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Flood Insurance in New York City Following Hurricane Sandy

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Cover image: A man walks through flood waters to survey damage from Hurricane Sandy in the New Dorp Beach neighborhood of the Staten Island borough of New York, November 1, 2012 (Reuters/Lucas Jackson).

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Summary

On the anniversary of Hurricane Sandy, many residents of New York City are still struggling to rebuild their homes, businesses, and lives. A year after the storm, they have learned that their recovery faces a new hurdle: changes in the flood insurance market that are likely to bring about much higher premiums for many residents living near the coast. How bad is the news? What can be done in response?

To understand the dimensions of this problem, the New York City Mayor’s Office of Long-Term Planning and Sustainability asked the RAND Corporation to analyze the changes in the flood insurance landscape in New York City following Hurricane Sandy and what these changes will mean to the city’s residents and businesses. This report provides the most-comprehensive answers to date to several important questions:

- What did flood insurance coverage in New York City look like before Hurricane Sandy, and what effect has Hurricane Sandy had on flood insurance markets?
- What are the consequences for New York City of changes in the National Flood Insurance Program (NFIP) and updates in the flood-risk maps for the city?
- How can policymakers help people in high-risk areas of New York City deal with major increases in insurance premiums?
- What key data should be collected, and what analyses should be done to evaluate potential responses?

New York City residents and businesses can buy flood insurance from the federal government through the NFIP or in the private market. The NFIP is the dominant source of flood insurance for homeowners and smaller residential properties and businesses. The NFIP was established in 1968 and is currently administered by the Federal Emergency Management Agency (FEMA). For decades, flood insurance has been mandated for any structure located in a high-risk area in the United States that has a mortgage from a federally regulated lender (i.e., the mandatory purchase requirement). High-risk areas are defined as areas in the 100-year floodplain—that is, those areas that have a 1-percent annual chance of flooding. Two recent changes, however, both planned long before Hurricane Sandy struck, are being implemented at the same time as storm victims in New York City are struggling to rebuild. They are both intended
Flood Insurance in New York City Following Hurricane Sandy

to put the federal program, which has accumulated billions of dollars of cost overruns since Hurricane Katrina in 2005, on a stronger financial footing by moving toward more risk-based premiums.

The first of these changes, the Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) (Pub. L. 112-141), eliminates the subsidies that existed for some classes of structures. It also phases out the grandfathering of certain structures when flood maps are updated: In the past, if a new map located these structures in a higher-risk flood zone, owners would still be able to pay premiums that are based on the prior map.

The second change is the update of the FEMA map that defines the flood-risk areas in New York. Flood insurance rate maps (FIRMs) identify areas at risk of flooding, including high-risk areas. The underlying analysis and mapping of flood risk for New York City had not been updated since FEMA released its first map for the city in 1983. Preliminary versions of the new map, released in June 2013 and expected to be finalized in 2015, reveal an expanded floodplain that includes approximately twice as many structures in the high-risk zones and greater flood depths for those structures already in the high-risk zones.

Although we provide estimates of the premium increases that will result from these changes, exactly what those changes will be and when they might begin will depend on how FEMA implements certain provisions of BW-12 and whether proposals to delay or reduce some of the premium increases in the act move forward in Congress.

How Well Insured Were Those in New York City for Flood Damage When Hurricane Sandy Hit?

Figure S.1 compares the flood map that was in effect when the storm hit (dated from 2007 but only minimally updated since it was first released in 1983) and the flood map released in June 2013, called the Preliminary Work Map. We describe here the flood insurance coverage at the time of the storm for structures in New York City, when the 2007 map defined the high-risk zones.

Number of Residents and Businesses in High-Risk Flood Zones
At the time Hurricane Sandy hit the coast, there were 35,700 structures in these high-risk areas, which accounted for 162,700 residential units. Perhaps surprising for a dense, urban area like New York City is that most of these structures (72 percent) were homes for one to four families. Eighty percent of structures in the high-risk areas were built before 1983, when the first flood map was issued for the city. In other words, these structures were built without the benefit of today’s building standards and understanding of flood risk.
Proportion of Residences and Businesses with Flood Insurance

We estimate that 55 percent of the one- to four-family homes in the high-risk areas on the 2007 map had federal flood insurance on the eve of Hurricane Sandy. Approximately three-quarters of these homes are subject to the mandatory purchase requirement; of these, about two-thirds have flood coverage. Among homeowners not required to buy coverage, the take-up rate is only about 20 percent. Because important data are missing, future analysis is needed to characterize the take-up rates for multifamily resi-
dential buildings (which would include large apartment buildings and condominiums) and mixed-use buildings (those with both commercial and residential zoning). Most residential units in the high-risk areas (78 percent), on the other hand, are found in multifamily or mixed-use dwellings.

