

Hurricane Sandy, Storm Surge, and the National Flood Insurance Program

A Primer on New York and New Jersey

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Resources for the Future is an independent, nonpartisan think tank that, through its social science research, enables policymakers and stakeholders to make better, more informed decisions about energy, environmental, and natural resource issues. Located in Washington, DC, its research scope comprises programs in nations around the world.



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Carolyn Kousky and Erwann Michel-Kerjan¹

Focus of this Issue Brief

Residential flood insurance is primarily provided through the federally run National Flood Insurance Program (NFIP). Following the devastating storm surge and flooding from Hurricane Sandy, concerns have been raised about the status of flood insurance in the United States. This issue brief asks and answers the two following questions.

- Roughly, what proportion of the affected homeowners in the states of New Jersey and New York had federal flood insurance? How much coverage was in-force in inundated areas?
- The NFIP is already \$17 billion in debt. Will it be able to pay the new claims from Hurricane Sandy?

Background on the NFIP

The NFIP was created in 1968 in response to a widespread belief that flood hazard was uninsurable by the private sector alone. The NFIP, housed in the Federal Emergency Management Agency (FEMA), makes flood insurance available to participating communities. Communities can voluntarily join the program, agreeing to adopt baseline floodplain management regulations, and in exchange, residents become eligible to purchase a flood insurance policy.

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As of August 2012, the NFIP covered 5.5 million policyholders across the country. These policies generated \$3.5 billion in annual premiums and amounted to \$1.27 trillion of exposure. Interestingly, only 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).

Of note, flood insurance is mandatory for homeowners living in a FEMA mapped 100-year floodplain (the area of land that has a 1 percent or greater annual chance of flooding) if they have a mortgage from a federally backed or regulated lender. Many analyses have found, however, that take-up rates are lower than this would suggest (e.g. Dixon et al. 2006). One possible reason is that some homeowners drop their policies two or three years after first purchasing it (Michel-Kerjan et al. 2012). Take-up rates for those not required by law to purchase a policy are lower, even for homes that are at risk of some level of inundation.

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.² 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

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² Thanks to H. E. "Gene" Longenecker, III for providing this data.

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 US Census. This does not take account of the fact that some homeowners are at greater risk than others, but does give some indication of market penetration.

QUESTION 1. WHAT PROPORTION OF THE AFFECTED HOMEOWNERS IN THE STATES OF NEW JERSEY AND NEW YORK HAD FEDERAL FLOOD INSURANCE? HOW MUCH COVERAGE WAS IN-FORCE IN INUNDATED AREAS?

