TIMBALIER ISLAND PLANTINGS (TE-18)
TE-18-MSPR-1296-3
PROGRESS REPORT NO. 3
for the period
June 17, 1996 to December 9, 1996

Project Status

During the storm season of 1995, several tropical storms impacted the Louisiana coastal area including Timbalier Island, causing damage to the fencing installed by the National Resources Conservation Service (NRCS) for the Timbalier Island Plantings project. In June 1996, the fencing damage was repaired except for the E, I-1, and I-2 segments, which remained unfenced (figure 1).

In July 1996, the vegetation planting was completed under the supervision of NRCS. The plantings included marshhay cordgrass (*Spartina patens*) and Atlantic panicgrass (*Panicum armarum*) at segments A, B, I-1, and I-2 (figure 1). No plantings took place in segments C and D, since vegetation was naturally colonizing the segments. Segment E was not planted. During the first week of August 1996, vegetation sampling was conducted at the planted segments on the island.

Elevational data were collected by NRCS prior to construction and after construction in September 1996 and tied to a permanent benchmark. The results of this elevational survey are not complete at this time, but will be included in the next progress report.

In October 1996, Hurricane Josephine passed near the Louisiana coast and impacted many of the Louisiana barrier islands, including Timbalier Island. Damage to the Timbalier Island Plantings project varied, ranging from extensive overwash and complete destruction of the vegetation at segments I-1 and I-2 on the eastern end of the island to saltwater burn of the vegetation and partial destruction of some of the sand fencing in segments C and D in the central island area. Sand accumulated at the eastern end of segment C as a result of the hurricane. Segments A and B on the western end of the island had little damage to the fencing, but experienced some saltwater damage to the plants. The majority of plants with saltwater damage showed signs of new growth as soon as a month after the storm. Varying degrees of beach erosion were observed, with the most erosion occurring on the eastern end of the island; the erosional damage diminished toward the west.

Project Description

Timbalier Island is part of a chain of barrier islands bordering Timbalier Bay in Terrebonne Parish. The island has decreased in size by 58% over the last century (Hester and Mendelssohn 1992) and island width has decreased from an average 2789.5 ft to 1361.9 ft between 1978 and 1988 (Williams et al. 1992). The dunes of Timbalier Island are not well developed and are less than 6.5 ft above MSL. These factors leave the island highly susceptible to erosion, storm overwash, and breaching. Stabilized sand dunes reduce the likelihood of island breaching and erosion from wave action (Mendelssohn and Hester 1988; Mendelssohn et al. 1991). Additionally, Mendelssohn et al. (1991) found that the only way to maintain a healthy, well-vegetated dune in Louisiana's barrier islands is through beach nourishment in conjunction with dune building and vegetative stabilization techniques.

The design of this project is to stabilize portions of bare beach and overwash areas on Timbalier Island by utilizing sediment-trapping fences and vegetation plantings (figure 1). This is being accomplished by construction of approximately 7,390 linear ft of fencing at seven locations along the length of the island, parallel to the Gulf of Mexico shoreline. Each fence segment (figure 2) has perpendicular spurs every 50ft, extending 25 ft from the fence toward the bay. Marshhay cordgrass and Atlantic panicgrass have been planted on the bayward side of the fences between the spurs. The specific goals of the project are (1) to increase the percent cover of emergent vegetation behind the sediment-trapping fences, (2) to increase the elevation adjacent to sediment- trapping fences, and (3) to decrease the rate of shoreline erosion along 7,390 ft of the island.

Monitoring Design

Habitat mapping, shoreline movement, plant species composition, percent plant survival, plant cover, and surface elevation are being monitored to evaluate the project success. Aerial photography was flown on November 21, 1993, prior to sediment-trapping fence construction, and is scheduled to be flown again in November 2001. Shoreline movement will be evaluated through Global Positioning System (GPS) surveys during the winters, January or February, of 1997 and 2002. Elevational data were obtained immediately after sediment-trapping fence construction and in September 1996. Future postconstruction elevational surveys are scheduled on dates corresponding with the vegetation sampling.

The vegetation planted in late June and early July 1996 (figure 2) was monitored in August 1996 and will be monitored in the month of August for the years 1997, 1999, and 2001, or until the original plants are indistinguishable. Planted segments were divided into "bayside" and "gulfside," based on the location of the plants with respect to center line and the Gulf of Mexico (figure 2). In both the bayside and gulfside of all segments where vegetation was planted (A, B, I-1, I-2), percent survival of planted individuals, percent cover of plants, and plant species composition were determined within a permanent 4-m^2 quadrat. In addition, two plants within each quadrat were randomly selected to determine tiller number and tiller length. Due to the extreme length of segment B, it was divided and sampled in two sections, the east end, BE, and the west end, BW.

