

Lake Chapeau Hydrologic Restoration and Marsh Creation (TE-26)

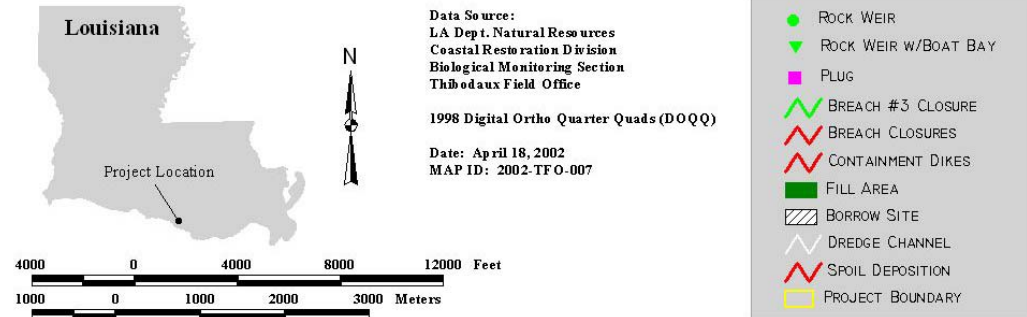
- Selected on PPL 3 (1993)
- Construction finished May, 2000
- Location:



Project Location

● Project Features

- 7 rock weirs
- 1 rock weir w/boat bay
- 1 rock plug
- dredge channel w/spoil deposition
- spoil bank maintenance
- 193.5 acres dedicated dredge fill
- dredge containment dikes
- 46,980 *Spartina alterniflora* plantings



Planning

- Assumed Causes of Loss:
 1. Altered hydrology
 - a. Oil & Gas access canals
 - b. Spoil placement impounding water
 2. Other loss factors
 - Subsidence
 - Shoreline erosion

Goals and Objectives

- The goal stated in the project's Environmental Assessment (NMFS 1998) was to partially re-establish a hydrologic separation of two watersheds in the project area utilizing sediment input by means of dredge and fill operations, to restore island hydrology by means of plugs/weirs, spoil bank gapping, and maintenance dredging a natural bayou.

The monitoring plan states the goals to be:

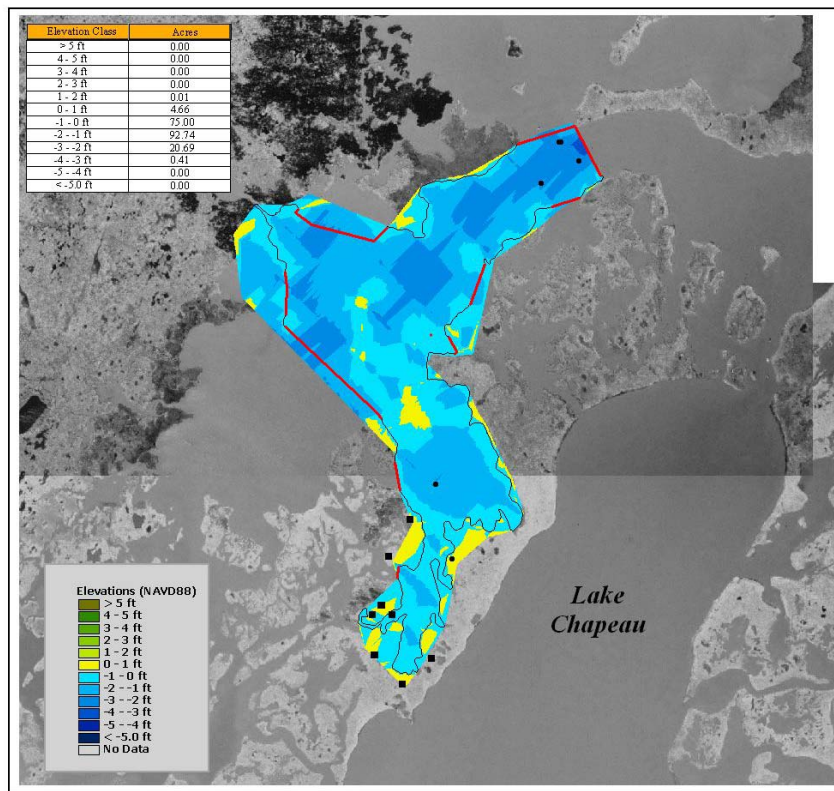
- Create approximately 260 ac (105 ha) of marsh west of Lake Chapeau.
- Decrease the water level variability within the project area.

