


Safe Haven

City planners surge ahead with efforts to stem flooding.

by **THERESA SULLIVAN BARGER** / *photography by* **TONY BACEWICZ / ATLANTIC VISION MEDIA**

PHOTO ABOVE: As part of the City of New Haven's plan to create a "living shoreline" along East Shore Park, plans call for encouraging native grasses to provide a natural method for preventing erosion while also allowing public enjoyment of the park. PHOTOS TO LEFT: Courtesy of the City of New Haven.

More on efforts to stem flooding at **SeasonsofNewHaven.com**

When Karyn Gilvarg observed the difference between how well Florida weathered Hurricane Irma compared to how Hurricane Harvey devastated Houston, she took note. As executive director of New Haven's planning department, she has been working with a team to address city flooding for more than 20 years.

Like many seaport cities, New Haven's coastal region was built atop filled-in salt marsh. As sea levels rise, so do flooding risks.

Hurricanes "Sandy and Irene were big wake-up calls because you could see the flooding at Long Wharf coming over the road," Gilvarg says, referring to the storms that hit in 2012 and 2011, respectively. "You could see the parking lot at IKEA flooded."

Since about 1860, as global temperatures have increased, regional sea levels have risen more rapidly than during the previous 1,000 years, according to a U.S. Geological Survey and U.S. Department of Interior report. The study says scientific models predict that sea levels in Connecticut will rise about half a foot by 2020 and almost by three feet by 2080. Rising sea levels will also impact groundwater levels in New Haven, according to the report.

But New Haven, like Florida, has learned from previous storms and has improved building codes and taken other steps.

ADDRESSING AREAS AT RISK

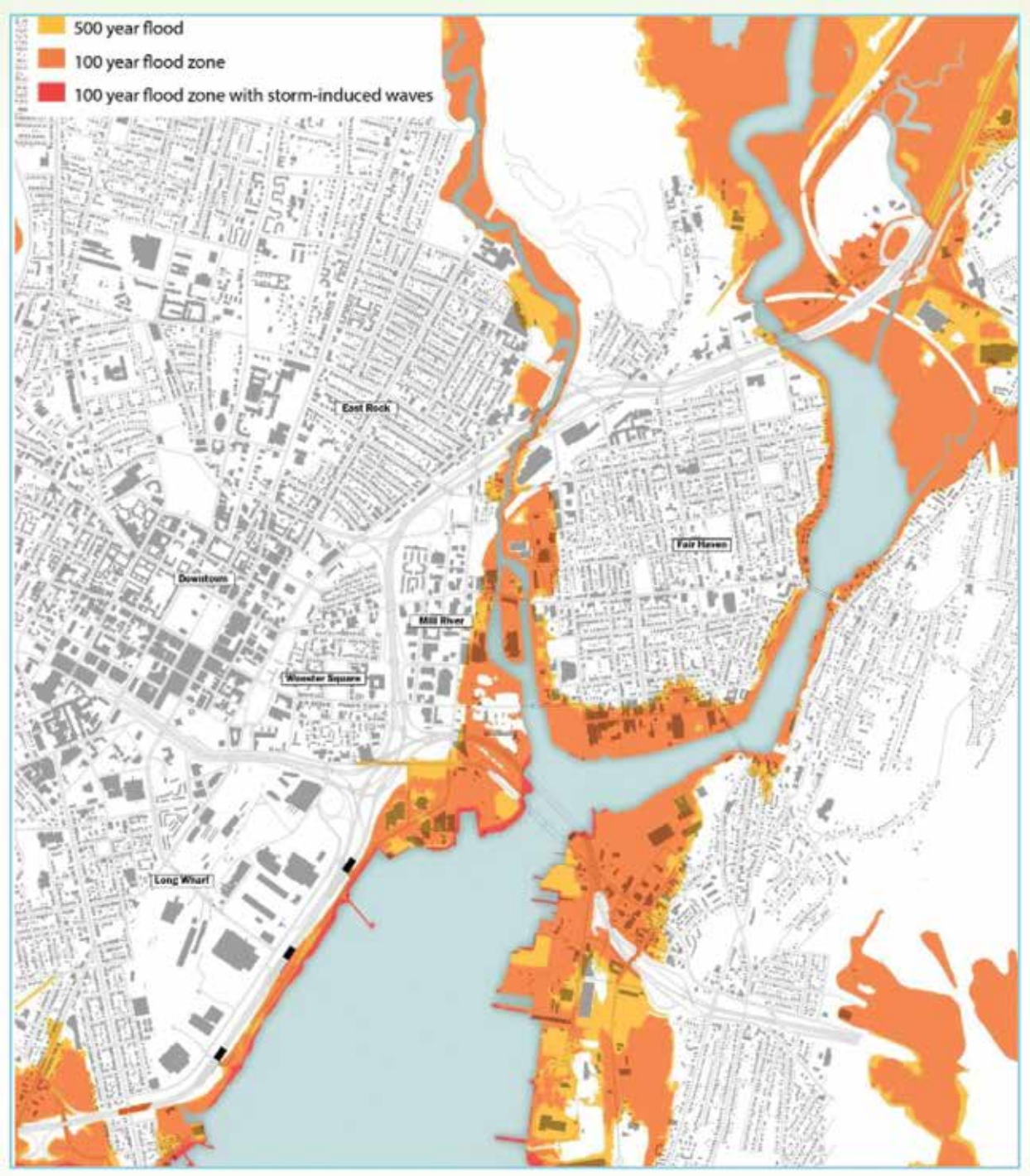
Some 1,800 parcels of land encompassing 2,564 acres are in the floodplain, either along riverbanks or in coastal or low-lying areas, according to FEMA's most recent figures.