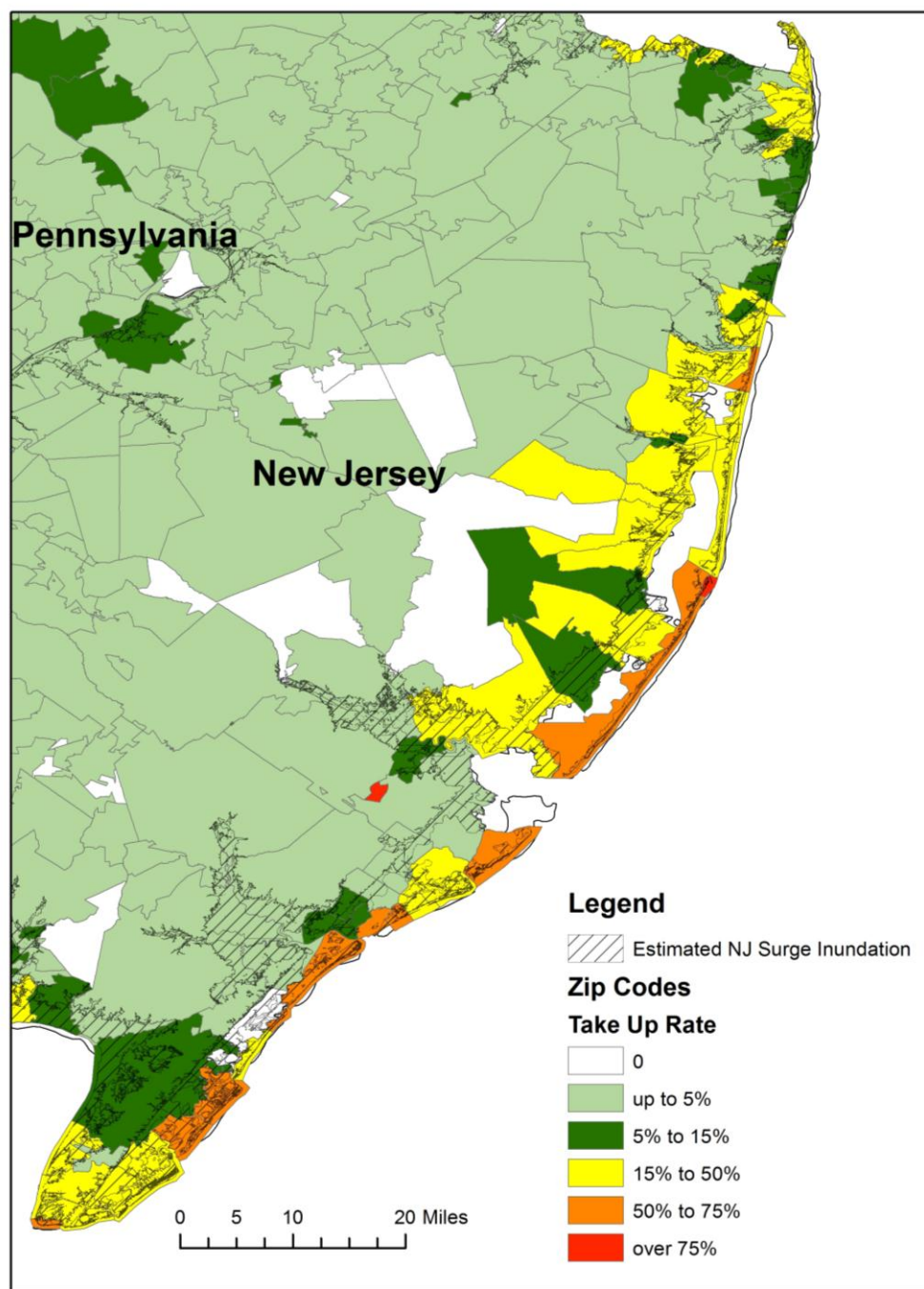
Using the 2010 data, Figure 1 shows take-up rates in New Jersey and Figure 2 shows take-up rates in New York. As is clear from the figures, there are higher take-up rates in coastal communities, most likely because residents are aware of the higher risk they face. That said, even in heavily flooded areas, they are still fairly low.

Take up rates along the New Jersey coast seem to be a bit higher than New York, particularly Manhattan. Sandy demonstrated that even Manhattan, however, can suffer major flooding. Along the entire New York Coast, take up rates exceed 30 percent in only a couple zip codes.

This analysis shows that many homes and business owners who sustained flood damage from Sandy did not have a flood insurance policy.

Storm after storm over the last several decades has shown that take-up rates for flood insurance are often lower than one would expect, leaving many homeowners without access to capital to rebuild. Researchers have identified many reasons for low take up rates: homeowners dismiss the risk, homeowners are overly optimistic thinking they won't be victims of a disaster, homeowners view insurance as an investment and drop it if they do not file a claim in a short period of time, homeowners do not realize their homeowners policy does not cover floods, or some homeowners face budget constraints and do not want or cannot pay the premium. Having adequate insurance coverage, particularly for those living in areas at higher risk of natural disasters, not only helps prevent financial hardship when a disaster strikes for those individuals, but also provides social benefits in terms of more funds being available for rebuilding communities and reducing reliance on limited federal aid post-disaster.

