PO-27

Chandeleur Islands Marsh Restoration Summary Data and Graphics

Hymel, M. 2003. *PO-27 Chandeleur Islands Marsh Restoration Summary Data and Graphics, Louisiana Department of Natural Resources, Coastal Restoration Division, Baton Rouge, Louisiana. 13pp.*

Chandeleur Islands Marsh Restoration (PO-27)

Project Overview:

The Chandeleur Islands are a 44.7-mile (72-km) long barrier island chain located about 70-miles (113-km) east of New Orleans, and are contained within the Breton National Wildlife Refuge.

In 1998, Hurricane Georges passed within 5-miles (8-km) east of the islands causing extensive breaching of the barrier island chain and reducing the area of the islands by 40%. Sediment deposited behind these breaches formed numerous intertidal washover flats on the western side of the island. If such washover areas are not subjected to repeated disruption due to storm events, they are often colonized by salt marsh vegetation and sea grasses which stabilize the sediment and encourage sand aggradation.

The purpose of this project is to provide stabilization to 364-acres (1.47-km^2) of unvegetated washover deposits on 22 overwash fan sites through *Spartina alterniflora* (smooth cordgrass) plantings. These plantings should complement the natural colonization that often occurs on these overwash deposits. Increased percent cover of vegetation on these deposits should allow for the maintenance and accretion of back barrier marshes through sediment trapping.

Phase I construction of the project was completed July 20, 2001 and consisted of a total of 80,730 plants installed at 10 overwash sites. Each site was planted with two rows of plants below mean tide, plus additional rows to reach the mean high tide line at 1.06-ft NAVD88 (0.32-m). Rows were spaced 10-ft (3-m) apart. A total of 35,100 linear ft (10,698-m) of shoreline was planted.

Phase II of the project, which includes plantings on the remaining unplanted overwash sites, is on hold pending project review in spring 2003.

Chandeleur Islands Marsh Restoration (PO-27)

Project Objective:

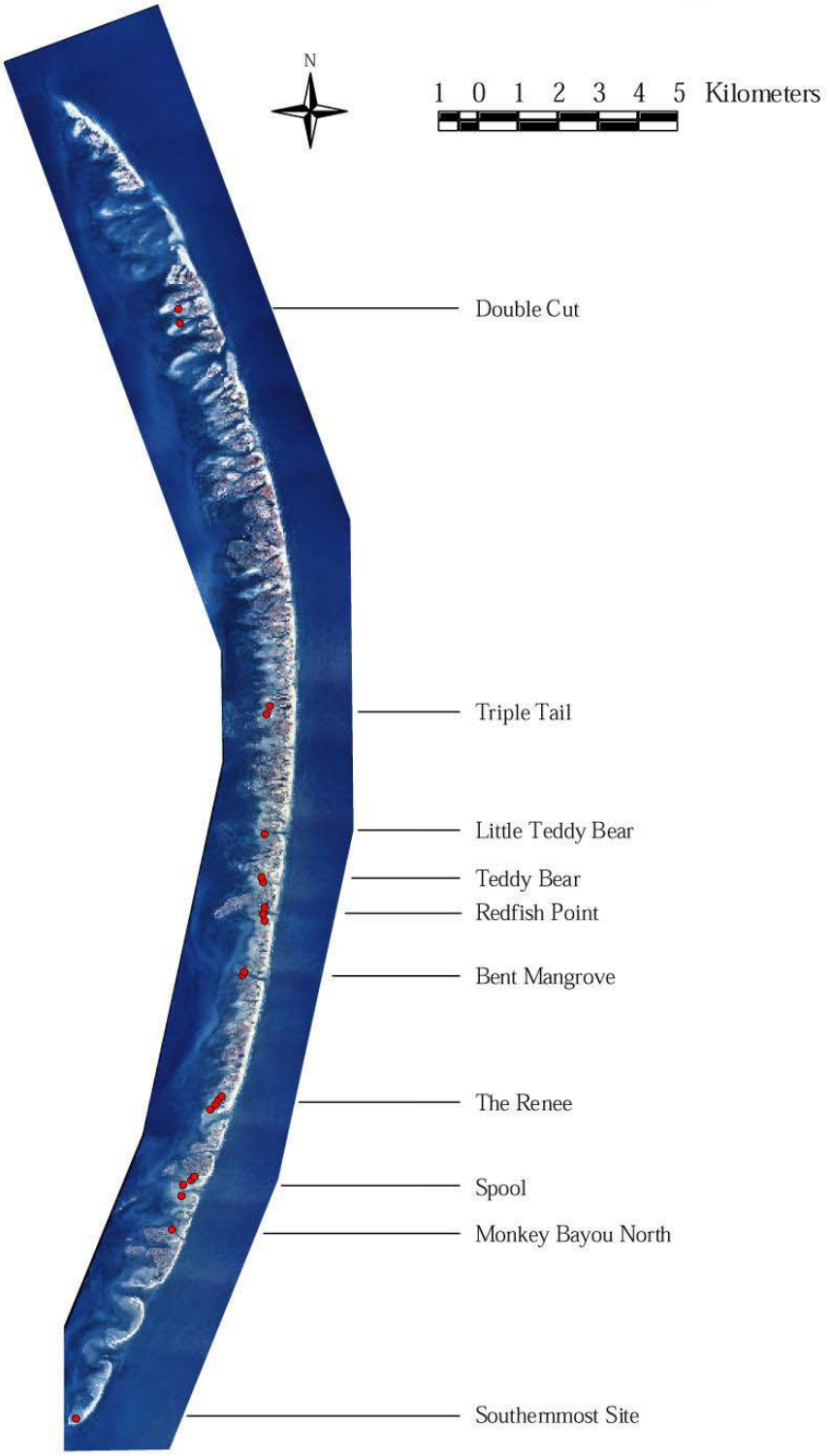
To stabilize hurricane overwash deposits through the use of *Spartina alterniflora* (smooth cordgrass) plantings to trap and hold sediments.

Specific Goals:

1. Increase percent cover of emergent vegetation in planting areas.

2. Maintain or increase intertidal area, as indexed by elevation data, within and adjacent to the planting sites. Areas within the elevation range of mean low water and mean high water will be defined as 'intertidal'.

Chandeleur Islands Marsh Restoration (PO-27)
Planting Site Locations



Chandeleur Islands Marsh Restoration (PO-27)

Monitoring Elements:

Aerial photography: Color-infrared aerial photography (1:12,000 scale) will be obtained and analyzed to determine land:water ratios. Each planting site will be quantified separately. Photography will be obtained in November 2000 (pre-construction), 2003 and 2005.

Vegetation Surveys: Percent cover and species composition will be determined at five of the planting sites. The Braun-Blanquet method will be used to survey vegetation in 4-m^2 plots along randomly selected transects, which will bisect the planting elevation contours. The number of transects and vegetation plots will be determined by the relative size of each planting area; however, a minimum of three transects and twelve plots (4 plots/transect) will be established at each site. Surveys will be conducted in spring of 2001 (as built), as well as in early fall in years 2001, 2002, 2003 and 2005.

Elevation Surveys: Elevation surveys will be conducted along the same transects established for vegetation monitoring. Elevations will be recorded at 20-ft (6.1-m) maximum intervals along each transect as well as at any significant changes in elevation within those intervals. The transects will be carried out at least 60-ft (18.3-m) beyond the most seaward planted row. The transect will also be carried across any interior unplanted area, in the case of an island planting. In addition, elevation will be taken at the southeast corner of each vegetation plot. A permanent benchmark has been established on the island to be used as a reference datum. Surveys will be conducted in conjunction with vegetation surveys in the spring of 2001 (as built) and in 2003 and 2005.

Chandeleur Islands Marsh Restoration (PO-27)
Aerial Photography

Aerial photography was obtained in November 2001 (as built) and is currently being analyzed to determine land/water ratios. Photography and LIDAR data obtained in October 2002 in response to Hurricane Lili are also being analyzed.

