ME-09

Cameron Prairie Refuge Protection
Summary Data and Graphics

8/20/03

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Cameron Prairie Refuge Protection (ME-09)

Project Overview:

The Cameron Prairie Refuge project includes a 247 ac (100 ha) area located within 1,600 ac (648 ha) of wetlands in the Cameron Prairie National Wildlife Refuge, approximately 25 mi (40 km) southeast of Lake Charles in north central Cameron Parish (figure 1). The project area borders the north bank of the Gulf Intracoastal Waterway (GIWW).

Since the construction of the GIWW (between 1935 and 1940), wave erosion on the north bank of the channel has accelerated significantly due to increased utilization by navigational vessels. This energy has enabled high river stages from the Mermentau Basin to overtop and erode the existing spoil bank, thus leaving exposed a highly organic freshwater marsh vulnerable to erosion.

The 2 mile (3.2 km) rock breakwater was constructed parallel to the existing shoreline and construction was completed in August 1994 .

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Project Objectives

1. Protect the emergent wetlands of the Cameron Prairie National Wildlife Refuge adjacent to the GIWW and prevent the loss of approximately 247 ac (100 ha) of marsh
2. Prevent the widening of the GIWW into the NWR.

Specific Goals

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

1. Decrease the rate of spoil bank erosion along the south boundary of the 247 ac (100 ha) area adjacent to the GIWW within the Cameron Prairie NWR management unit.
2. Restore and maintain approximately 2 miles (3.2 km) of levee along the north bank of the GIWW by constructing a rock dike along the refuge/GIWW boundary

