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Hurricane Sandy: Using Environmental History, Economics, Politics and Urban Planning to Prepare For the Next One

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Hurricane Sandy, a category 1 storm by the time it reached the North East coast of the United States, was a disaster that devastated all of those in its path. The physical effects of the hurricane, which hit the East coast of the United States on October 29, 2012, were felt by 15 states. The most devastating outcome in the aftermath of the storm was the death toll that numbered over 100 people. The shock from the disturbing effects of this storm was extremely unsettling, and unfortunately those who were affected by it will continue to suffer from these consequences for a long time to come. Unfortunately there is a strong likelihood that tropical storms, such as Sandy, will become more frequent as a result of climate change. This is concern to government officials and people living in vulnerable areas.

While the initial devastation of this natural disaster, such as loss of life and property, is difficult to come to terms with by those affected, so are some of other imminent issues that are exposed in the aftermath of the destruction. Issues that need to be addressed by our public officials post Hurricane Sandy are how to deal with extreme negative impacts on the economy, new and proper policies that will protect the public in the future, and the need for a reevaluation of geographic sites and urban planning in these areas. Government planning on these issues will better protect the public against future natural disasters.

1) Introduction [Environmental Issues and Impacts]

Hurricane Sandy was a devastating super storm that robbed many people of their lives, homes and businesses. It destroyed a great amount of infrastructure in New York City as well. It is necessary to develop certain precautions to protect New York City from storms such as Hurricane Sandy in the future, as these storms will become more frequent and much stronger, due to the influences of anthropocentric climate change. New York City is one of the most thriving economic capitals in the world, and has developed to accommodate and encourage the growing areas of capitalism in the state. As a result, the city has left itself extremely vulnerable to natural disasters, such as Hurricane Sandy, by building beyond its natural limits and promoting over population on the island of Manhattan and in the outlying boroughs of the city. The city must change in order to become more resilient. This change must stem from new policy proposals that incorporate interdisciplinary ways of thinking.

Many issues have arisen as a result of Hurricane Sandy, which have impacted the national and state economies as well as the daily way of life in parts of the United States in a very negative way. First, in order to prevent these issues from occurring again in the future, policy makers must learn to take into account the environmental history of certain areas in order to develop sound and resilient building codes that will protect inhabitants against future harm. Secondly, it is necessary to hone in on the devastating economic issues that arose during the storm and the issue of preparedness for future storms so that the same economic issues do not occur again. Being mindful of finding the certain ways to protect against negative economic impacts after natural disasters can help limit the amount of people affected by future storms and can take some of the burden off federal and state governments. Thirdly, taking time to investigate different policies that could be put into place to deal with future storms is an

extremely beneficial tactic. Policies should also be put into place to dictate which new urban design projects should be used in order to protect the public against devastation from natural disasters, and that could further improve future situations of people living in vulnerable areas. Policies that protect people from environmental racism and from severe health issues that arise from storms such as Hurricane Sandy should also be considered.

As anthropocentric climate change is the reason for this new surge of frequent and powerful storms in the North Atlantic region of the United States, it is important to focus on the reasons why climate change is happening and the affects that it is having on weather patterns, specifically storm patterns in the North Atlantic region. The affects of these more recent storms, and projections about the ways in which these storms will affect certain areas in the future are also necessary factors in developing plans to protect certain regions from these climate change consequences. Other than understanding the basic ramifications of climate change regarding powerful hurricanes, it is important that policy makers take into account the environmental history of the certain regions at hand, as well as the economic situations and new urban planning possibilities for these areas. A well-rounded background is crucial for informing policy, and all of these disciplines will play a role in forming this background.

As a former intern of the NYC Department of Environmental Protection, I was also exposed to environmental injustice in some of the poorer areas of New York City. These areas include Breezy Point, a cooperative of which I am a resident. Through my experiences I have seen how poor infrastructure increased destruction in this area, similar to many others. As part of my thesis I will focus on a case study of Breezy Point and contribute suggestions about how understanding the environmental history, economics, and development in the community will be useful in making the necessary changes to improve the region in the future.

Thesis Statement: ***NYC Has Become More Vulnerable to Destruction Over Time***

Over the last couple of decades there has been an increase in the number and severity of tropical storms that have hit the North East Coast of the United States, as well as in other areas of the country and the world. In October of 2012 the Northeast coast of the U.S. was hit by one of the worst storms it had ever experienced, Hurricane Sandy. Hurricane Sandy caused damage to fifteen different states in the region, and caused the most damage to New York and New Jersey. Homes and businesses up and down the coast, as well as the interiors of these two states were completely destroyed, leaving many people homeless and without any of their possessions. Many people died during the storm as well which inflicted more pain and tragedy among the people affected by damage to their homes and businesses. Many people not living on the coast or in these two particular states, were also affected, although not as tragically. There were hundreds of thousands of people left without clean water to drink and bathe or electricity, as the region began to enter the cold winter season. This posed many issues for the sick and elderly in the weeks that followed the storm. Hurricane Sandy was devastating at the time that it hit on the East Coast, and will continue to devastate those affected for years to come.

