Surficial sediments in the intertidal zone are predominantly muddy sand. Relatively large marsh areas of primarily S. alterniflora occur along the southwestern bay shoreline at the intersection of the bay and the bayou and along the southeastern shoreline near Moses Lake and Galveston Bay. Uplands and marshes composed of Iva frutescens, Spartina patens, Baccharis halimifolia, Andropogon glomeratus, and other high marsh species are found just inland of the clay bluffs, between the bay shoreline and the Texas City Dike.

Topographic surveys were conducted on the southwestern shoreline of Dickinson Bay. Relative elevations were measured and marsh communities were characterized along two transects in natural marshes and compared to elevations along an adjacent, primarily unvegetated transect (figs. 10, 11, and 12).

Transect 1, in a natural marsh, has a bearing of north 40 degrees east and is approximately 30 m long (fig. 10). The total range in elevation is approximately 0.8 m, which is the vertical distance from station 1 to station 6. Marsh species occur at all six stations on the transect. Stations 1 and 2 contain high salt marsh communities (classified as estuarine intertidal emergent [E2EM] as defined by Cowardin et al. [1979]) made up of Spartina patens, Lycium carolineanum, and Distichlis spicata. An intertidal salt marsh community of Spartina alterniflora occurs at the water line at station 3 and continues to station 6, a distance of about 17 m. The range in elevation for S. alterniflora along this transect is about 0.6 m. Salinity at transect 1 was 8 ppt.

Transect 2 has a bearing of north 65 degrees east and is approximately 19 m long (fig. 11). The elevation profile of transect 2 is different from transect 1 and probably similar to most other vegetated and unvegetated areas along the southern shoreline of the bay (fig. 11). Station 1 is on the upper edge of an erosional scarp about 0.9 m high. The total range in elevation of the transect is 1.4 m. High marsh species of Iva frustescens, Spartina spartinae, and Eleocharis sp. occur at station 1. Spartina alterniflora is found from stations 3 to 6, a distance of about 14 m and a range in elevation of 0.4 m. Water depth at station 5 was 2 cm. Salinity at transect 2 was 8 ppt.

Transect 3 has a bearing of north 80 degrees east and is 26 m long (fig. 12). Except for Spartina spartinae at station 1 along the edge of the scarp, transect 3 is unvegetated. The erosional scarp is about 1.3 m high, and the total range in elevation from station 1 to 6 is 1.8 m. Stations 4 to 6 had water depths of approximately 0.1 to 0.3 m. Relative elevations along transect 3 are approximately 0.4 to 0.5 m lower than elevations along transect 2 and more than 1 m lower than elevations along transect 1. Lower elevations indicate that the frequency and duration of

