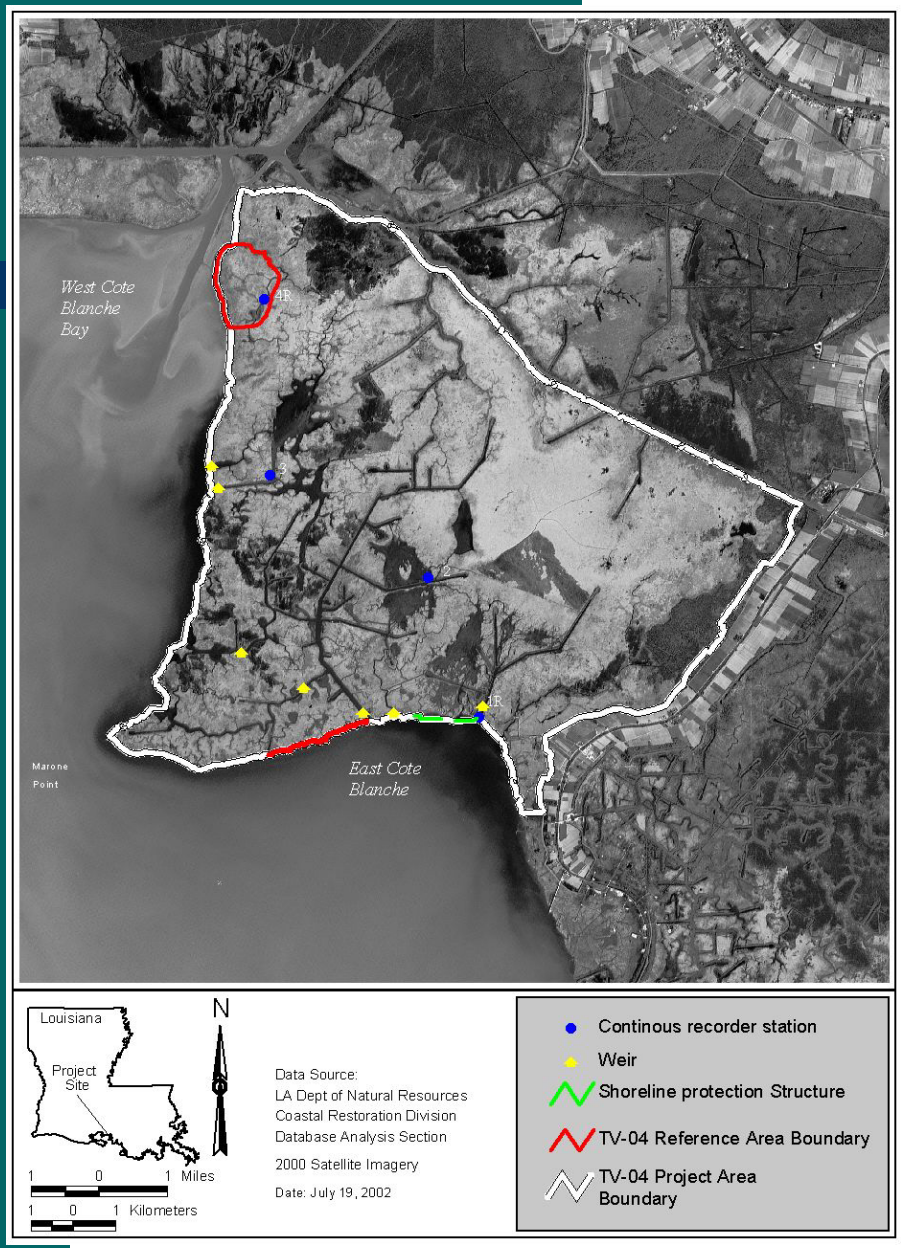
Cote Blanche Hydrologic Restoration Project

- Selected on PPL-3
- Construction finished in January 1999
- Location: north of East Cote Blanche Bay

Project Location



- Project Features
  - passive water control structures (weirs, culverts and plugs)
  - foreshore dike on southern project boundary

Planning

- Assumed Causes of Loss:
  1. Increased tidal action and rapid water exchange
  2. Shoreline erosion

Goals and Objectives

- Objectives: (1) Reduce water exchange between marshes of Cote Blanche and West and East Cote Blanche Bays to prevent scouring of interior marsh and (2) Protect shoreline on southern boundary between Humble and British-American canals from wave action

Goals and Objectives

- Goals: (1) Decrease variability in water level within the project area; (2) Reduce erosion rate of shoreline along southern project boundary; and (3) Decrease rate of marsh loss