Hurricane Sandy created many issues for the states that were affected, as well as for the national government. The most threatening issues that the government is now dealing with are economic, political, and include problems stemming from geography and urban planning. As numerous businesses and homes were destroyed in the storm, there are a variety of economic issues that have presented themselves in its aftermath. These issues include how the clean up will be handled, how insurance will be distributed, and how people will rebuild their lives so that they can provide for their families. An understanding of the history of the natural environments of

these affected lands is necessary in order to determine how the rebuilding process can incorporate the environments at hand to make new structures more resilient.

The affects of Hurricane Sandy have also called actors in the political science field into action. Inhabitants of these coastal areas are debating whether or not new building codes should be put into place in order to prepare for future storms. This debate includes the issue of global warming, and discussing whether underlying policies should be put into place to prevent problems like climate change, so that these disasters do not continue to have the same devastating effect.

Environmental justice is also a topic on which political action will have to be taken. Hurricane Sandy has brought to light the issue of geography and urban planning. It may be that we can no longer inhabit these coastal areas because they are unstable due to these severe storms. In this case people would have less surface area on Earth to inhabit. This is an issue because there is already not enough space for humans on this earth because of the large population size. By addressing the issues that have come to light as a result of Hurricane Sandy, such as developing a better understanding of environmental history, economic issues, and issues regarding policy and urban planning, cities such as New York City can learn from past mistakes and plan for future natural disasters. New York City can begin to rebuild in order to lessen its vulnerability to natural elements as well, and devote itself to the intention of better protecting the public from harm in future tropical storms.

Case Study:

As a part time resident of the Breezy Point Cooperative in Queens, New York I have personally experienced the negative affects of Hurricane Sandy. Breezy Point is a private community on the Atlantic Ocean in New York City. The cooperative is mostly made up of

working class people of originally Irish decent. The area is not very affluent and many of its residents reside full times in small bungalows that are vulnerable to flooding, as mant of these homes are at ground level and not very sturdy. This community has also not yet been required to join the New York City sewer system and still functions off of the use of cess pools. While the area provides its residents with a beautiful and close-knit environment, it did not offer proper protection during the storm.

Our home in Breezy Point is a small bungalow on the ocean side of the peninsula, a few blocks away from the beach. While the structure of our home remained mostly in tact, the flooding inside the house destroyed everything. I went down to help my mother retrieve valuable items from the house a week after the storm, to find our house still standing but almost all of our possessions destroyed. The lids of the cess pools had also shifted during the storm, releasing raw sewage into the environment. The floors as well as all of the walls and furniture were covered in sewage because it mixed with the water that flooded our home.

As we began to plan for the future, our family realized that we couldn't just demolish the house and build a brand new one. However, we are lucky because this home is not our primary residence, unlike man of the other year round residents in Breezy. New building codes are being discussed and there is talk about whether or not Governor Cuomo is going to buy out Breezy Point, meaning we would no longer have a house there. In order to prepare, with the hope that we will be able to rebuild, many preliminary steps had to be taken. Our family gutted the inside of the house so that we would not have a problem with mold, and we also purified the sand on our property to get rid of any bacteria from the sewage.

Despite these hopefully steps that we have taken, we still do not know if we will be able to afford to rebuild if given the opportunity. Our insurance company did not cover any of the

damages that were caused from flooding due to the fact that we only had hurricane insurance, not flood insurance. The money that we received from FEMA is also not enough to cover all of the expenses of rebuilding. Our neighbors our much worse off than we are because their house at Breezy were the only homes they have.

This loss has been very tragic for my family. Memories and many good times were had every summer at our house in Breezy Point and it is sad that we may never return there. In my eyes Environmental Injustice exacerbated this destruction. Many of the families living in Breezy Point do not have a lot of money or education. These people did not want to pay for a sewer system, but they did not understand the potential dangers of keeping the antiguated cess pool system, such as the release of sewage in a big storm, contributing to widespread sickness and destruction of belongings. New York City's government knew it would have to spend a lot of money to educate the people about the sewer system, as well as to implement the system, and therefore did not require that Breezy be connected to the system. As a result, the issue of sewage contamination was piled on to the long list of other issues that came about as a result of Sandy. Proper building codes for this coastal community were also not enforced, as it is almost a forgotten part of New York City. The bungalows were not built to withstand storms as powerful as Sandy and that is why many residents no longer have a place to live.

