



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

**2004 Operations, Maintenance,
and Monitoring Report**

for

Cameron Creole Plugs Project

State Project Number CS-17
Priority Project List 1

January 24, 2005
Cameron Parish

Prepared by:

Sharp, L. A. Biological Monitoring Section (CRD)
and
Dewey Billodeau, P.E., Field Engineering Section (CED)
LDNR/Coastal Restoration and Management
Lafayette Field Office
635 Cajundome Boulevard
Lafayette, LA 70506

Suggested Citation:

Sharp, L. A. and Billodeau, D. 2005. *2004 Operations, Maintenance, and Monitoring Report for Cameron Creole Plugs (CS-17)*, Louisiana Department of Natural Resources, Coastal Restoration Division, Lafayette, Louisiana.



2004 Operations, Maintenance, and Monitoring Report
For
Cameron Creole Plugs Project (CS-17)

Table of Contents

I. Introduction.....	1
II. Maintenance Activity.....	4
a. Project Feature Inspection Procedures.....	4
b. Inspection Results	4
c. Maintenance Recommendations	4
i. Immediate/Emergency	4
ii. Programmatic/Routine.....	4
III. Operation Activity.....	5
a. Operation Plan.....	5
b. Actual operations	5
IV. Monitoring Activity	6
a. Monitoring Goals	6
b. Monitoring Elements	6
c. Preliminary Monitoring Results and Discussion.....	10
V. Conclusions.....	13
a. Project Effectiveness.....	13
b. Recommended Improvements.....	13
c. Lessons Learned	13
VI. Appendices	
a. Appendix A (Inspection Photographs)	
b. Appendix B (Three Year Budget Projection)	
c. Appendix C (Field Inspection Notes)	



I. Introduction

The Cameron Creole Watershed consists of 64,000 acres (25,900 ha) of brackish, intermediate, and fresh marsh located along the east side of Calcasieu Lake in the Calcasieu/Sabine Basin in Cameron Parish and is part of the Sabine National Wildlife Refuge. The Calcasieu Ship Channel has allowed salt water to flood the interior marshes surrounding Calcasieu Lake. As a result, approximately 63,000 acres (25,496 ha) of brackish, intermediate, and fresh marsh on the east side of Calcasieu Lake were lost between 1950 and 1970.

In 1989, a levee and five (5) water control structures were constructed by the Soil Conservation Service along the eastern shore of Calcasieu Lake. The structures were intended to reduce the movement of salt water into the watershed. A borrow canal was also constructed along the wetland side of the levee which may further prevent saltwater intrusion into the marsh. In order to increase control of water flow, isolate management areas, and prevent further saltwater intrusion in the Cameron-Creole Watershed, the CS-17 plug project placed two plugs in the borrow canal in 1997.

The CS-17 project is comprised of 14,471 acres (5,858 ha) of brackish marsh divided into three project areas and two reference areas (figure 1). The plug south of Mangrove Bayou, was intended to influence 6,082 acres (3,462 ha) in the northern project area (figure 2). In order to investigate the effect of the plug south of Mangrove Bayou on the surrounding marshes, water flow and the response of emergent vegetation were measured in the northern project area.

The plug south of Grand Bayou was intended to allow for separate operation of the Grand Bayou and Lambert Bayou structures and was expected to affect 6,606 acres (2675 ha) of brackish marsh in the southern project area (figures 1 and 2). In order to determine if the borrow canal plugs reduced water level in the southern project area, duration of flooding was measured and emergent vegetation was sampled.

The plugs were also expected to affect 1,783 acres (720 ha) of broken marsh and shallow open water ponds from 0.5 ft to 2.0 ft (0.15-0.61 m) to the east of Grand Bayou (figures 1 and 2). The ponds support stands of submerged aquatic vegetation. The ponds in the eastern project area were monitored for affects of the plug project on submerged aquatic vegetation. Project construction was completed in February, 1997.



