

**COMMUNITY LED DISASTER PLANNING:
LESSONS LEARNED IN RED HOOK, BROOKLYN
POST SUPERSTORM SANDY**

Daniel Hewes

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Columbia University
Graduate School of Architecture, Planning & Preservation
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Superstorm Sandy, Climate Change, Disaster Planning, Community, Red Hook, Brooklyn, Resiliency, Red Hook Initiative

Abstract

New York City has long operated under the perceived low risk of severe hurricanes impacting the major city. In late October of 2012, Superstorm Sandy struck with ferocious intensity and exposed many weaknesses on multiple levels, from city to the federal government. As far back as 2007, New York City has been publishing groundbreaking and forward thinking long-term sustainability reports to deal with the threat of climate change on the city, and the impact it will have on various stakeholders. This thesis will examine the key points of three of the major reports, and identify to what extent areas in which vulnerable community stakeholders were involved. PlaNYC, A Stronger, More Resilient New York, and the Hazard Mitigation Plan all have attempted to plan for the long term across numerous hazards and risks that the city faces. The destruction that Sandy caused in the Brooklyn neighborhood of Red Hook epitomized the failures on multiple levels of city's response. At the same time, it became a case study for community led disaster response in the face of great neglect for some of New York's most geographically and socially vulnerable population.



Acknowledgements

This thesis was inspired by the devastating impacts that New York City faced during late October in 2012 when Superstorm Sandy made landfall. While the impacts were felt differently from neighborhood to neighborhood, New Yorkers came together as one to rebuild and recover. As a lifelong New Yorker, I witnessed the devastation and horrors during September 11th. Just four years later, I travelled to New Orleans after Hurricane Katrina decimated the Gulf Coast, and assisted in the rebuilding efforts in the ninth ward. Whether circumstantially or purposefully, I have witnessed the lowest and the highest that cities can go through.

I would like to acknowledge my thesis advisor, Lance Freeman, and my reader and professor, Peter Marcotullio, for guidance and encouragement with this complex and at times, overwhelming topic.

To the residents of Red Hook, Brooklyn, you have reminded me what it means to be a true New Yorker, with your selfless actions in a time of crisis. I will forever be inspired by what I learned in Red Hook and at Columbia to make this city a more equitable and better place to live.

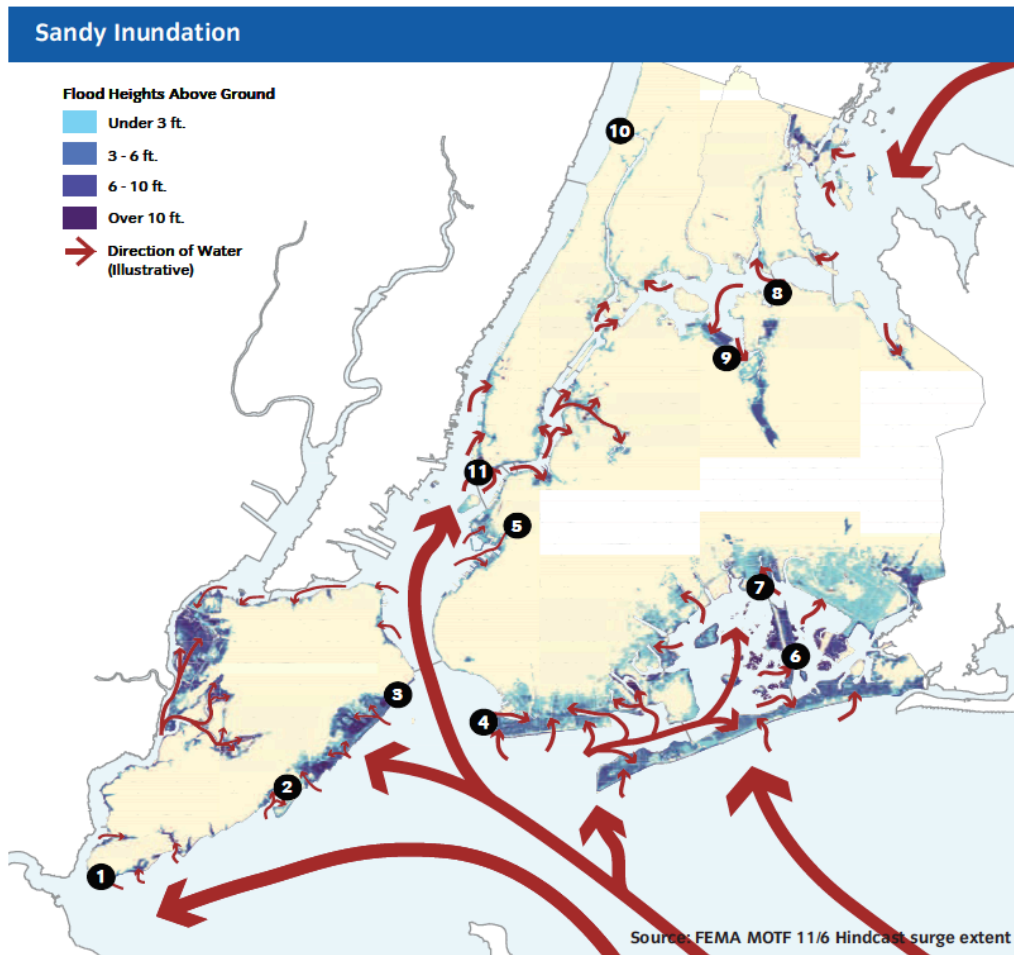
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INTRODUCTION

Superstorm Sandy began forming on October 22, 2012, and was forecast over a week before it made landfall on the east coast of the United States. It was originally predicted that the storm would turn east and head out into the Atlantic Ocean, missing the major east coast cities. Forecasting models showed the storm making landfall in the New Jersey/ New York City metro area. The National Weather Service confirmed this trajectory on October 24th, and the region began to brace for the impact. Sandy had a wind field of over 1,000 miles, and a highest recorded wind speed of 115 miles per hour.

Sandy made land fall on October 29th, 2012. High tide coupled with the left hook of the storm caused over 10 feet of storm surge to inundate coastal neighborhoods. Record Setting 30 foot waves were measured off the coast of the Rockaway Peninsula. The eastern coast of Staten Island and Red Hook in Brooklyn were two of the hardest hit areas, with flooding destroying many businesses and damaging many homes and residential buildings.



Map Source: A Stronger, More Resilient New York

By the time Sandy was over, it had impacted 24 states, all the way to Wisconsin and Michigan. Total damage was \$65 billion, with \$19 billion from New York City alone. Sandy caused 48 deaths in the New York City alone, many due to drowning. Off the coast of the Rockaways, waves as big as 32 feet were recorded. Homes and structures were left flooded and destroyed, with over 100 homes destroyed by fire in Breezy Point.

There has been much discussion in the past decade about global warming, and the effect it has on weather events. There is no doubt that the planet is getting warmer as

CO2 emissions continue to rise, as they have since the industrial revolution. Oceans are eight inches higher than they were in 1900, a huge increase. The book *Global Weirdness* nicely summarizes sea level rise over the past century, “There’s also some evidence that the rise has been faster lately: the average rate of sea-level rise from 1961 to 2009 was about 0.07 inches per year. But if you look just at the years 1993-2009, the rate was nearly double that, or about 0.12 inches per year. The increase could be due to a stronger influence of global warming, since warming melts ice and make seawater expand. Changes in ocean currents can also make sea level locally higher or lower than the global average”¹. Reminiscent of the destruction caused in the Gulf Coast by Hurricane Katrina in 2005, Sandy proved to be a storm that the New York City was not prepared for.

New York City is at a particular high level of vulnerability because of the “New York Bight”. This term refers to the right angle formed by the geography of Long Island and New Jersey, and the magnitude of force that is heightened and funneled directly into the five boroughs. Storm surge and damage is amplified, especially in the neighborhoods that lie on the coast. This makes New York one of the most vulnerable cities in the United States for severe weather events. Not only is the land vulnerable, the already at risk and vulnerable populations are put at elevated levels of damage and destruction. Add the densely populated areas that are situated in these vulnerable areas, and a bleak picture begins to get emerge for millions of New Yorkers. While all 520 miles of coastline in

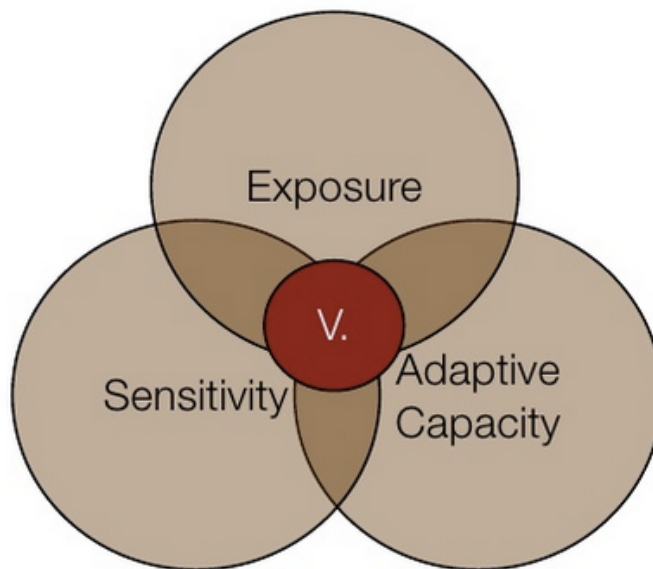
¹ Climate Central, *Global Weirdness* (Vintage Books, 2012) 84.

² City of New York, *A Stronger, More Resilient New York* (Mayor Bloomberg’s Administration, 2013, p. 25)

³ Coastal Storm Plan,
http://www.nyc.gov/html/oem/html/planning_response/planning_coastal_storm_plan.sht

New York City are not at high risks of flooding and damage, there is a very real threat to many residents on the water.

Vulnerability is a topic that appears in most of the planning literature, and must be addressed to give context to this thesis. As an area of study, three main points usually define vulnerability: exposure, sensitivity and adaptive capacity. Exposure defines the ways in which an area or populations is physically exposed and vulnerable to hazards. Sensitivity describes those who are most at risk of these hazards (ie: the elderly or poor). The adaptive capacity, which is the underlying theme of this paper, refers to the ability of a community, neighborhood, or city to recover after a disaster occurs.



<http://image.slidesharecdn.com/mekongrivercommission2010-100518045210-phpapp01/95/climate-change-vulnerability-and-adaptive-capacity-in-the-mekong-region-2010-5-728.jpg?cb=1367387898>

The exposure is dependent on external factors while the sensitivity and adaptive capacity depend on actors internal to a community.

It is also important to note that the events that occurred in Red Hook with NYCHA were not entirely a NYCHA problem. No city agency, no matter how well funded could have been completely prepared for every foreseeable risk and hazard. But irrespective of the funding issues, when a city agency is the only life line for so many vulnerable residents, it must be held to a higher standard. No matter the amount of funding, there was clear lack of planning and recovery efforts on multiple levels, made worse by the existing factors in Red Hook.

Disasters often occur at random, and can be very hard to predict. Cities like New York are no stranger to devastating disasters. The terror attacks of the World Trade Center in 1993 and on September 11, 2001 proved to be a test of security and recovery before and after the devastation occurred. New Orleans was decimated during Hurricane Katrina, and endured much more severe flooding than New York City did. Through addressing social and environmental injustices, the city was able to recover and rebuild over time. It is in the same manner that New York City can now help shape the conversation and recovery efforts for community led disaster planning.