Nearly all very large commercial firms carry flood insurance purchased from private insurers. Interviews with industry experts estimated the share to be 80 to 90 percent (not just in high-risk areas but overall) because large firms tend to purchase inclusive manuscript policies. Large insured firms typically do not buy federal flood insurance except occasionally to reduce a high deductible on a manuscript policy.

By contrast, very few small firms have private flood insurance coverage: Experts estimated the share to be as low as 5 to 10 percent. If small firms buy coverage at all, they tend to rely on the NFIP.

**Gaps in Coverage**

Hurricane Sandy revealed gaps in the flood insurance system that should be given priority attention in efforts to improve New York City’s resiliency in the next event. For residential structures with NFIP coverage, the most-important gaps are

- limited basement coverage
- lack of coverage for additional living expenses
- lack of coverage for damage due to earth movement resulting from flooding.

For commercial structures with NFIP coverage, the most-important gaps are

- limited basement coverage
- lack of business-interruption or business-expense coverage
- inadequate coverage for mixed-use buildings.

For commercial structures with private flood insurance coverage, the most-important gaps are

- lack of coverage for business interruption or extra expenses in cases in which there was no physical flood damage on the premises
- varying coverage for street and area closures imposed by civil authorities.

**Hurricane Sandy’s Impact on Private Insurance Markets**

Hurricane Sandy resulted in substantial claim payments by private insurers for wind as well as flood damage. At an estimated $18.8 billion (including losses outside New York City), insured losses due to Hurricane Sandy were roughly half those for Hurricane Katrina. This figure does not include NFIP claim payments and is likely dominated by
wind-related losses. Even though claim payments were substantial, Hurricane Sandy’s impact on the overall U.S. insurance market appears to be modest. Prices for commercial property coverage (excluding flood), business-interruption, and general liability insurance appear to have been little affected by Hurricane Sandy both nationwide and in the Northeast. However, our investigation did indicate that premiums for flood insurance purchased from private insurers for many commercial properties in New York City’s high-risk zones have increased substantially since Hurricane Sandy. For buildings that experienced a loss, increases of 35 to 40 percent are not uncommon. Private insurers also appear to be reducing their exposure in high-risk areas by reducing policy limits or dropping flood coverage altogether. Flood coverage is still available, but a commercial property owner will likely need to piece together coverage from a larger number of insurers than before Hurricane Sandy.

Consequences of Changes in the National Flood Insurance Program

The map that FEMA released in June 2013 (see Figure S.1) greatly expands the city’s high-risk areas and nearly doubles the number of structures and residents in those areas, as shown in Figure S.2. Added to the high-risk areas are structures that were not built to floodplain standards because the floodplain building standards do not apply to areas outside the current high-risk areas. As a result, 90 percent of the 67,400 structures in the expanded high-risk areas have not been built to floodplain standards. In the event of another major storm, according to the new map, the flood depth in the existing high-risk areas is also estimated to be greater. The changes vary across different parts of the city, but increases of 2 to 4 feet are common. These changes reflect a realization that flood risk in the city is higher than previously thought. And the risk will likely increase over time, putting more structures at risk because the updated map does not capture the consequences of future sea-level rise or the greater frequency of severe storms that might result from climate change.

Many more homeowners will also be required to purchase insurance. We estimate that the number of one- to four-family structures subject to the mandate will roughly double to 34,500. Only about 35 percent of these homes had flood insurance as of October 2012.

Effects on Insurance Premiums

As a consequence of the expanded flood map and the phase-out of premium subsidies and rate grandfathering enacted in 2012, local residents will face escalating costs for flood insurance. To estimate the dimension of these increases, we developed plausible scenarios for how the premiums might change with the adoption of the new flood map, assuming that it is similar to the preliminary map that has not yet been formally adopted. In some cases, premiums increased by $1,000 to $2,000 per year. As stipu-
Figure S.2
Number of Structures in High-Risk Areas of the Preliminary Work Map Compared with Those on the 2007 Flood Map