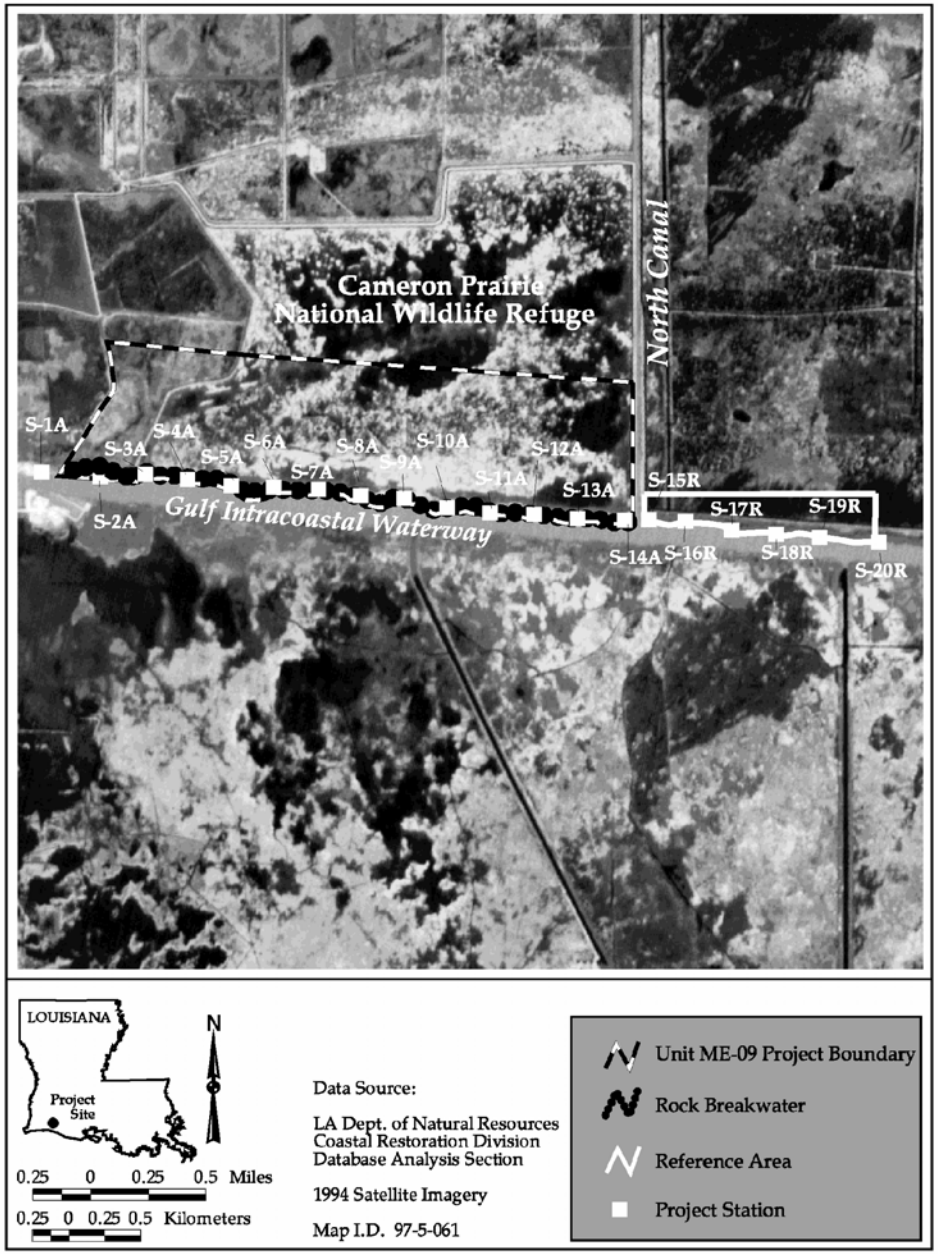

Figure 1. Cameron Prairie Refuge Protection (ME-09) project boundaries.

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Monitoring Elements

Aerial Photography: To document vegetated and non-vegetated areas, color-infrared aerial photography (1:12,000 scale with ground controls) will be obtained. The photography will be georectified by National Wetlands Research Center (NWRC) personnel using standard operating procedures described in Steyer et al. (1995), but detailed photointerpretation, mapping and GIS is not currently planned. The photography was obtained prior to construction in 1993 and in post-construction year 1996 and will be obtained in 2009.

Shoreline Change: To document shoreline movement, shoreline markers were placed at 30 points along the vegetated marsh edge adjacent to the rock breakwater, the western refuge boundary, and a reference located one mile (1.6 km) east of the proposed breakwater at a maximum interval of 500 ft (152 m). Position of the shoreline relative to the shoreline markers and the rock breakwater was documented initially by a professional surveyor in 1995. Post-construction surveys were conducted in years 1997, 2000, 2003, and will be conducted in 2006, 2009, and 2012 by direct measurements using a differential GPS. Aerial photography (1:12,000 scale) and GPS will also be used to document shoreline movement and provide a template for mapping shoreline position and shoreline position over time. Shoreline positions will be compared to historical data sets available in digitized format for 1956, 1978, and 1988 shorelines.

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Aerial Photography

Aerial photography was collected in November 1993 and January 1997. It will also be collected in 2009.

Figures:

- **Figure 2a.** Cameron Prairie (ME-09) 1993 Land/Water Analysis.
- **Figure 2b.** Cameron Prairie (ME-09) 1997 Land/Water Analysis.
- **Figure 3.** Cameron Prairie (ME-09) 1956-90 Habitat Analysis.

