A tale of two coastal states as the world gets wetter

By Lynn Bonner

In this aerial view, sandbags line the shoreline of North Topsail Beach, on the Outer Banks in North Carolina. Photo courtesy of the Western Carolina University Program for the Study of Developed Shorelines. Below, the southeast corner towns of Kinston and North Topsail Beach are shown in an inset of the profile of North Carolina. Map: Maxine A. Marcy

Connecticut and North Carolina have at least two things in common.

Both have shorelines considered among their most important natural and economic resources, and both are confronting the reality of rising waters.

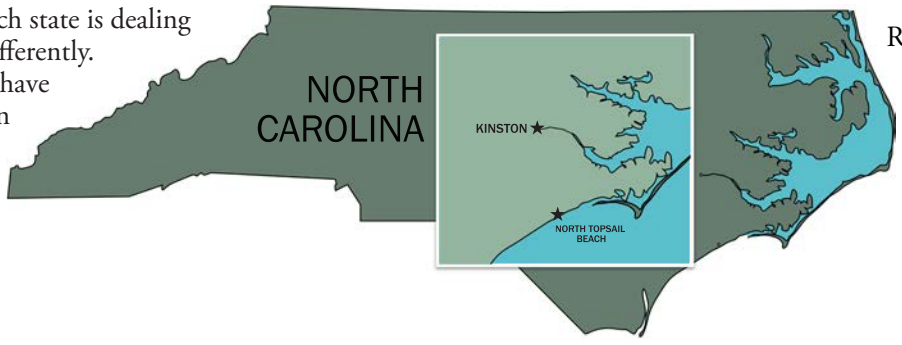
North Carolina, though, has had more extensive experience with this challenge. Perhaps some of the examples there could yield important lessons for this fellow East Coast state to follow as the need for relocating waterside homes and businesses intensifies.

"Moving people and infrastructure out of harm's way is happening around the country—in both coastal and inland locations," said Juliana Barrett, coastal habitat specialist at Connecticut Sea Grant. "Whether it is called managed retreat or another name, this is a national issue that each state is dealing with a bit differently. Even so, we have much to gain from understanding and sharing what is and is not working in other places."

In Connecticut, the term "managed retreat" is being used in discussions about what to do about neighborhoods repeatedly finding themselves under water. The city of West Haven is leading the way for action, with a buyout project under way in the Old Field Creek neighborhood, where the nearby waters of Long Island Sound are encroaching.

In North Carolina, there's a long history of moving people and buildings out of the way of floods. It's just not called retreat. Usually, the preferred term there is "buyouts."

Property purchases that aim to move residents out of floodplains and leave the land as open space have been going on there for decades—usually through FEMA buyout programs—and gained steam in the late 1990s.



Records show that between 1989 and 2017 nearly 3,000 properties in North Carolina had been purchased and cleared using FEMA buyouts. North Carolina has also

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Above, floodwaters cover much of the town of Kinston, N.C., after Hurricane Matthew in 2016. Photo: Jocelyn Augustino/FEMA

Left center: Workers from All Habitat Services plant bayberry, a native species, at a former home site in West Haven as part of a project to restore the natural floodplain. Photo: Judy Benson

Below: Kristin Walker, USDA program coordinator for the West Haven project, talks with the supervisor of the landscaping crew as work continued at the site in the fall of 2020. Photo: Judy Benson

spent millions in federal Housing and Urban Development money and state funds on property buyouts after hurricanes. The purchases continue to this day.

Climate change is making hurricanes wetter and the oceans rise. Inland and coastal communities are figuring out the best ways to adapt. For some it means getting out of the way of the risks.

Relocations in the North Carolina city of Kinston are among the most studied in the state. Kinston sits in the Neuse River floodplain in the inland county of Lenoir. Heavy rain and river flooding from hurricanes, including Fran in 1996, Floyd in 1999, Matthew in 2016 and Florence in 2018 collectively damaged thousands of Kinston homes.

