

# THE SEVEN MILE ISLAND INNOVATION LAB

## Cutting-Edge Research and Projects to Improve Dredging and Marsh Restoration Techniques

*Ring Island elevated nesting habitat.*

By Dr. Lenore Tedesco, Executive Director of The Wetlands Institute

Last spring, the Seven Mile Island Living Laboratory (SMILL) was launched in a partnership involving The Wetlands Institute, the U.S. Army Corps of Engineers (Philadelphia District), the USACE Engineer Research and Development Center, and the New Jersey Department of Environmental Protection. 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.

In December, it was upgraded to an innovation lab to reflect the expanding scale, importance, and reach of the program.

In the past, I have written about sea-level rise and the resulting changes to our marshes and the wildlife that depend on them. I have also periodically written about the beneficial use of dredged material as a tool to restore wetlands to help build resilience, and enhance habitat for marsh-nesting birds that are losing nesting areas to rising seas.

The Seven Mile Island Innovation Lab is a big step forward to formalize and organize these efforts – a step that is both nationally significant and is bringing innovative solutions to our area. The invest-



*Great Flats Elevated Nesting Habitat construction using sand dredged from the New Jersey Intracoastal Waterway.*

ments in SMILL are driving on-the-ground projects that bring direct benefits to our marshes, our communities, and the wildlife that we all value. This article provides an update on the lab's goals and efforts, and shares a few of the projects that have been built so far.

SMILL encompasses about 24 square miles of tidal marshes, coastal lagoons, tidal channels, and bays between the Middle Township mainland and the

barrier island communities of Stone Harbor and Avalon. The New Jersey Intracoastal Waterway (NJIWW), a federal channel maintained by the USACE, bisects the SMILL and is a major source of dredged sediment being used for project construction. The Wetlands Institute sits at the center of the laboratory's significant area of publicly managed lands (Cape May Wetlands Wildlife Management Area), provides an ideal base of op-

erations for scientists and practitioners, and houses important historical data sets.

SMILL efforts will enhance the science and engineering that supports dredging and placement practices in the region, the state, and the nation. SMILL goals focus on maintaining safe navigation channels while retaining dredged sediment in the system to benefit natural ecosystems and coastal communities. As an integral partner in the SMILL, The Wetlands Institute's efforts focus on using dredged materials to restore marshes, create and enhance habitats for at-risk species, and provide storm- and flood-risk reductions to area communities.

Engineering With Nature® (EWN) principles and practices serve as a strong foundation for SMILL. EWN is the alignment of natural and engineering processes to deliver economic, environmental, and social benefits. Several EWN initiatives have recently been pursued within the New Jersey back bays to develop sustainable water-dependent projects and resilient, nature-based storm/flood-risk reduction measures. SMILL is a key focus area for the development and implementation of these projects; to date, there have been four such projects with additional projects slated for construction this fall. These efforts include research

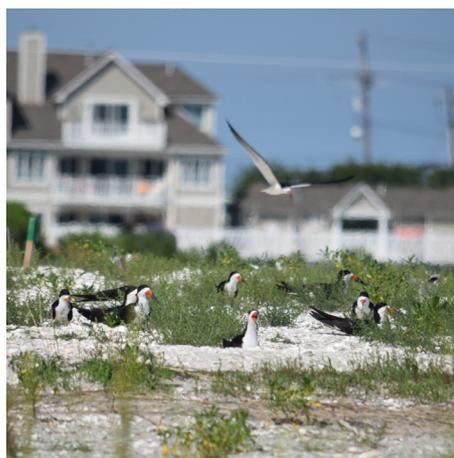
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and development investigations and the identification of opportunities to increase the amount of dredged sediment used beneficially within the system.

SMILL beneficial-use projects include a wetland-restoration project that utilized more than 50,000 cubic yards of muddy sediment to raise marsh elevation and fill expanding marsh pools over a 35-acre marsh island near Avalon. Constructed in 2015 and 2016, this was one of the first beneficial-use projects in New Jersey and was an important proof of concept project overseen by the NJDEP and funded with a post-Sandy resilience grant. Marsh grasses are gradually recolonizing the site, and ongoing monitoring and the commitment to tracking these projects is an important benefit of SMILL.

