

Understanding hurricane risks—5 essential reads

June 1 2018, by Jennifer Weeks



Hurricane Irma passes Cuba and approaches southern Florida on Sunday, Sept. 10, 2017, with Hurricane Jose at lower right. Credit: NASA

June 1 marks the start of the 2018 Atlantic hurricane season, with some communities [still rebuilding](#) after last year's largest storms.

The National Oceanic and Atmospheric Administration is predicting a 75 percent chance that this year's hurricane season will be [near or above normal](#). That translates to 10 to 16 named storms, with winds at or above 39 miles per hour. Of these, five to nine could become hurricanes, with winds at or above 74 miles per hour, including one to four hurricanes that reach category 3, 4 or 5, with winds of 111 miles per hour or higher.

Five stories from the past year offer insight into the complexities of preparing for and recovering from major hurricanes.

1. Flooding is a risk near coasts and inland

Flooding is the most serious risk during hurricanes and other major storms. In coastal areas, high tides and storm surge are factors in flooding risks. But when Louisiana State University geographer Nina Lam studied development patterns in the United States, she found that development was declining in most coastal flood zones, but was increasing in flood zones inland.

Why the divergence? Lam suspects that people who experience flooding in [coastal areas](#) may move inland, but not realize that they are still vulnerable if they settle in inland flood zones. She calls for more education and communication about flood risks in inland communities, as well as support for affordable housing located away from flood zones.

2. When sea level rise speeds up

In another study, scientists at the University of Florida showed that converging natural variations in Earth's climate patterns have repeatedly created "hot spots" for [sea level](#) rise along the Eastern Seaboard over the past century. When these zones form, sea levels can rise up to six times faster than the global average for one to several years.

"These hot spots amplify the severity of [coastal flooding](#) that is already occurring from storms and king tides," civil engineer Arnoldo Valle-Levinson and geologist Andrea Dutton write. "Residents between Charleston, South Carolina and Jacksonville, Florida – a stretch where sea levels are at least 4 inches (10 centimeters) higher now than they were in 2010 – have found this out the hard way." They also see signs that this pattern is occurring along the Louisiana and Texas Gulf coasts.

3. People with lower incomes suffer most

Even in well-prepared communities, some residents have far more resources than others to weather storms and rebuild afterward.

Historian Chris Sellers, who studies equality and social justice at New York's Stony Brook University, analyzed damage across Long island from Superstorm Sandy in 2012 and found that low-income and minority communities suffered more damage than their affluent neighbors. Well-off residents typically lived on higher ground, and their neighborhoods were zoned less densely, which enabled them to soak up floodwaters.

Similarly, many lower-income residents could not afford to buy flood insurance on their homes or pay out of pocket to rebuild afterward. Federal and state aid helped, but came so slowly that five years after Sandy, one-third of homeowners who qualified for state rehabilitation money were still restoring their homes.

"Now more than ever, we need a nationwide conversation on ways our coastal landscapes have developed so that our most vulnerable citizens are now at greater risk from such massive storms," Sellers states.

4. Older adults may need special help afterward

Disaster response operations after major storms typically last days to weeks. But Sue Ann Bell, a clinical associate professor of nursing at the University of Michigan who has worked in these efforts, warns that impacts on the elderly can be long-lasting.

"Age alone does not make people more vulnerable to disasters, but many health issues that are common with aging do, including frailness, memory impairment, limited mobility and chronic illness," Bell writes.

In a study that analyzed a 2011 tornado outbreak in the southeastern United States, Bell found that hospital admissions among older adults who lived in a ZIP code with a tornado touchdown increased over the 30 days after the disaster by 4 percent – a rise that translated to hundreds of additional hospital admissions.

"The aging U.S. population has a rising incidence of chronic diseases requiring consistent health care, such as diabetes, hypertension and obesity. If these health needs were being met in the tornado zone after the disaster, these patients may not have had to be hospitalized," Bell observes.

5. Protecting natural barriers pays off

Coastal experts have long understood that wetlands play valuable roles slowing storm surges and soaking up floodwaters. In a study funded by Lloyds' of London and using insurance industry storm surge models, coastal engineer Siddharth Narayan and marine scientist Michael Beck of the University of California, Santa Cruz sought to calculate the value of this natural service.

By analyzing flooding along the Atlantic coast during Superstorm Sandy, and then modeling how much more severe these impacts would have been without any coastal wetlands to buffer them, they estimated that

existing wetlands had prevented more than US\$625 million in direct property damages during this single storm. On average, from Maine to North Carolina, they estimated that wetlands and marshes reduced damage by 11 percent.

"Protecting coastal ecosystems is not a full remedy for coastal risks, but it should be part of a portfolio of solutions, from elevating buildings to strengthening levees to flood proofing," Narayan and Beck conclude.

"Beyond [hurricane season](#), coastal communities face a crucial question: whether they can rebuild in ways that make them better-prepared for the next storm while also conserving their natural resources. Our work shows that the answer is yes."

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