

## INFORMED DECISIONS ON CATASTROPHE RISK

### **Analysis of Flood Insurance Protection:**

### **The Case of the Rockaway Peninsula in New York City**

**The Rockaway Peninsula (RP) in New York City was severely impacted by Hurricane Sandy.**

**Data analysis reveals these findings about the RP:**

- **Only 14.4% of housing units had NFIP flood insurance in 2012.**
  - **Flood insurance premiums are \$5.25 per \$1,000 of coverage, per year on average.**
  - **A large percentage of residents are in very low income brackets, leading to affordability issues in purchasing flood insurance.**
- The Federal Government has provided residential flood insurance since 1968 under the National Flood Insurance Program (NFIP). The program covers more than 5.5 million policyholders today. New York City estimates that less than 20 percent of residential buildings in areas inundated by Sandy in 2012 had insurance coverage through the NFIP.
  - The Rockaway Peninsula (RP) is an 11-mile community facing the Atlantic Ocean in the borough of Queens in New York City with a population of 103,825. It contains a range of different building types including single-family homes, town houses and high rises (including affordable and public housing).
  - This brief provides a granular analysis of flood insurance market penetration and premium differentials in different parts of the RP where many residences were severely damaged by Sandy, and relates these figures to the income of the residents in these locations.
  - **METHODOLOGY:** We present findings on the status of flood insurance in the RP by Census tract (CT) from the 2012 NFIP database, with income data from the 2010 Census.
  - **QUESTIONS ADDRESSED:** (1) *What percentage of housing units in the RP had flood insurance in 2012?* (2) *What is the cost of residential flood insurance in the RP?* (3) *What is the income distribution in the RP?*

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*The Wharton Risk Center has for several years conducted applied research on the flood insurance market and discussed our findings with key stakeholders. Since January 2013 we have interacted closely with the New York City Mayor's Office that has completed a chapter on Insurance as part of the Special Initiative for Rebuilding and Resiliency (SIRR) report, released by the New York City Mayor's Office on June 11, 2013. This Wharton Risk Center issue brief and another, "NFIP Community Rating System (CRS) Analysis for New York State" are published as a complement to the NYC SIRR report.*

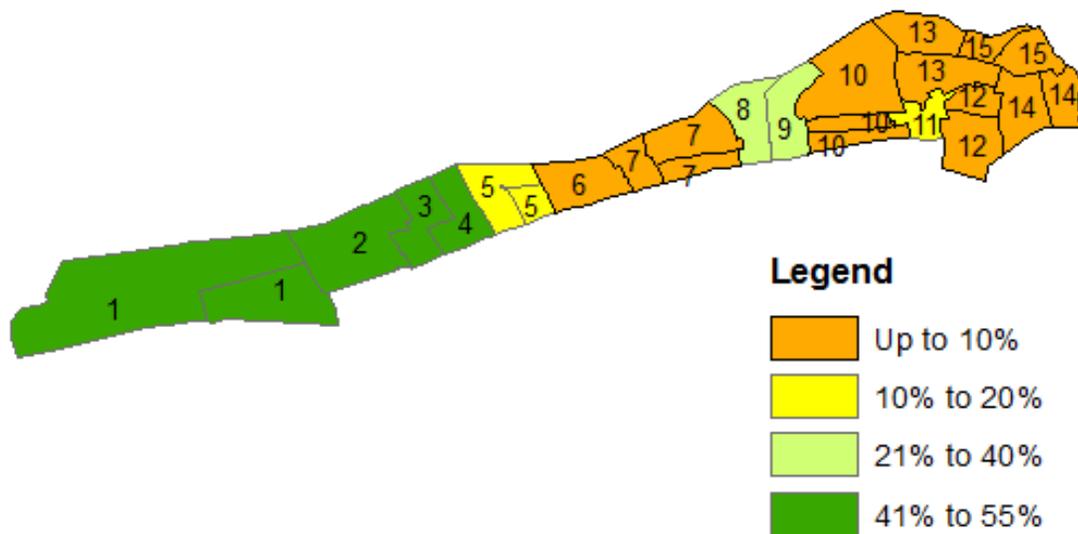
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## What percentage of housing units in the Rockaway Peninsula had flood insurance in 2012?

The percentage of housing units in the RP that had flood insurance varies greatly by Census tract (CT). It is less than 7 percent in CTs 6, 7, 10, 13 and 15. At the other extreme, insurance coverage in CTs 1, 2, 3 and 4 (western RP) was over 40 percent. (See details in Table 1).

