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# Mordecai Island Restoration



from **Engineering With Nature: An Atlas, Volume 1.**

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



## Barnegat Bay, Ocean County, New Jersey, United States

In 2015, the U.S. Army Corps of Engineers (USACE) Philadelphia District (NAP) and a contractor, Barnegat Bay Dredging Company of Harvey Cedars, implemented an Engineering With Nature coastal restoration project on Mordecai Island, New Jersey. The purpose of the project was to fill in an erosional cut that separated the north end of the island from its main portion. The team dredged New Jersey Intracoastal Waterway (NJIWW) shoals and used the material beneficially as thin-layer placement to fill in the Mordecai Island marshland. The island contributes to a diversity of sea- and birdlife by providing a variety of habitats, such as open marsh, exposed mud flats, and eelgrass beds; additionally, the island protects the Back Bay areas of Long Beach Island, contributing significantly to local coastal resiliency.

Article cover: The USACE Philadelphia District completed dredging and placement operations in 2015 at Mordecai Island near Long Beach Island, NJ. USACE worked with the state and several nonprofit organizations to dredge material from the federal channel of the New Jersey Intracoastal

Waterway and beneficially use it to restore sections of the marsh. (Photo by USACE Philadelphia District)

## Producing Efficiencies

Repurposing clean dredged material from the NJIWW off the western shore of Mordecai Island, USACE NAP placed sediment to elevate the eroded subtidal marsh to an emergent habitat. Placing the material on Mordecai Island reduced the distance for pumping—reducing costs associated with time and fuel—and maintained capacity in confined disposal facilities (CDFs), where less pristine material could potentially be placed. The project also took advantage of innovations in material placement by targeting the discharge pipe at specific areas of the island that had been severely impacted by historical erosion. This project advanced our knowledge of thin-layer placement techniques, which offer an efficient mechanism for targeting the placement of dredged material.

## Using Natural Processes

Areas impacted by erosion were restored to elevations that were comparable to pristine areas of the island. Multiple shoreline stabilization strategies have also been employed around the island, including the planting of marsh grass and the addition of bio-logs seeded with mussels. The plants help to stabilize the newly placed, dredged material; they also increased the biodiversity and function of the marsh area by reestablishing the ecosystem and providing added connectivity. With the island sections reconnected, additional wave attenuation was also afforded a coastal community that is immediately adjacent to Barnegat Bay: Beach Haven, New Jersey.





Marsh vegetation was planted to stabilize newly placed materials while enhancing ecological functions.

(Photo by USACE Philadelphia District)

## Broadening Benefits

Economic benefits include the placement of material on Mordecai Island, an effort that reduced the distance for pumping, as well as any costs associated with time and fuel. The effort also maintained capacity in CDFs, where less pristine material could potentially be placed. Environmentally, reestablishing the island and its vegetation increased the primary productivity of the bay system. Areas of sand were also created that offer bird-nesting habitat, including for diamond back terrapins and locally threatened black skimmers. From a social standpoint, the local communities are able to recreate around the island on small boats and bird watch. A local marina is also now protected from wave action and boat traffic that can be found on the Atlantic Intracoastal Waterway (opposite side of Mordecai Island from the Marina area).





The USACE Philadelphia District and its contractor, Barnegat Bay Dredging Company, conduct dredging operations and marsh restoration at Mordecai Island, NJ, in 2015. USACE is dredging critical shoals from the New Jersey Intracoastal Waterway and using the material to restore a portion of Mordecai Island marshland.

(Photo by USACE Philadelphia District)

## Promoting Collaboration

In addition to NAP, the project team included nonfederal sponsor and property owner, Mordecai Land Trust; non-federal sponsor, New Jersey Department of Environmental Protection; and stakeholders, Little Egg Harbor Yacht Club and U.S. Fish and Wildlife Service. The team developed the best solution to reduce erosion given the high-energy environment while making the best use of limited funds and resources to achieve the primary project goal and limiting impacts to present and future wildlife habitat.



Upon completion of placement of dredged material, the north end is now reconnected to the main portion of the island, contributing significantly to coastal resiliency.

(Photo by USACE Philadelphia District)



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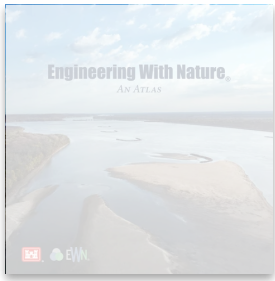


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