University of Delaware
Disaster Research Center

MISCELLANEOUS REPORT #76

HOUSEHOLD RESIDENTIAL
DECISION-MAKING IN THE
WAKE OF DISASTER:
REPORT OF RESULTS PREPARED FOR
OAKWOOD BEACH RESIDENTS

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ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

This report presents the findings of a questionnaire mailed to Oakwood Beach residents during the summer of 2014 focusing on housing damage, decisions, and repair following Hurricane Sandy. Researchers from the Disaster Research Center at the University of Delaware worked to complete this study. As researchers, we were interested in exploring the different elements that influenced how residents decided where to live after Sandy. Little research exists to help explain how households decide where to live after a disaster. Getting better information about how people here made and are making these decisions is important both for this community and for communities that will face these kinds of disaster in the future. We hope that this information will lead to better policies and programs that improve the disaster recovery process.

We mailed the questionnaire to Oakwood Beach residents during the summer of 2014. The questionnaire asked about a number of issues, including whether they had fully repaired their homes or not, if they had raised their homes or made them safer in any other way, if they had moved or if they planned to move in the near future, if they accepted a buyout offer for their property, if they were concerned about future storms like Sandy, and for general information about themselves and others that lived in their home. We mailed questionnaires to 282 addresses in Oakwood Beach and received 52 completed questionnaires. After removing invalid addresses from our database, we had an approximately 22% response rate. While this may seem like a small number of people that level of response is typical for scientific questionnaires. In addition to the questionnaire, we also interviewed three residents over the telephone. These interviews provided us with more details about their recovery after Sandy.

When we examined the completed questionnaires and looked for themes in the interviews, we found a number of interesting patterns. A majority of questionnaire participants were full-time residents of Oakwood Beach and lived in single-family homes. Most of the residents that participated in the study that the state offered the buyout accepted it. Many of the residents that the state did not include in the buyout process wanted to be included. Beyond the buyout offer, we found that a number of factors influenced how residents decided where to live after Sandy, including their financial situation, how attached they felt to Oakwood Beach, how much damage their home sustained from Sandy, the level of travel disruption in the area, and how concerned they were about future storms. This report provides additional details on all of these factors. We hope that the people find these results interesting and that those who can make decisions to improve the lives of the people affected by disasters use this information to reach that goal.

INTRODUCTION

On October 29, 2012, Hurricane Sandy made landfall on the northeastern U.S. coastline, damaging hundreds of thousands of homes and causing extensive damage to electrical lines, roads and bridges, and sewer systems. Sandy's tropical storm-force winds stretched over 900 miles, causing storm surges and destruction over a large area. According to the National Oceanic and Atmospheric Administration (2014), Sandy resulted in 159 deaths in the United States, fifty-three of which occurred in New York.

Of the many areas affected by Hurricane Sandy, communities along the coast of New York suffered some of the most devastating effects. Hurricane Sandy made landfall approximately 120 miles south of Oakwood Beach, resulting in twenty-three deaths on Staten Island, including three in Oakwood Beach (Barr 2013). The storm inflicted a tremendous amount of damage to the area. According to the U.S. Office of Housing and Urban Development (2014), Hurricane Sandy damaged 909 structures, flooding 152 structures with one to four feet of water and an additional 228 with over four feet of water in Oakwood. Of those damaged, 733 owned their homes and 176 rented. Noted as one of the most heavily impacted neighborhoods in New York, many media outlets called Oakwood Beach the "Ground Zero" of Hurricane Sandy damage (Knafo and Shapiro 2012; New York Rising 2013). Most of Oakwood Beach encountered thirteen to fifteen feet high storm surge, with the worst of the flooding contained below Hylan Boulevard but nearly reaching the Staten Island Rapid Transit Line.

Disasters like Hurricane Sandy cause individuals, households, communities, and government to rethink the protections in place for lives and property. While recent events like Hurricane Katrina, the Indian Ocean Tsunami, and the earthquake, tsunami, and radiological event in Japan have brought more attention to disaster recovery, researchers still lack a good understanding of the disaster recovery process, especially when considering how people decide where to live after a disaster.

The purpose of this study was to gain insights on how households decided to rebuild in the same spot or move following a disaster. We begin this report by discussing the status of the housing stock in Oakwood Beach. Next, we summarize the findings of other studies that explored how people decided where to live after a disaster that provided us with a foundation for our own study and detail our subsequent research approach. After that, we give an overview of our results. We close by discussing the conclusions we drew from our study.

STATUS

Our questionnaire provided a summary of the amount of damage following Sandy and the status of the housing recovery. Table 1 shows the amount of damage reported. The majority of respondents reported *Somewhat Extensive* or *Very Extensive* damage. Only 5.6% of respondents abandoned their property.

Table 1: Reported Extent of Housing Damage

Damage	Number of Respondents	Percentage of Respondents
No Damage	3	5.6
Not Very Extensive	7	13
Somewhat Extensive	22	40.7
Very Extensive	22	40.7
Total	54	100
Missing	0	0

Table 2 shows the status of the housing recovery as of June 2014. Over 11.1% of respondents indicated that repairs were still in progress.

Table 2: Status of Housing Recovery, June 2014

	Number of Respondents	Percentage of Respondents
Abandoned	3	5.6
Repairs Completed: Not Elevated	23	42.6
Repairs in Progress	6	11.1
Structure was or will be totally rebuilt	1	1.9
Structure was or will be demolished	18	33.3
Repairs completed; elevated	0	0
Repairs scheduled to begin	0	0
Property for sale or sold	21	38.9
Prefer not to answer	0	0
In good condition (did not require repairs)	2	3.7
Not sure (please explain)	4	7.4

Interestingly, many homeowners elected to not undertake and do not plan to undertake actions to mitigate the impact of future storms. Table 2 and Table 3 summarize the actions taken and the actions plan and how these actions have or will be funded. More than 66.7% of respondents have not undertaken any mitigation actions. The most common action was to purchase additional insurance, and the most common funding mechanism was personal funds or savings.

Table 2: Mitigation Actions

Activities and Funds	Specific Actions and Sources of Funds	Number of Respondents	Percentage of Respondents
Property Mitigation	*Purchased additional insurance*	5	9.3
	Elevated your home	1	1.9
	Installed hurricane windows	0	0
	Strengthened attachment to foundation	0	0
	Elevated utilities	4	7.4
	Installed roof fasteners	1	1.9
	Installed new pilings	0	0
	None of the above	36	66.7
	Prefer not to answer	3	5.6
	Other	8	14.8
Mitigation Fund	*Personal funds/savings*	17	31.5
	Insurance	12	22.2
	Borrowed from friends/family	5	9.3
	Non-profit assistance/aid	0	0
	Other (please explain)	1	1.9
	Loans from a financial institution	1	1.9
	Government support	0	0
	Did not select anything	28	51.9
	Prefer not to answer	4	7.4

Table 3: Mitigation Plans

Plans	Specific Actions and Sources of Funds	Number of Respondents	Percentage of Respondents
Mitigation Plans	*Install storm shutters*	1	1.9
	Purchase additional insurance	1	1.9
	Elevate your home	2	3.7
	Install hurricane windows	0	0
	Strengthen attachment to foundation	0	0
	Elevate utilities	0	0
	Install roof fasteners	0	0
	Install new pilings	0	0
	None of the above	42	77.8
	Prefer not to answer	3	5.6
	Other	5	9.3
Planned Mitigation Fund	*Personal funds/savings*	1	1.9
	Insurance	0	0
	Borrowed from friends/family	0	0
	Non-profit assistance/aid	0	0
	Other (please explain)	1	1.9
	Loans from a financial institution	1	1.9
	Government support	1	1.9
	Did not select anything	44	81.5
	Prefer not to answer	5	9.3