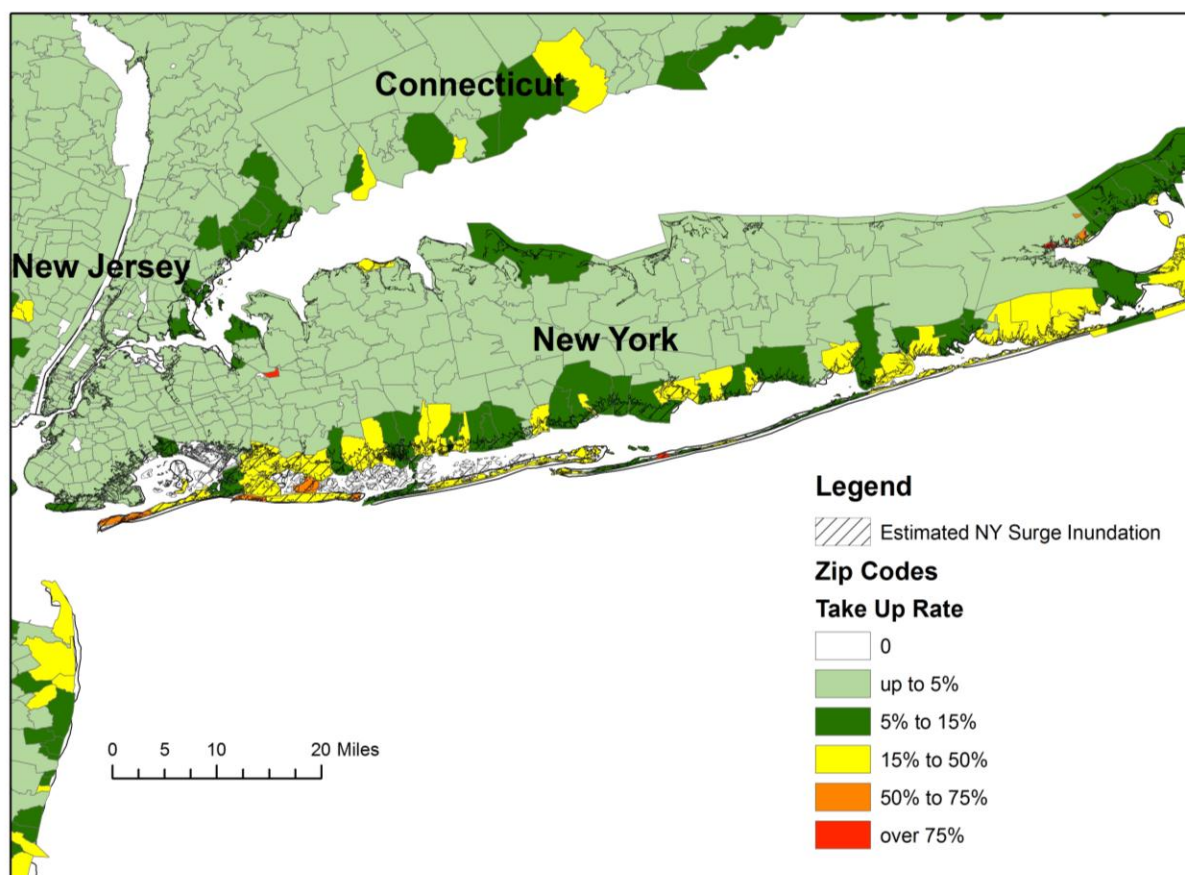
Figure 1. Residential NFIP Flood Insurance Take Up Rate by Zip Code in New Jersey in 2010 with Sandy Storm Surge Estimates



