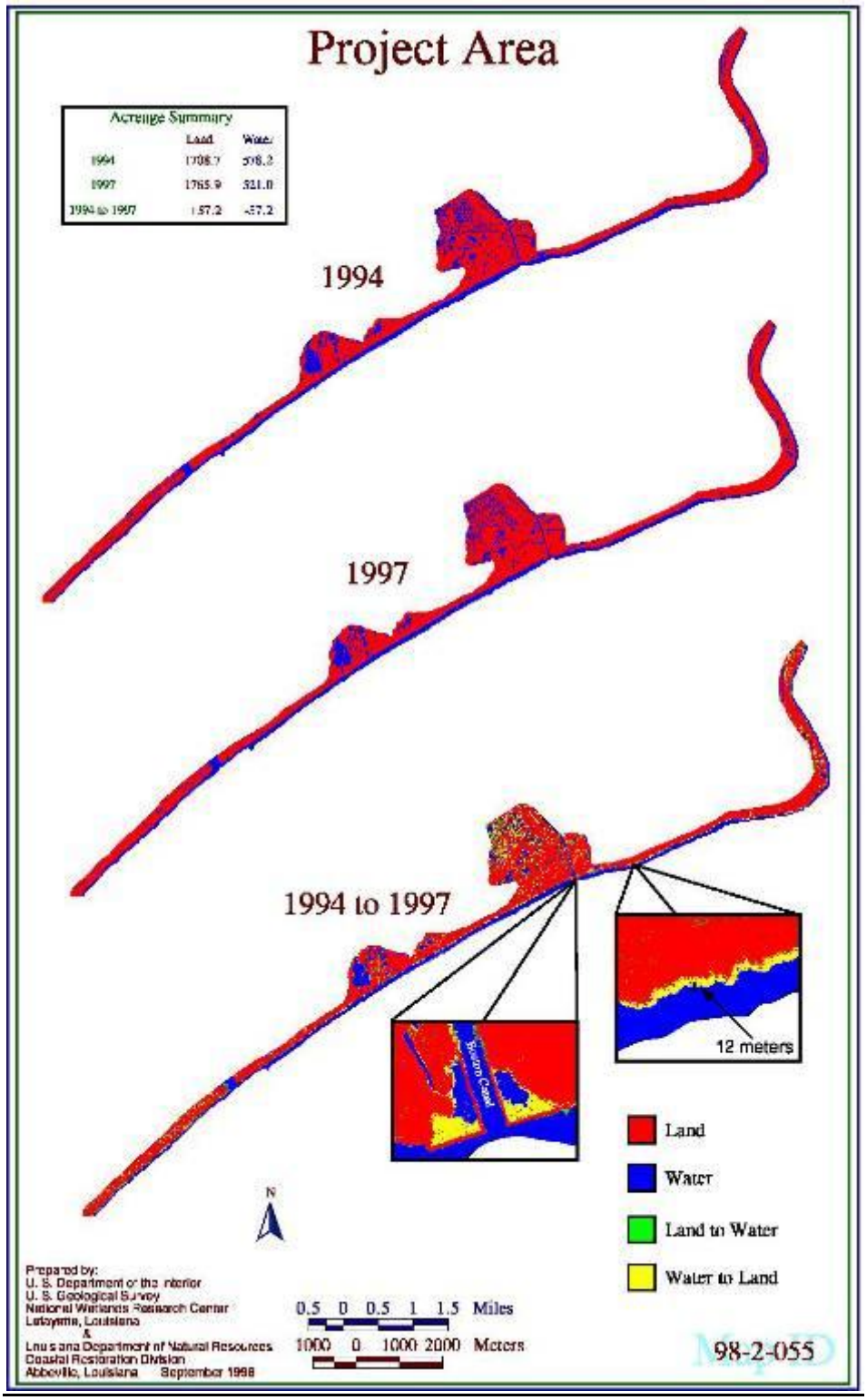

Figure 3. Boston Canal/Vermilion Bay Shoreline Stabilization (T/V-09) GIS Land/Water analysis of project area.