BACKGROUND

We built the questionnaire to include items other researchers who looked at past events noted as important. We reviewed over 70 documents (including books, peer-reviewed journal articles, and reports). These studies created the basis for our own work. We found the following seven themes in these studies:

1. Households tend to rebuild in the same spot in the same way following disasters (Berke and Campanella 2006; Dynes 1991:11; Haas, Kates, and Bowden 1977; Oliver-Smith 1996:308),
2. Households that feel strongly attached to where they live are more likely to rebuild in the same place than residents that do not feel the same level of attachment to their community (Cuba and Hummon 1993; Fraser *et al.* 2003; White, Virden, and Riper 2007),
3. Households that suffer extensive damage are less likely to rebuild in the same place than residents that experience minimal damage (Emily and Storr 2009; Miller and Rivera 2007; Myers, Slack, and Singelmann 2008; Wilson and Stein 2006),
4. A majority of households tend to accept buyout offers when offered and thought of as a fair offer (de Vries and Fraser 2012),
5. Households that are more concerned about another similar disaster are less likely to build in the same place than residents less concerned about another similar event (Slovic 1999; Kirschenbaum 2005),
6. A number of demographic characteristics may influence this decision, such as age, household income, and minority status (de Vries and Fraser 2012; Fraser *et al.* 2003; Weber and Peek 2012:16), and
7. Households with negative opinions of their community prior to the disaster are less likely to rebuild in the same spot than households that have positive opinions of their community (Castles 2002; Correa 2001; David and Meyer 1984).

To explore these themes within Oakwood Beach, we developed an academic case study, which is a research technique that uses different kinds of evidence to develop an overall understanding of a topic (Berg and Lune 2012:325). Appendix 1 provides more details about the methods we used for this study. The topics we focus on are demographics, attachment to Oakwood Beach, damage, disruption, risk perception and the buyout. For each topic, we provide the following three sections: 1) by the numbers, 2) in your words (with quotes from the interviews and questionnaires in italics), and 3) take away.

FINDINGS

Demographics
Previous researchers have suggested that demographic characteristics (such as age, race, and income) might influence how someone decides where to live after a disaster. To explore this idea in Oakwood Beach, we included demographic questions on our questionnaire modeled after the American Community Survey; a survey ran by the U.S. Census Bureau. Specifically, we asked residents to share their age, job or profession, household makeup, household income pre- and post-Sandy, gender, race, and education level.

As part of our questionnaire, we also included questions about resident's homes. Therefore, we asked residents about their tenure in the community, their housing type, the condition of their home after Sandy, and about any plans they might have for future protective measures.

By the numbers
The average age of residents that returned the questionnaire was fifty-four, with a majority of respondents between the ages of thirty-nine and seventy. Only 37% had children in their home under the age of eighteen, and 35% had seniors in their home over the age of sixty-four. The most common household size in Oakwood Beach had two members, and 40% of households reported having over three people living in the home.

The most common household income bracket in Oakwood Beach among respondents was over $99,999 pre-Sandy. On a surprising note, 17% of the sample reported in a lower income bracket post-Sandy. This does not necessarily mean their income dropped due to Sandy, but that their 2013 income was lower than 2011.

Approximately 59% of respondents indicated they were female, and 93% identified as white. Approximately 45% of residents had a Bachelor's Degree, and 5% held a Professional (MD, JD, etc.) or Doctoral Degree (PhD). Interestingly, we did not find any relationship between demographic factors and how someone decides where to live after a disaster.

Table 1 displays the questionnaire data compared to the Census data to show the similarities and differences between our sample and the Census profile for Oakwood Beach. In general, the data are similar. The biggest differences are in the age and gender of the respondents. This is typical, however, within questionnaire research. Often, people that respond to questionnaires tend to be older that the average population, disproportionately female (which was not the case here), and of the racial majority. It is also important to note that the Census includes individuals under the age of eighteen when calculating the median age, where we only included individuals eighteen years of age and older.

Table 1: Census Demographic Profile Compared to Questionnaire Data

	Census Data	Questionnaire Data
Median Age	38	54
Average Household Size	3	2
Percent of the Population Over the Age of 18 in Each Age Range		
20 – 29	19%	2%
30 – 39	16%	10%
40 – 49	20%	29%
50 – 59	19%	27%
60 – 69	15%	21%
70 & over	11%	11%
Total	100%	100%
Missing	-	-
Sex		
Female	50%	59%
Male	50%	41%
Total	100%	100%
Missing	-	-
Race		
White	92%	92%
Black or African American	1%	-
Asian	5%	6%
Other	2%	2%
Total	100%	100%
Missing	-	-
Household Income in 2011 (the year prior to Sandy)		
Less than $100,000	65%	59%
$100,000 or more	35%	30%
Total	100%	89%
Missing	-	11%
Highest Level of Education Completed		
No diploma	10%	7%
High School Graduate (includes equivalency)	39%	32%
Some College or Associates Degree (AA)	29%	15%
Bachelor's Degree	13%	22%
Graduate or Professional Degree	9%	23%
Total	100%	99%
Missing	-	1%

Table 2 displays the residential profile for Oakwood Beach questionnaire respondents. Approximately 91% of our questionnaire respondents owned their home, and while some did not answer, no one suggested their home in Oakwood Beach was a second home. Most respondents (85%) lived in single-family homes. The average respondent had lived in Oakwood Beach for thirteen years by the summer of 2014.

Table 2: Residential Profile of Questionnaire Respondents

	Number of Respondents	Percentage of Respondents
Residential Data		
Do you own or rent the property addressed on the envelope of this questionnaire?		
Rent	4	7%
Own	49	91%
Total	53	98%
Missing	1	2%
Which of the following describes how you use this property? Mark all that apply.		
Primary Residence	49	91%
Second Home	-	-
Rental Property	-	-
Other	-	-
Prefer not to answer	1	2%
Total	50	93%
Missing	4	7%
How long has this residence been owned by your family? Please answer in years.		
Median (years)	13	
What type of home is this?		
Single-family home	46	85%
Multi-family home	2	4%
Apartment	-	-
Condo/Townhouse	4	7%
Other	2	4%
Total	54	100%
Missing	-	-
When did you move into or take ownership of this house, apartment, or mobile home? Please provide the calendar year (for example, 2001).		
Median (year)	2001	
In total, how many years have you lived in [Oakwood Beach/Oakwood Beach]?		
Median (years)	13	

<u>In your own words</u>
There is no "in your own words" section for this topic because, fortunately, residents that returned their questionnaires and participated in interviewees did not mention demographic characteristics as the best or worst parts of their community, as a problem or pitfall of the housing recovery process, or in the interviews.