Monitoring Variables

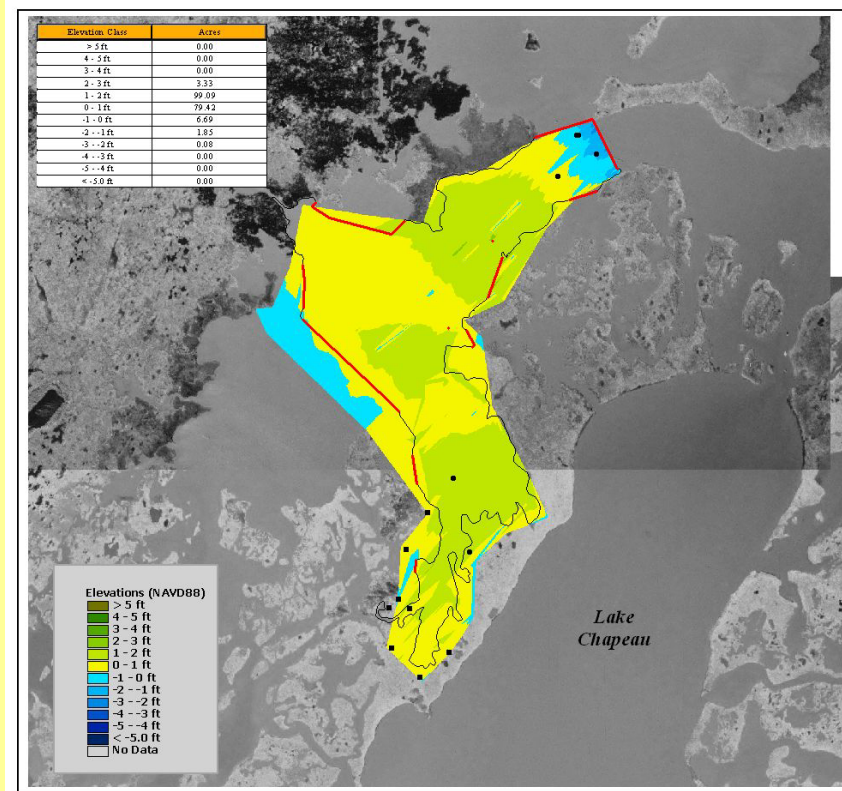
- Habitat mapping (1994, 1997, 2001, 2010)
- Water level (hourly 1997 - 2016)
- Salinity (hourly 1996 – 2016)
- Vegetation in fill area (1999, 2001, 2004, 2007, 2010, 2013, 2016)
- Survey fill area (Pre, As-Built, ????)