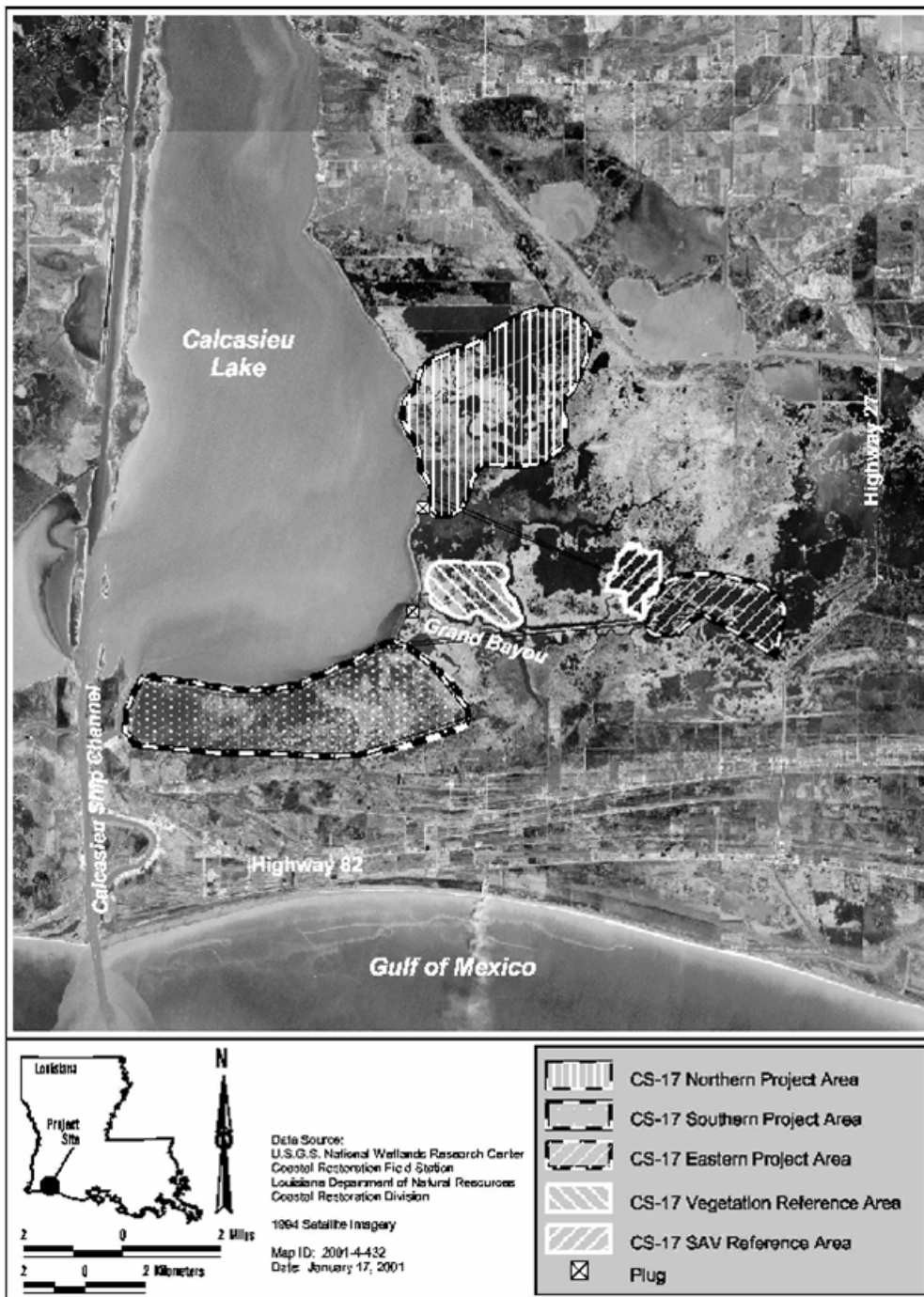


Figure 1. Cameron Creole (CS-17) project and reference areas.

