



**Coastal Protection and Restoration
Authority of Louisiana
Office of Coastal Protection and
Restoration**

**2008 Operations, Maintenance,
and Monitoring Report**

for

**PERRY RIDGE WEST BANK
STABILIZATION**

State Project Number CS-30
Priority Project List 9

April 2009
Calcasieu Parish

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2008 Operations, Maintenance, and Monitoring Report
For
Perry Ridge West Bank Stabilization (CS-30)

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I. Introduction

The Perry Ridge West project is located in the Calcasieu-Sabine Basin and is included in Region 4 of the Coast 2050 Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). The major problem in this region is marsh erosion caused by salt water intrusion, rapid water level fluctuation, and wave action (U.S. Department of Agriculture, Soil Conservation Service [USDA/SCS] 1988). Many canals have been dug to aid in navigation, mineral extraction, hunting, and fishing. The project area is located along the northern bank of the Gulf Intracoastal Waterway (GIWW) between Perry Ridge and the Sabine River and is comprised of 1,132 acres (458 ha) of fresh and intermediate marsh in Calcasieu Parish, Louisiana.

The GIWW is the dominant hydrologic influence in the project area, the construction of which has caused the area to become a tidal system. The GIWW crosses the entire region and allows salt water to encroach into traditionally freshwater areas. The use of double wide barges allowed in the section of the GIWW adjacent to the project area, has accelerated wave-induced erosion of the remaining spoil bank and marsh vegetation. The current estimate of the rate of shoreline erosion along the GIWW is 3.9 ft/yr (1.2 m/yr) (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA-NRCS] 1999). Amplification of the effects of meteorological events has occurred as well, as water levels can fluctuate as much as 2 ft (0.7 m) due to strong northerly winds and 10 ft (3 m) during a tropical storm or hurricane. This area has also exhibited tremendous wetland vegetation loss since 1956, as indicated by habitat change analysis (Balkum 2000). Bank stabilization of the GIWW is, therefore, a necessary restoration strategy.

In addition, there is no significant source of sediment in Region 4. Vertical accretion of the wetlands in this region must, therefore, be achieved predominately by organic production. Terracing and vegetative plantings are common restoration strategies that have been applied in this Region.

Construction of the rock dike portion of the project was completed in December 2001 and the terrace portion of the project was completed in July 2002 and included the following features:

1. A 10,704 linear ft (3,263 m) free-standing rock dike was constructed parallel to the existing shoreline. The centerline of the rock dike was positioned at the location where the existing bottom elevation was approximately -1.0' NAVD 88. The rock dike was constructed as a peaked dike (no top width) to an elevation of +3.7 NAVD 88 with 2 horizontal to 1 vertical side slopes using COE R-650 gradation rock riprap.
2. An earthen plug, approximately 350 ft (107 m) in length, was constructed to close a breach in the existing spoil bank of the GIWW adjacent to the project.



3. A total of 22,952 linear ft (6,996 m) of shallow water terraces were constructed in open water areas in the interior emergent marsh. The terraces were constructed of native earthen material to an elevation of +2.5' NAVD 88 with a 4' top width and 3 horizontal to 1 vertical side slopes.

4. After construction, 9,400 trade-gallon size containers of *Schoenoplectus californicus* (California bullwhip) were planted along the perimeter of the constructed terraces.



