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

2005 Operations, Maintenance, and Monitoring Report

for

Four-Mile Canal Terracing and Sediment Trapping

State Project Number TV-18
Priority Project List 9

June 2005
Vermilion Parish

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for
Four-Mile Canal Terracing and Sediment Trapping (TV-18)

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I. Introduction

The Four-Mile Canal Terracing and Sediment Trapping (TV-18) project is on the ninth priority project list of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA). The project is located approximately 4 miles (6.44 km) south of Intracoastal City in Vermilion Parish, Louisiana, and includes Little White Lake and the portion of Little Vermilion Bay immediately west of Four-Mile Canal also known as the Vermilion River Cutoff (figure 1). The total project area comprises approximately 2,269 acres (918.56 ha) of intermediate marsh and open water. There are approximately 160 acres (64.93 ha) of land and 2,109 acres (853.63 ha) of open water from the 1993 land loss data. The 1988/90 habitat data classifies the area as having 62 acres (25.09 ha) of intermediate marsh, 53 acres (21.45 ha) of brackish marsh, 5 acres (2.02 ha) of unavailable data (habitat undetermined), and 1,823 acres (737.34 ha) of open water (U.S. Geological Survey/National Wetlands Research Center/National Biological Survey [USGS/NWRC/NBS] 1988/90).

Soils around the project area are Clovelly and Lafitte muck with two patches of Udifluvents. Clovelly and Lafitte series are poorly drained organic soils that formed in herbaceous plant material over clayey alluvium. Udifluvents are sandy to clayey soils that were hydraulically excavated during the construction and maintenance of navigable waterways. Udifluvents are of medium fertility with water and air moving at a very slow to moderate rate. Many areas are very intermittently submerged and occur as small to large lakes (U.S. Department of Agriculture, Soil Conservation Service [USDA/SCS] 1996). Soil boring samples collected and analyzed by HNTB Corporation of Baton Rouge in 1-4 ft (0.3-1.2 m) of water encountered 2-5 ft (0.6-1.5 m) of very soft clay over 2-8 ft (0.6-2.4 m) of organic clay. This area was entirely a brackish marsh from 1949 through 1968 (O'Neil 1949; Chabreck et al. 1968). By 1978 through 1988 the marsh around the northern shore of Little White Lake and Four-Mile Canal was classified as an intermediate marsh (Chabreck and Linscombe 1978, 1988). The most recent classification, in 1997, finds the project area surrounded by intermediate marsh (Chabreck and Linscombe 1997).

Emergent vegetation observed on the shore around Little White Lake consists of *Phragmites australis* (common reed), *Zizaniopsis mileacea* (giant cutgrass), *Spartina alterniflora* (smooth cordgrass), *Hymenocallis caroliniana* (Carolina spiderlily), *Triadica sebifera* (tallowtree), and *Sesbania drummondii* (poisonbean). In 1998, the vegetation community included *Spartina patens* (saltmeadow cordgrass), *Cladium mariscus* ssp. *jamaicense* (Jamaica sawgrass), and *Schoenoplectus robustus* (sturdy bulrush) (U.S. Department of Commerce/National Oceanic and Atmospheric Administration/National Marine Fisheries Service 2000). Vegetation in the open water portion of the project area included scattered stands of *Myriophyllum spicatum* (spike watermilfoil), *Ceratophyllum demersum* (coon's tail), and *Najas guadalupensis* (southern waternymph).

The Flood Control Act of 18 August 1941, enacted by the United States Congress, provided for improvements in the Vermilion River. Vermilion River Cutoff, an 8 ft by 80 ft (2.44 m by 24.38 m) channel from the -8 foot (+2.44 m) contour in the Vermilion Bay to the Gulf Intracoastal Waterway (GIWW) was constructed for improving navigation from Lafayette, Louisiana, to the -8 foot (-2.44 m) contour in Vermilion Bay and to improve flood control from Port Barre, Louisiana, to the Vermilion Bay via Bayou Teche, Bayou Fusilier, and the Vermilion River. The materials excavated to build the canal were deposited in spoil banks along the canal. This prevented the river waters from nourishing the adjacent marsh (U.S. Army Corps of Engineers [USACE] 1993; HNTB Corporation 2002). The main cause of marsh loss in this area is believed to be shoreline erosion. From the 1978 Louisiana Department of Transportation and Development (LDOTD) inventory and assessment of shoreline erosion in coastal Louisiana, the Abbeville 15 Quadrangle, which is Vermilion Bay near Onion Bayou, documents an erosion rate of 1.6 ft/yr (0.5 m/yr); just adjacent to that, the Cheniere Au Tigre & Abbeville 15 quadrangle, which is Vermilion Bay (Mud Point to Lake Cleodis) is experiencing an erosion rate of 2.6 ft/yr [0.8 m/yr] (Adams et al. 1978). Shoreline change calculated by USGS, specifically in the project area, was 2.86 ft/yr (0.87 m/yr), and island area change was 0.64 acres/yr (0.26 ha/yr). A combination of wave and wake erosion continues to deteriorate this area, which is relatively unprotected and affected by storm events emerging from Vermilion Bay. This erosion prevents sub-aerial marsh development from sediments introduced to the area by the GIWW through the Vermilion River and Four-Mile Canal (Louisiana Department of Natural Resources [LDNR] 1999).

The construction of terraces in Little White Lake and Vermilion Bay will buffer existing marsh against shoreline erosion by reducing wave and wake energy. Marsh will immediately be created by planting *S. alterniflora* along the crowns and slopes of the constructed terraces. Additionally, new marsh will be created as freshwater and suspended sediments introduced from Four-Mile Canal and the Vermilion River are dispersed through the project area via conveyance channels, and trapped in the shallow open water adjacent to the terraces. In doing so, terraces may indirectly reduce water-column turbidity within the project area. This, in conjunction with decreased wave and wake energy, will create habitat suitable for colonization by submerged aquatic vegetation (SAV). Fisheries habitat may be enhanced by the marsh edge created by the terraces and the propagation of SAV. Conveyance channels may also promote the exchange of organisms and organic material within and through the project area. Data obtained from a USGS gauge at Cypremort Point from 1990 to 1999 indicate the average annual high water elevation in Little Vermilion Bay is +4.24 ft (+1.29 m) NAVD88 and average annual low water elevation is -1.63 ft (-0.50 m) NAVD88. Approximate marsh elevation in the area is 1.5 ft (0.46 m) NAVD88.

Approximately 40,300 linear ft (12,283.4 m) of terraces are found in the eastern portion of Little Vermilion Bay area adjacent to Four-Mile Canal (figure 2), and 28,150 linear ft (8,580.12 m) in the Little White Lake area (figure 3). The terraces are arranged in either a linear or "fish-net" orientation in the open water areas. Terraces in the Little Vermilion Bay area will be built to + 5.0 ft (+1.52 m) NAVD88 with a 20 ft crown and 4:1 ft (1.21:0.31 m) side slopes. Terraces in the Little White Lake area will also be built to + 5.0 ft (+1.52 m)

NAVD88, but will have a 15-ft (4.57-m) crown with 4:1 ft (1.21:0.31 m) side slopes (figure 4). Post-consolidation elevation of all terraces is expected to be between 2 and 3 ft NAVD88 (0.61 and 0.91 m) The borrow or floatation channel will be located on the land side of all terraces and will be at a maximum depth of 10 ft (3.0 m) below the current water bottom. In order to minimize erosive energies, the terrace slopes and crowns will be planted with *Spartina alterniflora* (smooth cordgrass). Construction was completed in May 2004.