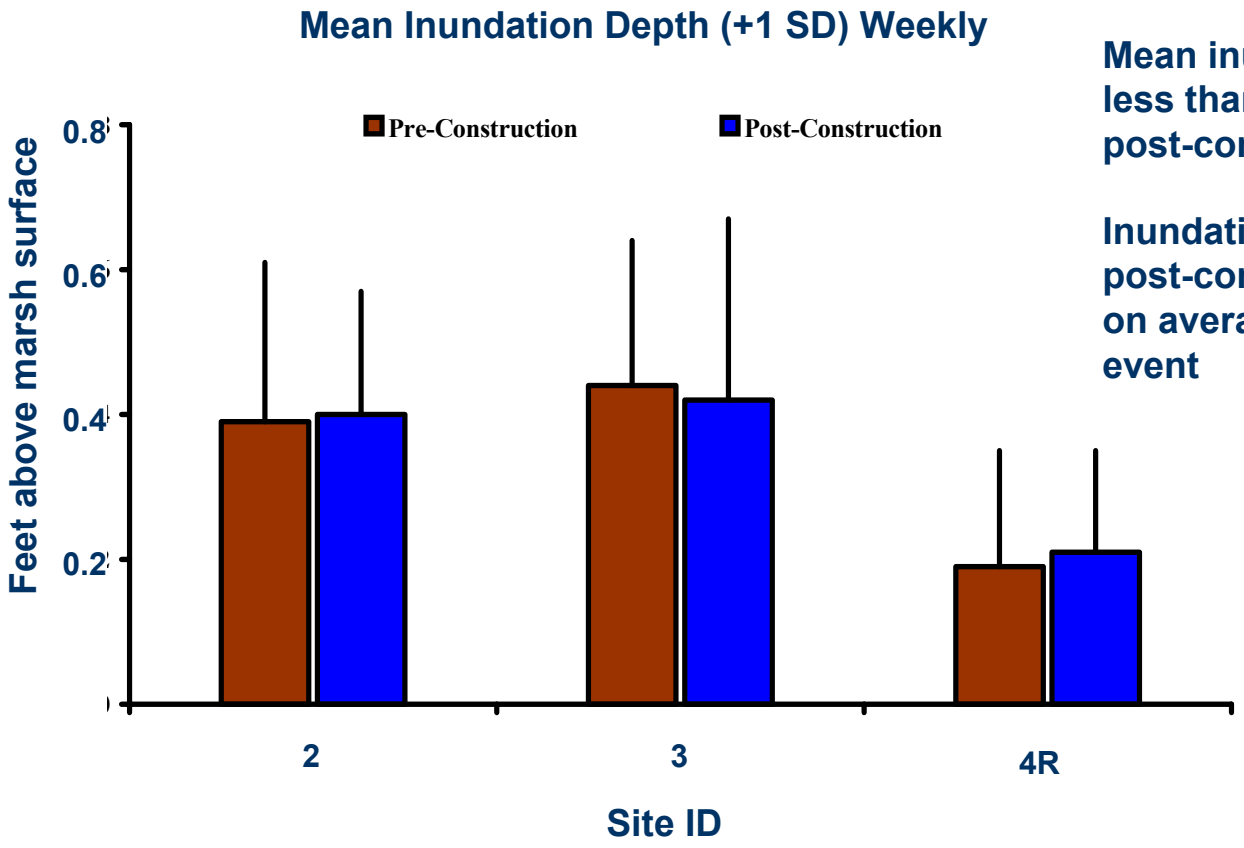
Construction

- Final Features
  - Four (4) low-level sheet pile weirs w/boat bays on Mud Bayou, Bayous Long and Carlin, and Jackson Bayou (-1.5' NAVD crest)
  - Two (2) rock weirs w/sheet pile wingwalls on Humble-F and British-American Canals (-0.5' NAVD crest)
  - One (1) low-level sheet pile and rock weir w/barge bay on Humble Canal (-1.5' NAVD crest)
  - 3,950 linear feet of vinyl sheet piling (PVC) wall in two sections between the British-American Canal and Jackson Bayou

Monitoring Variables

- Habitat Mapping – mapping vegetated and non-vegetated areas using 1:24,000 scale color-infrared aerial photography in years 1996, 2002, 2009, and 2015.
- Water Level – 2 project and 2 reference hourly recorders to document frequency, magnitude and duration of marsh inundation and drainage annually through 2016.
- Shoreline Change – GPS surveys starting in 1998 every 3 years through 2016.

