CS-22

Clear Marais
Summary Data and Graphics

Miller, M. 2003. *CS-22 Clear Marais Summary Data and Graphics, Louisiana Department of Natural Resources, Coastal Restoration Division, Baton Rouge, Louisiana. 15p.*

Clear Marais (CS-22)

Project Overview:

The Clear Marais shoreline protection project area is located along the north bank of the Gulf Intracoastal Waterway (GIWW) in Cameron Parish between the Alkali ditch and Goose Lake (figure 1). The project provides features to protect 3,827 ac (1,531 ha) of freshwater marsh that are threatened by saltwater intrusion and marsh loss from breaches in the GIWW shoreline. Of the 3,827 ac of fresh marsh, 1,179 ac (472 ha) are vegetated marsh and 2,648 ac (1,059 ha) are open water, with the dominant plant species present in the marsh being *Sagittaria lancifolia* (bulltongue), *Scirpus californicus* (bullwhip), and *Juncus effusus* (soft rush).

The construction of the GIWW, which was deepened to its present depth of 12 ft (3.7 m) between 1942 and 1949, provided an avenue for high-action wave energy. This wave energy is increased during high-river stages in the Calcasieu-Sabine basin (USDA 1993). The marshes located adjacent to the GIWW are protected from rapid fluctuations of water salinity and water level by a water management levee. However, increased tidal action and boat wakes threaten to create breaches in the levee that would connect the GIWW with interior ponds and marshes. The shoreline erosion rate of the north bank of the GIWW adjacent to the freshwater wetlands is 10 ft/yr (3.05 m/yr), based on aerial photography (USDA 1992). Additionally, the present rate of wetland loss in the project area is 1.1%/yr (USDA 1992). The susceptibility to saltwater damage and the erosional forces of the GIWW threaten the integrity of the remaining acres of the vegetated freshwater marsh.

The project design includes a 35,000 ft (10,668 m) rock dike along the north shore of the GIWW to protect the integrity of the Clear Marais freshwater wetlands north of the GIWW. Currently there are no locations for fishery exchange from the GIWW into the interior marsh, therefore the breakwater will not impact existing fishery access into the project area.

