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

2007 Operations, Maintenance, and Monitoring Report

for

Vermilion River Cutoff Bank Protection

State Project Number TV-03
Priority Project List 1

August 2007
Vermilion Parish

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2007 Operations, Maintenance, and Monitoring Report
for
Vermilion River Cutoff Bank Protection (TV-03)

Table of Contents

I. Introduction

The Vermilion River Cutoff Bank Protection project area consists of approximately 194.2 acres (78.6 ha) of brackish marsh and open water, located in Vermilion Parish, Louisiana. The Vermilion River Cutoff, near Intracoastal City, La., was constructed in 1947 to connect the Vermilion River and the Gulf Intracoastal Waterway (GIWW) with Vermilion Bay for navigational purposes. A large section of the west bank of the Vermilion River Cutoff has eroded as a result of both bay-side wave action and boat wakes within the cutoff. Erosion of the west bank of the Vermilion River Cutoff, estimated at 23.3 ft/yr (7.1 m/yr) from comparisons of 1955–1985 aerial photography, has occurred to the extent that the land bridge between the cutoff and Vermilion Bay, to the west, is breached in several places. The erosion rate from 1948 to 1972 for Vermilion Bay near Onion Bayou as estimated by the Louisiana Department of Transportation and Development was 1.6 ft/yr (0.5 m/yr). 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). Erosion on the east bank threatens to breach the land bridge between the cutoff and Onion Lake.

The project was originally designed to stabilize the west side of the cutoff by armoring the three remaining land points adjacent to Vermilion Bay with limestone rip-rap. It was also designed to protect the east side of the cutoff from further erosion through the use of 8,900 ft (2,713 m) freestanding rock breakwater. The original plan was redesigned due to cost overruns. The continuous dike along the west bank and sediment trapping features were eliminated. The constructed project consists of 6,269 ft (1,911 m) of foreshore rock dike along the east bank of Vermilion River Cutoff. The original boundary for the project area in 1993 (USACOE 1993) did not include the entire area where the shoreline structure was constructed. The revised boundary for the project area was adjusted to encompass the rock dike to better evaluate the project area over time. Construction of the breakwater was complete in February 1996 (figure 1).

Hurricane Rita struck the coast of southwestern Louisiana on September 24, 2005, with maximum storm surge of 10 ft (3.1 m) in the TV-03 project area. The U.S. Geological Society (USGS) calculated the amount of land that changed to water resulting from the storm to be 98 square miles in southwestern Louisiana, with 5 square miles in the Teche/Vermilion basin (Barras 2006). This loss can be attributed to shearing, which is ripping and removal of marsh vegetation in historically healthy marshes. Shearing was observed bordering the east bank of Freshwater Bayou. The removal of remnant marsh from areas with historical land loss was observed in the marsh west of Pecan Island.

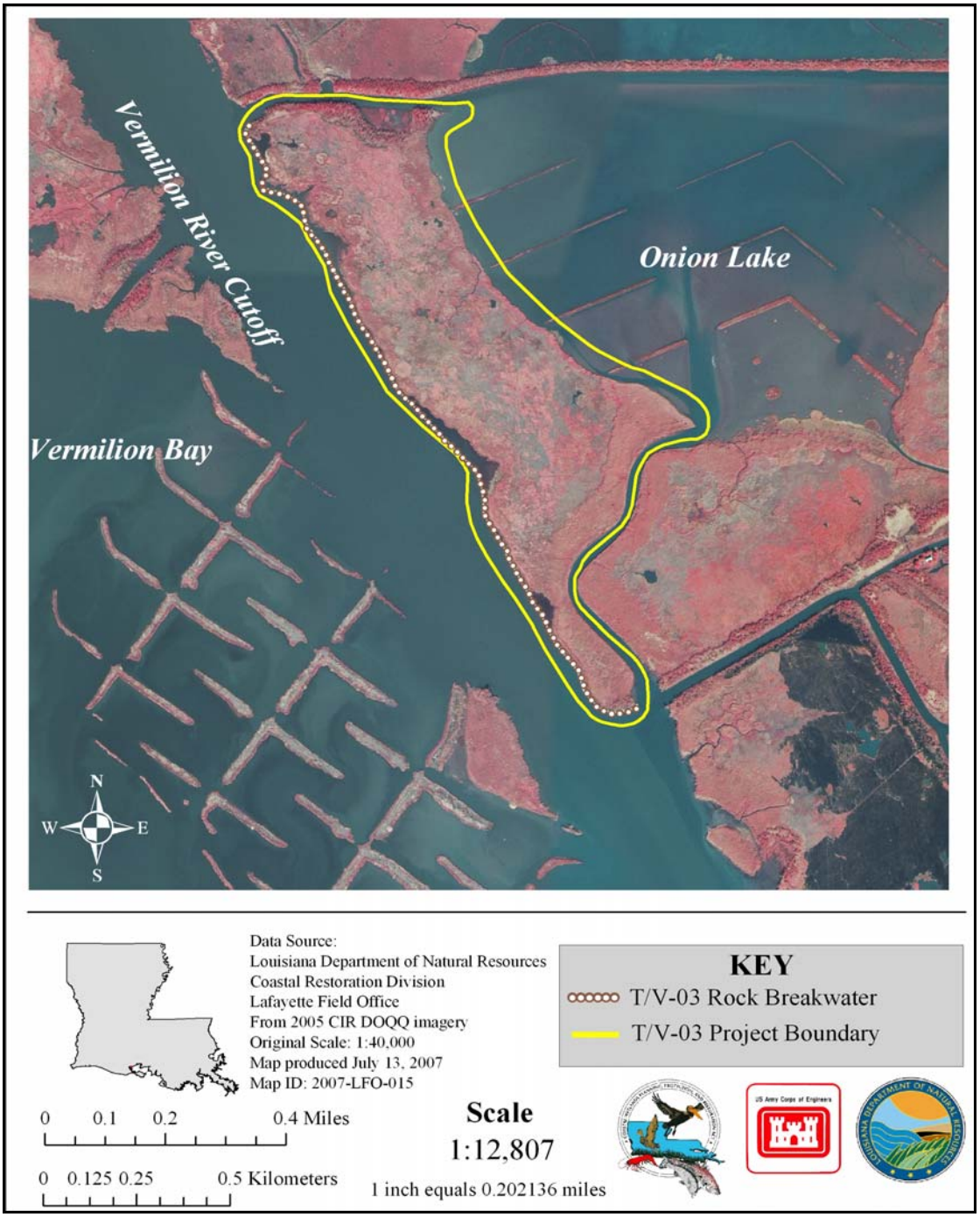

Figure 1. Vermilion River Cutoff Bank Protection (TV-03) project area map showing location of rock breakwater.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Vermilion River Cutoff Bank Protection (TV-03) project is to evaluate the constructed project features to identify any deficiencies and to prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, the Louisiana Department of Natural Resources (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 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. This project was previously inspected on March 29, 2004, and October 4, 2005.

An inspection of the Vermilion River Cutoff Bank Protection (TV-03) project was held on March 6, 2007, under sunny skies and cool temperatures. In attendance were Stan Aucoin and Herb Juneau from LDNR, and John Foret of National Oceanic and Atmospheric Administration (NOAA) Fisheries (for other inspections). Representatives from the U.S. Army Corps of Enginners (USACE) were invited but were unable to attend. All parties met at the Lafayette Field Office of the LDNR Coastal Engineering Division (CED) and traveled to Intracoastal City in Vermilion Parish, La. The annual inspection began at approximately 9:20 a.m. at the northern end of the rock dike on the Vermilion River Cutoff.

