



MAGAZINE ARTICLES

On the Edge

By Jenny Rogers, Senior Editor & Writer, Nature Conservancy magazine | August 29, 2022

Fall 2022 Issue

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Photographs by George Steinmetz

On the southwestern edge of New Jersey, it's hard to tell where land ends and sea begins. Tidal marshland extends into the Delaware Bay, buffering nearby communities from the full strength of the tides. But that marsh is drowning. Since 1930, this stretch of land known as [Gandys Beach](#) has receded 500 feet. A healthy coastal habitat here could adapt to gradual environmental changes: As briny water rose it would kill off terrestrial shrubs at the water's edge, and marsh grasses would grow in their place. But roads and houses now lie so close to the coast here that the marsh has nowhere to go. It is stuck in place, and the water is rising faster than the grasses can keep up.

Similar scenes are playing out along the mid-Atlantic and northeastern U.S. coastline. Home to 40 million people, the area is densely built up, and natural barriers, like marshes or dunes, that can help protect property have often been removed or weakened by development. Now, communities are more vulnerable to coastal flooding, erosion and sea-level rise. And severe storms like Hurricane Sandy in 2012 and Hurricane Irene in 2011 have caused tens of billions of dollars in damages and displaced entire towns.

"The urgency of climate change is real," says Steve Kirk, coastal program manager for The Nature Conservancy in Massachusetts. New England's Gulf of Maine is one of the [fastest-warming](#) bodies of water in the ocean, he says. "And we're looking at the recent [IPCC](#)

That response will look different all along the coast. Spurred in part by that urgency as well as an influx in post-disaster funding, federal and state agencies, local municipalities and conservation groups are trying numerous methods to protect the shoreline. In some cases that has meant “hardening” the coast by installing concrete seawalls, jetties and other human-made physical barriers. In others, communities have stopped rebuilding their homes after some states offered to buy frequently flooded properties from their owners—the lots are cleared and native vegetation is allowed to regrow.

At the same time, a growing number of projects are studying how to put back—or shore up—those natural defenses that have been lost to construction or damaged in storms. Natural coastal features like dunes, marshes, oyster reefs and other habitats can change, adapt over time and, when healthy, regenerate by themselves after storms, unlike concrete barriers and other hardened infrastructure. In addition, they have been shown to provide some protection for homes and communities from everyday erosion while also replacing lost habitat for birds and marine life.

Much of the research around coastal restoration comes from projects in Southern states, where the growing season is longer and the tides are weaker than in the Northeast. In the last decade, conservationists and academics have turned their attention to studying the best ways to install these natural features in the North.



COASTAL COMMUNITY Horseshoe crabs come ashore to spawn during spring high tide in New Jersey. When intact, the coastal habitats these living fossils rely on also help protect inland towns. © George Steinmetz

More Coastal Projects

New England Living Shorelines

Post-Sandy: Natural Habitats Vital to Protecting Coasts

Saving Sachuest Point Marsh

At Gandys Beach, where The Nature Conservancy owns a 2,700-acre [preserve](#), staff from the U.S. Fish and Wildlife Service and TNC are working together to test ways to shore up the receding marsh. In 2015, they began constructing nearly 3,000 feet of oyster reefs just

TNC and the state began using soils dredged up from ship channels to literally raise the level of one of New Jersey's drowning tidal marshes. In the years since the restoration projects began, the team has monitored how the coastline responds. Gandys Beach and the other projects have become demonstration sites for how coastal restoration can work.

"We've learned through a lot of challenges," Zito-Livingston says. Her team also learned how to navigate related issues like permitting, planning and funding—experience they can now share with partners. Through TNC, several New Jersey communities have received grants to install their own living shorelines, and by way of that program, Zito Livingston says, "we were able to provide support and comments on green projects, or to point them toward resources."

It's all part of an effort to find ways to protect coastal communities and make space for wildlife, too. In the last two decades, the National Oceanic and Atmospheric Administration has helped fund a couple hundred of these restoration [projects](#) along much of the Atlantic coastline.

Zito-Livingston and her colleagues are already seeing the coast's other residents wildlife—taking to the marsh sites as they are restored. She has watched as migrating shorebirds flocked to the mud flats, where the team spread dredge material to raise the surface level of the marshes, and fiddler crabs burrowed into the muck. Sometimes in their wake, vegetation has regrown more quickly, she says. It gives her hope that these restored habitats will continue to grow in the future, and that the sites will help inspire other communities to do the same.