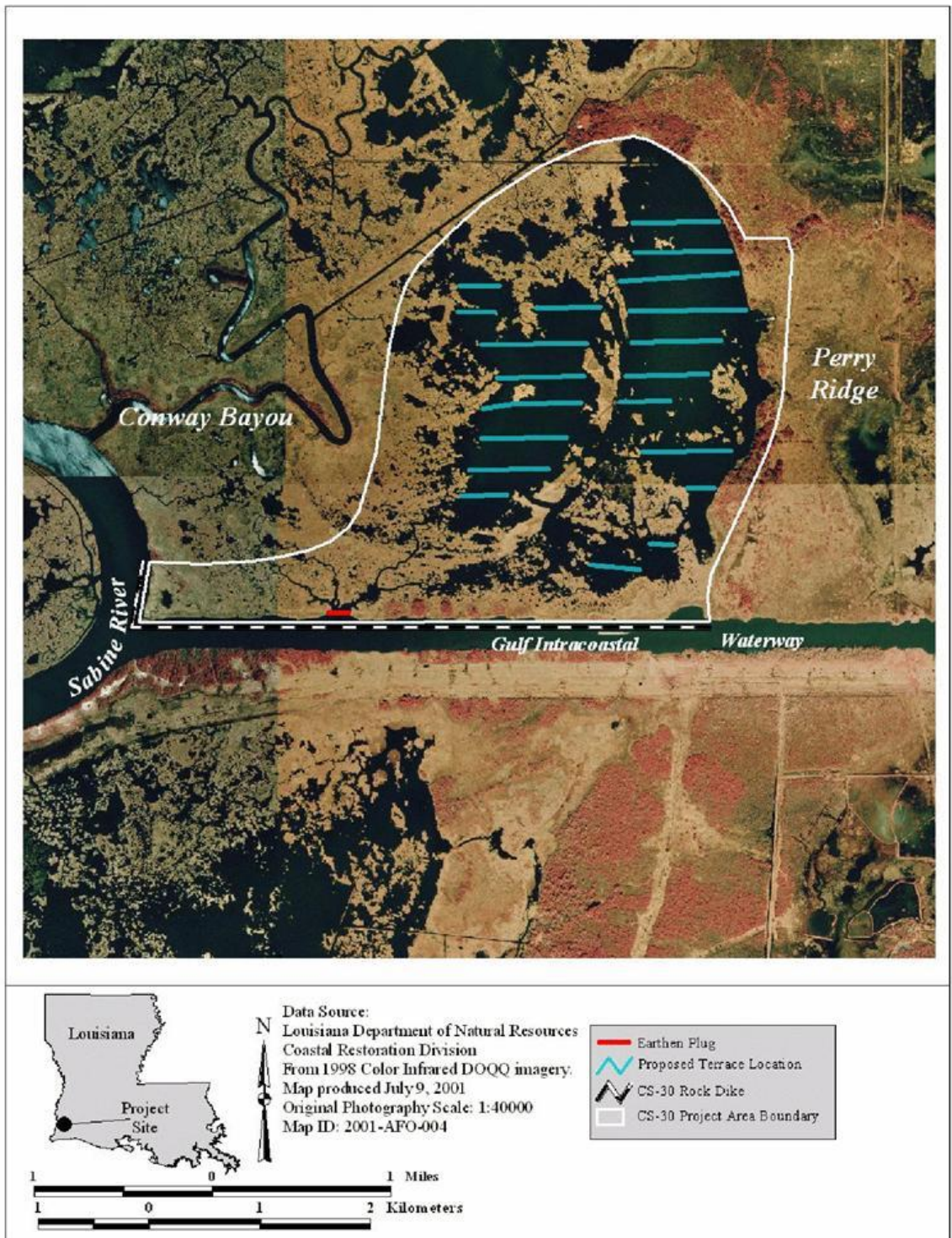


Figure 1. Perry Ridge West (CS-30) construction features and project boundary.



II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Perry Ridge West Bank Stabilization Project (State Project No. CS-30) is to evaluate the constructed project features and to identify any deficiencies. The information from the site visit will be used to prepare a report detailing the condition of project features and to recommend any necessary corrective actions. Should it be determined that corrective actions are needed, OCPR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects 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 B.

An annual O & M inspection of the GIWW Bank Stabilization (Perry Ridge to Texas) Project (CS-30) was held on November 27, 2007 under sunny skies and mild temperatures. In attendance were Mel Guidry, Stan Aucoin, Darrell Pontiff and Tommy McGinnis of OCPR, along with Dale Garber representing NRCS. The inspection began on the eastern end of the project.

The field inspection included a complete visual inspection on the entire project site. Staff gauge readings and existing benchmarks were used to determine approximate water elevation and existing elevation of the foreshore rock dike and earthen terraces. Photographs were taken at each project feature (see Appendix A) and field inspection notes were compiled to record measurement and deficiencies (Appendix C).

b. Inspection Results

Site 1—Foreshore rock dike

The dike is in very good condition with one small area apparently displaced by a barge noted as being below the constructed height. No maintenance is recommended at this time. (Photos: Appendix A, Photos 1 & 2)

Site 2—Earthen Terraces with vegetative plantings

The earthen terraces and vegetative plantings were not inspected during this trip.



II. Maintenance Activity (continued)

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

None

ii. Programmatic/ Routine Repairs

None

d. Maintenance History

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since July 2002, the construction completion date of the GIWW Bank Stabilization Project Perry Ridge to Texas (CS-30).

There has been no maintenance performed 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 CS-30 Monitoring Plan to merge it with CRMS-*Wetlands* and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act.

a. Monitoring Goals

The objectives of the Perry Ridge West Bank Stabilization Project are to reduce erosion along the northern bank of the GIWW to protect interior marshes, to create marsh habitat, and to maintain submerged aquatic vegetation (SAV).

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

1. Determine any direct (i.e. creation of land due to terrace construction) and/or indirect changes in land/water ratios in the project area north of the GIWW.
2. Determine changes in the frequency of occurrence of SAV within the shallow water areas of the project and reference areas.
3. Detect the presence and magnitude of erosion of the northern shore of the GIWW along the southern project boundary.

b. Monitoring Elements

Aerial Photography:

In order to evaluate shoreline movement and the extent of interior emergent marsh creation (direct and indirect) in the project area, near-vertical, color-infrared aerial photography (1:12,000 scale) was obtained once prior to construction in 2001, post-construction in 2005 and will be obtained in 2010. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by USGS/NWRC personnel according to standard operating procedures (Steyer et al. 1995, revised 2000).

Submerged Aquatic Vegetation:

To evaluate the effects of earthen terraces on SAV habitat, a modification of the rake method (Chabreck and Hoffpauir 1962) was used to estimate SAV occurrence. The project and reference areas were monitored along 6 transects divided equally among 3 representative shallow ponds. Each transect has a minimum of 25 sampling stations oriented toward the prevailing wind. At each station, aquatic vegetation was sampled by dragging a garden rake on the pond bottom for about 1 second. The presence of vegetation was recorded to determine the frequency of aquatic plant occurrence (frequency = number of occurrences/number of stations x 100). When vegetation is present, the species present is recorded in order to determine the frequencies of individual species (Nyman and Chabreck 1996). SAV



abundance was sampled prior to construction in 2000, and postconstruction in 2003, 2005 and 2007 and will be sampled in 2015, and 2020.

c. Preliminary Monitoring Results and Discussion

Aerial Photography:

Land to water analysis for pre-construction photography collected on November 17, 2001 (Figures 2-6) indicated 43.3% land and 56.7% water within the project area. Aerial photography flown on October 25, 2005 documented 47.21% land and 52.79% water, a gain of 45 ac (18.21 ha). The earthen terraces contributed 25 ac (10.11 ha) of the total land gain.

