

Cameron Prairie Refuge Protection

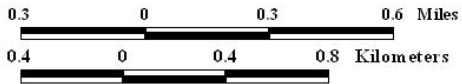
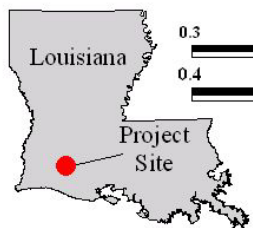
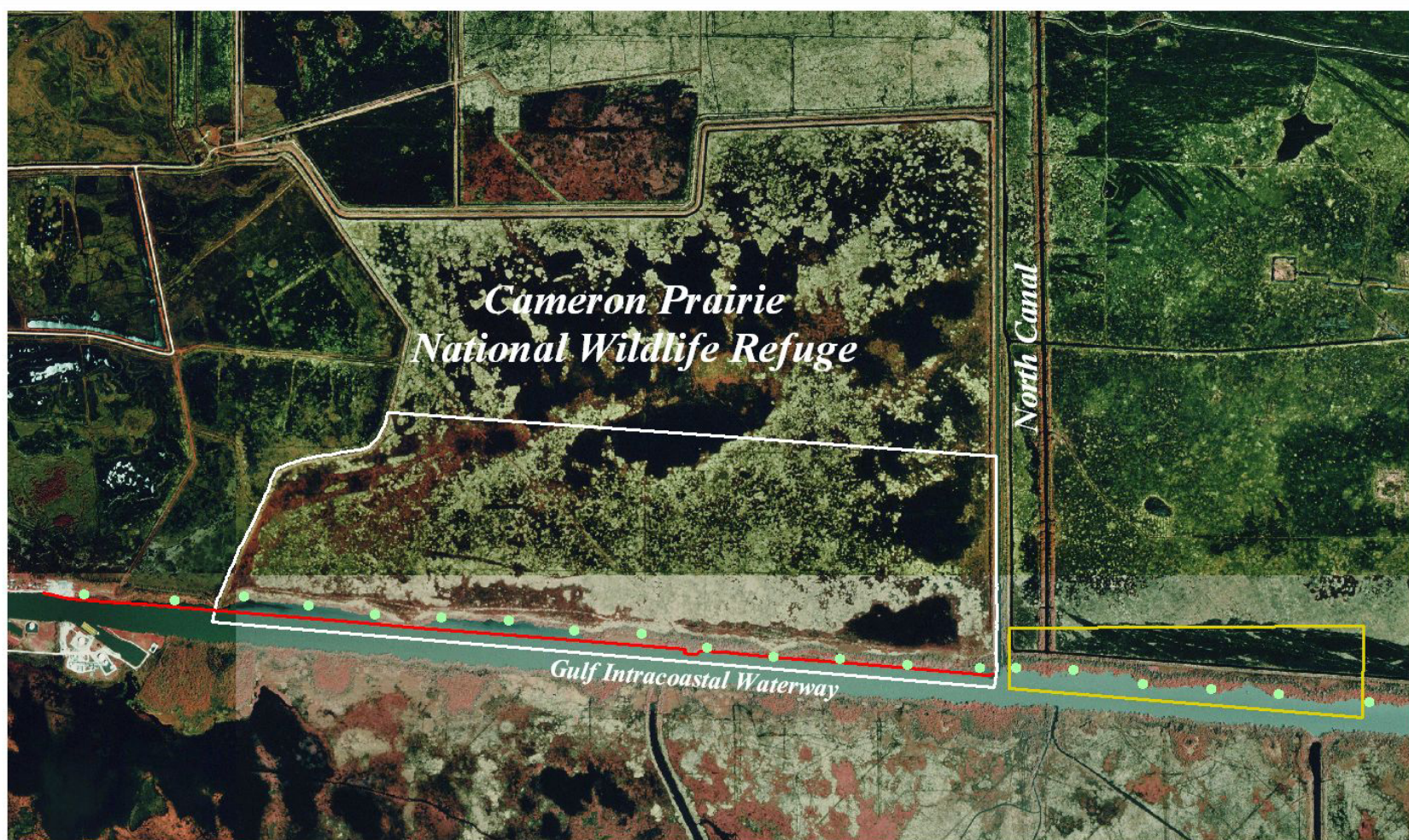
- Selected on PPL1
- Construction finished August, 1994
- Location:



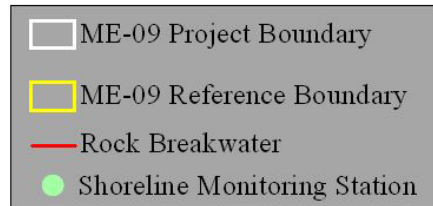
● Project Feature

- Rock Dike

ME-09



Data Source:
Louisiana Dept. of Natural Resources
Coastal Restoration Division
From 1998 CIR DOQQ imagery
Map produced July 30, 2001
Map ID: 2001-AFO-011

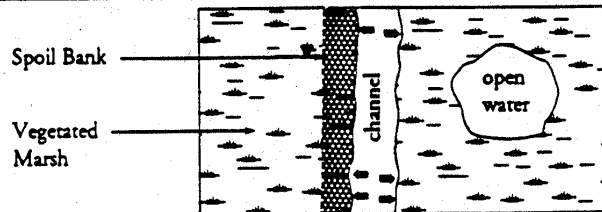


Planning

- Assumed Causes of Loss:
 1. Shoreline erosion at 2.5 ft/yr along 6,000 ft of the GIWW (7 acres of loss)
 2. Unspecified loss resulting in an additional 240 acres of loss