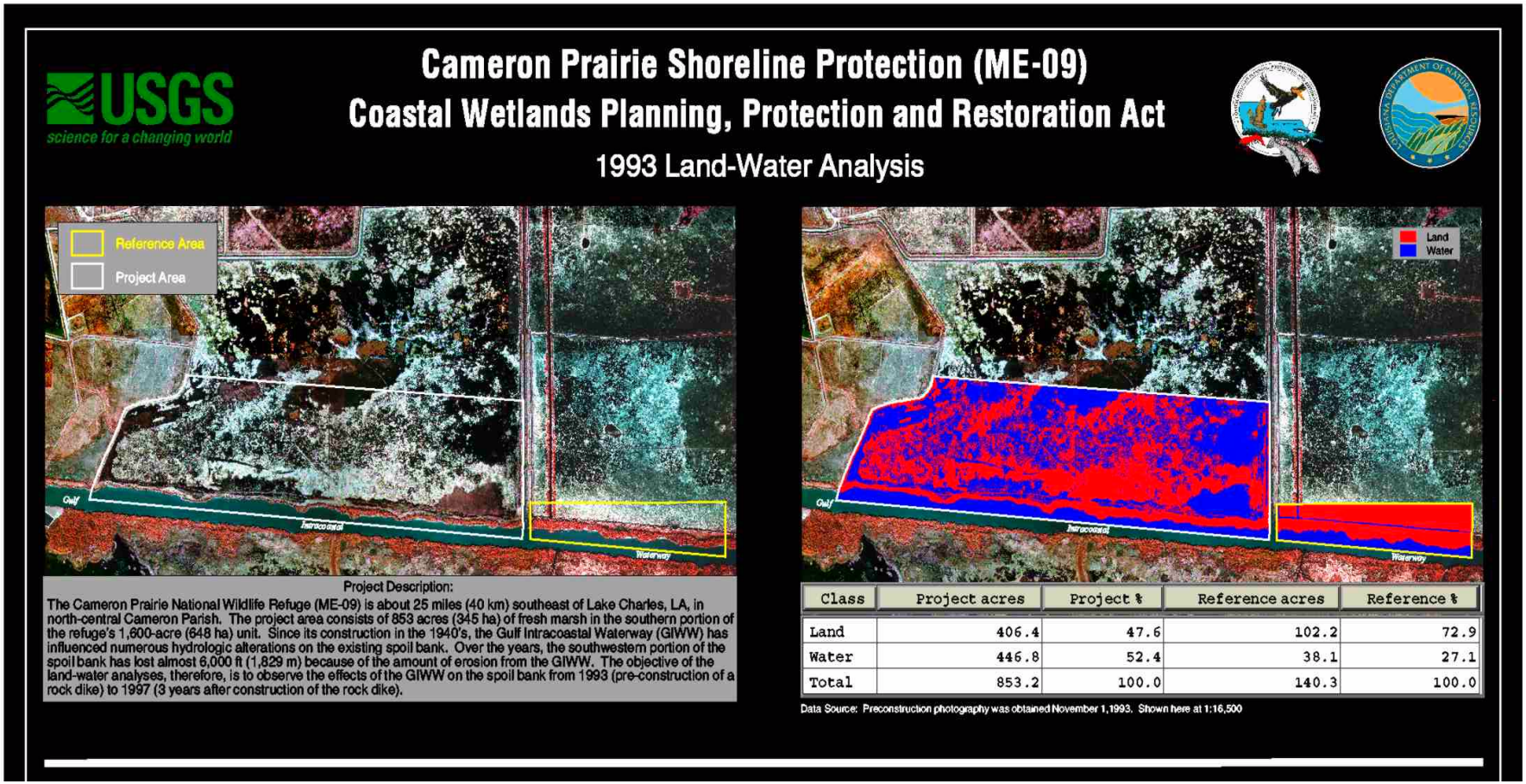

Figure 2a. Cameron Prairie (ME-09) 1993 Land/Water Analysis.