The project goals include:

1 Create 70 acres (28.3 ha) of earthen terraces within the project area immediately after construction.
2 Reduce shoreline erosion rates by 50% (reduce from 8 ft/yr [2.4 m] to 4 ft/yr[1.2 m/yr]) over the 20-year project life.
3 As a result of goals 1 and 2, achieve a 9% (approximately 17 acres [6.9 ha]) net increase in marsh habitat by the end of the 20 year project.
4 Increase submerged aquatic vegetation (SAV) coverage from 0% to 25% of the project area by the end of the 20-year project life.
5 Increase fisheries utilization of the project area.

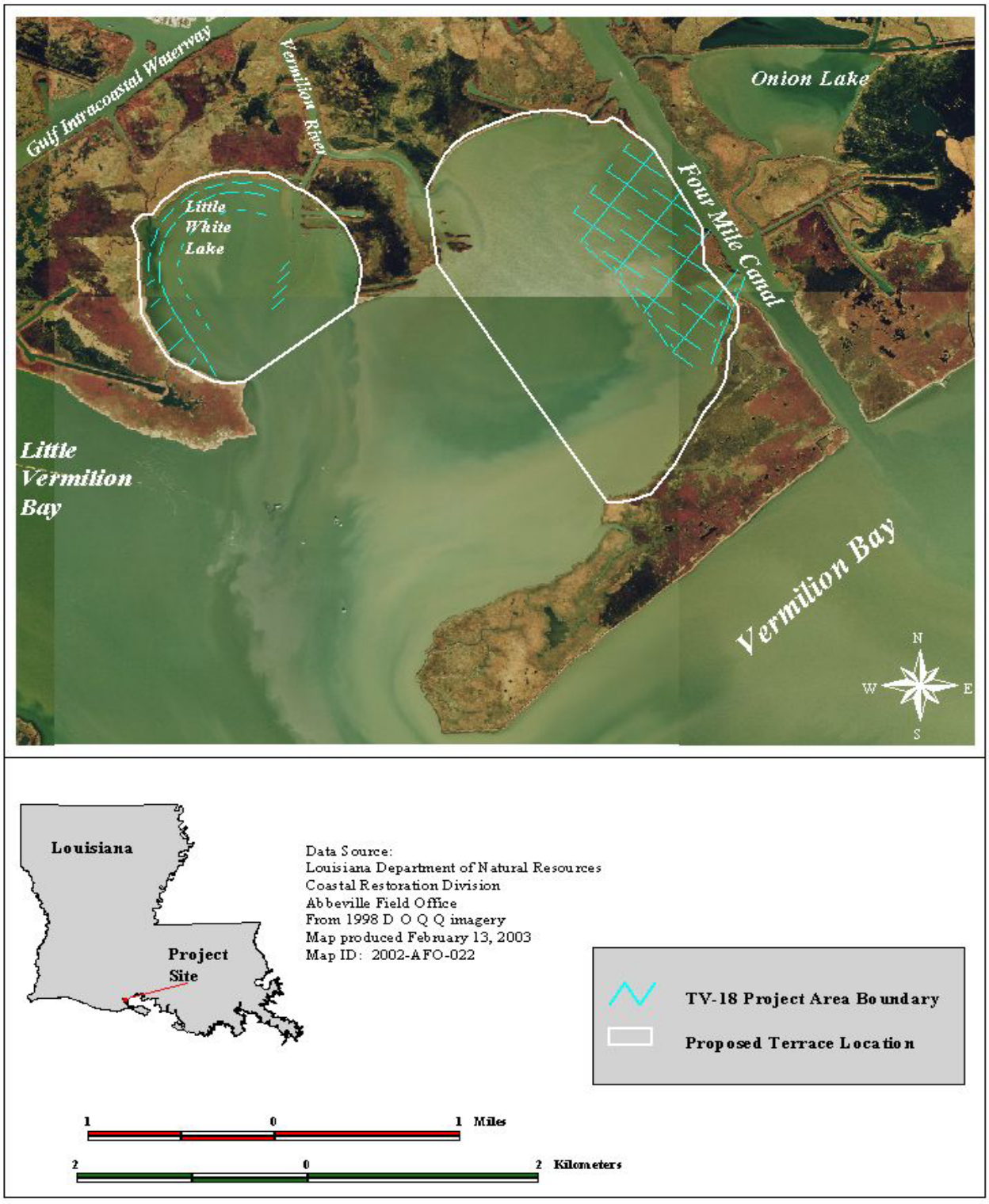

Figure 1. Four-Mile Canal Terracing and Sediment Trapping (TV-18) project area showing boundary and proposed terrace locations.

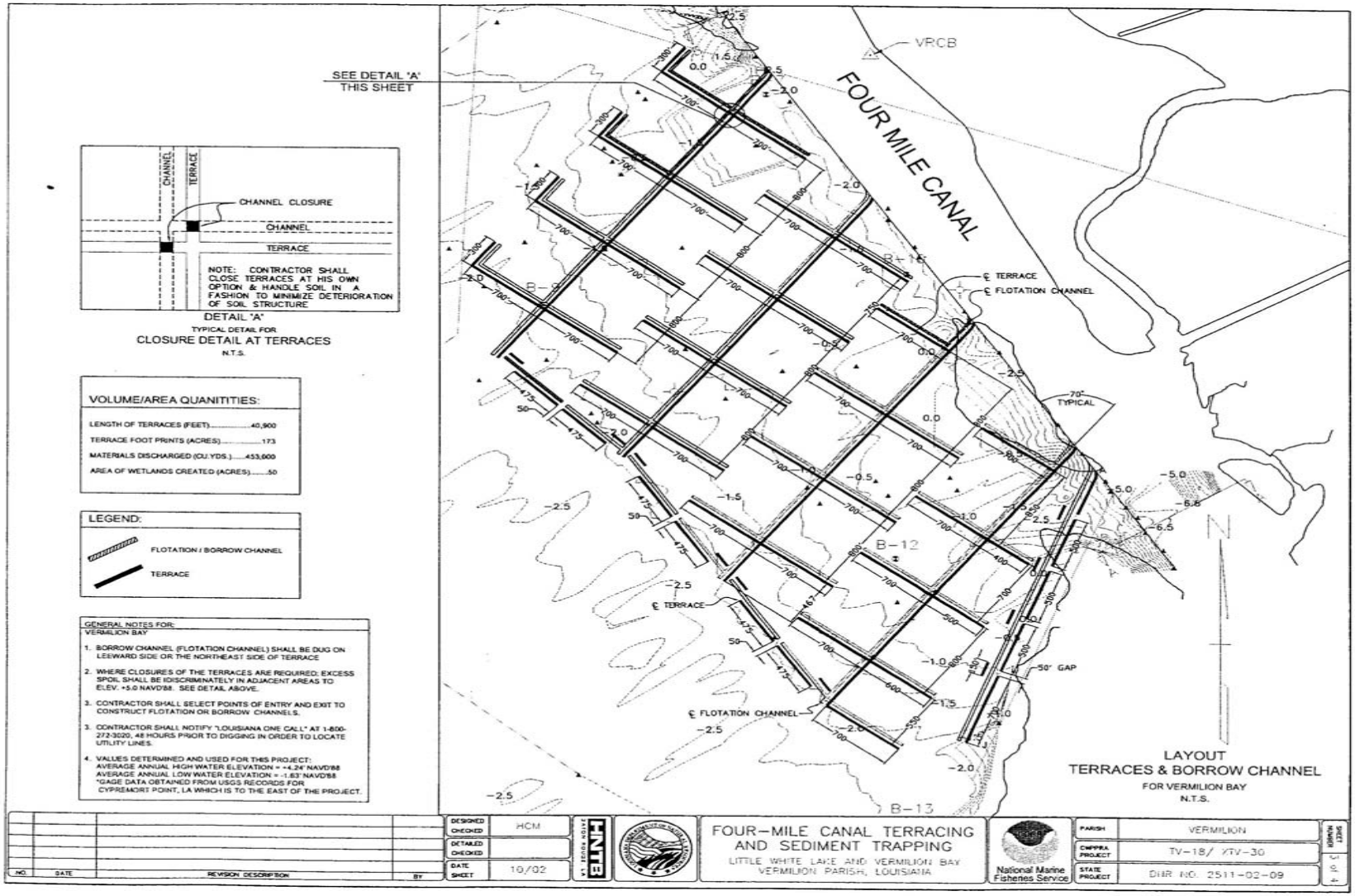

Figure 2. Proposed schematic for Four-Mile Canal Terracing and Sediment Trapping (TV-18) for terraces in the eastern section of Little Vermilion Bay (HNTB 2002).

