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Business	A31	Obituaries	A40
Editorials/Opinion	A26	Reaching Newsday	A21
Flash!	A44	TV listings	C18
Long Island	A20	Weather	A43
Lottery	A75	World	A24
Nation	A22		

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The following pertains to mailed subscriptions as required by the USPS:

Newsday (USPS# 388-760)
ISSN 0278-5587 (print) ISSN 2643-9417 (online) is published daily except Sunday and Christmas Day by Newsday LLC, 6 Corporate Center Drive, Melville, NY 11747. Periodicals postage paid at Huntington Station, NY. Postmaster: Send address changes to 6 Corporate Center Drive, Melville, NY 11747.

TOP STORIES

PULLING BACK FROM

Mastic work clears flood plain, returns the land to nature

ONLY IN NEWSDAY

BY TRACY TULLIS
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There was once a house at 512 Riviera Dr. in Mastic Beach, a one-story cottage with an expansive view across Narrow Bay toward Fire Island.

The house was badly damaged in Superstorm Sandy in 2012 and flooded again over the next decade when big storms came through. The house was sold to the Town of Brookhaven last December and razed in March, its driveway torn out and its septic tank dug up and carted off — one of about 60 buildings removed as part of the town's efforts to clear the flood plain and let the rising sea reclaim the land.

Sea levels on the East Coast are expected to rise 10 to 14 inches over the next 30 years, according to a report released last year on sea-level rise from the National Oceanic and Atmospheric Administration and other agencies. By 2050, “moderate” flooding will happen 10 times as often as it does today.

Many planners and climate experts say “managed retreat” — the strategy of moving human infrastructure away from the advancing ocean — will be unavoidable in the decades to come. Ideally, they say, starting now. Mastic Beach is one of the few places on Long Island that has launched a deliberate program of retreat, offering voluntary buyouts to people in flood-prone areas and restoring wetlands as a buffer for those who remain.

The idea, said Alison Branco, climate adaptation director at The Nature Conservancy in New York, which has contributed \$250,000 for Mastic Beach property buyouts, is “to make everyone safe and dry before they get wiped out by a storm.”

The state Environmental Bond Act passed last year earmarked up to \$250 million for voluntary buyouts in its \$4.2 bil-



An empty lot where a house once stood at the corner of Dahlia Drive and Elm Road East in Mastic Beach has been revegetated.

lion budget, which Branco and other local climate scientists hope could lead to a thoughtful, permanent statewide managed retreat program.

Mastic Beach could be a model for other towns contemplating such a program, but proponents as well as skeptics acknowledge that withdrawing from Long Island's shorelines will be fraught with logistical and financial challenges.

Buyouts and restoration

Mastic Beach, a hamlet of about 15,000 people, was hit hard by Sandy: Hundreds of houses were damaged and septic systems were overcome, pouring sewage into the flooded streets, yards and waterways.

After the floodwaters receded, some homeowners in the area, like others along Sandy's path, took buyouts funded through the Federal Emergency Management Administration. In many places, post-Sandy buyouts were scattershot — houses torn down here and there, empty lots becoming an eyesore for neighbors and a maintenance burden for the municipality.

The Town of Brookhaven had a more ambitious plan. Rather than simply level a few wrecked houses and move on, town planners sought to acquire all the properties they could in the most flood-prone areas, and then restore the sur-

rounding salt marsh as a refuge for native species and a natural barrier against rising tides and heavy storms.

Since Sandy, Brookhaven has bought more than 300 plots of land on 525 acres within the Mastic Beach Conservation Area, stretching from William Floyd Parkway in the west to Osprey Pointe in the east, at a cost of \$1.8 million. Most of the money comes from bonds issued by the town and from fines paid for environmental violations such as illegal dumping in the wetlands.

Many of the properties acquired were undeveloped, and by buying them the town ensures they will remain so. About 60 houses have been bought and torn down by the state, county or the town.

Luke Ormand, senior environmental analyst for Brookhaven's land management department, has been cold-calling homeowners, offering to buy their plots and houses. Some initially rejected buyout offers and rebuilt after Sandy, only to be flooded again. Finally, Ormand said, “they realize it just isn't feasible anymore.” Ormand continues to make offers on boarded-up houses and waterlogged land.