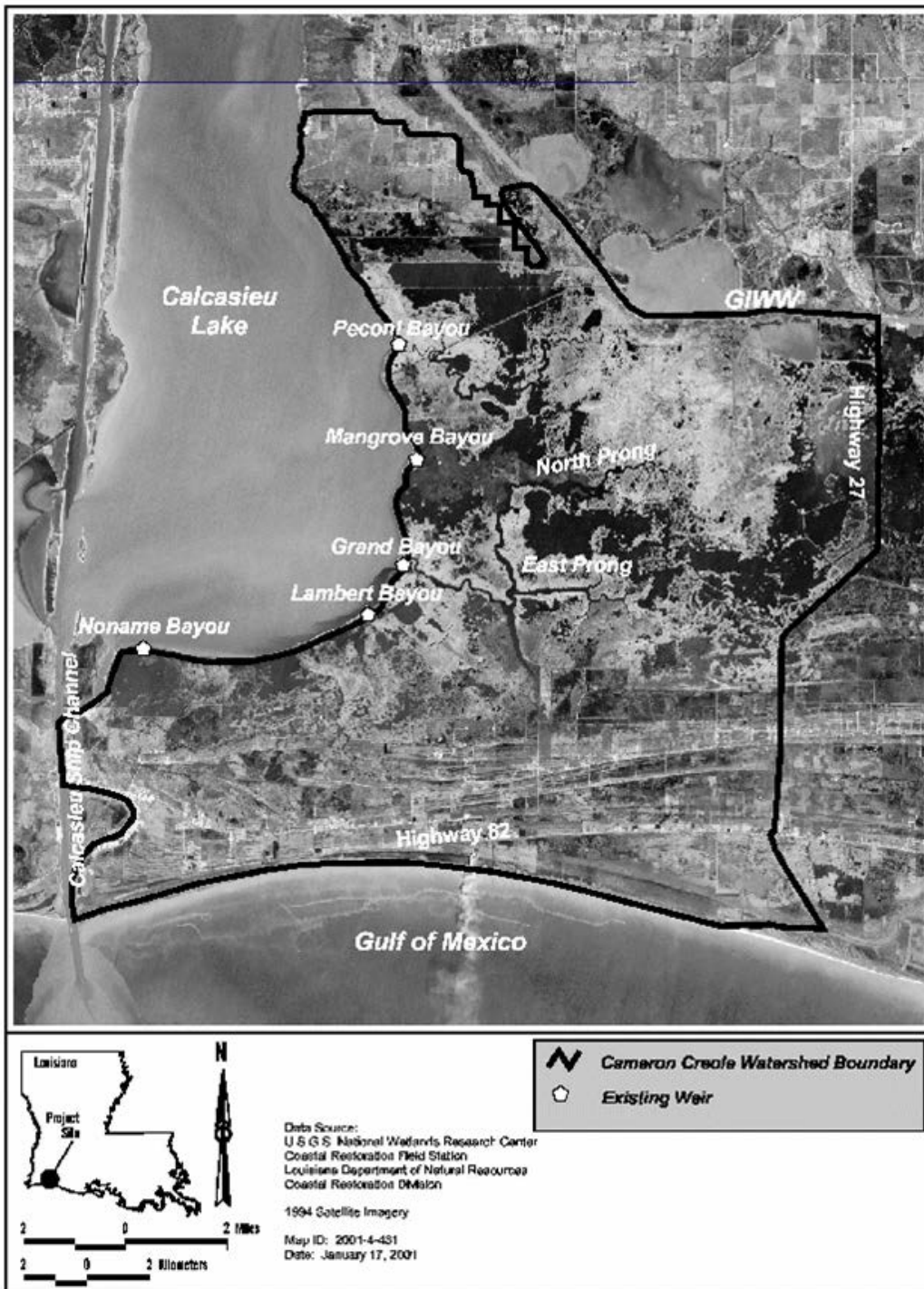


Figure 2. Cameron Creole Plugs (CS-17) project boundaries and structures.

Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Cameron/Creole Watershed Project (CS-17) 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 (O&M Plan, 2002). 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. A summary of past operation and maintenance projects completed since completion of the Cameron/Creole Project are outlined.

An inspection of the Cameron/Creole Watershed Project (CS-17) was held on May 21, 2004 under partly cloudy skies and warm temperatures. In attendance was Stan Aucoin and Dewey Billodeau from LDNR, and Jim Ashfield with USFWS. All parties met at the Big Pasture boat launch in Cameron Parish, LA. The annual inspection began at approximately 10:00 a.m. at the Grand Bayou structure.