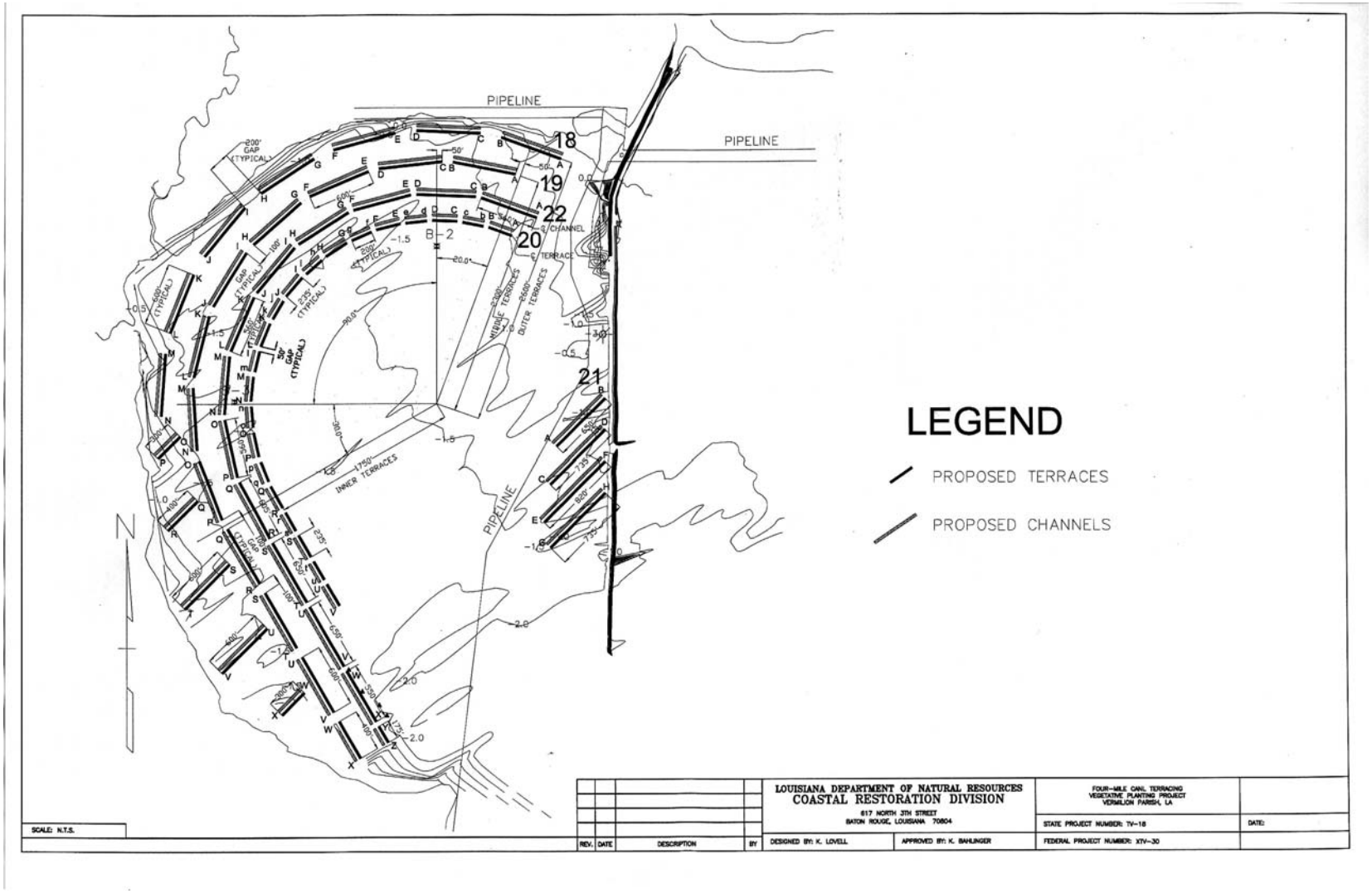

Figure 3. Proposed schematic for Four-Mile Canal Terracing and Sediment Trapping (TV-18) for terraces in the western section of Little White Lake (HNTB 2002).