On average, only 14.4 percent of residents in the Rockaway Peninsula had flood insurance in 2012. As discussed in the Insurance chapter of the New York City Mayor's Office report, *Special Initiative for Rebuilding and Resiliency (SIRR)*, this low percentage is partly due to the large portions of the RP that are outside the boundaries of the floodplain on FEMA's Flood Insurance Rate Maps (FIRMs), which may have led many residents to believe they were not at risk. Additionally, almost half of the RP households live in multifamily buildings of five units or more where they may not have been required to buy a separate flood insurance policy if the building association had purchased insurance with sufficient coverage.

FIGURE 1: DISTRIBUTION OF INSURANCE MARKET PENETRATION ACROSS THE RP



Sources: Wharton Risk Center - Data from FEMA and 2010 Census

*In a few cases, the NFIP combines several Census tracts. Based on the 2010 Census, 25 Census tracts comprise the RP, as shown.*

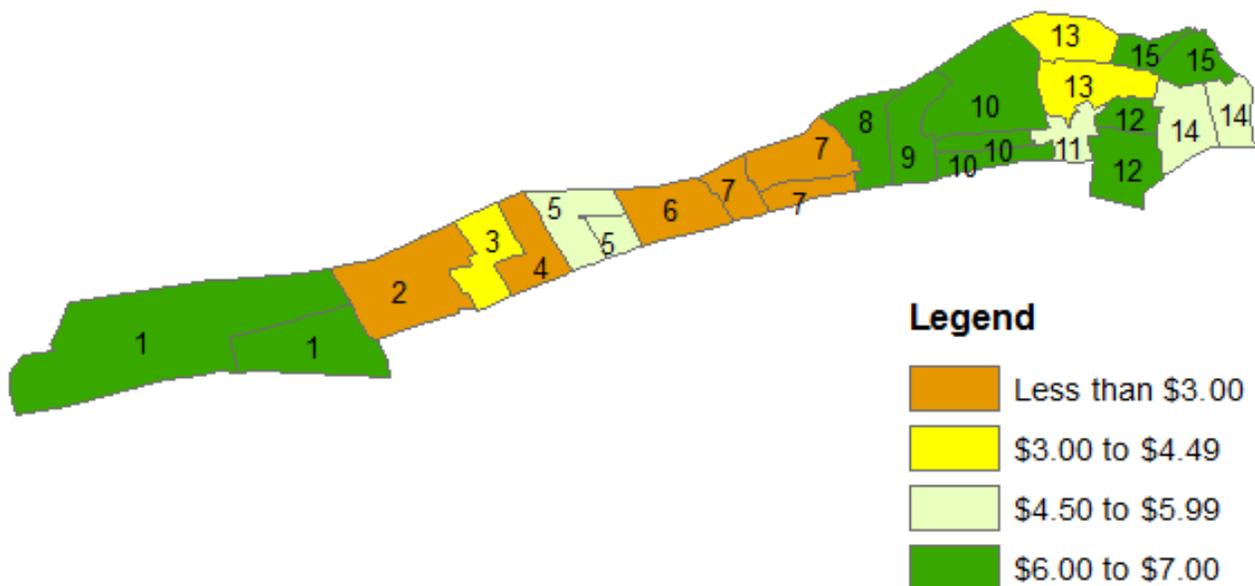
## What is the cost of residential flood insurance in the Rockaway Peninsula?

The average premium per \$1,000 of flood insurance coverage varies across CTs, from \$1.17 for the four insured residential units in CT 2, to greater than \$6 in CTs 1, 8, 9, 10, 12 and 15. (See details in Table 1). The average premium per \$1,000 of flood insurance coverage in the RP is \$5.25. That is, if a residential unit had \$100,000 in coverage, the total annual insurance premium would be \$525.

Flood insurance premiums can be subsidized based on whether a given house was built prior to the establishment of Flood Insurance Rate Maps (FIRMs) or after these maps were drawn. They are designated as pre-FIRM and post-FIRM policies, respectively. Owners of pre-FIRM houses can receive flood insurance at subsidized rates. Seventy-five percent of the housing units in the RP that have flood insurance are pre-FIRM structures with insurance premiums subsidized by the NFIP.

Taken across all the CTs, the average pre-FIRM premium is \$5.79 compared to \$3.29 for the average post-FIRM premium. Many pre-FIRM housing units are more vulnerable than those built to more recent construction standards. This explains the difference between the two premiums despite the subsidy given to pre-FIRM structures. If owners of these pre-FIRM houses were to be charged premiums reflecting their true risk, they would likely pay much more than they are currently charged.