Figure 10. Dickinson Bay Transect 1

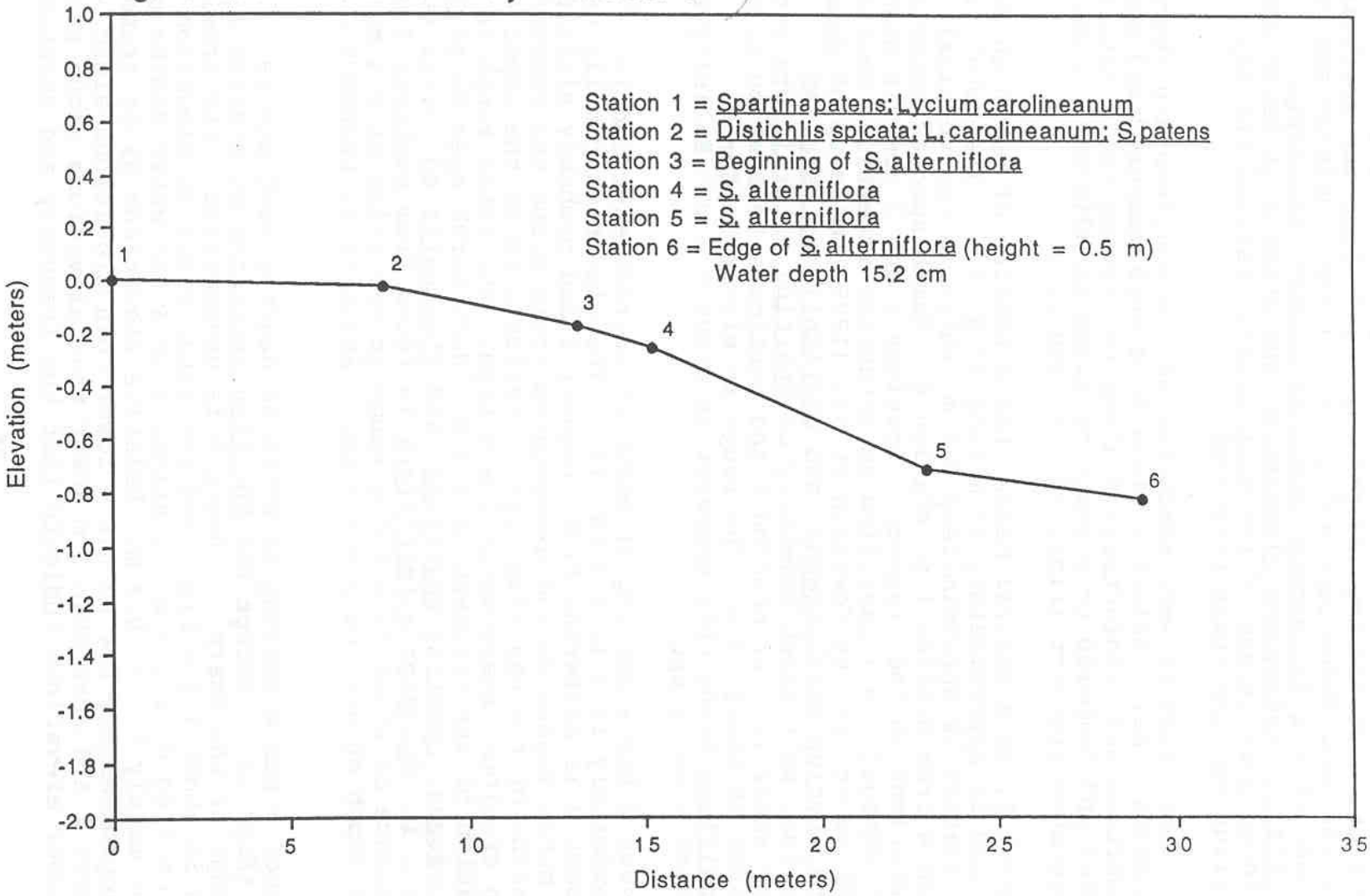


Figure 11. Dickinson