The field inspection included a complete visual inspection of the entire project site. Staff gauge readings and existing temporary benchmarks were used to determine approximate elevations of water, steel bulkhead structures and other project features. Photographs were taken at each project feature and Field Inspection notes were completed in the field to record measurements and deficiencies

b. Inspection Results

Structure #2—Grand Bayou structure

The structure is in relatively good condition. Signs are in immediate post construction condition. The sheet pile cap and the railing have rusted but only the railing will be replaced. USFWS personnel would like to incorporate soft bumpers into the boat bay. Lonnie Harper & Associates have begun preliminary engineering for this recommended maintenance. The structure, however, is functioning as designed



Structure #1—Mangrove Bayou structure

Structure is in similar condition as Structure #2. The railing will be replaced and the soft bumpers will be installed. The structure is functioning as designed.

II. Maintenance Activity (continued)

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

As noted at each structure

ii. Programmatic/ Routine Repairs

None

III. Operation Activity

a. Operation Plan

b. Actual Operations

Although the structures are operable, there are no active operations currently associated with this project.



IV. Monitoring Activity

a. Monitoring Goals

The object of the Cameron Creole Plugs project is to enhance and improve marsh condition in the northern, southern, and eastern project areas, and to improve present structural management capabilities.

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

1. Reduce the duration of flooding in the southern project area.
2. Reduce water flow in the borrow canal in the northern project area.
3. Increase cover of marsh vegetation in the northern and southern project areas.
4. Increase the relative frequency of occurrence of SAV in the eastern project area.

b. Monitoring Elements

Aerial Photography:

To measure wetland to open water ratios and to map habitat types in the project area, 1:24,000 scale near-vertical color-infrared aerial photography was obtained pre-construction on November 1, 1993. The original photographs were checked for flight accuracy, color correctness, and clarity and were subsequently archived. The photography was photo interpreted and classified to the subclass habitat level. The habitat delineations were transferred to 1:6,000 scale Mylar base maps, digitized according to standard operating procedures by USGS/NWRC personnel (Steyer et al. 1995, revised 2000). One postconstruction flight was budgeted into the project, however, the year was not specified.

Salinity:

To monitor the effects of the plugs on salinity in the project and reference area, salinity was measured at four permanent stations. One recorder was placed in the northern project area, one in the southern project area, one in the vegetation reference area (in the borrow canal), and one outside of the levee surrounding the watershed in Calcasieu Lake (figure 3). Discrete salinity readings were taken by refuge personnel at 25 existing USFWS monitoring stations, 6 located inside the project areas, and 19 located outside the project areas (figure 3) every two weeks (bi-weekly) from January 1990 to December 1999. Maximum and minimum mean salinity were calculated for each station over the entire sampling period.