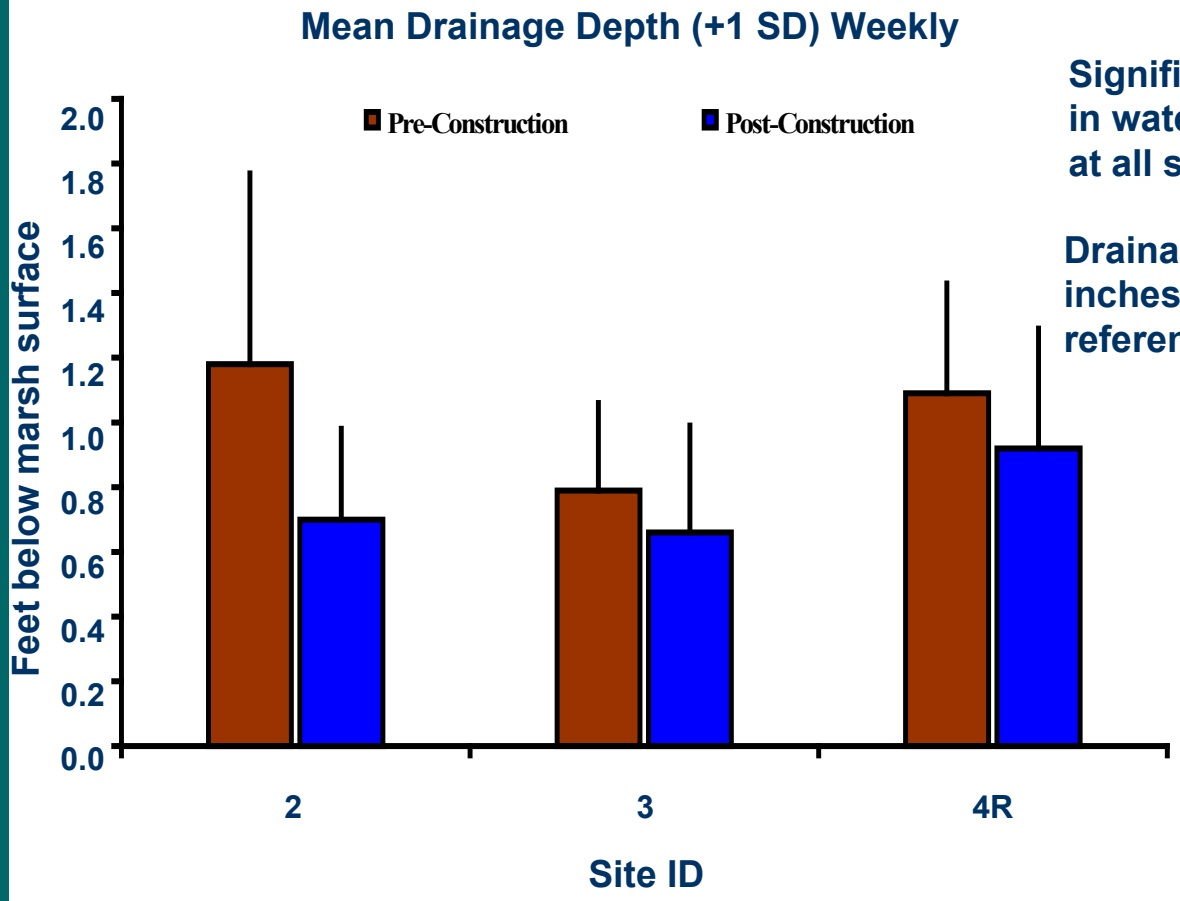
Physical Response



Mean inundation depths changed less than 0.5 inch between pre and post-construction

Inundation duration increased in post-construction project stations on average by approx. 3 hours per event