<u>Take away</u>
The discrepancy between the findings for this study and previous studies regarding the role demographics play when deciding where to live after a disaster is worth discussing, and could be due to a number of reasons. First, there was little variation in the demographic variables, both within questionnaire participants and in the population as a whole. This variation is required for many of the statistical tests we ran exploring demographic factors. Second, many of the other studies asked individuals about *their* moving behavior after disasters, where we argue they should have looked at *households*. We suggest, instead, that in the typical household the decision to move or stay is a negotiated, group decision, made by all the members of the household. We are not advocating that every household is a democracy, but we are arguing that you cannot reduce the decision to the choice of a single individual. Lastly, other studies might not measure all of the important factors. In other words, they might have missed some things that explain the differences in demographic factors. For example, imagine that researchers in another setting saw a pattern where young adults were more likely to move after an event than their older counterparts were, and concluded that age was a significant factor, and that younger people move out of the community more often than their older counterparts do after disasters. If they had conducted interviews, however, they may have found that the younger people moved because the schools that their children attended failed to re-open after the event. So in this case, they did not move because they were younger, but because the event resulted in a decreased quality of living for them, which did not affect their older counterparts that no longer had children in the home.

Attachment to Oakwood Beach

The first element we explored was an idea called "attachment to Oakwood Beach." This is an idea that considers how connected people are to where they live that researchers typically break down into two components. The first considers how much residents identify with where they live, their neighbors, and their history in an area. To put it another way, this component explores how emotionally attached someone is to where they live. The second factor explores how much residents depend on the qualities a place offers them that they enjoy, like access to the beach, public transportation, and privacy. We explored both components of attachment in three ways. First, we asked a panel of six questions related to attachment to Oakwood Beach on the questionnaire. Second, we asked residents to list the best and worst things about their community, both pre- and post-Sandy. Lastly, we asked interviewees to tell us about their communities, why they lived in Oakwood Beach, and what it was like both before and after Sandy.

By the numbers

In general, Oakwood Beach residents were attached to their community. While the responses vary, a majority of the responses speak positively of the attachment they felt toward their community. Of note, 48% of Oakwood Beach respondents felt strongly attached to Oakwood Beach, and 13% strongly agreed that no other place could compare to Oakwood Beach. Approximately 57% of respondents suggested that they felt that Oakwood Beach was a part of them, and 54% argued that they would not enjoy doing the things they do in Oakwood Beach in a similar community. Figure 1 displays the breakdown of attachment to place in Oakwood Beach.
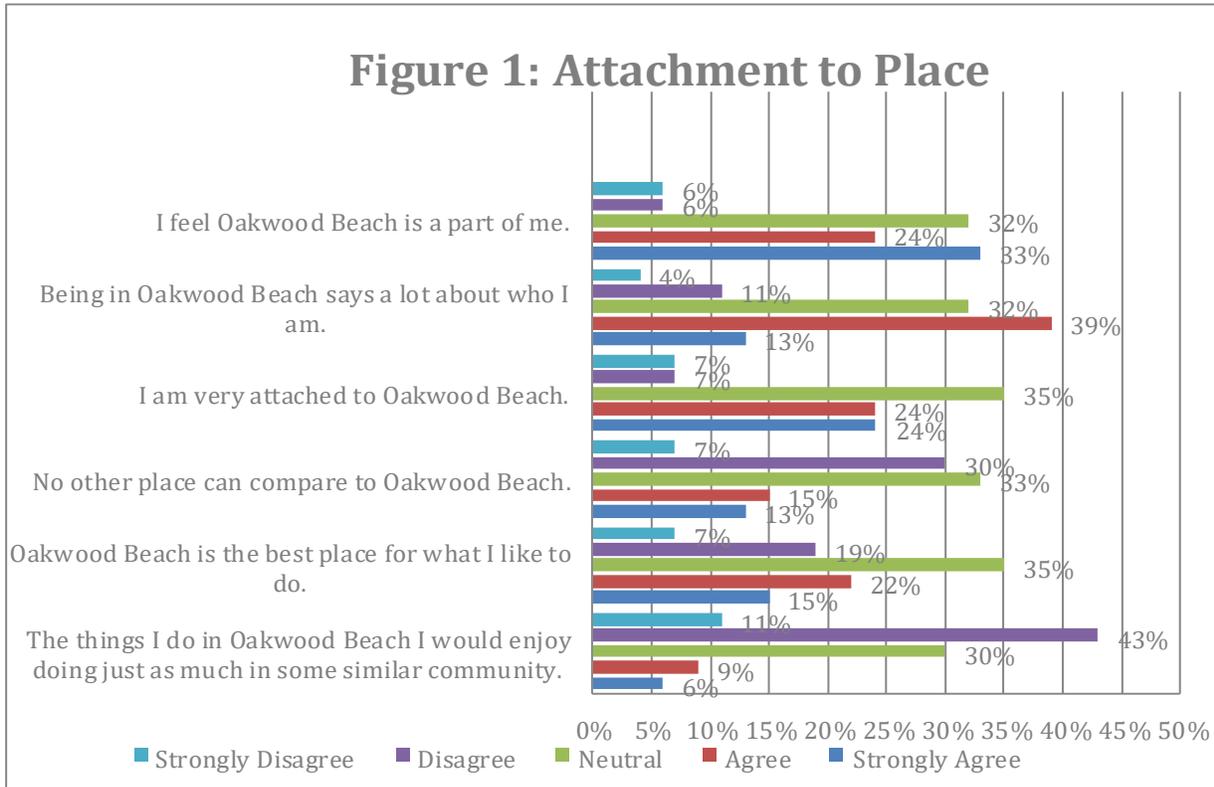
Figure 1: Attachment to Place

<u>In your own words</u>
When describing the three best and worst things about their community, both before and after Sandy, a few intriguing patterns emerged. We represented those patterns in Wordles. Wordles are "word cloud" figures that represent major themes in data by varying the size and boldness of the words based on how many times they appear in the text. Therefore, if a word is more common, it is both larger and bolder in the Wordle produced. Figure 2 displays the Wordle produced when examining what Residents liked most about their community pre-Sandy.

Figure 2: Wordle Representing the Three Most Common Things Residents Liked Most About Their Community Before Sandy

As you can see in the figure above, Residents emphasized how quiet their community was, their relationships with their neighbors, and the town's proximity to other places (like Manhattan) as some of the elements they liked the most about the community prior to Sandy. Other elements they mentioned included the atmosphere of the area, the wildlife surrounding the community, and living near the beach. Many of the items residents mentioned here relate to elements you would expect of a small, isolated coastal community. Figure 3, in contrast, displays what residents liked most about their community after Sandy.