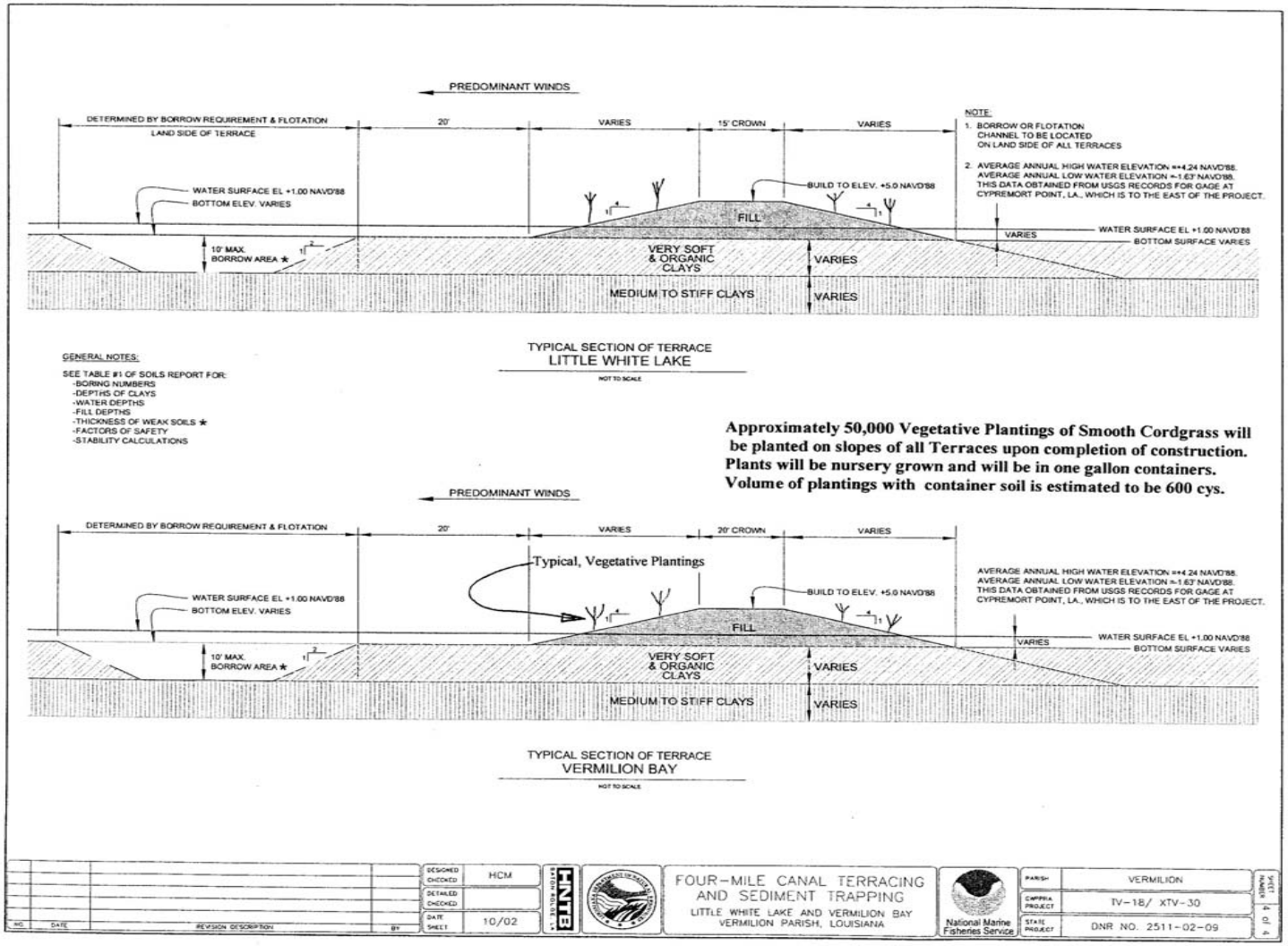

Figure 4. Typical layout and cross section of proposed terraces to be constructed in Little Vermilion Bay and Little White Lake for the Four-Mile Canal Terracing and Sediment Trapping (TV-18) project (HNTB 2002).

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Four-Mile Canal Terracing and Sediment Trapping Project (TV-18) 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 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. A summary of past operation and maintenance projects completed since completion of the Four-Mile Canal Project are outlined in Section IV.

An inspection of the Four-Mile Canal Terracing and Sediment Trapping Project (TV-18) was held on April 14, 2005, under clear skies and mild temperatures. In attendance was Stan Aucoin, Herb Juneau, Darrell Pontiff, and Pat Landry from LDNR, and John Foret of NOAA National Marine Fisheries Service. All parties met at the Lafayette Field Office of LDNR's Coastal Engineering Division (CED) and traveled to Intracoastal City in Vermilion Parish, Louisiana. The annual inspection began at approximately 11:00 a.m. at the terraces constructed in Little White Lake.

The field inspection included a complete visual inspection of the entire project site. Staff gauge readings were used to determine approximate elevations of water and earthen terraces. 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

Site 1—Earthen Terraces:

The terraces appear to be in fairly good condition. Expected erosion has taken place on the sacrificial terraces constructed in Little White Lake portion of the project but the remaining terraces are still providing protection for the interior terraces. On the Little Vermilion Bay portion of the project, some significant erosion has taken place on the terraces immediately adjacent to the Vermilion River Cut Off. These terraces will continue to be closely monitored. Interior terraces were unable to be closely inspected due to the closures. No

sections on the excavated channels to determine sediment deposited were taken on this inspection. No maintenance is needed at this time.

Site 2—Vegetation Plantings:
Vegetation has spread throughout the terraces. No maintenance is needed at this time.

c. Maintenance Recommendations

i. Immediate/Emergency Repairs
None

ii. Programmatic/Routine Repairs
None

d. Maintenance History

There has been no required maintenance on this project.

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

a. Monitoring Goals

The objectives of the Four-Mile Canal Terracing and Sediment Trapping project are to reduce shoreline erosion rates and increase marsh habitat, SAV, and fisheries utilization, and to increase freshwater and sediment flow from Four-Mile Canal into the project area by constructing conveyance channels adjacent to earthen terraces. The terraces may also reduce turbidity within the project area by causing suspended sediments to fall out of the water column.

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

Specific Monitoring Goals:

1 Evaluate the rate of erosion along the shoreline of the project area (Little White Lake and adjacent Little Vermilion Bay).
2 Evaluate establishment of emergent vegetation on planted terraces.
3 Evaluate sediment deposition within the project area.
4 Evaluate land/water ratios with respect to initial and secondary land gains.

b. Monitoring Elements

Shoreline Survey:
To document shoreline movement, differential GPS will be used to map the shoreline in Little Vermilion Bay and Little White Lake. Differential GPS will be used as described in Steyer et al. (1995, revised 2000). Differentially corrected GPS data sets were obtained in 2004 (as-built terraces), and will be obtained post-construction in years 2010 and 2017. GPS data will be taken during the spring of each monitoring year to minimize errors associated with taking data at different times of the year, not accounting for seasonal changes that might occur to the shoreline.

Terrace Vegetation:
The condition of the natural emergent and planted vegetation on the terraces over the life of the project will be monitored using a stratified sampling scheme on 16 of the total planted terraces using a modified Braun-Blanquet sampling method as outlined in Steyer et al. (1995, revised 2000). Transect lines and plots were established across selected terraces to include both high and low energy environments. Three sampling plots were established on randomly selected transect lines which will include a plot on both slopes and one plot on the crown. At each station, percent cover, dominant plant height, and species composition were documented in a 4-m^2 sample area. Each plot was marked with two corner poles to allow for revisiting the sites over time. Vegetation was evaluated at the sampling sites in the spring of 2004 (as built), and will be evaluated in the spring of 2007, 2010, and 2016.

Bathymetry/Topography:

Sediment deposition was monitored along existing transects used in bathymetry map creation (for engineering purposes). Twenty-eight (28) transects encompassing an array of terrace and channel formations were selected for development of elevational profiles. Elevation of the water bottom sediments was determined along each transect in a similar fashion to that in the initial survey. Surveys were conducted by a professional engineering firm in 2003 (immediately post-construction, funded by construction), and will be replicated in 2010 and 2017. Survey years may change to gather additional information earlier in the project life. based on potential effectiveness of the project.

Digital Color Infrared Video Imagery:
To document land to open-water ratios and marsh loss/gain rates in the project area, color infrared video imagery (1:12,000) was obtained in the summer of 2004 (as built), and will be obtained post-construction in 2007 and 2010. Imagery were delineated to classify all land in the project area as either (1) preexisting wetlands, (2) vegetated and non-vegetated terraces, and (3) non-terrace, newly developed wetlands (i.e., those that develop in open water areas between the terraces or adjacent to the preexisting perimeter levees).

c. Preliminary Monitoring Results and Discussion

Shoreline Position:
The first DGPS shoreline survey was performed on June 2, 2004, and results of that survey are overlayed onto 2004 Digital Orthophoto Quarter Quadrangle (DOQQ) images (figure 5). Loss and gain interpretations will be performed after the second and third survey.

Terrace Vegetation:
Terrace vegetation was monitored on July 27 and 28, 2004. Percent cover of the vegetation in the plots located in the Little White Lake (LWL) terrace area was 12.3 %, and percent cover for the vegetation in the plots located in Vermilion Bay (VB) was 71.58 %. The dominant species sampled on the LWL terraces was the planted vegetation, *Spartina alterniflora*. The dominant species on the VB terraces was *Echinochloa walterii*. Species richness per plot of the LWL terraces was 1.75 and 4.39 for the VB terraces. Mean dominant plant height for the terraces in the LWL area was 102.88 cm (40.50 in.), while the mean dominant plant height for the VB terraces was 190.12 cm (74.8 in.) (figures 6-9).

Bathymetry/Topography:
Results for the bathymetry survey have not been submitted to monitoring (figure 10).

Digital Color Infrared Video Imagery:
Analysis of digital color infrared video imagery has not been completed. The drafts of land to water loss/gain do not include newly developed wetlands acres or newly developed wetlands non-terrace (figures 11-12). To date the Little Vermilion Bay terrace area is 114 acres (46.2 ha) land to 1,448 acres (586.0 ha) water and the Little White Lake terrace area is 57 acres (23.10 ha) land to 651 acres (263.5 ha) water.

