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Pierce Marsh

from **Engineering With Nature: An Atlas, Volume 2.**

by **US Army Engineer Research and Development Center**

Hitchcock, Texas, United States

Restoring eroded marsh in the Gulf Intracoastal Waterway. The entire Pierce Marsh complex covers approximately 971 hectares and includes low marsh, shallow open water, and salt prairie. The marsh has a diverse ecosystem of marine invertebrates, fish, and numerous species of migratory and local birds, providing multiple ecological niches for coastal species. However, subsidence, freshwater intrusion, and erosion have led to habitat degradation of coastal prairie into intertidal marsh or open water. The Galveston Bay Foundation and other organizations have led intertidal wetland restoration efforts within Pierce Marsh since 1999 to address this. In 2016, the U.S. Army Corps of Engineers (USACE)–Galveston District in conjunction with their partners restored 32 hectares of the selected 49-hectare marsh section. The project took 150,000 cubic meters of unconsolidated fine material from routine maintenance dredging of the Gulf Intracoastal Waterway and used it to reduce erosion and raise Pierce Marsh to its target elevation of 1 meter. The project team restored valuable habitat at the site and used airboats to reseed the area with native vegetation. Since 2016, the Galveston District and their partners have continued

restoring Pierce Marsh's intertidal march complexes by beneficially using dredged sediment from nearby navigation projects while avoiding impacts to local wildlife.

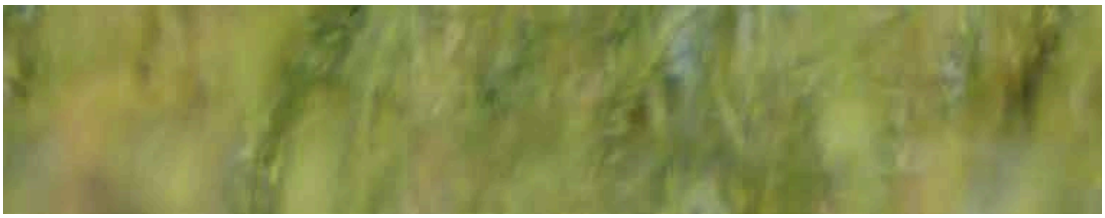
Article Cover: Pierce Marsh after restoration. (Photo by USACE Galveston District)

Producing Efficiencies

Silts and soft clays, also known as fines, are the most common material excavated in maintenance dredging in this reach of the Gulf Intracoastal Waterway. The material is ideal for beneficial-use projects that restore eroded habitat. Therefore, the Pierce Marsh project took advantage of this plentiful resource to elevate the marsh and restore habitat for colonial nesting birds and native vegetation. By using engineered perimeter berms and grade control markers, the team contained the dredged sediment in target areas while avoiding previously restored sections of the marsh. Now the coastal marsh can provide its own natural engineering benefits, such as protection against storm surge.

Using Natural Processes

Raising the elevation of targeted sections of Pierce Marsh by using engineered berms and the sediment removed from the federal navigation channel via cutterhead dredge reduced marsh erosion without permanently altering the ecological conditions. The Natural Resources Conservation Service's seeding operation helped to reestablish vegetation impacted by the restoration effort and restored resources in the marsh, providing a habitat to encourage the growth and return of native birds, fish, and invertebrates. Further, the intertidal marsh vegetation planted will filter pollution and act as a natural buffer to reduce future erosion.



Roseate spoonbills (Platalea ajaja) and laughing gulls (Leucophaeus atricilla) using the marsh. (Photo by Galveston Bay Foundation)

Broadening Benefits

Coastal marshes provide a wide range of environmental and economic benefits, including improved water quality, a buffer from erosion and rising sea levels, and increased property values in surrounding communities. They safeguard against extreme weather and provide foraging sites for local and migrating birds. Additionally, the increased biodiversity leads to increased tourism and interest, providing an opportunity to educate people on the value of marsh restoration and preservation. For example, over the years, hundreds of community volunteers have participated in hands-on restoration of Pierce Marsh at events such as Marsh Mania.

Dredged sediment being pumped into the marsh.
(Photo by Galveston Bay Foundation)

Promoting Collaboration

The Galveston District worked closely with its partners—the National Oceanic and Atmospheric Administration, the Department of the Interior's Natural Resource Damage Assessment and Restoration Program, the Natural Resources Conservation Service, the U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, the Texas General Land Office, the Texas Commission on Environmental Quality, Ducks Unlimited, and the Galveston Bay Foundation—to coordinate the dredging and transport of dredged sediment to restore sections of Pierce Marsh. This partnership will continue as the team replenishes Pierce Marsh and restores other sections in future projects.

American avocet (Recurvirostra americana) using the restored Pierce Marsh.
(Photo by Galveston Bay Foundation)

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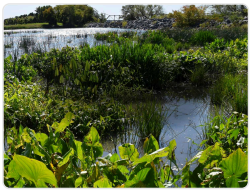

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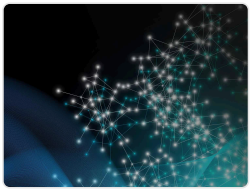

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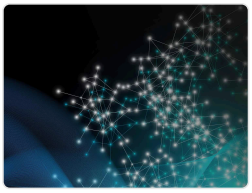

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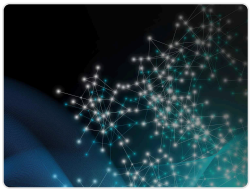

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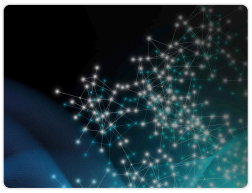

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