Results/Discussion

Visual observations indicated that the vegetation in segments A, BW, and BE benefited by the presence of sand fencing and accumulated sand. The absence of fences in segments I-1 and I-2, which were destroyed before planting, contributed to increased damage to the vegetation and occurrence of overwash areas, compared to segments where the fences remained intact. Results from all parameters demonstrate that vegetation planted on the bayside of the center line has had an overall higher success rate than vegetation planted on the gulfside.

Percent survival of the planted vegetation (figure 3a) was significantly higher ($P < 0.05$) bayside than gulfside at all segments except BE and I-2. The bayside had near 100% survival at all segments while the gulfside plant survival ranged from a low of 51% at I-1 to near 100% at BE.

Plant cover (figure 3b) was significantly higher ($P < 0.01$) at the bayside than the gulfside of all segments except BE and BW, where there was no significant difference. Segments I-1 and I-2 had less plant cover than the other three locations, which was likely due to the absence of fences at those segments and direct exposure to wave action and submergence by the Gulf of Mexico. Percent plant cover of Atlantic panicgrass naturally exceeds that of marshhay cordgrass in most of the segments measured (table 1). This difference in percent cover between species may be attributed to the width of Atlantic panicgrass leaves being two to five times greater than that of marshhay cordgrass leaves. Naturally colonizing vegetation accounted for less than 5% of the plant cover in three bayside segments (A, BE, and BW) and three gulfside segments (A, BW and I-2) and was nonexistent in the remaining segments.

With the exception of segment BE, the bayside had significantly greater tiller production ($P < 0.01$) than the gulfside (table 2). Additionally, tiller production was greater at the segments on the western end of the island (A, BE, and BW) than at those on the eastern end (I-1 and I-2).

Growth of planted vegetation was highest at the bayside of the three fenced segments (A, BE, and BW) at the western end of the island. These initial results indicate that the combination of vegetation plantings and sediment-trapping fences has been successful thus far in creating and maintaining dune habitats on the western end of the island. However, at the eastern end of the island, the segments (I-1 and I-2) have no fences or established dunes for protection from wave erosion. As a result, the planted vegetation showed reduced growth in response to these conditions in August 1996 and were completely destroyed by the wave energy and storm overwash accompanying the hurricane in October 1996.