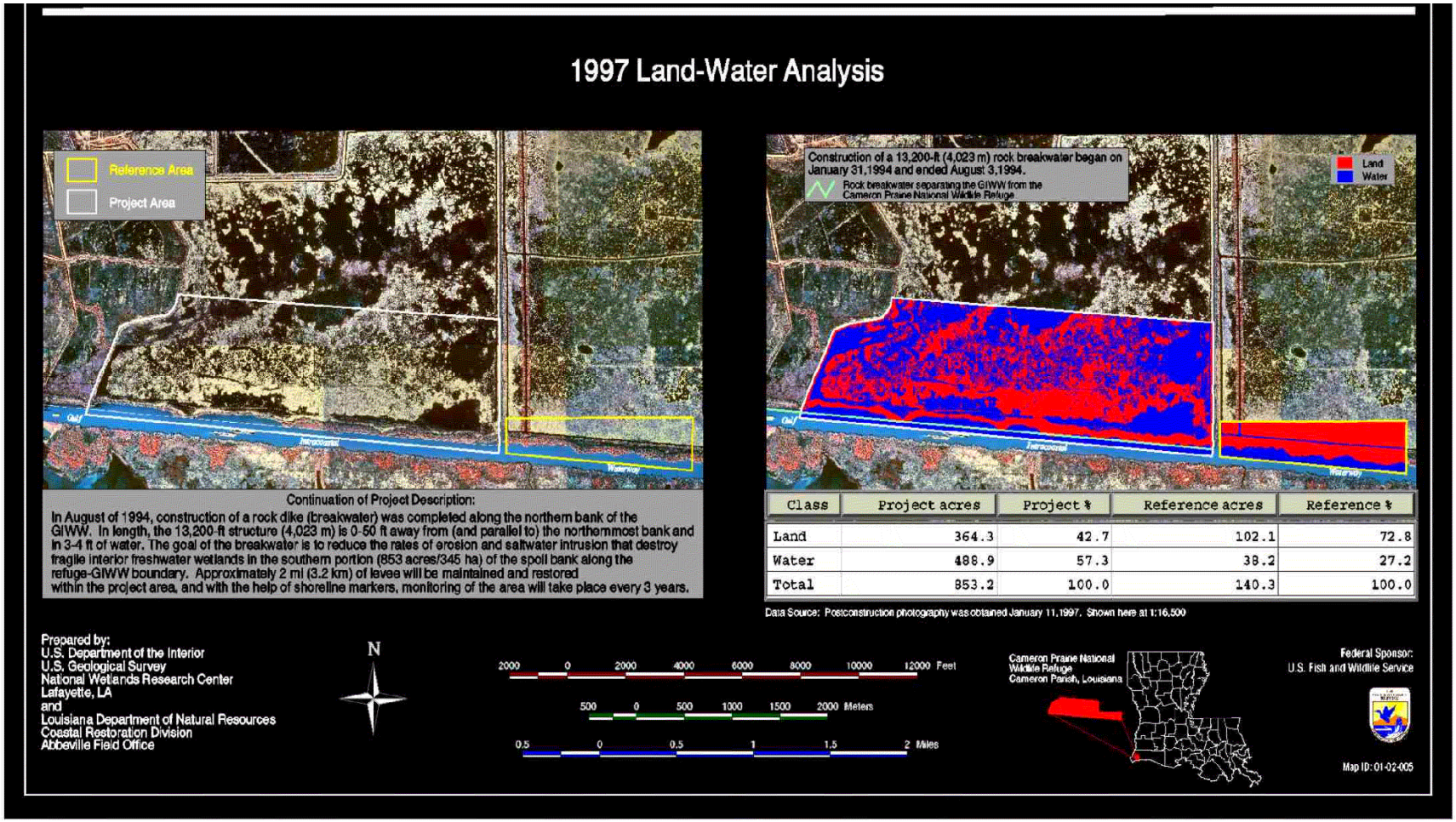

Figure 2b. Cameron Prairie (ME-09) 1997 Land/Water Analysis.

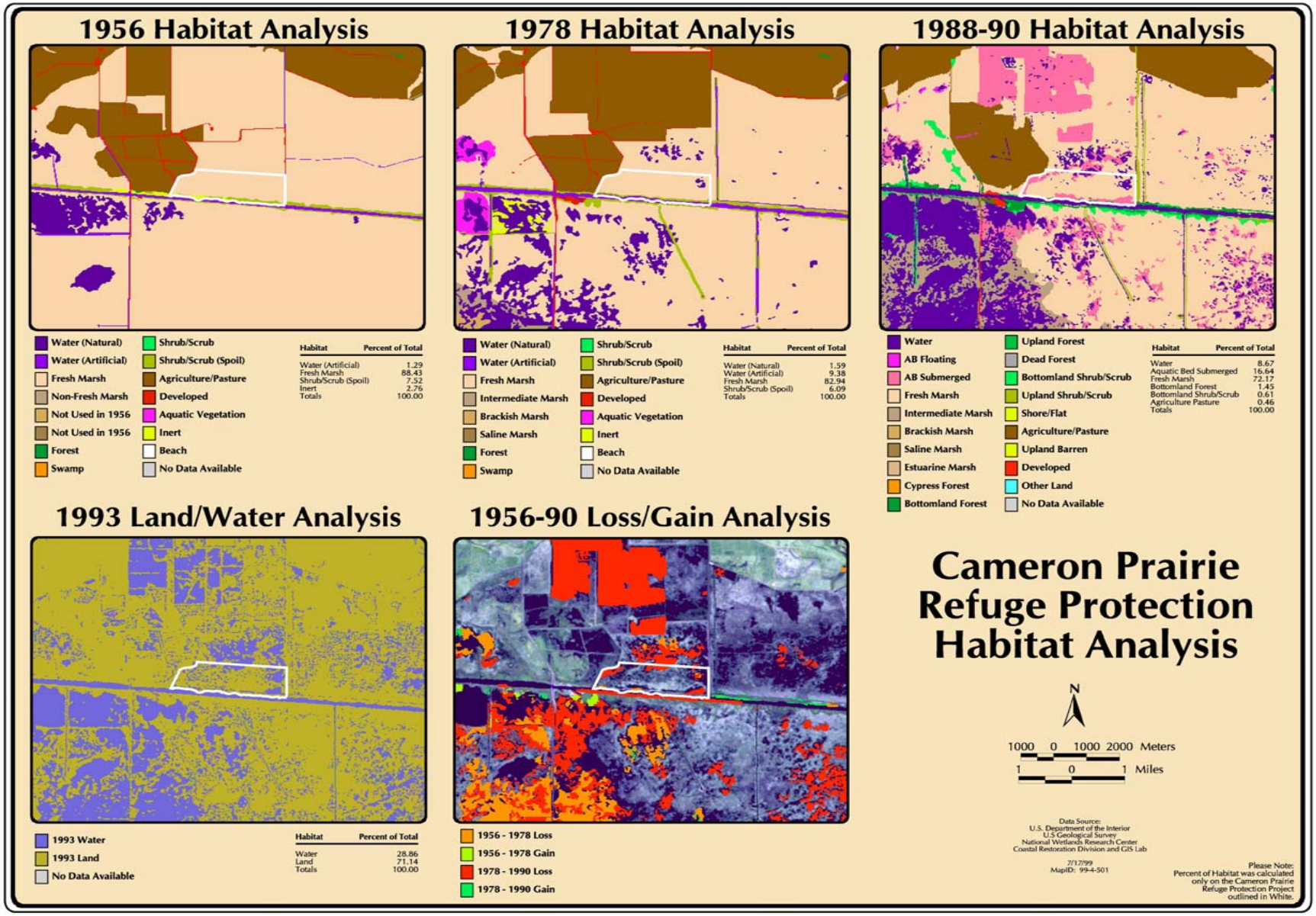

Figure 3. Cameron Prairie (ME-09) 1956-90 Habitat Analysis.