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

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

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



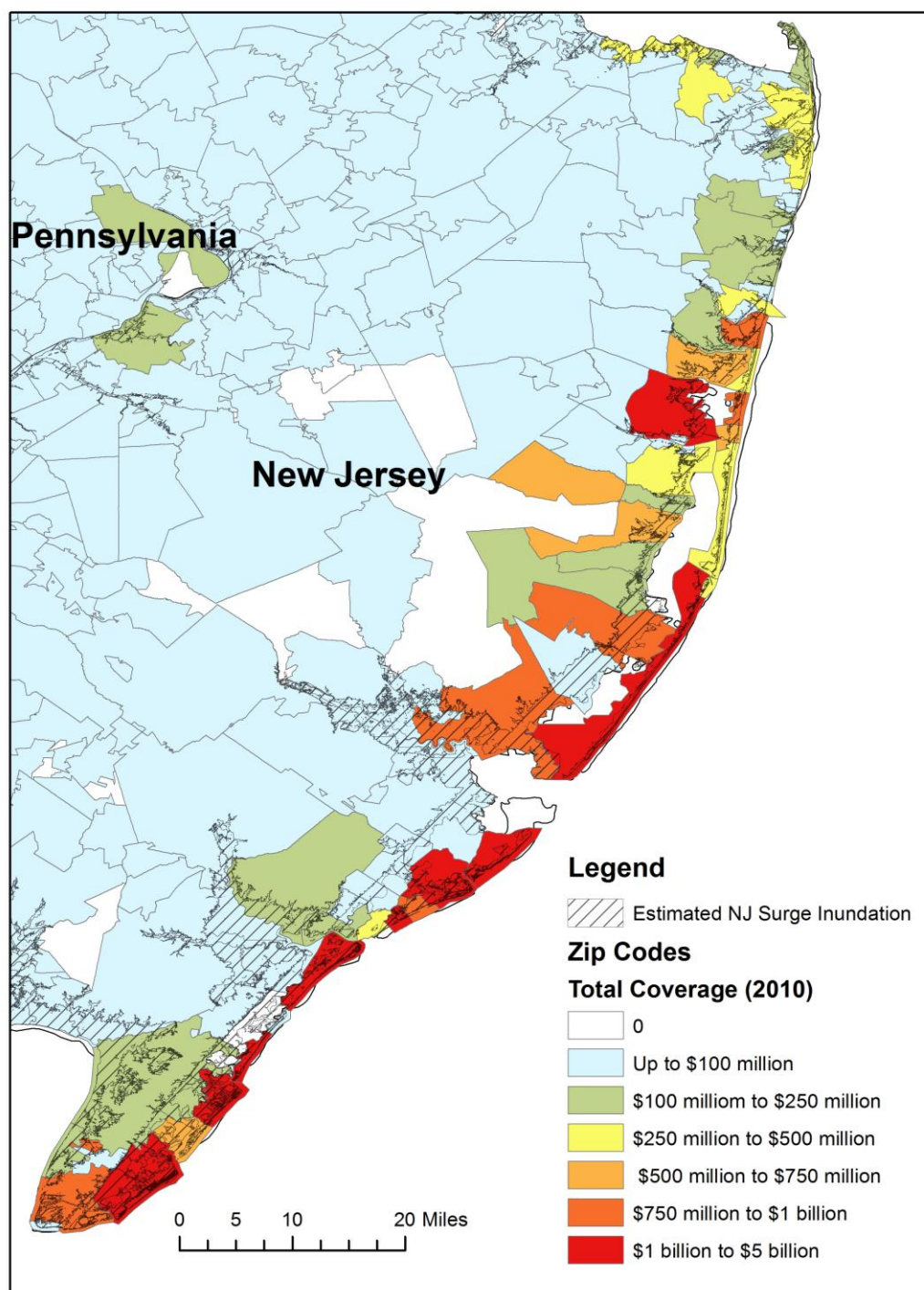
Source: Created by authors with data from the Federal Emergency Management Agency.

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

How Much Exposure Does the NFIP Have in the Impacted Areas?