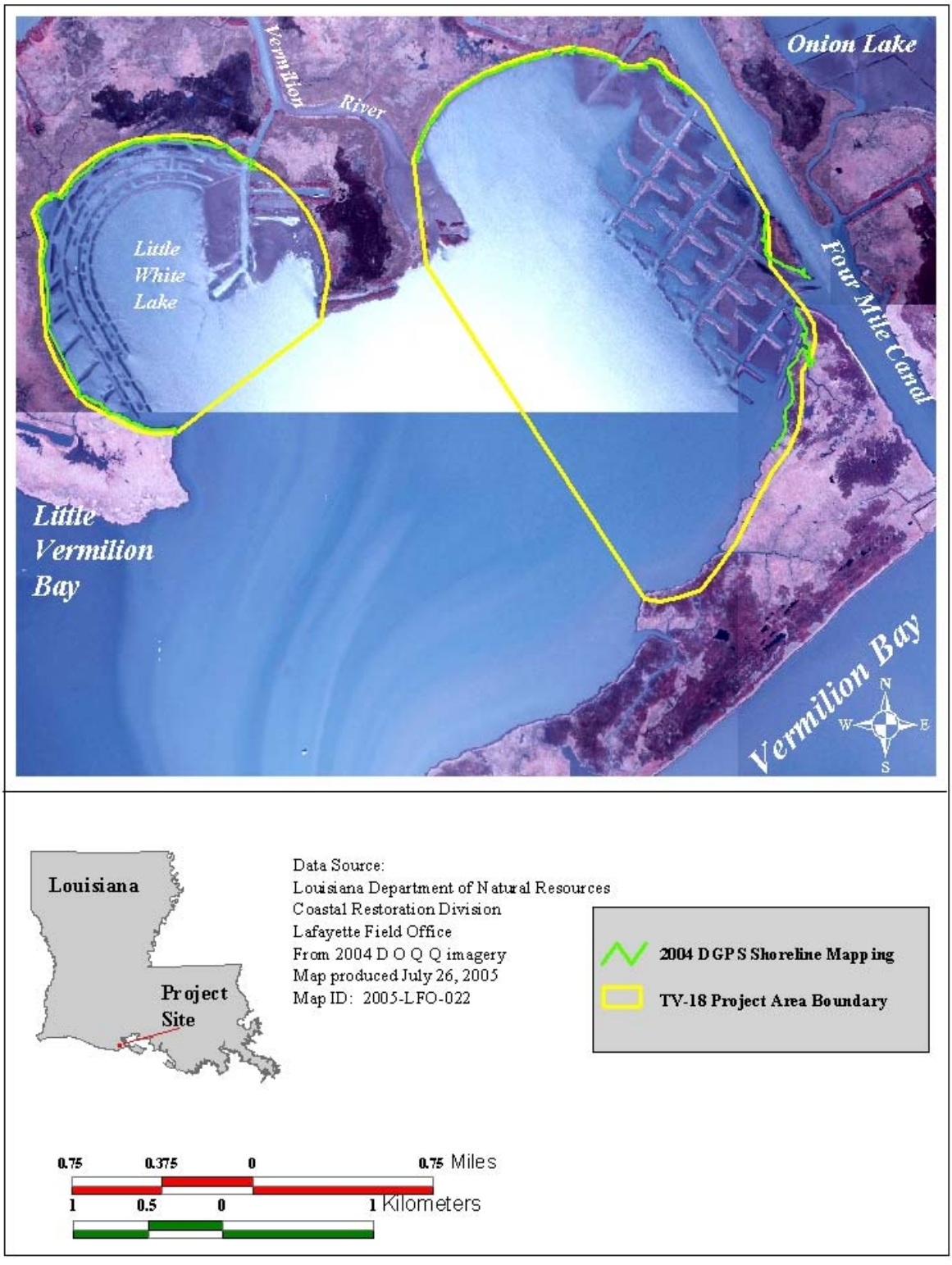

Figure 5. Four-Mile Canal Terracing and Sediment Trapping DGPS shoreline mapping for 2004.

Figure 6. Vegetation sampling plot of terraces located in Little White Lake (upper) and Vermilion Bay (lower) areas taken July 27, 2004, and July 28, 2004, respectively, project TV-18.

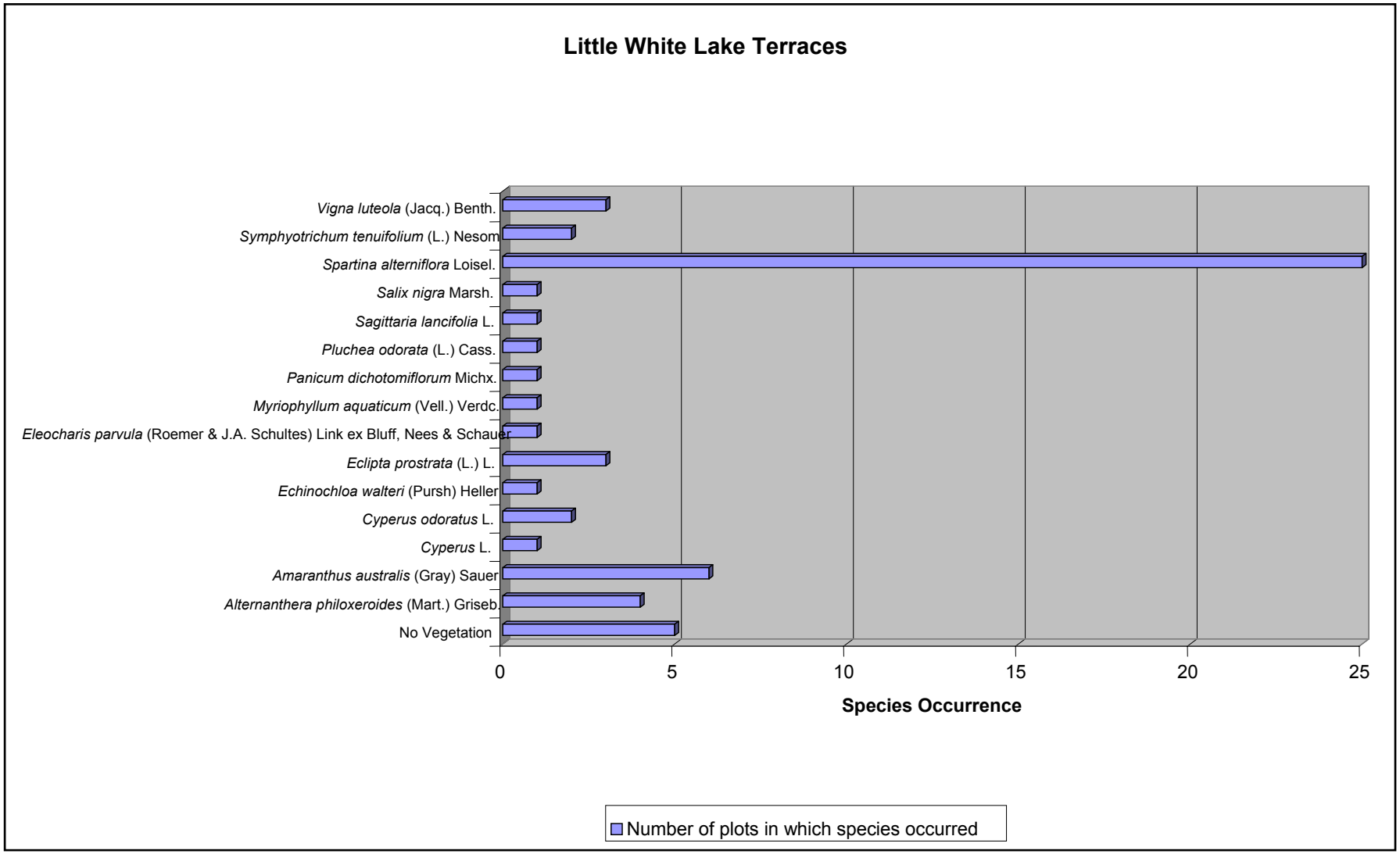

Figure 7. Emergent vegetation species occurrence in sampling plots located on the Little White Lake terrace area, project TV-18.

