



# Seven Mile Island Living Lab Sturgeon Island Restoration

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## Overview

In Fall 2020, the U.S. Army Corps of Engineers (USACE) Philadelphia District partnered with the State of New Jersey, The Wetlands Institute (TWI), and the USACE Engineer Research and Development Center (ERDC) to implement innovative beneficial use projects within the Seven Mile Island Innovation Laboratory (SMIIL). Phase One of the Sturgeon Island Restoration Project is designed to test new approaches to increasing island elevation to preserve and enhance a critical wading bird nesting colony, test innovative dredged material management approaches, and gain knowledge for the design of Phase Two material placement at Sturgeon Island and inform design for a Gull Island project.

SMIIL continues to advance Engineering with Nature principles while developing systems-based solutions that build upon the successful completion of recent dredging and marsh restoration projects in the backbays of coastal New Jersey. This factsheet covers work at Sturgeon Island, Cape May County, NJ between January and March 2020.



The Dredge Fullerton, owned and operated by Barnegat Bay Dredging Company, was used to dredge mud and fine sand from the New Jersey Intracoastal Waterway and pump material to raise island elevation to stabilize the marsh island and create wading bird habitat.

## Site Description, Significance, and Ecological Goals

Sturgeon Island is a 13.5 acre marsh island owned by The Wetlands Institute. It, along with adjacent Gull Island, are marsh islands that received material from New Jersey Intracoastal Waterway dredging operations prior to 1970. Vegetation growth on these previous dredge placement sites provides habitat for many colonial nesting bird species. Data collected by New Jersey Division of Fish & Wildlife and TWI showed that more than 25 percent of the wading birds in the state are nesting on these two islands. Seven species of wading birds nest on these islands (Glossy Ibis, Little Blue Heron, Snowy Egret, Tricolored Heron, Great Egret, Black-crowned Night-Heron) and almost all are considered priority Species of Greatest Conservation Need and the Night-Heron is a state threatened species.



Over the past several years, habitat suitability and availability has declined at Sturgeon Island as evidenced by decreasing areas of *Iva* shrub habitat (favored nesting sites), declining nest success, and the loss of one nesting species from the island. Low marsh and open pool areas (<2.0' NAVD88) on the north portion of Sturgeon Island, that were not being utilized for nesting, were selected for elevation enhancement with a goal of building to elevations suitable for *Iva* colonization (3.5' NAVD88) and to allow nest elevations to be above most storm flood elevations without impacting the nesting colony.

U.S. Army Corps of Engineers – Philadelphia District

<https://www.nap.usace.army.mil/Missions/Civil-Works/Coastal-Dredging-Beneficial-Use/>

## Project Approach and Dredging Tool Development

Given the small island size and low island elevations, the project team developed and tested new approaches to material placement that aimed to a) develop material delivery systems that separate sand and fines, b) lengthen flow pathways to encourage material to settle out, c) use natural island elevation features to contain and direct dewatering flows, and d) develop methods of subtidal material placement.

The Philadelphia District contracted with Barnegat Bay Dredging Company to dredge sediment from a critical shoal in the federal channel of the Intracoastal Waterway. The *Dredge Fullerton* was used to dredge the fine sand and mud mixture, and hydraulically pump material to the island. The Philadelphia District collaborated with the contractor, TWI and ERDC scientists and engineers on the placement design. The layout and construction techniques included 1) an elevated pipe network with drainage ports, 2) a modified Y-valve system to split and redirect flows, 3) a spreader and nozzle to distribute dredge materials and 4) other elements intended to work with the natural site elevations and flow paths during construction including a 14" water-filled pipe to contain and redirect dewatering flows along the island length.



Sturgeon Island Proposed Phase I Project Areas (circles). Wading bird nesting is confined to the higher former fill area (light green) on the southern portion of the island. Dredge material placement targeted low areas and pools (larger circle) and the shallow subtidal flat on the northern and eastern edge of the island.



Northern portion of Sturgeon Island showing (1) elevated pipe distribution system; (2) Y-valve flow separator; (3) spreader system; and (4) elevation-controlling containment pipe.

## Monitoring and Research

The duration of construction and some monitoring activities were limited due to the late March 2020 timeframe. ERDC, NAP, and TWI worked to have a comprehensive pre-, during, and post-construction monitoring program in place. Pre-construction monitoring was completed as planned but some construction monitoring was abbreviated and post construction monitoring has been shifted to largely remote approaches. Monitoring parameters include island subsidence and material placement evolution work, turbidity monitoring, as-built surveying, and colonial nest bird monitoring.

Assessments are being utilized to evaluate dredge technology innovation effectiveness, and plan adaptive management approaches for Phase 2 construction to complete island elevation goals.