References

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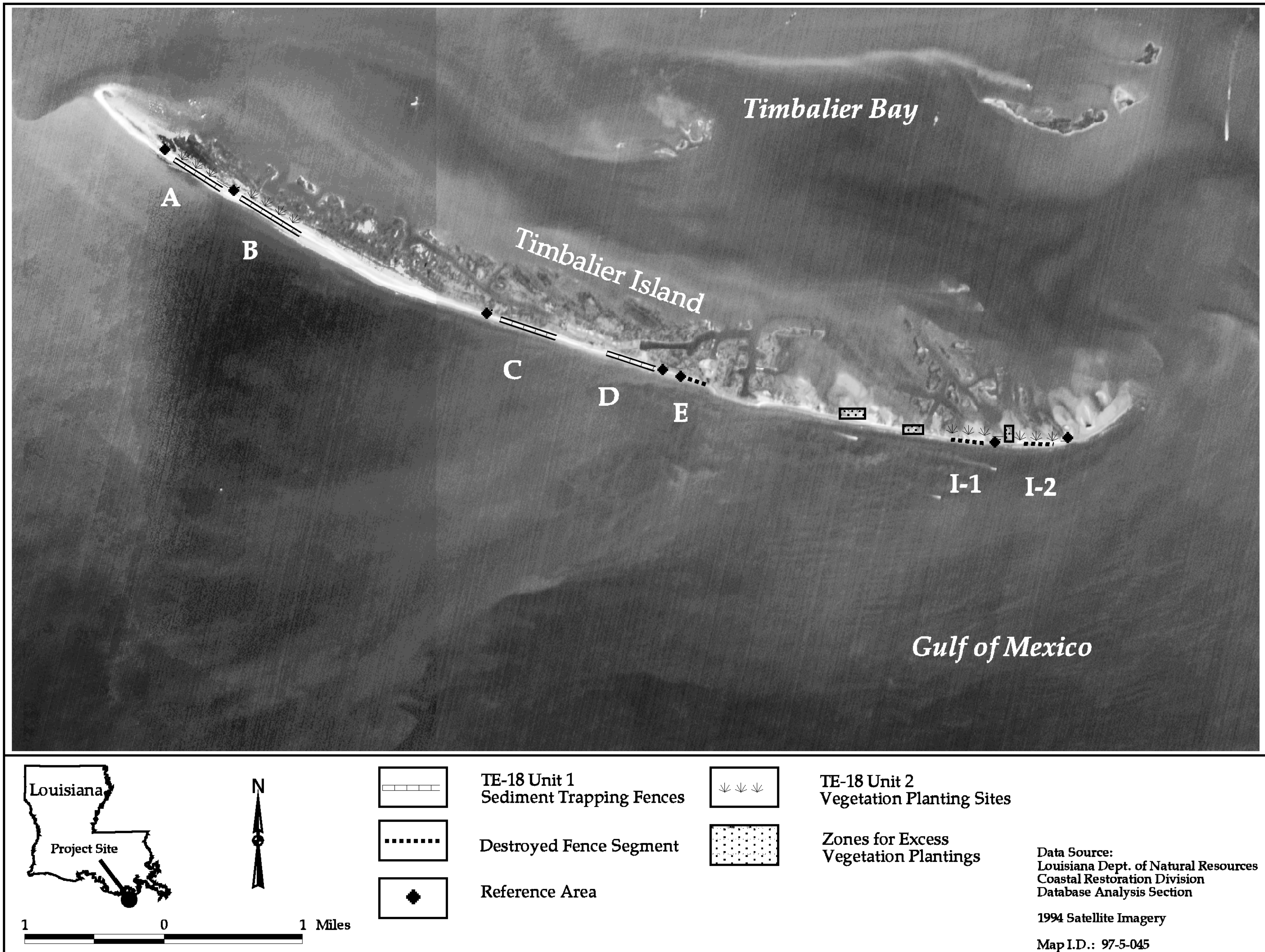

Figure 1. Timbalier Island Plantings (TE-18) project elements. Letters (A-I) represent fence segments.

