

Nature Hasn't Forgotten'

Coastal Development and Hazard Mitigation



Rhode Island and the Hurricane of '38

"On the afternoon of September 21, 1938, a hurricane of subtropical origin whirled out of the Atlantic Ocean and struck the northeast shore of the United States at Long Island. It advanced with ever-increasing speed and wind velocities... Before night fell, 312 men, women, and children were dead¹ and missing in [Rhode Island] and on the immediately adjacent shores of Massachusetts summer resorts ...

"Never in history had such a disaster visited these shores It was so alien a thing: an anachronism, that did not belong here in a northern latitude."²

Mistakes of the Past

Repeated three times in the sentence above is the idea that the hurricane was out of place in every way—without precedent, happening at the wrong time and in the wrong place. But a devastating storm had struck Rhode Island less than half a century earlier, and would happen again, twice, just a few years later.

The Hurricane of '38 drowned the streets of Providence under nearly 14 feet of water that surged up Narragansett Bay from the coast. The storm destroyed boats, homes, and other property throughout Rhode Island at an estimated cost of \$100 million.³ Shortly afterwards, the Providence Journal Company published a reflection on the damage, which ended with the assurance that "with proper permeable jetty construction...and by a proper location of hotels and summer residences back from the shore...Rhode Island can not only repair the damage, but build to an even greater

beauty as a recreation centre...with security to life and property as well." Just a few years later, Rhode Island was hit by another hurricane, and in 1954, Providence was again flooded by a hurricane, which killed 19 Rhode Islanders. It was not until 1961 that construction began on a hurricane barrier to safeguard Rhode Island's capital city from the storm surge that devastated the coast.

"In the wake of a hurricane, there is a brief political opportunity to implement new standards, because public memory is very short. After a storm is the only time that John Q. Public says, 'I don't want this kind of destruction to happen again,'" says Jeff Robinson, shutter manufacturer, in John Tibbets' "Racing to Catch up: South Florida's hurricane threat and building codes."⁴ He adds that the period shortly after a disaster is the best time to toughen hazard mitigation measures.

Compounded with this complacency is the problem that more and more homes and businesses are being constructed in high-hazard areas, although there is controversy as to why. According to one argument, the accessibility of low-cost insurance for building in flood-prone

for adopting stringent flood plain management measures and retrofitting existing structures, communities qualify for insurance through NFIP.

Availability of flood insurance is not the only reason that people are building in high-hazard areas. Graham Giese, recently retired Woods Hole Oceanographic Institution Sea Grant coastal processes and hazards specialist, notes that people simply *like* living along the water's edge. One study that Giese supervised used anthropology as well as geology to look at coastal erosion problems as a community problem. This work challenged the usual perception that people in high hazard areas simply need information and education. "There's something deeper than that ... We have a cultural commitment to coastal living," Giese says. He emphasizes that hazard studies should include anthropologists to examine cultural motivations for living along the coast and what can be done from a cultural perspective to mitigate hazards. Giese notes that some Cape Cod residents, whom he calls "the cliff dwellers of Truro," are intelligent, wealthy people who choose to live in a high-hazard area along the coast. "Maybe the hazard is part of the fun," he speculates.

Some, however, do not know—or choose not to know—about the dangers of living along

areas, available since 1968 through the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), encourages people to build in areas previously uninsurable. In the 10 years following the inception of the NFIP, deaths and damages from floods more than doubled.⁵ FEMA's argument, however, counters that the escalating costs of sponsoring engineering solutions to flooding (dams, levees, hydroelectric power and irrigation) and of paying out disaster relief assistance prompted the government to create NFIP, which combines the protection of insurance with the preventative strategy of hazard mitigation. In return

¹ Actually, the Hurricane of '38 killed 262 Rhode Islanders. Henderson, Linda L., editor, and Patricia E. Pothier, assistant editor. 1992 *Journal-Bulletin Rhode Island Almanac*. The Providence Journal Company, Providence, 1992. p. 257. A total of 600 people died as a result of the hurricane, according to The Weather Channel on-line, http://autocobrand.weather.com/breaking_weather/encyclopedia/tropical/history.html.