TOXIC BOTTLENECK Chequessett Neck Bridge in Wellfleet, Massachusetts © George Steinmetz

Toxic Bottleneck

CHEQUESSETT NECK BRIDGE IN WELLFLEET, MASSACHUSETTS

Between the “tip” and the “elbow” of Cape Cod lies Wellfleet Harbor, a community known today for its oysters. In 1909, Wellfleet installed a dike across the mouth of the Herring River—a 6-mile tidal waterway that ran through saltwater marsh and estuaries into the harbor. The bridge constricted the 450-foot-wide free-flowing tidal river down to an 18-foot trickle of water, all but stopping the oxygen-rich saltwater that previously flushed upstream. More than a century later, the wetlands have sunk and the water has become toxic to fish. A broad local [partnership](#) is considering [installing](#) a new bridge with larger tide gates to restore the lost estuaries.



SINKING CITIES Atlantic City in New Jersey, photographed in 2021 © George Steinmetz

Sinking Cities

ATLANTIC CITY, NEW JERSEY

This famous beach town sits on a barrier island that is separated from the mainland by New Jersey's Intracoastal Waterway. Built in the 1850s and famous for its boardwalk, casinos and beaches, the town today suffers from “sunny day” flooding, in which low-lying areas flood during high tides. This type of flooding is a growing problem among some coastal cities that are plagued by both sea-level rise and land subsidence or sinking.



LIVING SHORELINE Gandys Beach, New Jersey © George Steinmetz

Living Shoreline

GANDYS BEACH, NEW JERSEY

The shoreline and tidal marshes near [Gandys Beach](#) on the Delaware Bay act as a natural shield for the properties that lie just inland, but over time these buffers have eroded. Since 1930, the shoreline at Gandys Beach has receded by nearly 500 feet. To counteract those effects, TNC constructed nearly 3,000 feet of oyster reef breakwaters, seen here, with funding from the U.S. Fish and Wildlife Service. The reef is intended to reduce erosion while also providing habitat for species like horseshoe crabs and red knots, and bolstering the bay's population of wild oysters.