The field inspection included a complete visual inspection of the entire project site. Staff gauge readings were used, when available, to determine approximate elevations of water and rock weirs. Photographs were taken at each project feature (see Appendix B) and field inspection notes were completed in the field to record measurements and deficiencies (see Appendix D).

b. Inspection Results

Site 1—Foreshore rock dike:

The foreshore dike is in excellent condition with no maintenance required or foreseen. (Photos: Appendix B, Photos 1 and 2).

c. Maintenance Recommendations

None at this time.

d. Maintenance History

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since March 1996, the construction completion date of the Vermilion River Cutoff Bank Protection project.

September 2005 - Luhr Brothers, Inc. Provided labor and materials to restore the rock dike to original constructed elevations. Approximately 5,573 tons of rock were placed over the sections of dike that were below permitted elevation of +3.5 NAVD88. The project was completed in September 2005.

TOTAL CONSTRUCTION COST: $130,655.45

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.

III. 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 TV-03 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. No CRMS-*Wetlands* sites are located within the TV-03 project area.

In response to Hurricane Rita in 2005, 163 LDNR emergent vegetation stations were sampled in the late summer/early fall of 2005 and 2006. The stations represented a subset of the LDNR vegetation stations established on the Chenier Plain to monitor CWPPRA projects including sites in the CS-21 project area (Appendix A).

a. Monitoring Goals

The objectives of the Vermilion River Cutoff Bank Protection project are:

1. Maintain and protect approximately 67 ac (27 ha) of brackish marsh along the eastern side of the Vermilion River Cutoff that will contribute to protecting the integrity of several thousand acres of the Onion Lake wetland complex.

2. Prevent the Vermilion River Cutoff from widening into adjacent marshes.

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

1. Decrease the rate of shoreline erosion along the east bank of the Vermilion River Cutoff adjacent to Onion Lake through the use of a rock breakwater.

b. Monitoring Elements

Aerial Photography:

To document vegetated and non-vegetated areas, near vertical color-infrared aerial photography (1:12,000 scale with ground controls) was obtained in 1993 (pre-construction) and post-construction in 2002. 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/National Wetlands Research Center (NWRC) personnel according to standard operating procedures (Steyer et al. 1995, revised 2000). No additional photography is scheduled.

IV. Monitoring Activity (continued)

Shoreline Change:
Shoreline movement was documented using Differential Global Positioning System (DGPS) in 1995, 1999, 2002, and 2006 to provide a template for mapping shoreline changes and movement over time. Additional DGPS monitoring is scheduled for 2011 and 2015. Shoreline positions for 1999 were compared to historical data sets available in digitized format for 1993.

Shoreline markers were established at the vegetated marsh edge along the original shoreline adjacent to the breakwater post-construction in 1998, and direct measurements were taken from the settlement plate to the vegetated marsh edge. Measurements were also collected in 2000, 2002, and 2006 post-construction.

c. Preliminary Monitoring Results and Discussion

Aerial Photography:
The original boundary for the project area in 1993 did not include the entire area where the shoreline structure was constructed. The revised boundary for the project area was adjusted to encompass the rock dike to better evaluate the project area over time. Comparison of the 1993 land to water analysis to the analysis for 2002 shows an increase in land by 1 ac (figures 2 and 3). This is likely attributed to inclusion of the dike footprint and partial terraces in the "land" delineation. The significant finding is no net loss in the project boundary.

Shoreline Change:
Land to water analysis for 2002 indicates 45 acres of open water and 149 acres of land in the project area (figure 3). Aerial photography taken in 1993 was used as a baseline for shoreline position instead of the actual DGPS shoreline positions captured in 1995. This was three years prior to construction of the Vermilion River Cutoff Bank Protection (TV-03) project in February 1996, which increases the probability of error in interpreting actual land to water acreages. The data used for the shoreline analysis was from DGPS acquired by USGS and LDNR personnel. Analysis of baseline DGPS taken in 1997 was compared to DGPS taken in 1999, 2002, and 2006. The results of a shoreline analysis from 1997 and 2006 shorelines are mapped in figure 4. Change rates were calculated in m/yr for the length of the project area along transects spaced 20 m apart. Resulting change rates were determined and averaged from each transect along the shoreline. The rate of change for the project area behind the rock for the period of record November 1997 to July 2006 is an average loss of -0.24 m/yr. The results of the analysis from 2002 to 2006 DGPS are mapped in figure 5. The rate of change for the project area is an average gain of 0.27 m/yr.

Direct shoreline measurements taken from each settlement plate (figure 6) to the vegetated edge of the marsh behind the rock breakwater in the project area indicate progradation at four of the five sites. Only one site, at settlement plate 1006, experienced a loss of approximately 0.1 m/yr (table 1). Settlement plates 1003 and 1004 showed a gain of 0.9 m/yr and settlement plates 1005 and 1007 had a gain of 0.5 and 0.1 m/yr, respectively. The data from these measurements indicate the shoreline behind the rock breakwater on the three northernmost and the southernmost settlement plates are prograding. The loss of shoreline behind settlement plate 1006 may be attributed to the sinking elevation of the rock breakwater at or below 2 ft NAVD 88.

In 1999, 2002, and 2006, ancillary DGPS data were collected along the west bank of the Vermilion River Cutoff Bank Protection project and surrounding the island (figure 7). The DGPS line data were converted to a closed polygon feature and acreages were calculated. Acreage in 1999 was 13.42 and in 2002 the area was 12.47 ac, indicating a loss of 0.95 ac. Area in 2006 was 10.8 ac, indicating a loss of 1.68 ac from year 2002 and a total loss of 2.63 ac since 1999. The rate of change for all data collected from 1999 to 2006 indicated a loss of 0.37 ac/yr.