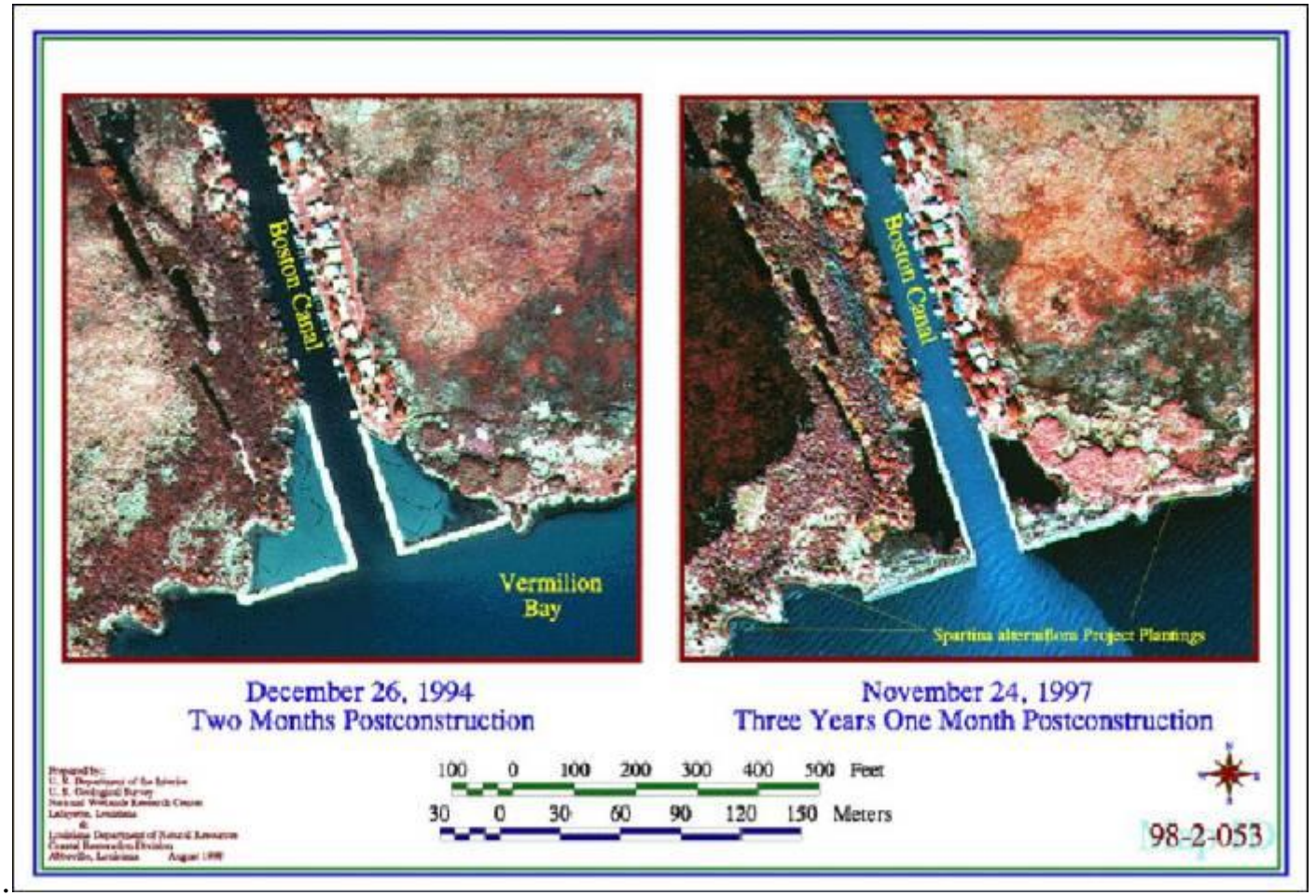

Figure 4. Aerial photography comparison of Boston Canal Shoreline Stabilization (TV-09) project at two month post construction (December 26, 1994) and three years one month post construction (November 24, 1997).

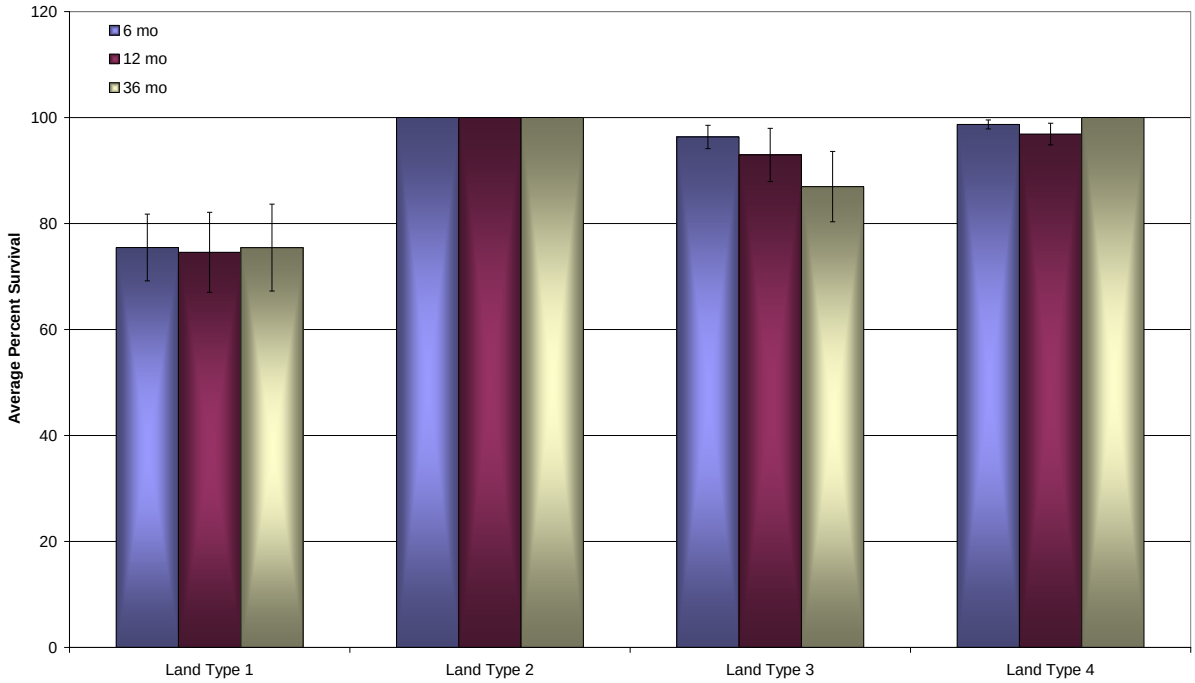

Figure 5. Average percent survival of *Spartina alterniflora* plantings in land types 1-4 observed at 6, 12, and 36 months post planting in 1995, 1996, and 1999 at TV-09 (means ± SE).