LITERATURE REVIEW

Coastal cities around the world are faced with numerous climate related issues, much more so than in the past decades. Climate change has forced cities to plan for rising sea levels, flooding, and overall severe weather events occurring at much higher frequencies than ever before. In New York City, agencies have had to plan long term for adaptation strategies, hazard mitigation, and increased resiliency on all levels. With

400,000 residents currently living in the 100-year floodplain, populations that had long been considered safe and protected are at high risks of many climate related disasters.

There were dozens of reports released in the following year to address adaptation and mitigation efforts. There have also been numerous reports authored by local non-profits and non-governmental organizations. Additionally, several academics and professionals have penned scholarly journal articles, even though Sandy occurred barely two years ago.

The research and data on this topic is fairly recent and ongoing. Plans set forth by the city have projections that date to 2050, and 2100 in some cases. While many of the future projections have not yet occurred, cities have been forced to plan for the threat of severe weather events occurring more frequently.

One common theme present in most of the literature is the idea of resiliency. The 2013 PlaNYC SIRR report “*A Stronger, More Resilient New York*” was a comprehensive look at the ways in which New York City must change and restructure its infrastructure to withstand future storms. The report is the latest edition of the PlaNYC reports that were first published in 2007. The *Vision 2020* uses almost the exact same metrics to determine climate models and forecasts, but as it relates to the coastline specifically. *Vission2020* was published and released in early 2011, but outlined identical vulnerable areas as the SIRR did. GIS maps and community based research is very similar. This is the case with most NYC based plans, as the city does a very lengthy and engaged

community outreach and consultation program for each report and initiative. As is the case with *Designing for Flood Risks*, and *Urban Waterfront Strategies*, the narrative of all the reports is one of urgency, practical strategies that can have immediate to long lasting impacts on the vulnerable populations.

The non-profit and NGO reports were more community based with the narrative. The reports varied from municipality level initiative and plans, to responses to already published city plans. Many of the reports also touched on housing, and the threat of climate change and increased storms on already disadvantaged populations of NYC. The research was very much more bottom up and began with local residents and local entities. Red Hook Initiative release their report one year after Sandy struck, and outlined the community led response that followed in the immediate aftermath. Local volunteers and groups were much more quickly able to provide the needed services and aid to those who were affected. Outlines the benefits of local groups to have their own disaster response plan. Red Hook was one of the hardest hit areas of the city, and floodwaters reached almost every block. Red Hook Houses is one of the largest and most populated housing developments in the entire city, and acted as a microcosm example of the city's slow response to the poor.

On a similar community level response, the *Sandy Regional Assembly* compiled dual reports, one examining the SIRR report, and one outlining the recovery agenda. The Assembly is comprised of over 30 members from varying community and business groups, and spearheaded by the NYC Environmental Justice Alliance. When large,

comprehensive city wide reports are published, it is often the case that there is no follow up with communities or residents. The Assembly took this opportunity to ensure that there was a complete review of the SIRR report as it pertained to residents of the neighborhood is discusses. This exemplifies the community led response and review of the city functions and long term planning.

The research and data that has been collected and presented through these various sources are all based in scientific grounding and findings by international climatologists and scientists. The data clearly states that global warming is a real, anthropogenic phenomenon that has drastic effects on the world's ecosystems. In urban areas, these effects can be amplified for the millions of residents who reside along coastline and in floodplains. In the NRDC's report, *Preparing for Climate Change: Lessons for Coastal Cities from Hurricane Sandy*, discussed the research that was currently available for the threat of rising sea levels to coastal cities. While it touched on New York City, and stayed more general to include a variety of cities along coastlines, many of the hazards presented mirror the hazards outlined in PlaNYC reports and community based reporting.

The Netherlands presents an interesting case study and perspective for water management approaches and flood resiliency. Sebastiaan van Herk, Chris Zevenbergen, Richard Ashley, and Jeroen Rijke released an article titled, "*Learning and Action Alliances for the integration of flood risk management into urban planning: a new framework from empirical evidence from The Netherlands*" in the Environmental Science and Policy Journal in 2011. The framework outlined can be applied to most communities

at risk of flooding and rising sea levels. Van Herk outlines a new framework on how to organize a “Learning and Action Alliance” to support collaborative planning.

Collaborative planning provides opportunities for a wide range of stakeholders, both public and private to be actively involved with developing long term plans.

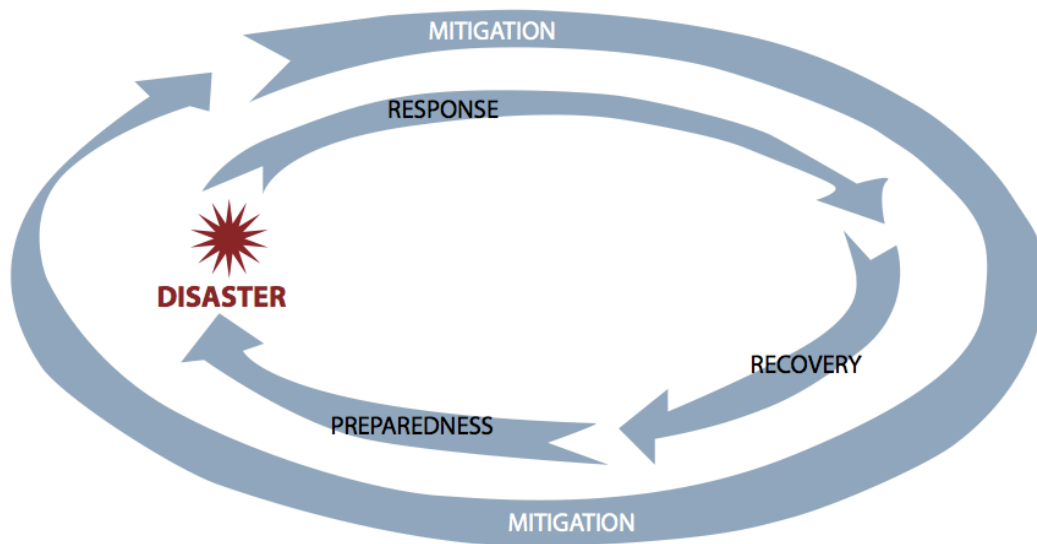
In a purely transparent process, this interactive decision making should result in a richer policy proposal that can be implemented and adapted more efficiently, and ultimately raise the democratic legitimacy of the final decisions. “The multi-objective decision making use din urban planning is complex and needs decision makers who are capable of planning urban areas that can accommodate uncertain futures” (544).

Additionally, it is noted that there is not one single stakeholder that has final or absolute control over the development or long term plans. The key in this framework is the social aspect. Continuous social learning is key to ensure that the public is knowledgeable on current issues that affect their communities and vulnerability. Many neighborhood and communities that are adversely affected by climate change do not have the proper education on the subject matter to make informed decisions. However, if a group of individuals or organizations with a shared interest in innovation and the scaling-up of innovation, is a topic of mutual interest, the social fabric can be developed to integrate a socially based response and collaboration effort.

In the *Global and Planetary Changes Journal* in 2002, Vivien Gornitz, Stephen Couch and Ellen Hartig released an article titled, “*Impacts of sea level rise in New York City metropolitan area*”, looking at direct effects of sea level rise on the region. Within the

next 20 years, sea level rise is expected to increase by up to 30 cm (11.8 inches). By 2050, SLR could be up to 60 cm (23.66 inches) and up to 108 cm (3.5 feet) by the 2080s.

The American Planning Association in partnership with FEMA released Report 576 titled, *“Planning for Post- Disaster Recovery: Next Generation”*. Edited by James Schwab, the report outlines best practices for preparing for the next generation of disasters facing cities.



Focusing on the cycle that disaster planning should follow, Schwab emphasizes the relationship between these components. Mitigation and preparedness, often seen as the same action, are indeed very different when disasters are the topic. Mitigation deals with the physical condition of the risk or hazard, attempting to lessen the potential severity. Preparedness can be seen a more temporary and provisional, focusing on more short-term

measures in the absence of mitigation actions. Schwab states “what you cant mitigate for, you prepare for”. Recovery and response can occur in a formal or informal setting and manner, depending on the forces at work in the immediate aftermath of a disaster. In more formal settings, the response is top-down, as well as the recovery process. In more informal settings, in the absence of city led recovery efforts, as was the case in Red Hook, the response and recovery can be bottom-up and involve community based individuals more.

The Sandy Regional Assembly is an association of a variety of environmental groups, community based organizations and labor unions that came together after Sandy to come up with best practices and plans moving forward. In the April 2013 report titled “Strategies for community based resiliency in New York and New Jersey”, SRA firmly believes that the low-income communities and most vulnerable groups are an integral part of the recovery and planning process. More often than not, long-term plans are top down and begin at the top of local government. New York City, in the outer boroughs, are predominately minority residents, with few resources and means to prepare and respond before and after a disaster strikes. The SRA argues that the low-income communities are n the frontline of climate change impacts, but can be the best resource for the city to use to understand the real impacts of sea level rise and increased storms on the coastal neighborhoods. Given the impacts that these neighborhoods face, the SRA developed three main goals for the vulnerable communities in New York and New Jersey.

Goal 1: Integrate Regional Rebuilding Efforts with Local Resiliency Priorities

Goal 2: Strengthen Vulnerable Communities and Address Public Health Impacts

Goal 3: Expand Community Based Climate Change Planning, Preparedness and Response

Goal 1 encompasses areas in which public housing resiliency can be strengthened, given the effects seen in Red Hook. The first goal is to strengthen resiliency in NYCHA and NJ public housing. This would involve an overhaul and upgrade of the power grid by installing energy back up systems and solar panels to ensure that power can still be supplied if power is lost, as it was during Sandy. NYCHA would also need to move all generators and electrical equipment to higher floors and HVAC systems be moved to the roof if possible. Many residents on upper floors were left stranded due to the elevators shutting down. Some of the residents were handicapped and confined to wheelchairs. Ensuring that NYCHA properties have a secondary power source able to power the elevator would leave no residents stranded and without medical care. Additionally, NYCHA could create an updated registry and log of elderly and disabled residents. NYCHA did create such a log, but only in haste while Sandy was approaching. A more permanent log could be created and updated to ensure that NYCHA knows exactly what residents need to be given priority when a storm is approaching.

The third goal is one that will ultimately strengthen community base efforts. While these points are general and broad, they can be applied in many communities and

can act as a solid base for the beginning of bottom up planning. The local capacity to plan and respond to future emergencies must be strengthened to ensure that the most vulnerable are prepared to respond in the absence of a response from the city.

In late August in 2005, Hurricane Katrina, similar to Sandy, was a wake up call to New Orleans. While the actual storm did not cause much destruction, it was the failure of the levees and the subsequent flooding that caused the horrible damage and loss of life. Most of the city was safely evacuated before Katrina struck, but a large population remained. This was either because those residents did not have the ability to leave, or wanted to take the chance and ride the storm out. Many of the residents who decided to stay were placed in the Superdome, which acted as a makeshift shelter.

The severity of Katrina as a category 4 storm was much more severe than Superstorm Sandy. The City of New Orleans has historically been more racially divided than New York City, but similar to New York, the most affected areas were neighborhoods predominantly minority, as was the case in Red Hook. The resulting community led planning has been studied, and presents the benefits of using on the ground community groups to lead the recovery efforts.

The urban planning program at MIT spent the following years after Katrina working with community based groups on developing plans for 17 targeted recovery areas. Anna Livia Brand and Karl Seidman led the school's planning efforts, and released "*Assessing Post- Katrina Recovery in New Orleans*", in the following years after Katrina

hit. As stated previously, New Orleans has been a racially divided city historically. The long term plans and rebuilding was mostly focused on the upper class neighborhoods and area with more financial means to rebuild- even though those neighborhoods were less affected. MIT found that the community led response has been inequitable and have further reinforced the historic racial and economic disparities. “This lack of attention and investment continues to exhibit a racially charged recovery process and the city has done little to use rebuilding to address historical disparities in terms of race and class”.

