

INFORMED DECISIONS ON CATASTROPHE RISK

Hurricane Sandy's Storm Surge and the NFIP

Flood Insurance Coverage in New York and New Jersey

Following the devastating storm surge and flooding from Hurricane Sandy, concerns have been raised about the status of flood insurance in the United States.

- Residential flood insurance is primarily provided through the federally run National Flood Insurance Program (NFIP).
- Interestingly, only a handful of states account for the vast majority of policies and coverage in the program. The top 5 states by approximate number of policies-in-force are:
 1. Florida: 2.06 million policies (\$475 billion in coverage)
 2. Texas: 650,000 policies (\$162 billion)
 3. Louisiana: 484,000 (\$112 billion)
 4. California: 260,000 (\$68 billion)
 5. **New Jersey**: 236,000 (\$55 billion)
- The state of **New York** has about 169,000 NFIP policies-in-force (representing \$42 billion in coverage).

Our analysis shows that many homeowners who sustained flood damage from Sandy did not have a flood insurance policy.

- Take-up rates along the New Jersey coast seem to be higher than New York, particularly in Manhattan.
- Along the entire New York coast, take up-rates exceed 30 percent in only a couple ZIP codes.

Sandy will cost the NFIP billions of dollars in claims, further increasing its debt.

- NFIP covers 5.5 million policyholders across the country, generates \$3.5 billion in annual premiums and amounted to \$1.27 trillion of exposure.
- The program is \$17 billion in debt (borrowed to pay for the 2005 and 2008 flood-related losses).
- The 2012 *Flood Insurance Reform Act* signed by the President in July requests a debt payment solution to be reached soon.

WHAT WE HAVE DONE

The Wharton Risk Center was given access to the entire NFIP portfolio for research purposes. In this brief, we use the policy data as of December 31, 2010 (the latest year we have available). While the numbers will have changed slightly between then and the time Sandy made landfall (end of October 2012), any changes are likely to be rather small. Indeed we know that overall the number of flood policies in New Jersey increased by only 2 percent between September 31, 2011 and August 2012 (from 230,708 to 236,068). We use our 2010 data to map both take-up rates and coverage levels for areas impacted by storm surge from Hurricane Sandy.

The FEMA Modeling Task Force has generated preliminary estimates of storm surge inundation from Hurricane Sandy based on United States Geological Survey field data. They stress this data is preliminary, but it gives a good indication of the areas that were hardest hit by surge inundation from the storm (shown in black hashing on the figures below). We combine this data with the NFIP data to show the relationship between Sandy's impact and NFIP take-up rates (percent of households with a policy) and coverage levels (the quantity of flood insurance purchased). As a rough measure of take-up rates, we divide the total number of residential policies-in-force in a ZIP code by an estimate of the number of households in a ZIP code from the 2010 U.S. Census. This does not take account the fact that some homeowners are at greater risk than others, but does give some indication of market penetration.

