

Hoboken's Post-Sandy Resilience

Learning from the past, rebuilding for the future

HIGHLIGHTS

Hoboken, New Jersey, experienced unprecedented flooding from Hurricane Sandy. The storm inundated much of the low-lying "Mile-Square City" and caused millions of dollars in damage. A history of ignoring science in developing infrastructure had left this urban coastal community vulnerable to increasing risks from sea level rise.

Hurricane Sandy marked a turning point. City leaders recognized that flooding was not just a chronic problem but a worsening one, and that science would need to be part of the solution. In August 2013, Mayor Dawn Zimmer released the Hoboken Resiliency and Readiness Plan, which takes a science-informed approach to preparing the city for the challenges it will continue to face from climate change.

When Hurricane Sandy's heavy rains and unprecedented storm surge reached low-lying Hoboken, New Jersey, on October 29, 2012, the streets—in the words of Mayor Dawn Zimmer—filled up with water “like a bathtub.” The storm ultimately caused more than \$100 million in damage to Hoboken.

This urban, coastal community just across the Hudson River from New York City has a long history of flooding and misguided urban planning. However, the destruction produced by Sandy's record 14-foot storm tide was unlike anything the city had ever seen, and Hoboken's general lack of preparedness was compounded by its residents' moderate degree of “social vulnerability” (that is, a limited ability to respond to disasters due to factors including income, vehicle access, and family stability).

Sandy made city leaders finally recognize that sea level rise has the potential to turn an already bad situation into a potential catastrophe, and that action was needed. Now, strong political leadership, careful consideration of science, and evidence-based decisions are making a difference in Hoboken, both in its rebuilding and its preparations to meet the challenges of climate change. Fully implementing the mayor's plan will take sustained leadership and community commitment, but Hoboken must also resist falling back into a bad habit of routinely ignoring science.



The dangers of ignoring science: during Hurricane Sandy, an estimated 20,000 Hoboken residents were completely surrounded by water.

Science-based Policies at All Levels

The August 2013 Hoboken Resiliency and Readiness Plan aligns with recommendations of the federal government’s Hurricane Sandy Rebuilding Task Force. The Task Force Advisory Group, of which Mayor Zimmer is a member, provides state, local, and tribal leaders the opportunity to inform federal policy makers about their communities’ needs.

Flood mitigation and storm water management are crucial science-based components of Hoboken’s plan, and are seen as growing challenges due to “the effects of climate change and extreme storm events.” Installing three “wet weather” pumps—an action the city had been delaying for years—is now a priority. But achieving resilience in the face of sea level rise will take more than pumps. As Michael Bruno, dean of Hoboken’s Stevens Institute of Technology’s Schaefer School of Engineering and Science, explained, “You can’t pump against the entire Atlantic Ocean.”

Additional storm water management strategies include rain gardens and conversion of land in a Federal Emergency Management Agency Coastal High Hazard Zone to parks and open space, with water retention facilities incorporated into the design. Hoboken has already received more than half a million dollars from Re.InvestInitiative.org, a public/private partnership, for technical assistance in designing “green” infrastructure. Other elements of the plan address energy resiliency, shoreline protection, critical facilities and infrastructure, emergency notification, public information access, building codes, and a local task force.

The worst effects of sea level rise are not projected to occur for several more decades, and subsequent city leaders will need to sustain the efforts Hoboken has begun.

The Risks of Ignoring Science

Hoboken’s leaders have not always supported science-informed policies. Long before Sandy, the city made decisions



A sailboat carried inland by Hurricane Sandy in Hoboken. Damage caused by Sandy’s unprecedented force was a wake-up call about the risks of ignoring science.

that increased its exposure to flood risks—risks that have been exacerbated by sea level rise but can be mitigated by science-based policies.

During the mid-1800s, local decision makers chose to drain a tidal marsh on the western side of town to make way for expanding development. Repeated flooding of the streets and structures built during this era—many of which remain in use—is a lasting consequence of those early decisions, but an even greater concern today because of the worsening effects of sea level rise (as the significant flood damage from Sandy shows).