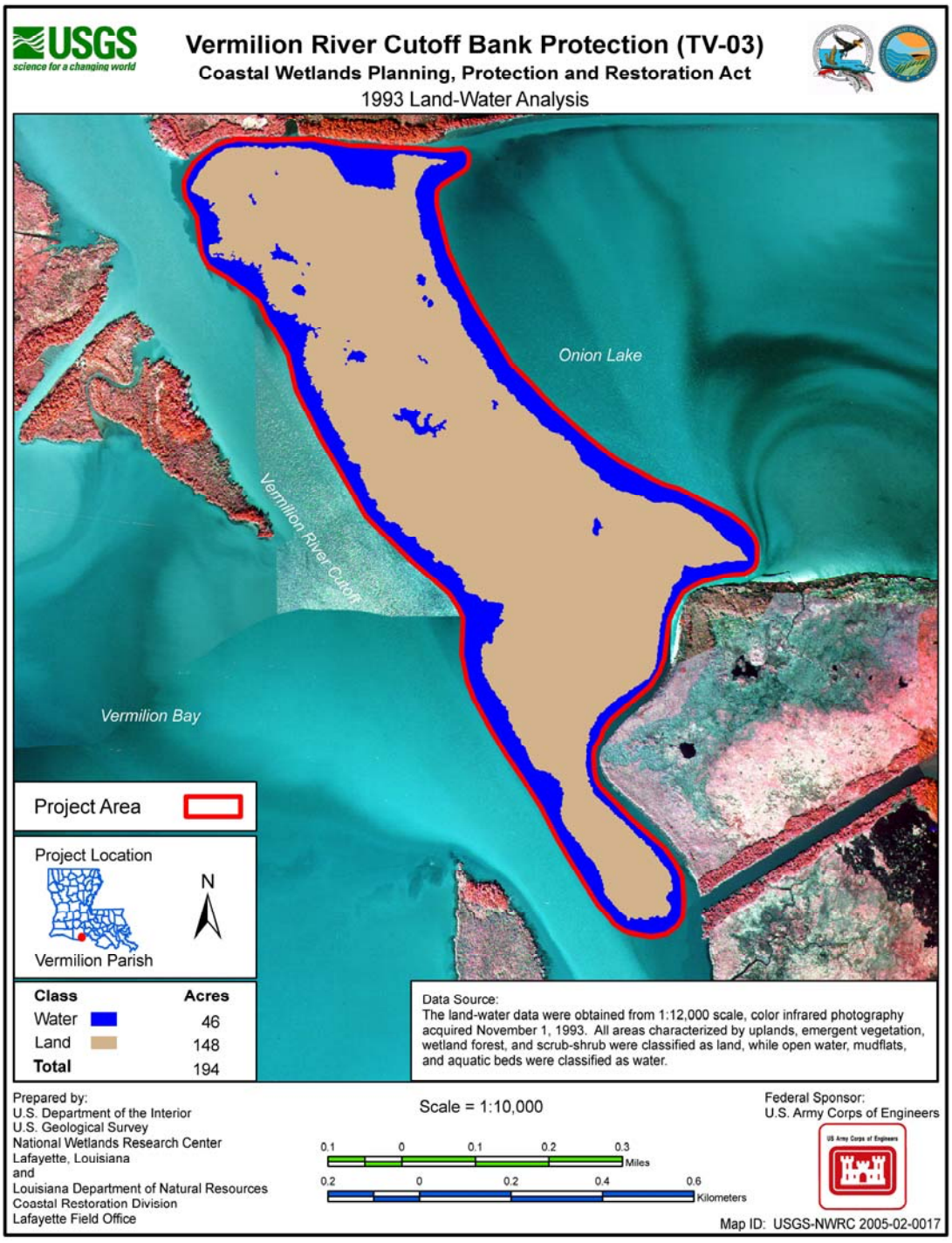

Figure 2. Pre-construction Land to Water analysis for Vermilion River Cutoff Bank Protection (TV-03) project area for 1993.

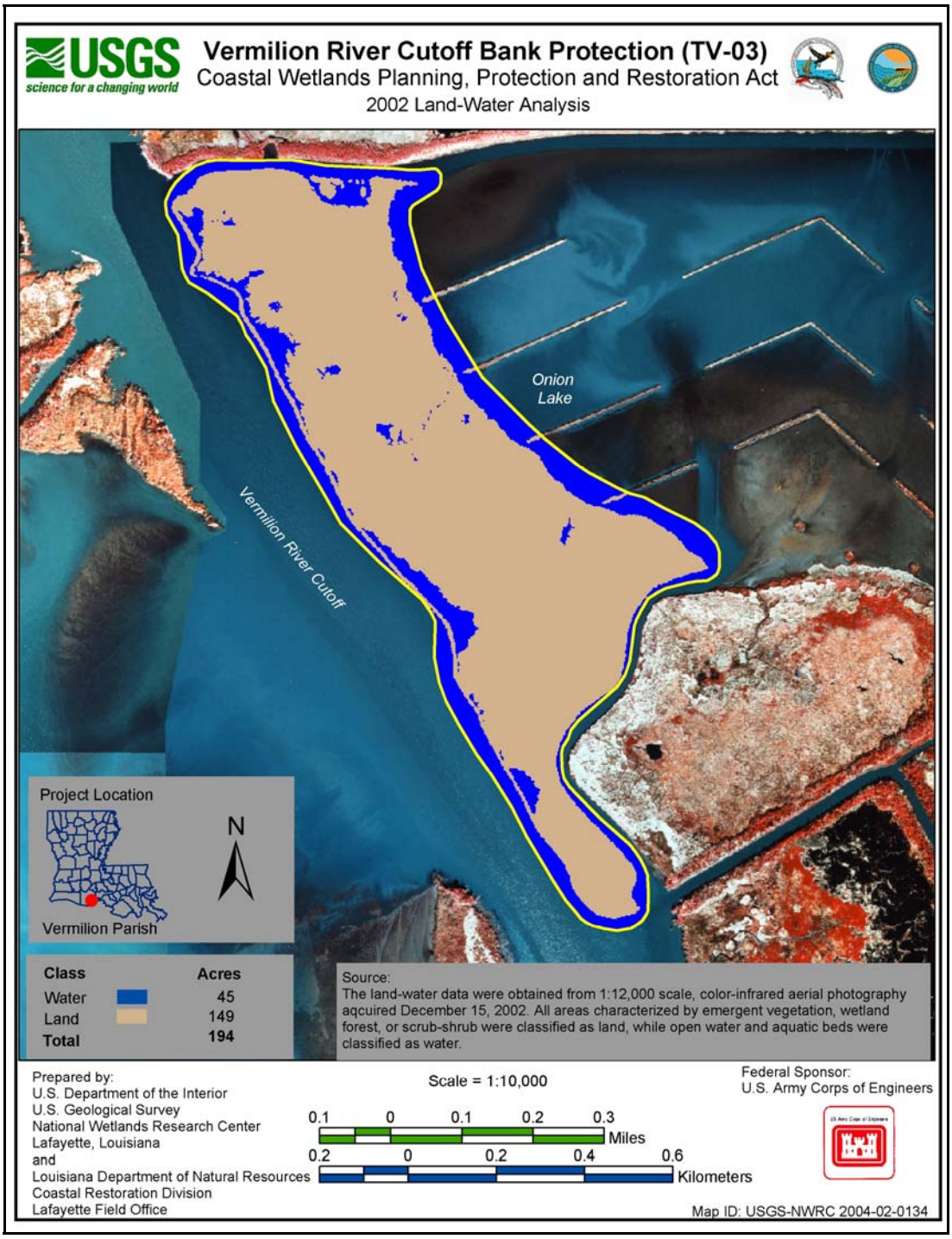

Figure 3. Land to water analysis for Vermilion River Cutoff Bank Protection (TV-03) project area in 2002.