The most vulnerable areas are those where topography is relatively flat, such as the Morris Cove neighborhood, land adjacent to the harbor, tidal areas of the Quinnipiac and Mill rivers, and the lower reaches of West River, according to the city's 2015 comprehensive plan. Rising sea levels put the Metro-North railroad station and train yard, the IKEA parking lot, the Tweed-New Haven Airport and parts of I-95 at greater risk for flooding.

In recent years, the city has completed several projects to help prevent or mitigate localized flooding and erosion, including repairing the Brewery Square promenade and sea wall, cleaning storm drains and catch basins, repairing the Long Wharf storm drain outfall and repairing River Street coastal structures, Gilvarg says.

Plans are underway for three major efforts to mitigate flooding. With a federal Community Development Block Grant, the city has installed 32 bioswales and plans at least 200 in the downtown area, says City Engineer Giovanni Zinn. Bioswales are placed between the sidewalk and the road, run five feet deep and are layered with stone, then soil, and topped with plants. They are designed to collect, hold and filter rainwater, lightening the burden on the storm

More than 30 bioswales that appear as miniature urban rain gardens were created by the City of New Haven to capture rainwater runoff and prevent flooding caused by heavy downpours and overtaxed storm drains. The city plans to install up to 300 more, 200 in the downtown area.



Source: *Mill River District Planning Study, New Haven, Connecticut, June 2013*

sewer system. They also reduce the amount of pollutants, pesticides and fertilizers that wash into Long Island Sound.

After some bioswales were installed along Daisy Street in the Newhallville neighborhood, street flooding stopped, says resident Jahmal Henderson.

"They're a good addition to our neighborhood," he says. "The water runs off into the plants. It keeps the water off our street."

The second effort focuses on the harbor. Using a 3D model of the Long Wharf area near IKEA, officials devised a plan to try to prevent flooding. While the logistics have not yet been worked out, city departments – working with the state Department of Transportation, which manages the rail yard – plan to install temporary, inflatable barriers under I-95 to block water from rushing through the underpass between Long Wharf and Sargent drives.

Since IKEA was built in 2003, the store has never flooded but it's getting harder to keep it dry, says Christof Stein, store manager.

"Water came very close a few years back when Hurricane

Looking to the future, City Engineer Giovanni Zinn is planning to reconstruct the shoreline of East Shore Park, bringing public access to the beach now separated by a steep drop from a well-used walking and bike trail. The native seagrasses that grow in the water near the shore serve as a natural buffer to absorb wave energy, helping to reduce shoreline erosion. Calling the grasses, "the first line of defense," he says plans call for creating conditions to encourage native seagrass growth as part of the city's goal to create a "living shoreline."

Sandy hit the area. It didn't make it into the store, but right to the front door, which was a strong reminder that those flooding risks are real and present," he said in an email.

"We like, of course, those ideas and initiatives, as it would prevent damage to our property in case another hurricane would hit," he said. "At this point, we are not aware of any timeline or concrete steps by when this inflatable barrier could be in place."

Before Hurricane Sandy struck, Metro-North staff moved the trains from the rail yard, says John Bernick, assistant rail administrator for the DOT. Officials installed a high-capacity pump in 2004, which solved the yard's flooding problem and worked even when Sandy hit, he says.