Submerged Aquatic Vegetation:

Data were collected along 12 transects pre-construction in 2000 and post-construction in years 2003, 2005 and 2007 (Figure 7). ANOVA was utilized to determine if there was a difference between the years sampled and/or a difference between the project and reference areas indicating a significant difference between years ($p < .0001$, $F_{3,36} = 12.18$). The frequency of occurrence of SAV remained the same between the 2000 and 2003 surveys (near 100%) in both the project and reference areas (Figure 9). However, the number of species increased between 2000 and 2003 (Figures 10 and 11). SAV coverage dropped to 66% in both project and reference areas following Hurricane Rita in 2005, but recovered in both areas in 2007 to pre-storm levels. There was no significant difference in total SAV coverage between the project and reference areas. Over time, the project area shifted from *Potamogeton* sp. and *Ruppia maritima* to *Myriophyllum spicatum* and *Najas guadalupensis*, while the reference area experienced a decrease in *Ruppia maritima*, an increase in *Najas guadalupensis* and a slight increase in *Myriophyllum spicatum*.

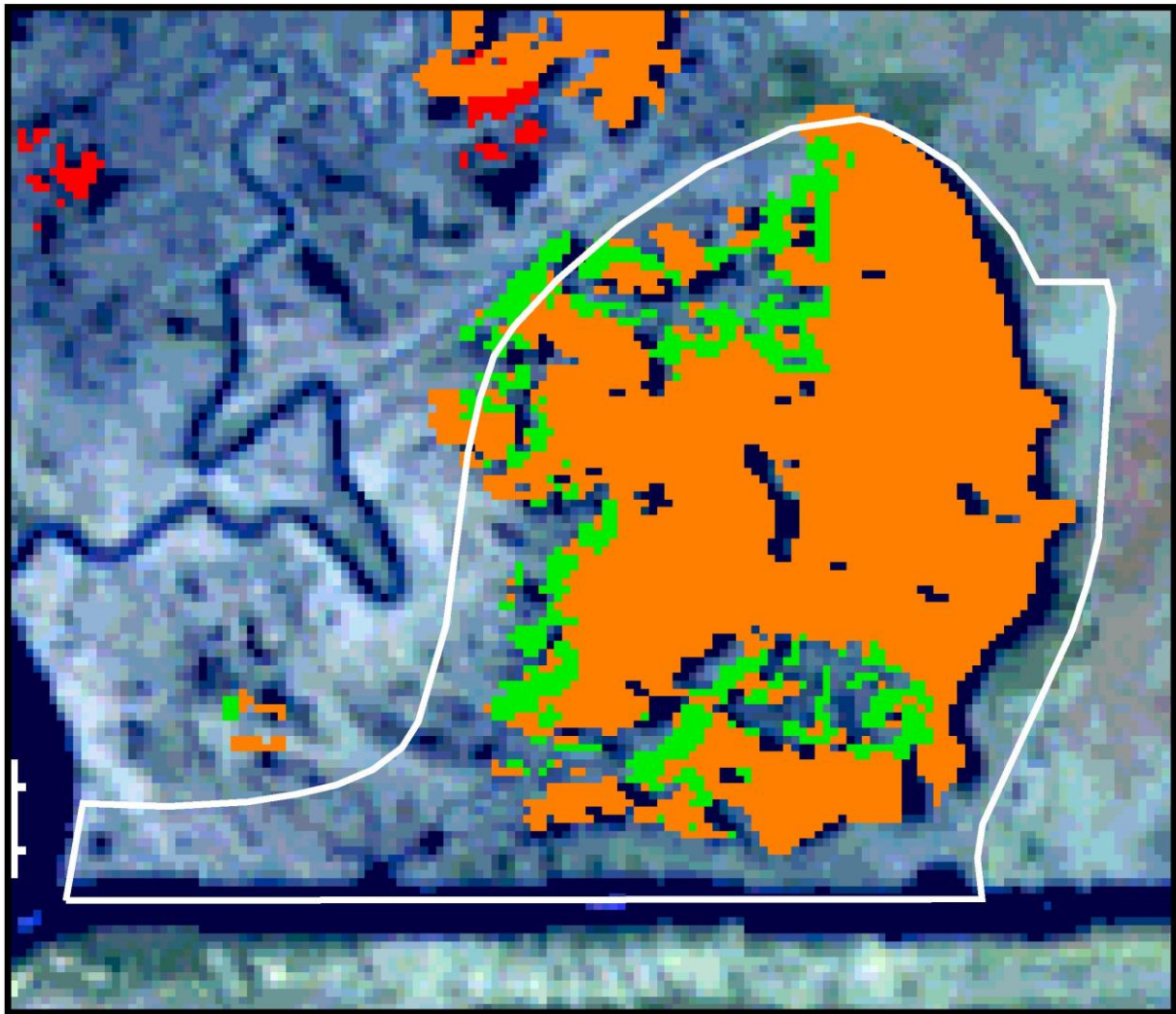
Shoreline movement:

Aerial photography will be used to monitor shoreline movement. Analysis of the 2005 land to water ratio indicates that shoreline erosion appears to have halted since the construction of the rock dike. Visual observations also indicate vertical accretion of the wetland area behind the rock dike at many locations. Direct shoreline measurements on the adjacent CS-24 project, which has similar hydrologic conditions, have shown that the project has been effective in preventing erosion at most project area stations, while the reference area continued to retreat.