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Shoreline Change Data

Shoreline Change data were collected in 1995, 1997, 2000 and 2003. Data will also be collected in 2006, 2009 and 2012. The data from the August 2003 survey will be presented in the next update.

Figures:

- **Figure 4.** Location of Shoreline Marker Stations at Cameron Prairie Refuge Protection (ME-09) project
- **Figure 5a.** Shoreline position change within the Cameron Prairie (ME-09) project and reference areas for 1995-2000 in feet/year.
- **Figure 5b.** Shoreline position change within the Cameron Prairie (ME-09) project and reference areas for 1995-2000 in meters/year.
- **Figure 6.** Photograph of the Cameron Prairie Refuge Protection (ME-09) project following construction in August 1994, illustrating the shoreline of the GIWW and the installed rock breakwater.
- **Figure 7.** View of the Cameron Prairie rock dike taken August 4, 2003. Note the healthy condition of the *Phragmites australis* and other native vegetation colonizing the dike itself.
- **Figure 8.** View of the Cameron Prairie rock dike showing naturalized vegetation colonizing the dike itself and the accreted marsh behind the dike. The red paint was used to mark the location of the shoreline marker for the DGPS survey.

Cameron Prairie (ME-09)
Shoreline Change Data

Tables:

- **Table 1a.** Measurements (feet) from survey hub to vegetated edge of the bank within project and reference areas for March 1995, May 1997 and September 2000.
- **Table 1b.** Measurements (meters) from survey hub to vegetated edge of the bank within project and reference areas for March 1995, May 1997 and September 2000.