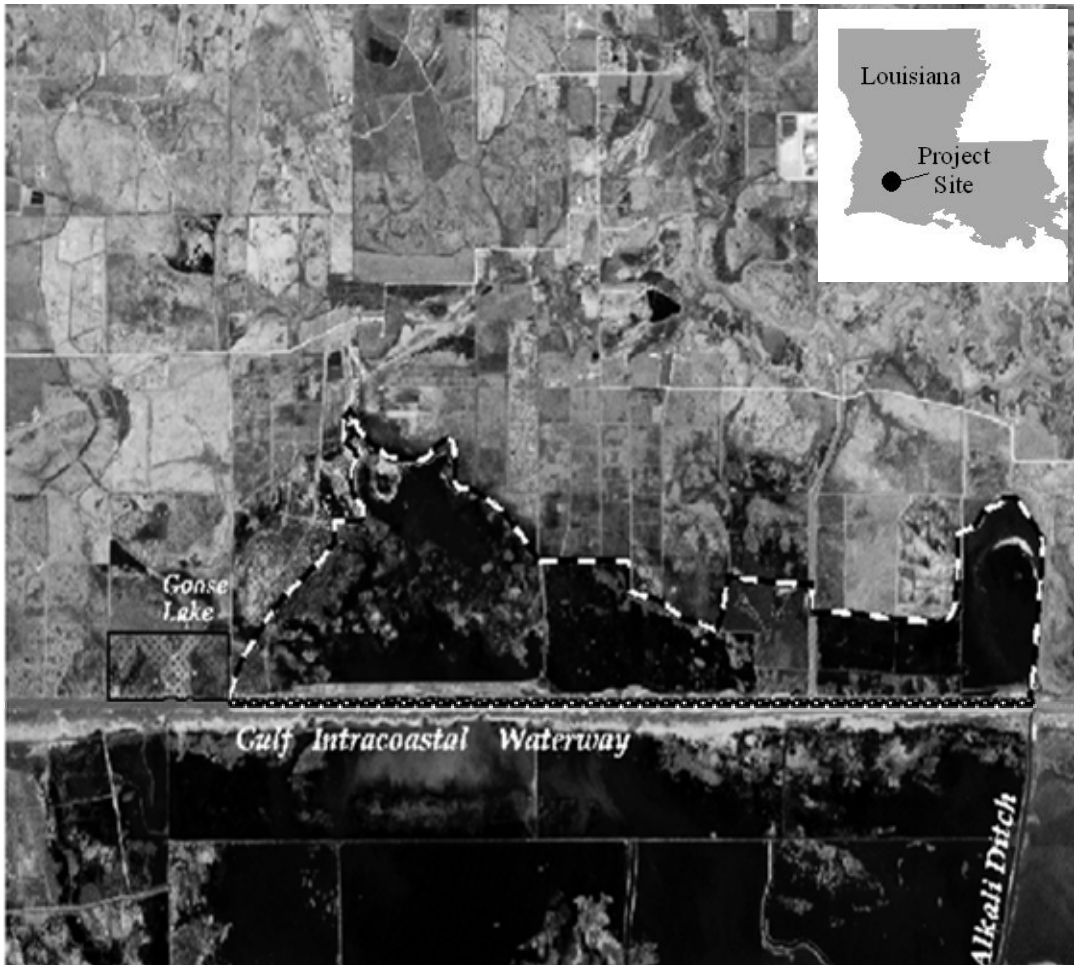

Figure 1. Clear Marais (CS-22) project and reference area location map.

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Project Objective

1. Maintain and protect approximately 35,000 linear ft (10,668 m) of management levee along the north bank of the GIWW that will contribute to protecting the integrity of the freshwater marshes of Clear Marais adjacent to the GIWW.

Specific Goal

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

1. Decrease the rate of shoreline erosion along the north bank of the GIWW south of the Clear Marais marshes through the use of a rock breakwater.

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Monitoring Elements

The following monitoring elements will provide the information necessary to evaluate the specific goal listed above:

1. **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 using National Wetland Research Center (NWRC) standard operating procedures described in Steyer et al. (1995), but detailed photointerpretation, mapping and GIS is not currently planned. The photography will be obtained in 1994 (pre-construction) and in 2006 and 2015 post-construction.

2. **Shoreline Change:**

   To document shoreline movement, 35 shoreline markers will be placed at points along the vegetated marsh edge adjacent to the rock breakwater at a maximum interval of 1,000 ft (305 m). Five shoreline markers will be placed at the same 1,000 ft intervals 1 mi (1.6 km) west of the proposed breakwater in the reference area. The position of the shoreline relative to the shoreline markers will be documented in 1997, 2000, 2003, 2006, 2010, and 2015 by direct measurement. A GPS coordinate will be obtained for each shoreline marker placed to maintain baseline condition over time. The shoreline will be stratified into three different land types: severe erosion directly adjacent to Clear Marais wetlands, moderate erosion from end of management levee to Brannon ditch and mild erosion east of Brannon ditch to the Alkali ditch. Determination of land types were made through evaluation of aerial photography.

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Habitat Mapping

Aerial photography was collected in November 1994. Photography will also be collected in 2006 and 2015.

Figure 2. 1994 Photomosaic of the Clear Marais (CS-22) project and reference areas.
Figure 3. 1994 Land : Water analysis of the Clear Marais (CS-22) project and reference areas.