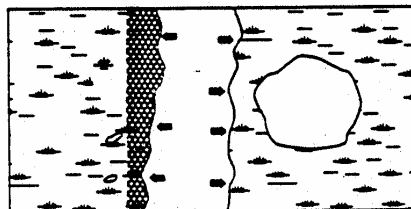
- Blow-out: wetland loss that occurs when hydraulically isolated broken-marsh areas are connected to large water bodies because “increased wave and wind energies and saltwater intrusion destroy fragile interior marsh which was previously unexposed to these effects” (Good et al. 1995)

Primary Losses

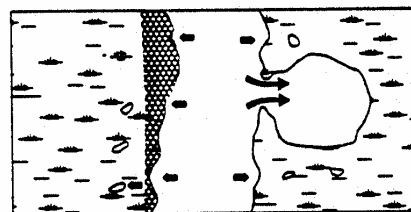


- A. During channel construction, conversion from vegetated marsh to open water represents direct wetland loss equal to the area of the canal. The disposal of dredged soil material also results in direct loss by killing existing vegetation and converting functional wetlands into upland areas.

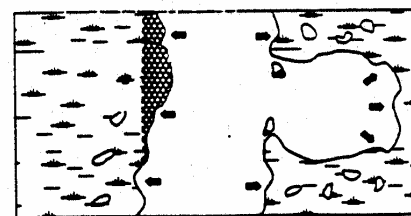
Secondary Losses



- B. Increased wave energy and water drawdown created by ships using the waterway, saltwater intrusion, and other hydrologic modifications result in further conversion of vegetated wetlands to open water through bank erosion and the breakup of interior marsh.



- C. As exposed marsh edges continue to erode, bank erosion can result in a blowout where direct connections between a channel and inland water body are formed.



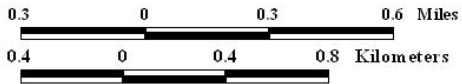
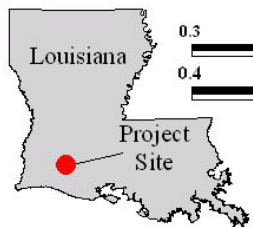
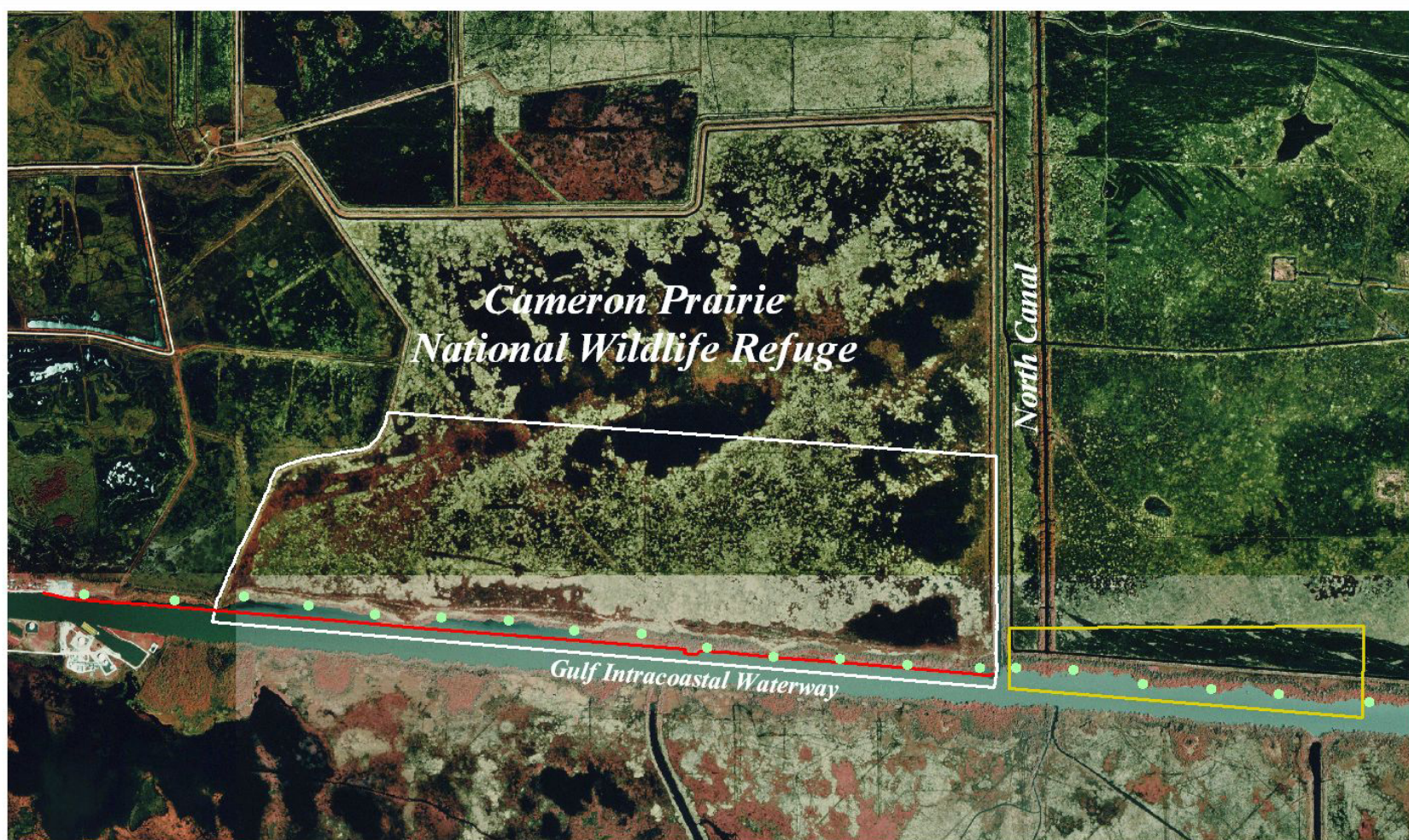
- D. After a blowout, increased wave and wind energies and saltwater intrusion destroy fragile interior marsh which was previously unexposed to these effects.

