PLANT COMMUNITY COMPOSITION OF THE BUCKTOWN CREATED MARSH: A PRELIMINARY ASSESSMENT

Prepared for:
John Lopez, Director
Coastal Sustainability Program
Lake Pontchartrain Basin Foundation

Prepared by:
Mark W. Hester
Jonathan M. Willis
C. Ellery Mayence

Coastal Plant Sciences Laboratory
Department of Biological Sciences &
Pontchartrain Institute for Environmental Sciences
University of New Orleans
New Orleans, LA 70148
"Providing the plant knowledge base for enhanced coastal restoration"

August 16, 2005

Introduction

This research was conducted by the UNO Coastal Plant Sciences Laboratory to provide a preliminary *gratis* assessment of the plant community composition of the Bucktown created marsh. A plant and elevation survey was conducted on August 9, 2005 to provide initial data on the plant species present, their community associations, and the elevation thresholds associated with these communities. The data presented herein represent only one point in time and should be interpreted as such. Both plant succession and the settling and compaction of the substrate are expected to continue to occur. No soil data were collected during this sampling. A more complete assessment approach that includes measurements of additional variables, such as soil nutrient status, bulk density, percent organic matter, moisture content, and degree of reduction, as well as water-level fluctuations, marsh surface accretion/subsidence processes, and plant community dynamics in permanent plots over time would be required to fully describe and understand the environmental variables controlling functional marsh development at this site and how to best create and manage fringing marshes in the Lake Pontchartrain Basin.

Methods

On August 9, 2005, an initial assessment of elevation and plant community composition was conducted in the Bucktown created marsh site. A total of 13 sampling stations were selected throughout the site based on a visual assessment of four main habitat types present in this created marsh: edge marsh, marsh, high marsh, and shrub (Figure 1). Edge marsh sites tracked the tidal creek and were located approximately 2 to 4 m from the creek bank. All marsh sites were composed primarily of herbaceous plant species, whereas the shrub sites had substantial cover of woody vegetation. At each sampling station a 1.0 m^2 sampling quadrat was placed on the marsh surface and plant community composition and vegetative cover was determined by ocular estimation in 5% intervals of aboveground cover by species (1% intervals for species with less than 5% cover). Marsh surface elevation was also determined at each sampling station with a laser level and stadia rod. Water levels were low during the sampling. Elevations of average water level (8:40 am Central time) and the lower elevation limit of smooth cordgrass (*Spartina alterniflora*) from three locations were also determined. Water level was set to a relative elevation of 0.0 m and all marsh elevations are reported relative to this low water elevation at the time of sampling.

Results

A sketch of the created marsh area (Figure 1) shows that areas of shrub habitat (often referred to as shrub/scrub habitat) occurred mainly along the site perimeter, as well as in a central finger. Elevations were generally higher in this shrub habitat, which was dominated by *Iva frutescens* (marsh elder) and had some of the highest plot vegetative covers because of the bushy growth form of this species (Figure 2). Interestingly, an elevation increase of only about 15 cm was sufficient to result in shrub habitat dominated

by marsh elder compared to the marsh edge habitat. Both the interior marsh and high marsh habitats averaged about 11 to 13 cm lower than the shrub habitat (Figure 2). These results show the importance of relatively small marsh surface elevation differences on plant community composition. Marsh elder may continue to spread into the high marsh zone via seed dispersal, but this is difficult to predict without data on marsh surface subsidence/accretion rates.

Spartina alterniflora (smooth cordgrass), a widespread salt marsh grass, was present in all marsh types and was the dominant species in the marsh and high marsh habitats, as well as being co-dominant in the edge habitats (Figures 3 & 4). Smooth cordgrass had an observed lower limit of 1 cm relative elevation (relative to the 0 cm low water conditions at sampling), and also grew vigorously in the marsh habitat type (relative elevation of 22 cm), was somewhat stunted, but still abundant, in the high marsh elevation of 24 cm, and was significantly suppressed in the shrub zone (relative elevation of 35 cm; Figure 3). Species richness tended to be greatest in the edge and marsh habitat types and lowest in the high marsh and shrub habitat types (Figure 4).