Physical Response

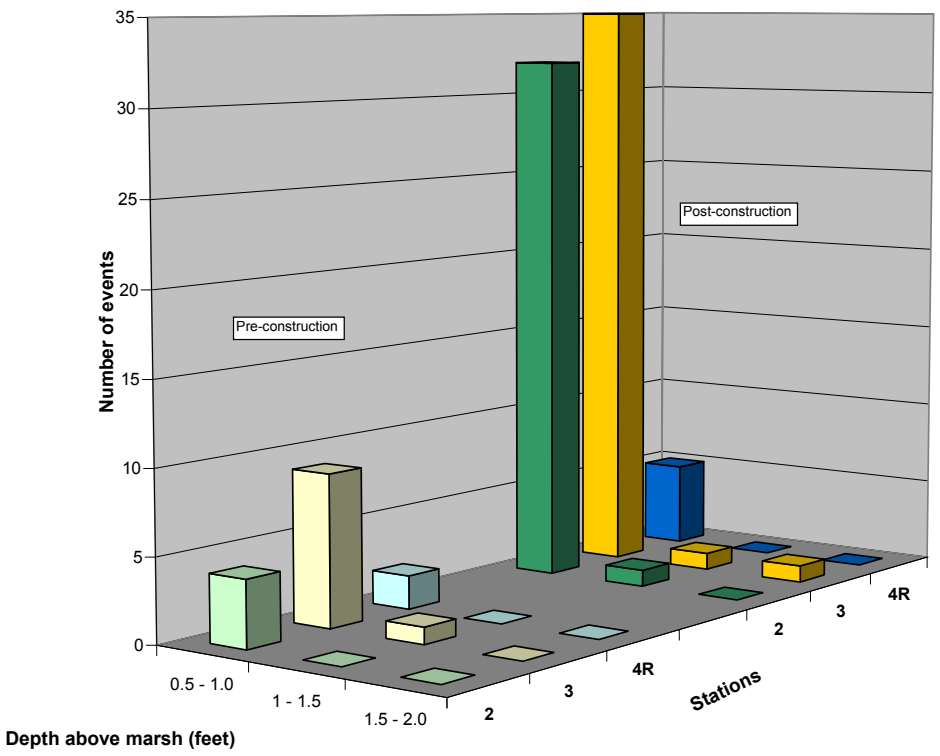


Significant post-construction reduction in water elevation and drainage depth at all stations

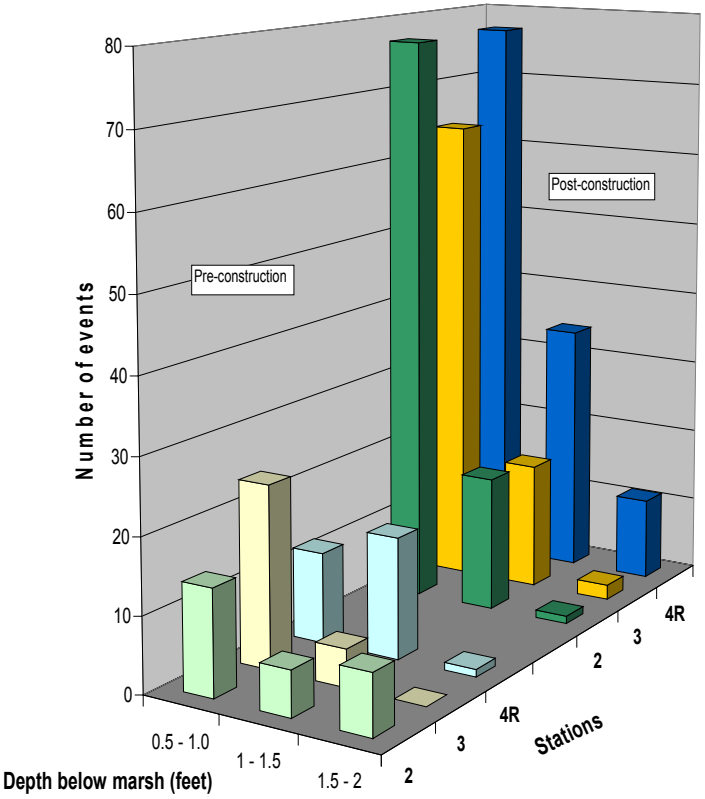
Drainage depth at site 2 reduced 6.36 inches compared to 1.68 inches at reference site 4