The third major plan, which is yet to be fully funded, calls for building "living shorelines" at East Shore Park and at Long Wharf.

"One of the biggest movements around the world is the concept of 'living shorelines,' a green infrastructure that mimics nature's systems," Zinn says.

Under living shorelines, natural elements are structured by engineers to create buffers as well as wildlife habitats. The areas also provide access to the shore.

The 82-acre East Shore Park overlooking New Haven harbor floods frequently, so officials plan to install a living shoreline that simultaneously mitigates flooding and coastal erosion. They would remove some of the retaining wall boulders along the water that were previously installed, and create a more gradual, natural slope from the park to the water. They'll take steps to encourage the growth of native grasses a few feet from the shore, replicating the ecosystem. These grasses diminish some of the wave energy, thus lessening a storm's punch.

"It's a wonderful access for people to enjoy the natural side of New Haven," Zinn said, while looking out at the harbor on recent fall day. "What we're trying to figure out is, how do we maintain that and also make the park more natural in how it deals with resiliency issues, erosion and storm events?"

Fifty years ago, the solution would have been to erect a retaining wall, but "we don't do that anymore. It's expensive. It cuts you off from the water," he says.

"We like to take a green-first approach where we look at living shorelines and other things that not only work in that 0.1 percent of the time when we have a storm, but also work every day," Zinn says. "We want to put infrastructure on the water that is beautiful, that connects people to the water."

Those who have worked with city officials say they're hampered by limited resources, but their creativity and willingness to partner with other organizations has helped them make progress on their mitigation plans.

"I think the city has done a fairly good job of anticipating the problem," says Chris Ozyck, associate director for the Urban Resources Initiative, whose employees helped install the bioswales. "It's just trying to figure out where the funds are going to come from, trying to do all this work, especially in this political climate with the state and the federal government – that's going to be more challenging. Every year that goes by without a major event is good. It buys us some time."

Pardee Seawall. Photo by Todd Fairchild

SUPPORT FROM RESIDENTS

Citizens have been crucial to helping city officials identify where roadways flood, which has helped them direct mitigation efforts, Gilvarg says.

"Believe it or not, the three times we revised the floodplain ordinance, we didn't get any pushback," she says. "We got support."

One regulation designed to mitigate flooding requires houses in floodplains to be elevated on columns if homeowners want to rebuild. Ground-level materials, such as lattice, must be able to break away easily, so that floodwaters can flow under houses.

The city's efforts have paid off. In September, the Federal Emergency Management Agency (FEMA) recognized New Haven with its highest rating for voluntarily addressing flooding, one of only two municipalities in the state to receive that rating. (Stamford was the other.)

Alderman Sal DeCola, whose home on Townsend Avenue faces Morris Cove, says that during high

During Hurricane Sandy, water flooded the IKEA parking lot and stopped right before the retailer's door. City officials have devised a plan to block off the I-95 underpass during storms to keep floodwaters from filling the Long Wharf area that includes IKEA and the Metro-North rail yard. Photo courtesy of City of New Haven.

tides, water in his neighborhood doesn't drain. He's glad the city has installed street-side bioswales to collect rainwater and reduce stormwater runoff flowing into the harbor. Nearby Dean Street used to flood, he says, but not anymore.

"The city has continuously done their job," DeCola says.

But one issue worrying residents is the added costs of living in a flood zone.

"The most concerning thing to my residents is flood insurance," he says.

Most of the houses in his district are in the flood zone, and mortgage companies require homeowners to purchase flood insurance from FEMA, which runs about $5,000 annually for $250,000 in coverage.

Residents were pleased that the FEMA rating could lower their insurance premiums by 15 percent, he says.

FUTURE PLANS

The city is exploring other green solutions, such as installing "oyster castles" – multifaceted concrete blocks that are placed on tidal mud flats under the water's surface, and over time, grow oyster colonies, Gilvarg says. Oyster castles help accelerate re-establishment of the natural environment. They also weaken waves, so the oysters simultaneously clean the water, help form a natural habitat for sea life, and reduce erosion and storm damage, she says.

These would be paired with a "structured" solution. To give the low point of I-95 additional protection, the city is looking at building a low wall in Long Wharf's Vietnam Veterans Memorial Park, which stretches for more than a half mile along the edge of tidal mud flats.

Old maps show that today's flooding woes prevail in the places that were once creeks, tidal areas or marshes.

Says Gilvarg, "It's nature reasserting herself."