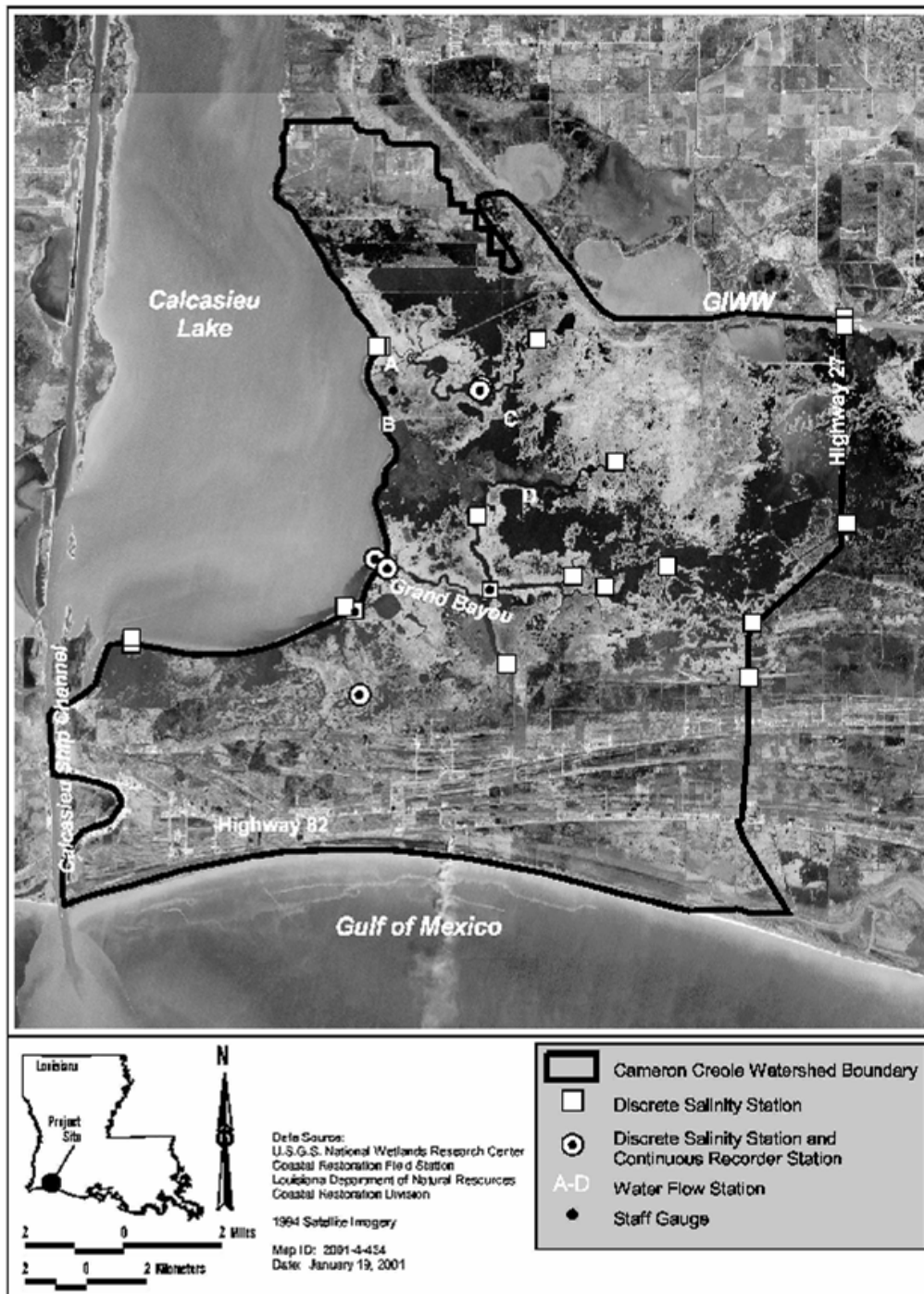


Figure 3. Cameron Creole Plugs (CS-17) permanent and discrete station locations.

Water Flow:

Flow was measured in four channels for four consecutive days in May, 1996 pre-construction and was not measured post-construction.

Water Level:

To monitor the effects of the plug project on inundation in the project and reference area, water level was recorded hourly at four permanent stations and at six staff gages (three located within the project area and three located outside the project area) (figure 3) surveyed to NAVD. Staff guages were monitored bi-weekly by USFWS personnel.

Emergent Vegetation:

Species composition, percent cover, and height of dominant plants in 2m² vegetation plots (1.4 m x 1.4 m) were determined at sixty sampling points [25 in the northern portion, 25 in the southern portion, and 10 in the vegetation reference area (figure 4)] along transects, using the modified Braun-Blanquet method. Emergent vegetation data were collected pre-construction in October 1996 and post-construction in October 1997, September 2000, and September 2002.

Submerged Aquatic Vegetation (SAV):

Species composition and relative frequency of occurrence were determined for SAV in two ponds in the eastern project area and two ponds in a SAV reference area (figure 4). Presence or absence of SAV was recorded at no less than 25 random points along two transects in each pond, using the rake method (figure 4). SAV was monitored pre-construction in October 1996 and post-construction in October 1997, September 2000, and September 2002. Means of relative frequency of occurrence of each species, species richness, and water depth and salinity were calculated and compared in the Eastern project and SAV reference areas.