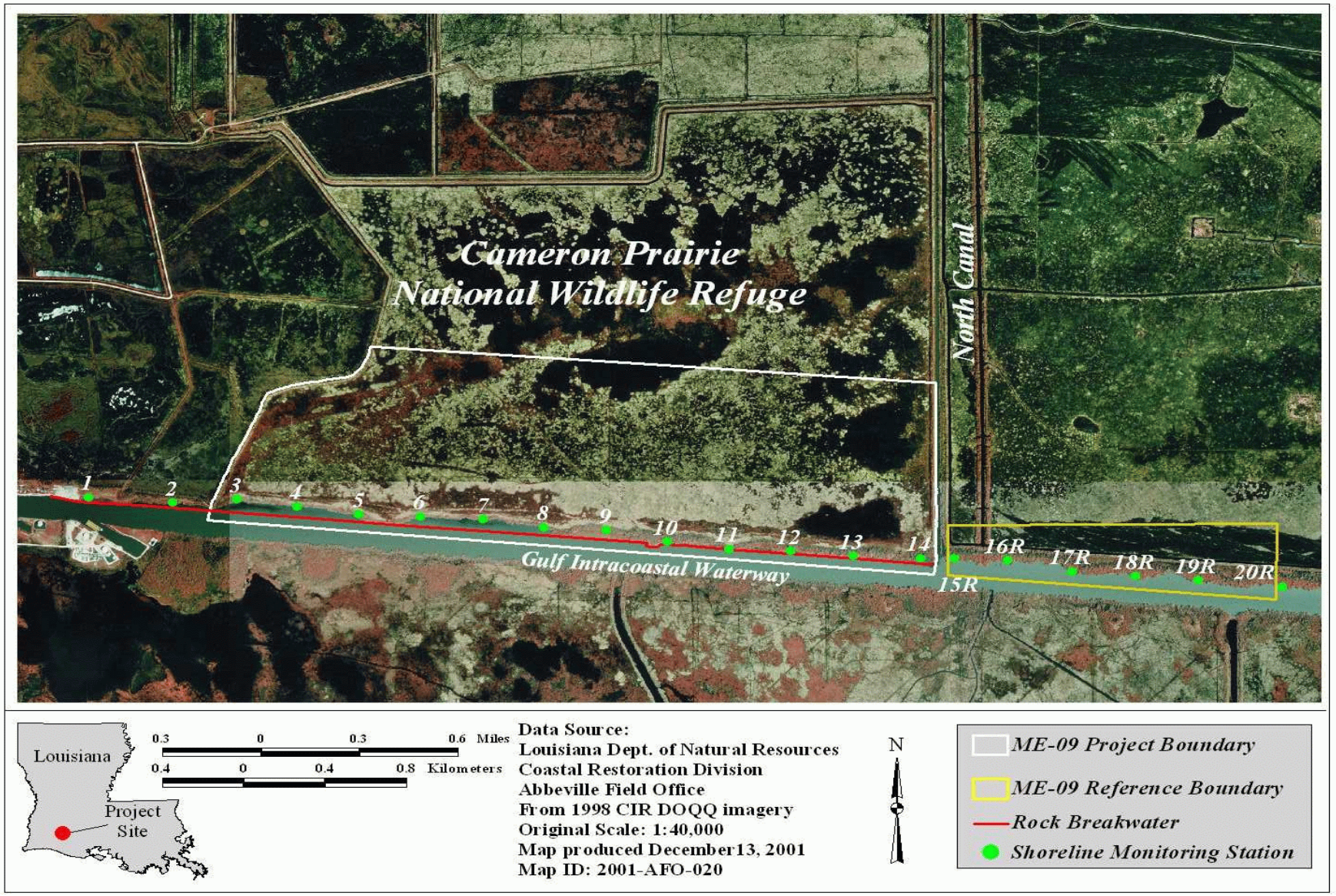

Figure 4. Location of Shoreline Marker Stations at Cameron Prairie Refuge Protection (ME-09) project.

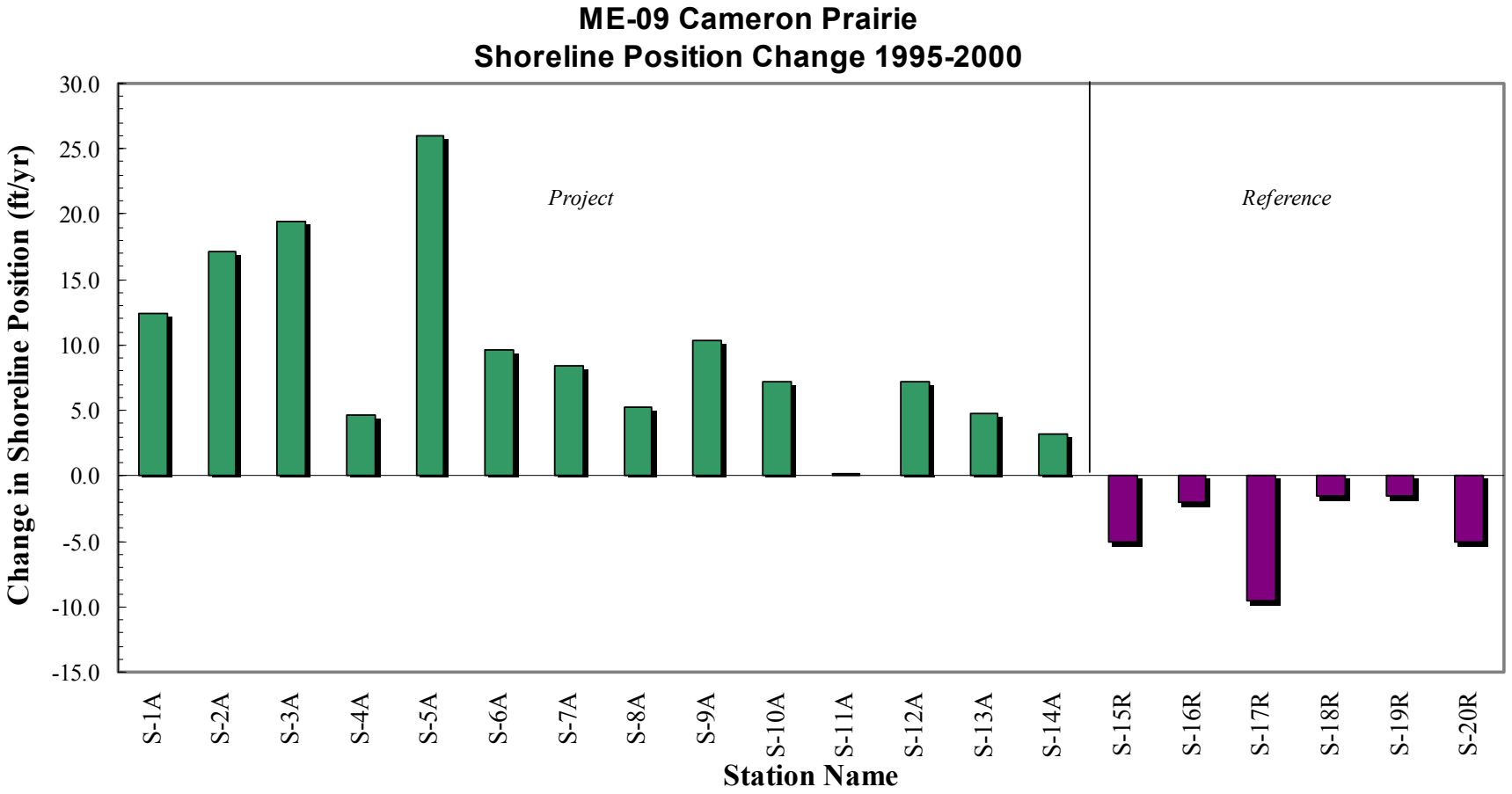

Figure 5a. Shoreline position change within the Cameron Prairie (ME-09) project and reference areas for 1995-2000 in feet/year.

