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Department of Natural Resources
Coastal Restoration Division and
Coastal Engineering Division

2007 Operations, Maintenance, and Monitoring Report

for

Grand-White Lakes Landbridge Protection

State Project Number ME-19
Priority Project List 10

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Vermilion Parish

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Grand-White Lakes Landbridge Protection (ME-19)

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I. Introduction

The Grand-White Lakes Landbridge Protection project is a shoreline protection project from the 10th priority list of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), comprising 1,530 ac (619 ha) of fresh marsh and open water in Cameron Parish, Louisiana. The project area includes Round Lake, a portion of the southwest Grand Lake shoreline, and the northern half of the shoreline of Collicon Lake. The project is located in the Mermentau Basin Lake's Sub-basin on the southeast shoreline of Grand Lake, from the old Gulf Intracoastal Waterway (GIWW) to the level of the northern edge of Round Lake, and eastward above Corp Mound Bayou to the eastern shore of Collicon Lake (figure 1).

In 1990, 29% of the project area was classified as fresh marsh, 71% as open water, and less than 1% as bottomland shrub/scrub (Clark et al. 1999]). In 1949, the entire project and reference area was classified as a *Cladium jamaicense* (sawgrass) marsh (O'Neil 1949). Sawgrass primarily grows in shallow, freshwater marshes, although it occasionally grows in and may even dominate some brackish water areas (Penfound and Hathaway 1938). Subsequent vegetation maps classify the project and reference area as fresh marsh (Chabreck and Linscombe 1978, 1988, 1997; Chabreck et al. 1968). Dominant emergent vegetation in the project area is *Sagittaria lancifolia* (bulltongue) with traces of *Sesbania drummondii* (rattlebox), *Triadica sebifera* (Chinese tallow), *Colocasia esculenta* (elephant ear), *Iris giganticaerulea* (giant blue iris), *Hibiscus moscheutos* L. ssp. *lasiocarpos* (crimsoneyed rosemallow), and *Hymenocallis caroliniana* (Carolina spiderlily) (Clark et al. 1999]).

Soils in the area between Grand Lake, Collicon Lake, and adjacent to the old GIWW are Larose muck. The northeastern shore of Collicon Lake consists of organic Allemands muck. Both Larose muck and Allemands muck are very poorly drained soils (United States Department of Agriculture, Soil Conservation Service [USDA/SCS] 1995).

Wind-induced erosion of the southeast shoreline of Grand Lake (15 mi [24.1 km] northwest fetch) and the west shoreline of Collicon Lake (2 mi [3.2 km] southeast fetch) has removed the lake rims and is endangering the narrow land bridge between the two lakes. The 3,000 ac (1,214 ha) Collicon Lake is in danger of breaching (< 500 ft) into the eastern portion of Grand Lake endangering the 13,281 acre (5374.6 ha) Grand-White Lakes Landbridge area. The small strip of marsh separating Collicon and Round Lake would be lost and the entire 1,530 ac (619 ha) project area would become part of Grand Lake. Shoreline erosion would accelerate in the marsh between the former Collicon Lake and Alligator Lake and Lake Le Bleu, which would also be in jeopardy of being converted to the open waters of Grand Lake. Measurements of shoreline loss at 10 transects at the southeast portion of Grand Lake yielded loss rates from 23.9 to 36.2 ft per year (7.3 to 11 m/yr) (Clark et al. 1999).

The objective of the project is to prevent the coalescence of Grand and Collicon lakes by:

a. Stopping erosion along the southeastern shoreline of Grand Lake and the north and western shorelines of Collicon Lake.
b. Creating a total of 17 acres of emergent marsh along the southeastern shoreline of Grand Lake and 10 acres of emergent marsh along the north and western shorelines of Collicon Lake.
c. Reducing erosion along the southern shoreline of Round Lake by 50 %.

The project features designed to attain the objectives described above were divided into two construction units (figure 2). Unit 1, or Grand Lake Shoreline Stabilization, features included installation of hard shoreline stabilization material lakeward of, and parallel to, the present Grand Lake southeastern shoreline. Subaerial land was created in open water behind the hard shoreline stabilization material with access channel spoil dredged during construction. More specifically, construction in this unit included the following items:

1. Excavation of a barge access canal lakeward of, and parallel to, the foreshore dike.
2. Placement of 12,024 ft (3,666 m) of limestone rock as a foreshore dike150–250 ft (45.72–76.2 m) lakeward of the shoreline, with 50 ft (15 m) gaps every 700–1,000 ft (213.36–304.8 m). The rock [+2.5 ft NAVD 88] was placed on geotextile fabric to a height of 1 ft (0.30 m) above average water level along the minus 1–2 ft depth contour. The foreshore dike initial height was 2.5 feet NAVD 88, with a 3 ft wide crown, a 29 ft (8.84 m) or less base width, and 3:1 side slopes. The gaps left in the foreshore dike and marsh creation area will provide for water exchange and fish access.
3. Use of the access canal spoil to create subaerial land behind the foreshore dike; the material will be seeded to reduce erosion and enhance marsh establishment (Clark and Dubois 2002).

In Unit 2, the Collicon Lake earthen terraces were constructed to create marsh, facilitate marsh building by trapping suspended sediments in adjacent shallow open water, stimulate the growth of submerged aquatic vegetation, and reduce erosion of fringing fresh marsh. Unit 2 construction features consist of the following items:

1. Construction of two rows of 83 ft (25 m) – 385 ft (117 m) long terrace segments (92 total segments), with gaps between each segment. Total length was 19,544 ft (5,959 m).
2. Planting of terrace tops with three rows of 4-inch diameter containers of *Paspalum vaginatum* (seashore paspalum) planted on 5 ft (1.52 m) centers. Terrace side slopes were planted with gallon containers of *Zizaniopis miliacea* (giant cutgrass) in one row on 5 ft (1.52 m) centers. The side slope facing Collicon Lake had two rows on 5 ft (1.52 m) centers.
3. Vegetation planting along the southern shoreline of Round Lake included planting one row of gallon containers of *Z. miliacea* (giant cutgrass) alternated

with *Schoenoplectus californicus* (California bulrush) on 5 ft (1.52 m) centers for a total distance of 4,000 ft (1,219.2 m).

Construction of the foreshore rock dike was initiated in July 2003 and completed in November 2003. Construction of the lake terraces was initiated in July 2004 and completed in September 2004.

Hurricane Rita struck the coast of southwestern Louisiana on September 24, 2005, with maximum storm surge of 9 ft (2.7 m) in the ME-19 project area. USGS calculated the amount of land that changed to water resulting from the storm to be 98 square miles in southwestern Louisiana, with 62 square miles in the Mermentau basin (Barras 2006). This loss can be attributed to shearing, the ripping and removal of marsh vegetation in historically healthy marshes, which was observed in marshes bordering the east bank of Freshwater Bayou. The removal of remnant marsh from areas with historical land loss from the surge was observed due east of Pecan Island, south of Sweet Lake, and due east of Deep Lake.