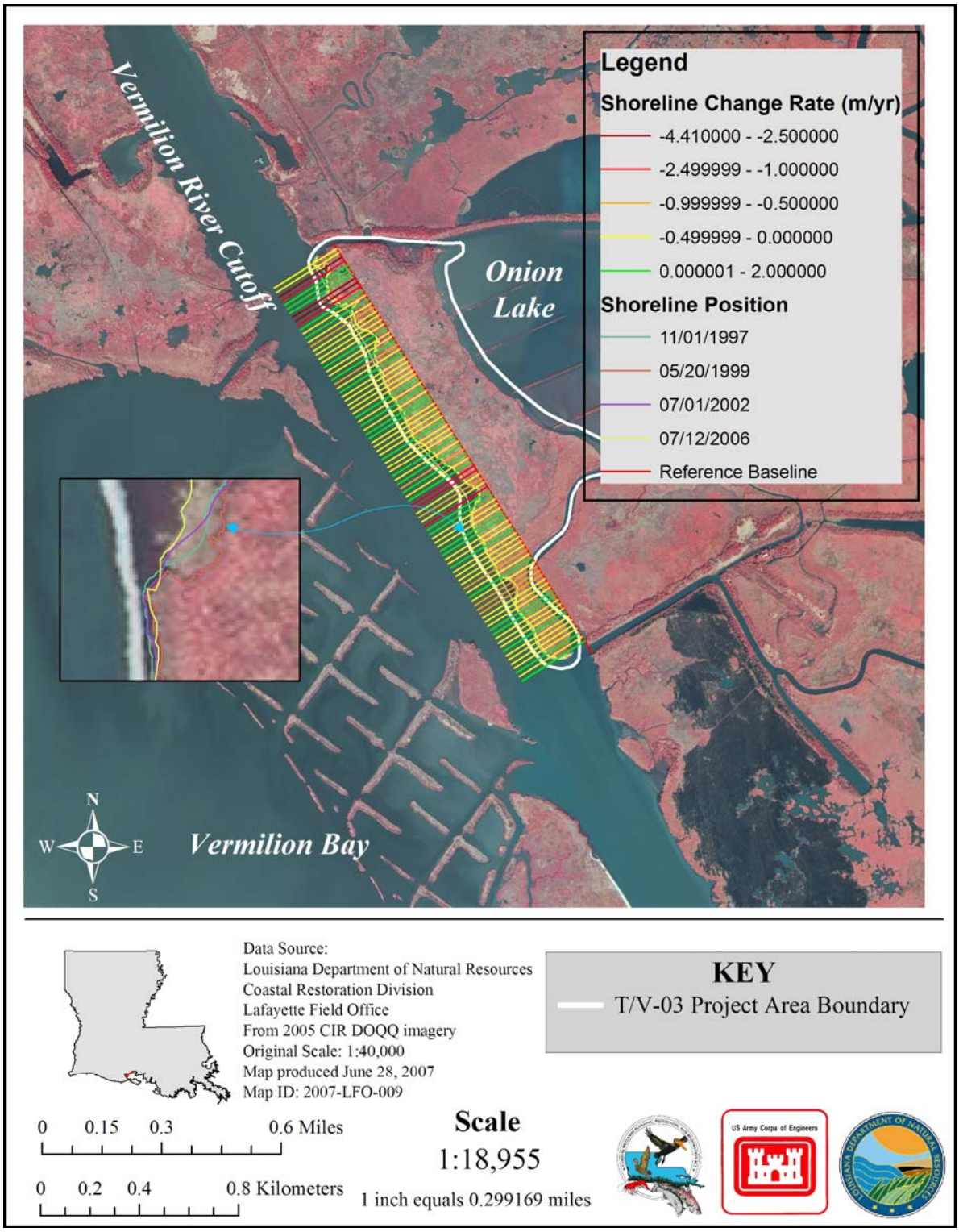

Figure 4. Shoreline change map of the Vermilion River Cutoff Bank Protection (TV-03) project for the period of record of November 1, 1997, to July 12, 2006.

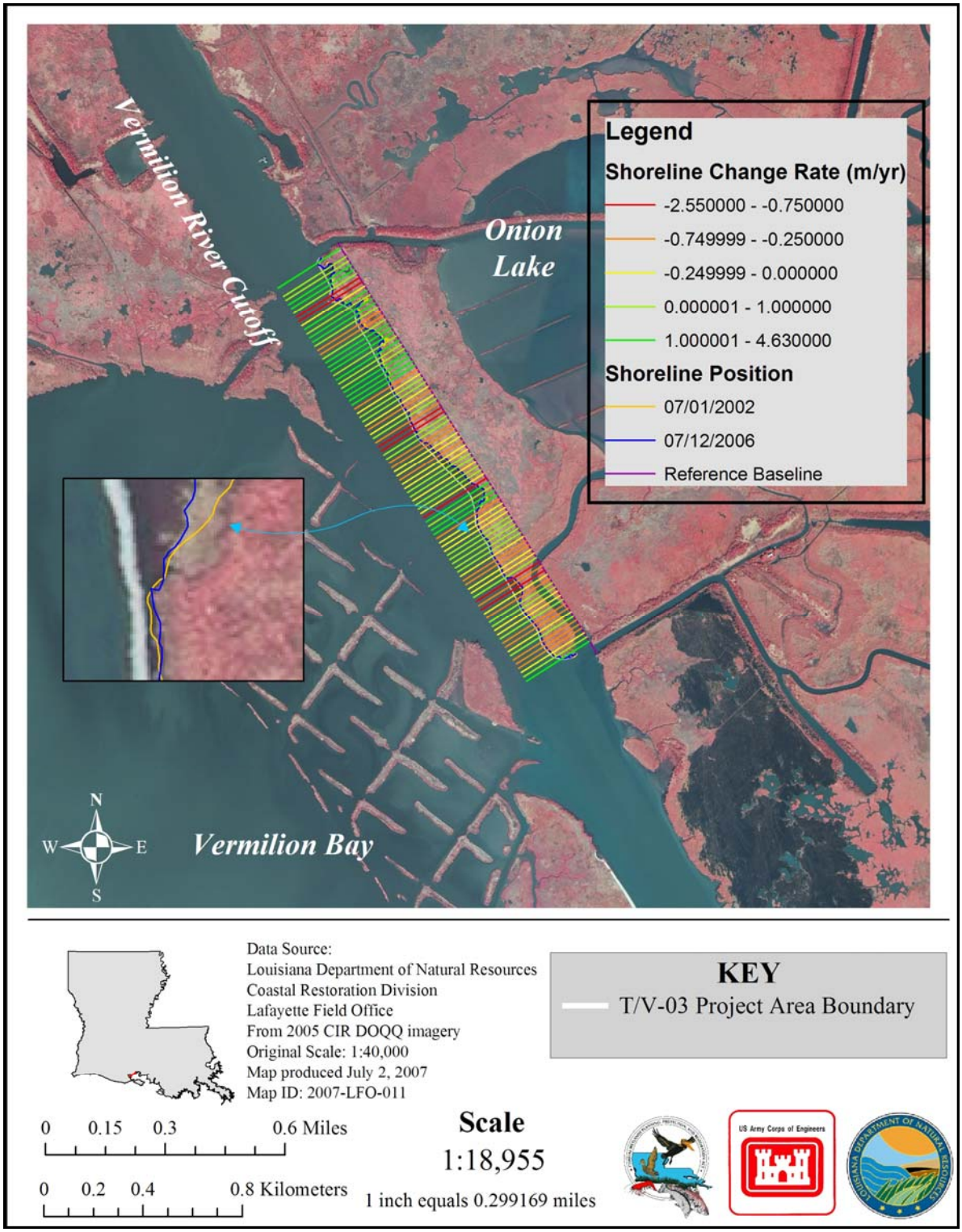

Figure 5. Shoreline change map of the Vermilion River Cutoff Bank Protection (TV-03) project for the period of record of July 9, 2002, to July 12, 2006

Figure 6. Settlement plate 1007 in the Vermilion River Cutoff Bank Protection (TV-03) project at the southern end of the rock breakwater.

Table 1. Shoreline changes at the settlement plates along the east bank of the Vermilion River Cutoff behind the project rock breakwater for the period beginning February 25, 1998, February 1, 2000, July 9, 2002 and July 12, 2006.