Bay Transect 2

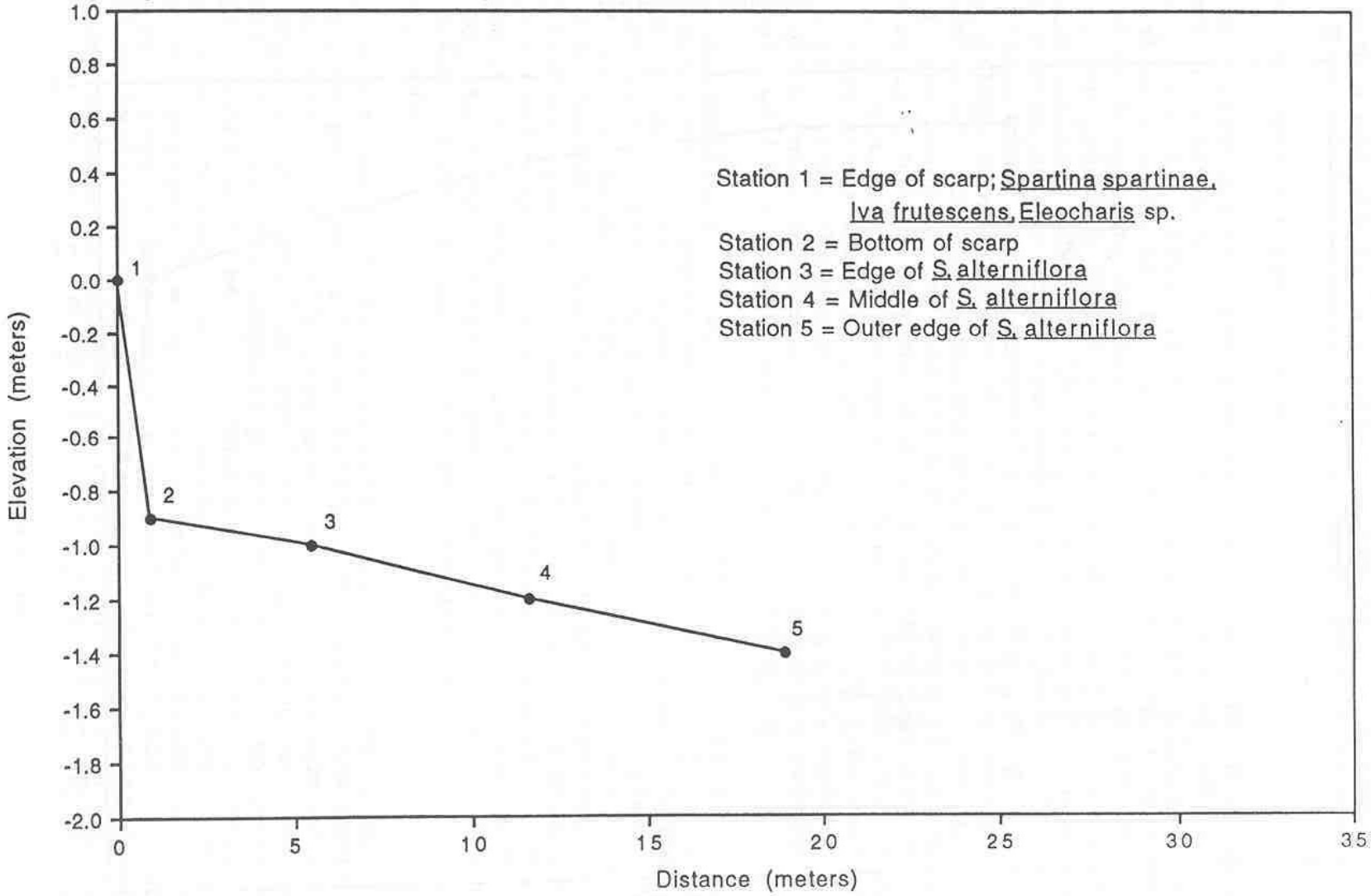
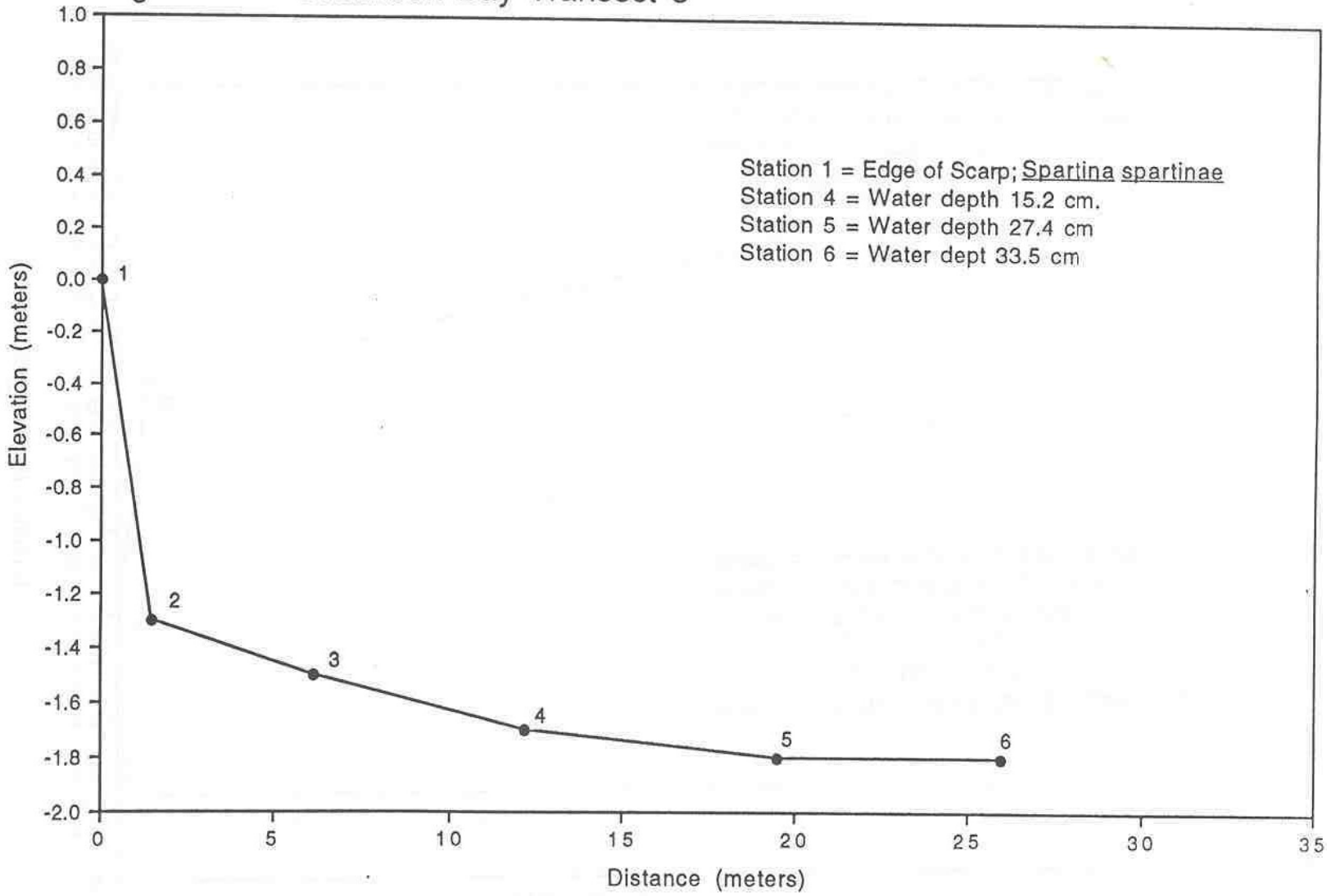