At the National Oceanic and Atmospheric Administration (NOAA), the Office for Coastal Management has featured Kinston's relocation

strategy on its Digital Coast website (https://www.coast.noaa.gov/digitalcoast/). In that community, thousands of residents were moved out of the way of the rising river, and more than 50% of the floodplain left as open space.

Kinston wanted to keep those relocated residents in the city. It turned an old high school into affordable apartments for senior citizens, according to a 2006 University of North Carolina master's thesis by Monica McCann. It also relocated some families from two mobile home parks to new lots, and built single-family homes on vacant lots, McCann wrote.

Governments coordinate the FEMA buyouts, but it's usually residents who are tired of repeated flooding, upheaval and damage who tip the scales toward relocations, said A.R. Siders, an expert in managed retreat and environmental justice at the University of Delaware.

Buyouts happen when enough residents are "sick and tired of having their homes destroyed over and over again and they're looking for relief," she said.

Hurricanes have also reshaped Connecticut communities. Flooding and storm surge from a monster hurricane in 1938 left more than 600 people in New England dead. Along its destructive path, the hurricane leveled homes on Ocean Beach in New London. The city used eminent domain to buy the land and built Ocean Beach Park, popular today for its wide beach, boardwalk, splash park, nature trail and other features.

Hurricane Sandy in 2012 triggered Connecticut's more recent experience with home removals using a voluntary program administered by the U.S. Department of Agriculture.

West Haven started helping residents move out of the floodplain using the USDA's Emergency Watershed Protection-Floodplain Easement program, in which the federal government buys development rights and restores the land as closely as possible to its natural state. The land is kept as permanent easement.

The West Haven program is on its third round of purchases. Twenty-five properties were purchased in the first two rounds in West Haven. Most are near Old Field Creek, a stream that connects to Long Island Sound, said Thomas Morgart, state conservationist with the USDA.

Program coordinator Kristin Walker recalled when an elderly couple came by their old home while it was being demolished. Walker said she was worried the scene would be traumatizing for them. "They said, 'Nope. We're glad to see it go,'" she said.

Landowners whose properties flood repeatedly know restoring the natural floodplain is the right thing to do, she said.

The goal is to get the land back to as close to its natural condition as possible.

A formal restoration plan for the land includes removing any buildings and impermeable surfaces, stabilizing the soil to prevent erosion, grading and bringing in native plants. The properties are intended to be low-maintenance, Walker said.

"It's not intended to be a park," she said. "It's intended to be a floodplain in a natural area."

A sponsor, West Haven in this case, takes responsibility for maintenance.

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All states will feel the effects of climate change, but specific impacts vary by region.

The Connecticut Institute for Resilience and Climate Adaptation at UConn predicted that the state will see up to 20 inches of sea level rise by 2050, leading to more frequent flooding.

Average precipitation is expected to increase by about 8%, or 4 inches a year.

A 2020 North Carolina Climate Science Report says heavier rains will make inland flooding worse. Sea level rise and the increasing intensity of storms will increase storm surge flooding on the coast. Coastal erosion will increase the risk of property damage. A state Climate Risk Assessment and Resilience Plan describes beach and dune nourishment as a short-term solution to preserving the state highway that runs through the fragile Outer Banks, the thread of barrier islands that feature some of the state's best-known beaches.

But it's become routine for Outer Banks communities to pile sand on eroded beaches to protect homes from the encroaching ocean, and some plan to do it indefinitely.

Moving beach homes to safer spots has historical precedent. After a devastating hurricane in 1899, hundreds of residents left a settlement called Diamond City located on a barrier island called Shackleford Banks. Some people even put their Diamond City homes on barges and floated them to Harkers Island, said Rob Young, director of the Program for the Study of Developed Shorelines at Western Carolina University.