Physical Response - Elevation

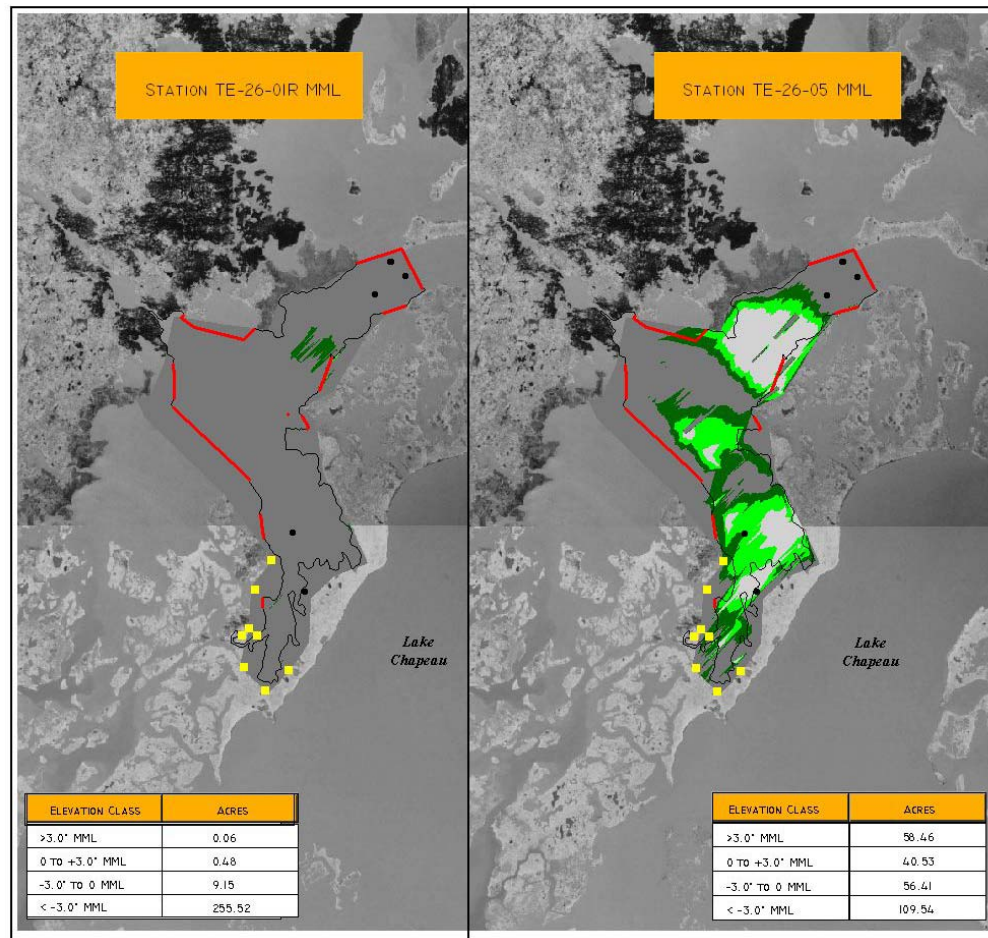
PRE



AS-BUILT