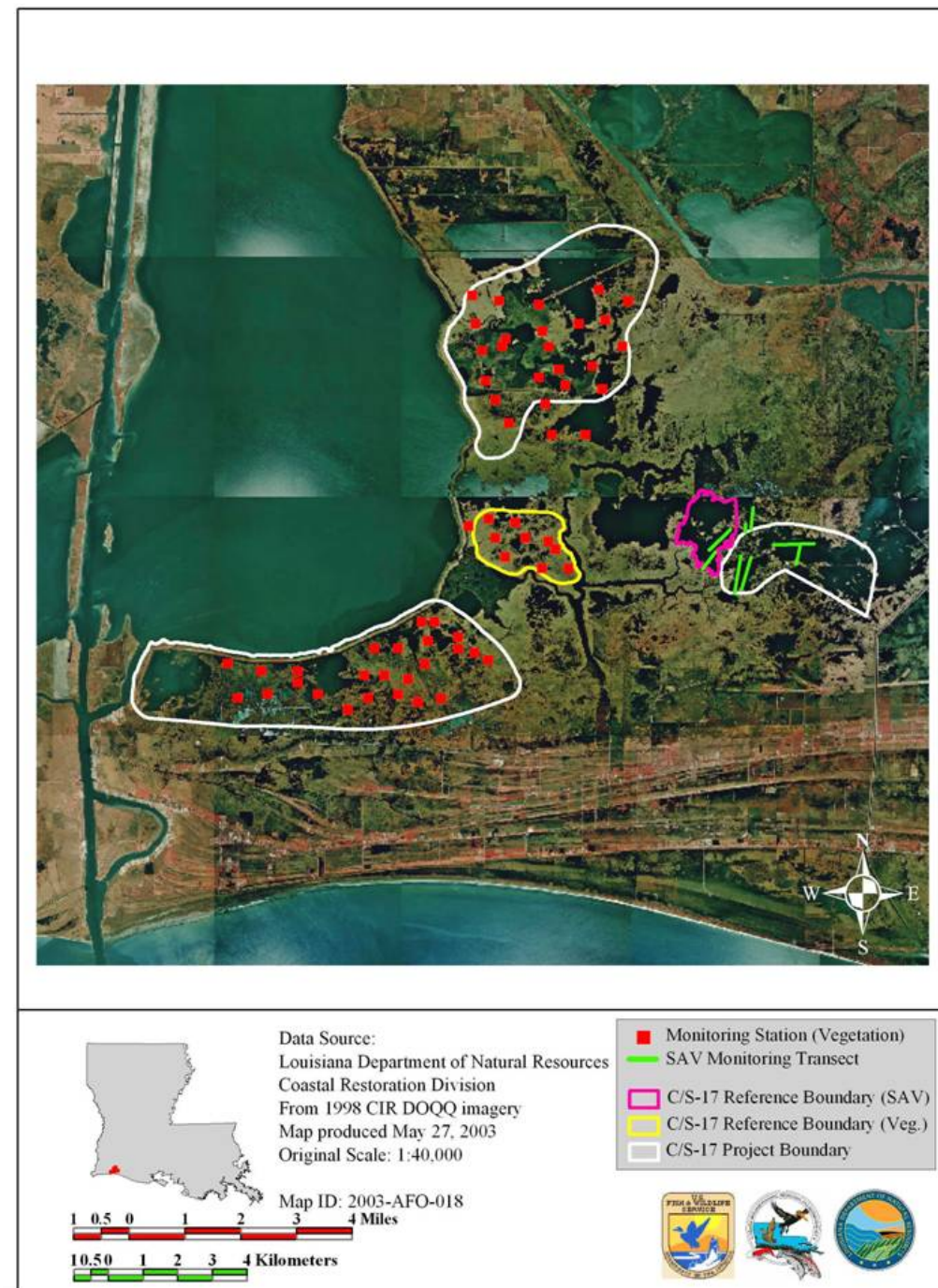


Figure 4. Cameron Creole Plugs (CS-17) vegetation and SAV sampling transects.

IV. Monitoring Activity (continued)

c. Preliminary Monitoring Results and Discussion

Data collected up to December, 2004 has been included in the following results and discussion. Project results using data collected through 2002 were discussed in detail in the 2003 CS-17 Comprehensive Report.

Aerial photography:

Aerial photography was obtained pre-construction in 1993 and has not been obtained post-construction. A habitat map and the acreages of each habitat are presented in figure 5 and table 1. The postconstruction flight has not been scheduled.