Figure 3: Wordle Representing the Three Most Common Things Residents Liked Most About Their Community After Sandy

When answering what they liked best about Oakwood Beach after Sandy, while many of the same categories reemerge, many new elements rise in importance. Exposure, referring to a reduced exposure to flooding and wildfires, was a major thing residents appreciated about their post-Sandy community. Given the effect Sandy had on the community and the amount of Oakwood Beach residents that did not return after the hurricane, it is not surprising that this is a major factor residents considered. People also mentioned their new housing as a major benefit after Sandy, and still emphasized their relationships with neighbors and friends along with their proximity to other areas. Figure 4 shows what elements Residents liked least about their community before Sandy.
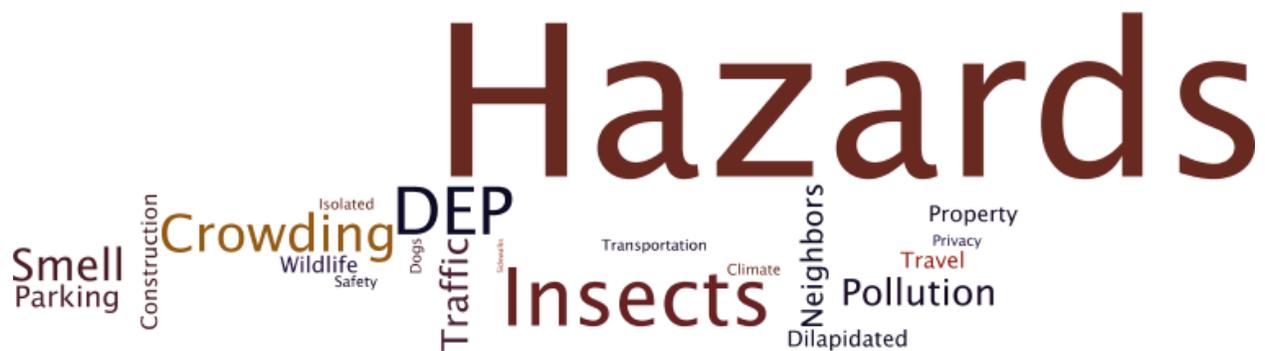
Figure 4: Wordle Representing the Three Most Common Things Residents Liked Least About Their Community Before Sandy

When asked the elements they liked least about their community prior to Sandy, residents gave a range of answers, dominated by negative environmental factors. Hazards was the most common factor, probably due to the history of flooding and fires in the area. Other environmental factors, such as insects, pollution, smells, and the Water Pollution Control Plant (labeled DEP), were prominently mentioned as well. Figure 5 presents, in comparison, what residents liked least about their community after Hurricane Sandy.

Figure 5: Wordle Representing the Three Most Common Things Residents Liked Least About Their Community After Sandy

Interestingly, when considering which parts residents liked least about their town after Sandy, the responses are quite a bit more diverse from what they liked least before Sandy. A number of residents mentioned their proximity to other places, which was seen as a good part of where they lived before Sandy, suggesting that they either had moved further out of the area or that the residents that stayed in Oakwood Beach felt like they could not travel as easily as they traveled before Sandy. Hazards were still a concern for many residents, where others suggested that traffic and crowding were issues for them after Sandy.

Interviewees highlighted the importance of their bonds with their neighbors and friends in the area prior to Sandy as an important reason they chose to live in the area. They often described the open space and nature surrounding them as a major perk for living in the community.

> There was four houses that all kept a common area in the back of our homes mowed down so it was large enough that we were able to hold the games there, you know, like softball and wiffleball games, my kids learned how to ride their bikes back there. I had a garden that was about, I'd say anywhere from 40 to 60 square feet, so we had a pool, we had a deck, it was very quiet and peaceful, it was a very nice place to be.

Residents we spoke with described the area as unique, suggesting that Oakwood Beach offered them something that nowhere else in New York City could offer. They emphasized the benefits of living so close to New York City in a quiet, relatively affordable community, particularly in contrast to the congested, dense, and expensive surrounding cityscape.

> *We actually chose the neighborhood because of its location. Um, it's quiet, it's private, um, and you know, the houses, of course where we lived, were fairly new. We had great neighbors and it really fit our budget also.*

Take away

The questionnaire and interview data show that there is a complex relationship between attachment to place and the decision to stay or move after Sandy. Most notably, Residents that participated in the questionnaire that were more attached to Oakwood Beach were more likely to think they will live in Oakwood Beach for an extended period, when compared to their less attached peers. While not an altogether surprising finding, it does offer evidence that attachment influences longer-term residential plans. This suggests that future studies should avoid simply asking if people have moved and look at what people plan to do in the near future. In the interviews, we spoke with a number of residents that described many of the physical elements associated with living in Oakwood Beach as what tied them to the area originally, highlighting location, the secluded nature of the area, and the interface with nature it offered.

Damage

Hurricane Sandy caused extensive damage to Oakwood Beach. To explore the range of damage and the perception of the damage in Oakwood Beach, we asked residents two sets of questions. One set asked residents to tell us the amount of damage done to their home in dollars, whether they had flood insurance, and how much said flood insurance covered. A second set of questions asked residents to rank the damage done by Sandy to both their homes and their community from "not very extensive" to "very extensive".

By the numbers

In our study, the average damage residents reported to their home was $67,000. Approximately 76% of respondents stated that they had flood insurance, and it covered $36,000 on average in damages. A majority of respondents in Oakwood Beach felt that damage to both their homes and their communities was extensive. Interestingly, the average responding resident thought the damage was worse to the community than their own home. We found that, in general, respondents with extensive damage were more likely to move than respondents with less than extensive damage were, especially when you focus on the "very extensive" categorization. Figure 6 displays respondent's impressions of damage to both their homes and their community.
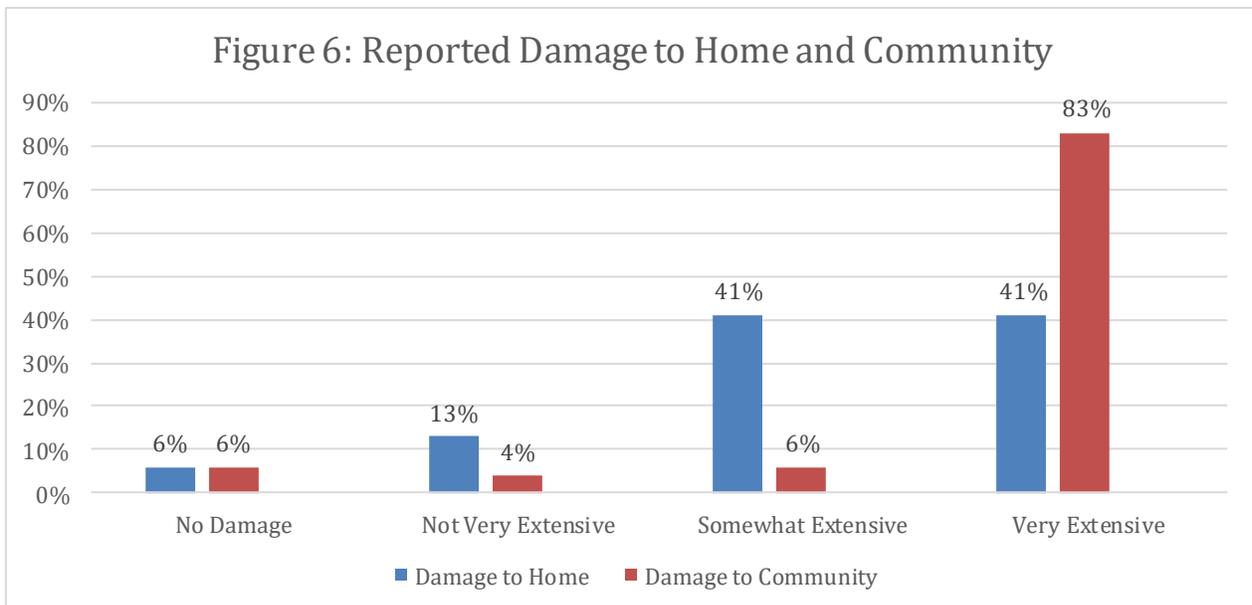

Figure 1: Reported Damage to Home and Community

<u>In your own words</u>
Since we asked residents during interviews to describe their experiences with Sandy, each one detailed the damage to their homes and their community. Residents often described the damage as total, and something they had never witnessed during their tenure in the area.