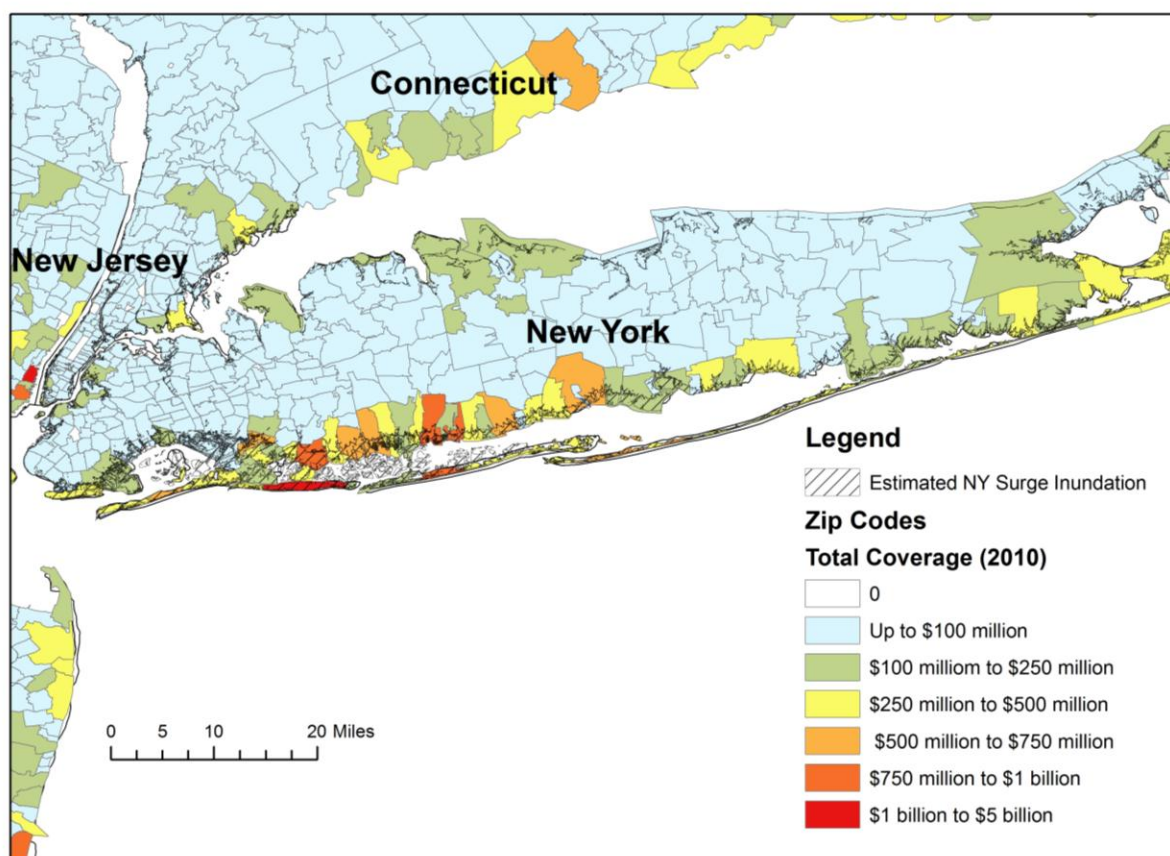
In the state of New Jersey, as of August 31, 2012, there was a total of just under \$54.5 billion of NFIP flood insurance coverage in force. For New York, the total was just under \$41.6 billion. Using the 2010 data, Figure 3 shows the total flood insurance coverage in force in zip codes in New Jersey, again with storm surge. Figure 4 shows the same thing for New York. The higher levels of coverage along the coast compared to more inland areas are striking, but not surprising, since there is a greater risk of storm surge inundation. More coverage is a function both of more policies-in-force and, in some cases, higher valued property. Also of interest is the fact that New York zip codes have, generally, less coverage-in-force than New Jersey.

