



New Heights FOR Old Houses

Adapting to Sea Level Rise in Historic Newport

BY ANDREA E. MCHUGH

Rapid sea level rise, extreme tides, coastal flooding and worsening storm surge — Newport faces harsh realities, but people are working every day to protect our city and its historic treasures.

As night fell and Superstorm Sandy drifted out of Newport heading north up the New England coastline, a lone kayaker gently paddled his way through the massive storm surge left behind, propelling his bright orange boat around the restaurants, shops, and businesses located along Bowen's Wharf. It was October 29, 2012, and the popular harborfront's cobblestone and brick pedestrian walkways were deep under water as a result of the four to six feet of storm surge measured in Narragansett Bay.

Though sections of Cliff Walk, due east of Bowen's Wharf, were washed away, chunks of seawall around Ocean Drive were substantially damaged, and homes and businesses were severely flooded, the city was largely spared compared to other coastal communities in New York and New Jersey. But what the superstorm left behind in its wake was a glaring warning of the threat that higher tides, worsening storm surge and extreme precipitation events present to Newport and coastal communities far and wide.

RISING AT RECORD PACE

"Sea level rise is not linear. It's accelerating. I don't know how to say that in a good way. The rate per year is rising every year," explains Pam Rubinoff, a Coastal Management and Climate Extension Specialist at the University of Rhode Island's Graduate School of



Jan Davis kayaks through seawater flooding Newport's Bowen's Wharf after the October 2012 Superstorm Sandy. PHOTO COURTESY OF THE NEWPORT DAILY NEWS

Oceanography Coastal Resources Center and Rhode Island Sea Grant. For millennia, sea level has remained relatively unchanged. More recently, not only is the fact that it has changed important, but *how quickly* it has changed that has caught researchers' attention. Since 1880, global mean sea level has risen about nine inches, according to the National Oceanic and Atmospheric Administration (NOAA). More concerning, a third of that number can be accounted for sea level rise in just the past 25 years.

Rubinoff has made preparedness and planning for rising seas and flooding the mainstay of her three-decade career. She sees both vulnerability and opportunities for Newport, the state's additional 20 coastal communities and other low-lying areas across the country and around the globe.

The City by the Sea, however, stands out when it comes to sea level rise issues and the data behind the threat, says Rubinoff. "Newport is a great place because the tide gauge had been there since 1939, so the state has projections that they are going by for their policy and planning," she says. Mariners are often especially aware of sea level threats because of their need to understand tidal fluctuations and tidal currents, she explains. "These days, we're seeing the

manifestation of sea level rise through some of our extreme high tides...and those extreme tides are actually increasing, so an extreme tide today is a normal high tide in the future."

LOWEST-LYING AT HIGHEST RISK

Newport's City Planner, Peter Friedrichs, says the city's greatest threats presented by climate change are coastal storms that bring tidal surge along with heavy rain events. He points to two specific streets, both located in high-density residential neighborhoods, as the lowest-lying and most in peril: Bridge Street in The Point section (off the northern part of America's Cup Avenue) and Wellington Avenue in the "Fifth Ward," which runs off Thames Street along the southern end of Newport Harbor.

According to NOAA, not only has Rhode Island experienced increased precipitation events over the past century, but the highest numbers of "extreme events" have unfolded over the past decade – and projections show continued increases in frequency and intensity of these storms. But there's more. "It's been made worse because we get more inches per hour now," explains Friedrichs. "We also have more and more development—people adding

"The city's greatest threats presented by climate change are coastal storms that bring tidal surge along with heavy rain events."

— PETER FRIEDRICHS,
NEWPORT CITY PLANNER



Water seeks the lowest level, so when snow and ice clogged the storm drains on Wellington Avenue in February 2016, the area was flooded with a foot of water when a severe rain storm coincided with high tide. PHOTOS BY AREA RESIDENT JOHN BRUNVAL.



Three single-family homes farther west on Wellington were elevated when built in 1988. According to Newport Building Official, William Hanley, FEMA's base flood elevation in this area is 13 ft. That's 1 ft. higher than in the point because it is a Velocity Zone where wave action of 1 1/2 ft. can be expected from storm surges. In addition to having the first floor elevated higher, the side walls and doors of the garages must break away with any storm surge, leaving the home perched on the upright supports, but otherwise relatively unharmed.

bigger houses, paved driveways, decks, patios and sheds, and that's a real challenge." Stormwater runoff also carries pollutants including fertilizers and chemicals, which harm water quality.

The City, he says, might be looking at regulating impervious surfaces to try and mitigate rainwater runoff, and down the line, upgrading the storm sewers, which he says will cost in the "tens of millions." To address the increased tidal flooding activity in The Point, one-way tidal gates, which allow stormwater to flow out to sea, but prevent seawater from backing up into the neighborhood, have been installed on Bridge Street. In the Wellington Avenue neighborhood, Friedrichs says the city has money in the budget to install tidal gates. That work is being scheduled for 2023.

The Point has been and continues to be studied by myriad organizations. It's rare to have a neighborhood that was platted circa 1775 next to a tidal gauge that's been providing sea level data for 82 years. Friedrichs says the U.S. Army Corps of Engineers is currently conducting a Coastal Storm Study on Narragansett Bay which specifically addresses the challenges facing The Point. "Their report is looking at what they call 'structural interventions,' which would be seawalls, basically, or levees, and so that may be a solution you hear about later this year."



The Cove in The Point neighborhood on the north end of Newport Harbor is one of the lowest-lying areas of the city. Bridge Street is named for the "Point Bl." seen in the left detail on the north side of the cove. By 1900 the Cove was completely filled in, and today it is the site of the Gateway Transportation Center and the Marriott Hotel that comply with FEMA floodplain elevations. DETAIL FROM CHARLES SLAROWITZ "A PLAN OF TOWN OF NEWPORT IN RHODE ISLAND" 1777 COURTESY OF THE LEVENTHAL COLLECTION, BOSTON PUBLIC LIBRARY.