Conclusions

Overall, the Bucktown marsh creation appears to have been successful in creating a variety of wetland and coastal habitat types. Woody, shrub marsh habitat dominated by marsh elder (*Iva frutescens)* occurs at the higher elevations of this created marsh site, whereas the lower elevation areas (edge and marsh habitats) appear to be functioning as healthy intertidal marsh habitat typical of this locale dominated by smooth cordgrass (*Spartina alterniflora*). However, to accurately determine the frequency, depth, and duration of tidal inundation in the various habitat types and the trajectory of wetland habitat change at this site, a more detailed plant and elevation survey approach would be needed in conjunction with the installation of a continuous-recording water-level gage and Sediment Elevation Tables (SETs). Based on personal observations and the limited amount of data collected from the site, the value of the tidal creek drainage was apparent as being crucial for the establishment of healthy intertidal marsh vegetation. Planning a more complete network of tidal creek drainages in future marsh creation efforts and minimizing the creation of excessively high elevation zones, which have a high probability of developing into shrub habitat, should increase the likelihood of successful creation of intertidal marsh habitat while also enhancing fish utilization and material exchange.

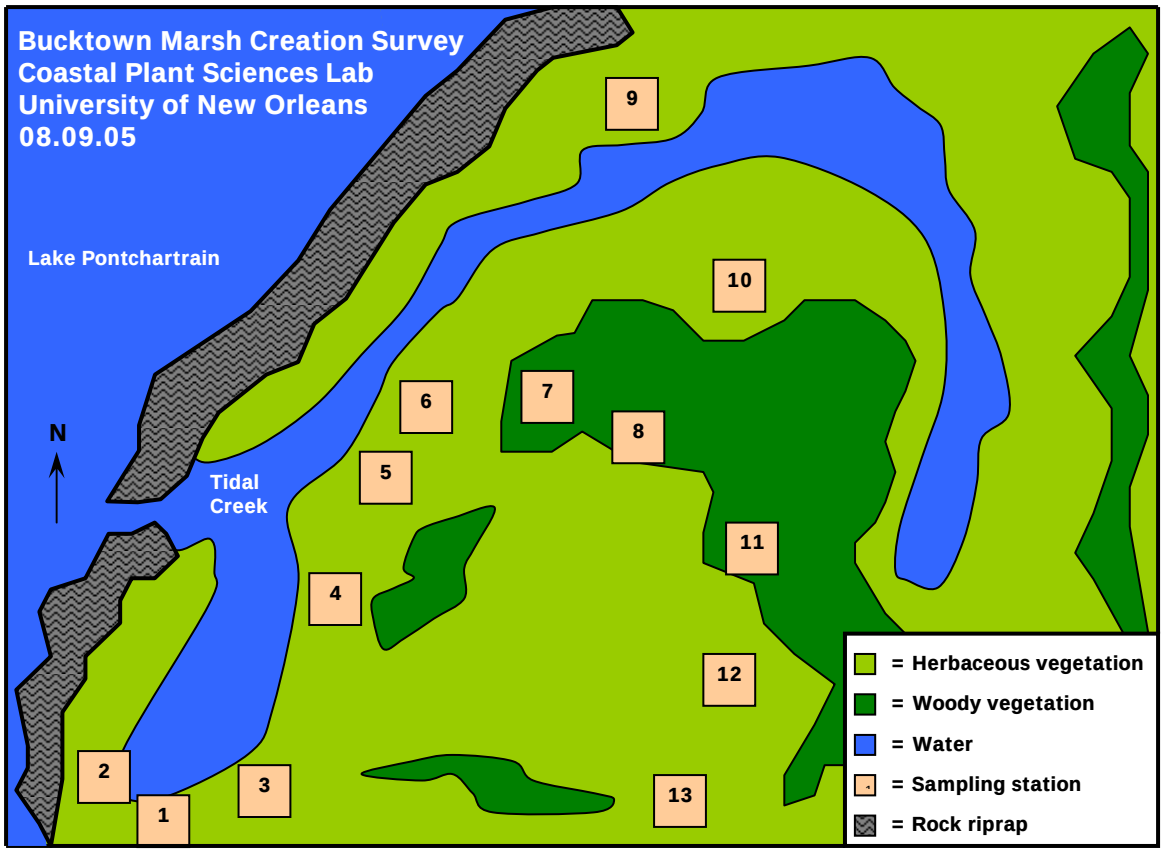

Figure 1. Conceptualized drawing (not to scale) of the Bucktown marsh creation site. Four habitat types were designated as follows: edge marsh habitat = plots 1,2,3,4; marsh habitat = plots 5,6,9,10; high marsh habitat = plots 12, 13; shrub habitat = plots 7, 8, 11.