² *The Great Hurricane and Tidal Wave * Rhode Island, September 21, 1938*. Providence Journal Company.

³ Henderson and Pothier, p. 257.

⁴ Tibbets, John. "Racing to Catch up: South Florida's hurricane threat and building codes." Report for the National Oceanic and Atmospheric Administration Coastal Services Center and the S.C. Sea Grant Consortium. <http://www.haznet.org/text/sflhurricane.html>.

⁵ "Rising Sea Level." From *Global Environmental Change—Past, Present and Future*, Karl Turekian, Prentice Hall, NJ, 1996. http://www.woodrow.org/teachers/estj/1997-98/GLOSSARY.htm#RISING_SEA

Left: Hanging out to dry. Courtesy the Rhode Island Historical Society. RHI (x3) 6319. Anonymous. Water damage in Arcade after 1954 hurricane. Providence, R.I. 1954. Silver print. PHOTOGRAPH. Lot 259.

the coast. Or, they are unaware of some of the *other* consequences of building in a hazard area, such as restrictions on the use of their property. Heather Crawford, Connecticut Sea Grant Extension associate educator, says that there are few areas along Connecticut's coast that are vulnerable to natural hazards, since much of the coastline is protected by Long Island. "There are only four or five areas where you get winter storm erosion," Crawford says, and those areas are well documented. Most of the people living in them know the potential hazards, but "new people who come in and build don't know." And the coastal population is expanding. Driving along highly developed coastal areas, Crawford often wonders "how they're still managing to slide houses in between" the ones already there.

Hazard mitigation regulations in such areas can come as a surprise to new property owners. Connecticut Sea Grant's goal is to work with municipal officials and real estate agents to educate them and, in turn, home buyers.

According to Crawford, trouble starts when someone spends a lot of money for coastal property and then can't get a permit to cut down vegetation and build a dock. Such property owners often blame their real estate agents for having misled them. And Crawford notes that "Realtors ... can get sued if they give misinformation at the point of purchase." Title searchers who omit telling property owners that half of their land lies in a hazard area can also face homeowners' ire. That detail means that if more than 50 percent of their property is destroyed, the homeowner can't rebuild. "With the amount of money people spend to buy coastal property, misinformation is really starting to have an impact [for real estate agents and those who do title searches]," Crawford says.

Hidden Costs: Long-Term Business Loss

Immediate damage to personal property, though one of the most visible effects of natural disaster, is not the most severe. Businesses suffer from natural disasters, and those economic effects can threaten entire communities. Just how well businesses recover after a disaster has an enormous impact on how well communities recover. The Rhode Island Hazard Mitigation Project, a partnership of Rhode Island Sea Grant, Coastal Resources Center (CRC), and various industry groups and federal and state agencies, is trying to address this problem.

Stephen B. Baruch, Stephen B. Baruch & Associates president, points out that "recovery is a different critter" from pre-disaster mitigation efforts. Baruch, whose firm is a Rhode Island Hazard Mitigation Project partner, explains that communities must contend both with actual damage and the perception of damage—even after recovery has taken place. For instance, tourists routinely steer clear of hurricane-devastated resorts long after the areas have been repaired. Another problem confronted by recovering towns was evident in Charleston, S.C., after Hurricane Hugo in 1989. The town saw a boom for businesses in charge of cleaning up and rebuilding, with carpenters, electricians, and plumbers in high demand in the 18 months following the hurricane. However, after the rebuilding was completed, construction fell into a lengthy bust.

Damage from natural disasters also frequently results in an interruption in business. Businesses that are forced to close temporarily after a disaster face costs beyond cleanup and repair.

"Most large businesses don't keep inventory," Baruch says. Consequently, suppliers whose business is interrupted by a disaster have a very short time to resume supplying companies

with merchandise to keep their shelves stocked. And, since contracts tend to be annual, once a customer turns to a new supplier, the old one must wait to find new customers.

"The status quo is very hard to find," after a disaster, Baruch explains. "A high percentage of companies fail within two years of a disaster."