MIT found that while community led planning has been the norm for the recovery process, “critical shortfalls in the recovery effort to date have perpetuated an inequitable and inefficient rebuilding process.” Funds that should have been better spent in poorer neighborhoods went to wealthier, less needed areas. Similar to New York City, the neighborhood organizations that are involved with the rebuilding process are limited by capacity and resources. “With little economic and administrative capacity, most of these markets organized by neighborhood organizations operate only once a month and are struggling to supply fresh produce and food to the community.” While food is just one area that was critical in the immediate aftermath of Katrina, the long term lack of planning for the most vulnerable communities has exemplified the disparities in the aftermath of the devastating storm. The recommendations that MIT proposed were: make equitable recovery a city and state priority, empower planning and enhance capacity to implement plans, strengthen communications, invest building strong civic and public institutions to support neighborhood rebuilding, and keep New Orleans on the national agenda. It is important to note that New Orleans was a much harder hit city, with much

poorer and socially disadvantaged residents affected. The planning and recovery process after Katrina hit attempted to involve every income level, a wide variety of geographically separated areas and uncoordinated community based organizations, the recovery process is less direct and specific than New York City after Sandy.

Similar to the MIT study, Harvard University's Kennedy School of Government released a report titled, "*Lessons from Katrina: How a community can spearhead successful disaster recovery*". This study focused on the neighborhood and community of Broadmoor, a hard hit area during Katrina. The bottom-up neighborhood approach is key in ensuring that the residents of Broadmoor are integral in long term planning efforts. This report defines this as a decentralized neighborhood approach, and begins with the individuals within the affected neighborhood or community to lead and spearhead the community groups. This approach is a departure from the standard top-down method, which is led by city, state or federal task forces and is more centralized in management. This is the common approach mainly because recovery funds come from the top and are distributed to lower level groups and organizations. Broadmoor recognizes that the most informed and the best individuals to lead the recovery efforts are those who were directly affected and have a personal connection to the residents.

While not the case in Red Hook, repopulation in New Orleans was a key issue following the storm. Whether through complete destruction of homes to large numbers of residents choosing to abandon the properties, many of the hardest hit communities were left almost entirely vacant. Without the funding allocated to these neighborhoods, little

incentive was left to return. Harvard and those working with this study project used outdated yet effective means of communications to reach residents not “on the grid”, but who still needed to be reached. By using flyers, lawn signs and banners, these organizations were much better able to reach the residents and relay messages.

Columbia University professor Clara Irazabal & Jason Neville also examined the bottom-up approaches in New Orleans, and released the findings in the article, *“Neighborhoods in the Lead: Grassroots Planning for Social Transformation in Post-Katrina New Orleans”* This examination looked at the shortfalls in the cohesiveness in the multiple stakeholders attempting to work together. Pre-Katrina, Irazabal states that the city of New Orleans and the planning for disasters, “lacked any cohesive, long term governing coalition, instead relying on short-lived, issue based coalitions that prevented stakeholders from either reaching shared understandings of policy problems and solutions, or recognizing and forming a larger, more systemic community agenda”. This echoes the post-Sandy community based efforts in New York City, with little overlap between citywide efforts and those at a local level.

Active citizenship is key in disaster planning, and particularly for the poor residents to hold the government and city accountable to their civil and political rights. This is often described as “insurgent planning or citizenship”. After Katrina struck, community based groups, already vastly separated by issue and constituency, formed what Irazabal calls “de facto empowering of communities”. Similarly developed out of sheer necessity and willpower following Sandy, New York City saw community-based

groups with little previous allegiance to each other prior to the storm, sharing resources and communications to ensure that the gap between the city and local response was as small as possible. Post Katrina, Broadmoor suggested radical tool for preventing future flooding- return part of the neighborhood to nature, while keeping the central residential pockets built. While this cannot be the case in Red Hook, it exemplifies the sometimes needed radical ideas to be started by those who know the neighborhood best. Irazabal also states that while this type of grassroots planning is more feasible and common in the developing world, areas with high amounts of poverty and low education in the developed world can share common practices out of a lack of response by the government.

The area of hurricane and disaster planning is a fairly new and recent area to examine. While there have been books and reporting published over the last 20-30 years, only the most recent surveying and data post Sandy is most valuable in compiling an accurate picture of current hazards. As is the case with most disasters, community level action is high, and in areas like Red Hook, we can paint a near complete picture of local response efforts. While very dense and technical reports released by the city and city agencies gets more into the data and forecasting of future events, it misses the mark to engage with on the ground community members. This effort and point of focus is more important and valuable in assessing the resiliency of a neighborhood or community group. It can't be ignored that these groups are often times more effective in providing immediate aid and care to those affected. By examining an responding to the data and plans that a top down long term report offers, it is imperative that all communities, not

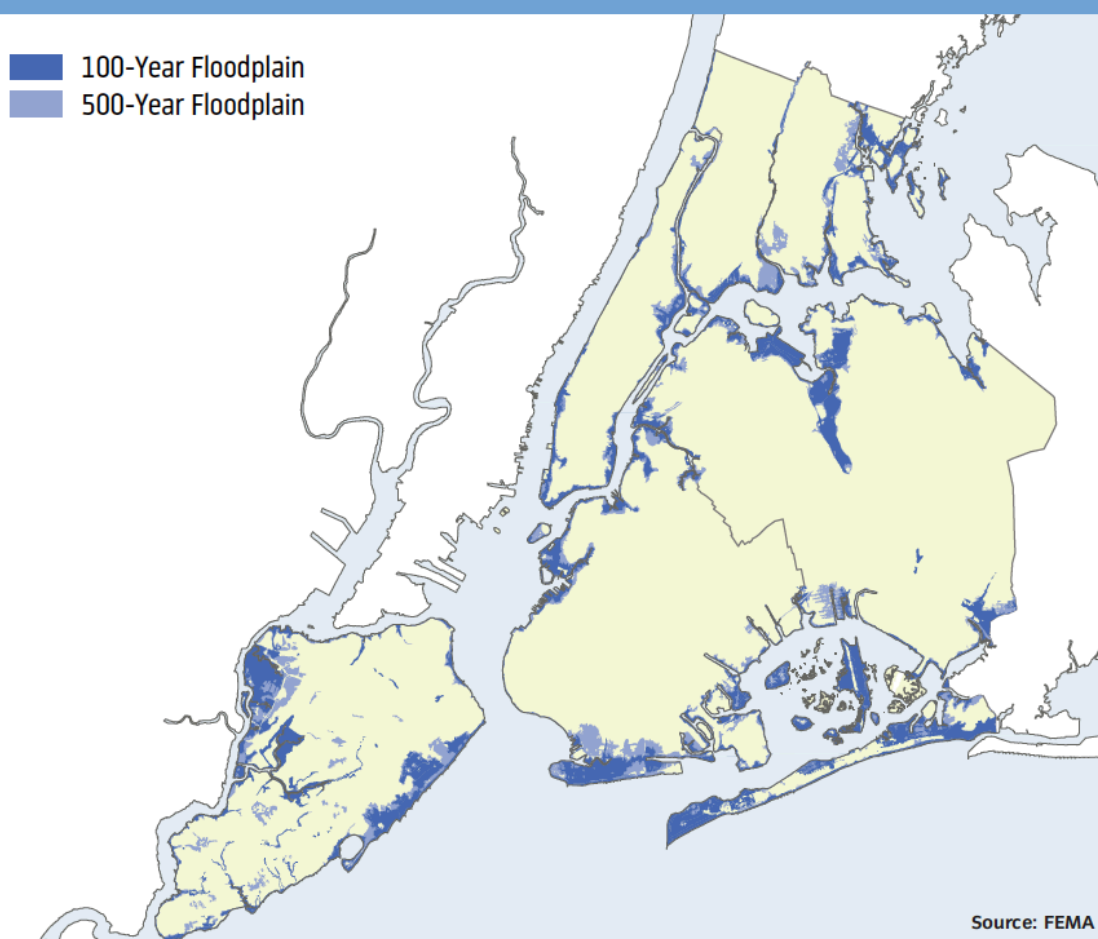
just those affected by storms, examine and respond for the benefit of those who live in vulnerable neighborhoods.

FEMA FIRMS

In 2012, Superstorm Sandy wreaked havoc on New York City. Flooding reached farther inland than ever previously recorded. FEMA flood maps that were being used to predict flood risk were last published in 1983. These maps are referred to as FIRMS (Flood Insurance Rate Maps), which are used by the National Flood Insurance Program to mandate certain flood insurance requirements, which New York City relies on FEMA to produce. Zones are designated by level of vulnerability, including land areas that are at risk of severe and destructive wave action, and that might require flood-protective construction standards.

Based on the 1983 maps, only 33 square miles of all of New York City were within the 100-year floodplain (the area that has 1 percent or greater chance of flooding in any given year).

1983 FEMA Flood Insurance Rate Maps, FIRMs



Map Source: A Stronger, More Resilient New York

In these flood zones, as of 2010, 218,000 New Yorkers resided in vulnerable areas. Additionally, 14 of the city's wastewater treatment plants, and 12 of 27 power plants (equivalent to 37 percent of the city's generational capacity) are in the 100-year floodplain. 35,500 buildings, 377 million square feet of flood area, and 214,000 jobs also reside in the 1983 FIRMs. In 2007, 5 years before Sandy, New York City called on FEMA to update the FIRMs, as well as to convert the maps into digital form, which had not been available in such a format. The 2007 updated maps were virtually identical to the 1983 maps, with just minor revisions. As the most updated and accurate maps for