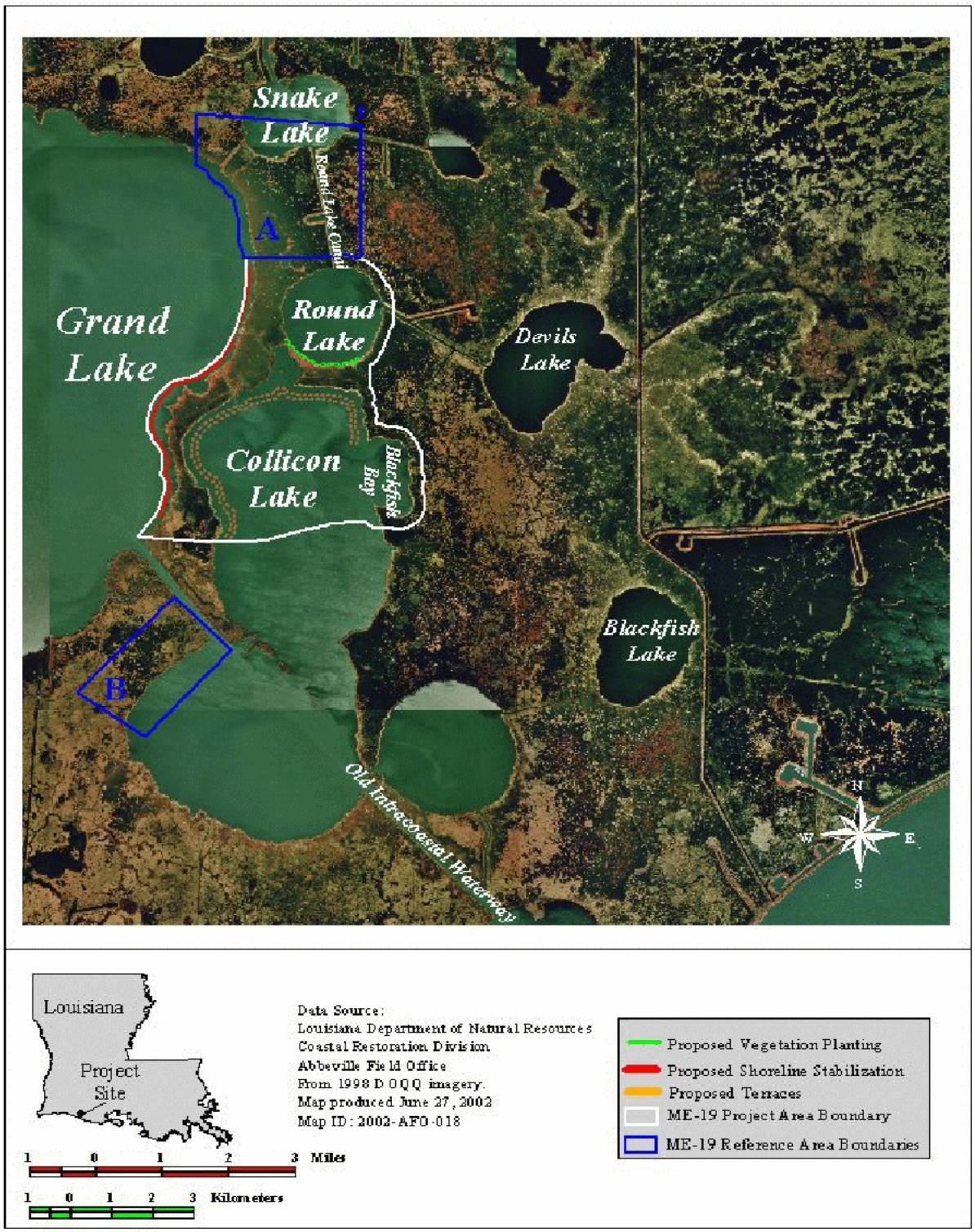

Figure 1. Grand-White Lakes Landbridge Protection Project (ME-19/PME-18) project and reference area showing shoreline planting, shoreline stabilization, and terrace locations.

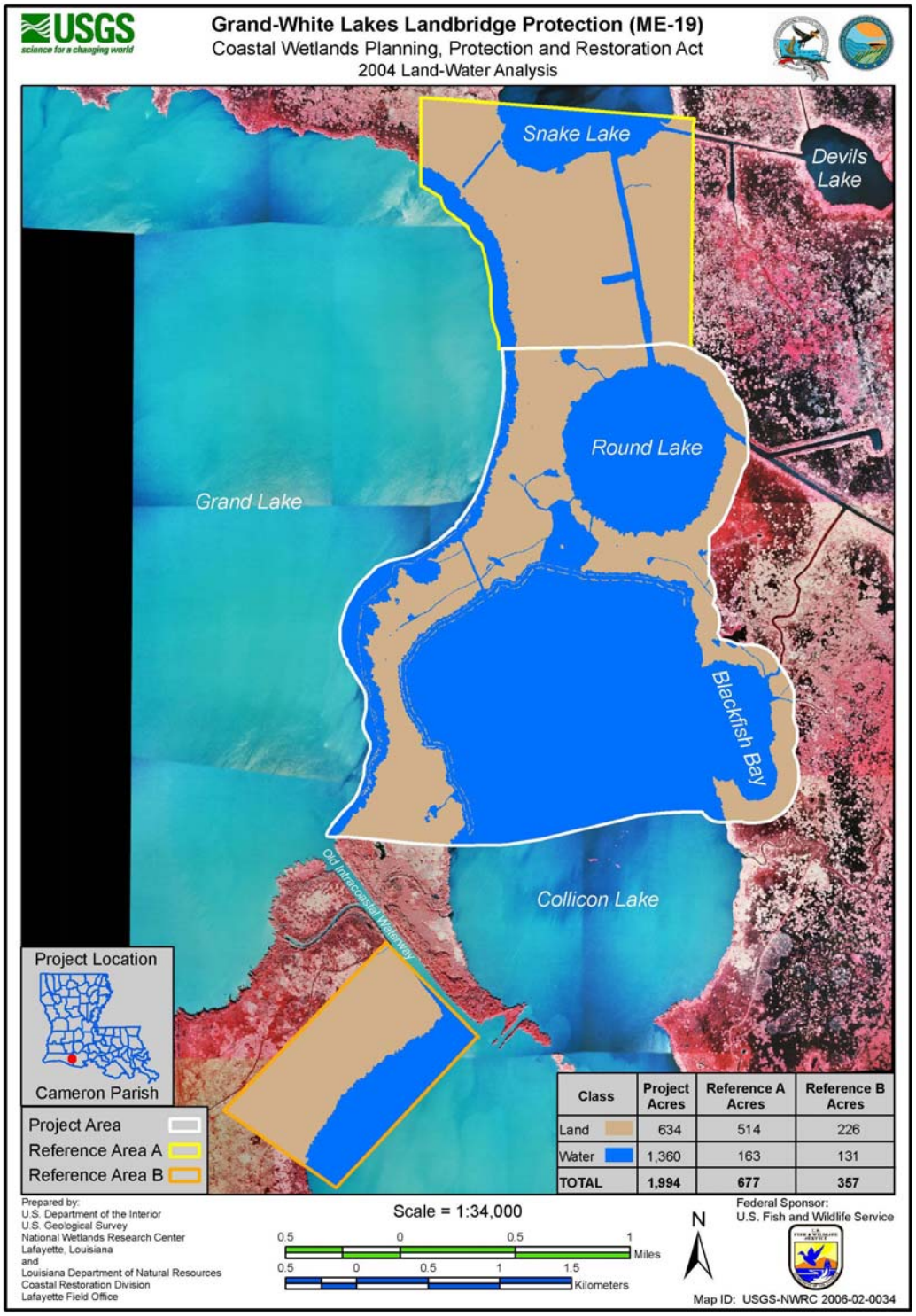

Figure 2. Land to water analysis for Grand-White Lakes Landbridge Protection Project (ME-19), flown November 24,, 2004, following completion of construction.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Grand-White Lakes Landbridge Protection Project (ME-19) is to evaluate the constructed project features, 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, 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, if any, which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance, and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C.