Figure 12. Dickinson Bay Transect 3



submergence (hydroperiod) is greater along transect 3 than along transects 1 and 2. The increased hydroperiod may prevent the expansion of S. alterniflora from adjacent natural marshes onto transect 3 and similar unvegetated areas along the southern bay shoreline. Salinity at transect 3 was 8 ppt.

Marsh restoration/creation plan

It was determined that wetlands can be created in three adjacent unvegetated areas along the southern Dickinson Bay shoreline (figs. 1 and 2). Transplants of Spartina alterniflora from natural marshes along the southwestern shoreline of Dickinson Bay can be used to plant adjacent unvegetated areas. Sediments and salinities indicate that the unvegetated areas are suitable for S. alterniflora; however, the slope is probably too great and water depths appear to be too deep for plantings in the intertidal zone. It is proposed that a small test plot of S. alterniflora approximately 30 X 30 m in area be planted to determine if current elevations are adequate. Transplanting would take place during low tides between March 15 and August 15. No more than one 15 cm plug of source material per square meter would be obtained from the borrow areas, and incidental damage to the borrow areas would be strictly avoided. Extreme care would be taken to keep the plant roots moist during transport. Required permits for restoration project would be obtained from appropriate local, state, and federal agencies.

If S. alterniflora failed to colonize the test plot after one complete growing season (approximately March to September in this region), muddy sand dredged from the Dickinson Bay Channel would be used to fill the unvegetated areas to a depth suitable for planting. A sediment conditioning time of two to six months would be needed for dewatering prior to final leveling. Conditioning time and the amount of leveling would depend on sediment and organic content of the dredged material. Two woven geotextile tubes approximately 2.0 m in diameter and 50 m long filled with dredged material would be used to temporarily retain the dredged material and to act as a breakwater for the transplants.

Plantings at each of the three sites would be made in multiple 100 m rows parallel to the shoreline. The first row would be at the mean high tide (MHT) line and the other rows approximately 1 m apart to the mean low tide line. A planting unit would consist of a single, properly pruned sprig with its associated roots. Roots would be considered adequate if ten or more roots were located on each stem. Planting units would be placed on 1 m centers. Sprigs would be set to depths of at least 12 to 15 cm. The total area to be planted is approximately 6,000 m^2. Plants would be fertilized with orchard starter tablets placed about 8 cm from the base of each plant (Cutshall, 1985).