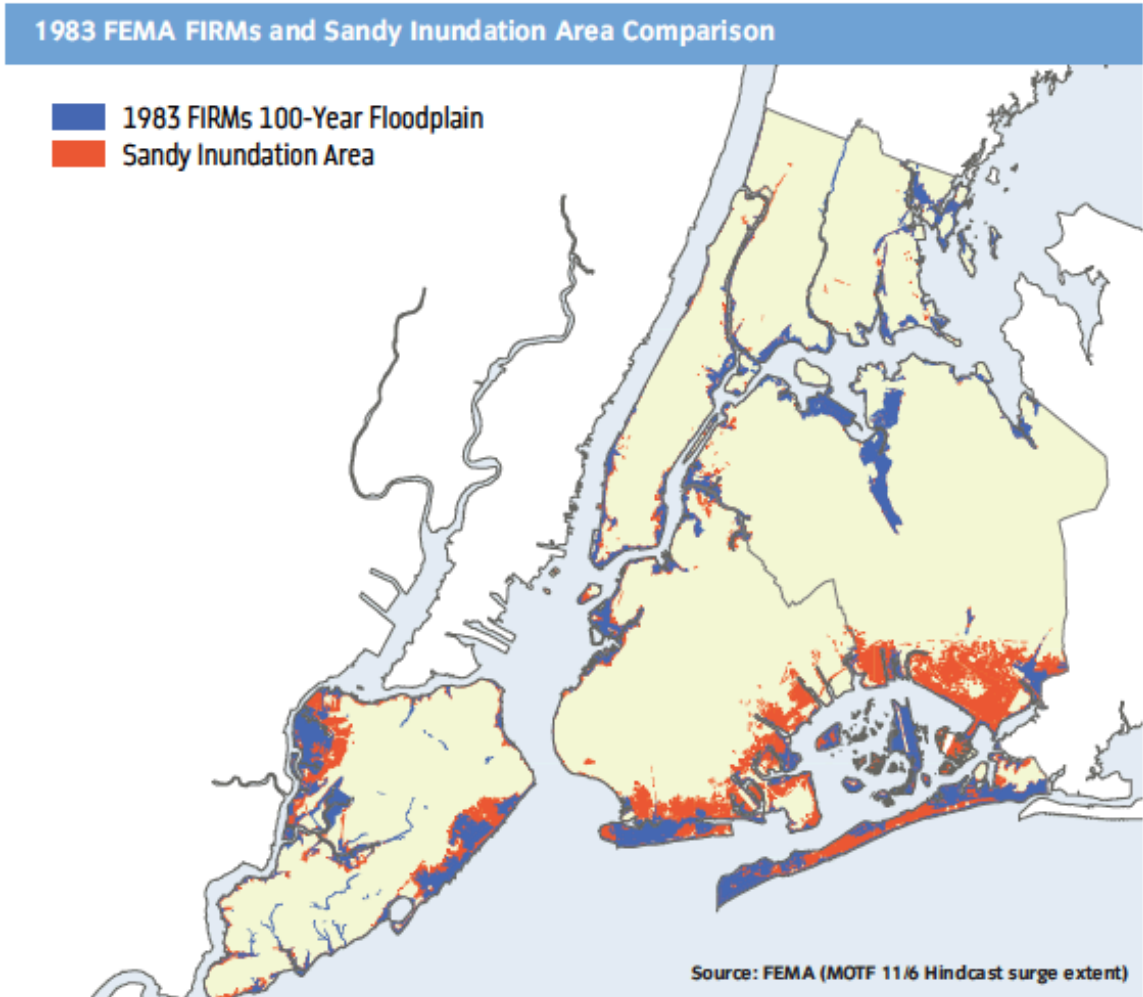
flooding, it is imperative that the FIRMs be regularly updated to accurately reflect changing coastal vulnerabilities.

Sandy struck New York City with unprecedented force and fury. High tides, a full moon, and a century of rising sea levels (sea levels have risen 1 foot since 1900) made way for a perfect storm of events. The resulting flooding was more than one and a half times larger in area coverage than what the 1983 FIRMS had predicted the 100-year floodplain would be. In Queens and Brooklyn, the area of land flooded, roughly 33 square miles, was equivalent to the entire 100-year floodplain for all of New York City predicted by the 1983 maps. Additionally, over 60% of the effected buildings, and 50% of the residential buildings in the flooded area were outside the 100-year floodplain. 25 percent of the buildings that the Department of Buildings deemed to be heavily damaged or destroyed by Sandy were also outside the floodplain. In the 2013 NYC report titled “A Stronger, More Resilient New York” reported that “In these areas, not only were residents unaware of the risks that they faced, but the buildings in which they lived and worked had not been subject to the flood-protective construction standards that generally apply within the floodplain”

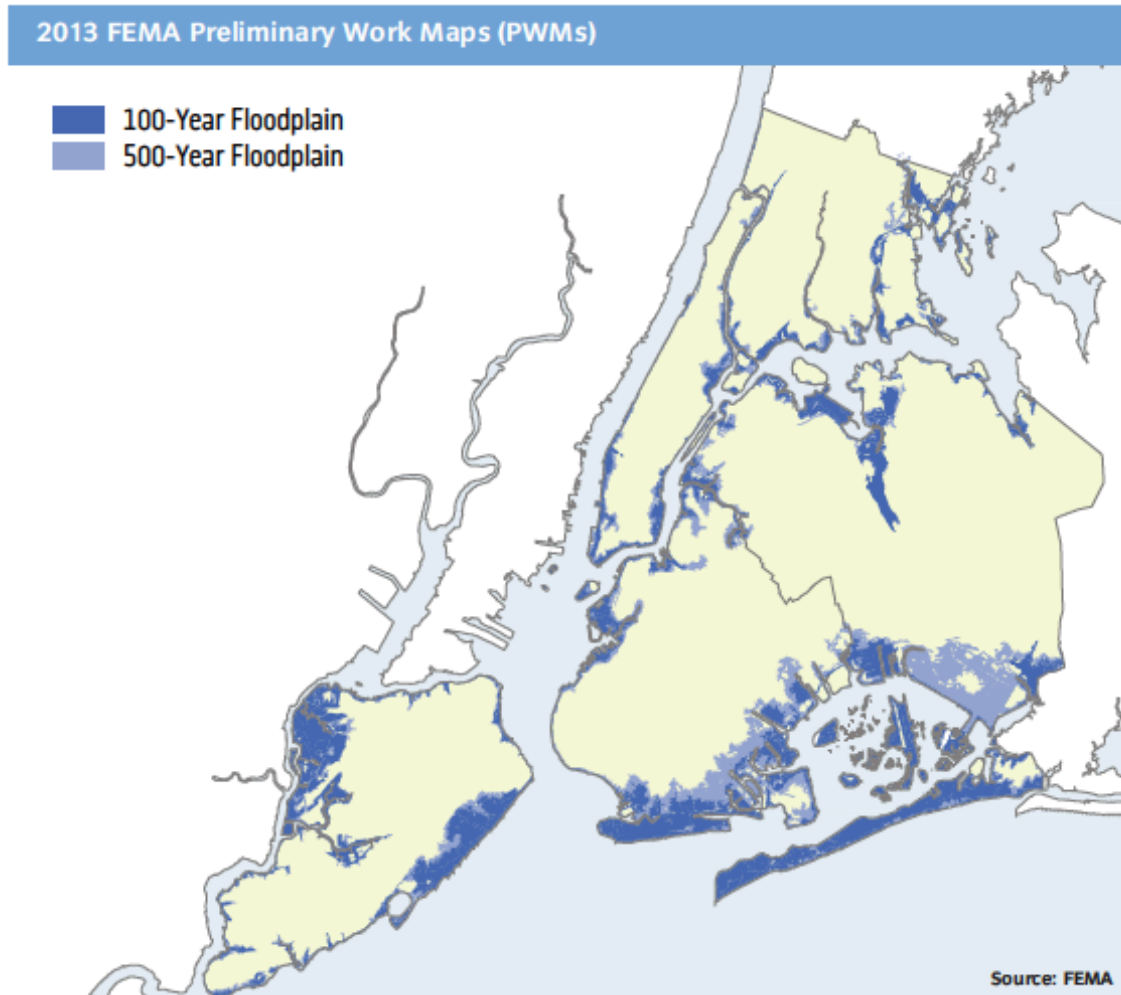
There was clearly a need to update these maps. Three months after Sandy, FEMA issued interim maps, known as Advisory Base Flood Elevation maps, or ABFEs. Mayor Michael Bloomberg simultaneously issued zoning restrictions and temporary modification of building codes that allowed residents to begin rebuilding to standards that reflected actual flood risks. The ABFEs were similarly issued for Louisiana and

Mississippi after Hurricane Katrina due to the fact that those maps were also outdated. In June of 2013, FEMA released the next series of maps; the Preliminary Work Maps, PWMs. To date, these are the most accurate set of map and modeling that New York City uses. The final set of FIRMs is likely to be released in late 2015. The new FIRMs and the current PWMs are expected to very similar.

The Preliminary Work Maps paint a very new picture of flooding vulnerability for New York City. The overall area now covered has increased by 15 square miles, roughly a 45% increase from the 1983 maps, with every floodplain in each borough expanding.



Map Source: A Stronger, More Resilient New York



Map Source: A Stronger, More Resilient New York

There are now 67,700 buildings in the floodplain, which cover 534 million square feet of floor area. This is an increase of 90% for the number of buildings, and an increase of 42% for floor coverage. Additionally, there has been a 61% increase in the number of residential units now in the floodplain, reaching 196,700 units. In total, nearly 400,000 residents in the five boroughs now live in the floodplain, a dramatic increase of 83%. These numbers still only account for 5% of the total population of New York City. In

New Orleans, for example, 240,000 residents live in the 100-year floodplain, but accounts for 70% of the total population².

CITY	Population in 100- Year Floodplain	Share of Total Population	Land Area of 100- Year Floodplain (Sq. miles)	Population Density/ Sq. Mile in floodplain
New York	398,100	5%	48	8,300
Houston	296,400	14%	107	2,800
New Orleans	240,200	70%	183	1,300
Miami	144,500	36%	18	8,000
Fort Lauderdale	83,200	50%	21	4,000
San Francisco	9,600	1%	3	3,200

Data Source: *A Stronger, More Resilient New York City*

Density is also an important factor; New York City has 8,300 residents per square mile in the 100-year flood plain. New Orleans by comparison, only has a density of 1,300 residents per square mile in the floodplain. It is clear that New York has some of the highest levels of vulnerable residents than any other city in this country. And within the zones, density is very high, mainly due to the high occupancy developments that are found along the coast. On a local level, New York City greatly expanded the evacuation zones to coincide with the soon to be released new FEMA flood maps. When Sandy

² City of New York, *A Stronger, More Resilient New York* (Mayor Bloomberg's Administration, 2013, p. 25)

struck, the evacuation zones were divided into just three zones, covering over two million residents. A total of six zones now exist, designated 1-6, with zone 1 being the most vulnerable to storm surge and flooding.

In the days leading up to Sandy making landfall, Mayor Bloomberg initiated the Coastal Storm Plan through the Office of Emergency Management. The Mayor can initiate this plan for any type of storm related event, from a single snowstorm to a more severe category 5 hurricane. Prior to Sandy, the plan was activated during Hurricane Irene³. The plan is divided into multiple categories, each tasked with overseeing a separate citywide component. The categories are as follows: storm tracking and notification, decision-making, evacuation, sheltering, logistics, public information, recovery and restoration. Decision-making is tasked with officially calling for the mandatory evacuation, which applies to public housing as well. Evacuation pertains to who will be evacuated and what areas will be given priority status based on predicted weather patterns.

Sea levels will continue to rise and will result in constantly changing flood zones. By 2050, New York City's floodplain could reach 72 square miles, almost a quarter of the city's total land area. With significant increases in the number of residents who now live in federally zoned vulnerable areas, flood insurance has become a very real obstacle for thousands of residents who had never had to consider the high cost of purchasing

³ Coastal Storm Plan,
http://www.nyc.gov/html/oem/html/planning_response/planning_coastal_storm_plan.shtml

insurance. Flood insurance is required to any homeowner that has a federally backed mortgage.

COMMUNITY PLANNING

It is difficult to define community led disaster planning due to the fluidity and ever changing nature of individual neighborhoods. Often times, the planning takes place after the disaster has occurred, leaving little time to adequately plan for a particular disaster. It is near impossible for any population, whether as a small community or a large city, to plan for every contingency and risk. No two storms are alike, and flooding can occur in varying intensities and locations given the tide and moon cycles. With each disaster come best practices for that particular area, which can be applied elsewhere.

At the very least, community planning should be a purely participatory process. Communities, neighborhoods and residents have the right to be an integral part of the decision making process. Without input from the residents and those who have a unique and personal connection with the vulnerable areas, the planning process is entirely top down.

There is also an issue of justice and democracy, planning issues that should always be addressed, especially when dealing with vulnerable populations and already at risk groups. It is imperative that these two issues be kept together and not separated. Justice deals with reducing inequalities and ensuring that social justice measures be

woven into the planning process. Democracy should safeguard the ability for those who would be most affected to have a voice in long term decisions that will ultimately shape the ways in which the neighborhoods will plan , respond and recover from disasters. Too often city functions, whether it is long term planning or development, miss the mark to engage citizens and local groups.

The following reports are three of the main long term planning publications released by New York City in an attempt to outline best practices and long term goals to reach to better protect NYC against the threat of climate change and hazards.

