Coastal Engineering Technical Note

SEAGRASS PLANTING GUIDELINES FOR THE PACIFIC, GULF, AND ATLANTIC COASTS

PURPOSE: Increasing usage of coastal areas by man has often resulted in loss of wetland habitat due to construction, recreation, harbor and channel maintenance, and pollution. Among such displaced habitats are beds of submerged aquatic vegetation, or seagrass. Restoration of seagrass for sediment stabilization and habitat enhancement is now possible through application of recently developed low-cost planting methodology.

BACKGROUND: Distribution of seagrass species occurs in three major zones: the Northeast Atlantic, Southeast Atlantic-Gulf, and Pacific coasts (Figure 1).

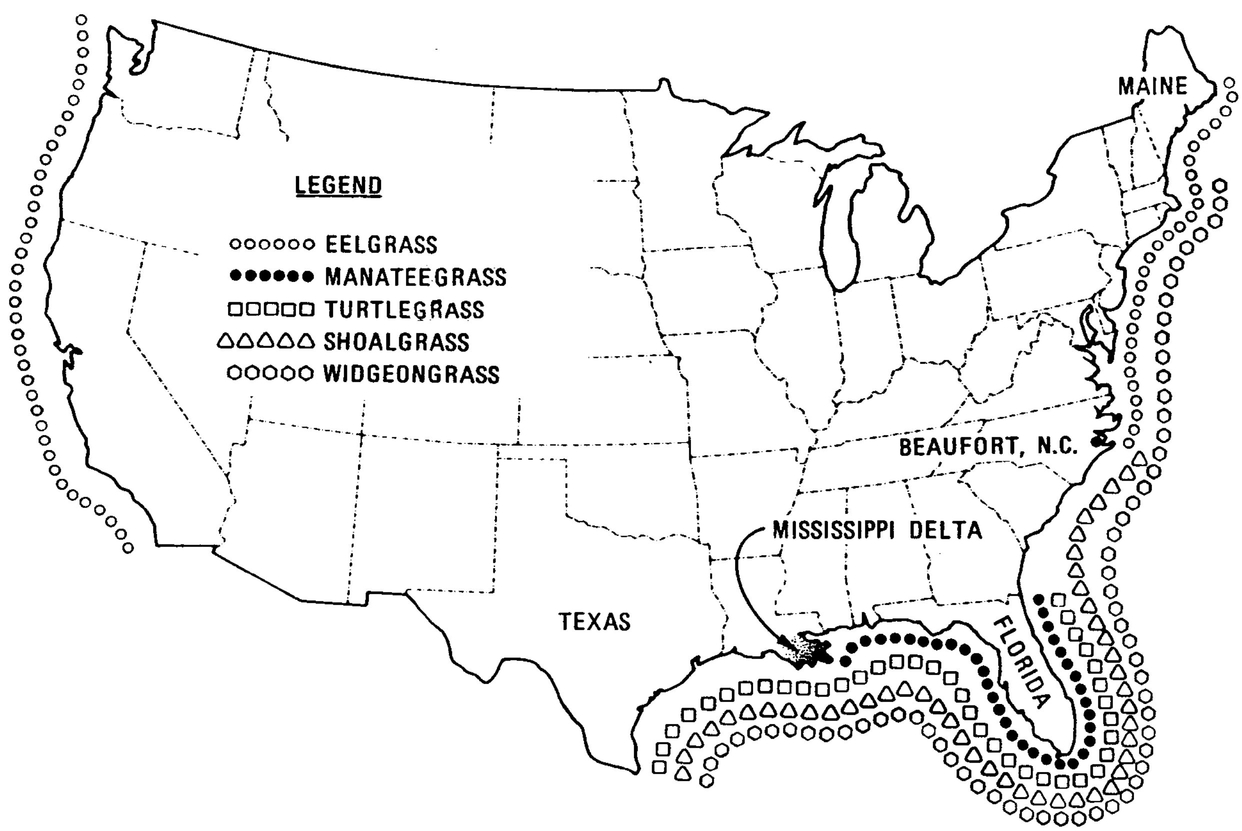

Figure 1. Distribution of Seagrass Species.

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The predominant method of seagrass reproduction is through growth of new shoots attached to the parent plant by runners (rhizomes), which generally grow below the sediment surface.

Planting methodology has been developed for four out of the five commonly occurring soft substrate seagrass species: eelgrass (*Zostera marina*), widgeongrass (*Ruppia maritima*), shoalgrass (*Halodule wrightii*), and manateegrass (*Syringodium filiforme*). The fifth species, turtlegrass (*Thalassia testudinum*), is still under investigation. Transplanted seagrass beds can be used for mitigation and substrate stabilization. Prior reports (Phillips 1980; Coastal Engineering Research Center 1981a, 1981b) recommended transplanting procedures involving collecting seagrass core plugs or weaving shoots into fiber mesh. While these methods can still be used and may have application in special circumstances, the currently described method is faster and less expensive.

REPLANTATION SITE SELECTION: Suitablilty of a site for seagrass planting must first be determined. This will involve both historical and physical considerations. A site that has previously supported seagrass is likely to be an ideal location for successful replantation unless physical and water quality parameters have changed drastically. Assessment of physical parameters becomes more important in areas that have no prior record of seagrass presence. Among the more important physical factors of the site that need to be addressed are salinity, water depth, currents and waves, and sediment type (Table 1).

Table 1. Important physical factors of site selection.