Figure 2. Primary & Secondary Wetland Loss Progression Associated with Navigational Channels.

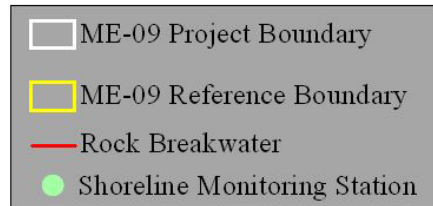
● Project Feature

- Rock Dike

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Goals and Objectives

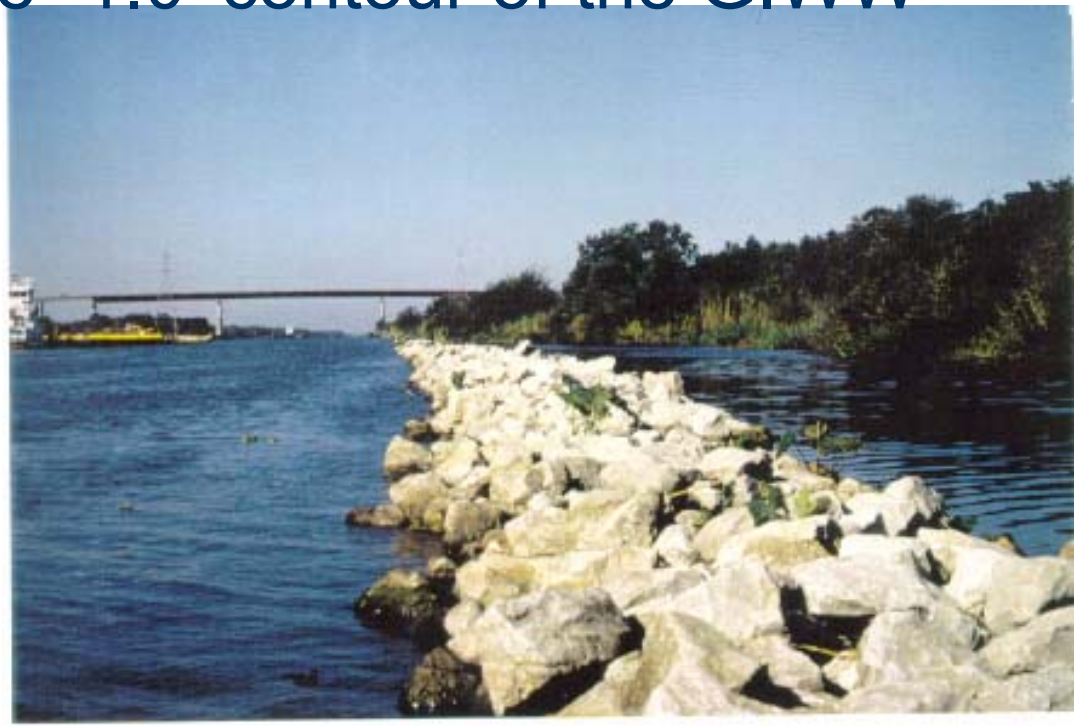
- CWPPRA (1993): (1) Protect the emergent wetlands of the Cameron Prairie NWR, (2) Enhancement of emergent wetlands protected by the proposed levee, and (3) Terminate the encroachment of the GIWW on the NWR.

Goals and Objectives

- LDNR (1994): (1) Protect the emergent wetlands of the Cameron Prairie NWR adjacent to the GIWW and prevent the loss of approximately 247 ac (100 ha) of marsh, and (2) prevent the widening of the GIWW into the NWR.

Construction

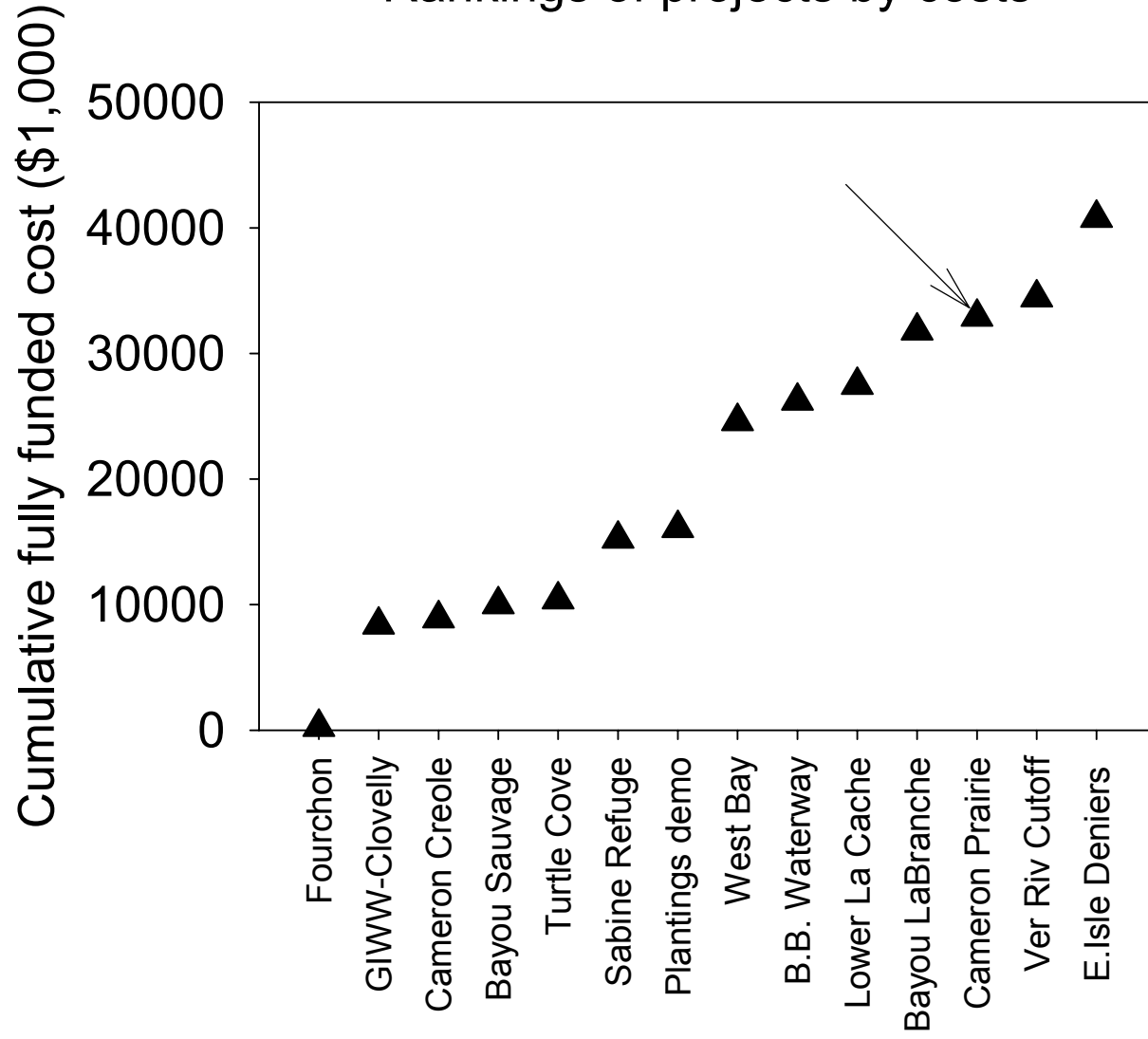
- Final Feature-foreshore rock dike with a top elevation of 3.7' NAVD with 2:1 side slopes constructed on the -1.0' contour of the GIWW