REPORTS

PlaNYC

In 2007, 5 years before Superstorm Sandy, New York City released what was at the time, the most comprehensive and groundbreaking long-term sustainability report to ever be released by a city. Under the direction of Mayor Bloomberg, the plan outlined 127 initiatives to be accomplished in the short term, and whose outlook was 2030 and beyond. The Office of Long-Term Planning and Sustainability headed the report, with collaboration with over 25 city agencies. The 127 original initiatives were dispersed in ten overreaching goals:

1. Housing
2. Open Space

3. Brownfields
4. Water Quality
5. Water Networks
6. Congestion Pricing
7. State of Good Repair
8. Energy
9. Air Quality
- 10. Climate Change**

The climate change chapter outlined three main initiatives to undertake:

1. Create an intergovernmental task force to protect our vital infrastructure
- 2. Work with vulnerable neighborhoods to develop site-specific strategies**
3. Launch a citywide strategic planning process for climate change adaptation

Initiative 2 stated that “we will create a community planning process to engage all stakeholders in community-specific climate adaptation strategies”. Additionally, it stated that “While all five boroughs have vulnerable coastline, each community’s risk and the optimal solution to minimize risk will vary... A successful community planning process provides the neighborhoods with the tools necessary to understand the challenges, engage in problem solving, and effectively communicate preferred solutions.” Red Hook, one of the most vulnerable neighborhoods in the city at the time, was only mentioned twice in the report, under the brownfields section. While the original PlaNYC was

groundbreaking, it failed to specify particular neighborhoods that were at the greatest risk to storms. Similarly, there was no further mention of community collaboration beyond what was briefly outlined in the second initiative.

Just four years later, PlaNYC released its updated report, and outlined what had since been accomplished. Some of the goals were slightly modified, but the main objectives remained virtually identical.

1. Housing and Neighborhood
2. Parks and Public Space
3. Brownfields
4. Waterways
5. Water Supply
6. Transportation
7. Energy
8. Air Quality
9. Solid Waste
- 10. Climate Change**

Goal: Reduce greenhouse gas emissions by more than 30%

Goal: Increase the resilience of our communities, natural systems, and infrastructure to
climate risks

Reduce and track greenhouse gas emissions

1. Release an annual inventory of greenhouse gas emissions
2. Assess opportunities to further reduce greenhouse gas emissions by 80% by 2050

Assess vulnerabilities and risks from climate change

3. Regularly assess climate change projections
4. Partner with the Federal Emergency Management Agency (FEMA) to update Flood Insurance Rate Maps
5. Develop tools to measure the city's current and future climate exposure

Increase the resilience of the city's built and natural environments

6. Update regulations to increase the resilience of buildings
7. Work with the insurance industry to develop strategies to encourage the use of flood protections in buildings
8. Protect New York City's critical infrastructure
9. Identify and evaluate citywide coastal protective measures

Protect public health from the effects of climate change

10. Mitigate the urban heat island effect 11 Enhance our understanding of the impacts of climate change on public health

Increase the city's preparedness for extreme climate events

11. Integrate climate change projections into emergency management and preparedness

Create resilient communities through public information and outreach

12. Work with communities to increase their climate resilience

The achievements that PlaNYC were able to accomplish were important and done in

record time. But many of what the city was able to achieve were purely aesthetic and did not get at the heart of vulnerable neighborhoods. Below are some of the achievements outlined in the 2011 Progress Report:

- . 19 rezonings approved focusing development in areas well-served by transit
- . 100,000 affordable housing units created or preserved
- . 319,054 trees planted and 113 schoolyards to playground sites opened by April 2010
- . Office of Environmental Remediation created, becoming nation's first municipal brownfield office
- . All 14 wastewater treatment plants now meet Clean Water Act's 85% pollutant removal requirement harbor-wide
- . 200 miles of bicycle lanes installed and bike access law enacted
- . Times Square, Herald Square, and Madison Square transformed into pedestrian friendly plazas
- . Greener, Greater Buildings Plan enacted into law, requires energy efficiency upgrades in all large buildings
- . 86 energy efficiency projects completed as part of plan to reduce City government energy use 30% by 2017
- . 25% of the yellow taxi fleet converted to hybrid vehicles
- . Clean air school bus law enacted, requiring installation of interior air quality controls on entire fleet
- . 9% decrease in citywide carbon emissions due to cleaner power generation and less sulfur hexafluoride release

- . Assessment of climate change impacts on critical infrastructure completed by Task Force

While this progress report was released just one year prior to Superstorm Sandy striking, the city fell short in enacting long-term community planning strategies. These reports dealt mainly with citywide initiatives, and failed to identify the most vulnerable populations. There was no vulnerability assessment in either version of PlaNYC. The community engagement level in this plan was low and did not better equip venerable populations for the increasing threat of large-scale storms, particularly on coastal populations.

A Stronger, More Resilient New York & OEM CERTs

It is no surprise that the most thorough plan released by the city has been post Superstorm Sandy. In June of 2013, Mayor Bloomberg released, A Stronger, More Resilient New York. Headed by the NYS Special Initiative for Rebuilding and Resiliency (SIRR), it has been the most comprehensive resiliency report directly focusing on climate change. There intensive studies completed on major topics such as:

Coastal Protection

Buildings

Insurance

Utilities

Liquid Fuels

Healthcare

Telecommunication

Transportation

Parks

Water and Wastewater

Other Critical Networks

This report then selected 5 key areas in the city that were impacted during Sandy. This designation of vulnerable neighborhoods was something that was absent in earlier PlaNYC reports. Of the five neighborhoods (Brooklyn- Queens Waterfront, East and South Shores of Staten Island, South Queens, Southern Brooklyn, Southern Manhattan), Red Hook is located in the Brooklyn- Queens Waterfront neighborhood. This has been the first time this area has been specifically outlined in a long-term environmental planning report. There are still only two community-centered initiatives in the entire report to address disaster preparedness.

1. Identify and address gaps in community capacity

2. Continue and expand OEM's Community Emergency Response Teams

Initiative 1 focused on economic recovery and getting businesses back in operation after impacts from storms. It stated a partnership and possible neighborhood study with the NYC Center for Economic Opportunity. This initiative was subject to available funding,

and the SIRR report failed to further specify which community, if any, would be the study area. An Internet search failed to find any study done through this goal, whether through OEM or CEO.

The second Initiative outlined the need to expand OEM CERTs. Currently, there are 54 teams of 1,500 volunteers across all of New York City. The goal states “before, during, and after disasters, including extreme weather events, members of these teams help to organize community disaster preparedness and participate in emergency response and recovery. Going forward, OEM will work with communities to create additional teams, ensuring that the volunteers that staff are as representative as possible of the communities that they serve.” The CERT program was developed in 2003 after the CERT program enacted by FEMA. While the local CERTs have no connection to its federal counterparts, functions and roles are almost identical. When not engaged with an immediate disaster, CERTs “educate their communities about disaster preparedness through OEM’s Ready New York program and by building Community Disaster Networks.”⁴ The commissioner of NYC’s OEM Joseph Bruno praised the work, “Whether they are staffing reception centers, delivering supplies to neighbors, or interpreting conversations between community members and first responders, CERT volunteers have shown they are ready to help at a moments notice, and the City is extremely grateful for their service.” While CERT have to play a vital role in disaster preparedness, it seem sin the case of Superstorm Sandy, there was a top-down failure to ensure that these teams were deployed in Red Hook.

⁴ What is the New York City CERT program? Flyer, NYC OEM



READY NEW YORK GUIDE REQUEST FORM FOR CERT
 EMAIL THIS FORM TO CERT@oem.nyc.gov , OR FAX IT TO (718) 246-6022

THIS FORM NEEDS TO BE SUBMITTED AT LEAST TWO WEEKS BEFORE YOU NEED THE GUIDES



Today's Date: _____ Needed by (date): _____
 Requestor's Name: _____ Is Material for: **Specific Event** Y N and/or **Reserve Stock** Y N
 Requestor's Phone: _____ Material should be: **Shipped** or **Pick-Up from OEM**
 Requestor's Email: _____ Shipping Address: _____
 Expected # of people for event(s): _____

Indicate Quantity Requested in Cells Below

Language	Emergency Preparedness	Beat the Heat	Teen	Kids	Hurricane	My Emergency Plan	Pocket	Pets	Business	Flood	Pandemic Flu	CERT Brochure
Arabic		N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A
Audio Tape			N/A	N/A		N/A	N/A		N/A	N/A	N/A	N/A
Bengali		N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chinese												N/A
English												
French		N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A		N/A
Haitian Creole						N/A	N/A	N/A	N/A	N/A		N/A
Italian	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Korean						N/A	N/A	N/A	N/A	N/A		N/A
Polish		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Russian												N/A
Spanish												N/A
Urdu		N/A				N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yiddish	N/A	N/A	N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A
TOTAL												

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OEM, which is tasked with ensuring that the city is prepared to prepare and respond during times of great crisis and disaster, fails at ensuring that basic information is made available in multiple languages. The diagram below is a form that can be filled out and submitted to OEM requesting additional pamphlets and flyers concerning emergency preparedness. Boxes checked N/A are not available in the language to the left. Of the 14 languages on the form, only four are available (Chinese, English, Russian and Spanish). In a city as ethnically diverse as New York, it is shocking that the agency tasked with

safety and emergencies does not have the capacity to reach more than 4 spoken languages.

This report, while a response to the devastation caused by Superstorm Sandy, did not adequately address on the ground actions that must be taken when a disaster strikes. This is made clear by the clear lack of concern to engage OEM CERTs in to these neighborhoods. It is a huge mistake not to make every emergency planning guide and materials available to each language spoken and ethnic group. Sandy exposed the need for direction and support in real time once the disaster and flooding occurred. Whether that instruction should come from NYCHA or a more localized group, it is clear that none of that was present, and the response was immediately and constantly evolving given those who were in most need of assistance.

Hazard Mitigation Plan

The Hazard Mitigation Plan released in 2014 on the same level at the SIRR report, and was a collaboration between OEM, The Department of City Planning and the Mayor's Office of Long Term Planning & Sustainability. The 550-page plan was released to coincide with the SIRR report, but dealt with hazard mitigation to reduce the risk to people and property. The overarching goals outlines in the HMP differed from PlaNYC or the SIRR report. The goals outlined in this report are:

Coastal Erosion

Drought

Flooding

Winter Storms

Coastal Storms

Earthquakes

Severe Weather

Chemical, biological, radiological and nuclear

Infrastructure Failures

Disease Outbreaks

Extreme Temperatures

Wild Fires

Cyber Threats



OEM operates under the structure that places mitigation at the top of a cycle that also

includes preparedness, response and recovery. Using mitigation as the driving force to generate the rest of the cycle, OEM has focused much of its efforts on collaboration between agencies and stakeholders. Of the top goals of the hazard planning, OEM highlights 5: Leads to selection of risk-reduction actions, Builds partnerships, Creates a more sustainable and disaster-resistant city, Establishes funding priorities, and Increases public awareness of hazards. The last point, increasing public awareness is the most crucial for communities. Lower educated communities, regardless if it is located in a hazard area, can have less education about the true threats of climate change on the neighborhood. Top down approaches on the educational side of the issue can increase knowledge about flooding and increasingly severe weather events.