Vegetative Plantings:

The plantings are in excellent shape at this time. Although the plantings appeared stressed following Hurricane Rita, in 2007, vegetation on the terraces was green and healthy.





1956 - 1990 Loss/Gain Analysis				
Color	Class	Acres	Hectares	Percent
Orange	1956 - 1978 Loss	-659.93	-267.06	48.89
Yellow	1956 - 1978 Gain			
Red	1978 - 1990 Loss	96.22	38.94	48.89
Green	1978 - 1990 Gain			
	Totals	-563.71	-228.13	



0.2 0 0.2 Miles



USGS
science for a changing world

Data Source:
U.S. Geologic Survey
National Wetlands Research Center
Coastal Restoration Field Station
Louisiana Department of Natural Resources
Coastal Restoration Division and GIS Lab
1956-1990 Loss/Gain Analysis
1993 TM Satellite Imagery
Map Date: September 19, 2001
Map ID: 2001-4-868

Figure 2. Perry Ridge West (CS-30) project land loss/gain analysis for the period 1956-1990.



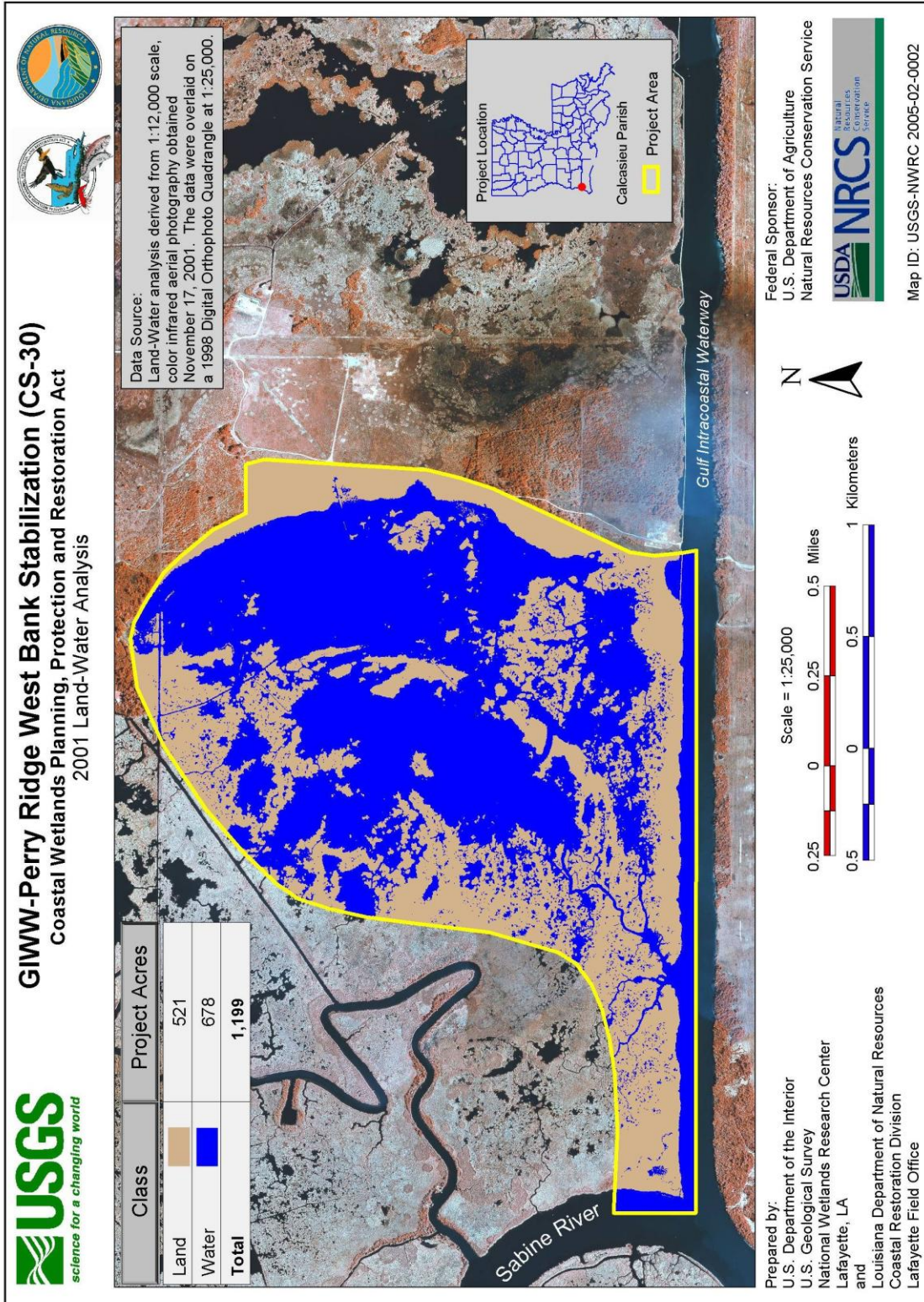


Figure 3. Perry Ridge West (CS-30) project 2001 land/water analysis.