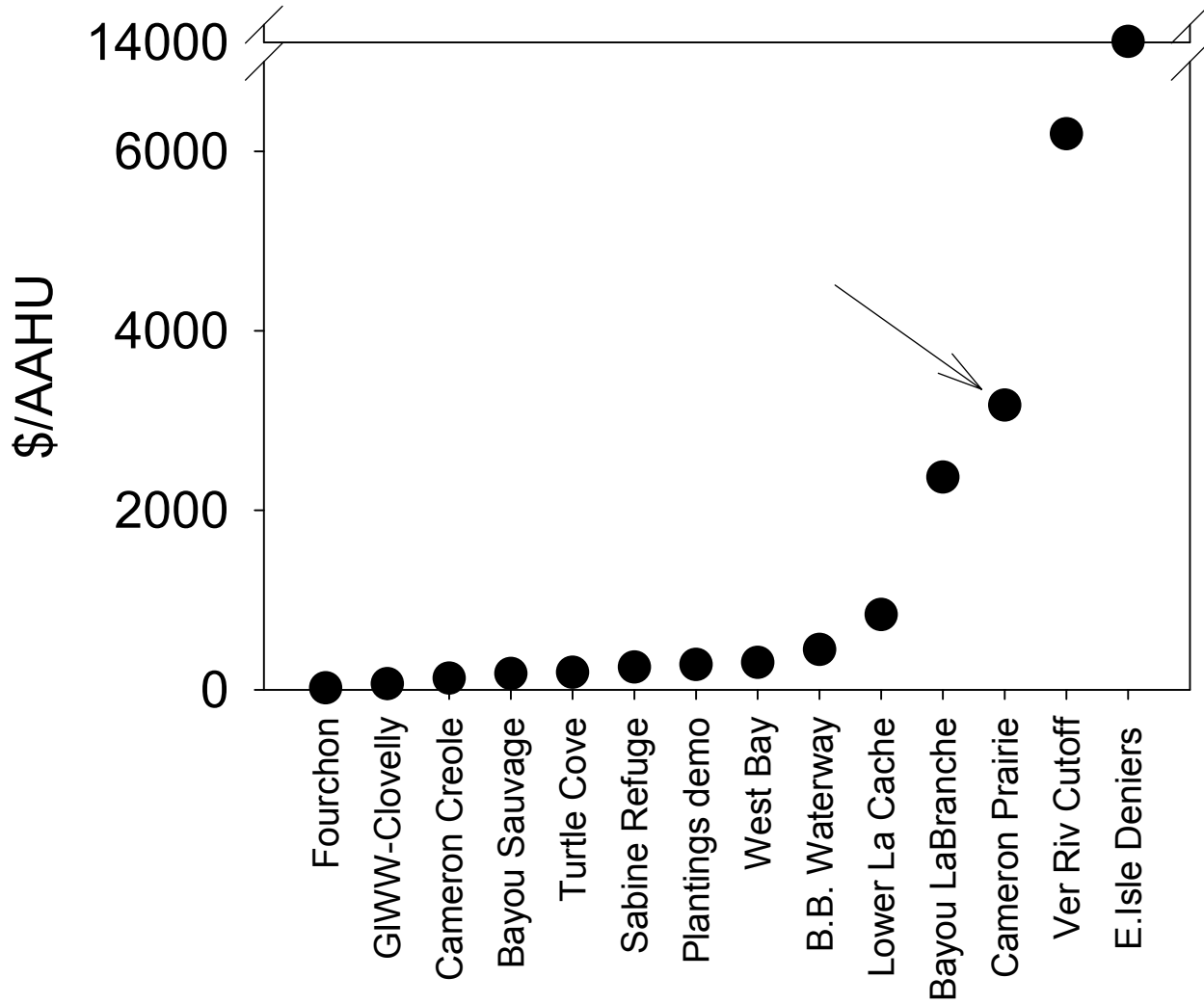
Construction

- CWPPRA (1993) called for building a 6,000 ft dike to protect 247 acres from being lost.
- 13,200 ft dike actually constructed to protect 247 acres from being lost.
- 120% increase in shoreline protected; 0% increase in anticipated benefits.