An inspection of the Grand-White Lakes Landbridge Protection Project (ME-19) was held on June 15, 2007, under clear skies and warm temperatures. In attendance were Mel Guidry and Stan Aucoin of LDNR, Darryl Clark of the U.S. Fish and Wildlife Service (USFWS), and Chad Courville and Ted Johanon of Miami Corporation. All parties met at the boat launch on the Superior Canal, and traveled north to the Grand-White Lakes Landbridge Protection Project site. The annual inspection began at approximately 10:00 a.m. at the southeastern end of the rock dike along Grand Lake.

The field inspection included a complete visual inspection of all project features. Staff gauge readings were used to determine approximate elevations of water, earthen terraces, rock dike, and other project features. Photographs were taken at each project feature (see Appendix B) and field inspection notes were completed in the field to record measurements and any notable deficiencies (see Appendix D).

b. Inspection Results

Grand Lake Shoreline Protection

The foreshore rock dike feature is in excellent condition. No maintenance is required at this time. (Photos: Appendix B, Photos 1 and 2)

Collicon Lake Terraces

Marsh side and lake side earthen terraces along Collicon Lake continue to experience erosion, with the lake side sacrificial terraces being more severe. Original giant cutgrass plantings along the marsh side terraces were visible. (Photos: Appendix B, Photos 3 and 4)

II. Maintenance Activity (continued)

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

None at this time.

ii. Programmatic/ Routine Repairs

Install vegetative plantings on the Collicon Lake terraces.

d. Maintenance History

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since September 2004, the construction completion date of the Grand-White Lakes Landbridge Protection Project (ME-19).

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 required structural operations.

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 ME-19 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. There is one CRMS-*Wetlands* site in the ME-19 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 ME-11 project area (Appendix A).

a. Monitoring Goals

The objective of the Grand-White Lakes Landbridge Protection Project is to prevent the coalescence of Grand and Collicon lakes by stopping erosion along the southeastern shoreline of Grand Lake and the north and western shorelines of Collicon Lake, by creating emergent marsh along the southeastern shoreline of Grand Lake along the north and western shorelines of Collicon Lake, and by reducing erosion along the southern shoreline of Round Lake by 50 %.

The following goals contribute to the evaluation of the above objective.

1. Evaluate changes in land:water ratios.
2. Evaluate rate of erosion along the eastern shoreline of Grand Lake and the north western shoreline of Collicon Lake.
3. Evaluate establishment of emergent vegetation on planted terraces.
4. Evaluate changes in elevation and landscape integrity due to the accumulation and erosion of sediments in landbridge areas.

b. Monitoring Elements

Aerial Photography

To evaluate the extent of marsh creation and erosion adjacent to project features, near-vertical, color-infrared aerial photography (1:12,000 scale) was obtained in project and reference areas as built, and will be obtained in post-construction year 2013. The photography was georectified and mosaicked, and land/water ratios determined using standard operating procedures described in Steyer et al. (1995, revised 2000).

Shoreline Survey

To document annual shoreline movement, differential GPS was used to map the shoreline in both the project and reference areas. Differential GPS was used as described in Steyer et al. (1995). Differentially corrected GPS data sets were obtained in 2003 (as built rock) and 2004

(as built terraces), and post-construction in years 2006, and will be obtained in 2008, 2013, and 2021. GPS data was taken during the spring of each monitoring year to minimize errors associated with collecting data at different times of the year.

Terrace Vegetation

The condition of the natural emergent, seeded, and planted vegetation on the terraces over the life of the project was monitored at sampling stations established systematically on 10% of the total planted terraces using a modified Braun-Blanquet sampling method as outlined in Steyer et al. (1995). Plots were established across selected terraces to include both high and low energy environments. Four sampling plots were established on selected terraces including a plot on the inner and outer slope and two plots on the crown. Twelve terraces were selected, one beginning at the northeast portion of Collicon Lake where the terraces are located and ending at the northwest portion of the lake. At each station, percent cover, dominant plant heights, 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 fall of 2004 (as built) and 2005, and will be sampled in the fall of 2008, 2013, and 2021.

c. Preliminary Monitoring Results and Discussion

Aerial Photography

Aerial photography for the project area was flown on November 25, 2004. The results of the 2004 aerial photography shows the total project area consisted of 1,994 ac (806.9 ha) with 634 ac (256.6 ha) of land and 1,360 ac (550.3 ha) of water (figure 2). The reference for the project is divided into two sections, one to evaluate the shoreline behind rock foreshore dike and the other to evaluate the shoreline behind the terraces over time. The reference area for the foreshore dike total was 677 ac (273.9 ha) with 514 ac (208 ha) of land and 163 ac (66 ha) of water. The reference area for the terraces total was 357 ac (144.5 ha) with 226 ac (91.5 ha) of land and 131 ac (ha) of water. Evaluation of project area and reference areas for marsh creation and erosion will be determined after the post-construction photographs are obtained in 2013.

Shoreline Survey

Analysis of as built Differential GPS (DGPS) sampled on November 11, 2003, was compared to post-construction DGPS sampled August 30, 2006, to evaluate the shoreline behind the foreshore dike. Change rates were calculated in m/yr for the length of the project area and the reference area along transects spaced 20 m apart (figures 3 and 4). Change rates were determined and averaged from each transect along the shoreline. The rate of change behind the foreshore dike indicated an average loss of -0.54 m/yr. The rate of change on the reference area is an average loss of -0.24 m/yr. DGPS of the as built shoreline behind the terraces and its reference area was taken on October 9, 2004. Analysis of this area will be determined after the next DGPS scheduled in 2007.