Chandeleur Islands Marsh Restoration (PO-27) Vegetation Surveys

Vegetation surveys were conducted in July 2001 (as built), October 2001, and October 2002. The planting sites selected for vegetation monitoring were (north to south) Tripletail, Little Teddy Bear, Redfish Point, Spool, and North Monkey Bayou.

Figures and Tables:

Table 1. Comparison of data collected during July 2001, October 2001, and October 2002 vegetation surveys.

Figure 1. Mean percent cover of *Spartina alterniflora* (smooth cordgrass) across all 4-m^2 vegetation plots at each planting site in July 2001, October 2001, and October 2002.

Figure 2. Mean percent cover of *Spartina alterniflora* (smooth cordgrass) within only 4-m^2 vegetation plots that contained plant cover (0% cover plots excluded) at five planting sites in July 2001, October 2001, and October 2002.

Figure 3. Percentage of 4-m^2 vegetation plots containing no living *Spartina alterniflora* (smooth cordgrass) plants (0% cover) at five planting sites in July 2001, October 2001, and October 2002.

Chandeleur Islands Marsh Restoration (PO-27) Vegetation Surveys

Table 1. Comparison of data collected during July 2001, October 2001, and October 2002 vegetation surveys of five *Spartina alterniflora* (smooth cordgrass) planting sites on Chandeleur Island. Data were collected within 4-m^2 plots using Braun-Blanquet methodology.

Site name	# of plots	Mean % cover within plots containing plants			Mean % cover across all plots			% of plots containing no living plants		
		Jul-01	Oct-01	Oct-02	Jul-01	Oct-01	Oct-02	Jul-01	Oct-01	Oct-02
Tripletail	12	5.4	5.7	24.8	3.1	3.3	20.6	41.7	41.7	16.7
Little Teddy Bear	12	0.5	1.9	28.5	0.3	0.8	23.7	50	58.3	16.7
Redfish Point	16	0.5	2.1	33.3	0.3	0.8	12.5	37.5	62.5	62.5
Spool	20 (15 in Jul-01)	0.5	0.8	13.3	0.4	0.4	3.3	13.3	55.0	75.0
North Monkey Bayou	12	0.5	0.8	42.0	0.4	0.5	17.5	16.7	41.7	58.3
Overall	72 (67 in Jul-01)	1.2	2.2	28.0	0.9	1.0	14.0	31.3	52.8	50.0