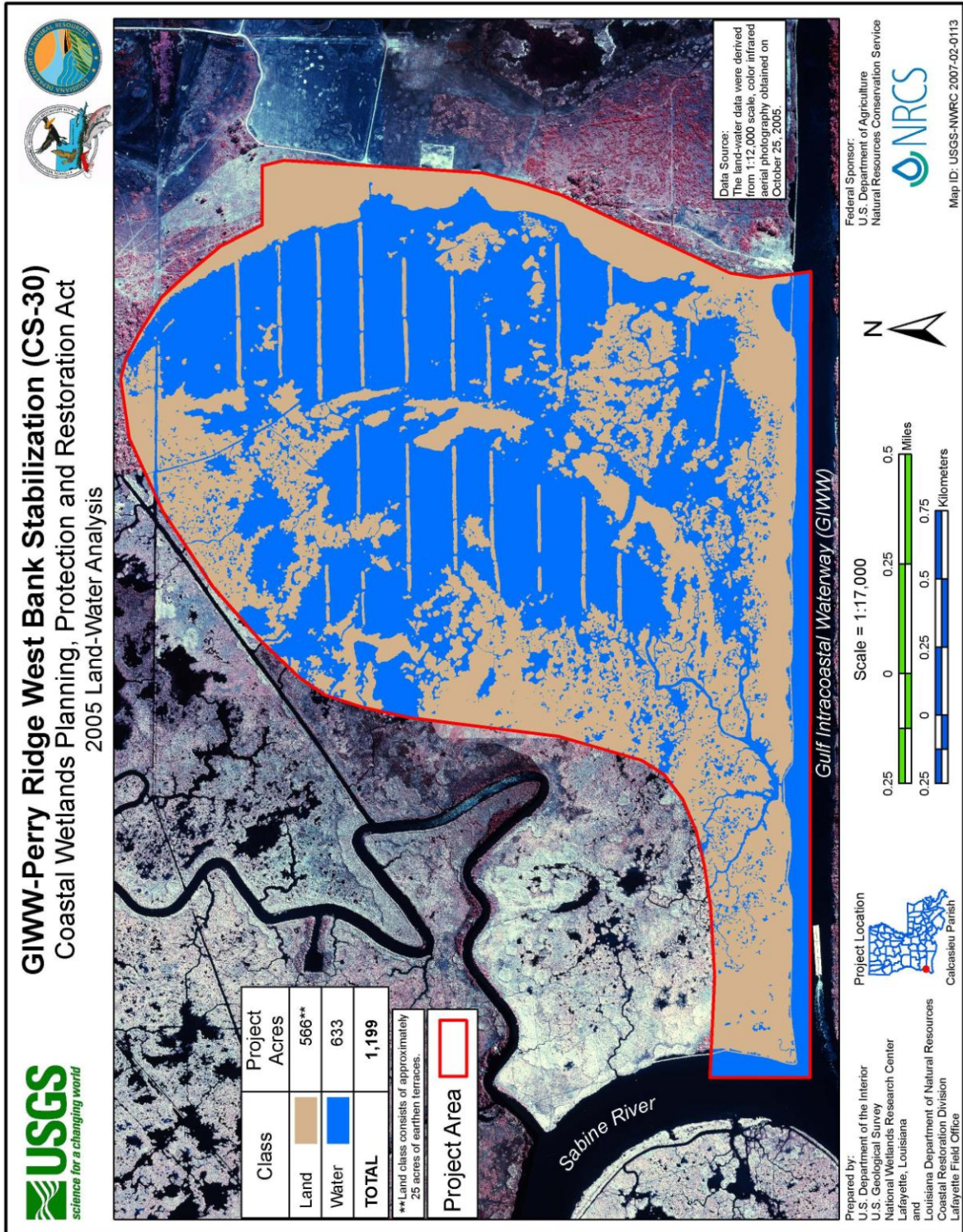


Figure 4. Perry Ridge West (CS-30) project 2005 land/water analysis.



Perry Ridge West Bank Stabilization (CS-30)



Figure 5. View of the Perry Ridge West rock dike taken October 21, 2003. The photograph is facing west.



Perry Ridge West Bank Stabilization (CS-30)



Figure 6. Views of the *Schoenoplectus californicus* plantings taken July 2002. The photograph on the top is facing southwest, and on the bottom is facing south. Submerged aquatic vegetation is evident in both photos.