To accurately assess the hazard associated in each area, OEM used what the other reports had not- an extensive risk assessment. Under specific FEMA guidelines in the Local Mitigation Plan Review Guide, OEM was required to include risk assessments in the report. The following is a break down of the FEMA requirements OEM operated under:

FEMA Requirement 44 CFR 201.6(c)(2)(i)

[The risk assessment *shall* include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

FEMA Requirement 44 CFR 201.6(c)(2)(ii)

The risk assessment shall include a description of the jurisdiction's vulnerability to the

hazard described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

FEMA Requirement 44 CFR 201.6(c)(2)(ii)(A)

The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

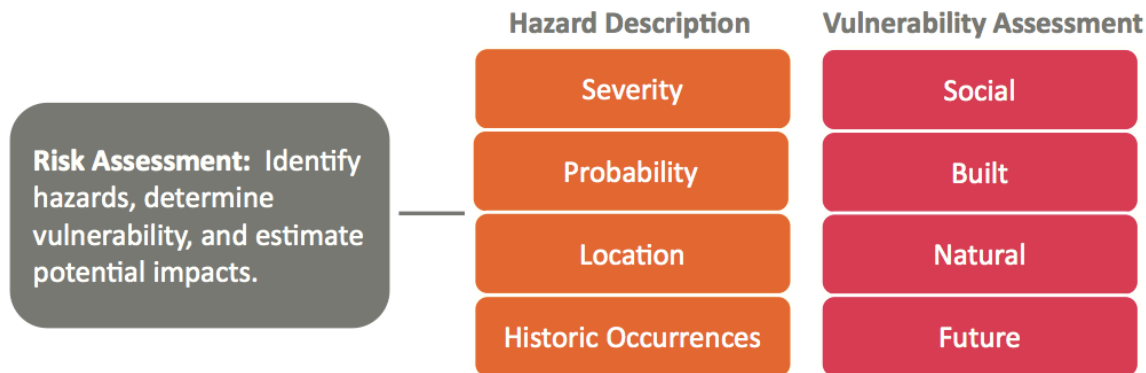
FEMA Requirement 44 CFR 201.6(c)(2)(ii)(B)

An estimate of the potential dollar losses to vulnerable structures identified in.. this section and a description of the methodology used to prepare the estimate.

FEMA Requirement 44 CFR 201.6(c)(2)(ii)(C)

Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

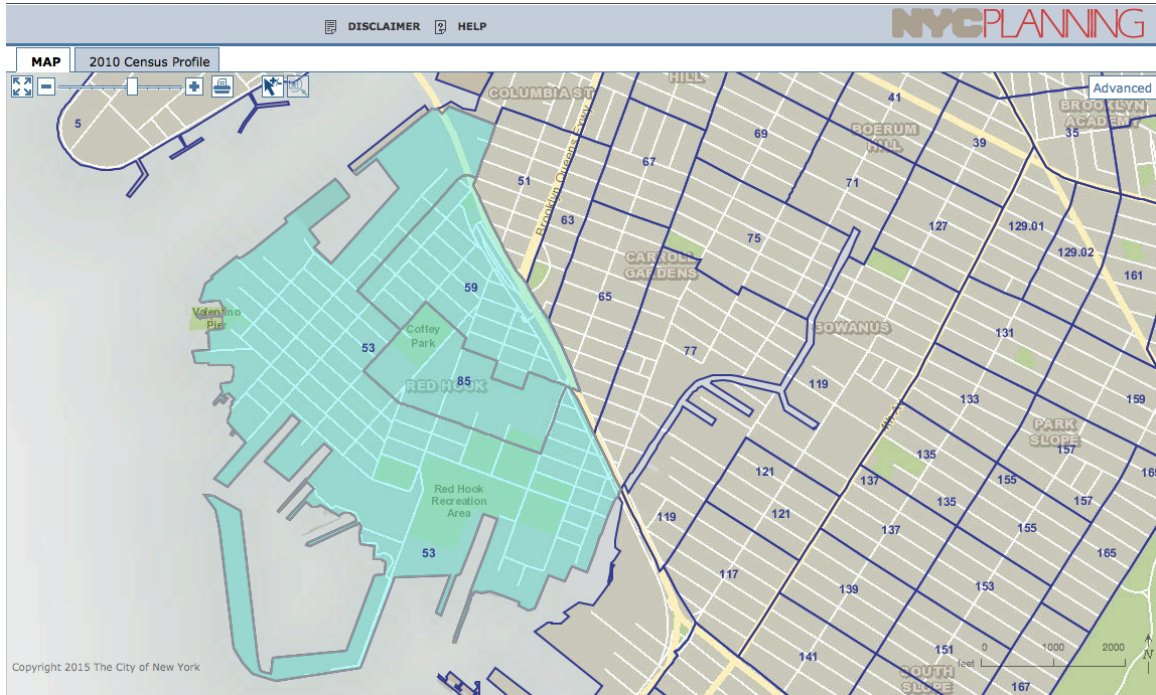
Using the requirements listed above, OEM was able to identify high areas of specific hazards based on multiple criteria.



The Mitigation plan was tasked with less community based focuses, and more city wide plans to minimize risk to a wide variety of hazards. While extremely useful as a resource guide for the city as a single entity, the breakdown of hazards presented an opportunity to integrate community engagement and input. While the Office of Emergency Management is tasked with more technical responses and planning, it is also in the best position to measure and establish community led planning to coincide with the top down approach of OEM.

RED HOOK, BROOKLYN

The neighborhood of Red Hook in Brooklyn was one of the hardest hit areas in the city, with some of the worst flooding and impacts of public housing. It was also the clearest example of negligence by the city to respond to those who most needed assistance in the immediate aftermath of the storm. Red Hook, a peninsula, is located between the Buttermilk Channel, Gowanus Bay and the Gowanus Channel in South-West Brooklyn.



Date Source: <http://maps.nyc.gov/census/>

Demographics of Red Hook* and NYC (2010 US Census)

	Red Hook, Brooklyn	NYC
Total Population	10,228	8,175,133
Race/ ethnicity		
% Black	36%	22%
% Hispanic or Latino origin	42%	28%
% White, not Hispanic	17%	33%
Education		
% High School degree	14%	25%
% Bachelor's degree	10%	20%

Income		
Median household income	\$40,026	\$51,270
% Below poverty line	45%	19%

*Brooklyn Census Tracts 53, 59 & 85 were used to delineate Red Hook

Red Hook has been one of the areas in Brooklyn to experience rapid gentrification on the northern section of the neighborhood. Ikea and Fairway have opened stores on the waterfront, along with some of the most expensive condominiums in Brooklyn above Fairway. While these portions of the neighborhood have seen shifting demographics and rental prices, Red Hook is also home to the Red Hook Houses, the largest public housing development in Brooklyn. In total, over 6,000 residents call the Red Hook Houses home. This development was first built as part of a Federal Works Program under President Roosevelt in 1938 to offer affordable housing for the growing number of dockworkers who lived in the neighborhood. But when shipping and ports moved from the Brooklyn waterfront to the larger ports in New Jersey, Red Hook's economy rapidly declined.

The vulnerability of Red Hook is both geographic and social. Geographically, the Brooklyn- Queens Expressway dissects this portion of Southern Brooklyn. The landmass for Red Hook is only 1.3 square miles, and houses over 10,000 residents as of the 2010 Census. There is a 45% poverty rate and higher rates of asthma and diabetes than the city

wide average⁵. When Superstorm Sandy struck, Red Hook lost electricity, heat and running water for 3 weeks in some areas. Without these basic services, residents could not cook food, keep perishable foods fresh, and had no access to clean water. Upon being ordered to evacuate, residents who decided to stay felt protected and safe, as previous storms had no major impact. There were others who might have wanted to leave, but could not due to the severe lack of public transportation in Red Hook. The closest subway station is the Smith-9th Street Station, a far distance for the elderly and those with luggage. Public transportation played a role in not being able to leave.

When contrasted to other significant Brooklyn neighborhoods, Red Hook's socioeconomic status appears bleak. The table below is in ascending order by poverty level for 6 Brooklyn neighborhoods:

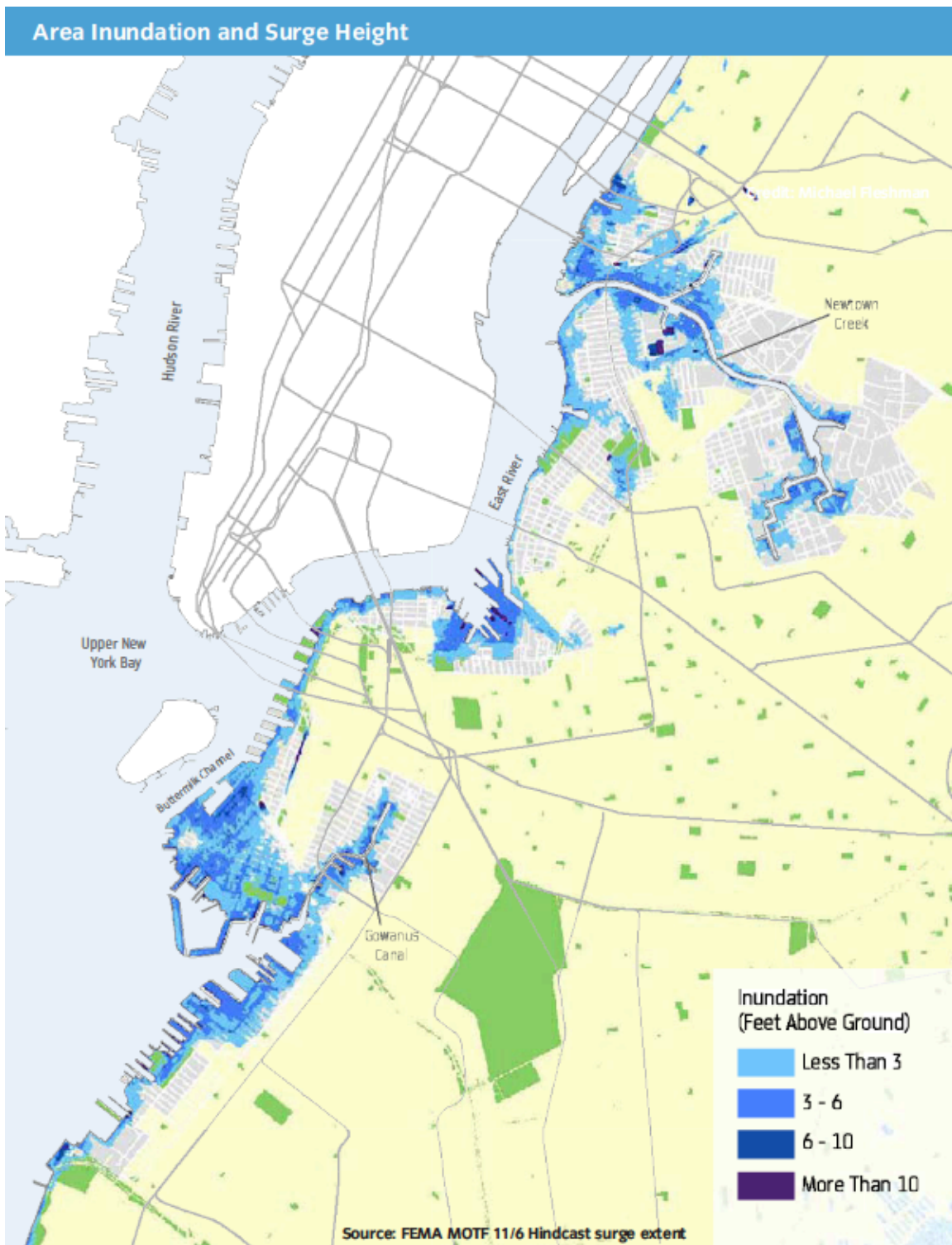
Area	Population	Poverty Rate	Med. Household Income	% Homeowners	Median Home Value
DUMBO	3,600	5%	\$167,700	46%	\$1 M+
Gowanus	17,800	18%	\$68,500	25%	\$854,100
Newtown Creek	12,400	19%	\$52,000	16%	\$678,400
Greenpoint/ Williamsburg	35,800	20%	\$60,400	18%	\$705,800

⁵ Brockwell, kilminster. Red Hook community health assessment, CB 6, May 22, 2009. http://www.brooklyn6.org/_assessments/2009-05-22%20RHI%20Red%20Hook%20Houses%20Health%20Assessmen.pdf

Red Hook	13,800	33%	\$47,700	15%	\$615,600
Navy Yard	5,100	36%	\$37,900	27%	\$506,800
NYC	8,175,000	19%	\$51,300	33%	\$514,900

Red Hook has one of the highest poverty rates in Brooklyn along with one of the most densely populated public housing projects in New York City. Additionally, Red Hook has the lowest home ownership rates of these neighborhoods at 15%. While most of the residents are renters, a large portion in NYCHA housing, leaving those residents at the mercy of a large city agency. In the months after the storm, NYCHA residents in the Red Hook houses experienced some of the worst neglect, with few answers.