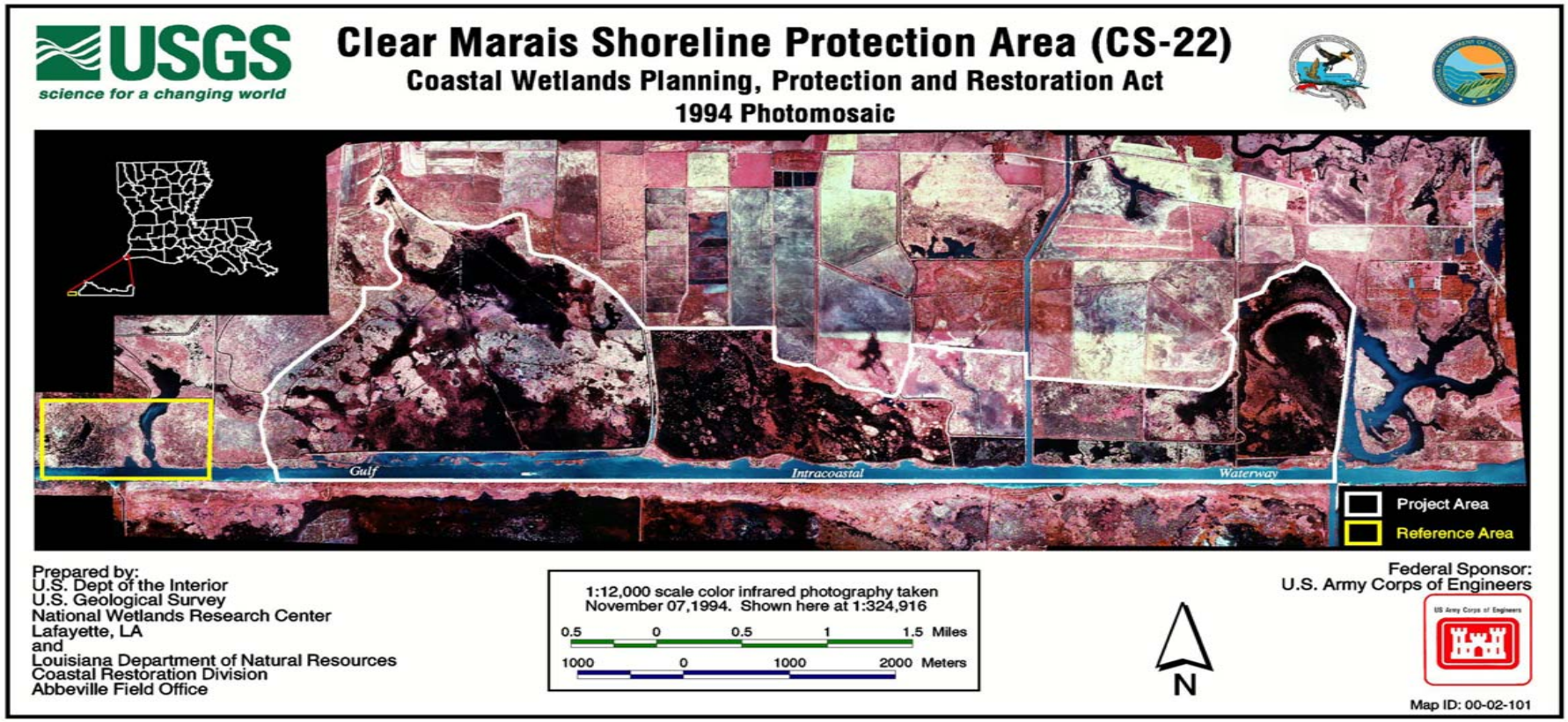

Figure 2. 1994 photomosaic of the Clear Marais (CS-22) project and reference areas.