> *Um, well this community was very, uh, badly hit almost like the epicenter of where the storm hit on Staten Island. You know, it was more than just flooding, it was actual waves going through the dunes down by the beach, and we had houses on the left of me down the street, a little closer to the water that were actually, um, you know disengaged from their foundations, they broke apart and floated away and landed in the marshland across the street from me.*

<u>Take away</u>
We found evidence in both the questionnaire data and through the interviews that residents considered the damage done to their homes and communities when deciding where to live after Sandy. Residents that thought that Sandy did more damage were more likely to move out of the community. Residents might have seen this damage as a chance to start in a new location, or as the start of an exhausting rebuilding process that they were not willing to endure. Interestingly, the average resident estimated damage to their community as worse than the damage to their own homes.

It is important to consider that while residents that lived in Oakwood Beach and the surrounding area during Sandy understand some of the risks associated with hurricanes and living in area, a number of residents are leaving the area, opening up space for new residents in the areas not held in perpetuity by the buyout program. Therefore, while Oakwood Beach still lives with the risk of future hurricanes, new residents may not be aware of the destructive potential of these events, or how to adequately protect themselves and their homes. In the future, the government and local citizen groups should be sensitive to this risk and consider educational campaigns and other approaches to ensure that residents are equipped with the knowledge necessary to persist in the area. Existing community members should also consider what they could do to help bring their new neighbors up to speed on the risks, and strategies to address these potential issues.

Disruption
In addition to the damage Sandy caused, it also resulted in significant disruption to residents' ability to travel. While this is an area ignored by previous researchers, we thought it was important to include, given the fact that many residents travel outside the area daily for work. To explore this idea, we asked residents whether Sandy disrupted their ability to travel both within and outside Oakwood Beach, and how long that disruption lasted.

<u>By the numbers</u>
When asked about travel disruption within Oakwood Beach, 76% of respondents indicated that Hurricane Sandy did disrupt their travel, and a majority of Residents that returned the questionnaire indicated that Hurricane Sandy disrupted travel within Oakwood Beach for a period between two to four weeks. Approximately 60% of Oakwood Beach residents indicated that travel outside of their community was an issue. The length of outside travel disruption was shorter, in general, than travel within Oakwood Beach. Interestingly, respondents that relocated were more likely to say that there was disruption than residents that rebuilt in Oakwood Beach. Figure 7 displays respondent's reported travel disruption within and outside of Oakwood Beach.

Oakwood Beach residents were split on the importance of the ability to travel both within and outside of the area when deciding where to live after Sandy. Approximately 39% of Oakwood Beach respondents suggested that their ability to travel within their community was somewhat to very important in their decision-making process. When considering travel outside their community, 46% of Oakwood Beach respondents indicated that the ability to travel outside of Oakwood Beach was somewhat to very important in their decision-making process, suggesting that in general Oakwood Beach residents were more concerned about their ability to travel

Figure 7: Travel Disruption Duration Within and Outside Oakwood Beach
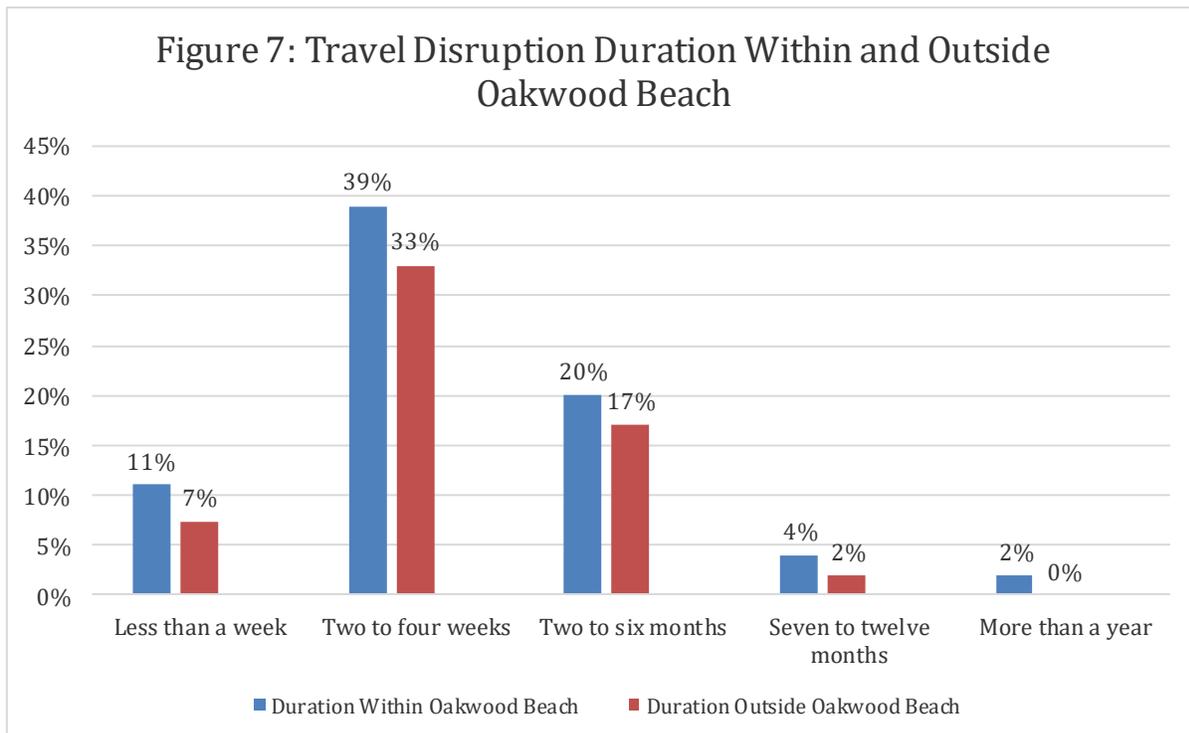
outside their community.

Figure 2: Travel Disruption Within and Outside Oakwood Beach

<u>In your own words</u>

Many residents mentioned that Sandy disrupted their travel during our interviews. A number of interviewees suggested that Sandy significantly impacted their travel to work, and that this, in turn, increased their stress levels. One of the main issues cited was lost transportation. While some people lamented the loss of public transportation, others highlighted the fact that Sandy destroyed their personal vehicles, which were not easy to replace. In many cases, this went to complicate and intensify an already tenuous financial situation.

> *We had all our clothes and a lot of irreplaceables destroyed. Furniture, furnace, washer and dryer that was put on charge cards that I am now paying for still. Our two cars were gone, so we had to rent a car until we were able to get a new one. I knew one my son's was not replaced – we leased ours, and he leased his. We also went to FEMA who did not help us but very little, and we had to borrow and put things on charge cards.*

<u>Take away</u>

Disruption, or interruptions in the ability to travel, returned mixed results. It is not surprising that, given the level of damage in the area, such a high percentage of residents would note disruption to travel after Sandy. In a complimentary finding, we also found that residents that suggested that their ability to travel both within and outside their community was important when deciding where to live were more likely to still live in the area. Given that a number of residents noted that their ability to travel, within and especially outside of Oakwood Beach, was an important factor when deciding where to live after Sandy, officials should consider prioritizing the restoration of roads, bridges, and public transportation after an event if their goal is to encourage residents to return to their homes.