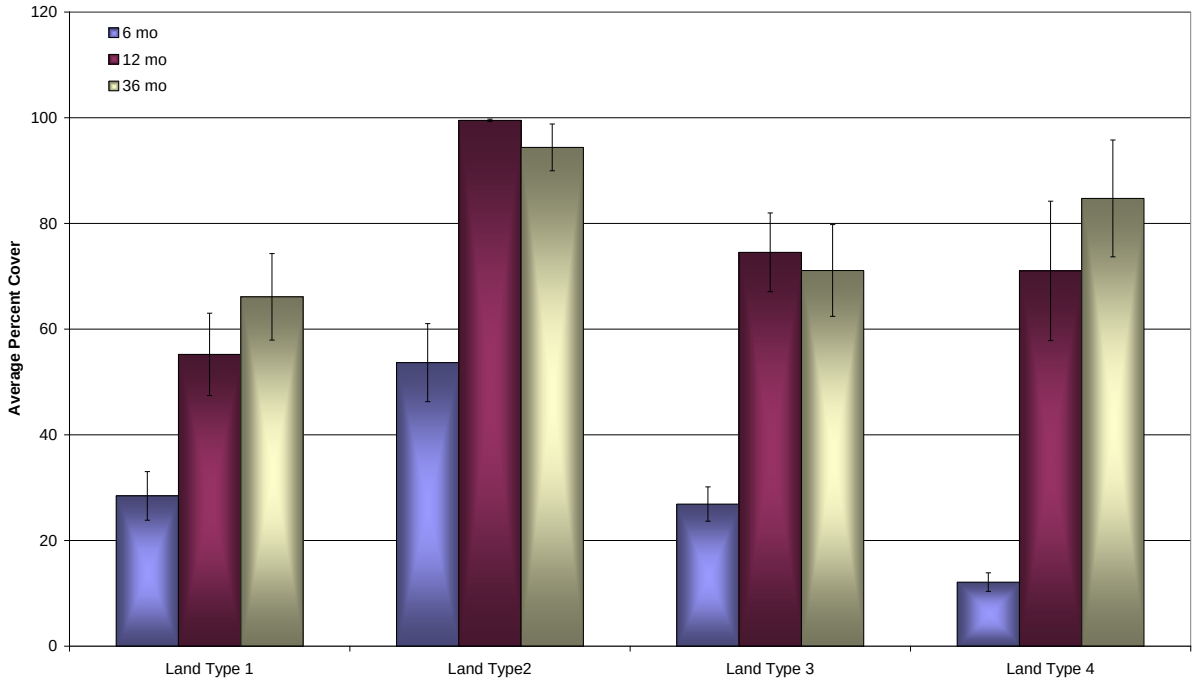

Figure 6. Average percent cover of *Spartina alterniflora* plantings in land types 1-4 observed at 6, 12, and 36 months post planting in 1995, 1996, and 1999 at TV-09 (means ± SE).