Rubinoff is also taking a closer look at these issues in conjunction with the City of Newport and Naval Station Newport. "We're doing real high-level modeling as we speak about the island right now at the University of Rhode Island, and looking at the impacts and implications of both storms as well as sea level rise," explains Rubinoff. She says the Navy is looking at how they can work with municipalities to examine their infrastructure, as the Navy depends on the water infrastructure, the wastewater infrastructure and the road infrastructure. "There are lots of interdependencies there that we are going to be looking at in high resolution."

SAVING NEWPORT'S HISTORICAL TREASURES

The Point area of Newport is lauded for being home to the largest collection of Colonial era homes in the nation. As such, the entirety of the neighborhood is within the Newport Historic District. More than 80 homes were restored there throughout the 1960s and '70s thanks to the neighborhood association's grassroots effort called "Operation Clapboard." Clapboards, shingles, gables and gambrels are *de rigueur* here.

Just before the pandemic descended on Rhode Island in 2020, Newport's Historic District Commission adopted a series of design guidelines for elevating historic buildings, making the city one of the first communities in the country to adopt standards aimed at protecting its most historic neighborhoods from the threat posed by rising sea levels. "We spoke with stakeholders, contractors, architects, planners... and we made sure to integrate feedback from the local community," says the City's Preservation Planner, Helen Johnson. "The Newport Restoration Foundation (NRF) was very involved as well, and really interested in facilitating the conversation. They were involved in the public process." Established in

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"Let me show you properties along our coastline and on this island I call home."



Left: There was only a small, damp crawlspace beneath the Rumble Restaurant at 62-64 Bridge Street when it was listed for sale in 2015. PHOTO: GREGORY ANASTASIAN

Right: Subsequent renovations by new owner Patrick Kiley included elevating it by 42 inches and moving it back 5 feet from the sidewalk to accommodate new front stairs. According to contractor Peter Kane, the hand-cut, stone-faced concrete foundation has two-way flood vents and poured cement floor with sump pumps. The area is warmed in winter by the radiant heating system in the first floor above it. Utilities were relocated to the second floor, above the 1.3 ft. floodplain, which for this area is FEMA's 12 ft. base flood elevation plus 1 ft. freeboard.

After visiting the area recently, Helen Johnson remarked, "As one walks around the Point neighborhood, they will see not only residences in the process of being elevated but also a number of houses that have already been elevated in years past." Whether the result of the hurricanes of '38 or '54 or recent storms, she observed, "There is certainly a history of elevating buildings in this neighborhood!"



1968 by heiress and part-time Newport resident, the late Doris Duke, the NRF continues to own two museums and a historic farm, in addition to more than 70 restored properties they put back into use in the community primarily as single-family residences. Nearly 40% of those are located in a flood zone.

In 2016, the organization introduced *Keeping History Above Water*, an initiative that specifically addresses challenges posed by sea level rise and increasing coastal storm activity to historic buildings and neighborhoods. Its inaugural national conference unfolded in Newport, where The Point became its case study. "It was one of the first conferences in the preservation field to tackle this question and I think momentum just accelerated from there," says Alyssa Lozupone, Director of Preservation at the NRF. "There's very much an appreciation for this type of conversation to happen in other communities."

Since then, the NRF and partnering organizations have brought the conversation to destinations including Annapolis, Palo Alto, St. Augustine, Nantucket and Charleston, among others. NRF makes clear that the conference is not about climate change, but instead, about what preservationists, engineers, city planners, legislators, insurers, historic home owners and other decision-makers need to know about climate change — sea level rise



Protecting Narragansett Bay from storm surges has been studied by the U.S. Army Corps of Engineers since the Great Hurricane of 1938. Of the four proposed hurricane barriers illustrated, only the Fox Point Barrier was built to protect the City of Providence. Completed in 1966, it took four and a half years to construct the barrier at a cost of \$15 million.

From *Hurricane Barriers in New England and New Jersey: History and Status after Five Decades*, by Andrew Morang, 2016. Coastal and Hydraulics Laboratory, Coastal Engineering Branch, NH-CE, Engineer Research and Development Center, Vicksburg, MS 39180, U.S.A.

in particular—and what steps can be taken to protect historic properties. The organization is also keenly aware that in Newport, historic character and contemporary livability often intersect, and change is inevitable. It's *how* the city changes and assuages the consequences of extreme weather that is at the forefront of their work. "Preservation is obviously our core mission, but I think there is a misconception that means nothing can change," says Lozupone. "We are very much open to and are currently exploring the options that are in front of us. Are we going to do adaptation measures at a basic level? Are we going to raise houses? How high are we going to raise them? We don't necessarily have all the answers, but it is something we tackle daily."

One thing all of these leaders in their fields agree on is that while Newport has its work cut out for it, the city is, comparatively speaking, ahead of the game in terms of studying the issues, analyzing the data and learning what works and what doesn't work.

"Newport in particular has done a great job through the years at advancing this," says Rubinoff. "A lot of it has been in partnership with the University of Rhode Island Coastal Resources Center and Rhode Island Sea Grant... Newport was one of the first areas we mapped [the effect of sea level rise]." Places boaters know and love, including Norfolk, Charleston and Annapolis, says Rubinoff, have similar challenges and thus, are actively working on different resilience activities, just like the City of Newport and other coastal areas in Rhode Island where Sea Grant has projected a 3- to 5-foot rise in sea level by 2100.

Rubinoff adds, "I think you really have to decide where you're going to focus those efforts because they are costly, especially for a downtown area like Newport." ★

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