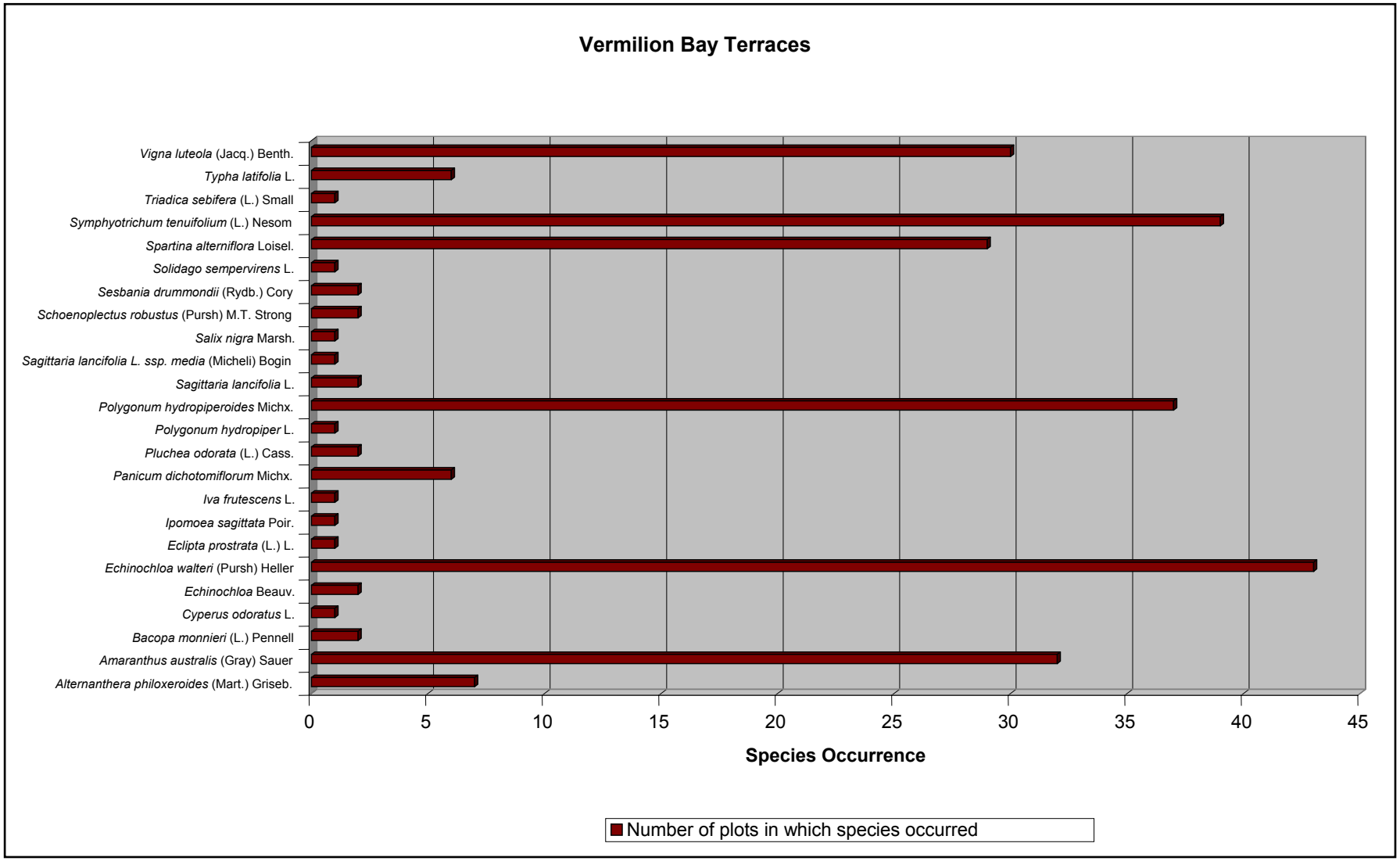

Figure 8. Emergent vegetation species occurrence in sampling plots located on the Vermilion Bay terrace area, project TV-18.

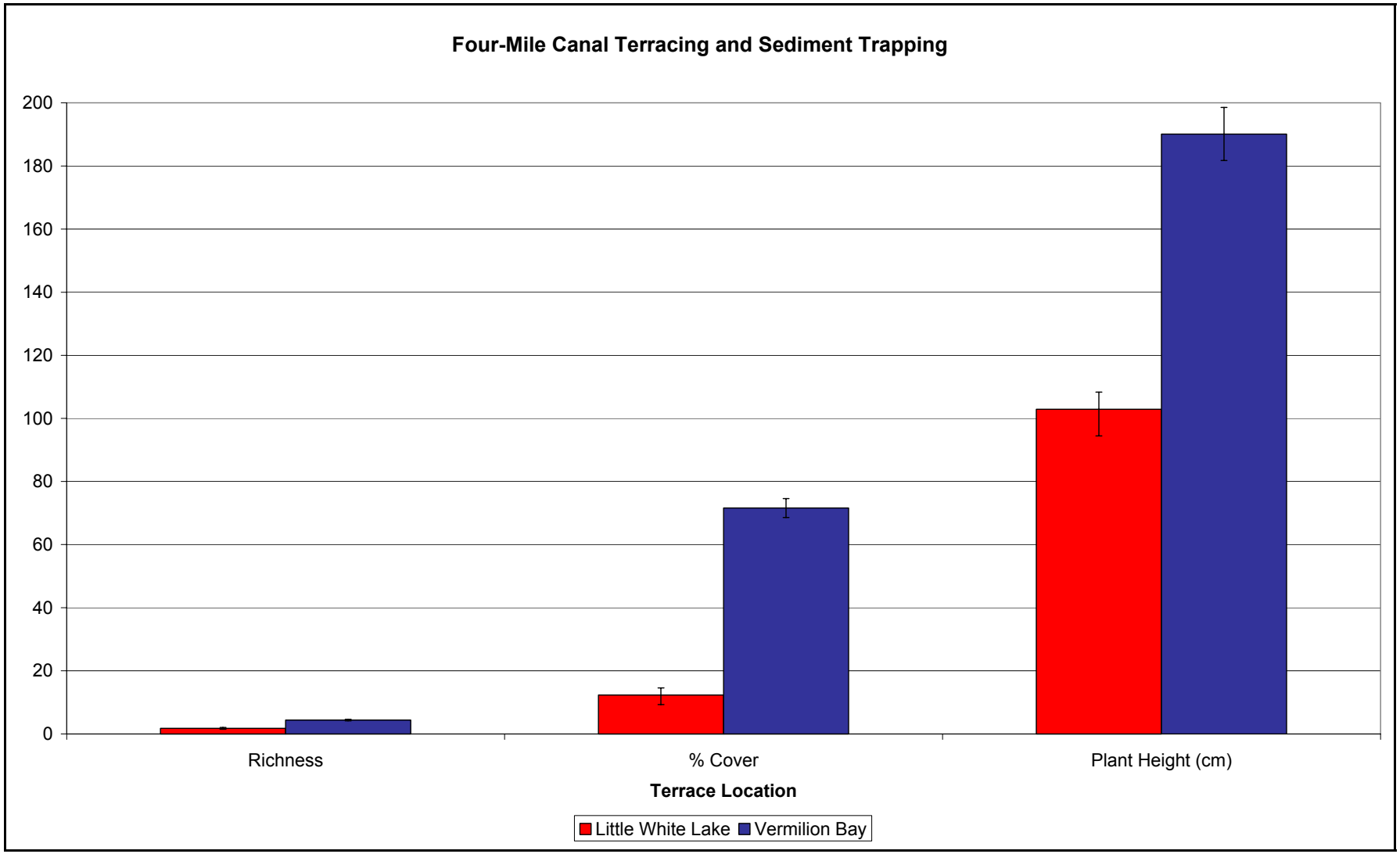

Figure 9. Emergent vegetation species richness, percent cover, and mean plant height for sampling plots located in Little White Lake and Vermilion Bay areas.