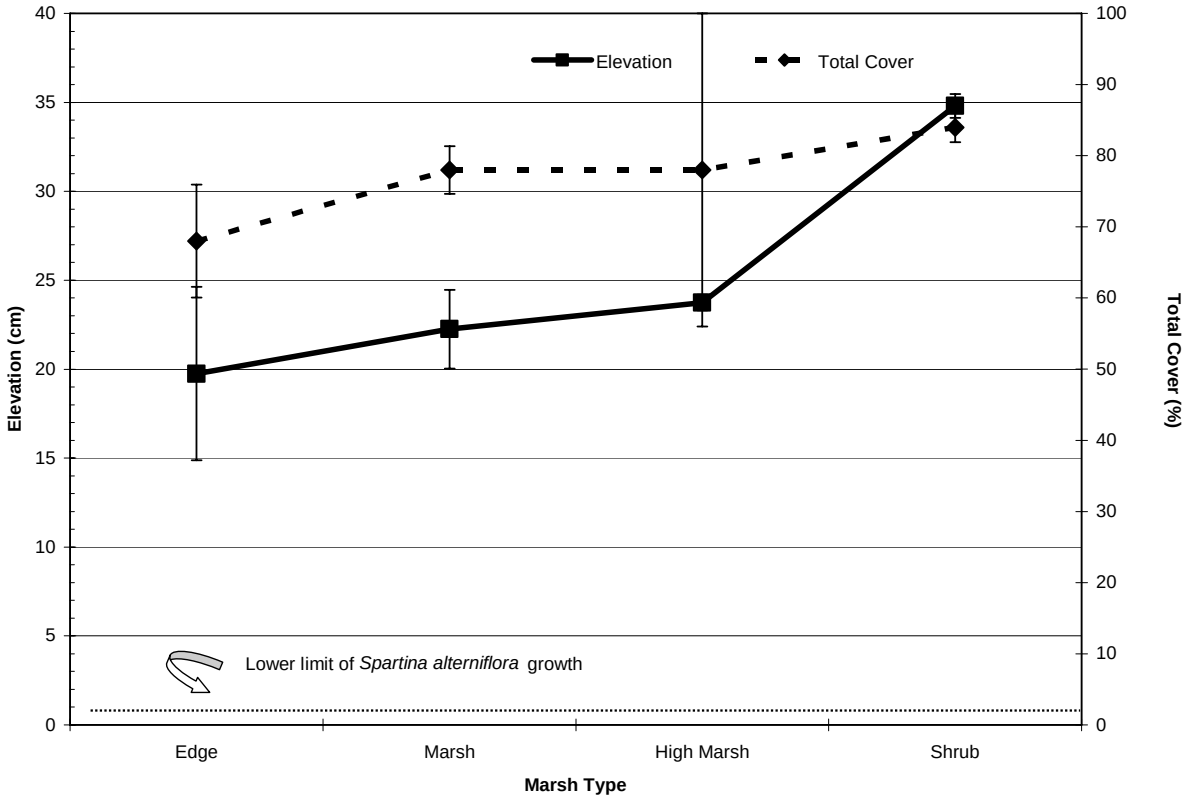

Figure 2. Marsh surface elevation (cm) and total vegetative cover (%) by marsh habitat type (means +/- SE). Marsh elevations are relative to a value of 0 cm that corresponds to the low water elevation present at the time of sampling (8:40 am Central time, August 9, 2005)