FIGURE 2. DISTRIBUTION OF AVERAGE PREMIUMS/ \$1,000 COVERAGE ACROSS CTs IN THE RP



Sources: Wharton Risk Center - Data from FEMA and 2010 Census

*In a few cases, the NFIP combines several Census tracts into one larger tract. Based on the 2010 Census, 25 Census tracts comprise the RP, as shown.*

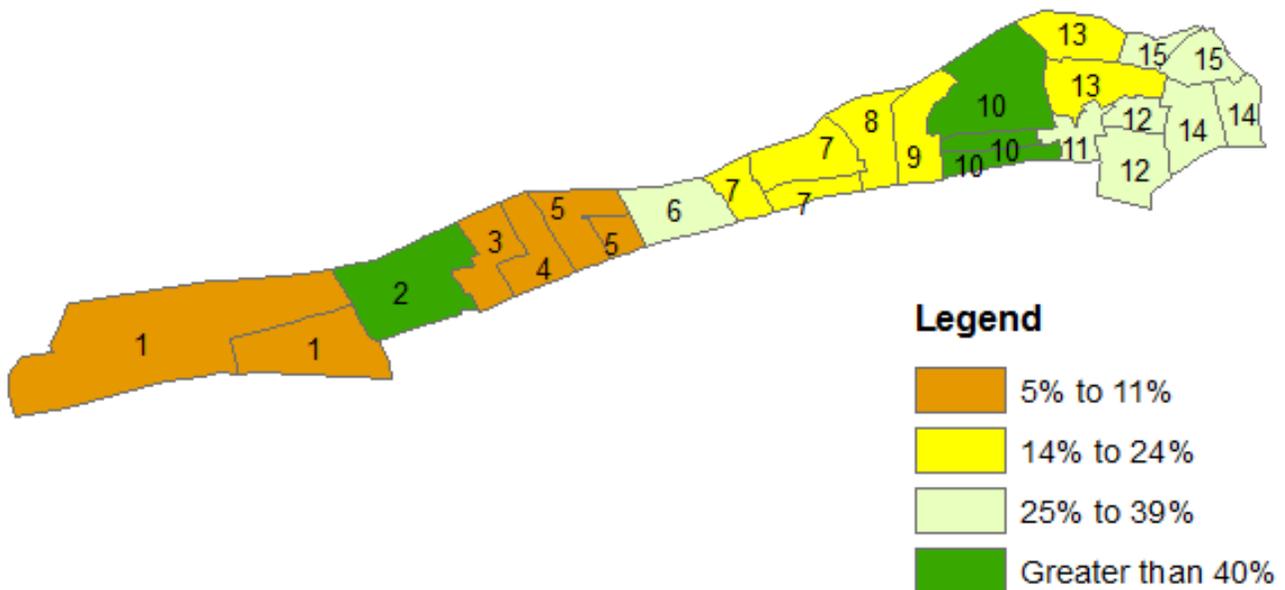
## What do we know about income distribution in the Rockaway Peninsula?

A significant percentage of residents in the Rockaway Peninsula are in the lower-income classes, making it likely difficult for them to recover financially from flood damage after Hurricane Sandy if they were uninsured.

The designated poverty level for a family of three is \$19,500. About 27 percent of the households in the RP had annual incomes below \$20,000. Six of the CTs had more than one-third of their residents with incomes below \$20,000. (See details in Table 1).

If low-income families were required to purchase flood insurance in the future, the residents in these areas would likely indicate that they could not afford the insurance premium.

**FIGURE 3: DISTRIBUTION OF HOMES IN EACH CENSUS TRACT WHERE ANNUAL INCOME WAS BELOW \$20,000**



Sources: Wharton Risk Center - Data from FEMA and 2010 Census

*In a few cases, the NFIP combines several Census tracts into one larger tract. Based on the 2010 Census, 25 Census tracts comprise the RP, as shown.*

**Table 1: Flood insurance implied market penetration, premium data, and the percentage of low-income households in each Census tract in the RP.**

Census tract	Housing units (2010)	Implied NFIP market penetration*	Average premium per \$1,000 of insurance coverage	Percentage of households with \$20,000 or less of income
1	2,698	54.5%	\$ 6.39	10.7%
2	9	44.4%	\$ 1.17	100.0%
3	873	47.1%	\$ 3.33	10.9%
4	1,289	40.7%	\$ 2.92	5.2%
5	3,567	18.7%	\$ 4.80	10.6%
6	2,678	3.4%	\$ 2.71	26.0%
7	5,914	6.9%	\$ 2.66	21.4%
8	1,919	30.7%	\$ 6.20	23.3%
9	1,435	27.2%	\$ 6.14	14.3%
10	4,723	6.6%	\$ 6.21	41.8%
11	1,335	19.0%	\$ 4.60	34.8%
12	5,527	7.3%	\$ 6.77	35.1%
13	3,181	6.5%	\$ 4.22	18.1%
14	5,154	9.4%	\$ 5.99	39.4%
15	3,943	4.3%	\$ 6.30	34.6%
<b>Total</b>	<b>44,245</b>	<b>14.4%</b>	<b>\$ 5.25</b>	<b>27.0%</b>

Sources: Wharton Risk Center - Data from FEMA and 2010 Census

\*Implied NFIP market penetration is determined by the number of active 2012 residential NFIP policies-in-force (single-family, 2-to-4 family, and other residential) divided by the total housing units as per the 2010 Census. Almost half of the RP households lived in multi-family buildings of five units or more where they may not have been required to buy a separate flood insurance policy if the building association had purchased insurance with sufficient coverage. The implied NFIP market penetration estimate in Table 1 can thus be viewed as a lower bound.