Physical Response

Number of inundation events by depth



Number of drainage events by depth



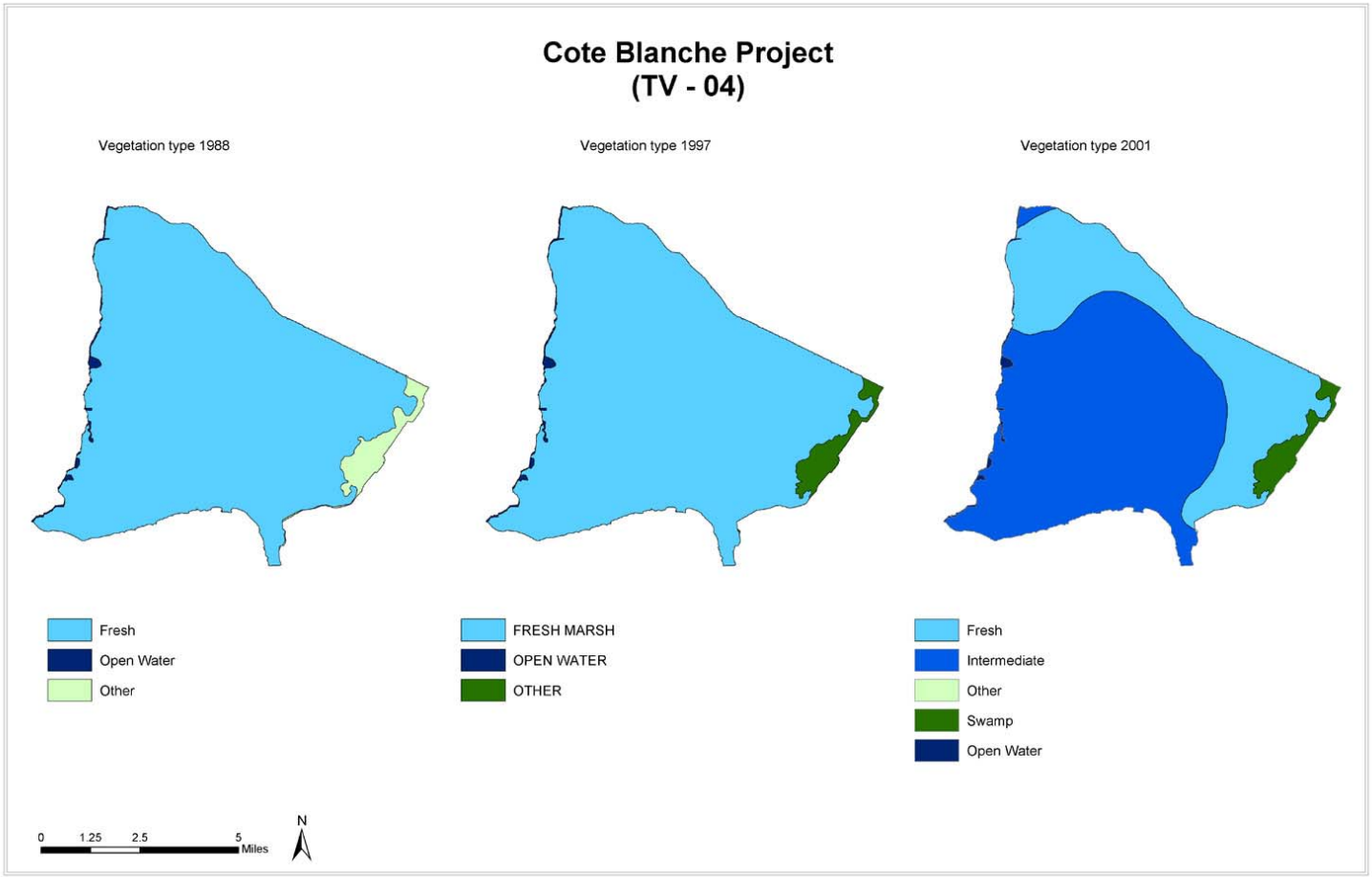
Biological Response

There were no biological response variables measured. However, DNR monitoring personnel observed healthy plant species indicative of a fresh to intermediate marsh environment.

Landscape Response

- Landscape response will be determined after first post-construction flight conducted in fall 2002.
- Land:water ratio estimates from 1984, 1990 and 1996 were approx. 93:7, 87:13 and 83:17.
- Visual observations comparing the 1996 pre-construction with unrectified 2000 “brown marsh” photography suggest little change has occurred in the project area and the landscape is maintaining its integrity.

Landscape Response



Project Adaptive Management

- Implemented Changes
  - Maintenance conducted on structures to maintain bay bottom elevations and preventative work to address potential structure circumvention.
  - Elevation surveys conducted to improve accuracy of water level information.

Project Adaptive Management

- Recommended Improvements
  - Consider monitoring water velocity, vegetation and sediment accretion and increase frequency of landscape analyses.
  - Shoreline protection on the southern boundary should be extended further west to prevent erosion from circumventing the structures.
  - Shoreline protection should be added to Mud Bayou and Humble-F Canal to prevent erosion from circumventing the structures.

Project Adaptive Management

- Recommended Improvements
  - Investigate enlargement of some GIWW openings to allow more sediment delivery into the project area.
  - Maintain flexibility to alter openings of structures based on data results. Project recommendations should be integrated with landowner needs.

Lessons Learned for Future Projects

- Incorporated in the CWPPRA process
  - Sufficient geotechnical investigations
  - Hydrologic modeling on projects of this type
  - Goals and objectives need to be consistent in all documentation (EA, WVA and Monitoring Plan)
- Recommended for incorporation
  - Support implementation of Coastwide Reference Monitoring System (CRMS)