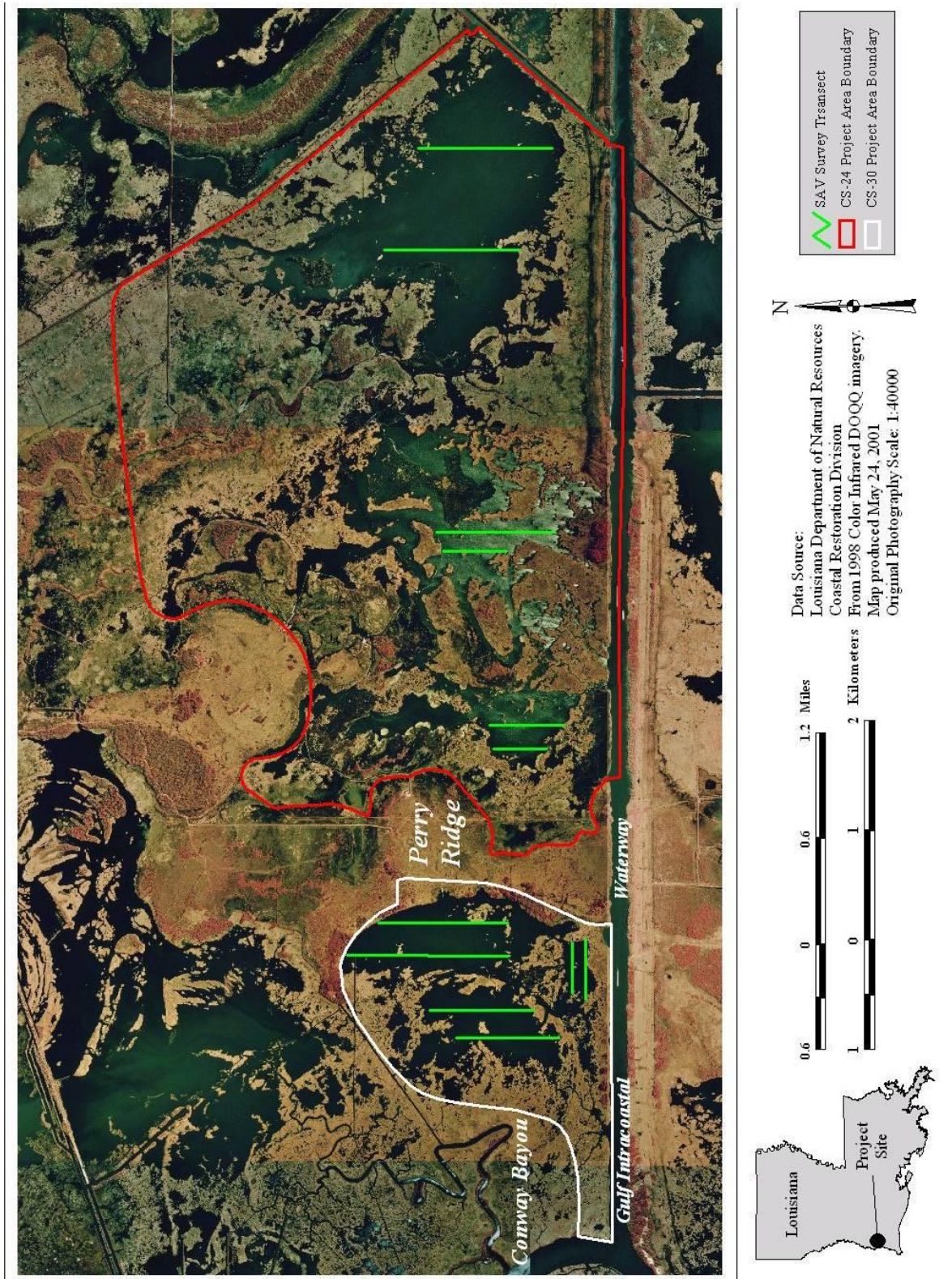


Figure 7. Location of SAV transects at Perry Ridge West (CS-30) project.



Perry Ridge West Bank Stabilization (CS-30)