Chandeleur Islands Marsh Restoration (PO-27) Vegetation Surveys

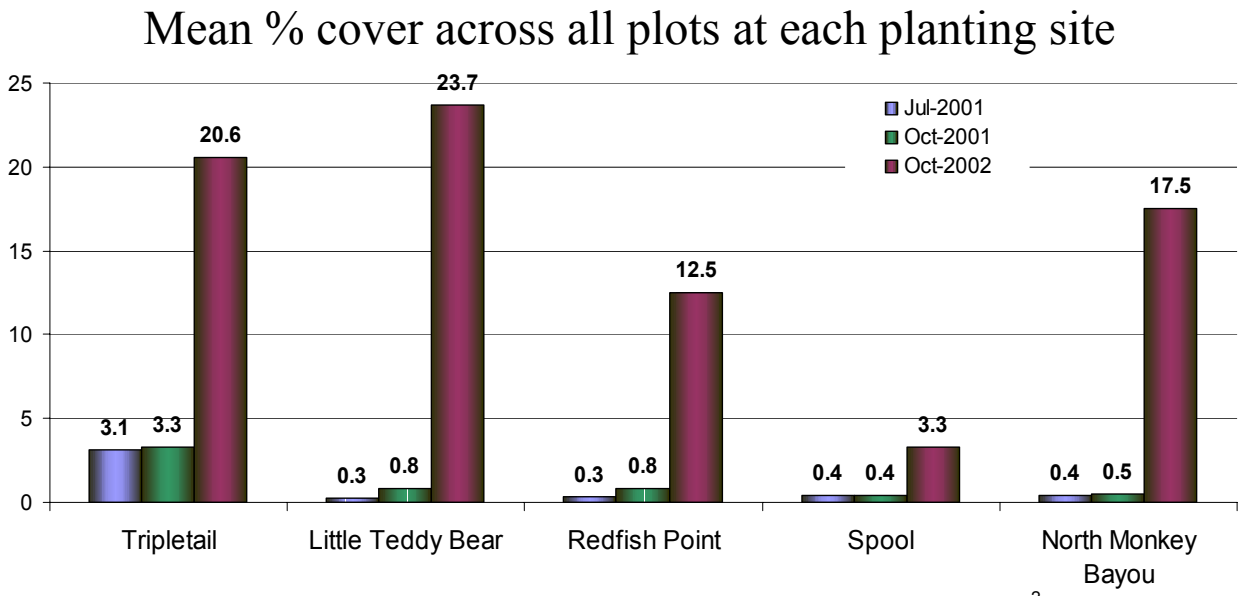


Figure 1. Mean percent cover of *Spartina alterniflora* (smooth cordgrass) across all 4-m^2 vegetation plots at each planting site in July 2001, October 2001, and October 2002.

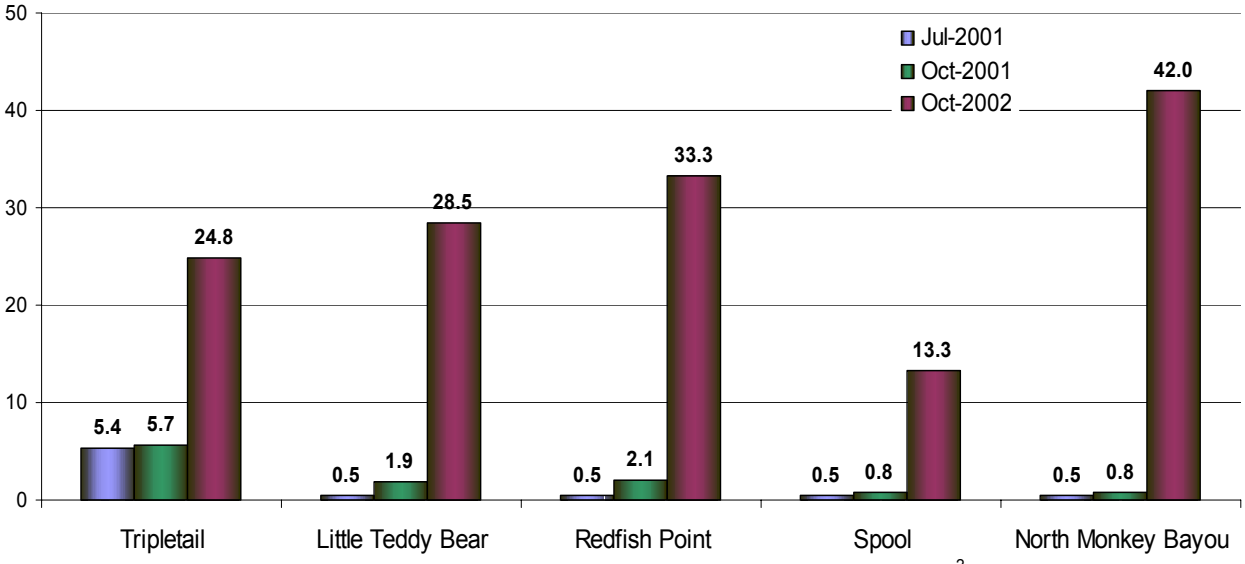


Figure 2. Mean percent cover of *Spartina alterniflora* (smooth cordgrass) within only 4-m^2 vegetation plots that contained plant cover (0% cover plots excluded) at five planting sites in July 2001, October 2001, and October 2002.