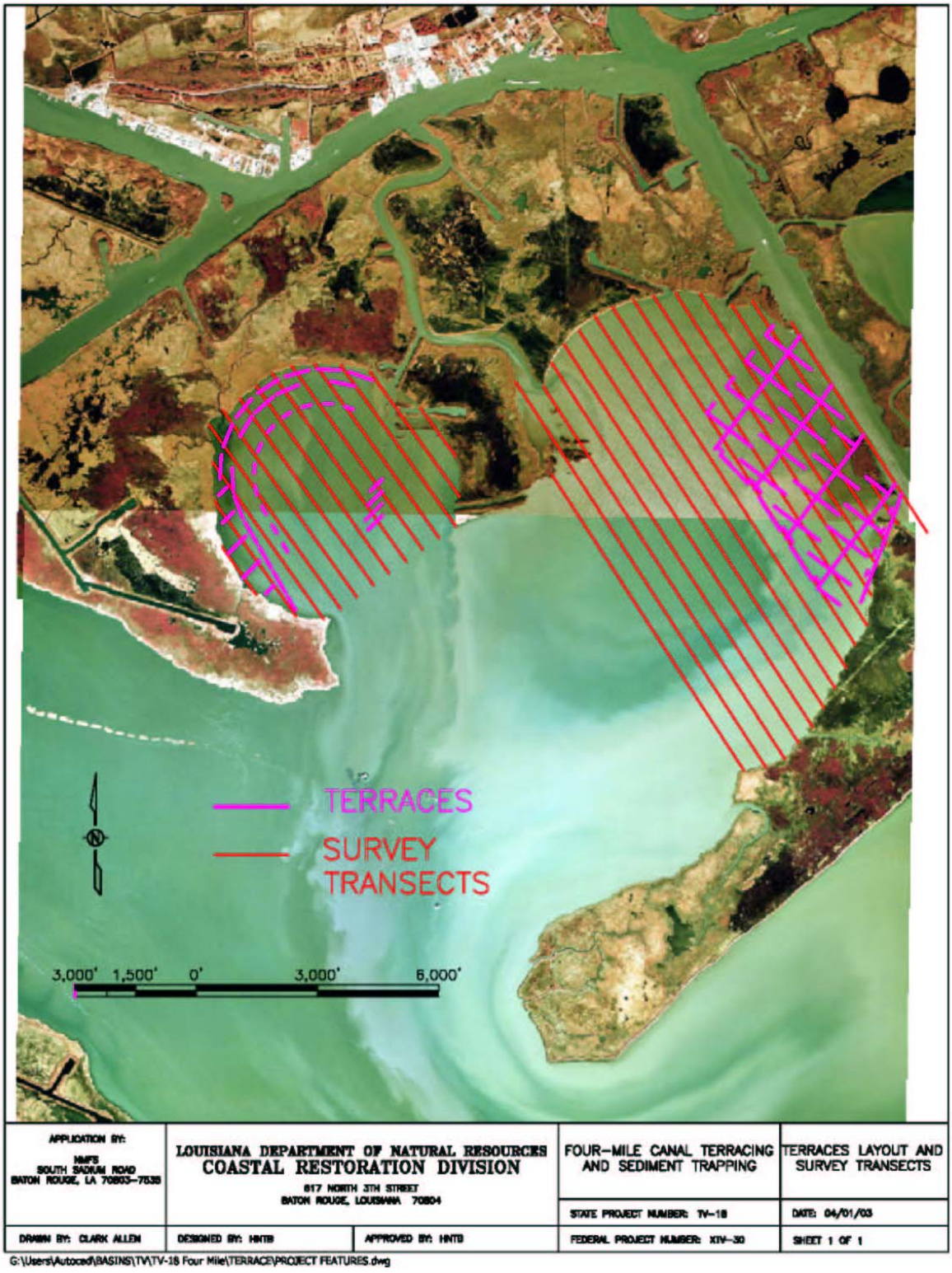

Figure 10. Layout for terraces and survey transects for Four-Mile Canal Terracing and Sediment Trapping (TV-18).