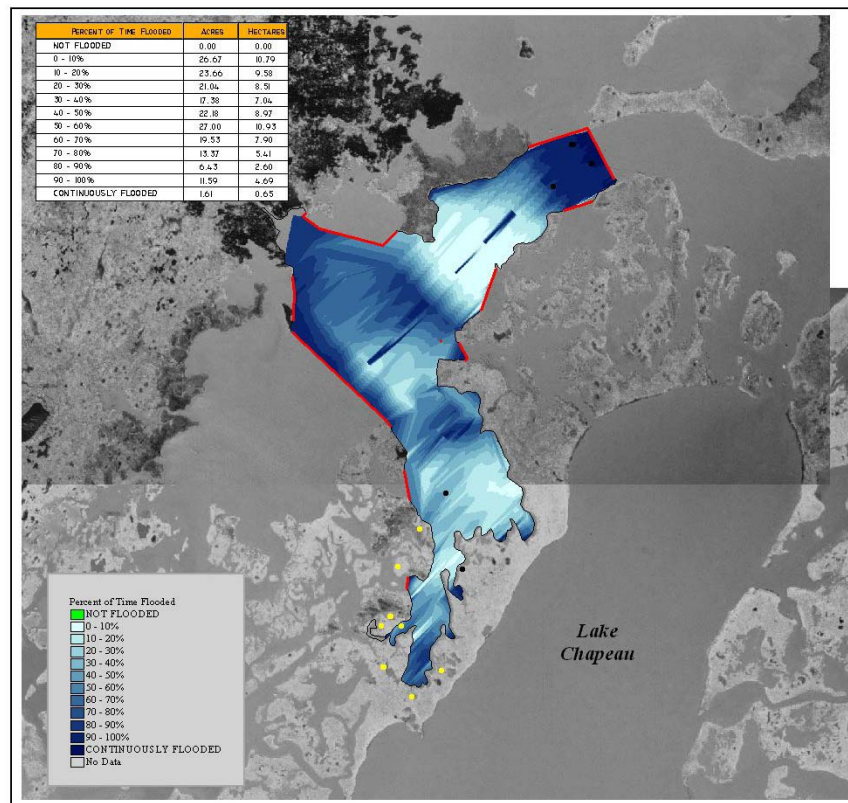
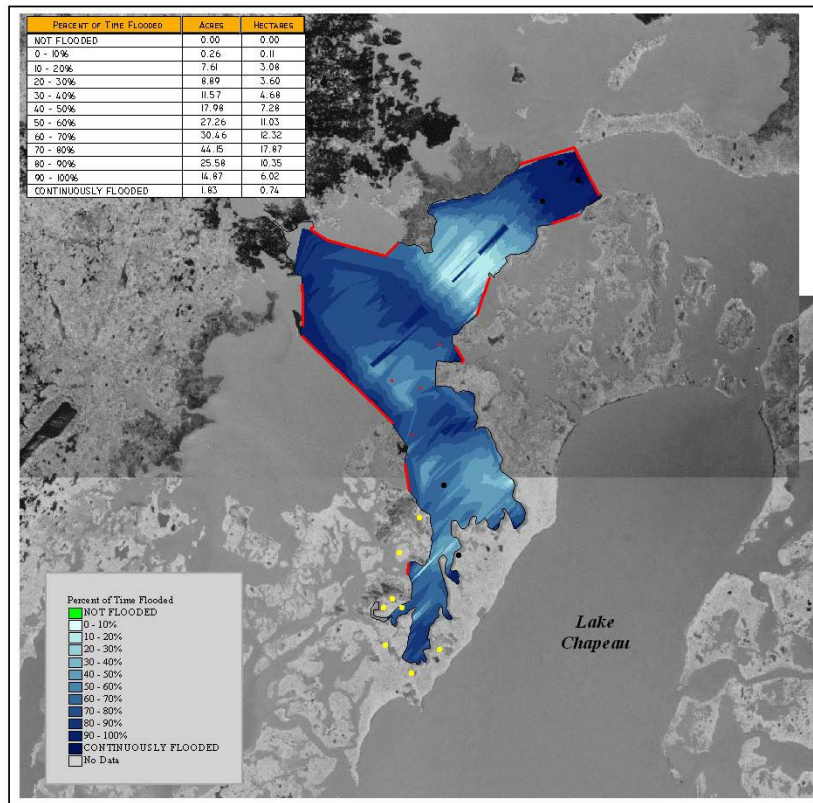
Physical Response – Elevation 2