## **Future Challenges Facing the Rockaway Peninsula and Other Communities**

**In July 2012, the NFIP was renewed for five years as a part of a comprehensive piece of legislation, the Biggert-Waters Flood Reform Act of 2012. Many residents in high flood risk areas are concerned that insurance premiums will significantly increase as a result of the new legislation. FEMA issued a Fact Sheet in April 2013 detailing several features of the new legislation that will impact a large number of households in the United States.**

- Owners of subsidized policies on secondary residences in a Special Flood Hazard Area (SFHA) will see 25 percent increases annually until rates reflect true risk (beginning on January 1, 2013).
- Owners of subsidized policies on property that have experienced severe or repeated flooding will see 25 percent rate increases annually until rates reflect true risk (beginning on October 1, 2013).
- The Federal Emergency Management Agency (FEMA) will improve the accuracy of its flood mapping so that maps more accurately reflect the risks that households face with respect to flood damage.
- Primary residences in SFHAs will be able to keep their subsidized rates unless or until: the property is sold; the policy lapses; the house suffers severe, repeated, flood losses; a new policy is purchased; or the property is assessed at a higher risk level as a result of updated Flood Insurance Rate Maps (since July 6, 2012, the date the new legislation was enacted).
- For those residences, including non-subsidized properties, assessed at higher risk levels as a result of updated Flood Insurance Rate Maps since July 6, 2012, premiums will increase over time to reflect risk. The increase will be phased in over a five-year period at an annual rate of 20 percent of the differential between the current premium and the risk-based premium.
- Unless homeowners invest in risk reduction measures, flood insurance premiums for many properties will be considerably higher than they are today.
- The Act authorizes a study by FEMA/National Academy of Sciences to establish an affordability framework for flood insurance, including targeted assistance such as means-tested vouchers. The Government Accountability Office (GAO) is undertaking complementary studies on these issues as well.

## Guiding Principles for Insurance

Since its inception, the Wharton Risk Center has focused on the role that insurance can play in mitigating losses and providing funds to aid the recovery process of those suffering damage from natural disasters and other extreme events. We believe two guiding principles for insurance, reflected in the Biggert-Waters Act, should be considered in the post-Sandy environment:

*Principle 1: Premiums Reflecting Risk Insurance premiums should reflect risk so that it is transparent to residents how exposed they are with respect to damage from floods and other disasters covered by their policy. A risk-based premium also provides an economic incentive in the form of reduced premiums to property owners who invest in loss reduction measures, given lower expected claims payments following future hurricanes, floods and other disasters.*

*Principle 2: Dealing with Equity and Affordability Issues Higher premiums based on newly drawn flood maps are likely to impose a financial burden on low-income households. Insurance vouchers financed by general taxation may be the best way to make the risk-based rates equitable. Note: this special treatment would be given only to people currently residing in hazard-prone areas. New property owners who locate to the area should be charged premiums that reflect the risk.*

## Questions to be Considered by the Rockaway Peninsula and Other Communities:

- How much will flood insurance premiums cost residents in the Rockaway Peninsula and other coastal areas as a result of updated flood mapping?
- What role can means-tested vouchers play in dealing with affordability issues with respect to the cost of flood insurance?
- Should flood insurance be required for all homeowners in flood-prone regions?
- Could flood insurance be tied to the property rather than the homeowner?
- What are the costs of mitigating one's home to reduce the flood risk, and how can these measures be financed so that homeowners are willing to undertake them?
- What community-based risk-reduction measures (e.g., building a sea wall, levee, dunes or other barriers) should be considered and how much will these measures cost?
- Would these barriers create a false sense of security against future flooding and lead to new construction that could create catastrophic losses in the future?



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## **Issue Brief: Analysis of Flood Insurance Protection: The Case of the Rockaway Peninsula in New York City**

INFORMED DECISIONS ON CATASTROPHE RISKS issue briefs are published by the Wharton Risk Management and Decision Processes Center of the University of Pennsylvania. For additional information, contact Carol Heller, [hellerc@wharton.upenn.edu](mailto:hellerc@wharton.upenn.edu) or 215-898-5688.

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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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