"Those were the days when the public sector didn't come in on a white horse to protect investment properties," he said. Homes along North Topsail Beach sit precariously on shifting sands, which governments and residents have spent millions trying to protect from hurricane scouring. North Topsail Beach is on the Outer Banks.

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The northern part of the town is near an inlet that is particularly unstable. The town tried to realign the channel about eight years ago, but it didn't help. Then came the walls of sandbags —3,600 feet worth—meant to protect the homes.

Young released an economic analysis two years ago that concluded that it would be less expensive long-term for the town to buy homes on the unstable stretch of beach, demolish them and let nature take over.

The analysis looked at costs over 30 years and calculated it would cost less to purchase and demolish 347 properties along the beach rather than have the town push ahead with its plan. That plan was to replace the sand and build a hardened concrete structure, called a terminal groin, to try to keep it in place.

"Nobody ever does the math because no one wants to do the math," he said. "There's an ingrained belief that it would be the end—that it would be giving up the fight. We showed you could walk away from 3% of the tax base and you could spend time and money on 97% of the tax base that was really more sustainable. Good luck in getting everyone to buy into that argument at the present time."

North Topsail is moving on its plan for a terminal groin and beach nourishment.

Fran Way, an engineer working for the town, told its governing board last fall that the terminal groin would help keep the sand from washing away so quickly, like it did the last time the town tried to reshape the inlet.

"We want to create a healthy beach and dune system," he told them.

The town is joining a neighboring town on a beach renourishment plan that will cost $900 million to replenish sand periodically over 50 years. The U.S. Army Corps of Engineers would pay 65% of the cost, with the state and local governments picking up part of it. Town leaders are considering using an increase in the occupancy tax, basically the tax that tourists pay to rent houses and condos, to help pay its share.

For another Outer Banks village, elected leaders voted to levy a tax on properties in the village of Avon to help pay for beach nourishment.

The special tax levy on Avon property owners would pay to help widen the beach and better protect buildings and the state highway that runs through the northern Outer Banks.

The cost would come to about $11 million to add 1 million cubic feet of sand to about 2½ miles of beach to make it about 120 feet wide. In five years, they'll have to do it again.

Avon didn't used to be an erosion hot-spot, but that's changed, Dare County Manager Bobby Outten told property owners this year as he presented the tax plan.

It used to have two rows of dunes and a wide beach, but the dunes are gone and the beach has narrowed.

"The rate of erosion has increased dramatically," Outten said. Climate change and sea level rise were not mentioned at these two North Carolina beach community meetings.

But climate change was the central topic of a webinar in a Fairfield County, Connecticut community last year hosted by a group called Sustainable Fairfield.

About 60% of Connecticut's population lives in coastal communities, and, in 2010, more than 32,000 homes sat in various floodplains across the state. Becky Bunnell, a member of the Sustainable Fairfield Task Force and chair of the town's Flood and Erosion Control Board, described the grim prospects that could come with sea level rise.

Sunny day flooding will become more frequent in the beach areas, she said. Heavy storms will overwhelm storm drains.

A category 1 or category 2 hurricane combined with sea level rise would flood streets throughout the beach area, where15% of the town lives, and where the town hall, six churches, several schools, historic buildings, and more than 250 commercial buildings sit.

The town depends on tax revenue from the beach area homes, Bunnell said.

Like North Carolina beach towns, Fairfield has turned to engineering solutions to address its problems.

The town has installed a detention basin, dry wells, and catch basins downtown, and has studied putting detention basins in the Rooster River watershed.

In the beach area, living breakwaters of oyster reefs, aquatic plants and other natural elements, beach nourishment or adding spurs to existing groins could mitigate wave impacts and erosion, she said.

Siders, the expert on climate adaptation policies, said the problem of beach erosion depends on how you look at it. It's the homes on the beach that are causing the beach to disappear, she said, because they stop natural beach migration inland.

Engineering projects to control erosion may still leave homes at long-term risk, she said.