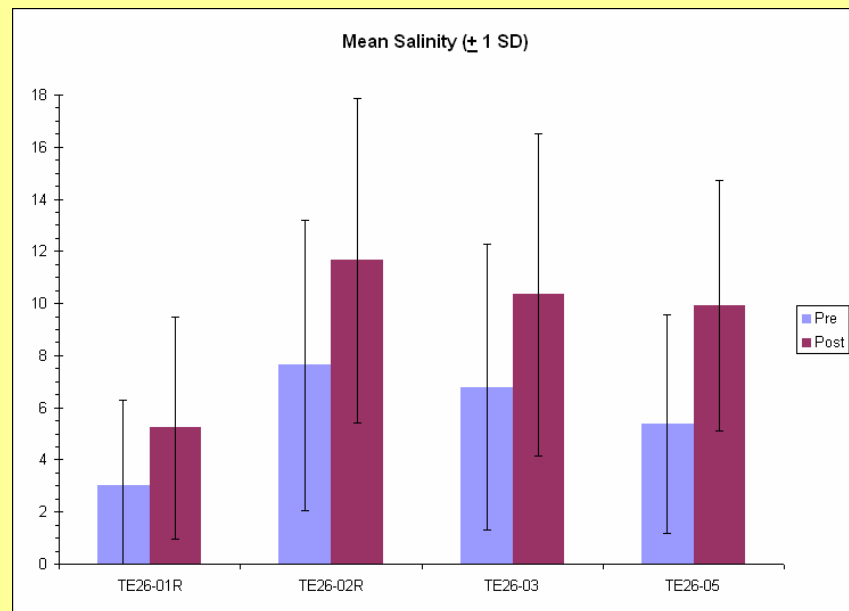
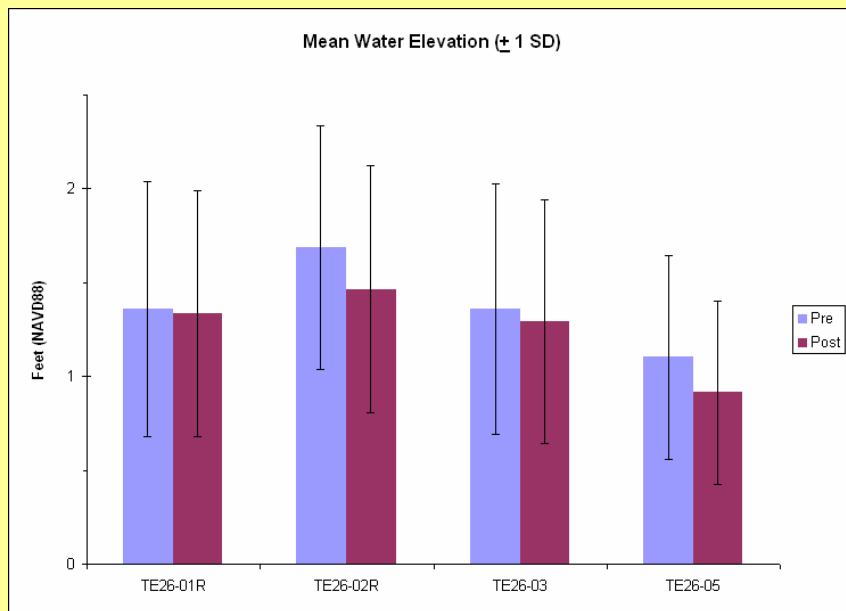
Physical Response – Hydrology