The insurance industry offers policies that cover not only structural and content losses (buildings and merchandise) but also business interruption insurance, which covers income lost while businesses are down, says Diana McClure, Institute for Business and Home Safety (IBHS) director of showcase communities and special projects. The IBHS is an insurance agency initiative whose mission is to "reduce deaths, injuries, property damage, economic losses and human suffering caused by natural disaster." Business interruption can represent a large loss for insurance companies but is an even bigger loss for businesses, which may lose market share. McClure points out that small businesses and communities feel the biggest losses. "Large companies can transfer work to another plant. If they close up shop there and move somewhere else... that affects property taxes in the area, sales tax revenues, [and] employment."

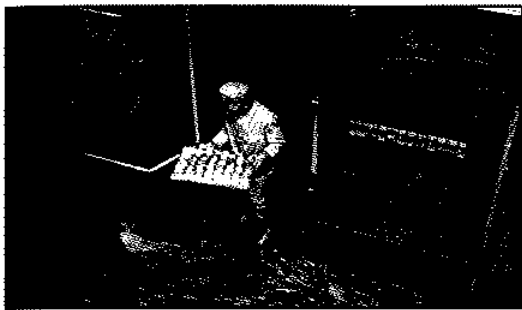
To help combat losses from natural disaster, IBHS initiated its Showcase Communities program, which funds community pilot hazard mitigation efforts, such as retrofitting existing structures to better withstand hurricane winds and flooding. One community from each state is chosen as a model for other communities in that state. Rhode Island, due to its size and pioneering efforts in mitigation, has been chosen as the only Showcase State in the nation and is a national model for hazard mitigation.

The Rhode Island Hazard Mitigation Partnership, consisting of Rhode Island Sea Grant,

the Coastal Resources Center, Rhode Island Emergency Management Agency (RIEMA), FEMA, IBHS, and Rhode Island FAIR Plan (another insurance industry group) has developed a partnership with industry called the Disaster Recovery Business Alliance. The idea is to get businesses involved in hazard mitigation and recovery efforts.

In the past, businesses were largely unaware of the resources available for mitigation and recovery. This may be changing, however. In October 1998, Rhode Island Sea Grant cosponsored a business needs assessment workshop to help determine how the Rhode Island Hazard Mitigation Project could help businesses recover more quickly from disaster. In February 1999, FEMA sponsored an interactive flood mitigation and recovery exercise in Warwick, R.I., one of the original FEMA Project Impact communities (Project Impact is a hazard mitigation initiative). Local government officials and business representatives examined recovery options such as rebuilding (or not) in flooded areas, elevating buildings, and tapping resources (i.e. low-interest rebuild loans). Pamela Pogue, CRC/Rhode Island Sea Grant hazard mitigation project manager, says the flood exercise was one of three in the nation (the others were hurricane and earthquake exercises) designed to be models of mitigation and recovery techniques. According to Pogue, businesses, which already have pre-disaster contingency plans, wanted to focus on recovery. "That's where they have the most at stake," she notes.

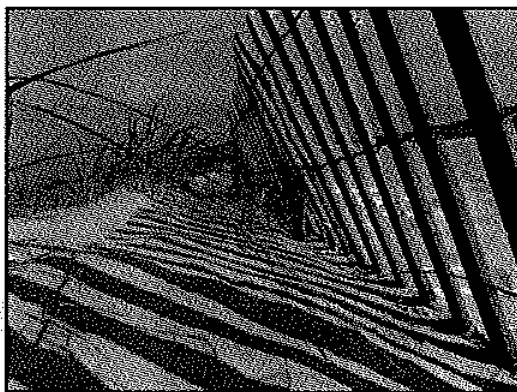
In other Northeastern states, coastal processes such as erosion are the natural hazards of primary concern. Joseph T. Kelley of the Maine Geological Survey has studied erosion, with Sea Grant support, along the two elements of Maine's "soft" coast—beaches and bluffs, both of which pose regulatory and mitigation problems. "Bluffs are an unregulated environment



Left: Time to save the doughnuts. Courtesy the Rhode Island Historical Society. RHi (x3) 9087: Anonymous. 1954 Hurricane flooding: Anderson's Luncheonette. Providence, R.I. 1954 PHOTOGRAPH. Lot 259.