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>2007 Map</th>
<th>Preliminary Work Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>One- to four-family dwelling</td>
<td>25,800</td>
<td>53,000</td>
</tr>
<tr>
<td>Condominium</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>Multifamily dwelling</td>
<td>1,400</td>
<td>2,700</td>
</tr>
<tr>
<td>Mixed-use dwelling</td>
<td>1,300</td>
<td>2,300</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>2,700</td>
<td>3,800</td>
</tr>
<tr>
<td>Transportation and utility</td>
<td>1,600</td>
<td>2,000</td>
</tr>
<tr>
<td>Condominium</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Other and missing</td>
<td>2,200</td>
<td>2,800</td>
</tr>
<tr>
<td>Total</td>
<td>35,700</td>
<td>67,400</td>
</tr>
</tbody>
</table>

SOURCE: New York City parcel data.
NOTE: Numbers have been rounded to the nearest hundred. Because of rounding, bars might not sum precisely. The Preliminary Work Map does not identify regions subject to riverine, as opposed to coastal, flooding. However, the missing areas are likely to be relatively moderate in size. In the 2007 flood map, only 2.7 square miles of the 33 square miles in the high-risk flood areas (8 percent) were subject to riverine flooding. The data for the preliminary map did not include areas subject to riverine flooding, but such an exclusion should not have much effect on the findings.
lated in BW-12, such increases will be phased in over five years in many cases. In other cases, however, premiums would not change: The act allows primary residences that were built before the first flood map was issued in an area (which, for New York City, was November 1983) to retain their subsidized rates. To qualify, these homes must not have had a lapse in coverage since July 6, 2012 (when the act was signed into law), not be resold, and not suffer repetitive losses.

Certain structures, however, would see much higher increases. Particularly hard hit are structures that are outside the high-risk areas of the 2007 map but will be inside the high-risk areas of the updated map. Approximately 28,800 one- to four-family structures fall into this category. A $429 annual premium on a structure previously outside the high-risk zones could well rise to $5,000 to $10,000 for the same amount of coverage if it is inside the high-risk area.

It is important to note that we have not been able to determine how frequently these scenarios will occur in practice. The key factor that precludes such an analysis is the lack of data on structure elevation relative to base flood elevation. However, the cases present plausible examples of how premiums could change with the adoption of the new map and the phase-out of subsidies.

**Differences in Effects Among Residents**

We examined differences in the effect that rate increases could have on families who own their own homes, as well as on renters and landlords.

**Homeowners**

Cost increases of this size would pose economic hardships for many households in the city. About 37 percent of households living in owner-occupied units in the floodplain earn less than $75,000 per year. A $5,000 premium would amount to 6.6 percent of a $75,000 annual income. (For comparison, national census data show that, on average, households in owner-occupied housing units spend 1.8 percent of their annual pre-tax income on home insurance, maintenance, repair, and other housing expenses, excluding mortgage payments and property taxes.)

The value of owner-occupied homes in the high-risk areas would also likely decline. Given the magnitude of the premium increases, the reductions could be considerable. Previous research on housing prices in other regions of the country found that, under reasonable assumptions, a $500 increase in insurance premiums could be associated with a $10,000 decrease in property value. Further analysis is necessary to determine whether the effect might be different in New York City.

These consequences could make it impossible for some homeowners to stay in their homes. Many residents may have to move out of high-risk areas. Foreclosures

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2 For comparison, note that New York City defines *low-income households* as households with incomes less than or equal to 80 percent of area median income (AMI). The low-income threshold in New York City is $48,100 for a one-person household and $68,700 for a four-person household.
and short sales could increase. In some neighborhoods, homes could be vacant for some period of time. Lower property values would also affect city tax revenue, absent changes in tax rates.

Renters and Landlords
Renters account for approximately two-thirds of the households living in the high-risk areas of the new floodplain, with a large fraction living in multifamily and mixed-use dwellings. For them, the new premium increases might not create short-term hardships in the form of increased rents: The supply of housing units is fixed in the short term, and one would not expect the demand for rental housing in the high-risk areas to shift as a result of premium increases faced by landlords.

Although further work is needed to better understand the longer-term effects, several outcomes are possible. Under some scenarios, the major adjustment might be a decline in the land value for rental properties in the high-risk areas, analogous to the expectation for owner-occupied housing units. In that case, there would be little change in rents, even over the long run. Under other scenarios, the increase in flood insurance premiums could eventually reduce the rental housing stock and increase rents. Part of the calculation in all rental situations would be the effect of rent-control and stabilization policies in New York and how these policies would change over time.