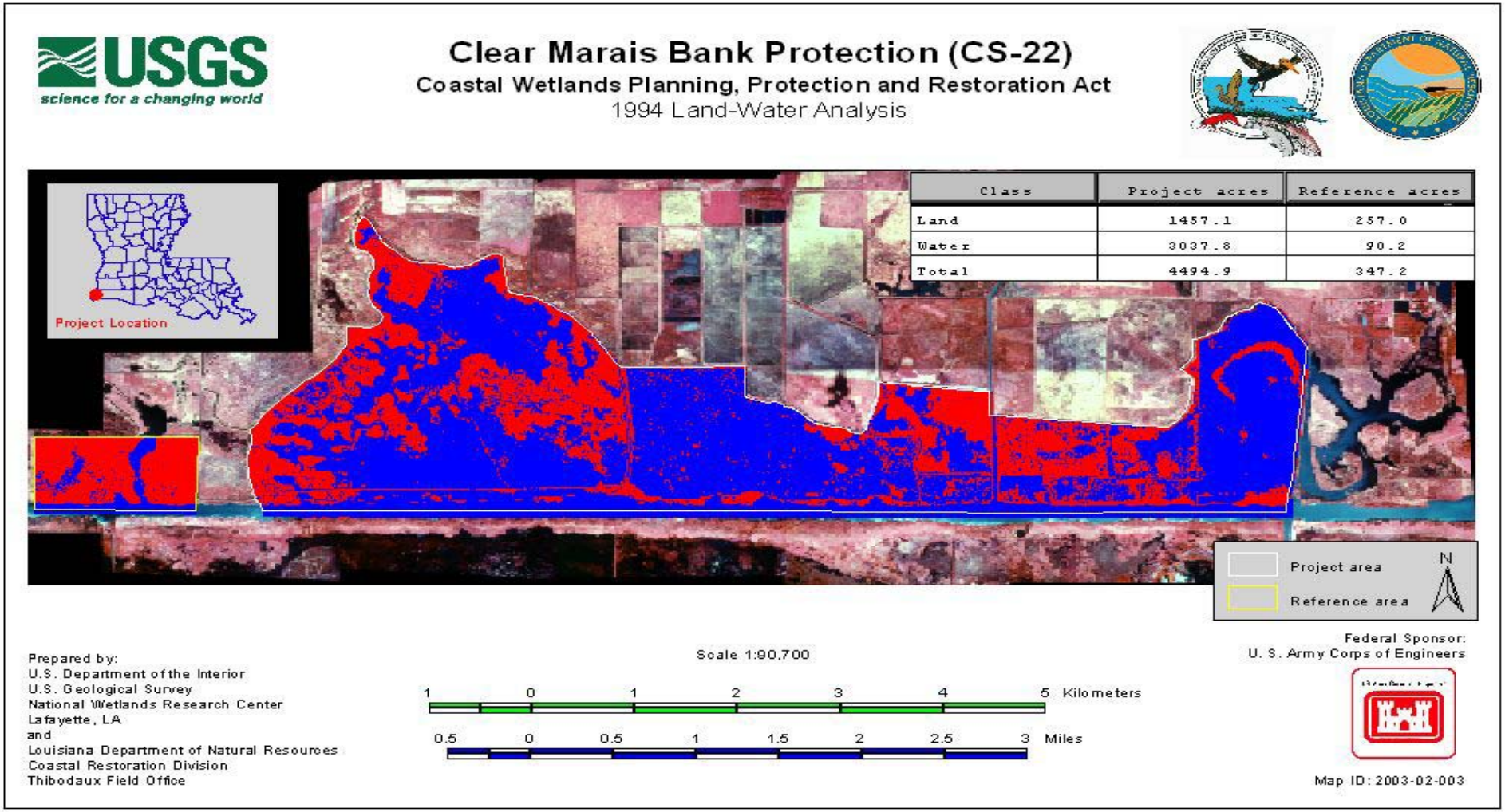

Figure 3. 1994 Land to Water analysis of the Clear Marais (CS-22) project and reference areas.

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Shoreline Change Data

Shoreline Change data were collected in 1997 and 2000. Data will also be collected in 2003, 2006, 2010 and 2015.

- Figure 4. Project map showing location of shoreline marker stations.
- Table 1. 1997 and 2000 measurements in feet and meters from the survey hub to the vegetated edge of the bank within project and reference areas.
- Figure 5. CS-22 Shoreline position change from 1997-2000 (ft/yr)
- Figure 6. CS-22 Shoreline position change from 1997-2000 (m/yr)