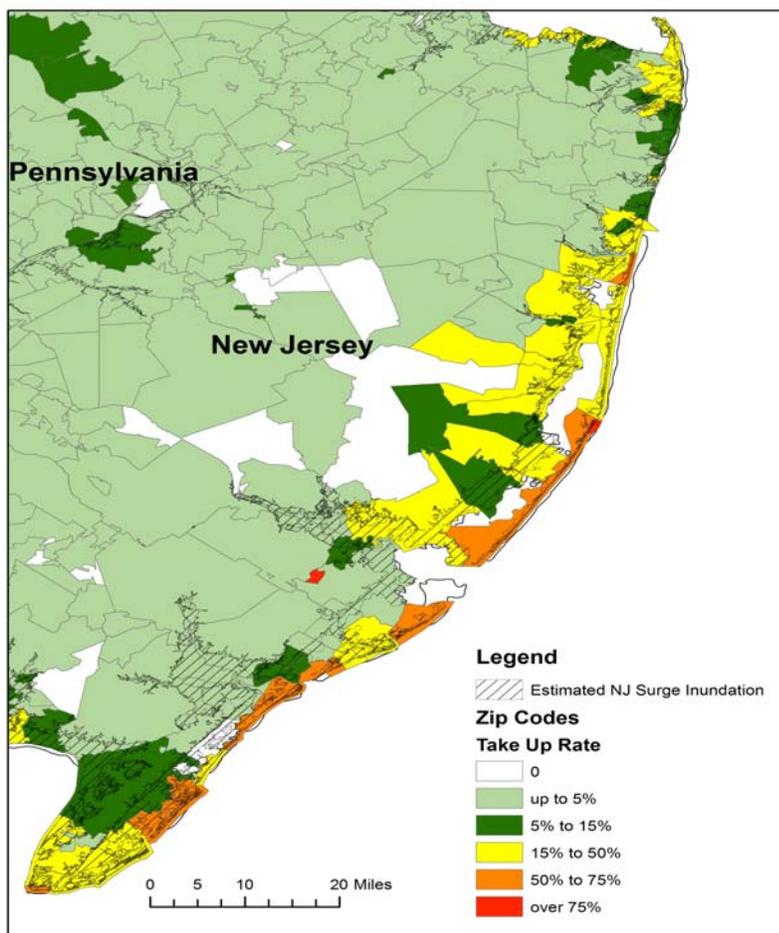


Figure 1. Residential NFIP Flood Insurance Take-Up Rate by ZIP Code in New Jersey in 2010 with Sandy Storm Surge Estimates

Note: Take-up rate is defined as the ratio number of flood policy-in-force divided by an estimate of total households.

Source: Created by authors with data from the Federal Emergency Management Agency.

