

WERE THE POST-SANDY STATEN ISLAND BUYOUTS EFFECTIVE IN REDUCING VULNERABILITY?

Quantifying the Success of Buyout Programs: A Staten Island Case Study

Buyout Participants Stayed Close to Home

82% of the buyout participants studied relocated within New York State. **60% of participants moved within 5 miles of their origin address.**

Nearly 40% of buyout participants who relocated within Staten Island relocated within the zip codes in which the buyouts were offered. 68% of Staten Island's Severe Repetitive Loss Properties are located within these zip codes.

Vulnerability Increased

Overall vulnerability, measured in terms of exposure and social vulnerability, **increased for 321 of the 323 buyout participants** considered by this study.

Social Vulnerability Dominates

Social vulnerability increased for 99% of buyout participants. Over 20% of participants relocated to an area within a flood zone or exposed to storm surge.

Shifting Vulnerability

Staten Island, one of New York City's five boroughs, was shattered by Superstorm Sandy in late October of 2012. The 16-foot peak storm surge devastated the vulnerable, low lying communities of Staten Island's eastern and southern shores.¹

In light of anticipated sea level rise and growing populations along the coasts, federally funded home buyout programs are often championed as an effective post-disaster mitigation approach.² Buyout programs strive to move people and property out of vulnerable areas and maintain the acquired land in its natural state in perpetuity. However, before federally funded buyout programs are assumed to be our country's solution to coastal vulnerability, their capacity to effectively reduce vulnerability should be evaluated. This analysis concludes that significant uncertainty remains with respect to whether or not the Staten Island buyout program met its objective of reducing the vulnerability of people and property to coastal flood hazards.

Trends in Relocation

The relocation patterns of 323 buyout participants from the Oakwood Beach, Graham Beach and Ocean Breeze communities of Staten Island were analyzed. This sample represents approximately 70% of all Staten Island program participants.

Given the importance of sense of place and the relocation incentives offered by the state, it is unsurprising to find that 79% of buyout participants relocated within the five boroughs of New York City. Of the 18% of participants who moved out of state, the majority moved to coastal New Jersey and coastal Florida.

¹ NY Rising Community Reconstruction Staten Island East & South Shores Planning Committee. March 2014. "East & South Shores Staten Island NY Rising Community Reconstruction Plan." Plan, NY Rising Community Reconstruction Program, New York

² De Vries, Daniel H, and James C Fraser. 2012. "Citizenship Rights and Voluntary Decision Making in Post-Disaster U.S. Floodplain Buyout Mitigation Programs." *International Journal of Mass Emergencies and Disasters* 30 (1): 1-33.

Methodology

This analysis endeavors to quantify the change in the vulnerability of people and property to coastal flood hazards as prompted by the NY Rising Buyout Program. It does not consider the potential vulnerability reduction of the acquisition component³ of the program or other risk reduction efforts in Staten Island following Superstorm Sandy.

First, the addresses of the buyout locations were determined using the New York State Housing Trust Fund Corporation’s Property Disposal Reports. Publicly available tax documents were then accessed to determine the names of homeowners at the time of Superstorm Sandy. Next, the most recent addresses of homeowners were found through a search of publicly available documents. Finally, origin and relocation address coordinates were assigned using a geo-referencing service.

Vulnerability was first defined as the sum of exposure, sensitivity and adaptive capacity. Demographic variables contributing to social vulnerability were assumed to indicate the sensitivity and adaptive capacity of the origin and relocation communities. Exposure vulnerability and social vulnerability scores for all origin and relocation addresses were measured using geospatial analyses.

The changes in exposure and social vulnerability were determined through a comparison of vulnerability scores at the locations of the buyouts in Staten Island and the scores at the relocation addresses of buyout participants. An overall change in vulnerability score was calculated by first standardizing, and then averaging, the exposure and social vulnerability scores. Exposure and social vulnerability were assumed to be equal contributors to overall vulnerability.

MEASURING THE CHANGE IN VULNERABILITY

Components of Vulnerability		Exposure	Sensitivity	Adaptive Capacity
Definitions / Indicators Used		Is the target physically located in an area experiencing the direct impacts of coastal flood hazards?	If exposed to coastal flood hazards, how does the target fare?	How does the target adjust or cope with the hazard?
Vulnerability Reduction Targets		Flood Zone, Storm Surge, Shallow Coastal Flooding	Elderly Population, Population Density, Poverty, Educational Attainment, Minority Population, Hispanic Population, Single-Parent Families	
			Data Largely Unavailable (Is home elevated? Set back? Etc.)	N/A, Assuming buildings do not adapt.

³ Although otherwise very similar to the buyout component, the acquisition component of the NY Rising program allows for acquired parcels to be resold and redeveloped.

Results

The exposure vulnerability analysis reveals that only two buyout participants relocated to an area more exposed than origin communities on Staten Island. However, because of the indicators chosen for this analysis, it is likely that exposure vulnerability is underestimated for both the origin and relocation addresses. Models that predict storm surge are not yet comprehensive and maps indicating flood zones may be grossly out of date, systematically underestimating the risk of coastal flood hazards. Further, 20% of the buyout program participants relocated to a census tract exposed to at least one of the coastal hazards evaluated.

99% of buyout participants relocated to an area with a higher social vulnerability score. Nearly all program participants relocated to areas with higher levels of poverty while two-thirds of the sample relocated to areas with a higher proportion of elderly residents.

In considering both exposure and social vulnerability, this analysis finds that overall vulnerability has increased for 99% of the 323 buyout participants studied. On average, buyout participants saw a 26% increase in their overall vulnerability score following their participation in the program.

Conclusions

It remains questionable whether or not the federally funded, 190 million dollar Staten Island buyout program met its objective of reducing the vulnerability of people and property to coastal flood hazards. As buyout programs are more frequently implemented to reduce vulnerability along the coasts of the United States, it is imperative that these programs meet their objectives. In order to develop effective buyout policies moving forward, it is critical that we understand whether or not programs to date have been successful. Further study of the efficacy of coastal buyout programs is warranted to inform the administration of inevitable widespread post-disaster coastal relocation initiatives. Strategic incentives may prove to be powerful tools in encouraging program participants to relocate to comparably less vulnerable places.

Recommendations

- Reconsider the applicability of the buyout policy and administration approach currently being implemented. Large-scale post-disaster relocations from densely populated coastlines may require a novel approach.
- Conduct follow-up surveys with buyout program participants. Survey results may be used to inform incentive strategies that encourage relocation to less vulnerable areas. Quantifying the success of buyout programs may encourage future participation.
- Preemptive buyout strategies should be implemented along our most imminently threatened coastlines. Proactive risk reduction programs will allow for the more thoughtful and effective relocation of vulnerable people and property.

Contact Information

Devon McGhee

Master of Environmental Management, Duke University
devonmcghee@gmail.com
(631) 748 - 7946