Salinity and Water Level:

Hourly salinity and water level data have been collected at the following continuous recorder stations:

Station	Data collection period
CS17-01R	5/10/1994 – 7/25/2005
CS17-02R	3/10/1994 – 7/25/2005
CS17-11	2/23/1994 - 7/25/2005
CS17-12	2/23/1995 - 7/25/2005



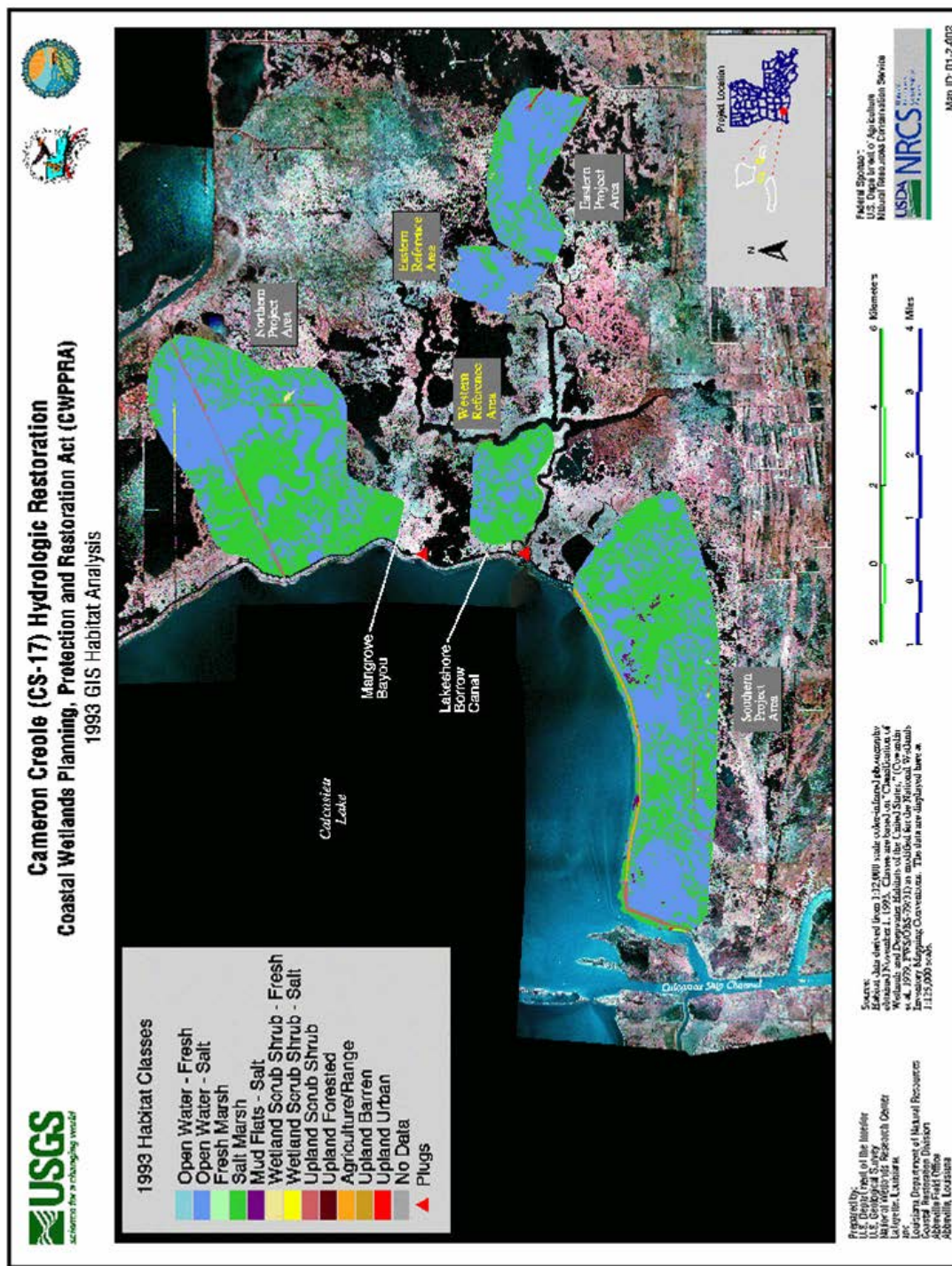


Figure 5. 1996 GIS habitat analysis of the Cameron Creole Plugs (CS-17) project area.

Table 1. Acreages of habitat types from the 1993 habitat analysis of the Cameron Creole Plugs (CS-17) project area.