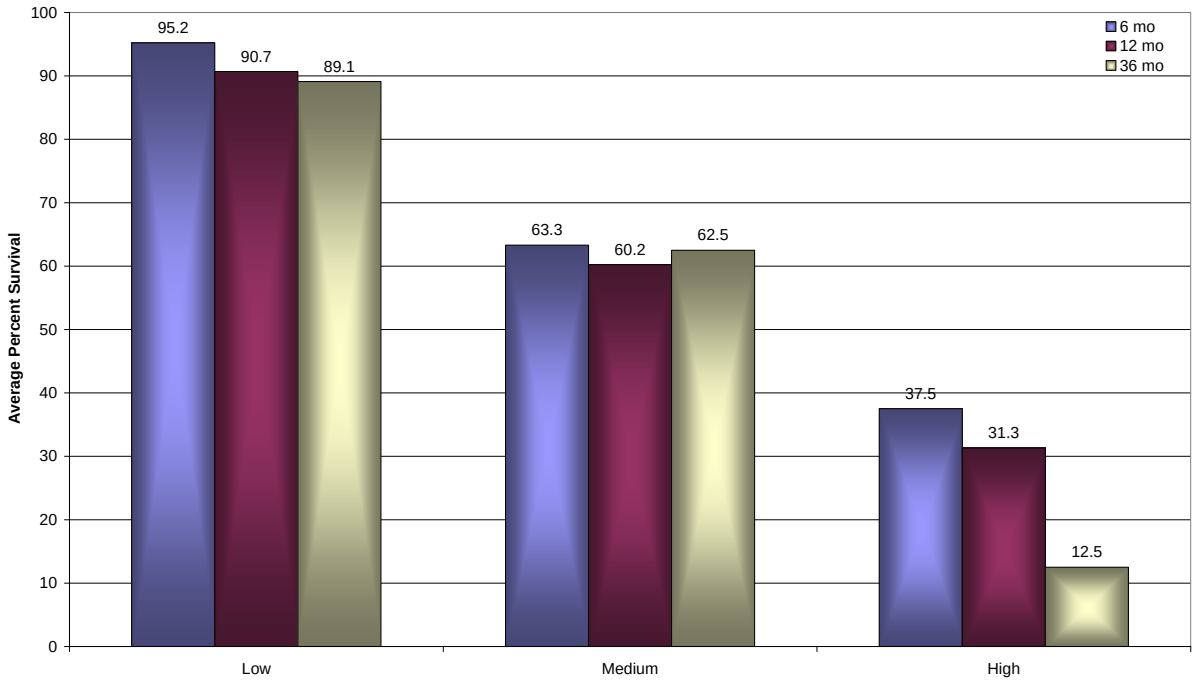

Figure 7. Average percent survival of *Spartina alterniflora* plantings in low, medium, and high levels of *Phragmites australis* coverage at 6, 12, and 36 months post planting in 1995, 1996, and 1999 at TV-09 (means ± SE).

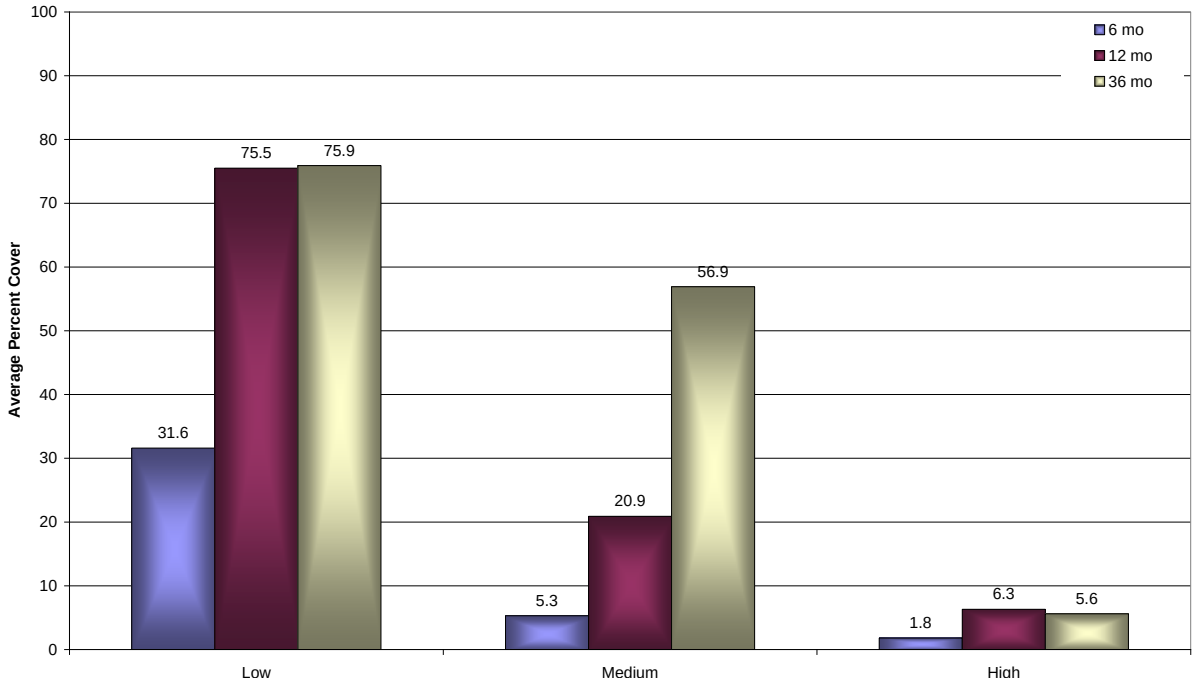

Figure 8. Average percent cover of *Spartina alterniflora* plantings in low, medium, and high levels of *Phragmites australis* coverage at 6, 12, and 36 months post planting in 1995, 1996, and 1999 at TV-09 (means ± SE).

Figure 9. *Spartina alterniflora* planting at the 6 (upper), 12 (center) and 36 (lower) month post-planting monitoring.

Figure 10. Boston Canal/Vermilion Bay Shoreline Stabilization Project GPS shoreline survey September 9, 2008. The wooden post in the upper photo shows erosion since initial planting and the lower photo is an area where the vegetation has extended towards the bay.

Shoreline Change:

The shoreline was mapped in 1998, 2004, and 2008 (figure 10). A comparison of DGPS mapping of the 13.25 mile project shoreline from 1998 to 2004 indicates a stable shoreline with an average loss of 0.46 m/yr (1.51 ft/yr) (figure 11). The highest losses from 1998 to 2004 occurred in an area west of Four Mile Canal and approximately 0.5 km (0.3 mi) east of Boston Canal, where average loss was between 3.27 m/yr (10.7 ft/yr) and 7.27 m/yr (23.6 ft/yr). The 1998 to 2008 time period indicated total average losses of 0.67 m/yr (2.2 ft/yr) and again loss east of Boston Canal (figure 9) was prominent (figure 12). Hurricane Lili impacted the area in 2002. Between the years of 2004 and 2008, average total shoreline losses were 1.04 m/yr (3.41 ft/yr). During the 2004-2008 mapping period, Hurricane Rita's storm surge in 2005 may have contributed to more rapid retreat of the shoreline (figure 13). Mapping in 2008 was preformed prior to Hurricanes Gustav and Ike on September 9, 2008. Largest loss amounts from 2004 to 2008 were, east of the shoreline protection rock at the mouth of Boston Canal. Gains were mainly seen in the area between Four Mile Canal and Boston Canal during that 2004 to 2008 interval. Although not mapped in this effort, the shoreline areas behind the rock dikes were completely protected and have continued to accumulate sediment (figures 14 thru 17).