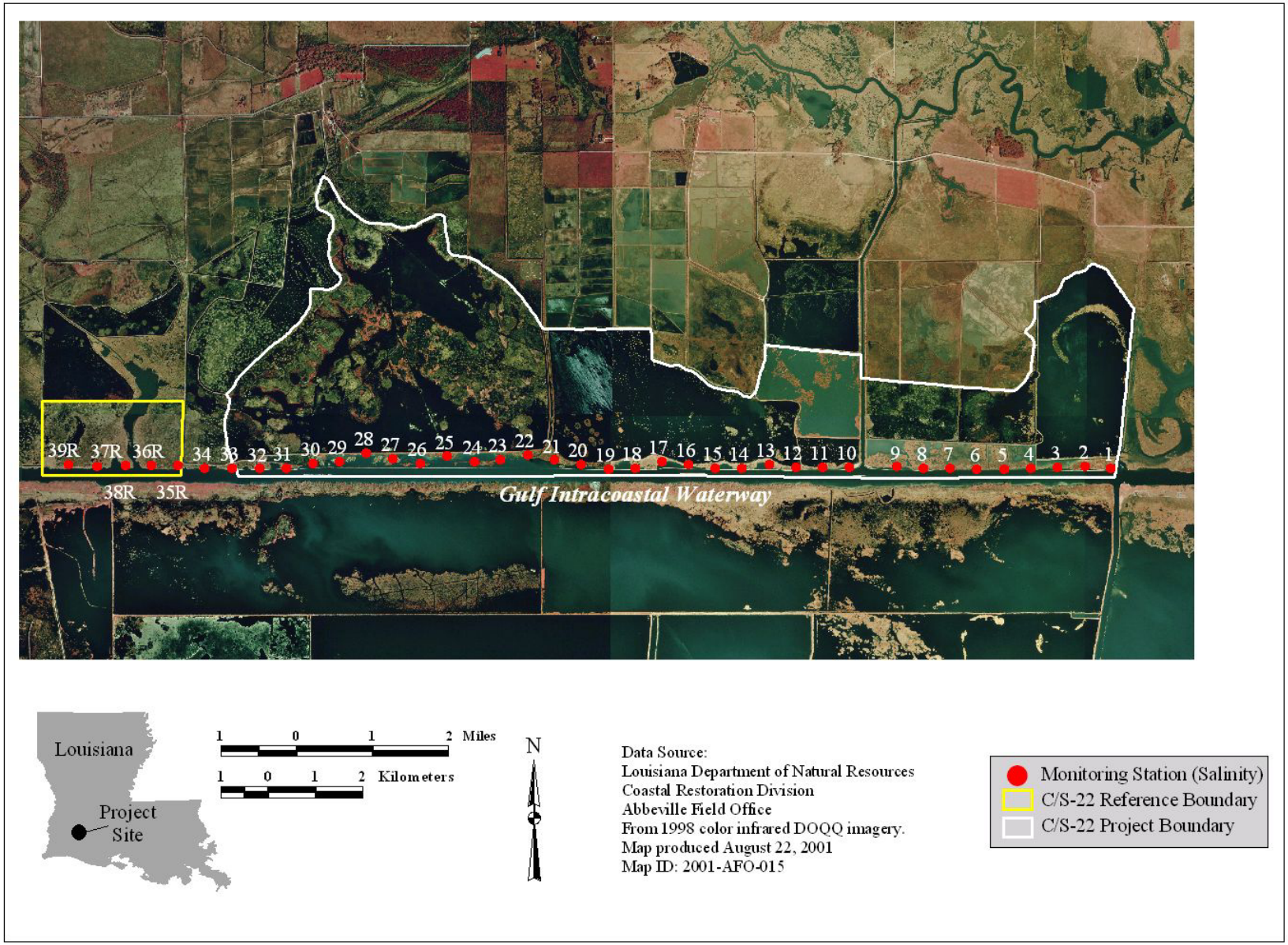

Figure 4. Monitoring station locations within the Clear Marais (CS-22) project and reference areas.

Table 1. 1997 and 2000 measurements from center of rock dike to the vegetated edge within the Clear Marais (CS-22) project and reference areas. Group A, B and C were experiencing severe, moderate and mild erosion respectively.