Risk Perception

Since previous studies found that residents that were more concerned about future disasters were more likely to move after a disaster, we wanted to explore this topic in Oakwood Beach. To that end, we asked questionnaire respondents a panel of questions that touched on the chance of a similar event occurring over a given timeframe, the potential impacts of such an event, and the importance of these potential events on where they decided to live after Sandy.

By the numbers

In Oakwood Beach, there is a real belief that another event like Hurricane Sandy is likely in the near future. Approximately 53% of residents agreed that another event was likely in the next five years, and 63% agreed that it was likely in the next twenty years. When considering the factors that influenced how residents decided where to live after Sandy, 74% of respondents stated that the likelihood of another hurricane was somewhat to very important in their decision-making process. Figure 8 presents resident's perceived likelihood of another event like Sandy over a specified period.
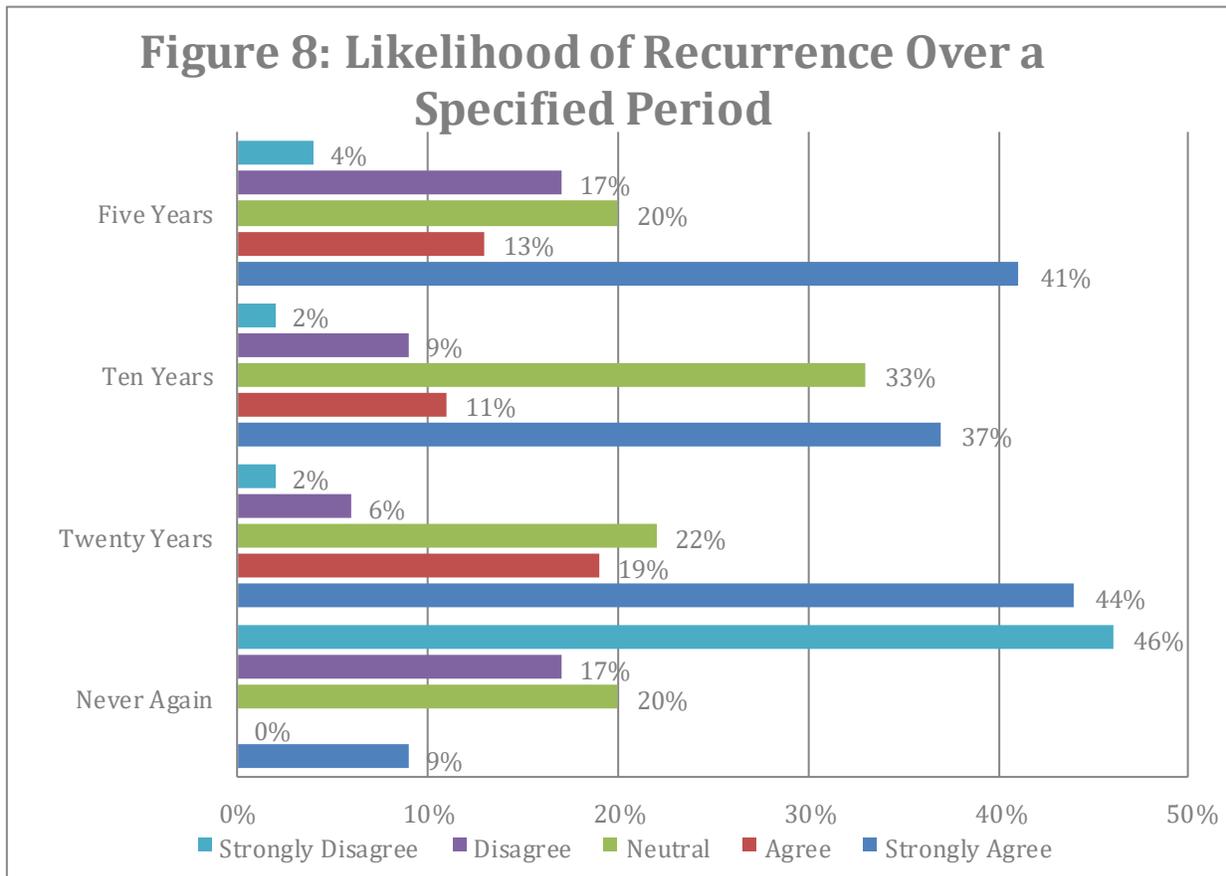

Figure 3: Likelihood of Recurrence over a Specified Period

When asked to consider what would happen if another event like Sandy occurred again in the next ten years, 78% of residents said they thought it would cause major damage to their home, whereas only 57% thought they, or members of their household, would suffer injury for said event. Interestingly, we found that Oakwood Beach respondents that rated the risk of recurrence higher were more likely to have accepted a buyout offer than respondents that rated risk of recurrence lower.

In your own words

During conversations, interviewees offered a number of insights on what they thought about local risks and how that influenced where they lived after Sandy. Interviewees often described themselves as "exposed", and, in light of the buyout, the ones that rebuilt in the area argued that they felt abandoned and without a way to protect themselves. A compounding factor residents of Oakwood Beach often mentioned is that they also live in an area threatened by multiple hazards, most notably wildfire.

> *We lived with constant threat of fires, secondary to people at the beaches, as well as the floods because at the end of our street was a creek. So if the floodgates backed up then the creek backed up and then that came back into the street, so we were constantly at risk due to the fires and the floods. So, we were always very conscious of it, at first sign of a fire, we definitely left the area because it was due to the fact that the beach was down at the other end of the block, there was only one way out. Once the fire engines came, it was impossible to get your car off the street so we just always evacuated as soon as we saw any threat of danger.*

Residents that moved out of Oakwood Beach often stayed in the general New York City area, but moved away from the coast, suggesting that it was because they feared another hurricane. They lamented, on the other hand, losing many of the great elements of living in Oakwood Beach and near the coast.

> *You know, living by the water is beautiful, and it's nice to be close to the beach, but uh, after you experience something like we did, you're certainly going to have your reservations. Unless you're rich and it doesn't matter to you and you're crazy and it doesn't matter to you. We saw people were killed here, and it wasn't just the flood. So, um, no we, we'd have enough distance between us and the ocean, but not too far, I'd like to be able to drive to the beach in a half an hour or an hour, but not live by the beach.*

<u>Take away</u>
We found that, in general, residents that participated in the questionnaire that thought a repeat event was more likely to occur were more likely to think they would move out of Oakwood Beach in the near future. Therefore, fear of a future hurricane served as motivation to move out of the area. Patterns in the interviews suggest that, as expected, risk was in the consciousness of residents in the wake of Sandy. This is also evident in the Wordles, where many respondents noted hazard exposure as one of the worst things about Oakwood Beach, both pre- and post-Sandy. Many questionnaire respondents and interviewees that relocated, or that had decided to move out of the area but were waiting to sell their home, emphasized the place a future storm held in their decision to leave the area. They would often acknowledge that this was a complicated decision, and that while they may feel attached to their community and the many appealing things Oakwood Beach offered them, the risk was too great for them to persist in Oakwood Beach.