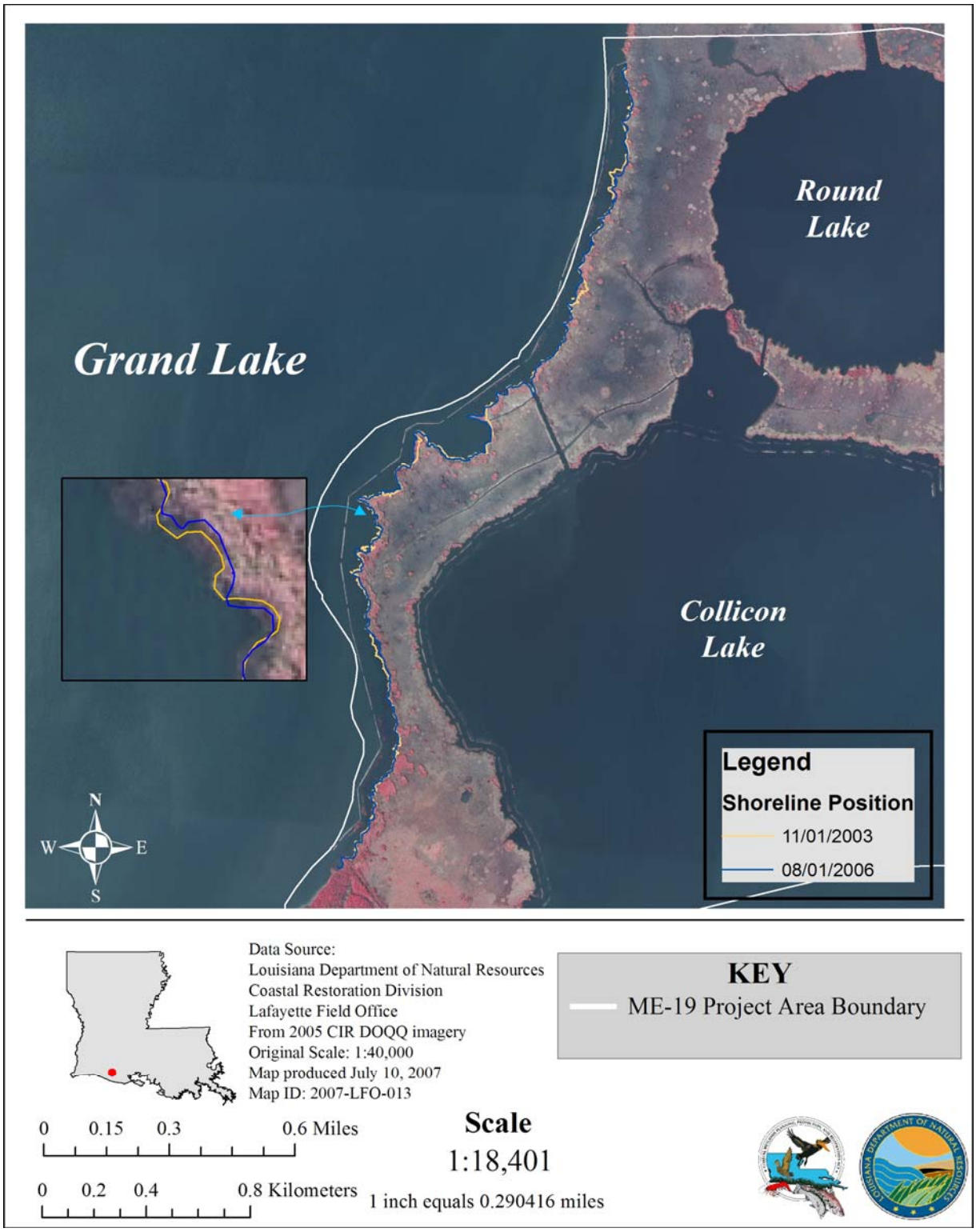

Figure 3. Shoreline change map of the Grand-White Lakes Landbridge Protection (ME-19) project for the period of record of November 11, 2003, to August 30, 2006.

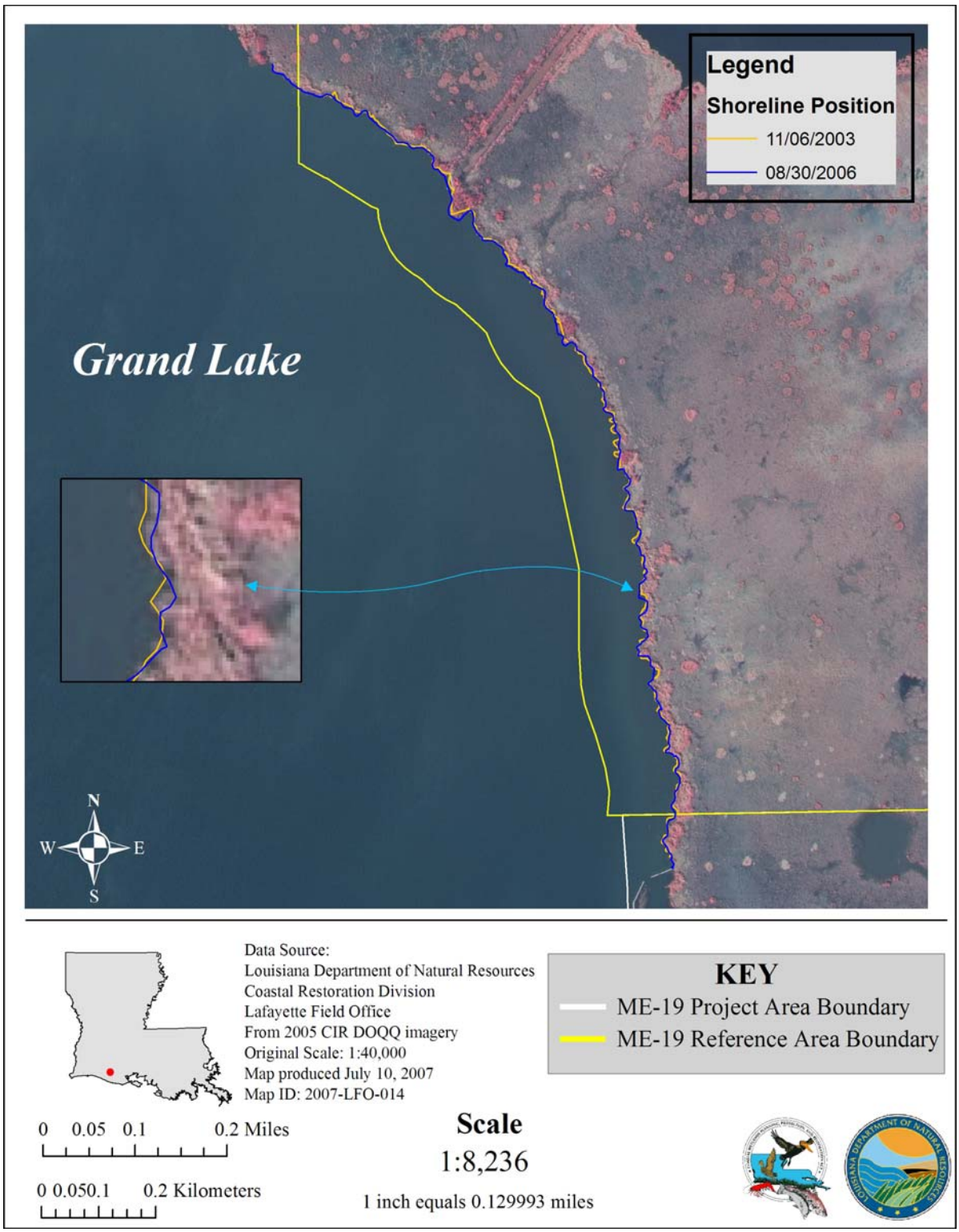

Figure 4. Shoreline change map of the Grand-White Lakes Landbridge Protection (ME-19) reference area for the period of record of November 11, 2003, to August 30, 2006.

Terrace Vegetation

Vegetation data on the constructed terraces were collected November 4, 2004, and October 31, 2005. The 2005 data were collected 37 days after Hurricane Rita made landfall in Cameron Parish. To evaluate establishment of emergent vegetation on the terraces mean percent cover, mean species richness, and mean cover of the planted vegetation were calculated. Mean percent cover of the vegetation within the plots increased from 2004 to 2005, but this increase was not significant due to the high variability in cover values. Species richness was significantly lower in 2005 (figure 5). The data were evaluated with consideration to the energy environment, high wave energy on the lake side compared to lower wave energy on the marsh side (figure 6). There were no significant differences in mean percent cover over time between energy environments. Comparison of species richness between energy environments was significant, indicating that marsh side terraces had more species than lake side terraces and that there were more species in 2004 than in 2005. The number of species in both terrace groups decreased at the same rate, which indicates that they responded similarly to the impacts of Hurricane Rita.

Species occurrence on terraces between years were plotted in figure 7. *Zizaniopis miliacea,* which was planted on the terrace slopes, decreased in occurrence from 2004 to 2005. *Paspalum vaginatum,* which was planted on the terrace crowns, increased in occurrence over time. Weifenbach and Sharp (2006) reported an increase in *Paspalum* species in all marsh types in southwestern Louisiana post-Hurricane Rita. *Echinochloa crus-galli,* which had been seeded on the crown, did not occur in the 2005 sampling. The overall appearance and health of all species present at the 2005 sampling were considered to be stressed and adversely affected by Hurricane Rita (figures 8 and 9).