Project	Station	Group	1997 Distance (ft)	1997 Distance (m)	2000 Distance (ft)	2000 Distance (m)
CS-22	CS22-01	A	53.99	16.46	55.76	17.00
CS-22	CS22-02	A	38.99	11.89	127.92	39.00
CS-22	CS22-03	A	93.98	28.65	137.76	42.00
CS-22	CS22-04	A	60.98	18.59	59.04	18.00
CS-22	CS22-05	A	25.99	7.92	6.56	2.00
CS-22	CS22-06	A	25.99	7.92	26.24	8.00
CS-22	CS22-07	A	49.99	15.24	52.48	16.00
CS-22	CS22-08	A	49.99	15.24	42.64	13.00
CS-22	CS22-09	A	98.97	30.18	100.36	30.60
CS-22	CS22-10	B	29.99	9.14	22.96	7.00
CS-22	CS22-11	B	92.98	28.35	88.56	27.00
CS-22	CS22-12	B	95.98	29.26	75.44	23.00
CS-22	CS22-13	B	159.96	48.77	160.72	49.00
CS-22	CS22-14	B	42.99	13.11	39.36	12.00
CS-22	CS22-15	B	22.99	7.01	13.12	4.00
CS-22	CS22-16	B	127.97	39.01	131.20	40.00
CS-22	CS22-17	B	205.95	62.79	203.36	62.00
CS-22	CS22-18	B	53.99	16.46	52.48	16.00
CS-22	CS22-19	B	23.99	7.32	16.40	5.00
CS-22	CS22-20	B	151.96	46.33	154.16	47.00
CS-22	CS22-21	B	272.93	83.21	272.24	83.00
CS-22	CS22-22	B	445.89	135.94	N/A	N/A

Table 1 cont. 1997 and 2000 measurements from center of rock dike to the vegetated edge within the Clear Marais (CS-22) project and reference areas. Group A, B and C were experiencing severe, moderate and mild erosion respectively.

Project	Station	Group	1997 Distance (ft)	1997 Distance (m)	2000 Distance (ft)	2000 Distance (m)
CS-22	CS22-23	C	532.86	162.46	429.16	130.84
CS-22	CS22-24	C	554.86	169.16	462.48	141.00
CS-22	CS22-25	C	389.90	118.87	328.00	100.00
CS-22	CS22-26	C	47.99	14.63	145.52	44.37
CS-22	CS22-27	C	502.87	153.31	256.62	78.24
CS-22	CS22-28	C	498.87	152.10	463.47	141.30
CS-22	CS22-29	C	179.95	54.86	137.51	41.93
CS-22	CS22-30	C	396.90	121.01	383.48	116.92
CS-22	CS22-31	C	26.99	8.23	10.22	3.12
CS-22	CS22-32	C	37.99	11.58	44.19	13.47
CS-22	CS22-33	C	30.99	9.45	28.27	8.62
CS-22	CS22-34	C	11.00	3.35	9.74	2.97
CS-22	CS22-35R	R	0.00	0.00	-33.80	-10.31
CS-22	CS22-36R	R	0.00	0.00	-44.32	-13.51
CS-22	CS22-37R	R	0.00	0.00	-111.34	-33.95
CS-22	CS22-38R	R	0.00	0.00	-28.86	-8.80
CS-22	CS22-39R	R	0.00	0.00	N/A	N/A