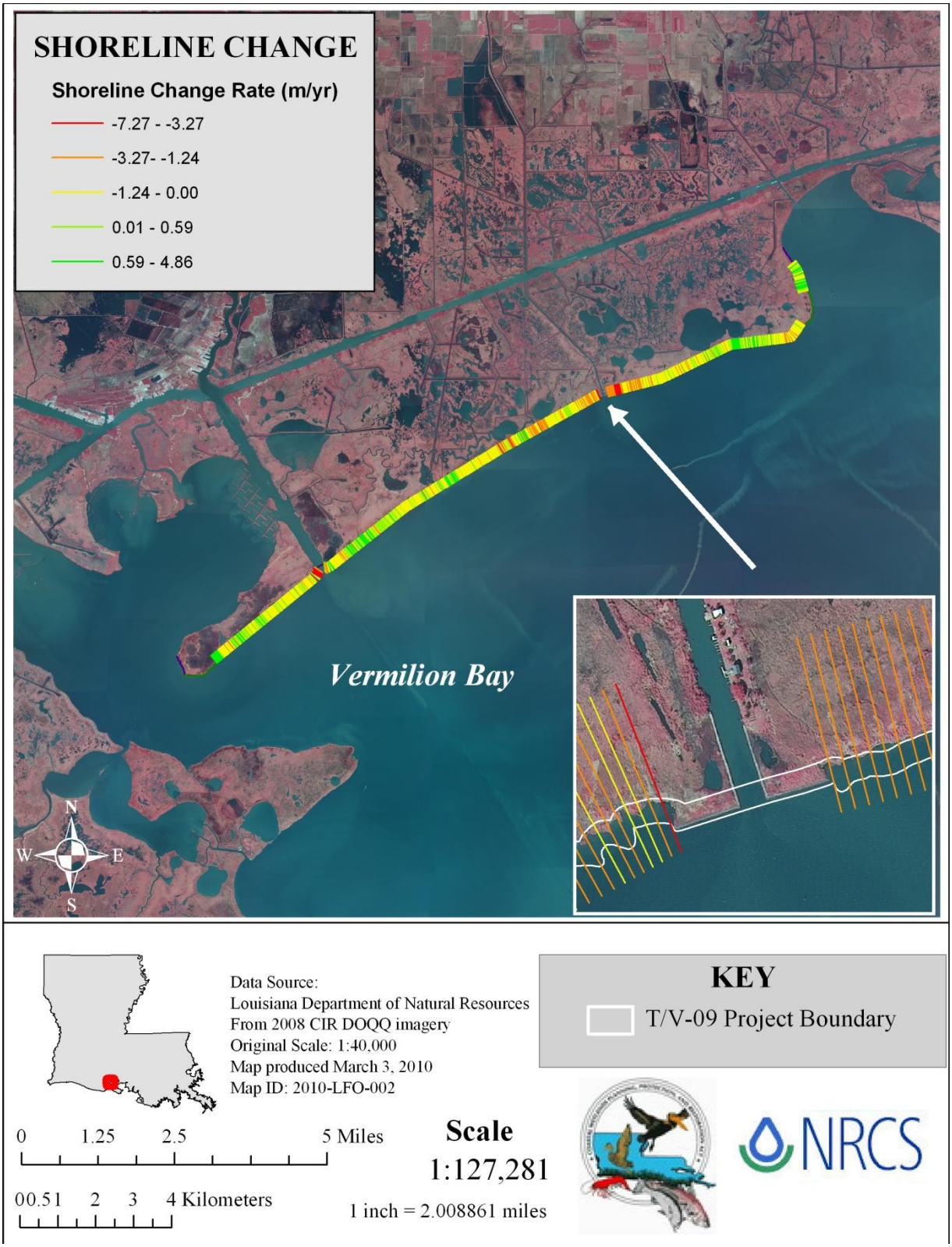

Figure 11. Shoreline position change for Boston Canal Shoreline Stabilization (TV-09) project using 1998 and 2004 differential global positioning system mapping data.