Below left: Clearance. This swimsuit stand found itself at least temporarily out of business after a recent hurricane. Photo courtesy of University of Rhode Island.

Below: Dune grass has been planted on Rhode Island beaches to prevent erosion. Photo courtesy of University of Rhode Island



in Maine. They're upland...your homeowner's insurance doesn't cover you if you experience a landslide," says Kelley. In the mid-1980s, Kelley and Stephen M. Dickson, also of the Maine Geological Survey, tried to get a more accurate picture of the coastal processes taking place in Maine, and, based on their work, produced erosion maps that are available from the Maine Geological Survey. "Every topographical quadrant of Maine's coast will be done eventually," he says.

Maine "is moving toward local beach management plans," Kelley says, with assistance from local and state officials, the state planning office, and homeowners. Kelley received Sea Grant funding to monitor beaches using data from an off-shore buoy and the observations of homeowners' groups. Through these efforts, Kelley hopes to "broaden our understanding of what is a beach." He adds that with all the development in coastal areas, people don't realize they're on sand dunes, but "nature hasn't forgotten."

One tactic for fighting beach

erosion that Maine plans to use is taking 200,000 cubic yards of sand from a planned dredge to add to beaches. According to Kelley, however, this added sand will not last long. Nevertheless, he notes, "For people dying of thirst, even salt water looks pretty good."

What's at Stake

As with most other Northeastern states, New York's threats from coastal processes are exacerbated by development. On Long Island's South Shore, a densely populated 135-mile strip of coastline, erosion or flooding threatens \$3 billion to \$10 billion worth of property and infrastructure. However, a collaborative study by New York Sea Grant, the Long Island Regional Planning Board, and the New York Coastal Management Program found that the absence of a consistent source of information hampered sound hazard management decisions. The collaborative provided technical background material to improve management of the South Shore of Long Island.

This idea of a "clean slate" is a problem hazard mitigation efforts everywhere seem to face—people are aware that they are at risk, but, despite recurrent hurricanes, floods, or other events, do not know the magnitude of their risk. The town of Freeport, N.Y., experiences flooding, says Jay Tanski, New York Sea Grant Extension coastal erosion specialist, but the exact extent or frequency of flooding is uncertain. The town recently received \$1.1 million from FEMA's Project Impact to raise structures and roads in the business district, and New York Sea Grant is working with the South Shore community to assess vulnerability to natural hazards.

History Lessons

To give hazard mitigation efforts a historical base from which to move forward, New York Sea Grant teamed up with the U. S. Army Corps of Engineers and the New York Coastal Management Program to create a geographic information system database of historical and current coastal events. The team

monitors such things as the configuration of the coastline and wave activity. New York Sea Grant will disseminate information from this database, providing town planners with area profiles, enabling them to plan better for hazard mitigation.

In creating effective hazard mitigation plans, there are difficulties that go beyond a lack of knowledge. Tanski warns that "each of these systems is different ... it's hard to develop a coastwide approach because of the way the shoreline responds." He recommends that hazard mitigation efforts be tailored on a site-by-site basis.

And what about the people? Long Island, Tanski notes, is highly developed, making social impacts difficult to mitigate for: "There's no place to retreat, and there's a lot of people."

And people themselves contribute to variables that affect planning for erosion and hazards. Land forms sustain themselves as part of a system. Sand eroded from barrier beaches accretes on other barrier beaches, salt marshes, and dunes. Each of these has a role in storm damage and flood protection. Building sea walls, dredging channels, building homes on barrier beaches, and adding nourishment all affect this self-sustaining system. "Human activity is a major coastal process today," says Giese. "In many places, it's the most important coastal process."

As we increasingly affect and are affected by coastal processes, planning for hazards becomes ever more difficult, and crucial. As much as we rely on new information to predict the effects of hazards, we must not ignore the copious information we already have: Hurricanes, coastal storms, erosion, and floods are not alien things or anachronisms. As elsewhere, they are a part of life in our northern latitude.

■ *Monica Allard is a Communicator for Rhode Island Sea Grant*