Habitat Class	Northern Project Area	Southern Project Area	Eastern Project Area (SA V)	Vegetation Reference Area	SA V Reference Area
	Acres (Hectares) % of total area				
Open Water - Fresh	0	3 (1.2)	1.7 (0.7)	0	0
Open Water - Salt	271.8 (1100.8) 45.1%	315.1 (1276.2) 47.7%	1302.2 (527.4) 73.7%	565.1 (228.9) 90.1%	310.6 (125.8) 27.2%
Fresh Marsh	0	0.2	0	0	0
Salt Marsh	3233.2 (1309.4) 53.7%	3220.4 (1304.3) 48.7%	453.5 (183.7) 25.7%	62.2 (25.2) 9.9%	831.6 (336.8) 72.8%
Mud Flats - Salt	0	35.9 (14.5) 0.5%	0	0	0
Wetland Shrub Scrub -Fresh	7.9 (3.2)	1.5 (0.6)	0	0	0
Wetland Shrub Scrub -Salt	8.6 (3.5)	2.6 (1.1)	1.1 (0.4)	0	0
Upland Shrub Scrub	57.5 (23.3) 1%	58 (23.5) 0.9%	0	0	0
Upland forested	0.5 (0.2)	0	0	0	0
Agriculture/Range	0.6 (.2)	125.2 (50.7) 2%	0	0	0
Upland Barren	0	5.5 (2.2)	0	0	0
Upland Urban	0	3 (1.2)	8.2 (3.3) 0.6%	0	0
TOTAL	6026.3 (2440.7)	6606.3 (2675.6)	1766.7 (715.5)	627.3 (254.1)	1142.2 (462.6)
% Open Water	45.1	48.3	73.8	90.1	27.2
% Land	54.9	51.7	26.2	9.9	72.8



V. Conclusions

- a. Project Effectiveness
- b. Recommended Improvements
- c. Lessons Learned

DRAFT



Appendix A Inspection Photographs





Appendix B Three Year Budget Projection

CAMERON CREOLE STRUCTURES / CS17 / PPL1			
Three-Year Operations & Maintenance Budgets 07/01/2004 - 06/30/07			
<u>Project Manager</u>	<u>O & M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Donald Voros	Clay Mernard	FWS	Dewey Billodeau
	2004/2005	2005/2006	2006/2007
Maintenance Inspection	\$4,825.00	\$4,955.00	\$6,250.00
Structure Operation	\$-	\$-	\$-
Administration	\$-		\$-
Maintenance/Rehabilitation			
04/05 Description: Annual Inspection			
E&D	\$-		
Construction	\$-		
Construction Oversight	\$-		
Sub Total - Maint. And Rehab.	\$-		
05/06 Description: Annual Inspection; install bumper systems			
E&D		\$-	
Construction		\$-	
Maintenance & Repair		\$48,500.00	
Sub Total - Maint. And Rehab.		\$48,500.00	
06/07 Description: Annual Inspection			
E&D			\$-
Construction			\$-
Construction Oversight			\$-
		Sub Total - Maint. And Rehab.	\$-
	2004/2005	2005/2006	2006/2007
Total O&M Budgets	\$4,825.00	\$53,455.00	\$6,250.00



Appendix C Field Inspection Notes

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-17 Cameron Creole Date of Inspection: May 21, 2004 Time:

Structure No. 1 Inspector(s): Stan Aucoin & Dewey Billodeau (LDNR)
James Ashfield (USFWS)

Structure Description: Fixed crest weir at Mangrove Bayou Water Level

Type of Inspection: Annual Weather Conditions: Partly cloudy, SE winds

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	Good		Some		Rust on the caps that occurred immediately after construction has apparently stabilized. It was decided by both DNR and USFWS to not replace the sheet pile cap at this time.
Steel Grating					
Stop Logs					
Hardware	Excellent	None	None		
Timber Piles					
Timber Wales				2	USFWS would like to modify the boat bay, adding bumpers. See photo.
Galv. Pile Caps					
Cables					
Signage / Supports	Excellent Poor	None	None Severe		Signs are in pristine post construction condition. The railings however have rusted to the point of almost falling off. AS recommended in previous inspections, Lonnie Harper & Ass. has begun E&D to fabricate and replace the railings using material more suitable for such extreme salt water conditions.
Rip Rap (fill)					
Earthen Embankment					

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?



DRAFT



DRAFT