Policy Options to Consider in Response to Premium Increases

New York City is considering a range of options that could provide residents with some relief in the cost of their insurance premiums, as summarized below. But better data are needed on household incomes and types of structures before developing a full range of potential responses.

Risk Mitigation
The most obvious way to reduce risk-based insurance premiums is to mitigate risk. This can be done on many levels—from developing dunes and integrated flood protection systems in order to reduce flooding to retrofitting buildings (by elevating a structure or its electrical equipment, for example) to reduce loss and facilitate quicker recovery in the event that flooding does occur.

Some of these measures, which have been applied elsewhere, would pose challenges in New York City because of the particular characteristics of the building stock in the city. For example, an initial analysis by the New York City Mayor’s Office found that 39 percent of buildings (approximately 26,300) in the high-risk zones of the new floodplain would be difficult to elevate because they are on narrow lots or are attached or semi-attached buildings. It is therefore important to continue to search for innovative ways to reduce flood risk that are tailored to a dense urban environment like New York City.
Consequently, we recommend that policymakers take the following steps to identify the best risk-mitigation strategies:

- **Work with FEMA to collect data on structure elevations and other structure characteristics in the high-risk zones.** The key piece of missing information is structure elevation. We have developed plausible scenarios for these elevations, but more information on their distribution across the high-risk areas is needed. Besides facilitating better projections of flood insurance premiums, this information would allow better estimates of the benefits of coastal protection projects, as well as better decisions on what types of building-level mitigation measures would be appropriate.

- **Work with FEMA to make sure that the benefits of risk-mitigation measures are properly reflected in NFIP rates.** Much is to be gained from establishing a schedule of premium reductions for different structure types and risk-mitigation measures and making the information readily available to property owners.

- **Consider a multilayered approach to mitigation and protection.** A suite of mitigation tools and incentives should be considered based on specific physical and socioeconomic attributes of New York City neighborhoods. These might include low-interest loans or grants to individuals to fund mitigation efforts or larger-scale coastal protection measures to fortify whole neighborhoods. They might also include changes in land use that remove structures from some areas when property owners are willing to sell.

- **Work with FEMA and the New York State Department of Financial Services to increase the take-up rate.** Higher take-up rates mean that more resources are available for recovery after an event, but higher flood insurance premiums will put downward pressure on the already-moderate take-up rates. Efforts to increase the understanding of flood risk, as well as better enforcement of the mandatory purchase requirement, should be considered.

**Affordability**

Our analysis has used data on the income distribution in high-risk areas of the new flood maps as a whole. But premium levels and household income vary considerably across the floodplain. Better data are needed on the household incomes of people living in the structures facing the highest increases in insurance premiums. Such information will improve the understanding of the scope of the financial challenges for specific households and identify the number of households that would qualify for various types of assistance.

With a better understanding of the finances and structures of individual households, policymakers will be able to identify the best approaches to making insurance premiums more affordable. Examples of strategies that have been proposed include the following:
• **Provide assistance based on financial need.** The assistance could take several forms, including tax credits, grants, and vouchers that could be applied toward the cost of flood insurance. A major concern about such an approach, however, is that it would distort the price signal that motivates property owners to invest in risk-mitigation measures in order to reduce premiums. To address this concern, proposals have been made to couple a means-tested voucher program with a loan program, thereby implementing mitigation measures that make sense for the property.

• **Allow higher deductibles and establish a public program to share costs when flooding occurs.** The higher deductibles would mean lower premiums, and a deductible-sharing program funded by the public would cover part of a large deductible when an event occurs. Again, the effects on risk-mitigation incentives and actual mitigation would need to be considered.

Congress recognized the challenge of affordability that would be imposed by BW-12 and required that the NFIP study “methods of establishing an affordability framework” and that the National Academy of Sciences conduct an analysis of a means-tested voucher program. At the time of this writing, the National Academy of Sciences is about to begin the study, with phase 1 set for completion in late 2014.

**In Conclusion**

The threats posed by extreme weather are persistent, and it is only a matter of time before the next major storm strikes the eastern seaboard. But New York City can improve its resilience and speed its recovery by taking steps to mitigate the risk of flood damage and to increase flood insurance coverage for its residents and businesses. To achieve these goals, the city needs to work with FEMA and other agencies to collect better data on its coastal residents and the structures in which they live and work. It also needs to conduct further analysis to determine what packages of mitigation and affordability programs make sense for the city given its population and building typology. By taking such steps, New York City could become a leader in community resilience and a beacon for other coastal regions around the country.