Below is a map outlining the impacted flood area in Red Hook after Sandy:



Map Source: A Stronger, More Resilient New York

NYCHA

To fully appreciate the gross negligence of the city and the Housing Authority immediately following Superstorm Sandy, the history and overall portfolio of NYCHA properties must be outlined.

New York City is home to the largest public housing agency in North America. The New York City Housing Authority provides housing for over 600,000 New Yorkers. The average gross income for residents is only \$23,150. There are 334 developments over the five boroughs with over 13,000 employees. Created in 1934, the first development was the First Houses on the Lower East Side of Manhattan. The last developments to be constructed were in the 1980s, with the highest concentration of housing in East Harlem and Brownsville, Brooklyn. The Red Hook Houses are the largest NYCHA development in Brooklyn, with over 2,000 apartments. Additionally, there is a large concentration of developments on the Lower East Side and Two Bridges area, which abuts the East River. During Sandy, flooding impacted 402 NYCHA buildings, which is nearly 20% of the NYCHA portfolio⁶.

There are 200 developments in evacuation zones across the city. In zone 1, there are 26 developments with 45,000 residents at risk. Of the 400 plus buildings, with roughly 80,000 residents that were impacted by Sandy, nearly all lost power and elevator services, and over 380 lost heat and hot water. 15 developments are located in zone 2,

⁶ Housing First, *Affordable Housing Policy Brief for New York's Next Mayor*

most of which are located on the lower east side of Manhattan. In zone 1, there are major clusters on the lower east side, Red Hook, and Coney Island. There is a long history of placing housing for lower income families and individuals on the fringes of the city. The first phase of the Red Hook Houses were built for the dockworkers, which placed them very near the water. Similarly, the first housing in the Rockaways were built for those who worked at the nearby airport, warehouses and factories. Over time however, these residents and developments became isolated as the city dramatically changed.

When Sandy struck, most of the residents in the Red Hook Houses were left without heat, hot water, and electricity. Sporadic reports filtered in of elderly and disabled residents trapped on the upper floors of the buildings. With temperatures plunging to freezing, these already poor and vulnerable residents

The New School organized a panel discussion in February of 2013 just 4 months after Sandy struck. On the panel was John Rhea, the chairman and head of NYCHA at the time. Rhea has since been replaced as Mayor De Blasio has been elected. NYCHA has an undeniable history of unfavorable policies and actions at the expense of the overwhelmingly low-income tenants who reside in the developments. With such a high number of residents who depend on NYCHA to provide basic services, it is not surprising that the agency has come under fire on many occasions. Rhea was the poster child and target for the majority of the outrage that erupted after the storm. His background was in financial advising to Wall Street firms, and many residents saw him as careless and unsympathetic to the low-income populations. In his time at NYCHA, the backlog of

apartment repair requests rose to a staggering 420,000⁷. Additionally, Rhea and the agency were heavily criticized for the reported \$45 million in city funds meant for upgrading and installation of new security cameras, a desperately needed repair for many developments riddled with high levels of crime.

The panel at the New School came just one day before he appeared in front of the New York City Council's Public Housing Committee to discuss NYCHA's response. Below is a brief excerpt from the panel when asked about what he believes NYCHA has learned from Sandy:

“The vulnerability of the physical structures was greater than anyone anticipated. When evacuating people out of zone A, they thought that they would have about 200 affected buildings. It turned out to be twice that, with over 400 buildings. The vulnerability of the critical systems (boilers, electric systems) was very high too. They were all located in basements that were flooded. While the buildings may have stood up to the actual storm, it was the storm surge, the surge of the water, is what really caused the most damage. As a whole, NYCHA is very vulnerable due to the location of many of the communities.”

⁷ Smith, Greg B., New York Daily News. <http://www.nydailynews.com/new-york/nycha-john-rhea-resigns-rocky-four-year-tenure-article-1.1562097>

Interestingly, Rhea did not address the outrage from the tenants initially, and blamed the storm for the problems that the residents faced, yet still admitted to the high vulnerability faced by NYCHA developments.

There is no doubting that the region was caught off guard and underplayed the severity of the storm. Massive preparations during Hurricane Irene just a few years before Sandy proved to be unnecessary given the actual impact of Irene on New York City. Unfortunately, there was a sentiment across many in the public that did not feel the need to evacuate or prepare for the storm. On a citywide level, agencies scrambled to brace for the storm, but it was the effectiveness, and not purely the action that has been questioned. Rhea noted that while the actual buildings withstood the force and storm surge, the utilities located mainly in basements and lower levels caused the most damage. Utilities for the developments were placed in the basements and cellars of the complexes, as were there breakers and generators for Con-Edison electrical company. This led to all of lower Manhattan being left in complete darkness in the immediate aftermath of Sandy. NYCHA had a particularly difficult time regaining the electricity and power following the storm. In NYCHA buildings without utilities, it took the city a total of 16 days to restore power to all, and an additional 4 days to restore heat to all residents. Temporary boilers are first installed in Coney Island on November 9th, and many of them still remain as the main source of heat. In February of 2014, the New York Daily News reported that NYCHA was spending \$3 million a month in taxpayer's money to use the 24 temporary boilers located in 16 developments across the city. A NYCHA Vice President told the City Council that these boilers would remain until at least 2016, which could total over \$120

million. Many of these boilers also cannot operate in temperatures below 40 degrees, due to the fact that they were rented from warm states such as Texas and Tennessee. With these boilers as just one issue that has shined more negative light onto NYCHA, it is clear that there is much needed fiscal oversight, in addition to the social aspects needed in this agency. Rhea did not publically address these boilers and the cost before he resigned.

On the panel, Rhea also noted the possibly skewed misconception about the treatment of tenants in times of crisis.

“People resisted the evacuation requests from NYCHA. There was fear and well placed paranoia that they won’t be let back in once they leave. There is also a large disconnect between what people think NYCHA is able to do and what they are actually to do. For example, acting as a social service agency to be able to handle every request or concern that any tenant has. This idea of expectations vs. capabilities. And how do you sync those two things up in the middle of a crisis. What is and is not NYCHA’s role, and if something is not NYCHAs role, whose is it?⁸”

At the crux of NYCHA and the response that most residents believed was flawed, is the idea that Rhea pointed out on expectations vs. capabilities. This is a very important element that has not been debated enough post Sandy. Given the sheer size of NYCHA, it is very difficult to separate what the public believes the agency should be doing, and what

⁸ The New School, *NYCHA & The Hurricane*, February 12, 2013

response is actually capable of. In times of emergency and crisis, it is clear that residents, who already lack many resources, turn to NYCHA for a range of requests and issues. While NYCHA has over 13,000 employees, it is still difficult to accommodate each issue. Rhea stated that NYCHA is often times seen as a social service entity, with many residents under the assumption that the agency can aid in social problems. Rhea made it very clear that his agency is only there to act as a supplier and landlord to the public housing it provides. If this is the case, there seems to be much more needed communication between the various agencies that revolve around the huge population of NYCHA resident. There is a link missing between those on the ground working for NYCHA during emergencies, and social welfare, social services and other resources tenants need to utilize. It is up to the resident to know who to call in times of crisis, and NYCHA does not seem to take any responsibility or role in ensuring that the other needs beyond the immediate housing issue is addressed. This leaves tenants with very few options, and the agency ideally free of blame when it cannot fulfill these roles. In Housing First's policy brief on affordable housing, one of the recommendations outlined was "Appoint a Deputy Mayor of Housing overseeing DHS, NYCHA, HPD, HDC & Housing Recovery Office (HRO) to ensure interagency cooperation in public housing, homelessness, housing recovery and development." While this targets affordable housing as a whole, it speaks to the need for improved and updated coordination on multiple levels with multiple agencies, a best practice that does not exist currently.

On the same panel at the New School, there was a lifelong Red Hook resident and community organizer Wally Bazemore, who was very vocal about the feelings many tenants have towards the agency.

“The storm caught us off guard. Irene turned out not to be that bad for residents, so many didn’t get on the buses when they were there to pick up and evacuate, and that we could ride the storm out. Nature has a way of humbling us.”

Many residents in the flood zone in NYCHA developments did not see the urgency to evacuate, and judged too much of it on the impact of the last sizable storm, Hurricane Irene. This can also be attributed to the overall flaws in basic communication between the agency and residents. NYCHA claims to have gone door to door in the days leading up to the storm, alerting the residents of the threat Sandy posed. A visit to NYCHA.com will prove that the agency does a lackluster job in making storm and emergency preparation plans easily available and accessible to the public. One would have to go through multiple tabs, with no clear direction to get to the “preparing for emergency” information. A visitor to the site would have to go to the “residents corner” tab on the main page, then to the “NYCHA prepares” sub tab, and then scroll to “get prepared for storm emergencies” link, which is the second to last link on the page. Given the very clear threat to many developments, it would seem logical to place emergency preparedness and possible evacuation information in an easy to find location on the website. This flaw

reinforces the notion that there is a wide gap between the agency and the actual residents and the public, especially during times of crisis.

Community Based Response & the Red Hook Initiative

During the terrible time of crisis, the community-based response that emerged was a direct result of the city and NYCHA seemingly forgetting about the Red Hook Houses residents for days. A staggering 82% of Red Hook residents reside in the Red Hook Houses, NYCHA's second largest in Brooklyn. Red Hook Initiative, a youth based community non-profit, stepped in and offered weeks worth of resources and temporary shelter for many of the residents who were displaced. Historically, Red Hook Initiative has no emergency or disaster response training. RHI, with only a full time staff of 11, maintains the mission statement "We believe that social change to overcome systemic inequities begins with empowered youth. In partnership with community adults, we nurture young people in Red Hook to be inspired, resilient, and healthy, and to envision themselves as co-creators of their lives, community and society". Through a time of crisis, when many were feeling forgotten about, this community led group took on roles that many believe should have been through NYCHA. Speaking to the bottom up and community led approach, Wally Bazemore highlighted the urge to provide assistance to fellow neighbors and community members,

"We didn't have any direction. Leadership was leading from behind.

Neighbors helping neighbors took the lead. We knew this was going to be

our Katrina, but we were not going to be treated like our cousins down there in New Orleans. Took the bull by the horns and started organizing. In the dark, we found some light to organize. We reached out to politicians, any volunteers who were able to come. We knew we couldn't depend on anybody but ourselves. We didn't feel any connections to anyone else.”