Settle-ment Plate	Distance (m) 2/5/98	Distance (m) 2/1/00	1998-2000 Distance Change (m)	Distance (m) 7/9/02	2000-2002 Distance Change (m)	Distance (m) 7/12/06	2002-2006 Distance Change (m)	Shoreline Change Rate m/yr
1003	19.3	19.3	0	15.3	4	11.5	3.8	0.9
1004	12.5	12.5	0	11.2	1.3	5.9	5.3	0.9
1005	21.5	19.9	1.6	16.9	3	20.2	-3.3	0.5
1006	7.1	7.1	0	8.5	-1.4	7.8	0.7	-0.1
1007	4.2	3.7	0.5	4.2	-1.9	3.1	1.1	0.1

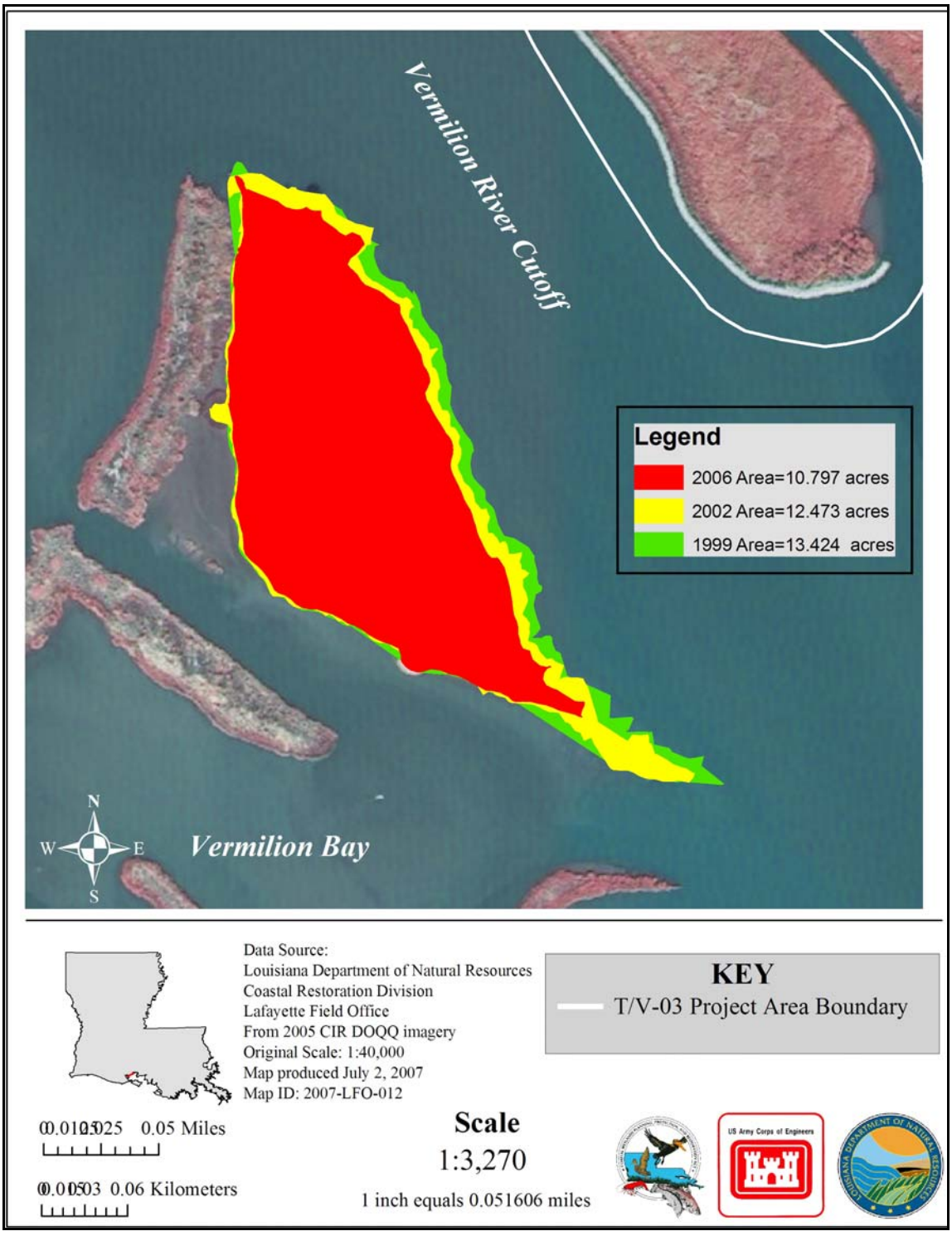

Figure 7. Land change map of an island located across from the Vermilion River Cutoff Bank Protection (TV-03) project area.

V. Conclusions

a. Project Effectiveness

The TV-03 project appears to be functioning as designed. The shoreline behind the foreshore rock dike is prograding at four of five monitoring stations. The shoreline survey performed in 2006 indicates a stable condition behind the rock dike as compared to the loss of area on the island across the Vermilion River Cutoff canal. Aerial photography indicates that land area in the project area has increased by 1 ac. The addition of the terraces in Onion Lake may have increased the land to water acreage in the 2002 aerial photography; however, small interior ponds appear to have partially filled in. The unprotected island west of the project has lost 2.6 ac since 2002.

b. Recommended Improvements

The Vermilion River Cutoff Bank Protection project structural components are in very good condition and functioning as designed. A maintenance event will be planned for the following item in 2007:

- Install staff gauge

VI. Literature Cited

Adams, R. D., P. J. Banas, R. H. Baumann, J. H. Blackmon, and W. G. McIntire. 1978. Shoreline erosion in coastal Louisiana: inventory and assessment. Baton Rouge: Louisiana Department of Transportation and Development, Coastal Resources Program. 139 pp.

Barras, J. 2006. Land area change in coastal Louisiana after the 2005 hurricanes—a series of three maps. U.S. Geological Survey Open-File Report 06-1274.

Steyer, G. D., R. C. Raynie, D. L. Steller, D. Fuller, and E. Swenson 1995, revised 2000. Quality management plan for Coastal Wetlands Planning, Protection, and Restoration Act monitoring program. Open-File Report 95-01. Baton Rouge: Louisiana Department of Natural Resources. 97 pp, plus appendices.

U.S. Army Corps of Engineers, New Orleans District. 1993. Environmental assessment for the Vermilion River Cutoff project. EA#181. 21 pp.

APPENDIX A
Response of Emergent Vegetation to Hurricane Rita

METHODS

In response to Hurricane Rita in 2005, 163 LDNR emergent vegetation stations were sampled in the late summer/early fall of 2005 and 2006. The stations represented a subset of the LDNR vegetation stations established on the Chenier Plain to monitor CWPPRA projects, including CS-20 (40 stations), CS-17 (24 stations), CS-31 (30 stations), CS-28 (18 stations), ME-04 (18 stations), and ME-11 (12 stations) (figure 1).

After the 2005 data collection, the stations were classified according to the level of disturbance/stress they had experienced and the resulting vegetation response. Stations were classified as either Open Water, Severely Stressed, Moderately Stressed (also classified as "Stressed"), or Slightly Stressed (Table 1). Data collected in 2006 and the last CWPPRA data available from before Hurricane Rita were also classified by stress.

At each station, a marker had been previously established. A 2m x 2m square was placed on the marsh and Total % Cover, % Cover of each species present in the plot, and height of the dominant species were collected. Presence of other species that were not in the plot, depth of surface water, salinity, and sometimes porewater salinity were noted.

The compiled vegetation data from the three sampling periods were utilized to classify each site according to Visser's vegetation types of the Chenier Plain (Visser et al. 2000). The pre-storm types were determined with photographs and Visser Type definitions. The stations were reclassified after the 2005 and 2006 sampling. Stations that did not fit into any Visser Type after the storm maintained their pre-storm types. If the dominant species shifted to an identifiable Visser Type, the station was reclassified.