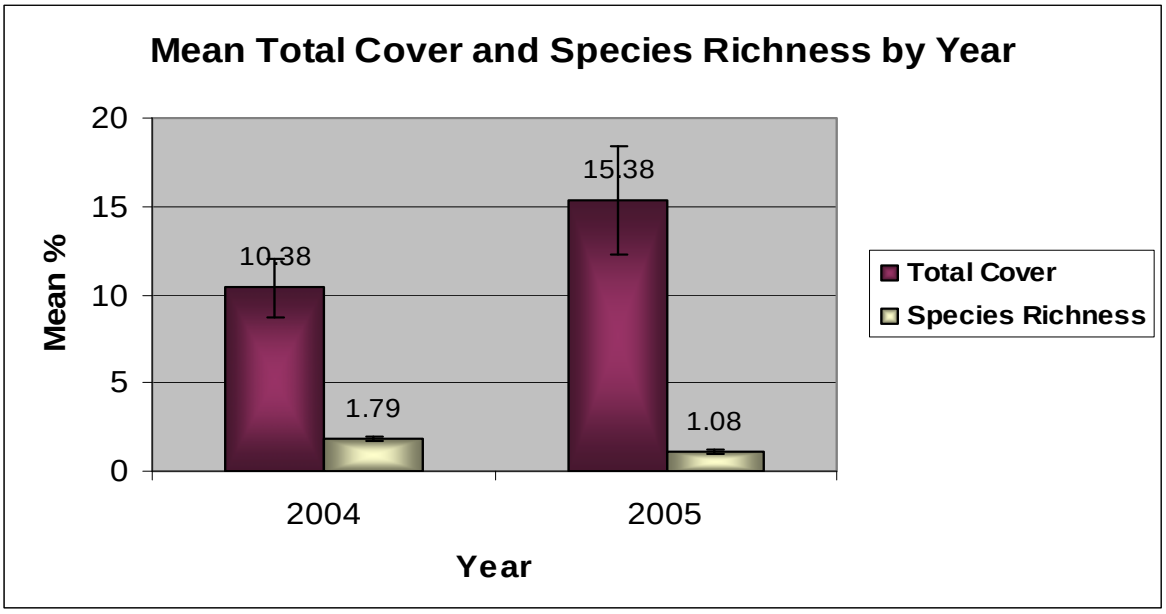

Figure 5. Mean total % cover and mean % richness of sampled vegetation for the period of record of November 4, 2004, to October 31, 2005. LS Mean ± SE, n=96 stations, $F_{1,94}$=14.22; p=0.0003.

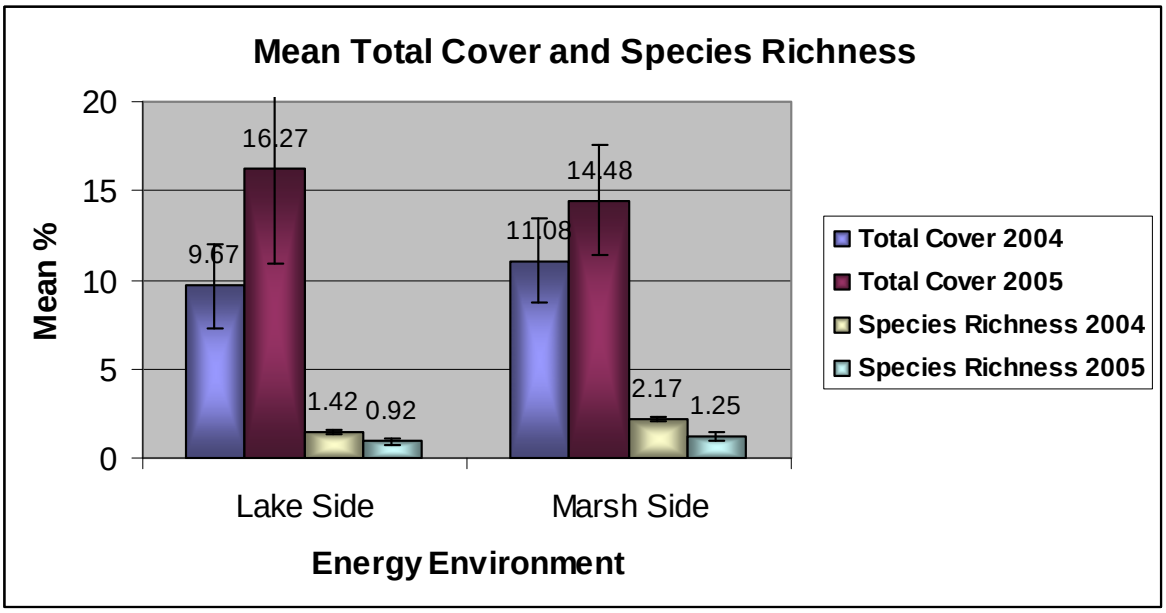

Figure 6. Mean total % cover and mean % richness of sampled vegetation over time and between the high energy environment of the lake terraces and the low energy environment of the marsh terraces.

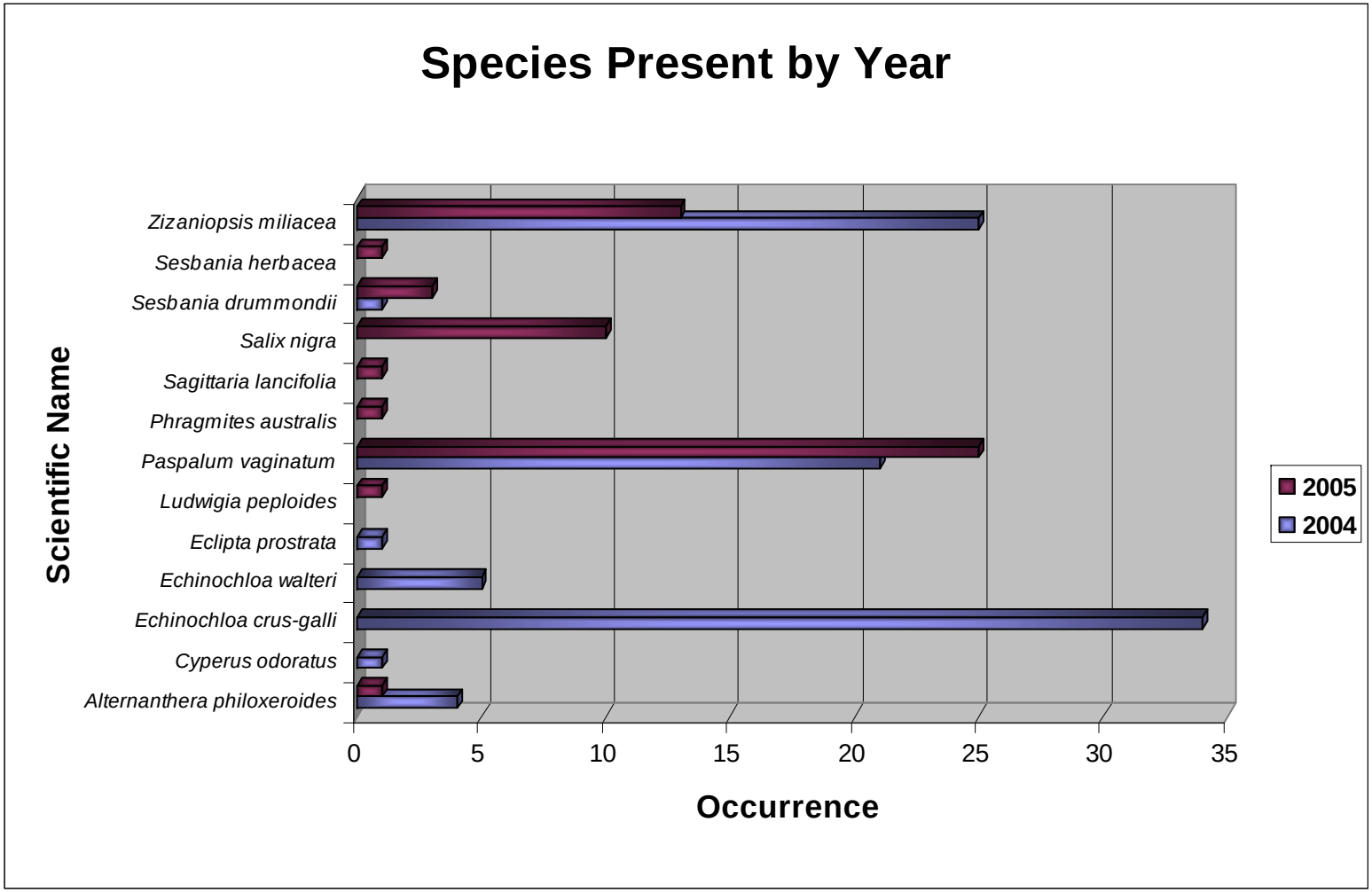

Figure 7. Species occurrence on terraces. Planted species were *Zizaniopsis miliacea* on terrace slopes and *Paspalum vaginatum* on crowns. *Echinochloa crus-galli* was seeded on crowns.