Rankings of projects by costs

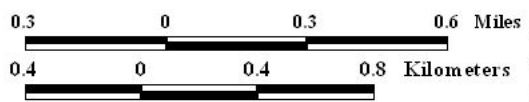
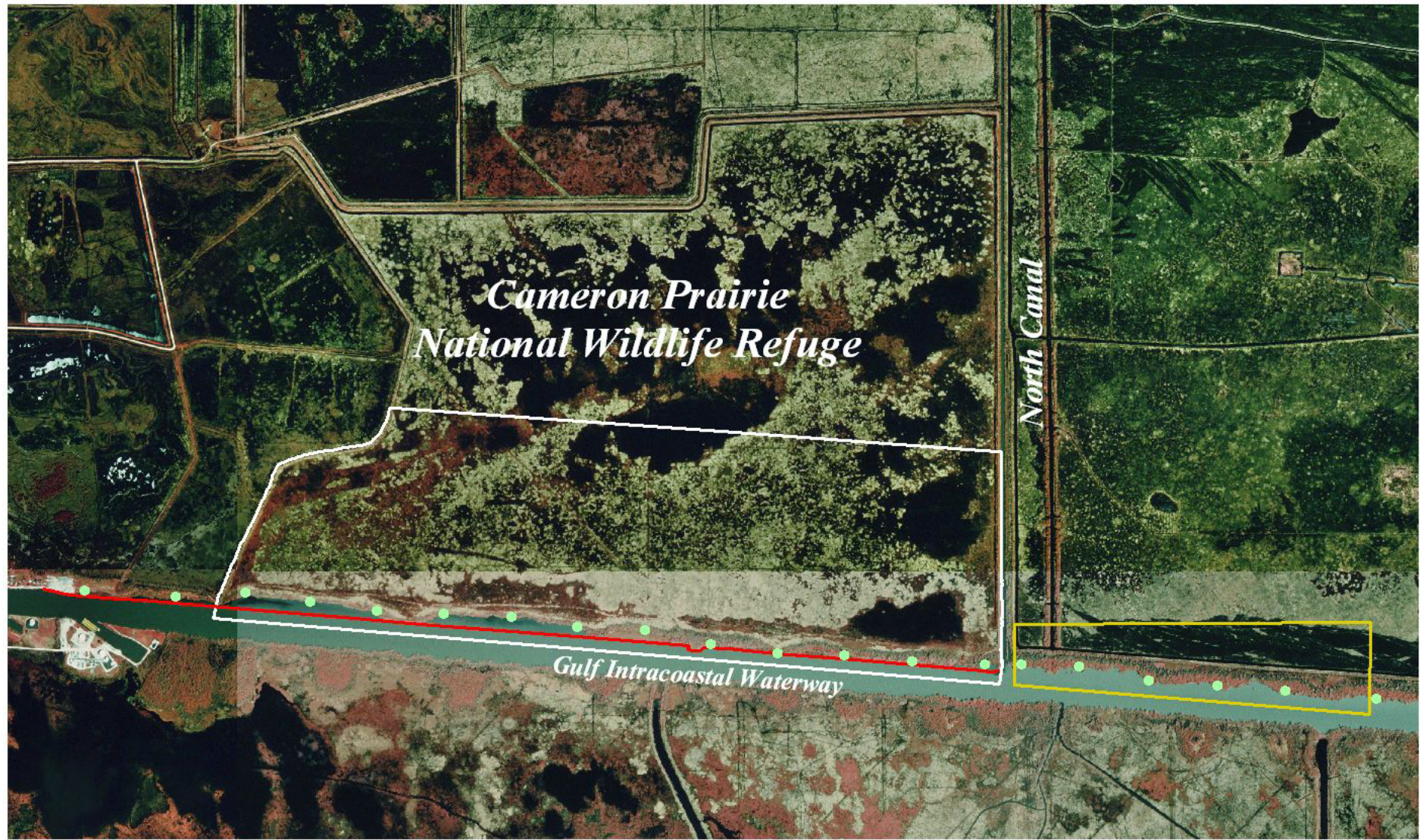


Rankings of projects on PPL-1 by cost (\$) per AAHU



Monitoring Variables

- Shoreline change (m/yr): 14 transects in project area; 5 in reference area
- Land water change (ha/yr): 1 Nov. 1993, 11 Jan. 1997, 2009



Data Source:
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 Coastal Restoration Division
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- ME-09 Project Boundary
- ME-09 Reference Boundary
- Rock Breakwater
- Shoreline Monitoring Station

Physical Response

- Erosion rate observed in reference area (4.1 ft/yr) was greater than earlier estimate by Refuge personnel (2.5 ft/yr).
- Rock dike stopped erosion: 25 acres of loss prevented by the 13,200 ft rock dike.
- Rock dike reversed erosion: shoreline advance of 9.8 ft/yr