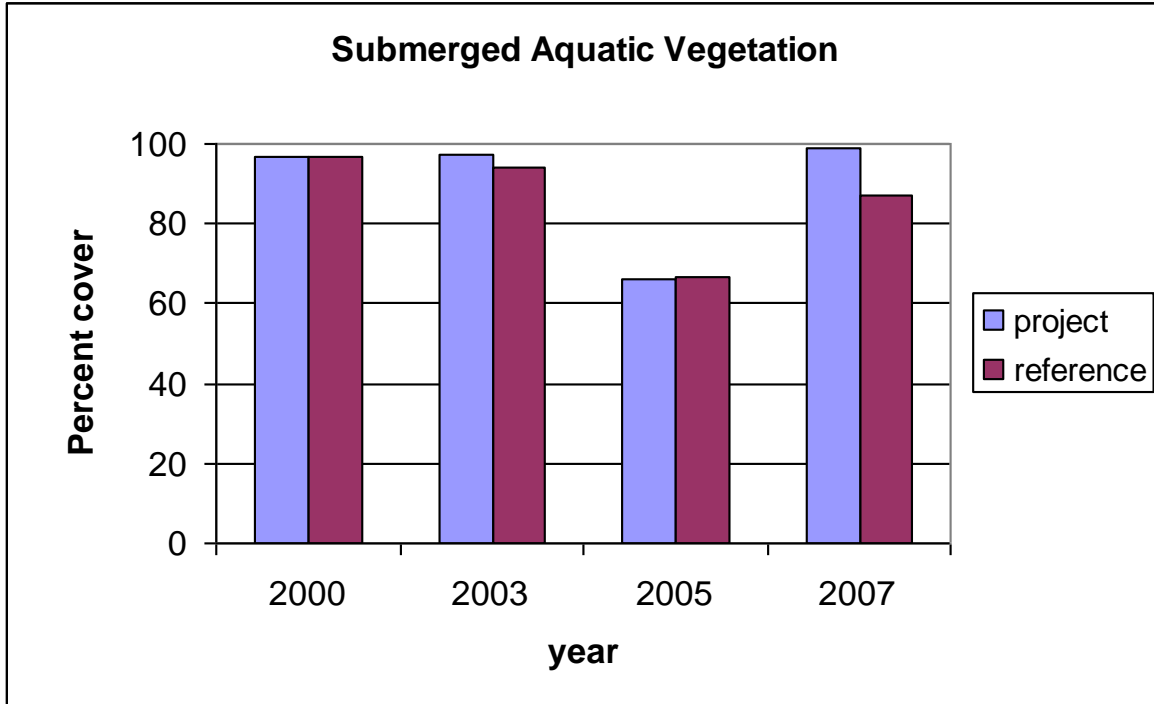


Figure 8. Total percent cover of SAV by area in years 2000, 2003, 2005 and 2007. Values are the LS Means of transect values.



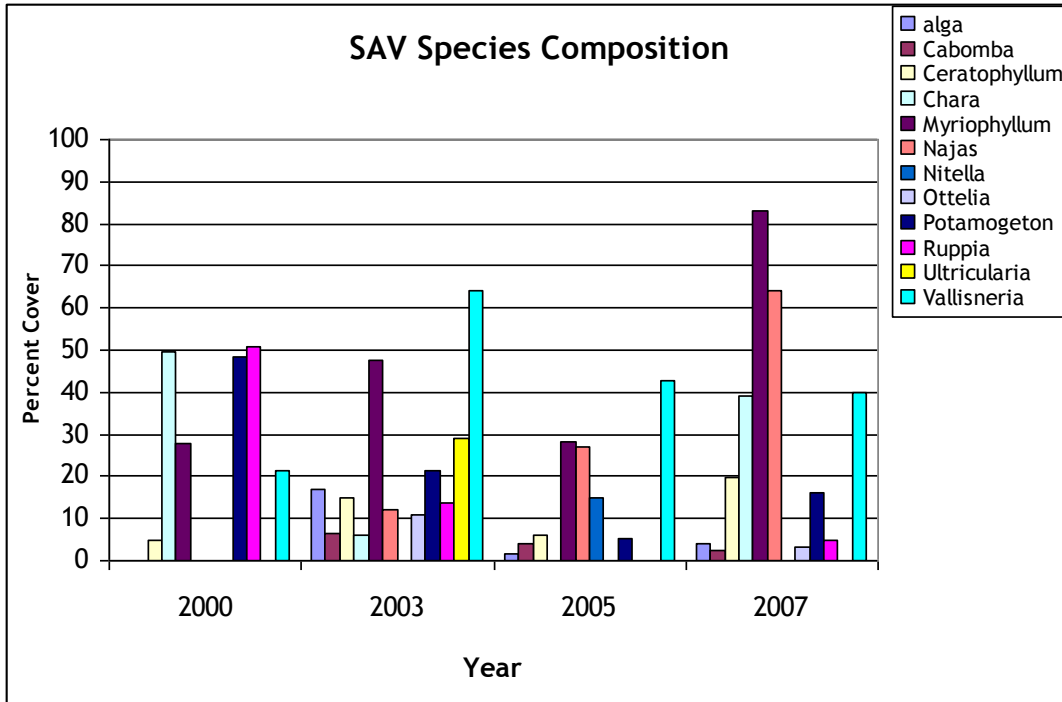


Figure 9. Percent cover by species within project area in years 2000, 2003, 2005 and 2007.

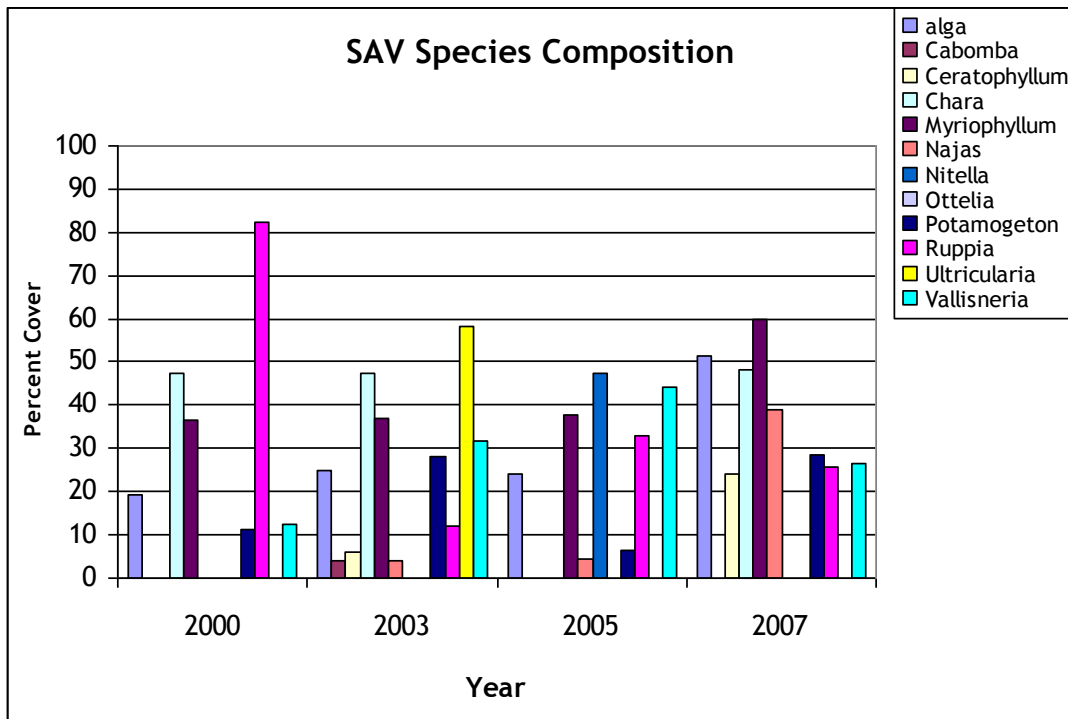


Figure 10. Percent cover by species within reference area in years 2000, 2003, 2005 and 2007.