Figure 8. Photo of monitored terrace; taken October 31, 2005.

Figure 9. Photo of planted *Paspalum vaginatum* planted on crowns of terraces; taken October 31, 2005.

V. Conclusions

a. Project Effectiveness

The shoreline behind the foreshore rock dike experienced a slightly greater average loss per year than the reference area. Because the shoreline survey was conducted one year after Hurricane Rita, this loss could be attributed to storm impacts. The shoreline behind the terraces will be evaluated after the next sampling date. Visual inspection of the lakeside terraces indicates heavy erosion. The *Zizaniopsis miliacea* plantings on the terrace slopes were impacted by sloughing of the soils. There was no evidence of *Echinochloa crus-galli*, that had been seeded on the terraces. It is difficult to attribute the response of the planted and seeded vegetation to the project features, instead, due to storm impacts.

b. Recommended Improvements

Overall, the foreshore rock dike feature of the Grand-White Lakes Landbridge Protection Project is in excellent condition and is functioning as designed, however some maintenance on the terraces is required as listed below. Plans and specifications will be prepared to address these issues in 2007/2008.

- Install 5,000 vegetative plantings on the Collicon Lake terraces.

c. Lessons Learned

The lakeside terraces are in a state of decline due to the high energy environment on Collicon Lake. Armoring the lakeside slope of terraces should be considered. Replanting and rebuilding the existing ME-19 terraces at a different orientation should also be considered. The terraces in the Little White Lake section of the Four-Mile Canal Terracing and Sediment Trapping (TV-18) Project were oriented both parallel and perpendicular to the shoreline to reduce erosion and to allow more sediment capture. However, the amount of available sediment in Collicon Lake is much less than that of the TV-18 Project, which has a defined channel delivering sediment into the project area.

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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), 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-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).

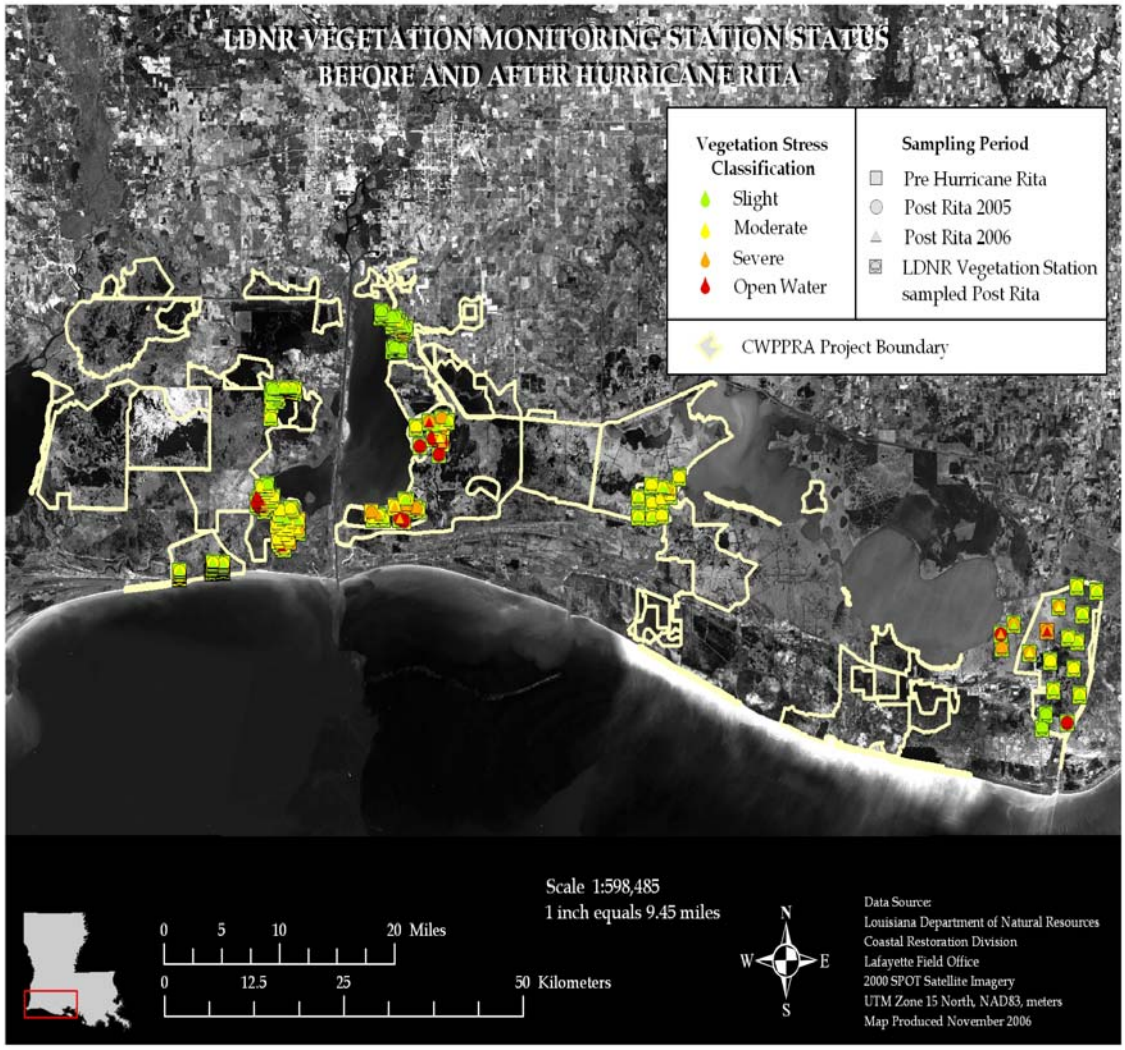

Figure 1. Location and status of LDNR vegetation stations sampled after Hurricane Rita. Stations were classified according to storm induced stress as described in Table 1.