Region	Species	Salinity Tolerance $^o/oo$	General Depth Distribution	Optimal Currents at Transplant Site, cm/sec	Optimal Transplant Time	Sediment Preference	Relative Current/ Wave Dampening
Northeast Atlantic	Eelgrass (*Zostera marina*)	20-35	MLW to -2 m	<50	Spring (North) Fall (South)	Combination (silt, clay, sand) or cohesive (silt, clay)	Very good
	Widgeongrass (*Ruppia maritima*)	0-20	MLW to -2 m	<50	Spring	Combination or cohesive	Unknown
	Shoalgrass (*Halodule wrightii*)	20-40	MLW to -10 m	<50	Winter	Combination or cohesive	Good
Southeast and Gulf Coast*	Manateegrass (*Syringodium filiforme*)	20-40	MLW to -10 m	<50	Winter	Combination or cohesive	Fair
	Widgeongrass (*Ruppia maritima*)	0-20	MLW to -2 m	<50	Winter	Combination or cohesive	Unknown
Pacific Coast	Eelgrass (*Zostera marina*)	20-35	MLW to -2 m	<50	Spring	Combination or cohesive	Very Good

* Note that turtlegrass (*Thalassia testudinum*) is omitted for lack of adequate planting methodology.

OBTAINING PLANT MATERIALS: In most areas the choice of plant species will be dictated by geographic distribution and physical attributes of the site. In the Southeast Atlantic and on the Gulf coast where species distributions overlap, the choice may be based on predicted growth rates of transplants (Fonseca et al. 1983b, 1984) or wave and current reduction qualities (Table 1) (Fonseca et al. 1983a).

Material for transplanting should be obtained from healthy, well established donor beds of the desired species. Donor beds located in high current areas (>50 cm/sec) are likely to result in transplants with more rapid growth rates than transplants from beds in lower current areas. Seagrass sods should be cut from the donor bed and washed free of sediment (Fonseca, Kenworthy, and Thayer 1982), or shoots on adventitious runners (runners not below the sediment surface) should be hand harvested. Harvested material should be kept in well aerated seawater at ambient temperatures.

PREPARATION OF TRANSPLANTS: Transplants are made by isolating bunches of plants containing 6 to 15 shoots (depending on species). Each bunch should include terminal shoots, as these shoots are capable of producing runners. For transplant sites that experience a fair degree of wave and current activity, bunches must be anchored in the sediment. This can be done with "U-" or "L-" shaped anchors made from pieces of wire (cut-up coat hangers are good) approximately 20 cm in length. It is recommended that seagrass shoots be attached to anchors by wrapping the shoots and anchor with a paper collar and binding with a twist tie (Figure 2).

PLANTING: Prepared transplants are brought to the field in storage containers suitable for keeping the plants submerged or wet (buckets, plastic trash barrels, etc.). Transplants are planted in a grid fashion by waders or divers. Using a grid design ensures that the area of concern will be evenly covered and, as the transplants grow and spread, that complete coverage will occur. Grid spacing is dependent on current conditions, species, and desired time to coverage (Fonseca et al. 1982, 1983b).

LABOR: Labor requirements using these methods range from <100 man-hours per acre to 200 man-hours per acre. Labor estimates for fiber mesh and core methods range from 300 to 4000 man-hours per acre.

ADDITIONAL INFORMATION: Contact Dr. Tom Fredette of the Coastal Ecology Group, Environmental Laboratory, at (601) 634-3891 (FTS 542-3891).

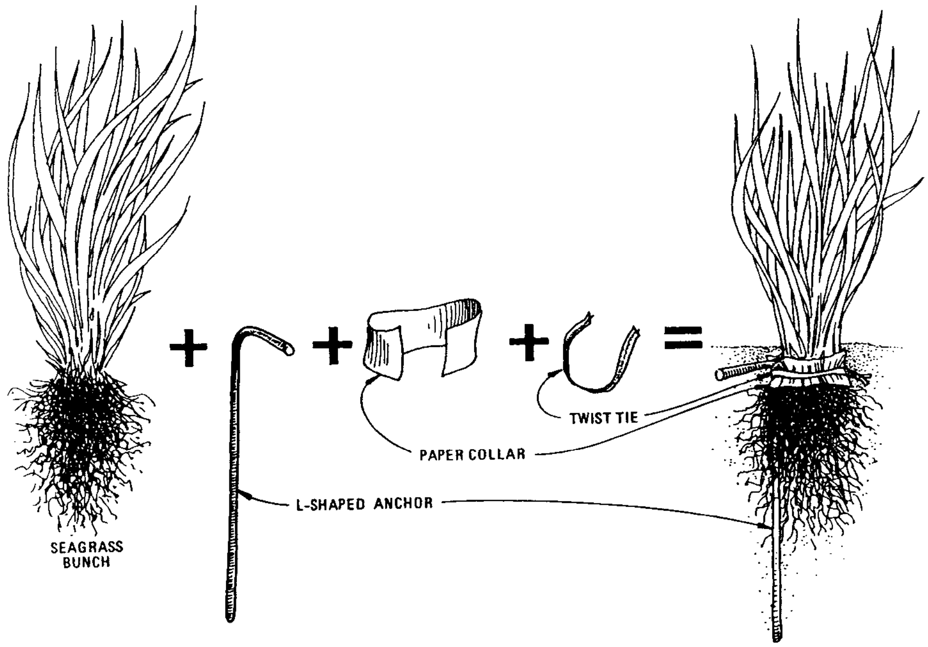

Figure 2. Steps for Anchoring Seagrass

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