Chandeleur Islands Marsh Restoration (PO-27) Vegetation Surveys

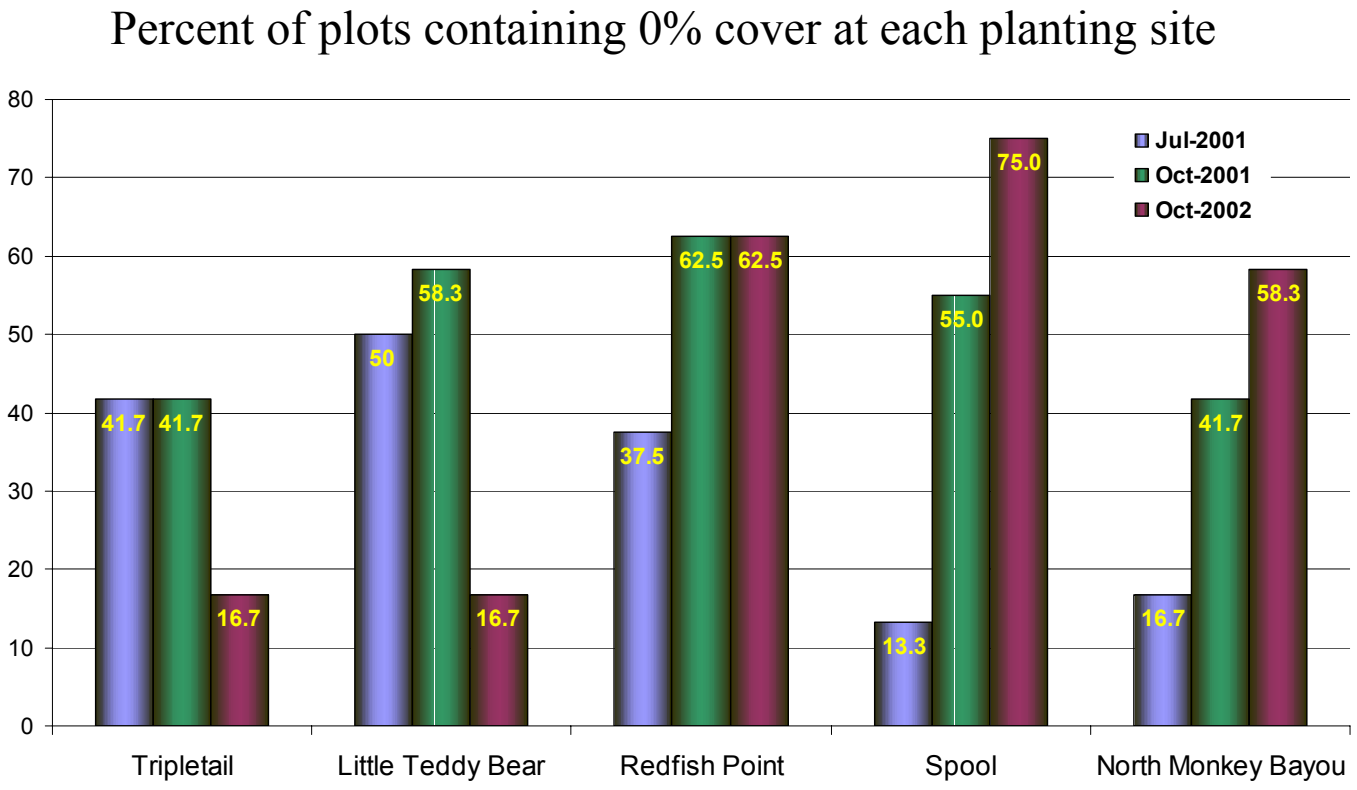


Figure 3. Percentage of 4-m^2 vegetation plots containing no living *Spartina alterniflora* (smooth cordgrass) plants (0% cover) at five planting sites in July 2001, October 2001, and October 2002.