The data were analyzed to determine the impact of the storm on Total % Cover and Species Richness at three levels; overall by year (all 163 stations), by CWPPRA restoration project (7 projects), and with Visser vegetation type (6 types).

Table 1. Vegetation Stress Classifications used in this survey.

Vegetation Classification	Description
Open Water	Vegetation has been ripped out. 100% of plot is open water.
Severely Stressed	>50% of plot is open water. Vegetation is weak.
Stressed	Perennial grasses and herbs are mostly dead (>50%) or >25% open water. Often dominated by annual shrubs.
Slightly Stressed	Perennial grasses are healthy and vigorous.

RESULTS

COASTWIDE

Prior to Hurricane Rita, most of the vegetation stations utilized for this survey were healthy and intact (>80%). Following the hurricane in 2005, most of the stations were stressed (67%) or worse (20%). A year later in 2006, over 50% of the stations were back to pre-storm stress levels. Severely stressed stations either converted to open water or recovered to a less stressed state. Most stations that had been converted to open water in 2005 did not recover (figures 1 and 2).

ANOVA was utilized to test for differences in Total % Cover (% of plot covered by living vegetation) and Species Richness (n species per plot) over the three sampling periods, by CWPPRA project, and with Visser vegetation type classifications.

Total % Cover was significantly different over time (figure 3). Post-ANOVA comparisons (Tukey's HSD) revealed that all three sampling periods were significantly different, meaning Total % Cover for 2006 is still significantly lower than pre-Hurricane Rita levels. Species Richness was also significantly different over the three sampling periods (figure 4). The number of species present before Rita and in 2006 were statistically the same.

Most of the projects had significant differences over time for both Total % Cover and Species Richness, with trends similar to the overall model (figures 3 and 4). Post-ANOVA comparisons were utilized to determine whether the projects had recovered to pre-storm levels for both Cover and Richness (Table 2).

Visser Type was added to the overall model and the interaction between Visser Type and time was analyzed. Both models had significant differences in Visser Type over time (figures 5 and 6). Post-ANOVA contrasts of Cover and Richness pre-Rita and post-06 for each Visser Type revealed that all Visser Types were the same in Total Cover (had recovered to pre-storm

levels) and in Richness except Fresh Bulltongue (mostly in the ME-04 project area), which had not recovered, and in Oligohaline Wiregrass, which had significantly more species per plot post-Rita than before (up from 2.83 to 3.22 species).

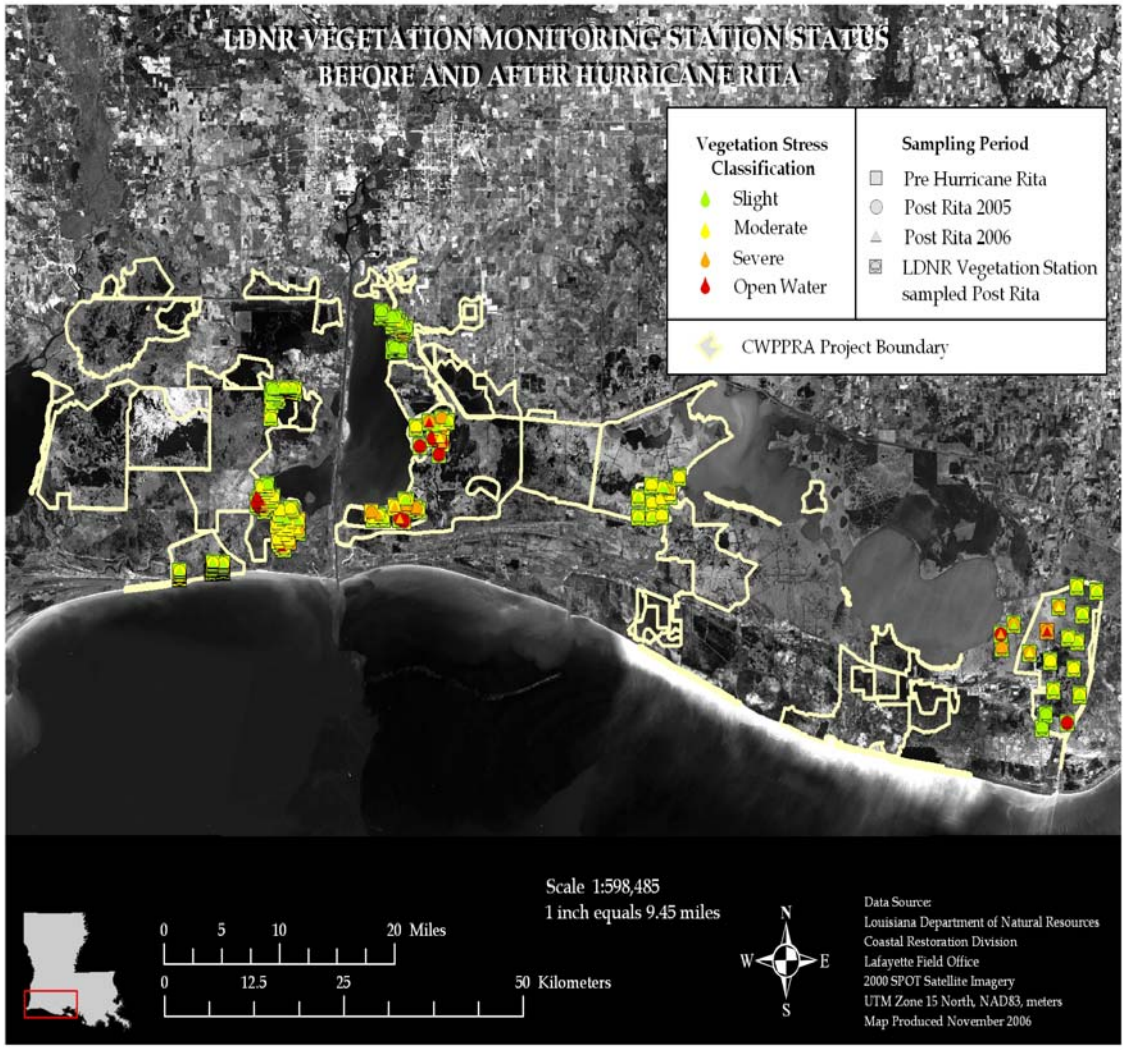

Figure 1. Location and status of LDNR vegetation stations sampled after Hurricane Rita. Stations were classified according to storm induced stress as described in Table 1.