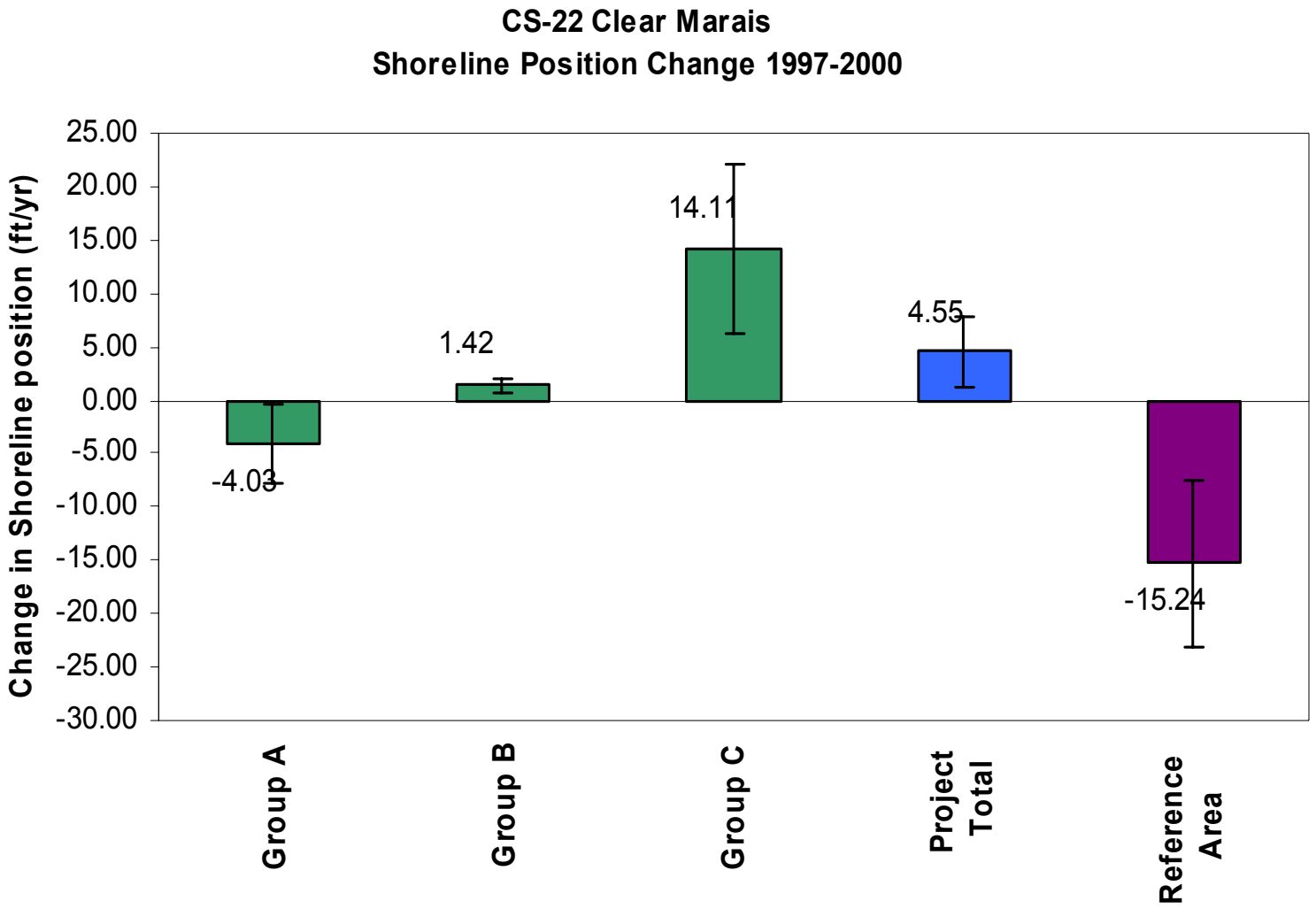

Figure 5. Shoreline change in ft/yr within groups A, B, C, project and reference areas for the Clear Marais (CS-22) project.