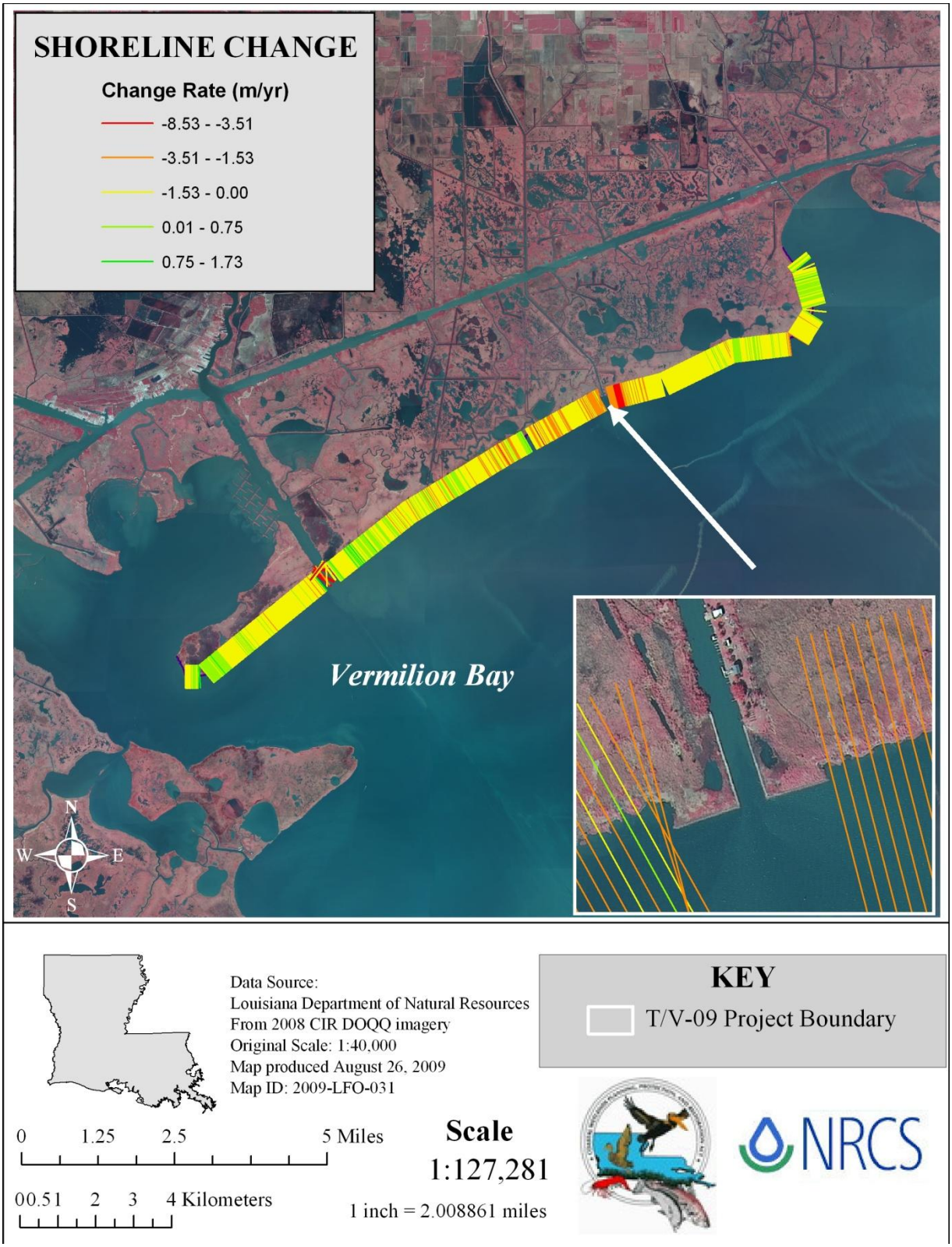

Figure 12. Shoreline position change for Boston Canal Shoreline Stabilization (TV-09) project using 1998 and 2008 differential global positioning system mapping data.

