



# Seven Mile Island Innovation Lab

## Gull Island Restoration

### Overview

In spring 2019, the U.S. Army Corps of Engineers Philadelphia District (USACE-NAP) partnered with the State of New Jersey, The Wetlands Institute, and the USACE Engineer Research and Development Center to create the Seven Mile Island Innovation Laboratory (SMIIL). The initiative is designed to advance and improve dredging and marsh restoration techniques in coastal New Jersey through innovative research, collaboration, knowledge sharing and practical application.

The project restored and enhanced the Gull Island complex through placement of material dredged from the NJ Intracoastal Waterway (NJIWW), builds upon the success of several beneficial use projects in coastal New Jersey, and tests several new ecological restoration and creation tools and techniques.



Low-lying Gull Island is a drowning marsh island with isolated high marsh areas that are the result of historic dredged material placement. These remnant high marsh areas support important wading bird colonies. Sea level rise is contributing to marsh loss, which in turn threatens long-legged wading bird colonies.

### Site Description and Project Need

Gull Island is located in Cape May County and is part of the Cape May Wetlands Wildlife Management Area, owned and managed by the New Jersey Division of Fish and Wildlife. The 287-acre marsh island now lies almost entirely below mean high water. The only remaining high marsh areas on the island are the result of historic dredged material placement from the NJIWW. These remnant high marsh areas support wading bird colonies that account for nearly 1/3 of nesting activity in the state of New Jersey.

The innovative placement techniques used to enhance Gull Island were designed to improve island resilience through a series of beneficial use placements that will a) enhance and fortify marsh elevation, b) restore unvegetated marsh interior mud flats to low marsh habitat, c) create high marsh areas suitable for salt marsh sparrow and wading bird colonies, d) reduce marsh edge erosion, and e) enhance tidal flats and shallows for submerged aquatic vegetation and fish habitat.

Seven Mile Island Innovation Lab, A Partnership between the [U.S. Army Corps of Engineers](#), the State of New Jersey, and [The Wetlands Institute](#)

## Construction Details

The USACE Philadelphia District contracted with Barnegat Bay Dredging Company of Harvey Cedars, N.J. to dredge approximately 40,000 cubic yards of sediment from a critical shoal in the NJIWW federal channel, using the Dredge Fullerton. The mixed fine sand and muddy sediment was hydraulically pumped to two different placement areas utilizing a network of pipelines and a Y-valve setup. Materials pumped freely onto the main Gull Island placement area resulted in the uplift of a 20-acre area of low marsh and unvegetated mud flat to more resilient marsh elevations. Tidal flooding naturally distributed sediments across portions of the marsh platform and transported materials to the southern and eastern island margins, extending and shallowing intertidal mud flats. Dredged material was directly placed along southern Gull Island and successfully built a sandy marsh-edge bar that reestablished a more natural marsh edge providing protection along an eroding marsh edge.

## Ecological Impact

Dredged material was used beneficially to create a habitat mosaic of supratidal to high marsh habitats that mimics the current marsh configuration but at higher overall elevations. Target elevations for dredged material placement ranged from +3.5' NAVD88 to support vegetation suitable for nesting habitat for long-legged wading birds while resultant surrounding lower elevation areas provide high marsh habitat that can help build marsh platform resilience and create conditions suitable for recolonization of unvegetated areas by *Spartina alterniflora*. A marsh-edge bar reestablished a more natural margin attenuating both storm-derived and boat-wake generated waves. Areas of tidal flat were successfully shallowed to above Mean Lower Low Water to benchmark depths for the establishment of macroalgal flats.



Gull Island direct placement area elevated the marsh to vegetation elevation benchmarks for shrub habitat suitable for wading bird nesting (+3.9' NAVD88). Elevations transition to vegetation benchmarks of high marsh vegetation. The large unvegetated interior mud flat was below the vegetation benchmark for *Spartina alterniflora*. Infilling has raised elevations over a large portion of the flat to low marsh benchmark elevations (2.2-2.6').

## Monitoring and Assessment

USACE Philadelphia District, USACE ERDC, and The Wetlands Institute documented pre-placement conditions. Material placement methodologies and outcomes were monitored throughout the construction phase and monitoring is ongoing for placement evolution, elevation changes, vegetation stabilization, avian usage, and benthic community response and recovery. Future maintenance dredging efforts will continue to employ Regional Sediment Management and Engineering with Nature best practices to innovatively utilize sediments on the Gull Island complex.