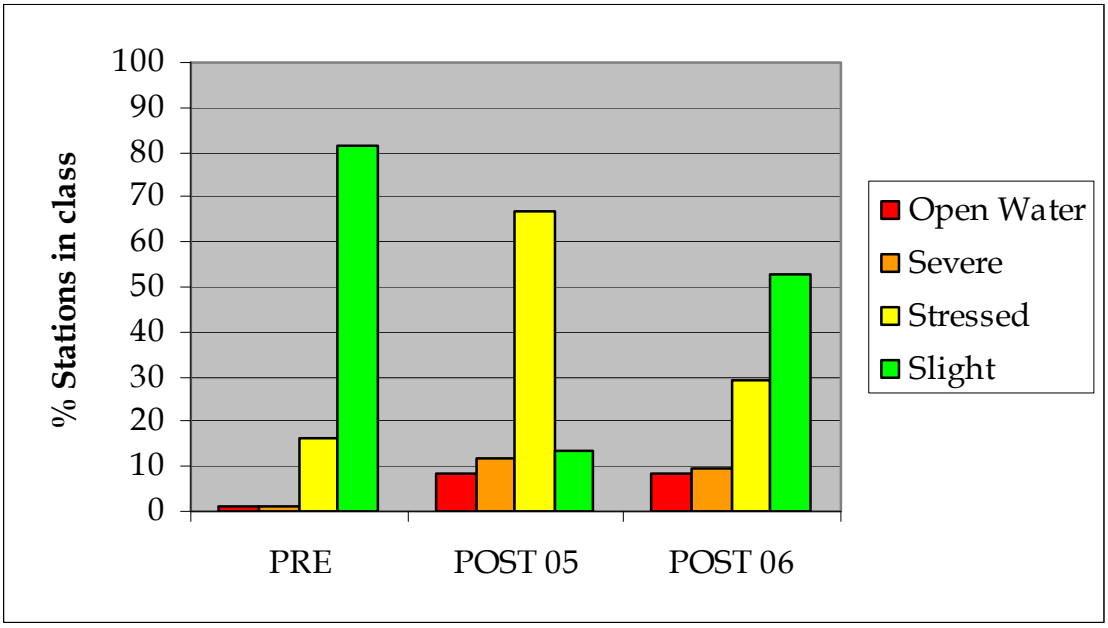

Figure 2. Percent of LDNR vegetation stations in each stress class before and after Hurricane Rita (n=163).

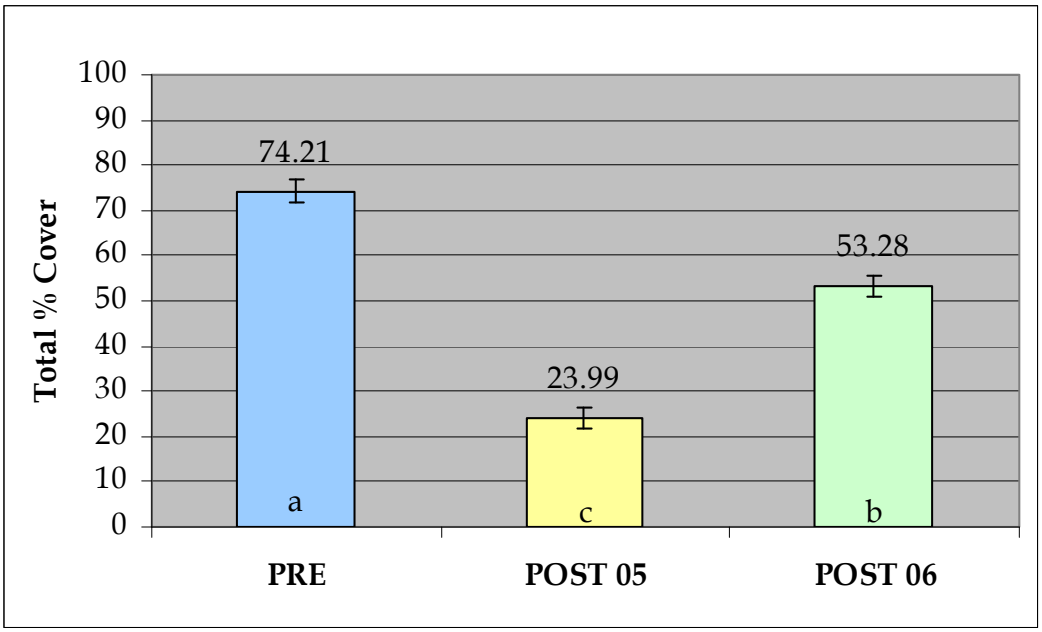

Figure 3. Total % Cover pre- and post-Hurricane Rita. LS Mean ± SE, n=163 stations, $F_{2, 488}$=109.7, p<0.0001. Levels not connected by same letter are significantly different.

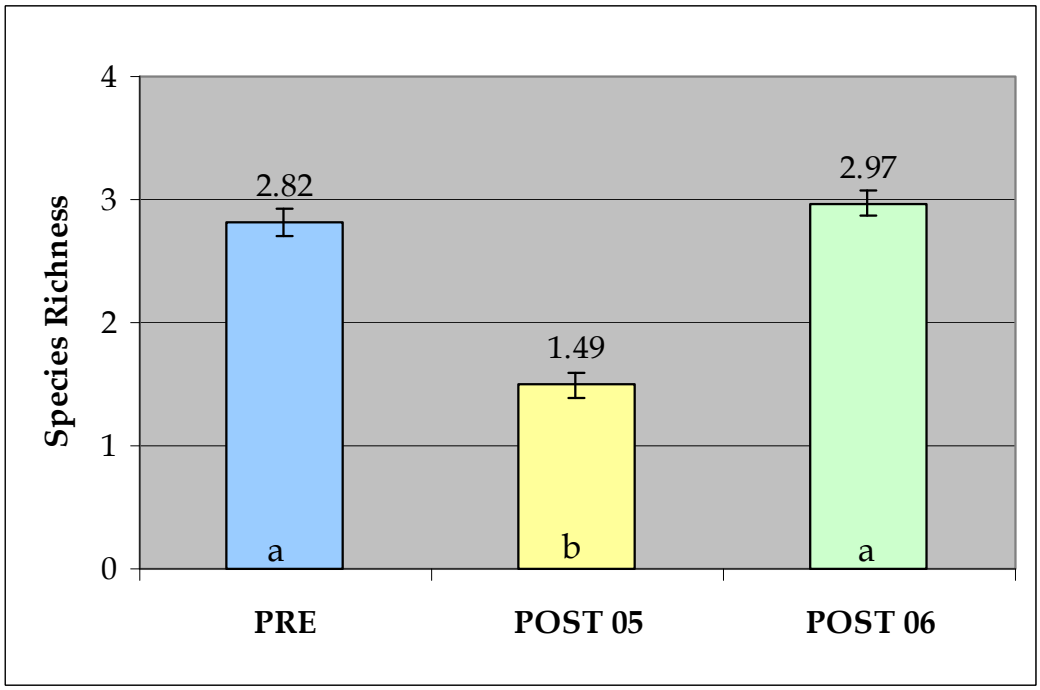

Figure 4. Species Richness pre- and post-Rita. LS Mean ± SE, n=163 stations, $F_{2, 488}$=56.8, p<0.0001. Levels not connected by same letter are significantly different.

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.

