## Shore's back bay areas struggle with flooding

**By Kirk Moore and Kristi Funderburk, Asbury Park (N.J.) Press** *Posted: February 18, 2014*

**SEASIDE HEIGHTS, N.J.** — It doesn't take a superstorm, just a steady rain, to flood Frank Santora's street. Water runs down Bayside Terrace into the lagoon, and when it rises above the storm-water valve, which it frequently does, it bubbles back into the street, where it sits until it evaporates, he said.

"Even if they redo everything, the fact of the matter is, there is too much water volume in that area," he said. "It's a big issue."

Outdated infrastructure and the limited protection offered by bulkheads have long contributed to frequent floods in many of Ocean County's back bay communities, even without storms as strong as Sandy. And with sea-level rise, it will only get worse, says Kenneth Miller, a Rutgers University professor of earth and planetary sciences, who has spent a career studying sea-level fluctuations over millennia. He also has a summer home in Waretown that was nearly wrecked by the storm.

With sea level trends, Miller said, house elevations should be two feet higher than the latest recommendations from government flood-mappers, to prepare for midcentury conditions. It is not that far off, he warns: "My son will be paying a mortgage in 2050."

One foot of sea-level rise would inundate more than 10,000 acres along New Jersey's bay shores and could take 58,800 acres from the low-lying back-bay sides of barrier islands, according to one research group working with the federally sponsored Rebuild by Design post-Sandy project. In square miles, that is nearly equal to the entire northeast corner of Ocean County, from Point Pleasant to the Toms River.

Most at risk will be lands that a century ago were marginal swampland, but dredged and filled in the mid-20th century to create thriving bayside neighborhoods of summer and year-round homes enjoyed by generations. They were hit hard by Sandy, and in late 2013 about 26,000 residents were still displaced, according to Ocean County officials.

Jason Hellendrung, a principal of Massachusetts-based Sasaki Associates, part of Rebuild by Design, said that with some sea-level rise projections of 31 inches by 2050, a loss of property along the Jersey Shore could mean a $526.6 million drop in annual tax revenue for the entire state. That is, unless some changes are made.

Heading the Rebuild by Design group is Henk Ovink, who served as the second-in-charge of a department in the Dutch government that deals with planning and water. While it was largely Sandy that brought flood planning to the forefront here, the Netherlands, where Ovink hails, started it about 800 years ago. The Dutch are also advising engineers and flood plain managers in Louisiana as they continue to raise defenses overrun by Hurricanes Katrina and Rita in 2005. Ovink says about 60 percent of the Netherlands is at risk from flooding.

A catastrophic storm in 1953 that killed more than 2,000 people around the North Sea in a single night launched the Dutch into a modern era of flood control engineering, from bigger dikes to massive moving floodgates that seal off harbors. But in the Netherlands, they also are recognizing limits. After much controversy, there are decisions being made to buy out farmers and homeowners in high-risk areas, in preparation for what Dutch planners worry may come out of the North Sea in this century.

At the Jersey Shore, teams of scientists and experts have been exploring how to resolve some of the more immediate flooding problems that plague bayside homeowners as part of a state-commissioned study.

"They have had to struggle with flooding from low-lying areas around Barnegat Bay. It's going to get worse with rising sea level. We know that. We're anticipating that and there need to be strategies put in place," said Michael Kennish, a Rutgers research professor at the Institute of Marine and Coastal Science in New Brunswick.

Rutgers, Stevens Institute of Technology, New Jersey Institute of Technology, Richard Stockton College, and Monmouth University were tapped to evaluate flood mitigation strategies in the areas of the state hardest-hit by Sandy. The state plans to incorporate these findings, due out around the spring, into its work with the Army Corps of Engineers on its $20 million comprehensive study of the coastal North Atlantic Region.

Kennish said the Rutgers team has been visiting municipalities such as Seaside Heights, Toms River, Point Pleasant, and Little Egg Harbor to speak with officials, tour the areas, and analyze what creates flooding so they can come up with affordable ways to plug the problem. They hope to map out a variety of solutions, whether fixed or mobile, permanent or temporary, and fit for small floods or major storms, so they can be applied in any community, said George Guo, principal investigator for the Rutgers component.

Guo, a professor of civil engineering at Rutgers, said many factors, from a spike in development to inadequate drainage, explain why these communities are more prone to flooding. Rising sea level and runoff have stressed storm-water infrastructure, such as storm-sewer pipes and drainage ditches, which need to be improved or redesigned to continue to be effective, he said.

Some issues can be addressed in the short term to help communities that are still vulnerable from mud- and silt-laden ditches, channels and drainage system and dune washouts, but sea-level rise will demand long-term solutions, too, Guo said.

Last winter after Sandy, repeated high storm tides kept bayside residents on edge. "We had two really serious high-water events after Sandy, and that really got to people," said William deCamp Jr. of Save Barnegat Bay, a local environmental group.

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