In the 1990s, developers and politicians ignored the warnings of scientists and engineers about the risks of building on top of existing, aging infrastructure in a potentially harsh coastal environment. Old docks and marinas along Hoboken’s waterfront were turned into parks, walkways, and roads, some of which collapsed prior to Sandy due to corrosion and mollusks boring into 100-year-old wooden support beams. Repairs cost the city millions.

Even after Sandy, new science-informed local policies have been threatened by state lawmakers. But in one fortunate exception, Governor Chris Christie vetoed bills passed by the New Jersey legislature that would have permitted even riskier waterfront development. The proposed residential and commercial structures, built on top of piers, would have been especially vulnerable to storms like Sandy, whose high waves

and storm surge were amplified by high tide and sea level rise. That level of risk would have jeopardized Hoboken's ability to participate in the National Flood Insurance Program and endangered not only property but also people's lives.

Community Exposure to Extreme Weather

Rising seas caused by climate change create a higher launching pad for water entering the city via high tides and storm surges. And nowhere in New Jersey is this threat greater than in Hoboken.

Unlike more sparsely populated beachfront communities along the Jersey Shore, Hoboken has a high density of both population and buildings and infrastructure. The result is that Hoboken has the largest population exposed to flood risk among all New Jersey cities: 53 percent of its 50,000 residents live less than five feet above the local high tide line. And Climate Central has determined that "the chances for floods topping 5 feet by midcentury are significant throughout the region under all sea-level-rise scenarios."

Much of the city's vital infrastructure also lies below the five-foot mark. All of Hoboken's fire and EMS stations,

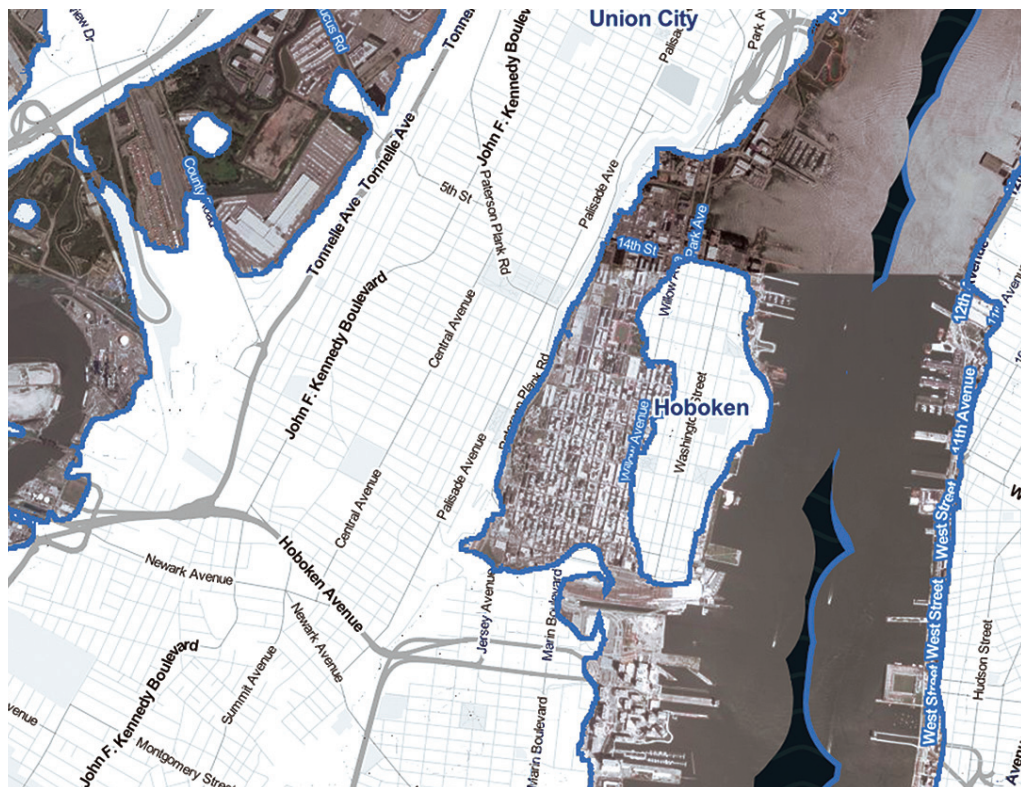
hospitals, libraries, community centers, rail and ferry stations, sewage plants, and major hazardous waste sites are below the five-foot mark, along with 57 percent of its houses of worship, 57 percent of its roads, and 50 percent of its schools.