**Figure 3. Total \$ Amount of Flood Insurance in Force by Zip Code in New Jersey in 2010
with Storm Surge Estimates**



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

**Figure 4. Total \$ Amount of Flood Insurance in Place by Zip Code in New York in 2010
with Storm Surge Estimates**



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

Looking at the exposure amounts of the NFIP vis-à-vis surge extents clearly indicates that Sandy will cost the NFIP many billions (Preliminary figures have been discussed but we feel it is wiser to wait for FEMA to provide the accurate estimates). Does it have enough reserve to pay for those claims?

QUESTION 2: THE NFIP IS ALREADY \$17 BILLION IN DEBT. WILL IT BE ABLE TO PAY FOR THESE NEW CLAIMS AND IF SO, HOW?

By law, the NFIP can borrow money from the US Treasury if it does not have enough reserves to pay claims. This has happened several times over the 44 years the program has been in operation. Before Hurricane Katrina, such borrowing was always repaid. After 2005, however, the program had to borrow around \$18 billion to pay for the claims from the 2005 hurricane season and then the 2008 hurricane season (Hurricanes Katrina, Rita, Wilma, and Ike). The flooding from storm surge and heavy precipitation associated with these events was substantial.

As of today, the program is still \$17 billion in debt. The interest of this debt varies over time depending on the intergovernmental borrowing rate. It was a high of \$700 million a year several years ago, but is now down to about \$80 million. The potentially large amount that will be spent by the program on Sandy's claims will further increase the debt of the NFIP.

The program can only add another \$3 billion to its debt without Congressional intervention, and Sandy will easily generate twice that number in claims. In all likelihood, Congress will authorize this increase, but this might not be as easily done politically as it was in 2005 given the current fiscal situation the country is facing. If the NFIP's borrowing capacity is increased, all policyholders with claims from Hurricane Sandy will be indemnified by the program. If it is not increased, the ability of the program to pay claims in a timely manner will be jeopardized.

Future Steps: Moving Beyond the Price Reform Signed by the President in July 2012

The burden of the debt to the NFIP and the unsustainability of rates is not a new issue and initial steps were taken by Congress to address these problems last summer. There are two key concerns: discounted policies and flood maps.

On the first issue, roughly 20 percent of all policyholders in the program pay discounted rates; for some this means they are paying only half of what they should be paying (according to FEMA). These discounts were a historical artifact of the program, having been established to encourage communities to join the NFIP and to encourage individuals to insure. The discounts, however, reduce the total premium revenue of the program and are financially unsustainable.

Congress passed legislation last summer (the Biggert-Waters Act) that begins to phase out these discounts. Discounted rates for several groups of policyholders are being eliminated, including owners of second homes, those who sell their property, and those whose property is substantially damaged. This will be done over a 5-year period that started in October 2012. This should substantially reduce the number of policyholders receiving discounted rates.

Further price reform is needed, however, related to catastrophic events. FEMA prices policies based on the “average historical loss year.” This does not generate enough revenue to cover exceptional loss years. A private insurance company would include a “catastrophe loading” in their rates to guarantee they could pay claims associated with larger disasters. We think it will be important for FEMA, if the NFIP is to remain solvent without intervention from taxpayers, to begin to incorporate catastrophe loadings into its rates. This might upset homeowners and make such rates difficult to implement politically. If history is a guide, when residents start seeing their flood insurance premiums increase, they will likely complain to their elected officials. Without such loadings, however, it will ultimately have to be the taxpayers that cover claims from big events. The question of who pays for disaster losses is one on which there is not political consensus.

Another concern is that with higher rates, more individuals will simply not purchase insurance. The implications of this for federal disaster aid are unclear. Howard Kunreuther and Erwann Michel-Kerjan (2009; 2011) have proposed the creation of a federal means-tested flood insurance voucher program. This concept will be the focus of one of the studies requested by the 2012 reform act. Such a program would help low-income individuals insure. Ongoing work at the Wharton Risk Center and RFF is exploring other policy options for the NFIP. We look forward to continuing to work with other stakeholders on these issues in the coming months.

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