TE26-01R

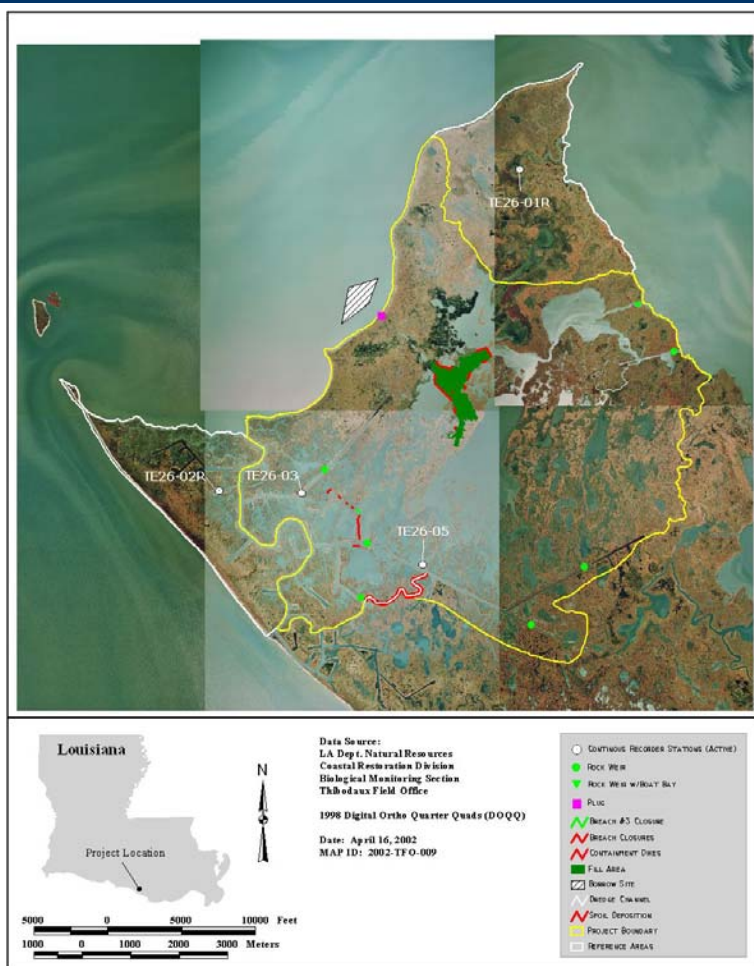
TE26-05



Physical Response - Hydrology 2



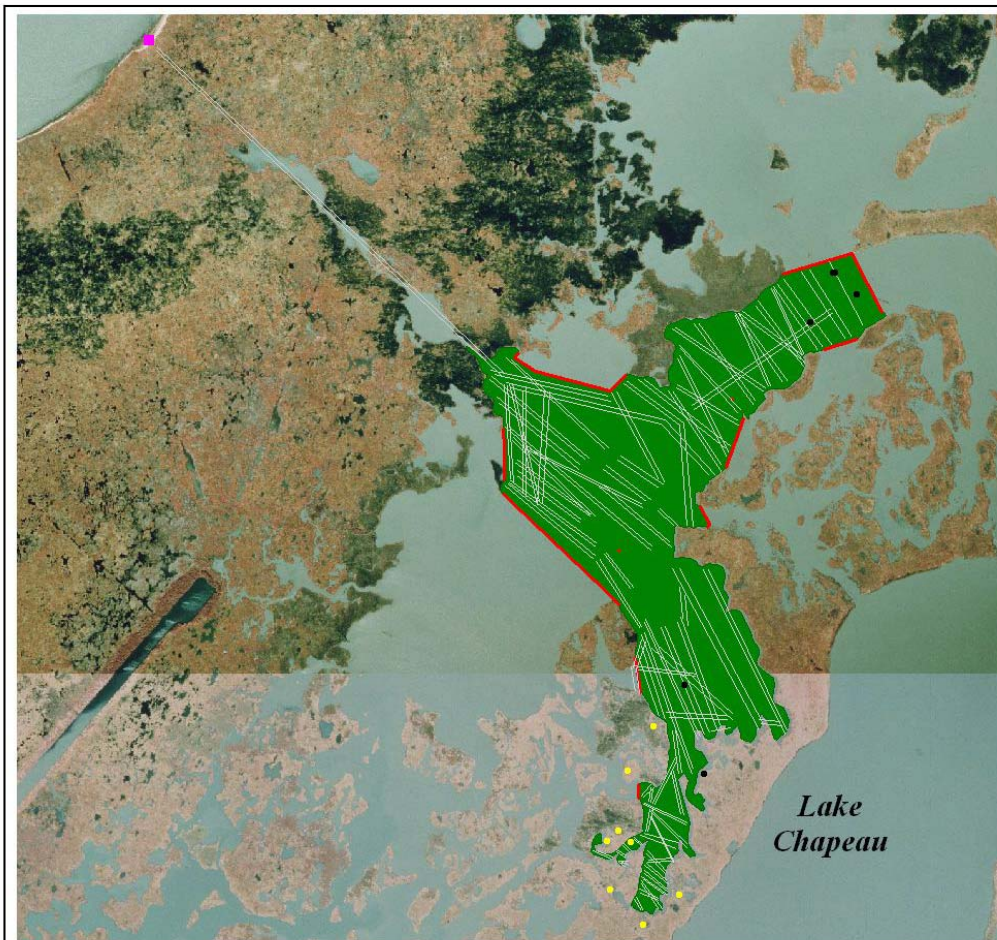
Physical Response - Hydrology 3



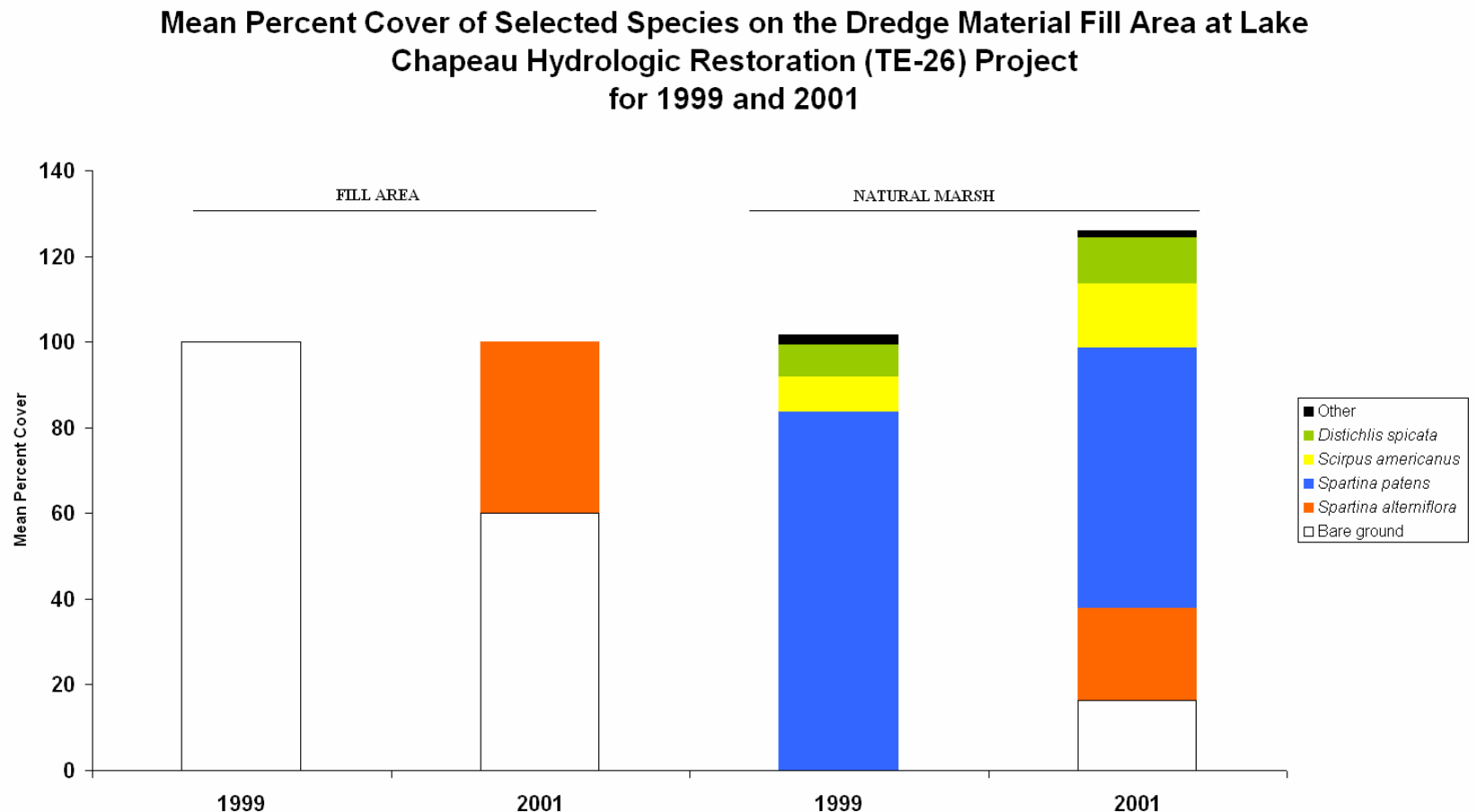
Salinity Station Differences	Variability ttests					
	Mean		Std.Dev.		Pr > t	
	Pre	Post	Pre	Post	Pre	Post
Diff1 (01r - 02r)	-0.005	-0.039	0.5387	1.0548	0.3369	<.0001
Diff2 (01r - 03)	-0.047	-0.007	1.0138	0.8591	<.0001	0.2548
Diff3 (01r - 05)	0.0006	0.0036	0.5749	0.7067	0.9246	0.4229
Diff4 (02r - 03)	-0.043	0.0287	1.0287	1.1492	<.0001	0.001
Diff5 (02r - 05)	0.0047	0.0389	0.6359	1.0728	0.5201	<.0001
Diff6 (03 - 05)	0.0676	0.0096	1.1562	0.9177	<.0001	0.127
Water Level Station Differences						
Diff1 (01r - 02r)	-0.000098	-0.005	0.124	0.1553	0.9333	<.0001
Diff2 (01r - 03)	-0.009	-0.002	0.1618	0.1225	<.0001	0.0042
Diff3 (01r - 05)	0.001	-0.00087	0.1521	0.1588	0.5575	0.4215
Diff4 (02r - 03)	-0.009	0.0022	0.1556	0.1214	<.0001	0.0122
Diff5 (02r - 05)	0.0014	0.0052	0.1766	0.2073	0.4908	0.0006
Diff6 (03 - 05)	0.0135	0.0013	0.2071	0.175	<.0001	0.3034

