



## TEAMING UP TO SAVE OUR MARSHES ... *While There is Still Time*

Gull Island  
A. Marsh edge protection berm  
B. Marsh elevation enhancement

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

**A**s a geologist, my perception of time normally takes an incredibly long view, and so I study marsh landscapes through a lens of eons and millennia – and beyond. I often write about the changes to our ecosystems and how those changes affect our coastal communities and the wildlife that visit or make their homes here. For the past several years, these changes have been accelerating, with the onslaught of rapidly rising seas at the forefront of the issues affecting our beaches, our island communities, and the entire back-bay system.

Make no mistake: Change isn't coming, it's here ... and happening fast. You can see it in the notable increase in flooding of bayside streets on sunny days; in the never-ending cycle of eroding beaches; in the number of days each month that the marshes are underwater. These are all visual reminders that sea level has risen, and this is a major concern for the entire Jersey Shore.

New Jersey is experiencing rates of sea-level rise that are more than twice the national average, and this has a severe impact on our coastline and coastal wetlands. Seas are rising faster than our marshes can keep pace, marshes are flooding too frequently for marsh-nesting birds to successfully nest and rear their young, and some marshes are drowning and converting to tidal mud flats.

This raises critical questions about the changing roles of the wetlands for storm protection and as a life-support system for fisheries and migratory birds. Without intervention, our marshes, beaches, and the back bay itself will be dramatically different. Some published estimates anticipate 87% marsh loss by 2100. The Wetlands Institute works every day to understand how these changes affect our coastal marshes and beaches and how the wildlife that depend on those areas adapt. Understanding is only the first step, though. Making a difference requires action.

In 2019, TWI partnered with the U.S. Army Corp of Engineers and the New Jersey Department of Environmental Protection and created the Seven Mile Island Innovation Lab so that we could act. The SMILL is designed to advance and improve dredging and marsh restoration techniques in coastal New Jersey through innovative research, collaboration, knowledge sharing, and practical application. We are working to develop and implement projects to help our marshes mitigate some of the effects of sea-level rise and rebuild lost wildlife habitat.

Since the founding of the SMILL, together we have successfully implemented eight marsh-restoration, marsh-protection, and habitat-design projects. These projects beneficially use clean dredged material from the New Jersey Intracoastal Waterway as a tool to restore wetlands, slow wetland loss, and create or enhance habitat for wildlife either in danger or in the process of losing it. Sediment is a critical asset to marshes, and a key tenet of ben-



Restored area immediately after sediment placement.



Two years post-placement with marsh grass recovery.

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*I wonder if the snow loves the trees and fields, that it kisses them so gently? And then it covers them up snug, ...*

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Gull Island sediment placement.



Migratory shorebirds in new placement area of Gull Island.



A scientist monitoring nests on Gull Island.

official-use projects is to keep this sediment in the system – while using a combination of engineering and natural processes to enrich and protect marshes. This relatively new approach involves developing engineering tools, understanding the environmental needs of the marshes and their response to interventions, and creating a new regulatory framework to permit the activities. To date, more than 60 acres of marshes have received treatment.

In March 2020, SMIIIL partners began an elevation-enhancement project on Sturgeon Island, a marsh island in Great Sound owned by TWI. 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 and neighboring Gull

Island are the nesting sites for more than one-quarter of the state's wading birds, including 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, and both islands are drowning. Projections based on current climate-change models show that, without active intervention, vast portions of northern Sturgeon Island and southern Gull Island will revert to tidal mud flat and open water within 20 years.

We used Sturgeon Island as a test bed for the development of several dredging and material placement tools that we then implemented in fall 2021, when work resumed at both Sturgeon and Gull islands. The Gull Island project enhanced marsh resilience through ele-

vation enhancement, restored portions of the island that had gotten so low that marsh grass could no longer be found there, and created sandy marsh edge protection features – an experimental approach to try to prevent breaking waves (predominantly from boat wakes) from damaging the marsh edge. Nearly 65,000 cubic yards of clean dredged material was used to enhance more than 30 acres of marsh, helping clear the shoaling that is affecting navigation in the “football field” area of the NJIWW behind Avalon in the process. After two years of monitoring, results have been excellent.

The marsh edge berm remains well-defined and is effectively intercepting boat-wake waves. Studies have shown that bottom-dwelling plants and animals quickly



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\*\*44 MILLION VISITORS PER MONTH\*\*



SCAN ME

... you know with a white quilt; and perhaps it says, go to sleep darlings, till the summer comes again. ~ Lewis Carroll



inhabited the newly placed sediment, alleviating concerns related to possible long-term impacts. The marsh platform at both Gull and Sturgeon islands was raised up to 3 feet in some areas, reversing marsh loss in progress and restoring areas where loss had already occurred back up to suitable elevations for recovery. Marsh grasses are naturally growing on the dredged materials, increasing marsh area and also ensuring the marshes can last for decades to come. Areas of the islands that persist as tidal flats have been shallowed and are now hosting thousands of migratory shorebirds as they feed and rest. These results are exciting, and they show the value of beneficial-use projects and have the potential to create a sea change for our marshes and the wildlife that depend on them.

Today, more than 30 scientists and engineers are working on projects right here in the back bays of Seven Mile Island. Together we are creating and testing these necessary new tools and techniques for marsh restoration, evaluating their effectiveness, and quickly and

widely sharing what we learn so that this work can be put to use worldwide. Research and conservation projects pioneered in the SMILL are providing information to scientists, coastal-restoration practitioners, natural-resource managers, state and federal permitting agencies, and local municipalities to enable the more widespread adoption and use of these tools over time frames and scales that can make a difference.

These are exciting times for the advancement of beneficial use and I am proud to be a co-project lead with my collaborators at the NJDEP and USACE. This is by far the most impactful work I have had the privilege of being a part of. SMILL is internationally recognized as a leader in the development of these important techniques, and is addressing the seminal issue of our time. The Wetlands Institute is extremely pleased to take on a leadership role studying, preserving, and conserving these marshes and coastal ecosystems now and well into the future. To learn more, visit [wetlandsinstitute.org/smill](http://wetlandsinstitute.org/smill).



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