She emphasized the need for long-term planning for communities and for property owners, she said. People who sign 30-year mortgages should think about whether their home is going to be safe for 30 years.

"Yes, the beach is disappearing," she said. "The other solution is for us to get out of the way and let the beach maintain itself."

The Western Carolina University report on North Topsail Beach can be found at: https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2021/04/NTB-July-1-2019.pdf

In Connecticut, workshop starts the difficult conversation about managed retreat

Retreat isn't defeat.

It's deliberately stepping back to make a better future.


A.R. Siders

"Retreat is very difficult, but it's going to happen," said A.R. Siders, assistant professor in the Biden School of Public Policy and Administration at the University of Delaware. "Wouldn't it be better to have a managed process? It can be an opportunity to do something more exciting than elevating a few houses, and there are resources available."

A national expert and keynote speaker at the "Managed Retreat in the Age of Climate Change" virtual workshop in Connecticut last November 2020, Siders challenged the audience of about 130 municipal and state land-use officials and others to rethink notions of what's possible. Rising seas and more frequent flooding of coastal and riverine areas means getting people out of harm's way is necessary, she said. But it can also be a chance to improve our waterfronts for everyone.

Siders said she began focusing on how retreat can be done in an orderly, methodical way—rather than as a haphazard reaction to a disaster—after Superstorm Sandy in 2012. It's the better alternative to the other options: avoidance, fortifying shorelines with concrete or accommodating rising seas by elevating properties, she said.

To begin the hard conversation with communities, Siders urged land use professionals to pose it as challenge to realize a positive vision for the future: "What do you want your city or community or coast to look like in 30 years? 100 years?

"I don't want to see a coast that's armored with sea walls, but I would love to see open beaches all the way from Maine to Texas, so everyone can access them. It won't happen if we don't plan for retreat," she said.

The workshop was the latest in a series hosted by the Climate Adaptation Academy, a partnership of Connecticut Sea Grant and The Center for Land Use Education & Research (UConn CLEAR). Juliana Barrett, CT Sea Grant coastal habitat specialist, and fellow organizer Bruce Hyde, extension educator with CLEAR, emphasized that this workshop is considered the first in a series on managed retreat that will delve into this complex and important issue.

"We see this as just getting the conversation going," said Barrett.

Left, a boy rides his bicycle in Meriden Green, a 14-acre downtown park created in a flood-prone area in 2016 at a cost of $14 million. Right, a sign reminds visitors to avoid using one of the footbridges at the park when Harbor Brook floods. Photos: Judy Benson

Two examples offered inspiration for what can be accomplished. In downtown Meriden, a $14 million project funded by various state and federal agencies has transformed a blighted, flood-prone area into a municipal park. Public Works Director Howard Weissberg, City Engineer Brian Ennis and Assistant Planning Director Paul Dickson took turns describing various aspects of what one of them described as "a flood control site first, a park second, and an economic development parcel third."

Twenty-five properties were purchased and razed for the project, which resulted in improved flood protection for more than 100 surrounding acres and a new public space for farmer's markets, concerts and commercial businesses.

"Property values are going up around the park" since it opened in 2016, Dickson said.

In West Haven, the Old Field Creek neighborhood is undergoing a different kind of transformation. Arde Ranthum and Kristin Walker, state conservation engineer and civil engineer, respectively, for the USDA's Natural Resources Conservation Service in Connecticut, are leading a years-long effort to convert a flood-prone working-class neighborhood back into the wetlands that existed there before the 1920s.

Working since 2014, the project has thus far purchased 25 homes slated for demolition, and another 39 are in line for a later phase.

"This is 100% voluntary," Ranthum emphasized, with residents offered the market value of their homes on the day before Superstorm Sandy struck.

Walker said residents in the neighborhood were hit especially hard by Sandy, and the flooding from nearby Old Field Creek, a short tidal channel connected to Long Island Sound, never abated after that.

"You're talking about residents who had water up to the first floor," she said.

– Judy Benson