CAPE COD NATIONAL SEASHORE Photographed in 2015 © George Steinmetz





CAPE COD NATIONAL SEASHORE Photographed in 2021 © George Steinmetz

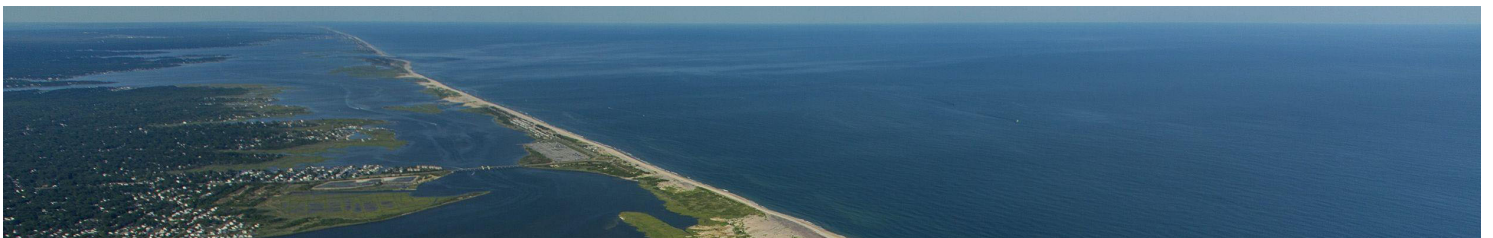
Losing Time

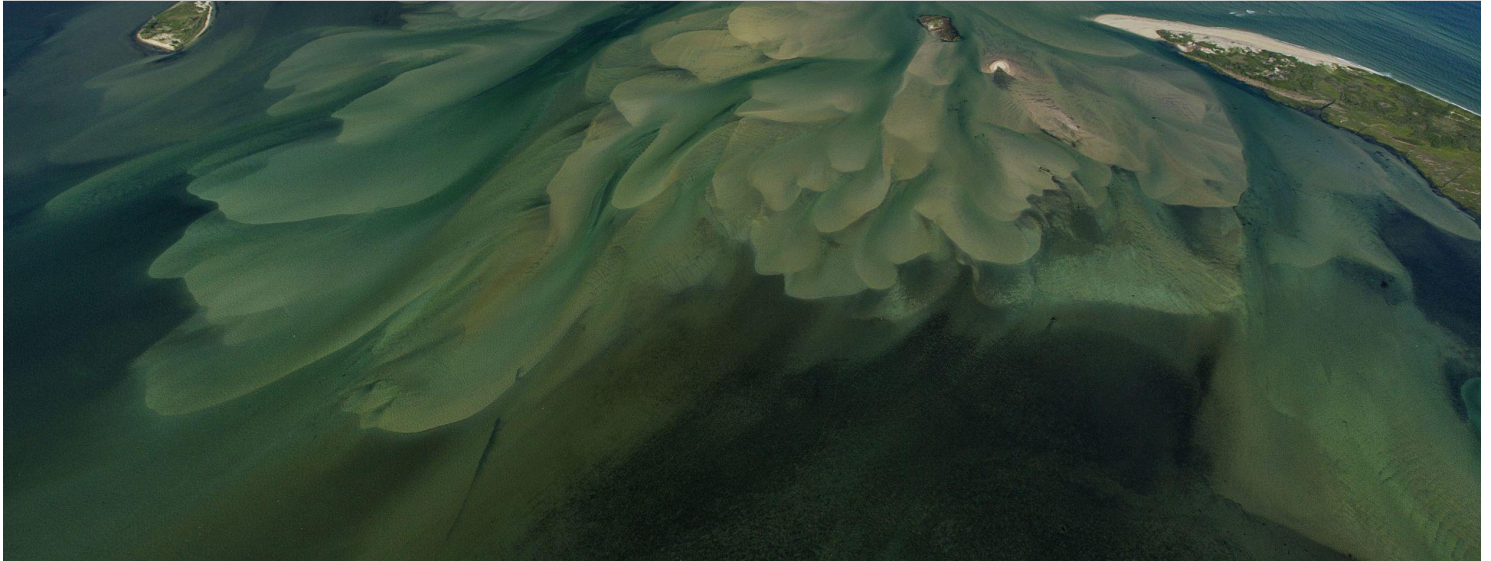
CAPE COD NATIONAL SEASHORE, MASSACHUSETTS

The seaside homes and golden bluffs of [Cape Cod](#) were made famous by artist Edward Hopper's 20th-century paintings. But those famous bluffs are losing an average of 2 to 3 feet of land per year. The owners of this house received permission to move their home back from the edge by 90 feet. The first picture was taken in 2015 and the second in 2021, after the house was moved. Many coastal residents don't have the land or the financial resources to move (or raise) their homes, however. As a result, in some instances, less-affluent communities have been more likely to be displaced than wealthier neighborhoods. A number of environmental organizations, including TNC, are working to address this inequity while keeping communities safe.



AVON-BY-THE-SEA, NEW JERSEY Photographed in 2013 © George Steinmetz





FIRE ISLAND, NEW YORK Photographed in 2012 © George Steinmetz

Hurricane Sandy

AVON-BY-THE-SEA, NEW JERSEY, AND FIRE ISLAND, NEW YORK

In 2012, Hurricane Sandy had a profound effect on the U.S. Atlantic coast, causing an estimated \$70 billion in damage and killing more than 200 people. It also degraded parts of the shore itself, accelerating erosion in some areas. At Fire Island National Seashore, an uninhabited barrier beach on Long Island, the storm created an entirely new inlet. The new water flow improved the bay's water quality. Sandy closed some existing tidal inlets and opened many more from North Carolina to New England. In the months following Sandy, some communities recovered quickly while others struggled or simply never returned. In the first image, the beach of Avon-by-the-Sea is seen eight months after the storm.

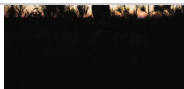


LOOKING AHEAD Cedar Grove Beach on Staten Island, photographed in 2021 © George Steinmetz

Looking Ahead

CEDAR GROVE BEACH, STATEN ISLAND, NEW YORK

Ten years on from Hurricane Sandy, many communities have sought—and implemented—ways to adapt. On New York’s Staten Island, the U.S. Department of Agriculture’s Natural Resources Conservation Service [partnered](#) with TNC to buy 11 storm-damaged homes in New Dorp Beach and Midland Beach (seen here in the middle distance). The properties have been cleared and reseeded with native plants. Next, TNC will donate the land to New York City to help make the community safer. Elsewhere the [Governor’s Office of Storm Recovery](#) has purchased hundreds of endangered homes as a part of a buyout program that did not exist before Sandy.



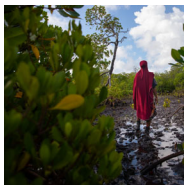
BY JENNIFER WINGER



MAGAZINE FEATURE

An Interview with a Seed Collector

BY TIMOTHY A. SCHULER



MAGAZINE FEATURE

The Mangrove Mothers

BY DUSTIN SOLBERG



Jenny Rogers is a writer and editor for *Nature Conservancy* magazine, covering books, science and conservation.

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