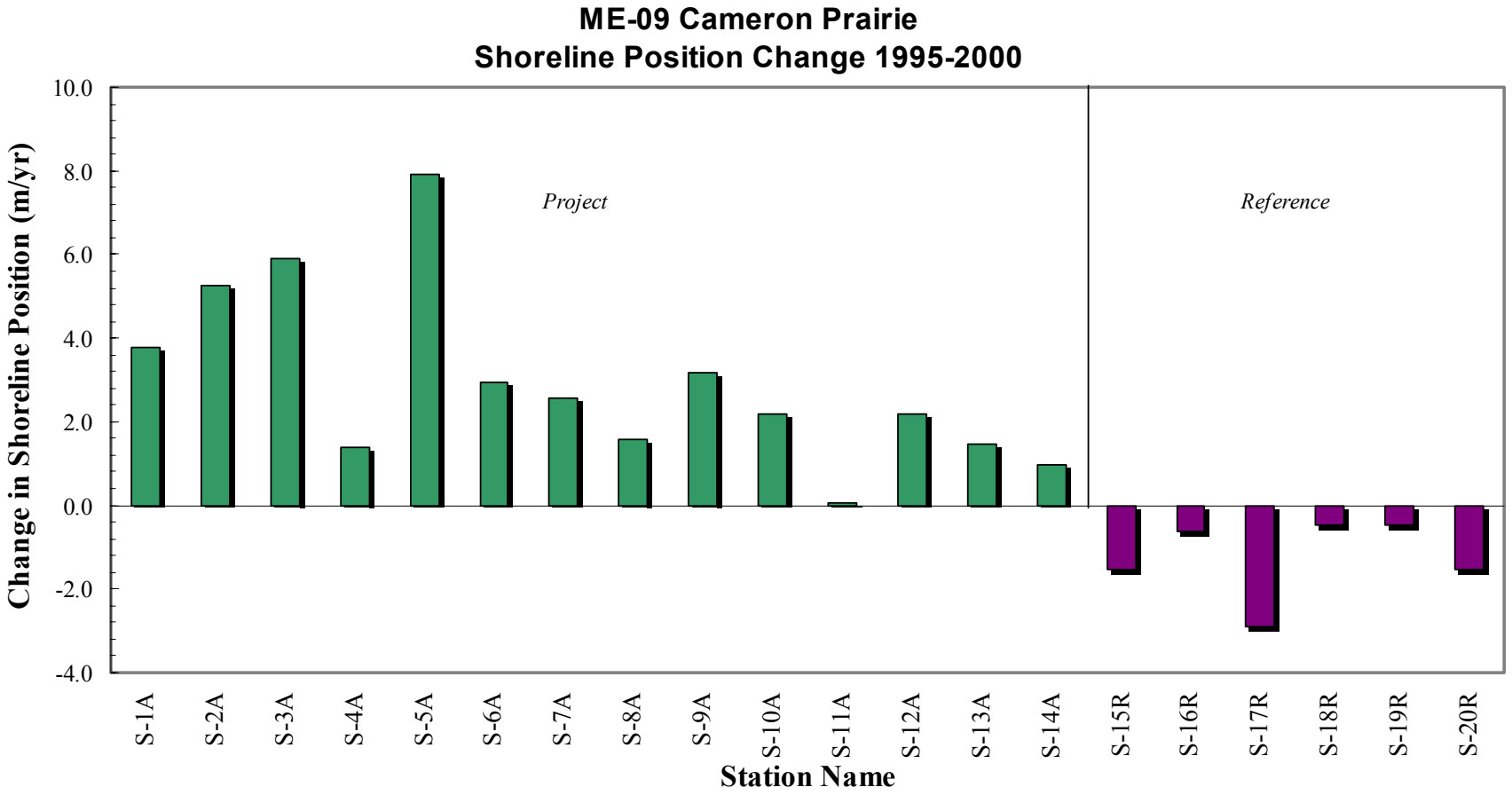

Figure 5b. Shoreline position change within the Cameron Prairie (ME-09) project and reference areas for 1995-2000 in meters/year.

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Figure 6. Photograph of the Cameron Prairie Refuge Protection (ME-09) project following construction in August 1994, illustrating the shoreline of the GIWW and the installed rock breakwater.

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Figure 7. View of the Cameron Prairie rock dike taken August 4, 2003. Note the healthy condition of the *Phragmites australis* and other native vegetation colonizing the dike itself.