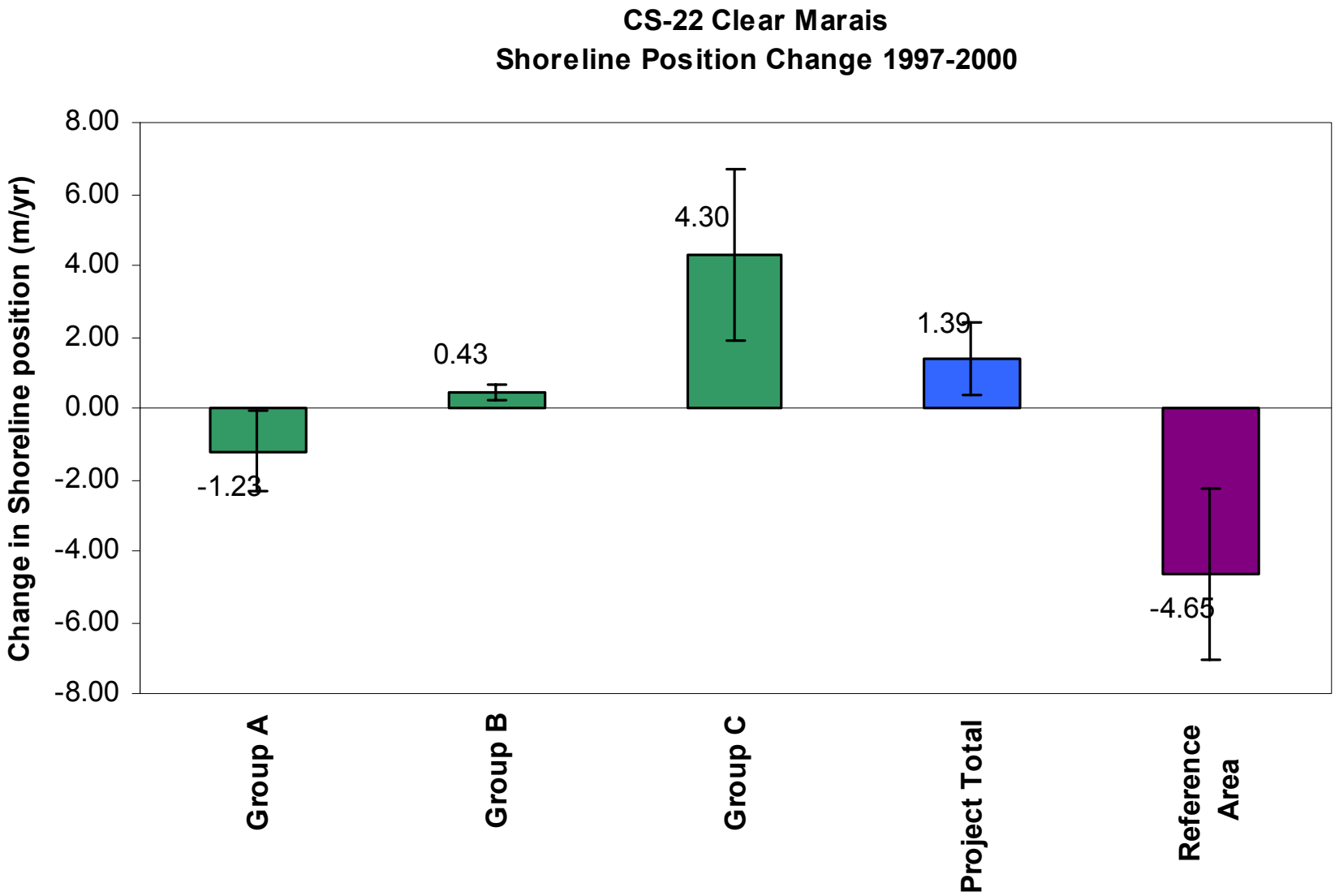

Figure 6. Shoreline change in m/yr within groups A, B, C, project and reference areas for the Clear Marais (CS-22) project.

METRIC units

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Preliminary Findings

Aerial Photography

- Pre-construction (1994) land:water classification indicated 32.4% land and 67.6% water within the project area versus 74.0% land and 26.0% water within reference area.

Shoreline Position

- Data were collected in May 1997 (as-built) and May 2000. The data indicate that the project, thus far, has been effective in preventing erosion within each group. Group A which was experiencing severe erosion lost 4.03 ft/yr (1.23m/yr). Group B which was experiencing moderate erosion gained 1.42 ft/yr (.43 m/yr). Group C which was experiencing mild erosion gained 14.11 ft/yr (4.30 m/yr). Overall the project area gained 4.55 ft/yr as compared to the reference area which lost 15.24 ft/yr (4.65 m/yr).