Chandeleur Islands Marsh Restoration (PO-27) Elevation Surveys

One PO-27 elevation survey was conducted in July 2001 (as built). At the Little Teddy Bear planting site, two of the survey transects were extended to bisect nearby unvegetated intertidal sand flats, which will be used as informal reference sites. Future surveys will allow for the analysis of vertical changes in the area within and adjacent to the planting sites over time.

Figures and Tables:

Figure 4. Mean elevation (m) at five planting sites and one unplanted reference area of the Chandeleur Islands Marsh Restoration (PO-27) Project.

Figure 5. Mean elevation (ft) at five planting sites and one unplanted reference area of the Chandeleur Islands Marsh Restoration (PO-27) Project.

Chandeleur Islands Marsh Restoration (PO-27) Elevation Surveys

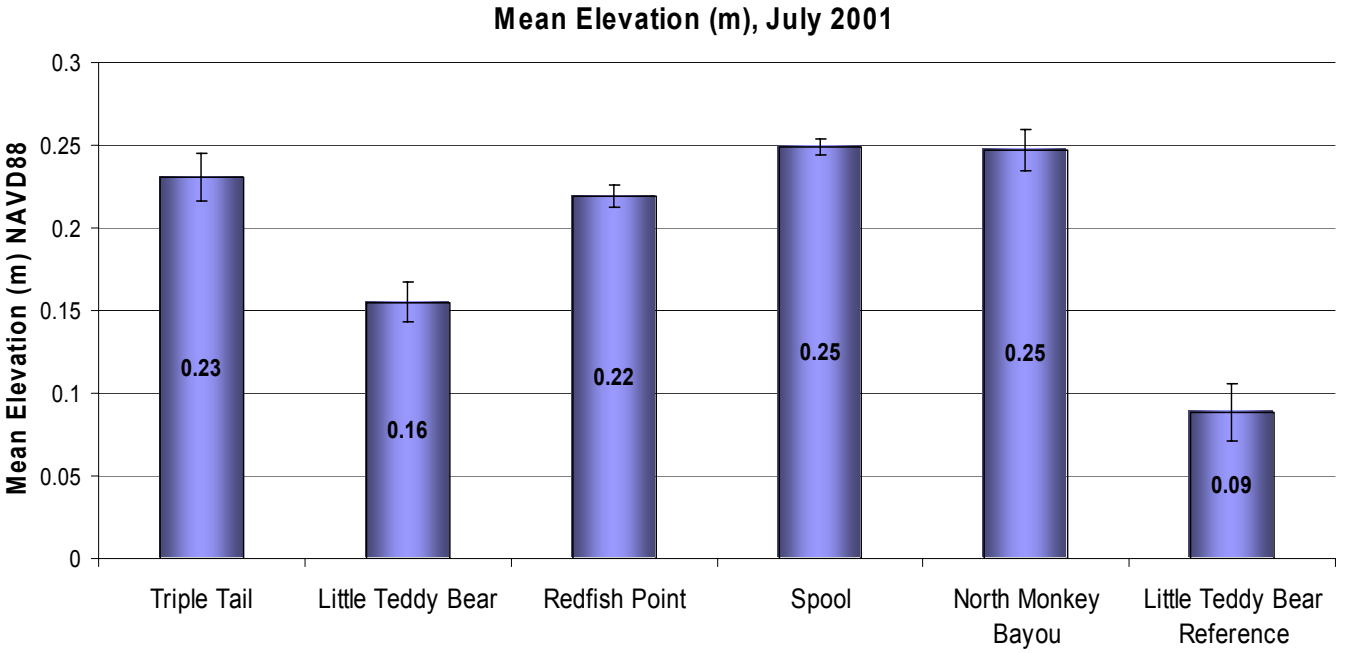


Figure 4. Mean elevation (m) at five planting sites and one unplanted reference area of the Chandeleur Islands Marsh Restoration (PO-27) Project. Elevation readings were taken along three to five transects per planting site.