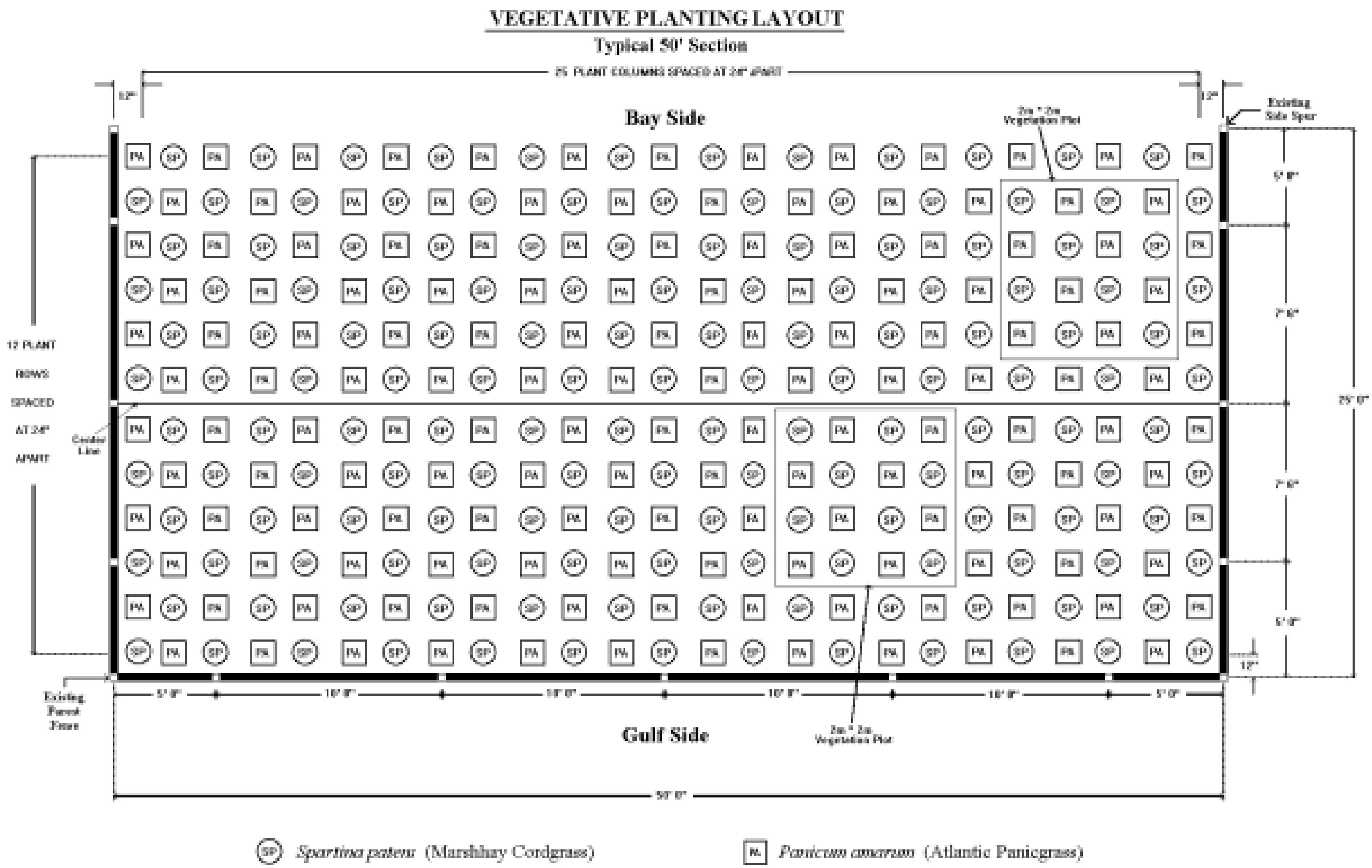

Figure 2. Timbalier Island Plantings (TE-18) project layout for vegetation plantings.

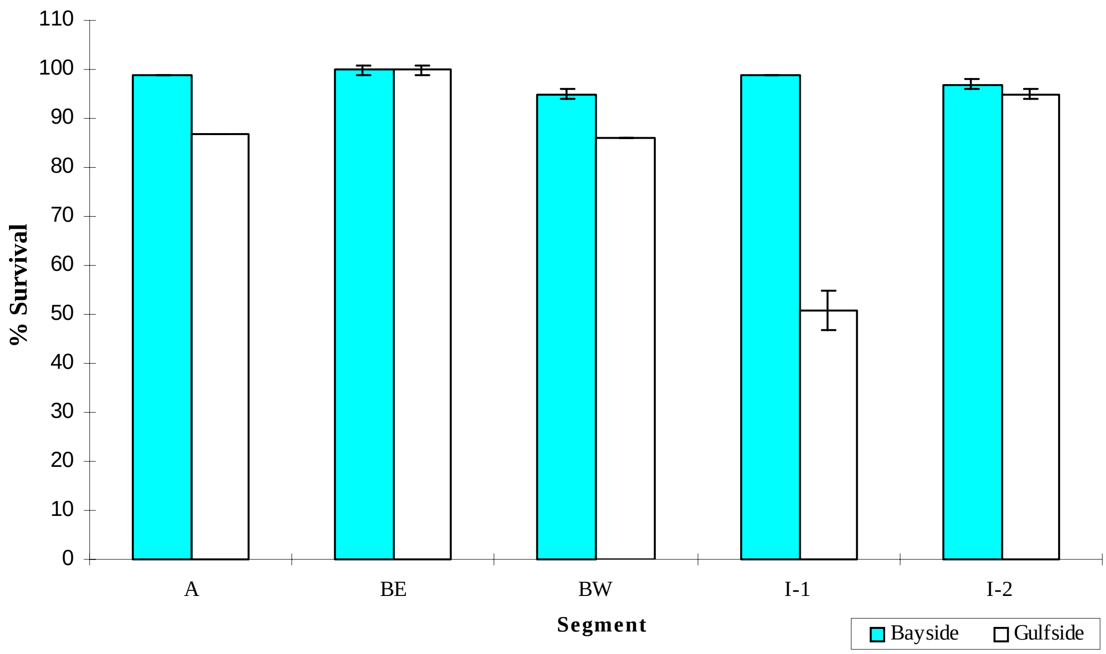

Figure 3a. Timbalier Island Plantings (TE-18) project percent survival for vegetation plantings (July-August 1996). Bars represent the mean percent survival of both planted species ± 1 SE.