Houses built in the flood plain are a financial strain for the town as well, said Brookhaven Town Council member Dan Panico, who is incoming town supervisor. “The

THE SEA AS WATER LEVELS RISE



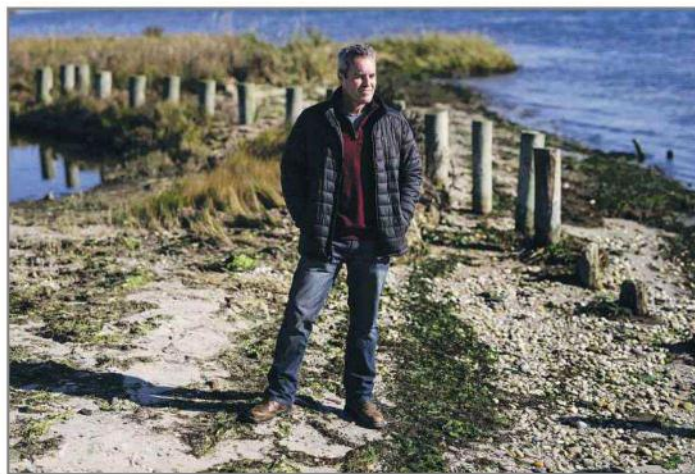
Four houses and 28 parcels of land have been bought for the project, and Riviera Drive is inaccessible by vehicles. ■ Video: [newsday.tv](https://www.newsday.com)

WHAT TO KNOW

- **The Town of Brookhaven** has been buying vacant properties in Mastic Beach and removing buildings damaged in Superstorm Sandy in an effort to clear the flood plain and let the rising sea reclaim the land.
- **Climate experts say** it could serve as a model for a statewide managed retreat program and keep people away from future storms.
- **The program might** be too expensive to replicate in other areas of Long Island.

town can't continue to maintain roads and drainage structure, which are underwater simply from the tides."

Within the larger conservation area, the town mapped out 149 acres, from Sheepen Creek to Pattersquash Creek, for a concentrated buyout and



Alan Duckworth, an environmental analyst working on the Mastic Beach project, says nothing can stop the area from flooding.

restoration project. About 90% of the land there is less than 2 feet above sea level, the groundwater just inches below ground. Trees that once shaded suburban lawns are dead or dying, their roots steeped in saltwater, and stretches of Riviera Drive are impassable after

a heavy rain or at high tide.

In the past two years, 28 parcels of land and four houses have been bought in the project area, including the house at 512 Riviera Dr.

The town enlisted Ramboll, a Danish architecture and engineering firm with an office in

Lindenhurst, to design the project, with grants from the U.S. Fish and Wildlife Service.

The plan calls for two meandering tidal creeks that will channel high tides and storm surges. "Nothing can stop this area from being flooded," said Alan Duckworth, an environmental analyst for Brookhaven. "What we can do is better control floodwater and allow it to recede faster from the land."

The tidal streams also provide habitat for killifish, which eat mosquito larvae, helping to control the bloodthirsty swarms; and they in turn provide food for wading birds such as great blue herons, American and snowy egrets and black-crowned night herons.

Invasive phragmites — which crowd out the lower grasses where endangered salt marsh sparrows build their nests — will be removed and replaced with native spartina.

A little farther inland and at a slighter higher elevation, there will be two "hammocks" — a

coastal shrub and hardwood forest — that will "slow the velocity of storm surges coming in," Duckworth said, and provide habitat for the diamondback terrapin, the only turtle in North America adapted to salty environments.

In public surveys, locals said that access to the waterfront was their top priority, so the designers added wide, ADA-compliant boardwalks to their drawings where portions of the impassable road will be removed.

Costs present challenges

Mastic Beach has been praised by climate specialists for its forward-looking and holistic plan for retreat, but its vision might be difficult to replicate elsewhere.