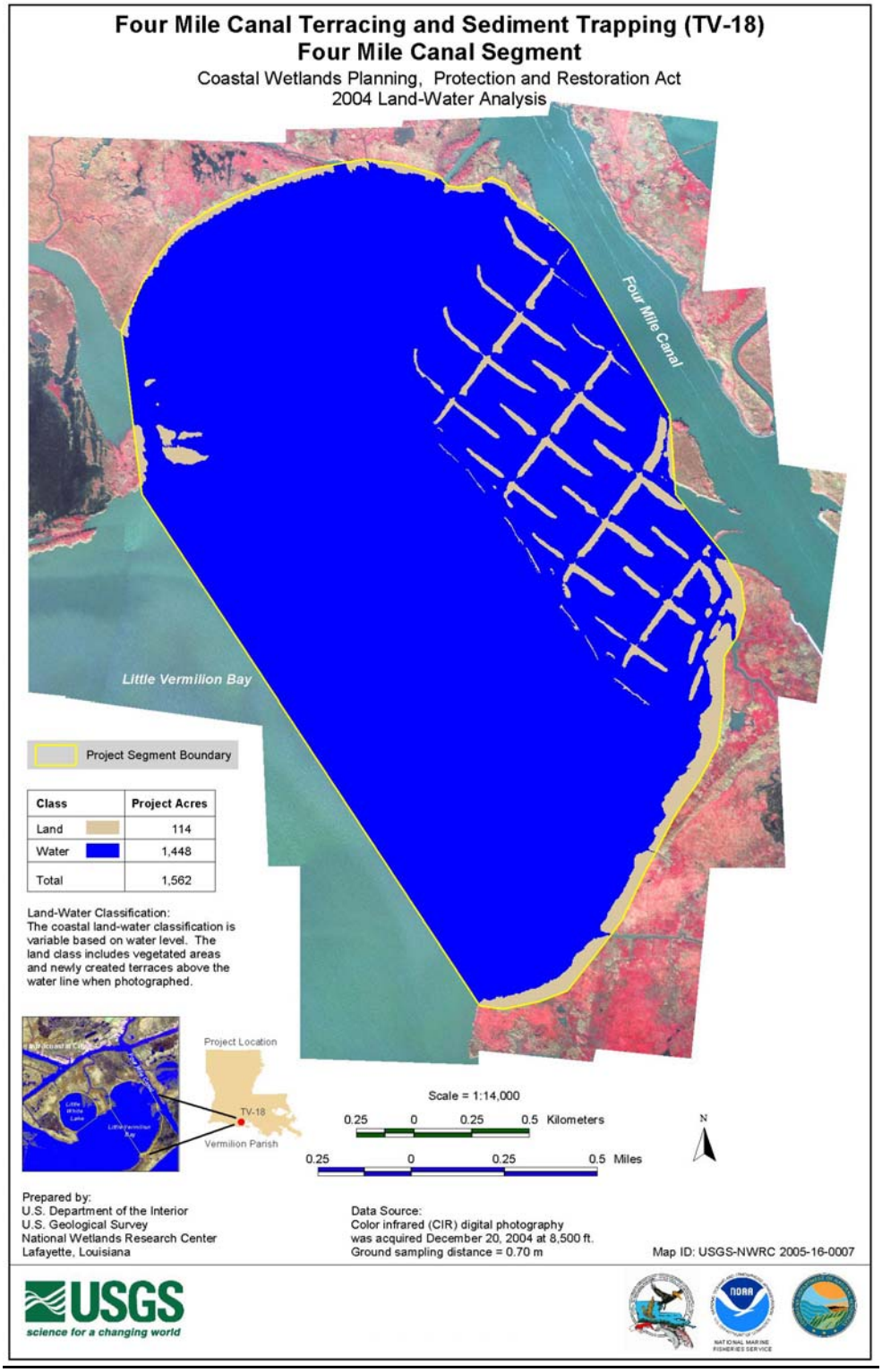

Figure 11. Four-Mile Canal Terracing and Sediment Trapping (TV-18) draft land to water analysis of the terraces located in Little Vermilion Bay.

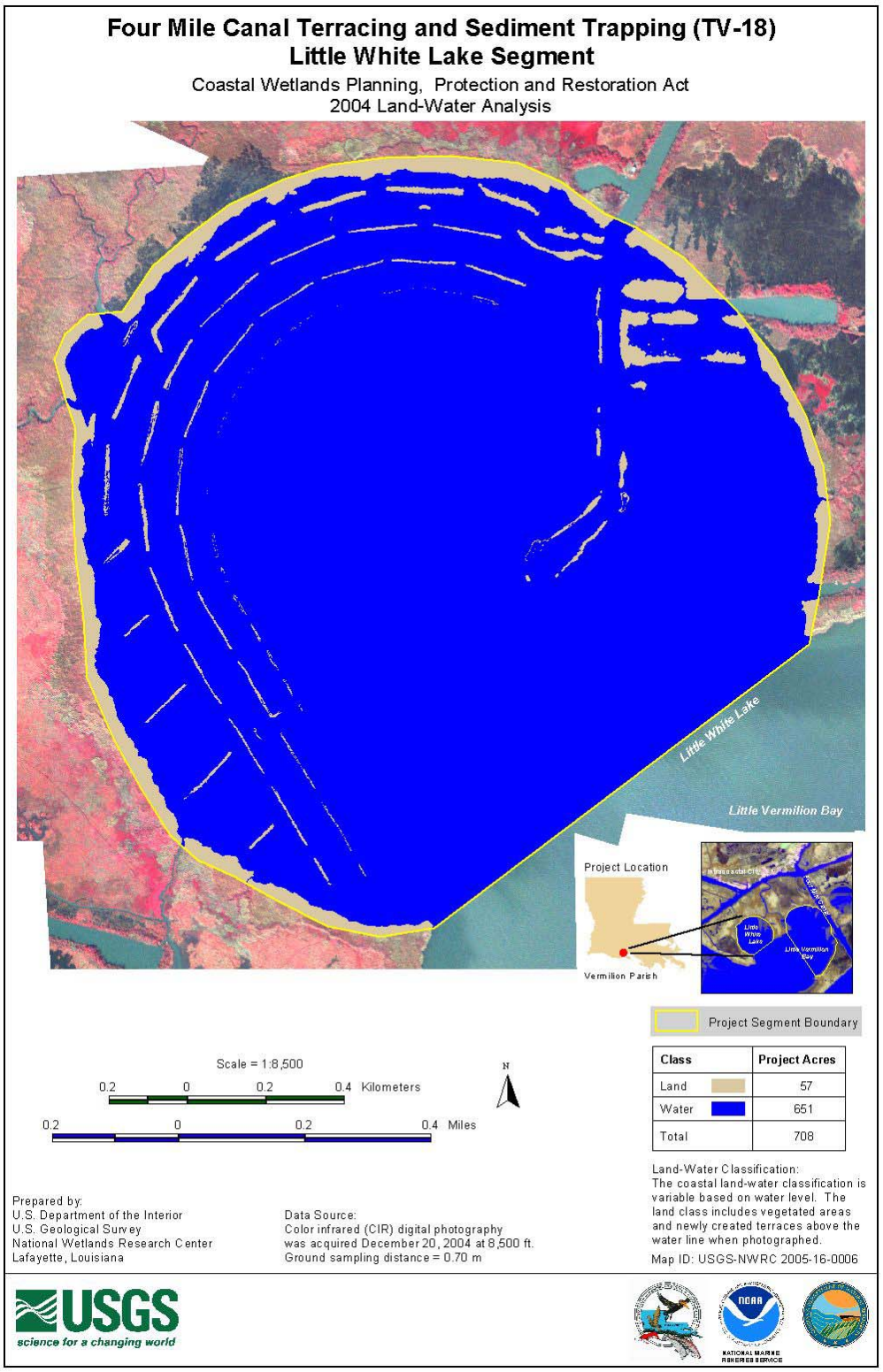

Figure 12. Four-Mile Canal Terracing and Sediment Trapping (TV-18) draft land to water analysis of the terraces located in Little White Lake.

IV. Conclusions

a. Project Effectiveness

The Four-Mile Canal Terracing and Sediment Trapping Project is in very good condition and functioning as intended.

b. Recommended Improvements

In order to evaluate earthen terrace settlement and any vertical accretion between the terraces, a structural assessment survey performed by a licensed engineering/ land surveying firm is recommended within the first five years of construction . The date of the assessment survey is to be agreed upon by the state and federal sponsor at the annual maintenance inspection.

Staff gauges should be installed at convenient locations when other survey work in the area is required.

c. Lessons Learned

Terraces created in high-energy environments such as the ones located adjacent to the Four-Mile Canal may benefit from a hard structure, fence, or breakwater to minimize the erosive effects from boat wake traffic.

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Appendix A
(Inspection Photographs)

Photo 1—Little White Lake terrace

Photo 2—Little White Lake terrace

Photo 3—Little Vermilion Bay terrace

Photo 4—Little Vermilion Bay terrace

Appendix B
(Three-Year Budget Projection)

FOUR MILE CANAL TERRACING AND SEDIMENT TRAPPING / TV18 / PPL9
Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/08

Project Manager	O & M Manager	Federal Sponsor	Prepared By
		NMFS	

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

05/06 Description:

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

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	**$ 4,955.00**	**$ 5,119.00**	**$ 5,288.00**

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

FOUR MILE CANAL TERRACING AND SEDIMENT TRAPPING/TV-18/PPL9

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	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: **$4,955.00**

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

FOUR MILE CANAL TERRACING AND SEDIMENT TRAPPING/TV-18/PPL9

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

FOUR MILE CANAL TERRACING AND SEDIMENT TRAPPING/TV-18/PPL9

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)

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: TV-18 Four Mile Canal

Date of Inspection: April 14, 2005 Time: 11:00 a.m.

Structure No. N/A

Inspector(s): Stan Aucoin, Darrell Pontiff, Pat Landry, Herb Juneau
John Foret

Structure Description: Terracing and Sediment Trapping

Water Level

Type of Inspection: Annual

Weater Conditions: Clear and mild

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps					
Steel Grating					
Stop Logs					
Hardware					
Timber Piles					
Timber Wales					
Galv. Pile Caps					
Vegetation	Good				
Signage /Supports					
Rip Rap (fill)					
Eathern Embankment Terraces	Good				Expected erosion on sacrificial terraces.

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