Note: For test results, if 0.05 or less, variability is significantly different

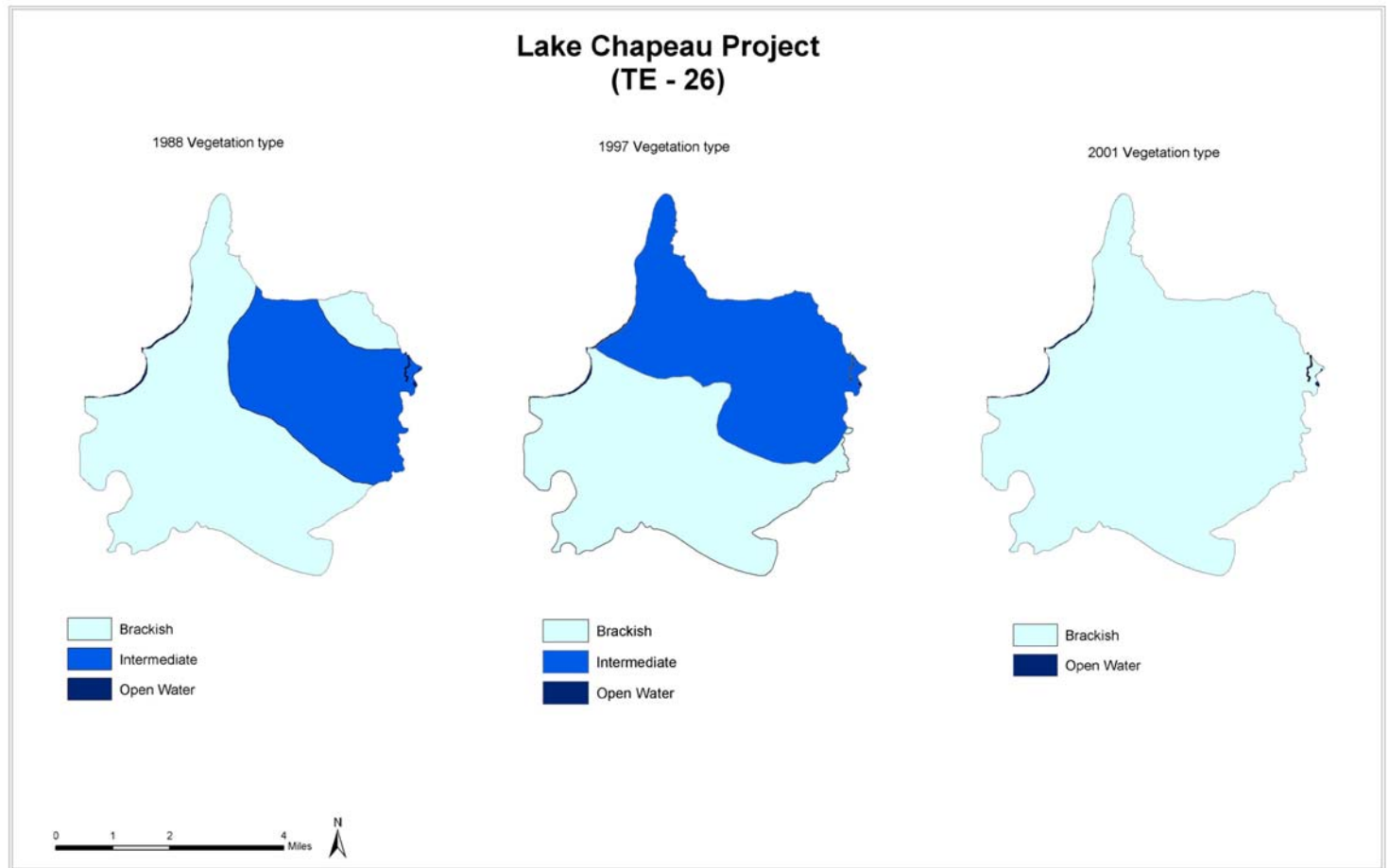
Biological Response - Plantings



Biological Response – Vegetation



Landscape Response



Project Adaptive Management

- Implemented Changes
 - Plantings added once natural colonization of fill area did not occur

Project Adaptive Management

- Recommended Improvements
 - Another dredge material cycle could be done to increase the acreage to original plans as well as fill low areas bringing the project closer to elevation necessary to provide hydrologic separation, and complete hydrologic barrier per goals
 - Backfill access corridor and extend shoreline plug

Lessons Learned for Future Projects

- Incorporated in the CWPPRA process
 - Consistency of survey datums
- Recommended for incorporation
 - Consideration needs to be made of any damage that may occur to the marsh as a result of pipeline corridors to the dredge fill areas.
 - Containing the slurry is very difficult and multiple dredge placements may be needed to attain marsh elevation without containment dike failure
 - Contractors are paid by the amount of materials moved, not the benefits (acres in this case) attained. Therefore, the goal for the contractor is to move material, while the project goal is to create marsh. This leads to compromising the goal of creating marsh to fit budget constraints and complicates estimating marsh creation costs.