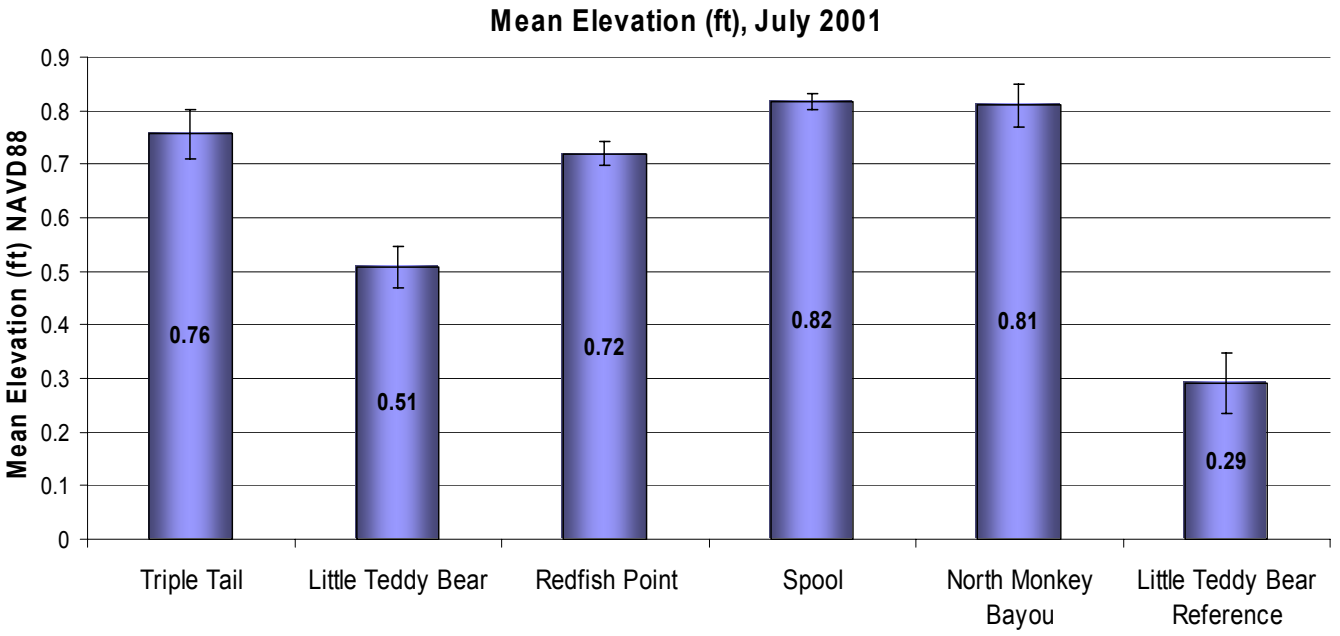


Figure 5. Mean elevation (ft) at five planting sites and one unplanted reference area of the Chandeleur Islands Marsh Restoration (PO-27) Project. Elevation readings were taken along three to five transects per planting site.

Chandeleur Islands Marsh Restoration (PO-27)

Preliminary Findings:

Aerial photography: Preliminary conclusions based on aerial photography will be made after 2003 photography is acquired.

Vegetation Surveys: Vegetation surveys indicated that percent cover of *Spartina alterniflora* increased at all planting sites from 2001 to 2002. Although approximately half of the plots remained unvegetated in 2002, the distribution of the unvegetated plots changed from 2001 to 2002. The number of unvegetated plots decreased at the northern sites and increased at the southern sites. The increase at the southern sites was most likely due to storm impacts from Tropical Storm Isidore and Hurricane Lili, which both made landfall in Louisiana in late September and early October of 2002. Despite the storms, the plants generally thrived within the vegetated plots, and it appeared that some stands were successful in trapping large amounts of sediment in areas where island breaching had occurred during the storms.

Elevation Surveys: Results of the July 2001 survey showed that the mean elevation of the planting sites was 0.72±0.3 ft NAVD88 (0.22±0.1 m). Further analyses will be conducted following the 2003 and 2005 surveys.