The Buyout

Given the lack of buyouts following previous disaster in the U.S., the limited number of previous studies exploring buyouts in the U.S. context, and the scale of buyouts in Oakwood Beach, we wanted to investigate the role buyouts played in how Oakwood Beach residents decided were to live after Hurricane Sandy. To explore this issue, we asked residents whether or not the state offered them a buyout, and, if they received a buyout offer, whether they accepted or rejected the offer.

By the numbers

As part of our study design, we sent our questionnaire to people both within and outside the area the state offered buyouts. Of our fifty-four questionnaire respondents, thirty-four (63%) indicated that they received a buyout offer. Of those thirty-four, twenty-nine (85%) indicated that they had accepted the state's offer for their property. Not surprisingly, statistical analysis showed that a buyout offer was strongly related to whether someone moved or rebuilt in Oakwood Beach after Hurricane Sandy. In fact, it was one of the strongest relationships in our study. Simply put, residents that received a buyout offer were significantly more likely to move out of the area than residents that did not receive a buyout offer.
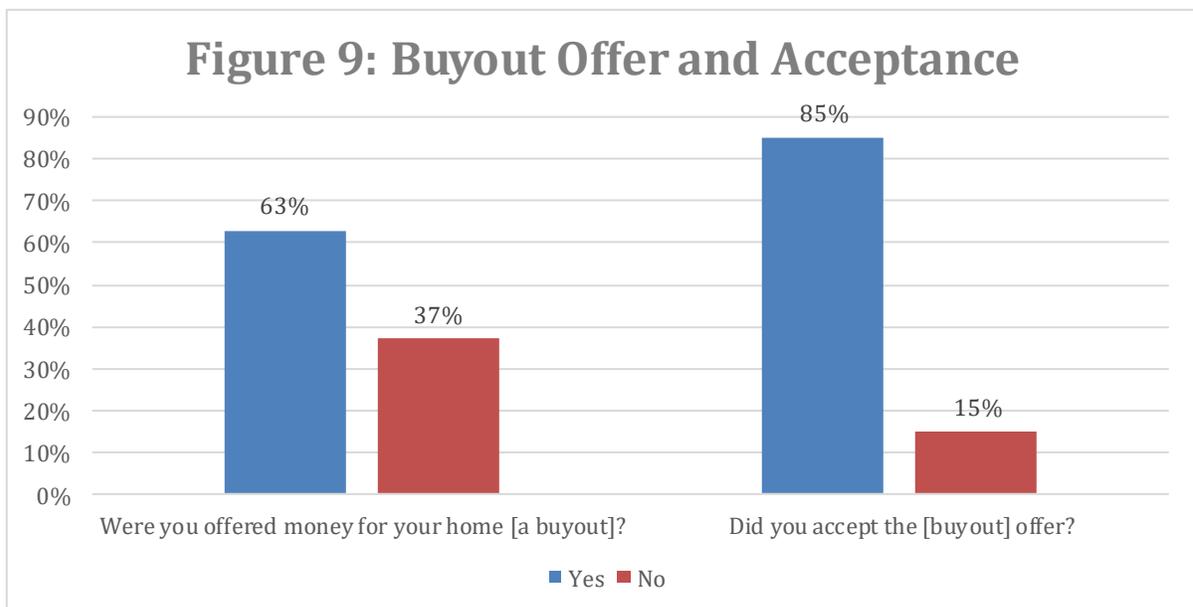

Figure 9: Buyout Offer and Acceptance

<u>In your own words</u>
A number of Oakwood Beach residents wrote about the buyout program in their questionnaire responses and discussed the process in the interviews. While a number of our questionnaire respondents participated in the buyout program, the state of New York did not offer any of our interviewees a buyout. Two interviewees lived directly outside of the buyout area and one was in a rental home that the state purchased. Generally, we saw three themes in the data, where some participants discussed the process as a straightforward, positive venture, a portion described problems they encountered in the process, and renters explained their experiences with the buyout.

A portion of the questionnaire respondents described the buyout as a fairly straight-forward, three-step process of working with local community leaders, filling an application to the state, and receiving a buyout offer from the state between eleven and sixteen months after the storm, as typified by the quote "…the NY state buyout was clear cut and expeditious". Many noted that they were thankful for the buyout, and saw it as an opportunity for a fresh start in a new location. While they felt connected to the area and had many positive things to say about it before Sandy, the storm, and both the history of hazards and the threat of future storms, pushed them out of the area.

> *It wasn't just the storm. It wasn't just the storm that made people want to get bought out. That was what… I kind of likened it to a boxing match, where they were constantly getting beat up through every round… Now Irene comes, and that was what knocked everybody in this boxing match back on their heels. Because they were dealing with the floods, the natural floods from just the regular rain, the fires and everything like that, and now they have this ocean storm that brought both…. But then when Sandy came, that was the knockout punch.*

> *And um, my children have um, lost one of their friends who was a twenty year old, and his father and another one of their friend's fathers. I did not plan on going back at all. That was it for me. And then once he [the landlord] had the buyout, we left with what we could salvage and he cleaned out the house and gutted the house out and he offered but we definitely let him know we weren't interested in returning. We haven't heard anything about the buyout, you know, what happened with him. We just pretty much left it with we weren't returning either way.*

Additional questionnaire respondents, however, noted issues associated with their buyout offers. One respondent called the process "a joke" and stated that it took multiple follow-ups to ultimately receive the offer and move. A few others noted changes in the housing market post-Sandy made the buyout offer too low to purchase equivalent housing, while another respondent stated that their "dream of paying off their mortgage of their former house before retirement" was gone due to expenses incurred in the moving process, even with the buyout. Another respondent noted that, even though the buyout offer was not mandatory, they did not feel they had a choice, mentioning that "…in the end we were compelled to take the state's offer to buy our property".

As noted above, we also included residents just outside the defined buyout area. Many of these residents were interested in a buyout offer, and even asked their government representatives for a buyout offer, but did not receive one. One resident not eligible for a buyout described their home and the surrounding area as "…completely unsafe from tidal surges and hurricanes". Questionnaire respondents went to great lengths to indicate that they wanted buyouts, including one respondent writing on every page of the questionnaire "WE NEED A BUYOUT". Another respondent stated that their home was fifty feet away from other homes that the state purchased but were not included, while a different person noted that:

> *Even someone I know, whose neighbor got bought out lived on the corner, but these people were farther up the street on the same side and weren't bought out. Again, this is word of mouth. These are the kind of things I've heard, but that was further up. Not to say it was nowhere near the beach, but they weren't a block away from the beach like we were. They were separated by… it's actually called Mill Road. And their houses out there, maybe the water went up another four or five blocks from my area. And a lot of those houses though were built there all higher houses with steps, that would be like eight or twelve feet up, where my house and the houses in my little three block community were 95% bungalows or on the ground.*

Other quotes made it clear that some residents did not understand why New York State offered some areas buyouts and did not offer a similar program in other areas. Unfortunately, studies like this may emphasize and exacerbate some of that confusion, as noted in the following quote:

> *The politicians told us we were in Oakwood and not Oakwood Beach. In the meantime were receive these surveys we fill out stating Oakwood Beach. This is the problem and pitfall unfortunately for my family.*

Renters described a different experience with the buyout program when compared to homeowners. A few respondents that rented their properties noted that they were rarely considered or consulted during the buyouts, which often put them in a tough position. One was even surprised by an eviction notice in the form of buyout acceptance, noting "…out of the blue I was notified that my landlord accepted the buyout and I had ninety days to move." A second renter noted that, after the property owner told them they had to move, they had a difficult time finding another rental, presumably due to the increased rent prices and influx of new renters displaced by Hurricane Sandy.