Two additional projects utilized sand dredged from the NJIWW to build elevated nesting habitats for colonial beach-nesting bird species. These include several state endangered and threatened species that are losing suitable nesting habitat to flooding, development, and recreational-use conflicts on area beaches. They include black skimmers, common and least terns, and American oystercatchers. One-acre sites were constructed on Ring Island and Great Flats, marsh islands near Stone Harbor, and



**Black skimmer colony at Ring Island constructed habitat.**

the plan is to construct a third habitat island in the next few years to complete a nesting habitat complex.

We are trying to develop system approaches that match repetitive dredging needs with ecological needs so that these projects are cost-effective, sustainable, and easier to implement. For these habitats, the birds like open, wind-swept sand with little vegetation, similar to their beach-front nesting areas like Stone Harbor Point. After a few years, the sandy habitat loses some of the elevation and vegetation starts to encroach, making it less desirable for these species.



**Great egret chicks nesting on island slated for restoration.**

This provides an opportunity for refurbishment with new sandy dredge material and with an island complex gives the USACE the appropriate number of sites to match the dredging needs to manage the shifting sand shoals that clog the channel near the Free Bridge and Nummy Island. The birds benefit, project design and planning is manageable, costs are reduced, and the channel can be maintained.

These sites have been very successful, with high numbers of nesting birds utilizing the Ring Island site, built in 2014 and refurbished in 2018. Great Flats, built

in 2019, is just beginning to be utilized by the birds. In addition to the target bird species, diamondback terrapins immediately found the sites and are benefiting from new nesting areas away from the dangers of roadways. Horseshoe crabs have been spawning on the sandy apron at Ring Island, and migratory shorebirds are benefiting from both constructed sites. These added wildlife benefits help replace habitat that has been lost.

In March, we were able to begin an elevation enhancement project on Sturgeon Island, a marsh island owned by The Wetlands Institute in Great Sound. The island hosts a wading bird nesting colony that has been utilizing the shrubby habitat created by dredge material placement prior to the 1970s. Sturgeon Island, along with neighboring Gull Island, are the nesting sites for more than one-quarter of the state's wading birds. These include many of our favorite marsh birds like great and snowy egrets, little blue and tricolored herons, and glossy ibis. Habitat degradation is resulting in decreased nesting success on Sturgeon Island, and portions of the island are also eroding.

Sturgeon Island is a test bed for the development of several new dredging and material placement tools. We successfully started restoring island eleva-



**Dredge material placement to restore Sturgeon Island.**

tion and learned a lot about the new tools that were tested. COVID-19 shut down that project prematurely, but work will continue at Sturgeon Island, and a new project is in the design phase for construction near Gull Island, both planned for this fall. The Gull Flat project aims to build underwater flats for enhanced fish habitat. These projects will help clear the shoaling that is impacting navigation in “the football field” area of the NJIWW behind Avalon.

These are exciting times for beneficial use and I am proud to be a co-project lead with my collaborators at the NJDEP and USACE. These projects are addressing the seminal issue of our time and The Wetlands Institute has, once again, been able to bring expertise and resources to our community. Stay tuned and look for more information about these projects and opportunities to see them first-hand.





## A DIFFERENT SUMMER

COVID-19 has dramatically impacted operations at The Wetlands Institute, requiring it to temporarily close and cancel many of its programs and special events. But it will pass, and the institute’s staffers are all working to ensure that they can welcome you back safely when it does. In the meantime, you can connect with them through their marsh cams ([wetlandsinstitute.org/visit-us/livecams/](http://wetlandsinstitute.org/visit-us/livecams/)) and the Wetlands Connection web gallery ([wetlandsinstitute.org/wetlandsconnection/](http://wetlandsinstitute.org/wetlandsconnection/)).

COVID-19 has also required The Wetlands Institute to adjust how it conducts its conservation work – but it has not stopped the need for it. Nature carries on, and wildlife still needs protection. During this challenging time, you can support the institute through its adoption programs. Donations are used to fund critical research and conservation work for at-risk species like American oystercatchers, diamondback terrapins, and horseshoe crabs.



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**a Terrapin**



*Adopt*  
**a Horseshoe Crab**



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