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# Drake Wilson Island



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

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



Apalachicola, Florida, United States

Pioneering the beneficial use of dredged sediment for more than 40 years. In 1976, the U.S. Army Corps of Engineers–Mobile District established a 5-hectare marsh on Drake Wilson Island off the coast of Florida in the Gulf of Mexico, one of the earliest dredged sediment habitat improvement projects in the U.S. The created marsh provided a valuable habitat and prevented erosion into the adjacent navigation channel in an area subject to long wind fetches and strong currents. Previously an unmanaged, low-habitat-value, dredged sediment placement site composed of sandy dredged sediment deposits, the island has since become a thriving marsh habitat for native wildlife. The project team constructed the marsh in two phases using hydraulically pumped material derived from the adjacent navigation channel; and by 1982, the native plantings placed during construction completely covered the island. Meanwhile, as planned, natural events breached the dike in several places, providing intertidal flow. The most recent series of observations, in 2019, documented several diverse habitats on the island: natural sand deposits, pine woodlands, and high-quality marsh habitat. The island now provides forage and nesting sites for a variety of species, including least terns, clapper rail, willet, great blue heron, marsh wren, boat-tailed grackle, bald eagles, brown-headed nuthatches, and osprey.

Article Cover: Great blue heron surveying the marsh. (Photo by Nathan Beane, U.S. Army Engineer Research and Development Center [ERDC])

## Producing Efficiencies

In 1976, little information was available regarding appropriate techniques to design and construct wetlands. Though starting with engineered features, including a dike to contain the dredged sediment during marsh establishment and a weir system to maintain tidal exchange, the project team then allowed natural processes to take over. The successful weir, experimental planting techniques, and the development of appropriate elevation gradients all helped guide future efforts. Monitoring data from the 1970s and 1980s and again in 2019 provides a unique opportunity to evaluate project success and ecological trajectory over extended time scales.

## Using Natural Processes

Once established, the created marsh was subject to natural processes, which degraded the dike and weir system, allowing for natural patterns of tidal exchange. Storm events introduced additional sediments, and recruitment of 17 native plant species has led to widespread vegetation. The site now exhibits low marsh habitat dominated by sturdy bulrush (*Bolbochoenus robustus*) and smooth cordgrass (*Sporobolus alternifolus*), high marsh dominated by black needlerush (*Juncus roemerianus*), and xeric slash pine (*Pinus elliottii*) hammock communities across an elevation gradient established during construction.





Researchers monitoring conditions 43 years after construction.

Photo by Nathan Beane, ERDC

## Broadening Benefits

More than 40 years after its creation, the marsh at Drake Wilson Island is a valuable habitat and is now home to more than thirty species of birds, such as the great blue heron (*Ardea herodias*). While supporting habitat growth, the marsh and nearby areas provide recreational opportunities, such as camping, wildlife watching, and recreational fishing. Additionally, the location of the marsh, adjacent to Two-Mile Channel, decreases erosive forces in the area, improving navigation and decreasing dredging maintenance requirements.



Organic matter accumulating in the soil of the created marsh.

Photo by Nathan Beane, ERDC





Intertidal exchange with Apalachicola Bay after the planned erosion of the earthen dike.

Photo by Nathan Beane, ERDC

## Promoting Collaboration

The Mobile District partnered with the Dredged Material Research Program for the initial construction and implementation of Drake Wilson Island. The long-term monitoring continued through the Dredged Material Research Program as well as the Environmental Effects of Dredging Program, the Dredging Operations Technical Support Program, the Dredging Operations and Environmental Research Program, and the Engineering With Nature Initiative. The projects' decades-long span highlights the need to adequately document the design, construction, and monitoring aspects. This allows future studies to build on previous research and to capture the true life-cycle benefits of the restoration.



Dense low and high marsh precedes pine forests at higher elevations.

Photo by Nathan Beane, ERDC



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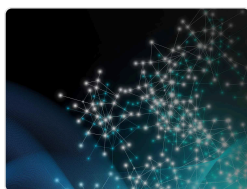
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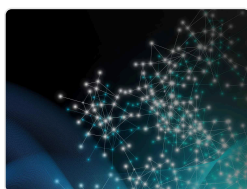
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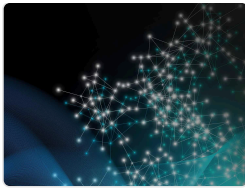
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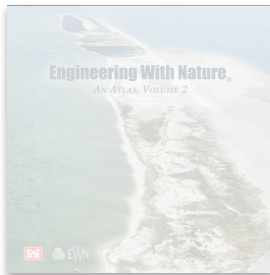
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