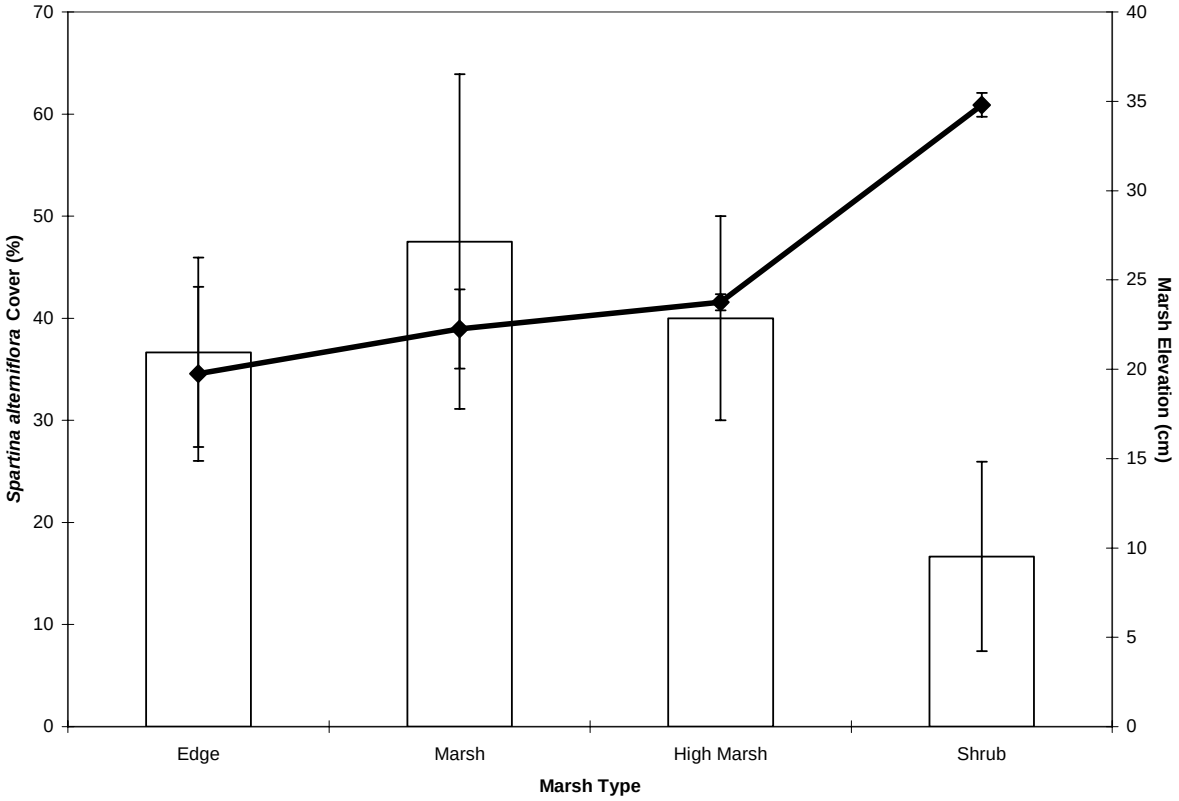

Figure 3. Marsh surface elevation (cm; designated by a line) and *Spartina alterniflora* cover (%; designated by bars) by marsh habitat type (means +/- SE).

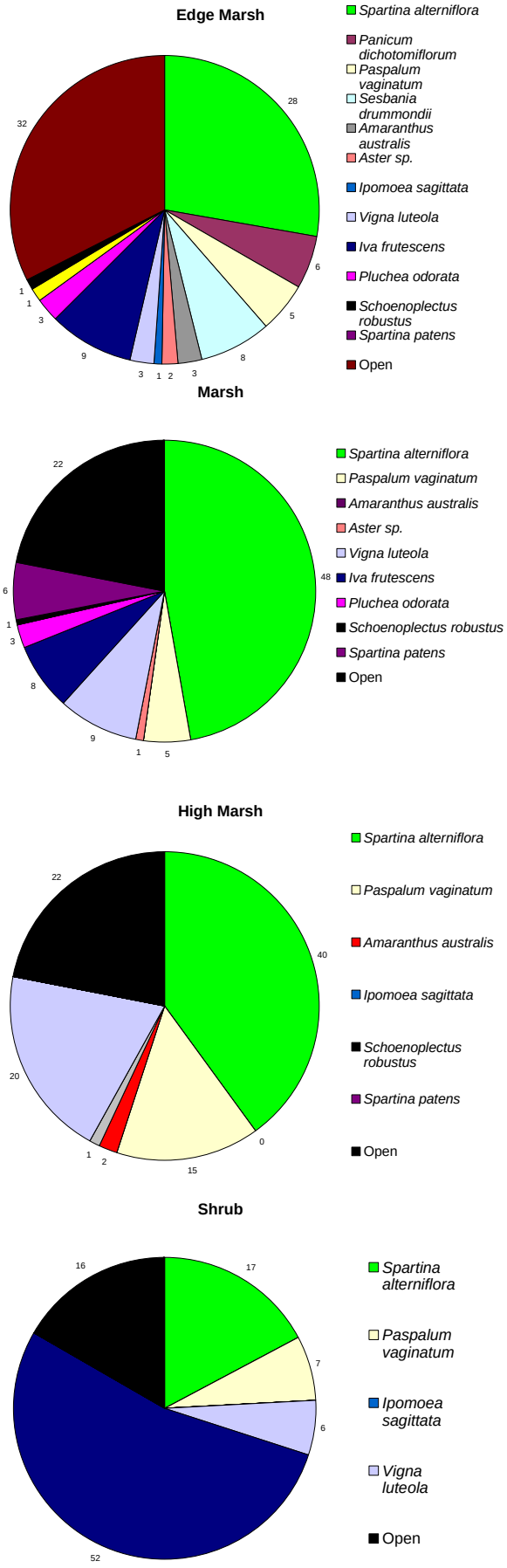

Figure 4. Mean plant community composition by marsh habitat type. Each species mean percentage of ground coverage is indicated around the periphery of each marsh habitat pie chart. Open refers to unvegetated marsh surface.