Take away
We found that, in general, most of the Oakwood Beach residents offered a buyout by the state accepted those offers. Residents told us that this was often because they felt this was their best and possibly only chance to leave the area and restart. They feared another storm, localized flooding, fires, the loss of their neighbors, the effect of this on their home value, and the future of Oakwood Beach.

While a number of residents were happy with the buyout program, many others noted issues they encountered. Many residents had issues securing their buyout offers, while others questioned the fairness and voluntariness of the offer. Residents just outside the buyout area lamented the fact that the state did not give them a buyout offer as well, and expressed concern over their long-

term safety. Since buyouts are rare, community organizations and policymakers should look at this buyout effort as a source of lessons for future buyouts.

CONCLUSIONS

The goal of this study was to understand the factors residents considered when deciding where to live after Hurricane Sandy. We found that attachment to Oakwood Beach, the level of damage to the home and community, travel disruption, level of concern about a subsequent hurricane, and the buyout offer influenced how residents decided where to live after Sandy. Typically, residents suggested that a number of these factors identified above influenced their decision, and the choice of where to live rarely ever boiled down to one factor. While a number of other studies suggested that demographic factors affected this decision, we did not find evidence to support this claim.

Interestingly, we found that a household's financial situation disempowered them in this decision-making process. A number of residents offered buyouts told us that they felt that the buyout was the best, and possibly only offer they would get for their homes, and their sole chance to recover financially. Other residents outside the buyout zone suggested that they could not afford to walk away from their homes and incur the remaining mortgage, but in its current condition the house lost much of its worth. So, in this situation, often the only affordable housing residents recognized was to continue working toward repairing their current home, whether that meant incurring new debt or tapping into retirement funds, creating new uncertainties for themselves in the future. Even when provided with a buyout, some residents suggested that the financial burden created by Hurricane Sandy forced them to use personal funds, which put them in a potentially tough financial situation in the near future. While past studies focused on providing affected populations with new, affordable properties, in this case it is less about the ability to acquire new affordable properties as empowering their recovery. This was a largely understudied area in past work, and one that should be given more attention in future studies.

While the losses, both human and material, were extensive and residents will feel Sandy's impacts for years to come, there is a lot to celebrate in the area. A number of residents noted that they felt closer to their friends and family in the wake of Sandy. Community members in Oakwood Beach worked with their neighbors to secure state-funded buyouts for a portion of residents. Guyon Rescue, a grassroots nonprofit, emerged to help meet local needs. A number of residents have found long-term housing, and are in the process of either completing their repairs or reestablishing their normal rhythms.

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Appendix 1: METHODOLOGY

Case Study Development
To develop an understanding of how households decided where to live after Hurricane Sandy, the research team developed case studies. A case study is a research method that utilizes multiple sources of data to create an in-depth and detailed examination of an event (Berg and Lune 2012:325). We used three data sources to form an understanding of how households decided to either relocate or stay and rebuild:
1. A systematic review of policy documents,
2. Interviews with households, and
3. Interviews within the local, state, and federal government.

We analyzed each data source to create an overall picture of the elements influencing the decision-making process.

To understand how households decided to relocate or rebuild, we needed to examine one case where a majority of the community decided to resettle and another case where an overwhelming majority of the community members decided to rebuild in the same place. Ideally, the communities would be comparable but not identical, allowing us to explore those differences in the case study development (Yin 2009).

We chose Oakwood Beach, NY, as one of our two communities because of the housing buyout program instituted by New York State that led to a majority of the residents leaving their community. Sea Bright, NJ, served as our second community due to local efforts to bring residents back to the area.

Policy Review
To develop a more comprehensive understanding of policy associated with post-disaster recovery, we conducted a policy review. By policy, we are referring to "a course of government action or inaction in response to public problems" (Kraft and Furlong 2009). We conducted a systematic review of policy documents, including current federal policies on post-disaster recovery and state-level plans for federal funds dispersed following Hurricane Sandy.

Questionnaires
Questionnaires serve as a practical research method because they are relatively affordable and can collect a large sum of information across a variety of different topics. We mailed a self-administered questionnaire via the United States Postal Service to residents of both case sites. We included households within and outside the buyout zone for comparative purposes.

On April 29, 2014, we sent each household on the mailing list a postcard to inform them of the study and provide them with contact information of the researchers in case they had any questions about the research. Three waves of the questionnaire packets followed the postcards. Before each round, we removed households from the mailing list that had already returned the questionnaire and packets that USPS could not deliver. In total, we received 54 questionnaires from residents of Oakwood Beach, which results in a response rate of approximately 22%.

The questionnaire contained 80 questions pertaining to the respondents' homes and their actions following Hurricane Sandy. We used multiple question types, including Likert and open-ended questions, to explore these issues. It consisted of twelve separate content sections, each intended to elicit responses on a different concept of interest to the research team and/or the Boro of Oakwood Beach. These sections included:

1. General residential data,
2. Place identity and place dependence,
3. Pre-event functioning and place attachment,
4. Condition of housing and mitigation plans,
5. Damage and insurance coverage,
6. Travel disruption,
7. Residential status and plans,
8. Buyout decision and reasoning,
9. Variables influencing residential decision-making,
10. Post-event functioning,
11. Risk perception,
12. Demographics, and
13. Open-ended questions regarding the process of housing recovery and pitfalls associated with that process.

We chose these areas to explore based on findings of previous studies.

Interviews

To expand upon the information gathered from the questionnaires we conducted in-depth, semi-structured interviews. Interviews are a great way to gain a fuller understanding of variation within the decision-making process. We developed interview questions as a way to guide the flow of conversation, but often the interviews emerged organically and new questions developed as the interviewee shared their experiences.

We completed three telephone interviews with residents of Oakwood Beach. These interviews gave us an invaluable set of insights on the experience of Oakwood Beach residents in the wake of Hurricane Sandy. We only contacted potential interviewees if they indicated on the questionnaire that they were interested in talking to us, and all interviewees were 18 years of age or older.

One of our interviewees rented a home in the buyout area, the second lived one street away from the buyout area, and the third lived approximately two streets away from the buyout area at the time of Sandy. We explored similar ideas in both the interviews and questionnaire. The interviews served as a way for us to understand the context within which households made their residential decisions, and learn about the struggles they encountered as they navigated their road to housing recovery.

<u>Limitations</u>
It is important that we acknowledge the limitations to this study to help with interpretation of our findings. Since this study was exploratory, we did not perform higher-level statistical analyses that might have shed more light on the factors that influence how households decided where to live. Anytime researchers use a mail questionnaire, their database of addresses is inevitably not perfect, which means groups of people are not reached. Disasters exacerbate this issue, with homes and mailboxes destroyed, creating hardships when trying to understand the experience of those households. This method also does not capture the experiences of individuals without housing or that are already in transitional housing at the time of the disaster.

There is also always a concern when you ask people after an event to tell you about the time before the event. Without the foresight to perform this questionnaire and interviews before Sandy (or a time machine), this problem cannot be addressed, but only considered when interpreting findings.