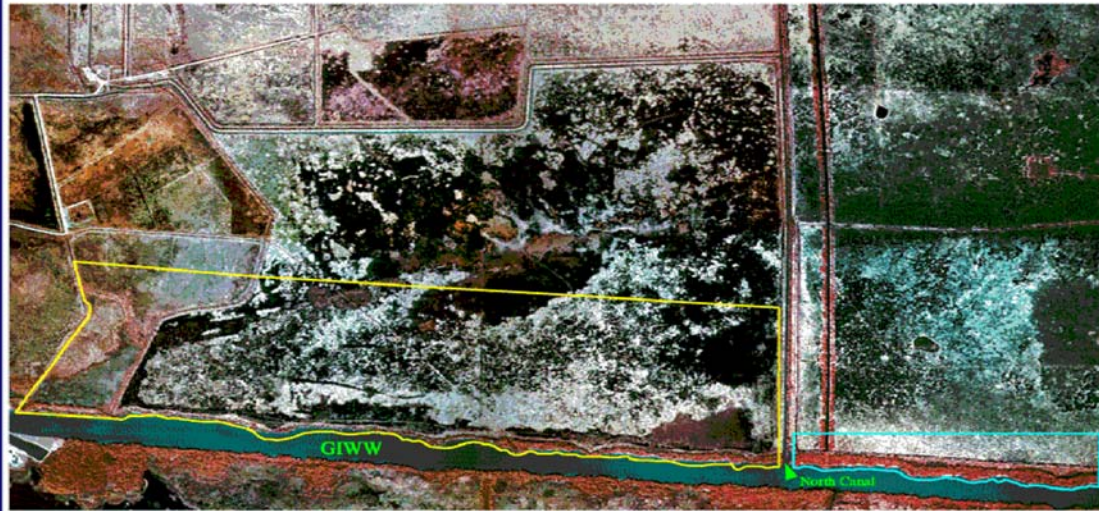
Biological Response

Landscape Response

- Initial analysis indicated that interior marsh loss continued in the project area (9.8 ha/yr; 24.3 ac/yr). At that rate, 486 ac will be lost over 20 years.
- Re-analysis indicated that interior marsh loss continued in project area (5.4 ha/yr; 13.3 ac/yr). At that rate, 108 ha (266 ac) will be lost over 20 years.
- Interior marsh loss was faster in project area than in reference area in both analyses (5.4 ha/yr; 0.1 ha/yr).

Cameron Prairie Refuge Protection (ME-09)

E-09



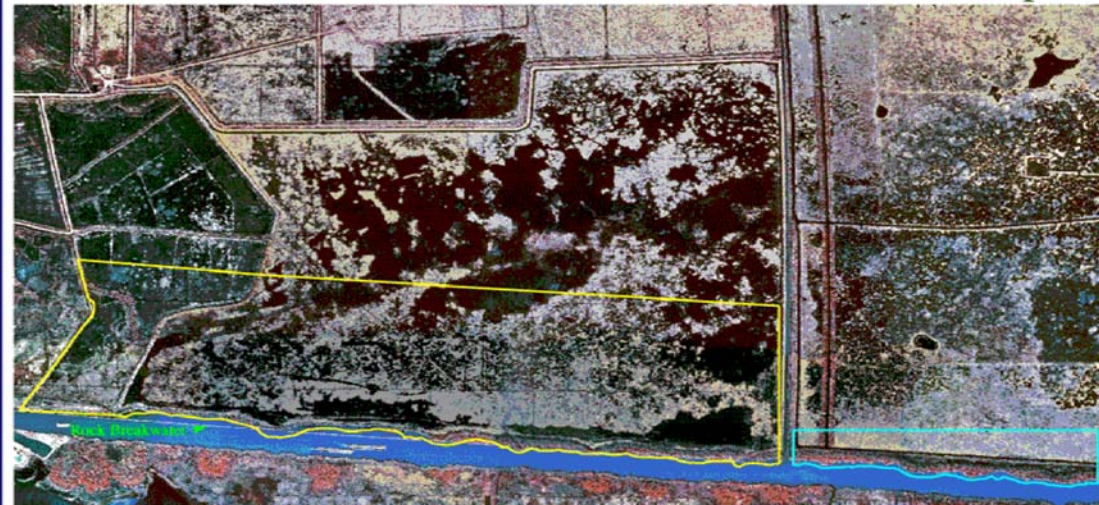
November 1, 1993
Pre-Construction Aerial Photography
1:12,000 Scale

-  Cameron Prairie (ME-09) Project Boundary
-  Cameron Prairie (ME-09) Reference Boundary