V. Conclusions

a. Project Effectiveness

The project has been effective in achieving the goal of maintaining land to water ratios. The project area experienced a 4% gain in land. Although the majority of this can be attributed to the construction of the earthen terraces, an additional 20 acres (8 ha) were created since 2001. The vegetative plantings on the terraces are in excellent shape at this time after recovering from the effects of Hurricane Rita. Visual observation indicates vertical accretion of the wetland area at many locations between the foreshore rock dike and the shoreline.

The goal of maintaining SAV abundance has been achieved. The percent cover of SAV within the project area has remained near 100% in all years, excluding the post-Rita survey. The diversity of species has increased since construction of the earthen terraces.

The structural components of the Perry Ridge West Bank Stabilization Project are in very good condition and functioning as designed.

b. Recommended Improvements

None at this time.

c. Lessons Learned



VI. Literature Cited

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APPENDIX A
(Inspection Photographs)





Photo 1, Typical rock dike.



Photo 2, Rock dike, view showing western tie-in to existing marsh.



APPENDIX B
(Three Year Budget Projection)



GIWW-PERRY RIDGE BANK STABILIZATION/ CS-30 /PPL 9
Three-Year Operations & Maintenance Budgets 07/01/2008 - 06/30/2011

<u>Project Manager</u> Pat Landry	<u>O & M Manager</u> Mel Guidry	<u>Federal Sponsor</u> NRCS	<u>Prepared By</u> Mel Guidry
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	2008/2009	2009/2010	2010/2011
Maintenance Inspection	\$ 5,570.00	\$ 5,737.00	\$ 5,909.00
Structure Operation			
Administration		\$ -	\$ -
Maintenance/Rehabilitation			

08/09 Description:

E&D	
Construction	
Construction Oversight	
<i>Sub Total - Maint. And Rehab.</i>	\$ -

09/10 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
<i>Sub Total - Maint. And Rehab.</i>	\$ -

10/11 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
<i>Sub Total - Maint. And Rehab.</i>	\$ -

	2008/2009	2009/2010	2010/2011
<u>Total O&M Budgets</u>	\$ 5,570.00	\$ 5,737.00	\$ 5,909.00

<u>O &M Budget (3 yr Total)</u>	\$ 17,216.00
<u>Unexpended O & M Budget</u>	\$ 42,306.44
<u>Remaining O & M Budget (Projected)</u>	\$ 25,090.44



OPERATION AND MAINTENANCE BUDGET 07/01/2008-06/30/2009
PERRY RIDGE WEST BANK STABILIZATION/CS-30/PPL9

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	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: **\$5,570.00**



OPERATION AND MAINTENANCE BUDGET 07/01/2009-06/30/2010
PERRY RIDGE WEST BANK STABILIZATION/CS-30/PPL9

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	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	
Navigation Aid	EACH	0	\$0.00	\$0.00	
Signage	EACH	0	\$0.00	\$0.00	
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	
Dredging	CU YD	0	\$0.00	\$0.00	
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	
Timber Members (each or lump sum)		0	\$0.00	\$0.00	
Hardware	LUMP	1	\$0.00	\$0.00	
Materials	LUMP	1	\$0.00	\$0.00	
Mob / Demob	LUMP	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**



OPERATION AND MAINTENANCE BUDGET 07/01/2010-06/30/2011
PERRY RIDGE WEST BANK STABILIZATION/CS-30/PPL9

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,909.00	\$5,909.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	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:	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
	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:	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
	Borings	EACH	0	\$0.00	\$0.00
	OTHER				\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

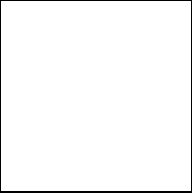
CONSTRUCTION DESCRIPTION:	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
	Rip Rap	LIN FT	0	\$0.00	\$0.00
		TON / FT	0.0	\$0.00	\$0.00
		TONS	0	\$0.00	\$0.00
			0	\$0.00	\$0.00
	Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00
	Navagation Aid	EACH	0	\$0.00	\$0.00
	Signage	EACH	0	\$0.00	\$0.00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

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,909.00**



APPENDIX C
(Field Inspection Notes)





MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-30 GIWW-Perry Ridge

Date of Inspection: November 27, 2007 Time: 11:30 am

Structure No.

Inspector(s): Stan Aucoin, Mel Guidry & Darrell Pontiff (OCPR)
Tommy McGinnis (OCPR) Dale Garber (NRCS)

Structure Description: Rock Dike/Earthen Terraces

Water Level

Type of Inspection: Annual

Weather Conditions: Clear & 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	
Earthen Terraces					Not inspected on this trip.
Vegetative Plantings					

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?

