

The Day

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Rescuing Rocky Neck's endangered marsh

[By Theresa Sullivan Barger](#)
[Special to The Day](#)

East Lyme — Salt marshes capture more carbon per square foot than rain forests. They act as sponges to absorb the intense rainfall more common with climate change. And they clean the polluted water that passes through the marsh on the way to Long Island Sound. Healthy salt marshes and estuaries also serve as spawning grounds for fish and vital habitats for a variety of insects and birds.

But is it worth millions to study how to restore an imperiled estuary and salt marsh at Rocky Neck State Park?

“A salt marsh ecosystem is one of the most productive ecosystems on the planet. The biodiversity and carbon sequestration are unparalleled with most of the ecosystems found on this planet,” said Min T. Huang, migratory bird program leader with the state Department of Energy and Environmental Protection (DEEP).

The Nature Conservancy, a global environmental nonprofit, has received a \$4 million grant from the federal National Oceanic and Atmospheric Administration (NOAA) under the federal Bipartisan Infrastructure Law and Inflation Reduction Act to study what has harmed the Bride Brook marsh’s health and what can be done to restore it.

Working with DEEP, The Nature Conservancy’s Connecticut office will spend the next three years researching how to best restore the marsh to improve tidal exchanges between Bride Brook tidal creek and Long Island Sound. Opening up the tidal flow so tidal waters can pass unencumbered through the estuary will improve the ecological health of the estuary and salt marsh so that river herring, or alewives can pass upstream to spawn.

“Fully functioning wetlands ecosystems can store floodwaters. They can store more carbon than any other ecosystem on the planet,” said Jessica Cañizares, director of coastal ecosystem projects for The Nature Conservancy in Connecticut.

Called ‘blue carbon ecosystems’, salt marshes, mangroves and eelgrass are “carbon sequestration powerhouses,” said Beth Lawrence, associate professor in the UConn Department

of Natural Resources and the Environment. Carbon sequestration is the process of capturing, securing and storing carbon dioxide from the atmosphere.

“Per unit area, salt marshes are incredibly efficient at taking up carbon dioxide out of the atmosphere and turning it into plant biomass. Much of that biomass is then added to the soil, where it is stored long-term, as soil carbon, because decomposition rates are very slow,” said Lawrence, who researches plant ecology, restoration and carbon and nutrient cycling in wetland ecosystems.

Restoring salt marshes provides a way to buffer against climate change. “We don’t have that many salt marshes left. They only occur along coastlines,” she said, so it’s vital to “expand and restore the degraded ones.”

Drowning in water

Salt marshes provide a specialized habitat for birds and other wildlife. Today, the 82 acres of marshland surrounding Rocky Neck State Park may look vibrant because visitors can see osprey, ducks, fish and crab feeding in the pools of open water, Cañizares said. Instead of appearing as if it’s drowning in too much water, a salt marsh should have fairly defined creeks with marsh grasses around it.

The land around the marsh has been modified since 1851, when the railway bridge was installed, Cañizares said. Other modifications that have disrupted the system’s natural state, restricted fish passage and contributed to the loss of marsh plants and animals include two road crossings and two pedestrian boardwalks.

These alterations, including directing the estuary to Long Island Sound through twin concrete pipes under the beach, have hindered tidal waters’ ability to flow in and out of the marsh, she said. Sediment has built up to an unhealthy level.

“There were profound consequences. That’s where you can see significant degradation,” she said. Efforts have been made in the past to address the problem. For example, in 2009, Save the Sound led a project funded by NOAA to replace the buried pipes with large, box-shaped culverts; that was an important step to allow the fish to move from Long Island Sound into the marsh system, Cañizares said.

“With that \$4 million, we’re hoping to come up with technical designs, permits and an adaptive management plan that basically will provide a blueprint long into the future beyond any single administration over a span of decades,” said Tim Clark, southeastern Connecticut project director for The Nature Conservancy. The Nature Conservancy plans to hire coastal hydrologists to identify the causes of the marsh’s degradation and recommend a host of solutions. The team will seek further grants to implement the plan.

Some of the many causes that contributed to the marsh’s degradation are global influences like sea level rise and local factors such as development, Clark said. Wastewater and runoff are

believed to be major contributors to the problems with the marsh, because they increase nitrogen into the estuary, which impacts the soil around the marsh grasses and makes the area more susceptible to erosion, Clark said.

Septic systems and stormwater runoff also introduce fecal bacteria and other pollution in the marsh's water systems, Cañizares said. "If you had a watercourse and a high level of run-off upstream, downstream it [water quality] is reduced," she said. "We do know the entire length of Bride Brook is impaired, meaning there is E.coli in the system."