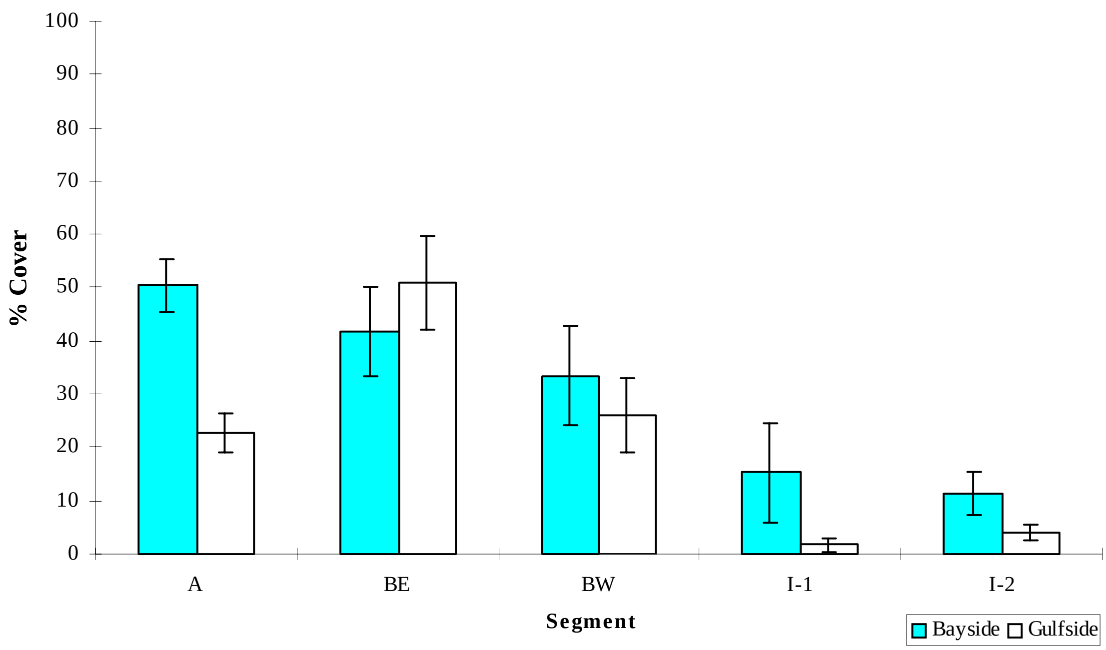

Figure 3b. Timbalier Island Plantings (TE-18) project percent cover for vegetation plantings (July-August 1996). Bars represent the mean percent cover of all plant species ± 1 SE.

Table 1. Mean percent cover, standard deviation (x), and number of plots per segment [n] of Atlantic panicgrass (*Panicum armarum*) and marshhay cordgrass (*Spartina patens*) planted in July 1996 in TE-18 project area on Timbalier Island, Louisiana. Data were collected on August 6 and 7, 1996.

Segment	Atlantic panicgrass			Marshhay cordgrass		
A Bayside	36	(31)	[30]	11	(20)	[30]
A Gulfside	12	(17)	[30]	8	(13)	[30]
A Overall	24	(28)	[60]	9	(17)	[60]
BE Bayside	32	(23)	[9]	9	(12)	[9]
BE Gulfside	35	(26)	[9]	16	(16)	[9]
BE Overall	33	(24)	[18]	12	(14)	[18]
BW Bayside	20	(25)	[10]	10	(10)	[10]
BW Gulfside	17	(24)	[10]	13	(23)	[10]
BW Overall	19	(24)	[20]	11	(17)	[20]
I-1 Bayside	12	(25)	[7]	3	(8)	[7]
I-1 Gulfside	0	(0)	[7]	2	(4)	[7]
I-1 Overall	7	(2)	[14]	3	(6)	[14]
I-2 Bayside	3	(5)	[8]	5	(9)	[8]
I-2 Gulfside	3	(3)	[8]	1	(3)	[8]
I-2 Overall	3	(4)	[16]	3	(7)	[16]
Weighted Bayside Mean	26	(28)	[64]	9	(15)	[64]
Weighted Gulfside Mean	14	(20)	[64]	8	(15)	[64]
Weighted Overall Mean	20	(25)	[128]	9	(15)	[128]

Table 2. Mean tiller number per segment ± 1 SE and mean tiller length for bayside and gulfside plots. Data collected one month after planting (August 1996).

	Bayside		Gulfside	
Segment	Mean tiller number	Mean tiller length (cm)	Mean tiller number	Mean tiller length (cm)
A	41 ± 4	9	13 ± 2	5
BE	39 ± 6	12	41 ± 4	9
BW	31 ± 6	6	20 ± 4	4
I-1	10 ± 4	8	1 ± 0	1
I-2	15 ± 2	5	10 ± 2	3