The parcels Brookhaven bought are small, just 20 to 50 feet wide, and many had been acquired decades ago for very little money, or none. According to Ormand, Mastic Beach marshland was given away for free with magazine subscriptions in the 1930s. One man received a plot as a bar mitzvah present in the 1950s and has held onto it since. Another, a doctor in Manhattan, accepted a plot as payment from a patient. Neither of those was ever built on.

The town was able to buy most of the undeveloped plots for just \$5,000 to \$10,000 each, and the houses it bought were generally modest cottages.

To buy out a place like Fire Island, with its pricey summer houses, would cost "in the billions of dollars," said John Cameron, president of the Long Island Regional Planning Council. And a city such as Long Beach — "that's also in the billions."

There are other formidable challenges. Climate specialists suggest that a managed retreat program in New York should address two significant drawbacks of federal buyout efforts: long delays and the question of who gets offered what — both of which raise equity concerns.

Government buyout programs must run a benefit-cost analysis to determine which properties will be bought and destroyed, and which could be

See LAND on A4

RETREAT FROM RISING SEA, FLOOD PLAIN

LAND from A3

raised and repaired. In the cold calculus of the benefit-cost analysis, the modest house is often not worth saving.

“When that’s the standard, people with higher value properties are helped to rebuild, and people with lower-value properties are pushed to take a buyout,” Branco said. “So you end up with a shoreline full of wealthy people.”

Those who do take buyouts find it is not a quick solution. A study by the Natural Resources Defense Council found sellers wait 5.7 years on average to close a federally funded buyout — a particular hardship for lower-income owners. (By contrast, buyouts in Mastic Beach are generally closed within two to four months.)

“Sometimes people can’t afford to leave a house that’s been damaged,” said Shameika Hanson, who works on climate adaptation at The Nature Conservancy. Some decline an offer and hope the next storm misses them. Others stay in their flood-damaged houses, with mold blooming on damp walls, while they wait for their check.

Even when the money arrives, often it’s not enough to relocate to a comparable but higher and drier area. “If you don’t know where you’re going, and you can’t afford to move, then you can’t afford to sell,” Hanson said.

Brookhaven continues to buy up houses and properties in southern Mastic Beach, as two more houses were removed earlier this month.

The grants the town received for the restoration project covered just the planning phase; the landscaping work will cost another \$15 million to \$20 million, according to Duckworth. The funding hasn’t yet been secured, and it could be another five years before the work begins.

But the salt marsh knows nothing of budgets or timelines. At 512 Riviera Dr., spartina grass already has begun to creep into the void where the house once stood, spreading its roots into the wet, spongy soil. In another season or two, the house’s footprint will have disappeared into the marsh.



A pedestrian strolls the new walkway at the living shoreline on Patchogue Bay at Shorefront Park in Patchogue. ■ Video: newsday.tv

‘Living’ shorelines to control erosion

LI has at least 12 of the projects that use both natural, structural components

BY NICHOLAS SPANGLER
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An unusual kind of shoreline is taking root where failed bulkheads once lined Patchogue’s Shorefront Park off the Great South Bay.

Shallow basins crowded with milkweed and blooming goldenrod capture stormwater running from upland, catching sediment and pollutants before the water drains into the bay. Beyond the basins is a strip of salt marsh, sparse now but expected to thicken over the next year, providing habitat to birds and a natural shock absorber for waves in a severe storm.

Protecting it all, within what is known as a living shoreline, is a low sill of massive stones, parallel to the shoreline and partially submerged in the water, providing a first line of defense against waves and a home for marine life in its crannies.

Shorefront, designed by VHB Engineering and finished in September, is one of the newest and biggest projects executing

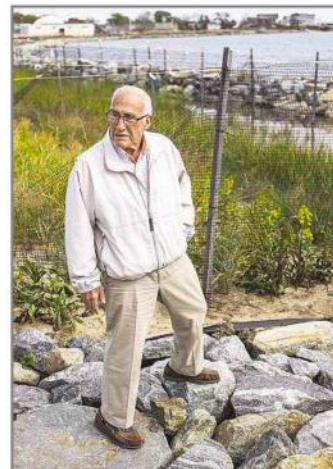
WHAT TO KNOW

- Living shorelines use natural elements and sometimes structural components to control erosion.
- New York’s Department of Environmental Conservation has overseen construction of about 12 such projects.
- While living shorelines are relatively new to Long Island, they’ve been used for decades near the Chesapeake Bay and states around the Gulf of Mexico.

