RESEARCH PAYS OFF

Salt Marsh Restored

When the F. J. Torras Causeway connecting St. Simons Island to the mainland near Brunswick, Georgia, required widening from a two-lane to a four-lane highway, it was realized that the construction would require some filling of the adjacent salt marsh. Part of the impact mitigation package for the project involved restoration of several unvegetated spoil sites paralleling the causeway to a smooth cordgrass (*Spartina alterniflora Loisel*) marsh. These spoil sites were remnants of fill material from the original construction undertaken in 1950.

Amphibious rotary ditcher used in mosquito control can simultaneously traverse and ditch salt marshes.

Problem

Tidal frequency and duration, particularly the retention time of standing water after high tide, can influence the productivity of a salt marsh. Standing water can reduce the availability of oxygen to plant roots and rhizomes, but even more devastating, soil salinity may increase as a result of evaporation. The most widely accepted method of stimulating growth in these kinds of marshes, therefore, is to reduce elevations and increase the frequency and flushing of tidal inundations.

In the past, excavation of the top layer of soil with subsequent establishment of vegetation, backhoe channelization, or a combination of the two have been used. Both excavation and backhoe channelization usually require large earth-moving equipment, earth mats, and access to the restoration area, with resulting traffic problems. Highly productive marshes that are adjacent to the restoration site are often damaged by equipment during excavation and removal of soil. In addition, disposal of excavated material is usually difficult. An upland disposal site must be located and acquired for spoil disposal or the spoil must be deposited elsewhere in the marsh.

Recognizing these potential problems, the Georgia Department of Transporta-

tion, in cooperation with the Federal Highway Administration, initiated a study of restoration techniques. The study, which was conducted by Georgia State University, explored the use of a different restoration technique to increase the frequency of tidal flooding and decrease the retention time following a high-tide cycle.

Rhizomatous growth indicator plot, April 1986.

Rhizomatous growth indicator plot, December 1988.

Solution

The Mosquito Control Departments of both Glynn and Chatham Counties had employed an innovative method of ditching mosquito breeding areas by using an "amphibious" rotary ditcher. This device can simultaneously traverse and ditch areas of unstable substrates such as salt marshes. Over several years, both mosquito control departments noted not only a reduction in mosquitoes at recently ditched sites, but also enhanced growth of salt marsh vegetation.

The rotary ditching technique was tried in an experiment along the Torras Causeway to determine whether the damaged areas could be restored. An amphibious rotary ditcher owned by the Glynn County Mosquito Control Department was used to construct approximately 3,000 feet of channels at one of the spoil sites along the causeway. The discharge was dispersed evenly to either side of the ditcher onto the marsh, eliminating the need for an upland disposal site.

An unchannelized comparison site was set up to determine the degree of restoration achieved. Study results show no permanent damage from the sidecast material and indicate that the discharge may have enhanced the smooth cordgrass on either side of the channel. Random sampling of harvested smooth cordgrass shows that it more than doubled between 1986 and 1988. Fiddler crab burrows also increased by a similar amount. The channelized site not only increased tidal frequency and duration, but also reduced standing water and improved soil drainage after tidal cycles. Aerial photography revealed a 58 percent increase in the vegetated area on the channelized site after only two years.

Application

Rotary ditching is ideally suited for the long, narrow, bare areas along the Torras Causeway. The technique is far more suitable for partially vegetated areas than other marsh restoration methods. The appropriate regulatory agencies have approved the use of this technique to restore 9.5 acres required by the impact mitigation strategy for the Torras Causeway. Expansion of the causeway should begin in early 1990. Rotary ditching is expected to be even more successful at the remaining sites because of better access to tidal rivers.

Benefits

The research study cost $16,600, but the anticipated savings from implementing the results are much greater. The usual method of excavating the soil, removing it from the site, and sprigging smooth cordgrass is estimated to cost $350,000 for the 9.5 acres involved. The rotary ditching technique is estimated to cost only $25,000 for the same area. As a result of the savings realized on this construction project, the Georgia Department of Transportation is considering using rotary ditching on other similar projects.

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Suggestions for "Research Pays Off" articles are welcome.

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