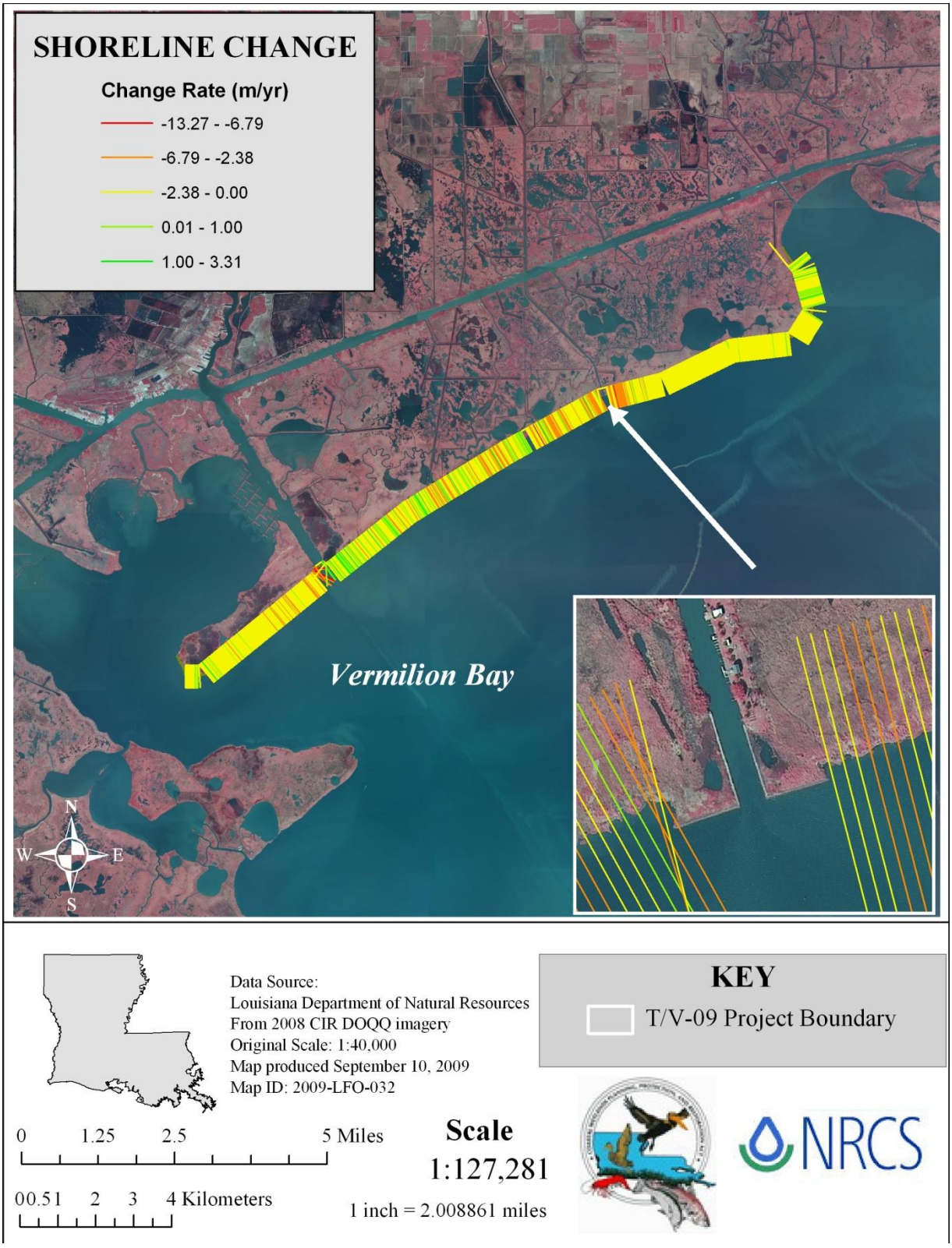

Figure 13. Shoreline position change for Boston Canal Shoreline Stabilization (TV-09) project using 2004 and 2008 differential global positioning system mapping data.

Figure 14. Boston Canal/Vermilion Bay Shoreline Stabilization (TV-09) rock dike and sediment fences at the mouth of Boston Canal (January 2001).

Figure 15. Boston Canal/Vermilion Bay Shoreline Stabilization (T/V-09) photographs: (A) sedimentation behind the dike December 1994: (B) vegetation growing behind the dike in February 1998.

Figure 16. Boston Canal/Vermilion Bay Shoreline Stabilization (T/V-09) photographs: (Upper) vegetation behind the dike July 1999: (Lower) vegetation behind the dike in October 2001.

Figure 17. Boston Canal/Vermilion Bay Shoreline Stabilization Project behind the eastern rock dike November 9, 2004.

V. Conclusions

a. Project Effectiveness

The project is experiencing erosion along the Vermilion Bay shoreline despite the success of the plantings. Shoreline mapping results from 1998 to 2008 show a loss of only 0.67 m\yr (2.2 ft/yr). The most recent mapping recorded an average loss of 1.04 m/yr (3.4 ft/yr) from 2004 to 2008. Of that 0.52m\yr (1.7 ft/yr) is gain and 1.33 m/yr (4.4 ft/yr) is loss. Hurricane Lili struck the Louisiana coast east of Vermilion Bay near Cote Blanche in October of 2002 and Hurricanes Rita in 2005 and Ike in 2008 which produced a storm surge that caused extensive damage to the coast. Considering that the monitoring results from the first monitoring interval showed accretion occurred along some sections of shoreline and a net gain in acreage was achieved, it is highly probable that the wave energy from the storms produced the erosion and resulting net loss in the following interval. Other moderate losses have occurred from *Eichhornia crassipes* (water hyacinth) mats and other wrack material thrown onshore from bay waters via wave action that smothered establishment of vegetation. The now established *S. alterniflora* community has persisted for the most part, but along some sections of the shoreline where loss or gain occurred, the community moves along with the shoreline edge to maintain occupation of its niche in the intertidal zone. This explains why there is still a 'hedge' of stems existing behind - or in front of some monitoring posts. Although the plantings of *S. alterniflora* have become well established and are indistinguishable from each other along most of the shoreline, the plantings cannot protect shorelines from hurricane force wave energy.

Sediment build-up behind the dike on the east and west sides is continuing and vegetation has taken over the exposed mud flats (figures 14-17).

b. Recommended Improvements

Installation of a staff gage at the mouth of Boston Canal is recommended.

Any significant gaps in the vegetative plantings along the shoreline should be monitored. OCPR will coordinate with NRCS for consensus on any proposed replanting.

c. Lessons Learned

Survivorship and percent cover of *S. alterniflora* was lessened in established stands of *P. australis*. Planting *S. alterniflora* in dense stands of *P. australis* should be avoided. Sediment fences inhibited even distribution of sediment behind the rock breakwaters. In March 2002, wire on the sediment fences was removed by NRCS personnel to allow the sediment to be more evenly distributed into the open water areas behind the fences closest to the shore (see figure 15). The use of sediment fences may not be necessary behind rock breakwaters.