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Figure 8. View of the Cameron Prairie rock dike showing naturalized vegetation colonizing the dike itself and the accreted marsh behind the dike. The red paint was used to mark the location of the shoreline marker for the DGPS survey.

Table 1a Measurements (feet) from survey hub to vegetated edge of the bank within project and reference areas for March 1995, May 1997 and September 2000.

Project Number	Station #	Group		Distance to VE - from hub (ft)			
				1995	1997	2000	
ME-09	ME09-01A	Project		14.0	21.0	76.0	
ME-09	ME09-02A	Project		6.0	10.0	92.0	
ME-09	ME09-03A	Project		3.0	21.0	100.0	
ME-09	ME09-04A	Project		1.0	9.0	24.0	
ME-09	ME09-05A	Project		4.0	27.0	134.0	
ME-09	ME09-06A	Project		3.0	23.0	51.0	
ME-09	ME09-07A	Project		1.0	6.0	43.0	
ME-09	ME09-08A	Project		9.0	11.0	35.0	
ME-09	ME09-09A	Project		6.0	9.0	58.0	
ME-09	ME09-10A	Project		8.0	26.0	44.0	
ME-09	ME09-11A	Project		14.0	8.0	15.0	
ME-09	ME09-12A	Project		10.0	20.0	46.0	
ME-09	ME09-13A	Project		16.0	26.0	40.0	
ME-09	ME09-14A	Project		0.0	8.0	16.0	
ME-09	ME09-15R	Project		22.0	12.0	33.0	
ME-09	ME09-16R	Reference		19.0	15.0	31.0	
ME-09	ME09-17R	Reference		28.0	9.0	No hub	
ME-09	ME09-18R	Reference		49.0	46.0	55.0	
ME-09	ME09-19R	Reference		43.0	40.0	45.0	
ME-09	ME09-20R	Reference		34.0	24.0	29.0	

Table 1b Measurements (meters) from survey hub to vegetated edge of the bank within project and reference areas for March 1995, May 1997 and September 2000.

Project Number	Station #	Group		Distance to VE - from hub (m)			
				1995	1997	2000	
ME-09	ME09-01A	Project		4.3	6.4	23.2	
ME-09	ME09-02A	Project		1.8	3.0	28.0	
ME-09	ME09-03A	Project		0.9	6.4	30.5	
ME-09	ME09-04A	Project		0.3	2.7	7.3	
ME-09	ME09-05A	Project		1.2	8.2	40.8	
ME-09	ME09-06A	Project		0.9	7.0	15.5	
ME-09	ME09-07A	Project		0.3	1.8	13.1	
ME-09	ME09-08A	Project		2.7	3.4	10.7	
ME-09	ME09-09A	Project		1.8	2.7	17.7	
ME-09	ME09-10A	Project		2.4	7.9	13.4	
ME-09	ME09-11A	Project		4.3	2.4	4.6	
ME-09	ME09-12A	Project		3.0	6.1	14.0	
ME-09	ME09-13A	Project		4.9	7.9	12.2	
ME-09	ME09-14A	Project		0.0	2.4	4.9	
ME-09	ME09-15R	Project		6.7	3.7	10.1	
ME-09	ME09-16R	Reference		5.8	4.6	9.4	
ME-09	ME09-17R	Reference		8.5	2.7	No hub	
ME-09	ME09-18R	Reference		14.9	14.0	16.8	
ME-09	ME09-19R	Reference		13.1	12.2	13.7	
ME-09	ME09-20R	Reference		10.4	7.3	8.8	

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Preliminary Findings

Aerial Photography

- Pre-construction (1993) land:water classification indicated 47.6% land and 52.4% water within the project area. The reference area classification indicated 72.9% land and 27.0% water.
- Post-construction (1997) land:water classification indicated 42.7% land and 57.3% water within the project area. The reference area classification indicated 72.8% land and 27.2% water.
- GIS land and water analysis comparing preconstruction and post-construction photography revealed only small changes in the reference area; the project area showed a marked increase in the ratio of water to land. This change could be attributed to seasonal fluctuations in water level and not result from subsidence or erosional processes since the 1993 photography was taken in November and the 1997 photography was taken in January.

Shoreline Position

- Data were collected in May 1995 (as-built), May 1997 and September 2000. Mean shoreline change rate was calculated to be 9.8 +/- 7.1 ft/yr (3.0 +/- 2.2 m/yr) and -4.1 +/- 3.1 ft/yr (-1.2 +/- 0.9 m/yr) for the project and reference areas, respectively. The data indicates that the project, thus far, has been effective in preventing erosion at all project area stations. Shoreline position at the reference sites continued to retreat.
- Information outlining the details of the 1997 reference survey hub relocation was not available from the contractor and therefore the distances that the hubs were moved could not be determined. Thus, shoreline change measurements in the reference area were calculated for the period 1995-1997.