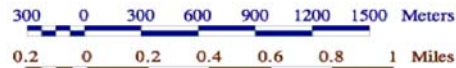


January 11, 1997
Post-Construction Aerial Photography
1:12,000 Scale

Map4D

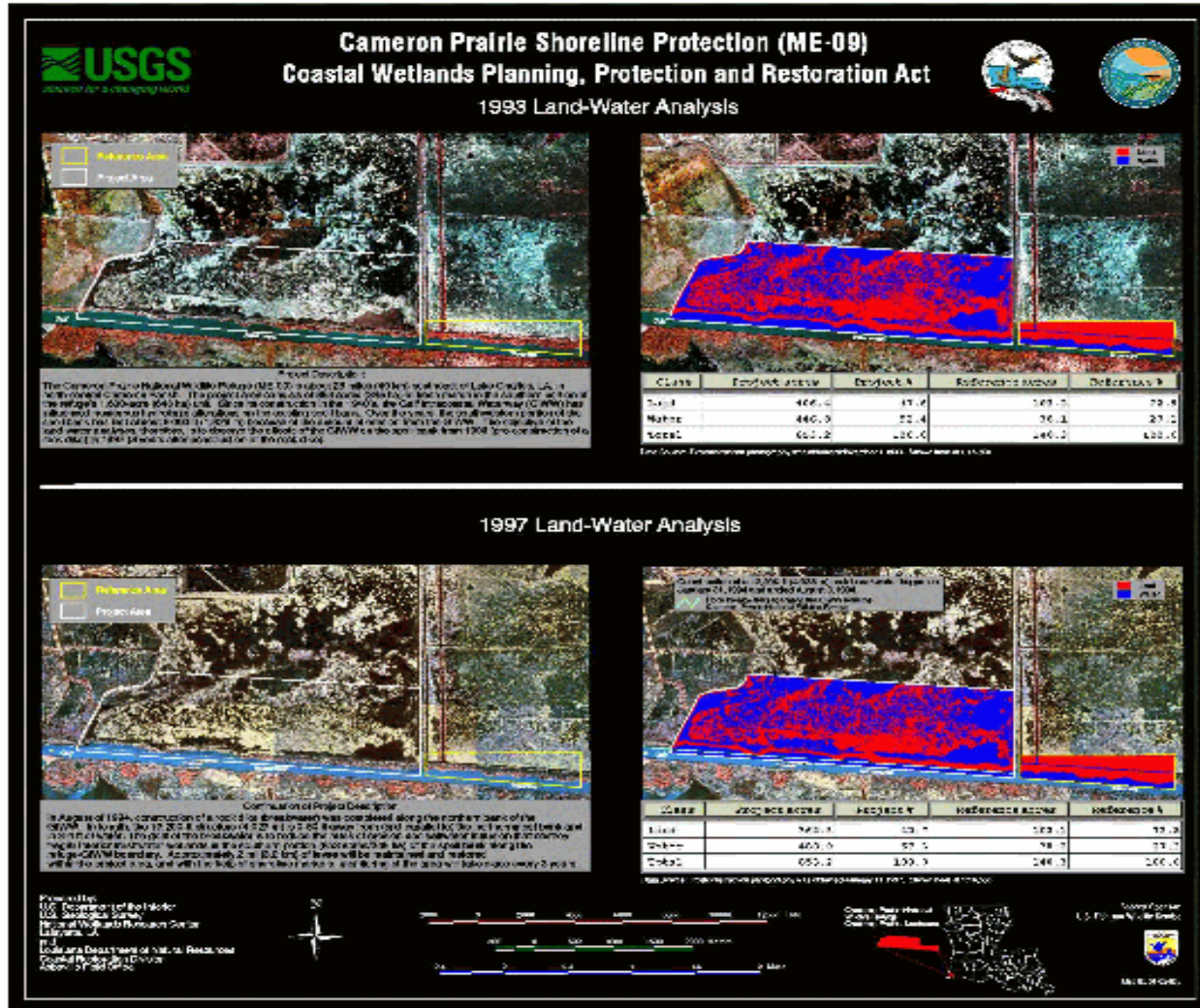


Prepared by:
United States Geological Survey
Biological Resources Division
National Wetlands Research Center
Lafayette, Louisiana
&
Louisiana Department of Natural Resources
Coastal Restoration Division
Baton Rouge, Louisiana August 1997