Even though plantings have generally survived well and functioned to reduce the rate of shoreline erosion, storms or occasional debris wash can cause loss to sections of plantings during the project life. To prolong the continuity of the vegetative buffer and maintain its effectiveness throughout, project planners should include a specific item with funds in the O&M Plan to provide for replacement of a small percentage of the project planting once or twice during the project life. In this project's case, NRCS recommends that an O&M planting be conducted to re-establish the vegetative shoreline buffer in stretches selected by the project team. This could be included in the O&M funding request for next year.

In April 2010, a rapid assessment of the shoreline planting found that the smooth cordgrass buffer is absent for an approximate total of 16,500 linear feet of shoreline, most of which occurs west of Boston Canal. Approximately 7,000 to 10,000 trade gallon transplants of smooth cordgrass would be required to replant all bare reaches. The cost of this is estimated to range from $56,000 to $80,000.

REFERENCES

Louisiana Department of Natural Resources – Coastal Restoration and Management Division, Coastal Engineering Division, and Coastal Restoration Division. 2004. *2004 Operations, Maintenance and Monitoring Report for Boston Canal Shoreline Protection Project (TV-09).* Louisiana Department of Natural Resources, Coastal Restoration Division.

Mendelssohn, I. A., and M. W. Hester 1988. Coastal Vegetation Project: Timbalier Island. Final Report submitted to Texaco, USA, New Orleans Division, New Orleans, LA. Agreement No. RC-84-01.244pp.

Steyer, G. D., R. C. Raynie, D. L. Steller, D. Fuller, and E. Swenson 1995, 2000. Quality management plan for coastal Wetlands Planning, Protection, and Restoration Act Monitoring Program. Open-file report no. 95-01. Baton Rouge, La.: Louisiana Department of Natural Resources Division. 97pp. Plus appendices.

Appendix A
(Inspection Photographs)

Photo No. 1, View of Boston Canal at the bay shore looking north

Photo No. 2, Close up view of the rock dike

Photo No. 3, Close up view of vegetation behind the rock dike

Photo No. 4, Typical view of vegetative plantings along the bay shore

Appendix B
(Three Year Budget Projection)
BOSTON CANAL/ TV-09 / PPL 2
Three-Year Operations & Maintenance Budgets 07/01/2009 - 06/30/2012

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Pat Landry	*Mel Guidry*	*NRCS*	*Mel Guidry*

	2009/2010	2010/2011	2011/2012
Maintenance Inspection	$ 5,737.00	$ 5,909.00	$ 6,086.00
Structure Operation			
Administration		$ -	$ -
Maintenance/Rehabilitation			

09/10 Description: Install staff gage

E&D	
Construction	$7,500.00
Construction Oversight	
Sub Total - Maint. And Rehab.	$ 7,500.00

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.	$ -

	2009/2010	2010/2011	2011/2012
Total O&M Budgets	**$ 13,237.00**	**$ 5,909.00**	**$ 6,086.00**

O &M Budget (3 yr Total)	**$ 25,232.00**
Unexpended O & M Budget	**$ 148,324.00**
Remaining O & M Budget (Projected)	**$ 123,092.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET 07/01/2009-06/30/2010

BOSTON CANAL/VERMILION BAY SP/ PROJECT NO. TV-09 / PPL NO. 2

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,737.00	**$5,737.00**
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

OCPR / CRD Admin.	LUMP	1	$0.00	$0.00
FEDERAL SPONSOR Admin.	LUMP	1	$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:	Set staff gage				
	Secondary Monument	EACH	0	$0.00	$0.00
	Staff Gauge / Recorders	EACH	1	$7,500.00	$7,500.00
	Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
	TBM Installation	EACH	0	$0.00	$0.00
	OTHER				$0.00
				TOTAL SURVEY COSTS:	**$7,500.00**

GEOTECHNICAL

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

CONSTRUCTION

CONSTRUCTION DESCRIPTION:	Hurricane RITA repairs, bank paving at ends of closures.					
	Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	Rock Dike	0	0.0	0	$65.00	$0.00
	Bank Paving	0	0.0	0	$60.00	$0.00
		0	0.0	0	$0.00	$0.00
	Filter Cloth / Geogrid Fabric		SQ YD	0	$8.00	$0.00
	Navigation 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	0	$150,000.00	$0.00
	Contingency		LUMP	0	$49,083.71	$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: **$13,237.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2010-06/30/2011

BOSTON CANAL/TV-09/PPL2

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,909.00	**$5,909.00**
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: **$5,909.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2011-06/30/2012

BOSTON CANAL/TV-09/PPL2

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$6,086.00	**$6,086.00**
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: **$6,086.00**

CPRA
Coastal Protection and Restoration Authority of Louisiana

Appendix C
(Field Inspection Notes)

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: Boston Canal/Vermilion Bay Bank Protectio

Structure No.

Structure Description: Rock Dike

Type of Inspection: Annual

Date of Inspection: October 30, 2008 Time: 11:35 a.m.

Inspector(s):Stan Aucoin, Darrell Pontiff , Troy Barrilleaux (OCPR)
Loland Broussard, Donald Taffi (NRCS)

Water Level Inside:_____ Outside: _____

Weather Conditions: partly cloudy and mild temperatures

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
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 /Supports	Good				
Rock Dike	Excellent			1,2	Southeast and southwest tie-ins not significantly worse. Will be monitored.
Vegetative Plantings	N/A			3,4	Not directly inspected on this trip.

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?