Bazemore feels a strong sense of leadership and will to ensure that the horrors of Katrina and what happened in New Orleans are not repeated. Stern and motivated, Bazemore took part in helping his fellow residents when it was clear leadership from the top was not going to arrive in time. It is this very response that exemplifies the urgent need for more transparency and communications, not just with residents, but with other city agencies as well. It is only then can residents be certain of the actual response that can be expected from NYCHA, and can be integrated with the community led response that was so effective in Red Hook.

Post Sandy, Mayor Bloomberg requested his administration to analyze and report the city's response to the storm. The deputy mayor for operations Caswell Holloway and deputy mayor for health and human services Linda Gibbs spearheaded the report titled Hurricane Sandy After Action report. It was released in May of 2013, giving the city just 6 months to assess the response. A New York Times article that same month stated “the

point was to identify ways the city could do better, not find fault⁹”. Mr. Halloway was quoted saying, “We were certainly not in a self-flagellation mode”. It is clear that the Mayor and the city firmly believed that the response on every level was strong and with very few, if any faults. The New York Housing Authority response is very difficult to find analyzed in most official reports. Whether that is because there was little to question on the response from NYCHA officials, or because the city as an entity wanted to separate itself from the embattled agency, has not been confirmed either way. Regardless, there is a clear disapproval from the side of the residents towards the NYCHA administration. Most of this rhetoric can be found in non-official reports and interviews with the tenants. No where can one find these accounts on any city website, and certainly not NYCHA’s website. As far as the city and NYCHA is concerned, the response was appropriate and any minor flaw can be attributed only to the unforeseen severity of Sandy.

The New York City Housing Authority is one of the most vital parts of this amazingly diverse and historic bustling city. As a lifeline for over 600,000 New Yorkers, NYCHA must be as prepared, if not more, than private developments. With residents that are already vulnerable due to economic status, much more is needs to be done to ensure all basic utilities are restored in a timely manner. Additionally, and more importantly, NYCHA as an agency cannot be seen as an uncompassionate and completely top down entity in the eyes of the tenants. Residents have a great sense of responsibility for

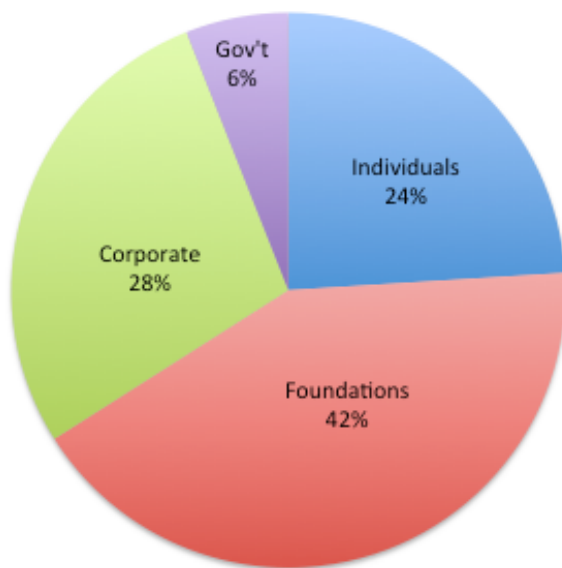
⁹ Halbfinger, David, *Adding Evacuation Zones in Response to Hurricane* (The New York Times, May 3, 2013) <http://www.nytimes.com/2013/05/04/nyregion/new-york-city-to-double-number-of-storm-evacuation-zones.html>

themselves and fellow neighbors, and will step to the challenge when faced with a disaster. But the well being of this population cannot be dependent on the response of the residents themselves. Superstorm Sandy was a storm that many misjudged the extent of the damage, and was not the fault of any one agency or administration. But lessons about communication and cooperation were learned, and must be applied in a far-reaching manner to ensure that all residents are protected.

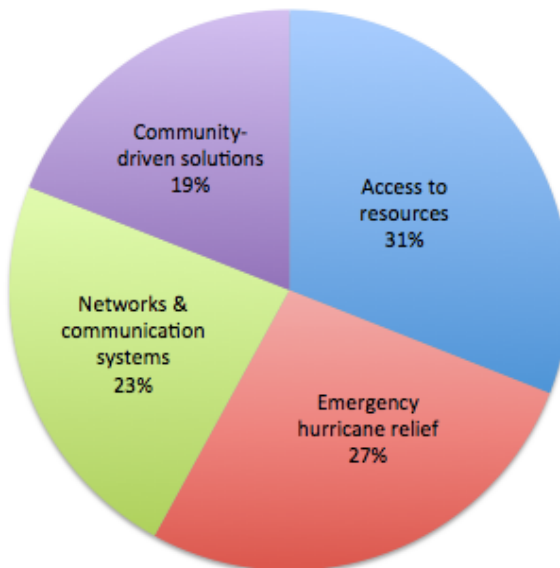
The Red Hook Initiative was able to serve the needs of the residents in the neighborhood through food services and delivery for three weeks following the storm. The initiative was able to feed 1,000 people twice a day, a much needed service when power and food storage was down. The doors stayed open 12-14 hours a day for 24 consecutive days. Residents with no heat or electricity fed off the power generator at the Initiative. The on the ground operation in an area that had extensive flooding during the recovery process presented unique challenges for the staff and volunteers. Social media played a vital role as well, and the Initiative received 300 contributions per day for 3 weeks. It was not until local officials and representatives from city agencies arrived that public health needs were first addressed. This included porter potties, generated powered floodlights for safety concerns, and trash and litter removal by the sanitation department finally resumed. Temporary shower facilities were also brought in due to the water still being shut off to the entire area.

The success of the Initiative resulted in \$1.3 million in funding and donations after Superstorm Sandy.

Sources of Support:



Allocation of Funds:



Red Hook Initiative played a vital role after the storm, and filled the gap created by the blatant lack of response by the city. There was a clear separation between the residents of the Red Hook houses and the community sources that surrounded them. There was also, and more importantly, a clear division between the residents and the New York City Housing Authority. Either division could have led to the lack of resources and emergency services immediately following the storm. The bottom up disaster response seen in Red Hook speaks volumes about what an already disadvantaged community can accomplish when neighbors have nowhere else to go.

CONCLUSIONS/ RECCOMENDATIONS

Superstorm Sandy exposed was a severe lack of preparedness and readiness to respond to large-scale natural disasters. Clearly there was a lack of oversight and leadership that resulted in many of the hardest hit areas. Red Hook faced the brunt of the storm and flooding, and required the most community led response in the city. Red Hook is disadvantaged both socially and economically, and is geographically situated in a high-risk area. The social capital was high in Red Hook, and despite the great challenges, neighbors extended a hand to neighbors, and while the city ignored what was happening, a small non profit was able to make a huge impact.

The lack of outreach in different languages that should be made available at all times was truly shocking during this research. OEM's CERT teams are solely tasked with ensuring that communities are equipped and prepared for disasters and emergencies, not just during hurricanes. But as an extension of the local government and the Office of Emergency Management, coordination between these agencies and residents who needed immediate help was lost.

The report and plans examined in this thesis were all very much top-down, and began with overarching goals and themes applicable to the city as a whole. While these plans were groundbreaking and acted as major influences for other municipalities around the country, it takes real digging to find the tangible community development and input. The goals and objectives outlined in the SIRR report are all suitable goals, but the fact

that they only emerged after the storm raises questions as to the actual preparedness of the city prior to Sandy striking. The plans did not adequately address the long lasting and extensive power outages and lack of basic and key services. Community groups need to be a much more integral participant in each long term planning proposal; communities and neighborhoods are best equipped to understand the residents and risks. A bottom up approach rather than a top down could lead to better-informed recommendations as to the adaptation and mitigation strategies at a local level. The adaptive capacity of individuals, local groups and neighborhoods is largely determined by the processes at higher levels of city government. There have been clear shortfalls with community disaster planning:

- Lack of interaction between the Red Hook Houses residents and the surrounding neighborhood pre- Sandy
- Lack of public transportation for evacuation
- High vulnerability of the power system
- Lack of adequate communication with OEM CERTs
- Lack of education about threats of climate change

In order to reach more members of a vulnerable neighborhood like Red Hook, the city must undertake a more rigorous planning process to better educate residents about the real threats of climate change and intensifying storms. This will include programs that bring in environmental educators to educate residents of Red Hook Houses and others who might not be versed in climate change literature and plans. Similarly, the plans that are released need to at the very least be available to more than 4 spoken languages. The

OEM emergency preparedness forms that are only available in limited languages is a perfect example of the lack of transparency and lack of priorities of these community outreach materials on a city level.

No city can fully protect all residents and all communities with any set of resiliency or environmental plans. New York City has been a leader in planning for long-term climate change impacts and risks, and has been a model for cities around the world. But a better job can be done to engage community and individual stakeholders who are in the most vulnerable communities. In Red Hook, there was a clear breakdown in services and response from the city to ensure the already vulnerable residents were provided for. Community led disaster preparing and recovery has great benefits, and must be woven into the fabric of long-term solutions, if the city is to avoid another disaster in Red Hook and communities alike.

BIBLIOGRAPHY

- American Planning Association. *Planning for Post- Disaster Recovery*, James Schwab, 2015
- Beatley, Timothy. *Planning for Coastal Resilience: Best Practices for Calamitous Times*, Island Press, 2009
- Bulkeley, Harriet. *Cities and Climate Change*, Abingdon, Oxon: Routledge, 2013
- City of New York. *PlaNYC*, 2007, New York, NY
- City of New York. *PlaNYC 2011 Update*, New York, NY
- City of New York, *A Stronger, More Resilient New York*. 2014
- City of New York, Office of Emergency Management. *Hazard Mitigation Report*, 2014, New York, NY
- Englander, John. *High Tide on Main Street*, The Science Bookshelf, 2012
- Gornitz, Vivien. *Impacts of sea level rise in New York City Metropolitan area*, *Global and Planetary Changes*, 32: 61-88, 2002
- Lincoln Land Institute of Land Policy. *Urban Planning for Climate Change*, 2007
- Massachusetts Institute of Technology. *Lessons from Katrina: How a community can spearhead successful disaster recover*. 2008
- McArdle, Andrea. *Storm surges, disaster planning, and vulnerability populations at the urban periphery: imaging a resilient new york after superstorm sandy*, *Idaho Law Review*, Vol 50, 2014
- NRDC. *Preparing for Climate Change: Lessons for Coastal Cities from Hurricane Sandy*, April 2014
- NYC Panel on Climate Change, *Climate Risk Information 2013* June 2013, PlaNYC
- NYC Panel on Climate Change: *Building the Knowledge Base for Climate Resiliency*, 2015
- NYCHA's Planning and Response for Superstorm Sandy City Council Public Hearing Committee, Testimony from NYCHA GM Cecil House (January 2013)
- Red Hook Initiative. *A Community Response to Hurricane Sandy*. 2013

Sandy Regional Assembly, *SIRR Analysis* , July 2013

Sandy Regional Assembly, *Recovery Agenda*, April 2013

Schmeltz, MT. *Lessons from Hurricane Sandy: a community response in Brooklyn, New York*, *Journal of Urban Health*, 90 (5): 799-809, 2013

Subramanian, Meera. *The City and the Sea*, Orion Magazine, March 2014

Urban Justice Center: The Alliance for a Just Rebuilding. *Weathering the Storm: Rebuilding a More Resilient New York City Housing Authority Post- Sandy*, 2013,

Urban Land Institute. *After Sandy: Advancing Strategies for Long- Term Resilience and Adaptability*, 2013

Van Herk, Sebastiaan. *Learning and Action Alliance for the integration of flood risk management into urban planning: a new framework from empirical evidence from The Netherlands*, *Environmental Science & Policy* (14): 543-554, 2011