Hoboken's residents of color are disproportionately affected by flood risk. While 52 percent of the city's white residents live below the five-foot mark, 57 percent of nonwhite residents and 62 percent of African-American residents live in these low-lying areas.

Furthermore, nearly Hoboken's entire population—91 percent of all residents—is considered more socially vulnerable than other New Jersey communities. That is, residents' ability to prepare for, respond to, and recover from floods and other natural disasters may be hindered by such socioeconomic factors as their income level, education, age, family structure, language, housing, and access to a vehicle.

Sandy's Impact: A Turning Point

Scientists accurately predicted that when Sandy came ashore it would have devastating consequences. Though it was technically a post-tropical cyclone (i.e., its winds were no longer



Things below +5 feet in Hoboken, New Jersey

Population	26,089	52.2%
Homes	14,311	53.3%
Acres	464	58.4%

Over 1 in 6 chance sea level rise + storm surge + tide will overtop +5 feet by 2030 at nearest flood risk indicator site: The Battery - New York Harbor, 3.2 miles away.

Much of the western side of Hoboken lies less than five feet above the average high tide. This map depicts flooding in Hoboken when water—driven by a combination of sea level rise, storm surge, and high tide—rises at least five feet above the average high tide. Hurricane Sandy brought a 9-foot storm surge on top of a higher-than-average high tide.

SOURCE: CLIMATE CENTRAL

officially hurricane-strength when it made landfall), Sandy was so unprecedented in its impact on a major metropolitan area that forecasters and the media called it a “superstorm” and “frankenstorm.”

Damage to Hoboken was extensive not only because Sandy was an unprecedented storm but also because effective, science-based recovery and resilience measures had never been established.

Damage to Hoboken was extensive not only because Sandy was an unprecedented storm but also because effective, science-based planning and preparedness measures had never been established. The city suffered more than \$100 million in damage to private property including more than 1,700 homes, hundreds of millions in damage to the mass transit system, and \$10 million in damage to city property.

Additionally, more than 200 businesses were flooded, and struggled to stay open in the ensuing weeks. Many reported up to a 60 percent drop in revenue more than a month after the storm. Even businesses not directly affected by flooding experienced significant decreases in revenue due to transportation disruptions; the closure of Hoboken’s train station made it difficult for residents to get to work in New York City and also prevented New Yorkers from visiting Hoboken.

To make matters worse, both residents and business owners had difficulty accessing financial aid. Mayor Zimmer,

in December 2012 testimony to the U.S. Senate Committee on Small Business and Entrepreneurship, described “an insurance gauntlet” Hoboken faced “because the National Flood Insurance Program is not designed to meet the needs of the built urban environment.”

Many flooded property owners in Hoboken thus found themselves high and dry when it came to their financial recovery. Zimmer stressed the need for policies that support both infrastructure and financial resilience, and suggested that, “rather than denying people coverage, businesses and residents should be given incentives to invest in taking the necessary steps to reduce the impact of flooding.”

A Proactive Approach to Science-based Policy

Given Hoboken’s history of avoiding long-term solutions and ignoring scientific evidence in favor of unsustainable development and short-term gains, it would be premature to conclude that its post-Sandy plans will succeed. The worst effects of sea level rise are not projected to occur for several more decades, and subsequent city leaders will need to sustain the efforts Mayor Zimmer has begun.

Rebuilding and planning for the extreme weather that accompanies global warming must consider the needs of all Hoboken residents, including the most vulnerable: the elderly, the young, and low-income communities. Political resolve will be needed to resist a continuing push from overzealous waterfront developers. And policy makers at the state and federal levels must continue to support local preparedness and resilience efforts.

These caveats aside, Hoboken is better prepared to respond to sea level rise today than it was before Sandy. Mayor Zimmer’s proactive approach to science-based policy should serve as a model for leaders in other coastal communities that are being forced to contend with the effects of climate change.



FIND A MORE DETAILED VERSION OF THIS CASE STUDY (INCLUDING REFERENCES) ONLINE:
www.ucsusa.org/hoboken

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