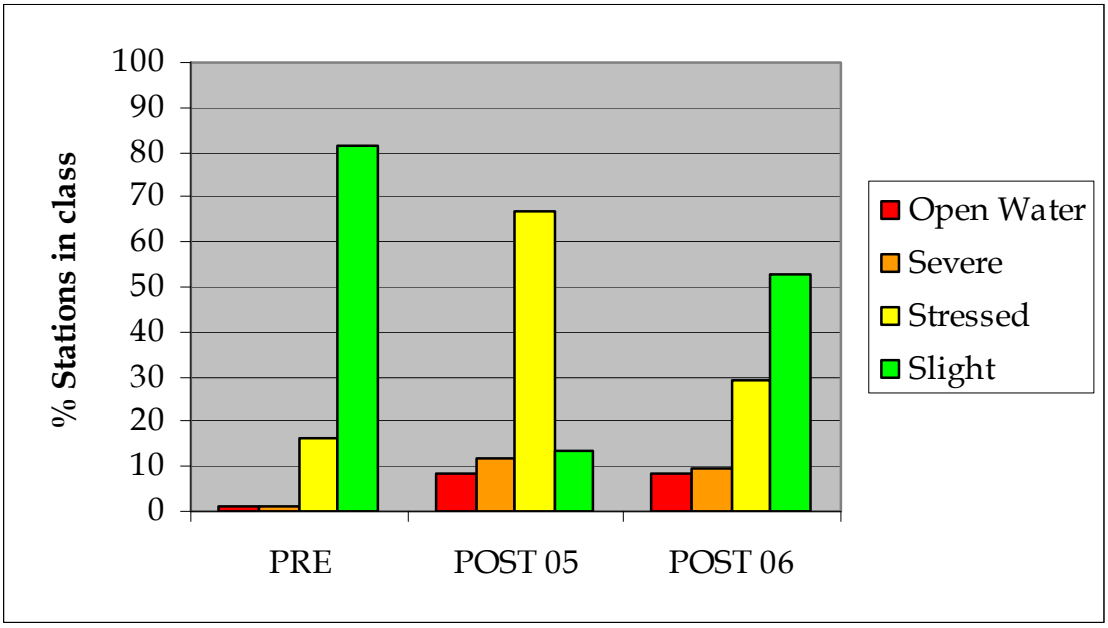

Figure 2. Percent of LDNR vegetation stations in each stress class before and after Hurricane Rita (n=163).

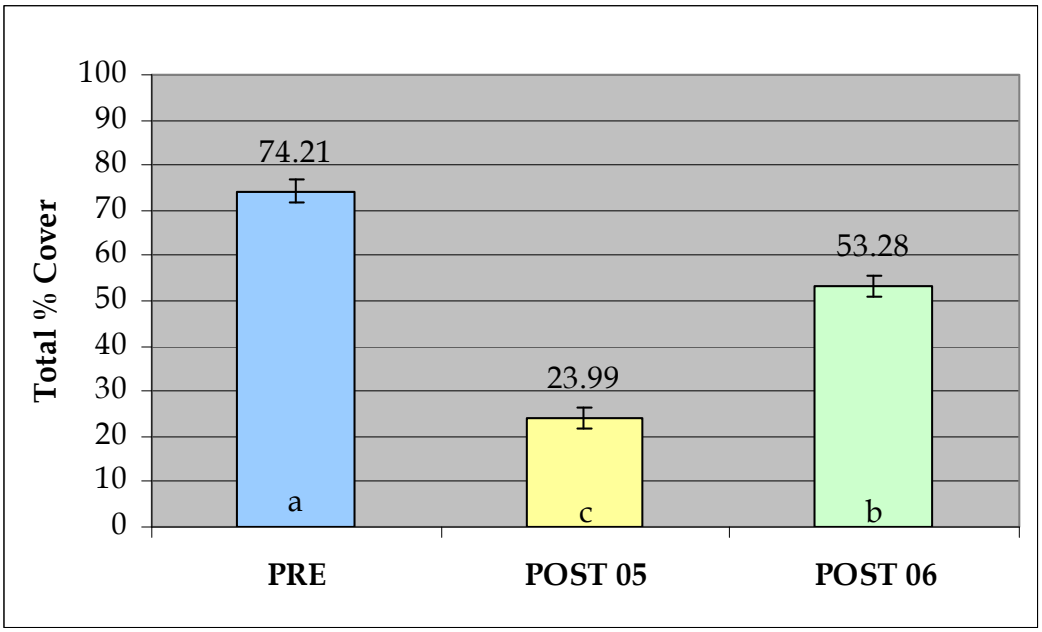

Figure 3. Total % Cover pre- and post-Hurricane Rita. LS Mean ± SE, n=163 stations, $F_{2, 488}$=109.7, p<0.0001. Levels not connected by same letter are significantly different.

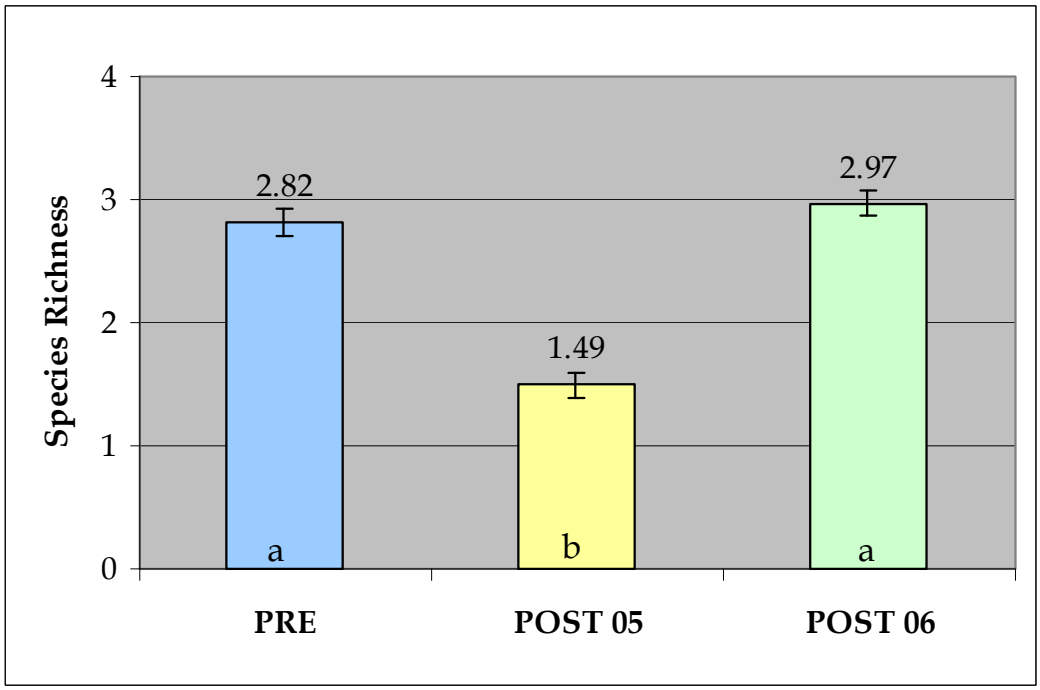

Figure 4. Species Richness pre- and post-Hurricane Rita. LS Mean ± SE, n=163 stations, $F_{2, 488}$=56.8, p<0.0001. Levels not connected by same letter are significantly different.

Table 2. CWPPRA Project ANOVA Results

Results of Post-ANOVA comparisons by CWPPRA Project Summary of 2006 levels relative to Pre-Hurricane Rita and 2005		
Project	**Total Cover**	**Species Richness***
CS-17	Not Recovered	Recovered
CS-20	Not Recovered	Recovered
CS-21	Recovered	Recovered
CS-28	Recovered	No Rita Impact.
CS-31	Not Recovered	Recovered
ME-04	Not Recovered	Recovered
ME-11	No Rita Impact	Recovered

*****Although the number of species present returned to pre-Rita levels at most projects, many of the species present were disturbance species.