ONLY IN NEWSDAY

a strategy that has been used for decades to stabilize shorelines along the Chesapeake Bay, the Gulf states, Australia and Europe.

Living shorelines use natural elements alone or in combination with structural components. They are built to control erosion but also to provide



Patchogue Mayor Paul Pontieri says the living shoreline is both useful and provides protection.

sponse to sea-level rise.

Shoreline projects on LI

There are at least 12 such shoreline projects in New York, state environmental officials said. Besides Patchogue, they include public projects in Riverhead, Baldwin, Southold, the Shinnecock Nation and Westchester County. East Hampton officials plan at least two in Montauk. A shoreline built to protect eight properties on Dune Road in Westhampton Beach is likely the first private project on Long Island, according to its designer. Another private project, still in permitting, will protect 12 nearby properties.

More may be on the way: A law signed in September by Gov. Kathy Hochul requires the state Department of Environmental Conservation to adopt policies and regulations to establish the approach as the “preferred alternative” for stabilizing tidal shorelines.

Patchogue’s “looks great — people come down here all the time to walk their dogs, ride bicycles — and more impor-



Workers place beach grass seedlings at the living shoreline project at Indian Island in Riverhead.

tantly, this will provide protection against storms like Sandy and major rainstorms," village Mayor Paul Pontieri said.

Superstorm Sandy's flooding damaged nearby houses, but the area was vulnerable even to lesser events. Heavy rains near Christmas last year failed to drain and turned to ice, cutting off a nearby restaurant, Lombardi's on the Bay, before workers chipped access paths, Pontieri said. The project cost roughly \$5 million and included extensive upland work, including elevating a grassy swath of the park by several feet to improve flood resistance.

VHB tried to reproduce the variety and abundance of a natural shoreline by planting 57,041 plugs of sea grass and seven varieties and 5,810 shrubs and other plants in the basins, project manager Carlos Vargas said. "Even during construction, we saw a lot more shore birds moving in. We saw schools of small fish in high tide. In the little creek, I saw a blue crab . . . In September, I saw an American eel."

Marshes a natural barrier

Much of Long Island's natural shoreline was once wetland marsh. But between 1974 and 2008, according to the DEC, Long Island estuaries lost 2,758 acres of marsh area on their shores, a 13.1% decrease attributed to factors including sea-level rise, erosion and invasive species.

The benefits of a marsh — whether naturally occurring or planted — are considerable. According to NOAA, one square mile of salt marsh secures the

carbon equivalent of 76,000 gallons of gas annually, sequestering carbon dioxide that would otherwise help warm the climate. A 15-foot strip of marsh absorbs up to half of incoming wave energy. Marshes also trap sediment, rising along with sea level, and the grasses that make up a marsh are remarkably adaptive.

Grass that grows 3 feet high on Long Island's South Shore grows to 7 feet on Long Island Sound to match higher tides. "As long as you have a stable environment with wetlands, it will grow vertically," said Aram Terchunian, a coastal geologist whose Westhampton Beach firm, First Coastal, worked on Suffolk County's Indian Island Park project in Riverhead and on the private Westhampton Beach projects.

Marsh, and the rocky sills featured in many living shorelines, are far more biologically productive than a sand beach, or one armored by a sea wall or bulkhead, Terchunian said. Marsh houses mollusks and insects, which attract birds. Rocks provide hiding places for juvenile fish and more surface area for algae and mollusks to encrust. "It's a food web," Terchunian said.

Mollusks such as oysters and mussels also clean the water as they feed. The Cedar Beach Creek project in Southold, a collaboration between Peconic Estuary Partnership, local government and Cornell Cooperative Extension, was built as a demonstration and uses the hardy ribbed mussel — common to Long Island waters but rarely eaten — to fertilize and toughen the salt marsh where it

grows, said Barry Udelson, an aquaculture specialist, formerly with Cornell and now at New York Sea Grant.