Those involved in this marsh restoration effort are engaged in a large-scale conversation about why the marsh is getting a lot of open water, Clark said. "The majority of this project is to identify why we're losing marsh. That will subsequently inform the designs" to address the problem.

Clark, a landscape architect, will be involved in the development of the designs and he'll be working with a team that includes ecologists, engineers and hydrologists. There's a lot to be learned from this site; the solutions the team identifies can be applied to other compromised salt marshes with similar acidic soil conditions on the East Coast, he said. Up and down the East Coast, there are salt marshes behind transportation infrastructure such as railroad lines and roads.

Salt marsh habitats

"A healthy marsh, which acts as a storm buffer, contains a complex vegetative mix of low marsh and high marsh plant species; it supports a diverse collection of birds, including some birds only found in that environment," said Huang, from DEEP. Healthy salt marshes provide a critical habitat for several species, including the salt marsh sparrow which only breeds in a salt marsh. Once endemic to the Atlantic Coast, their populations have declined by more than 80%, according to Audubon Connecticut.

"Salt marshes in general are great places to see a diversity of species," Huang said. The canary in the coal mine analogy applies to the greater natural world, he said.

"When the birds aren't doing well, there's something amiss," he said. "We're seeing birds declining; insects are declining. That should wave a big red flag. The things we're doing to Mother Earth are not good."

Alewife, also called river herring, are a foundational species in the coastal food chain, Cañizares said. Alewife travel upstream from the Sound to spawn in fresh water. The marsh is a spawning area, nursery and foraging habitat for fish caught by recreational fishing enthusiasts in Long Island Sound and by commercial fishermen, she said. As one of the state's largest fish runs, it also serves flounder, sea robins, striped bass and blue fish.

In the state's own wildlife action plan, more than 100 species listed as having a conservation need use marsh ecosystems, Cañizares said. The marsh is also home to reptiles and insects that feed fish and birds; more than 230 species have been found in Rocky Neck State Park, she said.

If nothing is done to restore the salt marsh, "You will see the marsh converting to open water," Clark said. "You might have tufts of salt marsh grasses."

Public access & enjoyment

Since the marsh is part of Rocky Neck State Park, one of the state's most popular state parks with 600,000 annual visitors, The Nature Conservancy project involves looking at the park in its entirety, Clark said. Today, the people visiting Rocky Neck's beach rarely see the salt marsh, so part of the project's goal is to improve public access to the marsh.

"We're really thinking of how we can make the most of this asset we have. We also want to celebrate it to make sure birders and kids can enjoy it for what it is," he said. They are considering adding a boardwalk to provide environmental education opportunities so everyone can see the marsh, including people using wheelchairs and kids in strollers, Clark said.

Another goal of the project is improving equitable public access to Rocky Neck State Park, since it's one of the few ways the public can enjoy Long Island Sound, said Jeremy Hall, acting Parks Division director for DEEP. With the location of the Amtrak line, there's only one way in and out. DEEP is working with Amtrak to try to provide an additional entrance point, he said.

Some of the grant funds will be used to seek public comment and input and work with surrounding municipalities, Hall said. They hope to work with towns that are upland of Bride Brook to identify ways to protect the area from runoff and improve climate resilience, he said.

Lately, people visit the park to enjoy the beach, camp grounds and fish rather than exploring the marshlands, Hall said, because the marsh isn't what it used to be. While DEEP wants to continue to encourage all the existing recreational uses of Rocky Neck, the department also wants to restore an essential coastal natural resource.

"Any time we can work with federal agencies to implement changes and protect our marshlands," Hall said, "we want to do that."



University of Connecticut PhD Candidates Madeleine Meadows-McDonnell, studying Natural Resources and the Environment, left, and Franco Gigliotti, studying Ecology and Evolutionary Biology, collect samples in the Bride Book salt marsh at Rocky Neck State Park in East Lyme September 21, 2022. The students are working on an interdisciplinary project between different departments at UConn as well as Connecticut Sea Grant and the Connecticut Department of Energy and Environmental Protection researching restoration efforts to salt marshes across the state. (Sarah Gordon / The Day)



Aerial view of the marsh at Rocky Neck State Park in East Lyme on December 13, 2024. (Peter Huoppi/The Day)



A great egret gulps down its meal while hunting for food in the Bride Brook Salt Marsh at Rocky Neck State Park in East Lyme Monday, April 6, 2020. (Sean D. Elliot/The Day)