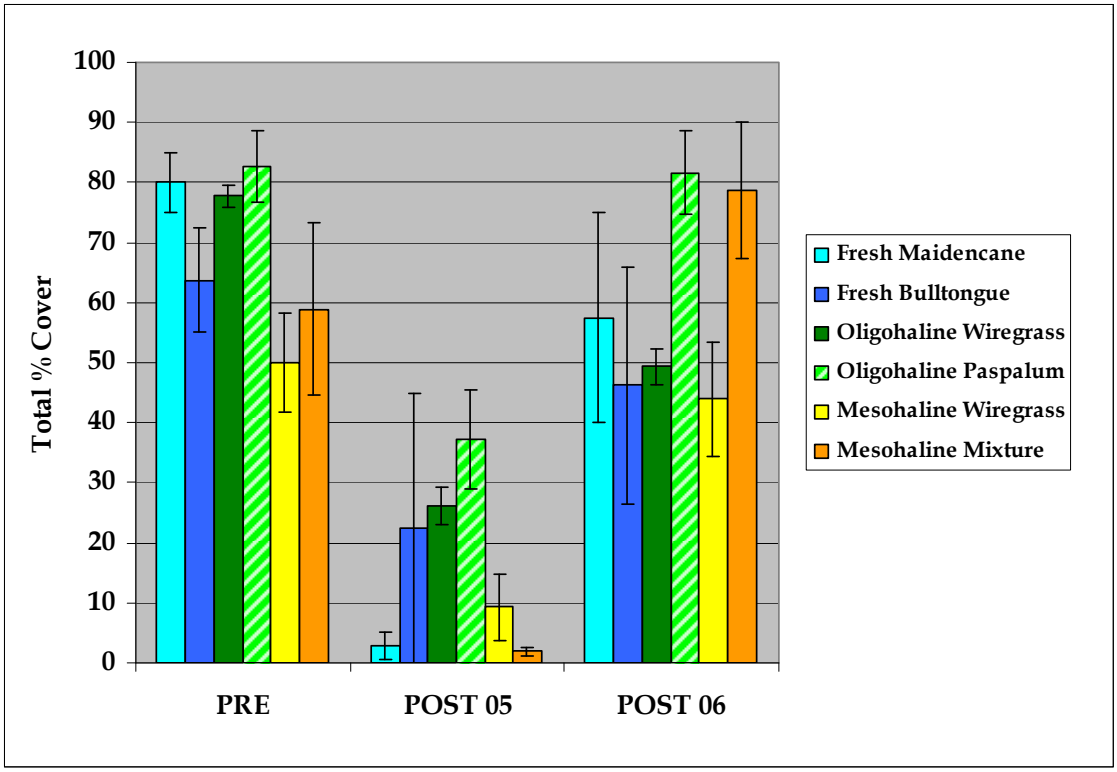

Figure 5. Total % Cover by Visser Vegetation Type. LS Mean ± SE, n=163 stations, $F_{17, 488}$=17.0, p<0.0001.

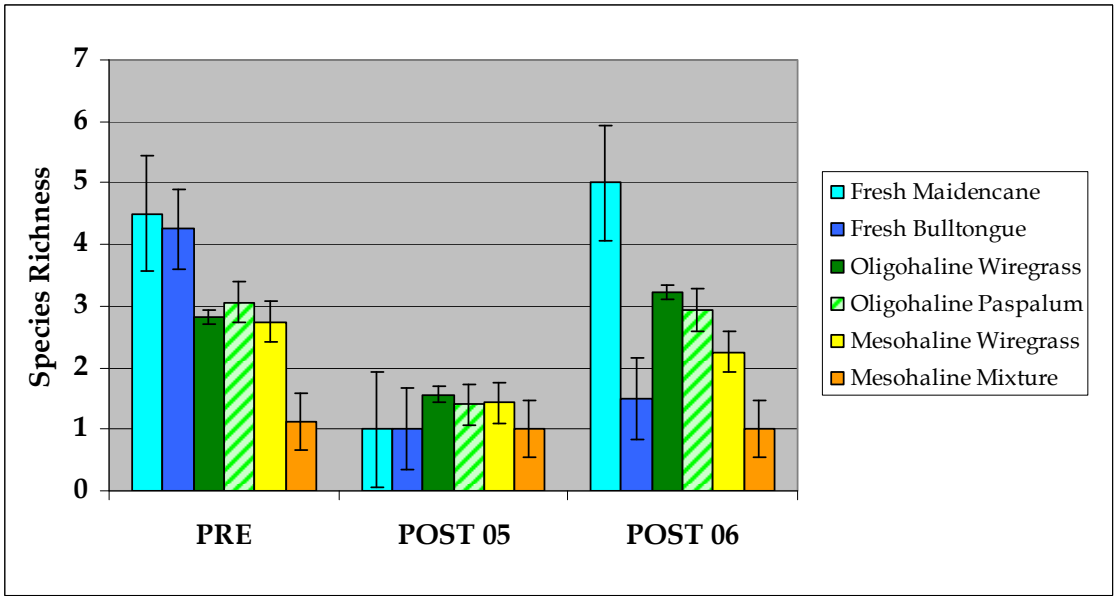

Figure 6. Species Richness by Visser Vegetation Type. LS Mean ± SE, n=163 stations, $F_{17, 488}$=10.9, p<0.0001.

REFERENCES

Visser, J. M., C. E. Sasser, R. H. Chabreck, and R. G. Linscombe. 2000. Marsh vegetation types of the Chenier Plain, Louisiana, USA. Estuaries 23(3):318–327.

APPENDIX B
(Inspection Photographs)

Appendix B
(Inspection Photographs)

Photo 1—north tie-in

Photo 2—south tie-in

APPENDIX C
(Three Year Budget Projection)

Appendix C
(Three Year Budget Projection)
VERMILION RIVER CUT OFF/ TV-03 / PPL 1
Three-Year Operations & Maintenance Budgets 07/01/2008 - 06/30/10

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Pat Landry	*Herb Juneau*	*COE*	*Stan Aucoin*

	2007/2008	2008/2009	2009/2010
Maintenance Inspection	$ 5,407.00	$ 5,570.00	$ 5,737.00
Structure Operation			
Administration		$ -	$ -
Maintenance/Rehabilitation			

07/08 Description: Install staff gauge

E&D	
Construction	$5,000.00
Construction Oversight	
Sub Total - Maint. And Rehab.	$ 5,000.00

08/09 Description

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

09/10 Description:

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

	2007/2008	2008/2009	2009/2010
Total O&M Budgets	**$ 10,407.00**	**$ 5,570.00**	**$ 5,737.00**

O &M Budget (3 yr Total)	**$ 21,714.00**
Unexpended O & M Budget	**$ 24,118.66**
Remaining O & M Budget (Projected)	**$ 2,404.66**

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

VERMILION RIVER CUTOFF/TV-03/PPL 1

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,407.00	**$5,407.00**
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	0	$2,000.00	$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	1	$5,000.00	$5,000.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$5,000.00**

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: **$10,407.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET 07/01/2008 - 06/30/2009

VERMILION RIVER CUTOFF/TV-03/PPL 1

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,570.00	**$5,570.00**
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	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: **$5,570.00**

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

VERMILION RIVER CUTOFF/TV-03/PPL 1

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

LDNR / CRD Admin.	LUMP	1	$0.00	$0.00
FEDERAL SPONSER 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:					
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: **$5,737.00**

APPENDIX D
(Field Inspection Notes)

Appendix D
(Field Inspection Notes)

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: TV-03 Vermilion River Cut-Off

Date of Inspection: March 6, 2007 Time: 9:20 am

Structure No. N/A

Inspector(s): Stan Aucoin & Herb Juneau (LDNR)
John Foret (NMFS) (for other inspections)

Structure Description: Foreshore Rock Dike

Water Level -

Type of Inspection: Annual

Weather Conditions: Sunny & cool mild

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	N/A				
Rip Rap (fill) (foreshore dike)	Good			1 & 2	The foreshore dike was just recently elevated to original permitted height.
Earthen Embankment	N/A				

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?