At Indian Island, a \$2 million living shoreline project now weeks away from completion was prompted in part by the erosion that in the early 2000s uncovered an American Indian burial ground.

The funneling action of Great Peconic Bay during Nor'Easters and wave energy generated over the long fetch of open water across Flanders Bay caused erosion that averaged 3 feet a year and reached as much as 20 feet in some storms.

"We tried for years placing sand and it would wash away," Suffolk County Parks Commissioner Jason Smagin said. "We were looking for a permanent fix."

Twenty-five years ago, even 10 years ago, "We would have bulkheaded this," said Nick Gib-

bons, chief environmental analyst for county parks. "The science hadn't evolved to look at new ways of solving problems."

A bulkhead likely would have meant continued scouring and no salt marsh, and its engineering is difficult to modify. By contrast, a living shoreline can be modified, up to a point, simply by adding rocks to the rock sill.

Suffolk's project was minutely engineered at a massive scale. For months, 16 trucks a day hauled in a total of 11,040 cubic yards of sand, 3,200 tons of granite and 27,050 plugs of sea grass. Then, said Steven Vecchia, from Woodbury-based D & B Engineers and Architects, which worked on the job, the sand was graded into a bluff and held fast by a layer of jute mesh topped by the sea grass, whose spreading roots will maintain the bluff's shape. A machine operator placed rocks in two sizes — smaller ones from 100 to 300 pounds and larger ones from 800 to 1,200 pounds — in interlocking fashion to build the rock sill solid enough to withstand decades of wave and tide action.

"The guy who does this is like an artist" using a GPS-controlled backhoe bucket instead of a brush, Vecchia said. "He's sitting there, puzzling it out."

Breaks in the wall, similar to those at Patchogue, let sediment-bearing water flow in. The rocks capture the sediment as the water flows out.

When waves hit an armored shoreline, "That structure is bouncing energy in both directions," said Alison Branco, climate adaptation director for the Nature Conservancy in New York. "You end up with this kind of arms race" as residents, unwilling to lose increasingly valuable waterfront land, join their neighbors in armoring.



The living shoreline strategy at Shorefront Park in Patchogue, above, has been used for years in the southern U.S., Australia and Europe.

Appetite for armoring increased in the 2000s, especially after Sandy, she said, when permits "ramped way up and there were so many people with so much damage."

Challenges, costs

Some experts interviewed for this story said living shorelines cost more per square foot than shoreline hardening, but according to NOAA, living shorelines tend to cost less, with installation costs ranging from less than \$1,000 to \$5,000 per linear foot. Maintenance typically costs less than \$100 per linear foot annually.

Some are deeply skeptical. In Baldwin, Bonnie and Richard Weinstein said construction of a living shoreline in Baldwin Park across the canal from their Bertha Drive house had destroyed trees and habitat for hawks and other birds, and that after removal of bulkheading, so much earth slumped into the canal it was unnavigable except at high tide. Karen Montalbano, government liaison for the Baldwin Civic Association, called execution of the project "troubling" and said her organization was disturbed that park access was still restricted. Bids for the project were awarded in 2021.

In an email, Casey Sammon, a Hempstead Town spokesman, said the town involved itself in what was originally a Governor's Office of Storm Recovery project after the project manager said it could not complete the job within its \$3.1 million budget. The town has been waiting six months for a DEC permit to reinstall some of the bulkheading, he said. While 30 trees were removed during construction, 110 new ones were planted. Some "weren't able to establish themselves" due to flooding from a storm last December, he said.

Against a backdrop of sea-level rise, there is also a question of usable life. NOAA's intermediate low scenarios project sea-level rise of close to 2½ feet by the end of the century in Port Jefferson and Montauk. The high scenario is for more than 6½ feet in those locations.

"Seventy-five thousand homes will be in chronic flooding by the end of the century," Branco said. "A living shoreline wouldn't mean those people can stay in their homes. It can buy you a little more time, but eventually the water will come up so high, it doesn't matter what's on the shoreline — the whole property will go under water."