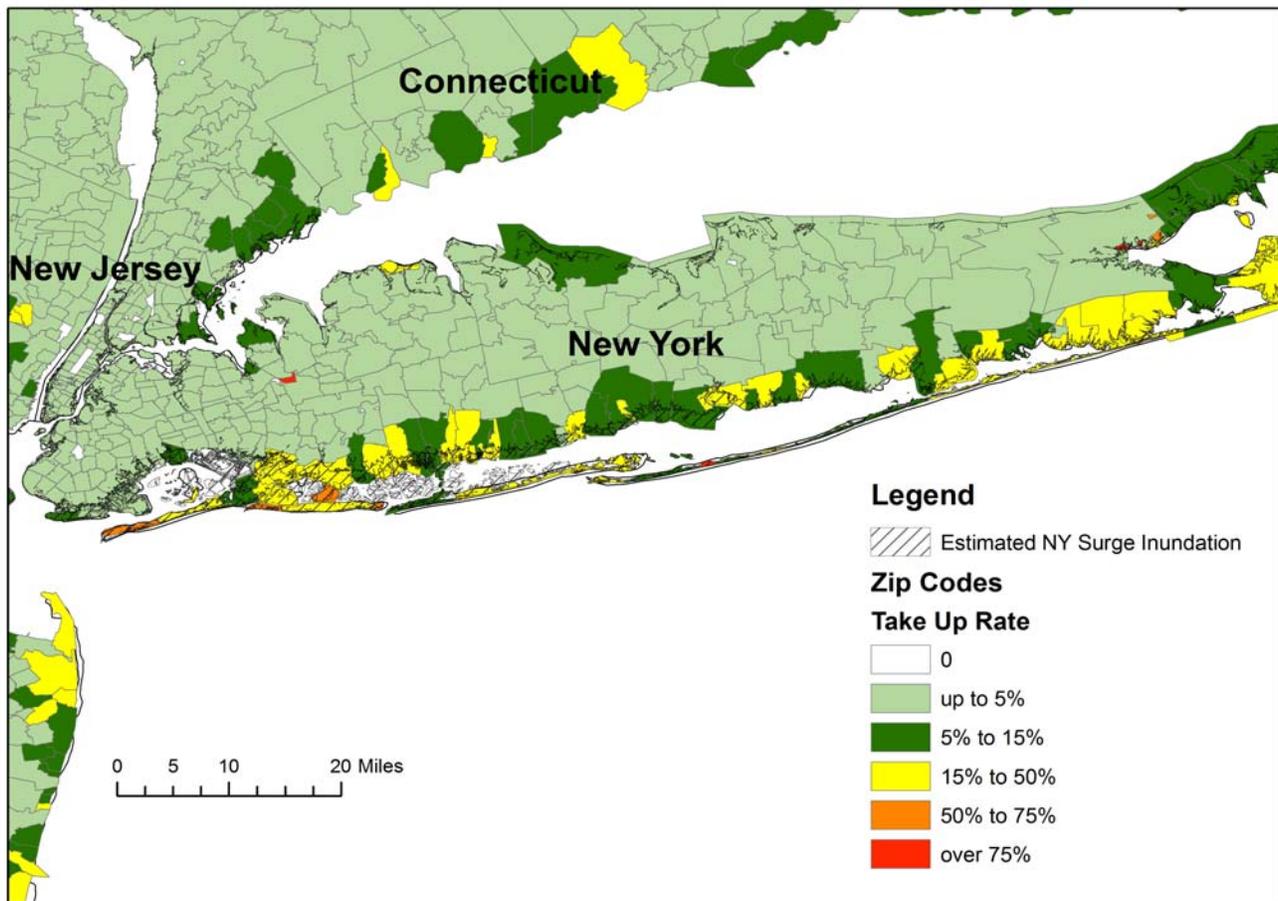


Figure 2. Residential Flood Insurance Take-Up Rates in New York in 2010 with Sandy Storm Surge Estimates

*Note: Take-up rate is defined as the ratio number of flood policy-in-force divided by an estimate of total households
 Source: Created by authors with data from the Federal Emergency Management Agency.*

As is clear from the figures, there are higher take-up rates in coastal communities, most likely because residents are aware of the higher risk they face. That said, even in heavily flooded areas, they are still fairly low.

Given the highly populated areas where Sandy hit, this disaster is likely to cost the NFIP billions of dollars, while it's already running a \$17 billion deficit. The interest of this debt varies over time depending on the intergovernmental borrowing rate. It was a high of \$700 million several years ago, but is now down to about \$80 million.

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About the Wharton Risk Center

Established in 1984, the **Wharton Risk Management and Decision Processes Center** develops and promotes effective corporate and public policies for dealing with catastrophic events including natural disasters, technological hazards, terrorism, pandemics and other crises. The Risk Center research team – over 70 faculty, fellows and doctoral students – investigate how individuals and organizations make choices under conditions of risk and uncertainty under various regulatory and market conditions, and the effectiveness of strategies such as alternative risk financing, incentive systems, insurance, regulation, and public-private collaborations at a national and international scale. The Center actively engages multiple viewpoints, including top representatives from industry, government, international organizations, interest groups and academia. More information is available at <http://www.wharton.upenn.edu/riskcenter>.

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Carolyn Kousky is a fellow at *Resources for the Future* in Washington, D.C. RFF is a nonprofit and nonpartisan organization established in 1957 that conducts independent research on environmental, energy, natural resource and public health issues. Dr. Kousky's research focuses on natural resource management, decision-making under uncertainty, and individual and societal responses to natural disaster risk. She has examined how individuals learn about extreme event risk, the demand for natural disaster insurance, and policy responses to potential changes in extreme events with climate change. Kousky has a B.S. in Earth Systems from Stanford University and a Ph.D. in Public Policy from Harvard University.

Erwann O. Michel-Kerjan teaches at the *Wharton School* and is the managing director of the Wharton Risk Management Center. He also chairs the OECD Secretary-General Board on Financial Management of Catastrophes. His research and advisory role focuses on how to better manage and finance extreme events, and strengthen resilience through business and policy innovation. He has testified before Congress on these issues. He has done considerable work on flood insurance and is the principle investigator of a dedicated NSF-supported multi-year initiative on reforming flood insurance. Recent books include *Seeds of Disaster, Roots of Response: How Private Action Can Reduce Public Vulnerability* (Cambridge University Press, 2006); *The Irrational Economist* (with P. Slovic, 2010), and *At War with the Weather* (with H. Kunreuther, 2011), which received the prestigious Kulp-Wright prize for the most influential book on risk management.