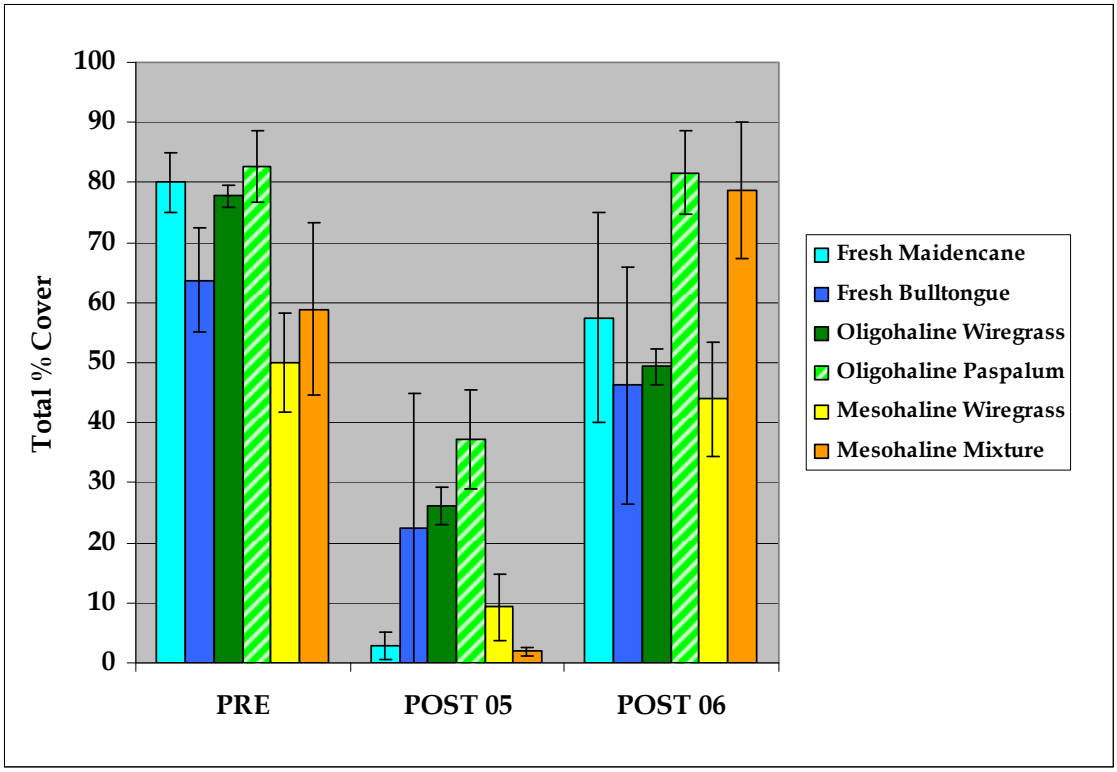

Figure 5. Total % Cover by Visser Vegetation Type. LS Mean ± SE, n=163 stations, $F_{17, 488}$=17.0, p<0.0001.

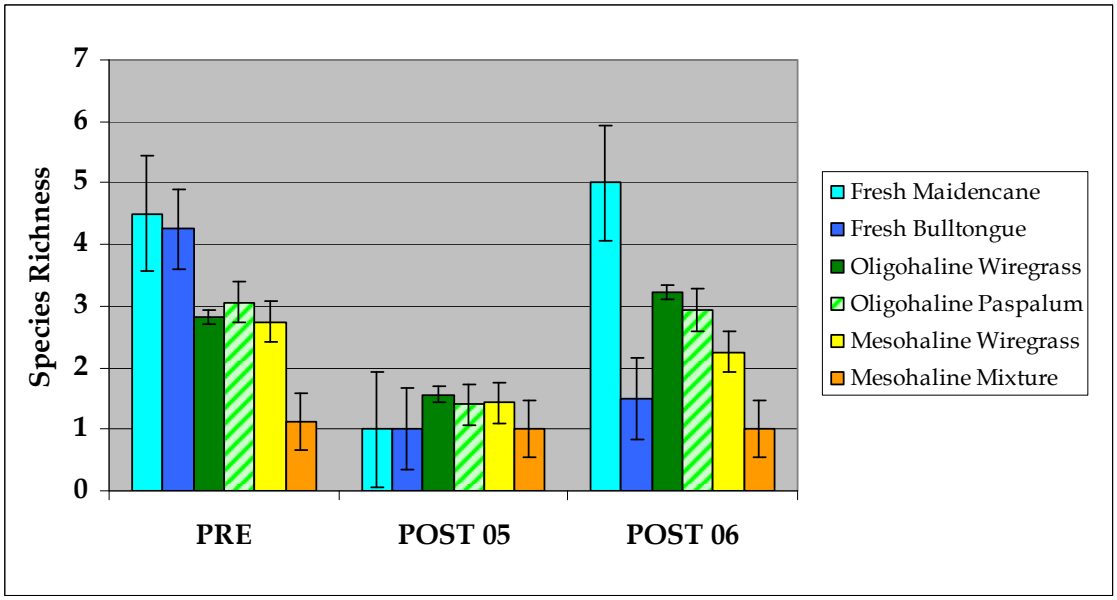

Figure 6. Species Richness by Visser Vegetation Type. LS Mean ± SE, n=163 stations, $F_{17, 488}$=10.9, p<0.0001.

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, Typical rock dike.

Photo 2, Rock foreshore dike.

Photo 3, Earthen terraces.

Photo 4, Earthen terraces.

APPENDIX C
(Three Year Budget Projection)

Appendix C
(Three Year Budget Projection)
GRAND-WHITE LAKES LANDBRIDGE/ ME-19 / PPL 10
Three-Year Operations & Maintenance Budgets 07/01/2007 - 06/30/10

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

	2007/2008	2008/2009	2009/2010
Maintenance Inspection	$ 5,407.00	$ 5,570.00	$ 5,737.00
Structure Operation			
Administration	$3,000.00	$ -	$ -
Maintenance/Rehabilitation			

07/08 Description: Planting contract on lakeside terraces.

E&D	$10,000.00
Construction	$50,000.00
Construction Oversight	$10,000.00
Sub Total - Maint. And Rehab.	$ 70,000.00

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	**$ 78,407.00**	**$ 5,570.00**	**$ 5,737.00**

O &M Budget (3 yr Total)	**$ 89,714.00**
Unexpended O & M Budget	**$ 1,129,012.45**
Remaining O & M Budget (Projected)	**$ 1,039,298.45**

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

GRAND-WHITE LAKES LANDBRIDGE / PROJECT NO. ME-19 / PPL NO. 10

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	$10,000.00	**$10,000.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$10,000.00	**$10,000.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	1	$2,000.00	$2,000.00
FEDERAL SPONSOR Admin.	LUMP	1	$1,000.00	$1,000.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$3,000.00**

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:	Repair bank erosion at Grand Bayou & Mangrove structures, replace composite marine timber at Mangrove boat guide.				
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
Bank Paving	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		$0.00	$0.00
Navigation Aid		EACH		$0.00	$0.00
Signage		EACH		$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
Vegetative Plantings		EACH	5,000	$10.00	$50,000.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$50,000.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$78,407.00**

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

GRAND-WHITE LAKES LANDBRIDGE / PROJECT NO. ME-19 / PPL NO. 10

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 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:				
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: Repair bank erosion at Grand Bayou & Mangrove structures, replace composite marine timber at Mangrove boat guide.

Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
Bank Paving	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		$0.00	$0.00
Navigation Aid		EACH		$0.00	$0.00
Signage		EACH		$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
Vegetative Plantings		EACH	0	$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

GRAND-WHITE LAKES LANDBRIDGE / PROJECT NO. ME-19 / PPL NO. 10

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 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:				
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: Repair bank erosion at Grand Bayou & Mangrove structures, replace composite marine timber at Mangrove boat guide.

Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
Bank Paving	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		$0.00	$0.00
Navigation Aid		EACH		$0.00	$0.00
Signage		EACH		$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
Vegetative Plantings		EACH	0	$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:ME-19 Grand-White Lake Landbridge

Date of Inspection: June 15, 2007 Time: 10:00 am

Structure No.

Inspector(s):Mel Guidry, Stan Aucoin (LDNR), Darryl Clark (USFWS)
Chad Courville & Ted Johanon (Miami Corp)

Structure Description: Rock Dike and Earthen Terraces

Water Level Inside: Outside: _____

Type of Inspection: Annual

Weather Conditions: Sunny and 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) Rock Dike	Good			1 & 2	Rock dike is in very good shape.
Earthen Terraces	Fair			3 & 4	Terraces will require vegetative planting.

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?