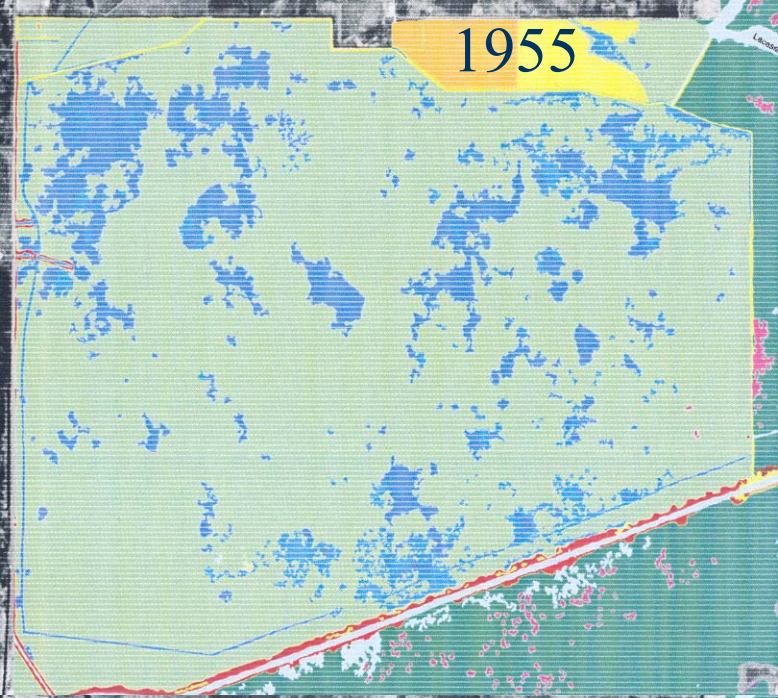


Federal Sponsor

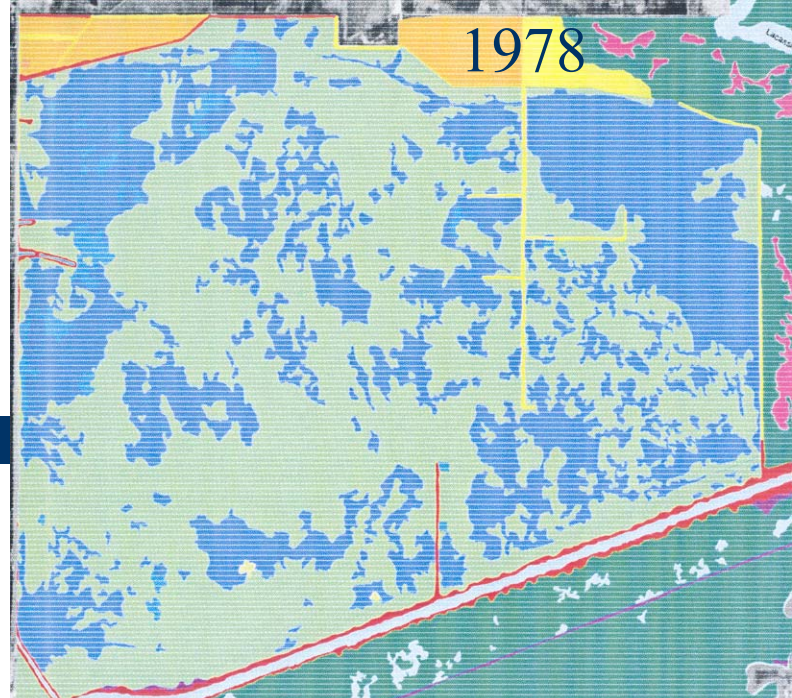




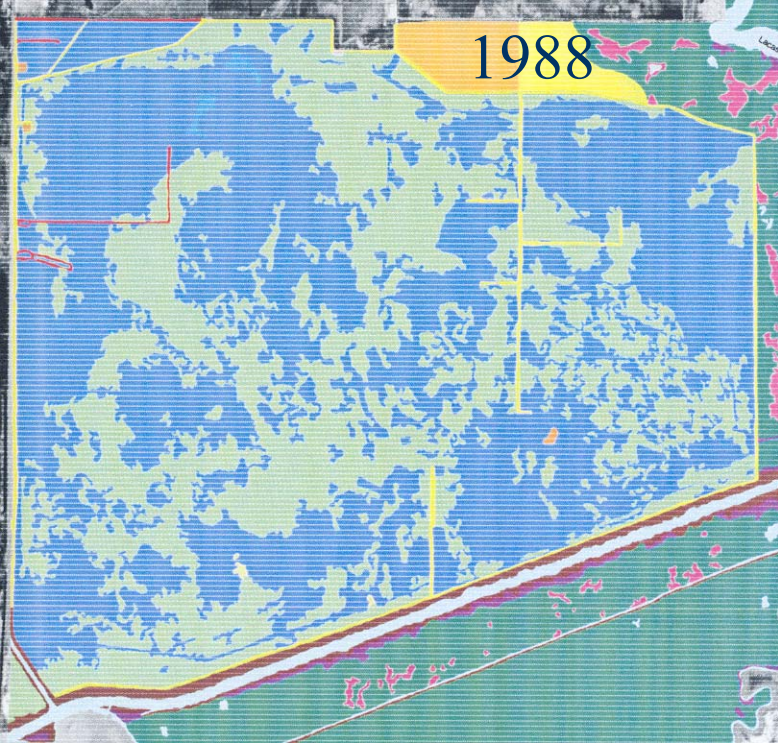
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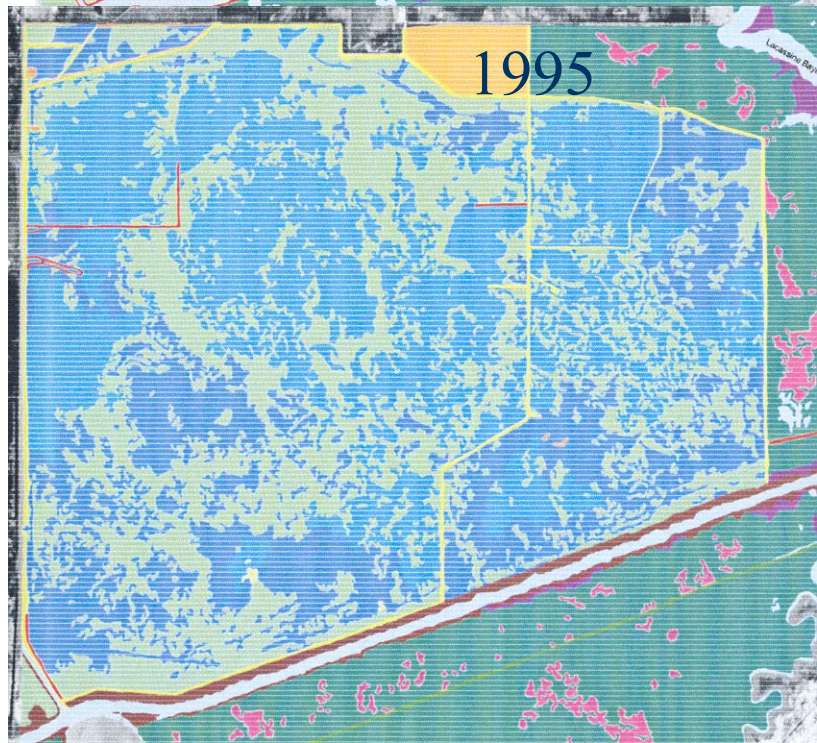
1978



1988



1995



Project Adaptive Management

- Implemented Changes
 - Pre-construction (1 Nov., 1993) and first post-construction (11, Jan. 1997) aerial photography were re-analyzed.
 - Shoreline position will be measured every 3 years rather than every one year.
 - One of two remaining planned aerial photographs was dropped.

Project Adaptive Management

- Recommended Improvements
 - Acquire 2009 aerial photographs within 2 weeks of 1 November.
 - Acquire next aerial photographs in 2002, not in 2009. Analyze it by 2003.
 - If next aerial photographs indicate interior marsh loss, then determine cause.

Lessons Learned for Future Projects

- Incorporated in the CWPPRA process
 - Goals and objectives must be clearly stated
 - Rules (albeit conflicting) adopted that require a re-evaluation of the decision to construct if the project area or costs change by more than 15% or 25%.
- Recommended for incorporation
 - Aerial photographs in different years need to be taken at the same time in the growing period, or not taken at all.
 - Projects that protect more acres of marsh than are anticipated to erode should be classified as something other than shoreline protection, or not classified at all.

Recommended for incorporation

- A coastwide reference system might provide the data needed to determine if the interior marsh loss is unusually high or if it is typical.