NYC: Climate Change and The Consequences of Hurricanes

Climate Change

A rise in the number of tropical storms over the past few years, and the magnitude of some, in areas such as the North Atlantic region is routed in a deeper problem: anthropocentric climate change. There is evidence that shows that each time the global temperature has increased since the year 1945, there has been an increase in the number of tropical storms and

cyclones. Since 1995 there has been an even greater increase in the amount of hurricanes that have hit the North Atlantic region, and the severity of the intense wind speed and flooding from these hurricanes has also increased. Obviously, as the population has increased along the shore in areas the hurricanes reek havoc not just on a personal level but also have wide ranging economic effects.

Temperature increases do not just happen on land, they also occur in the oceans. This eventually affects the wind patterns, which strongly influence storm direction and intensity. From the year 1970 until 2005 there has been an increase in vertical wind shear, which scientists believe correlates to the increase in more serious hurricanes, such as those measuring the category 4 and category 5 standards.[1]

As set forth above, the warming of the Earth's surfaces and oceans is believed to be due to anthropocentric climate change. Facts supporting the hypothesis that anthropocentric climate change is occurring are plentiful, and should be taken seriously. The Intergovernmental Panel on Climate change has found that, "Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004."[2] Human activities that have contributed, and continue to contribute to this increase in GHG emissions include, the use of fossil fuels, certain agricultural practices, deforestation, and the use of fertilizers in the production of food. Deforestation and the use of fossil fuels to run machinery and cars contribute to the release of the most abundant green house gas, Carbon Dioxide, into the

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[1] Heightened Tropical Cyclone Activity in the North Atlantic: Natural Variability or Climate Trend? Greg J. Holland and Peter J. Webster Philosophical Transactions: Mathematical, Physical and Engineering SciencesVol. 365, No. 1860, Climate Change and Urban Areas (Nov. 15, 2007) (pp. 2695-2716)

[2] Intergovernmental Panel on Climate Change. "Climate Change 2007", 5.

environment. Agricultural practices and energy production release methane. In addition, the use of fertilizers in agriculture produces nitrogen dioxide.

The release of green house gases, such as Carbon Dioxide through the use of fossil fuels, into the atmosphere contributes to heat being trapped in the Earth's atmosphere. This ultimately causes the average temperature of the planet to increase.

These GHGs change the atmospheric makeup and ultimately the climate, leading to the catastrophic increase in cyclones and tropical storms, as a result of changes in weather patterns. These strong storms are abnormal in regions such as the North Atlantic and therefore will cause great damage to the unsuspecting habitats that are situated in these regions, such as the Manhattan shoreline. The intensity and frequency of these storms will only continue to grow as the temperature of Earth's surface continues to increase, because of climate change.

Despite these ever growing patterns, many remain in opposition to the issue and have said that global warming is too skeptical and therefore the issue cannot be taken seriously. The groups who debunk global warming as an environmental theory have started a disinformation campaign to support their beliefs. They retained their own scientists who are funded by fossil fuel corporations, and have established their own public relations firms to convey their argument. Capitalists, who benefit from the production of fossil fuels, are afraid of changing the economic system of the United States, in order to combat the issue of climate change. Taxing the rich, limiting production, and strong government intervention go against all capitalist doctrine. However, some argue that this would be a better price to pay than having our national security threatened by the problems that may arise as a direct result of climate change. The United States military already has been called upon to help during major crisis in other parts of the world due to natural disasters, and this expenditure of our army will only increase as these natural disasters

keep occurring. The destruction of people's homes and lives is also a price that many people are not willing to pay, in order to support the current capitalist system.[3]

Climate Change Impacts

Severe tropical storms do not just cause physical damage to the areas that they hit but they also cause other wide range issues for the people living in these areas, as well as those living in the surrounding areas. Storms such as these destroy and change entire communities and the way of life for the people living in these communities. The IPCC report from the year 2007 predicted that in North America, "coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution."[4] . If houses are destroyed then people may be forced to rebuild entirely new houses, and if this is not possible then they may have no other choice but to move to different areas, leaving behind a barren landscape. While some people may want to rebuild their businesses and homes, others may choose to move away from these areas voluntarily because they do not want to take the risk that another storm may hit in the future, for example in the cooperative of Breezy Point in Queens, New York. This conflict of natural geography affecting urban planning and development also poses economic problems. The property value of these coastal communities will go down when seen as a residential risk, and the revenue for the capitalist businesses that thrive off the communities there may also decrease as a result.

The states affected by storms such as these also experience revenue loss because these states rely on the businesses in these coastal communities for taxes. For example, Hurricane Sandy shut down the casinos in Atlantic City for weeks, and this greatly affected the state income of New Jersey, which depends heavily on these casinos to make money and pay taxes.

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[3] Donald A. Brown, *The Ethical Abhorrence of the climate.*. . 2012. Ethicsandclimate.org.

[4] Intergovernmental Panel on Climate Change. "Climate Change 2007", 11.

The sale of gasoline and the associated taxes were also down due to the fact that there were limited amounts of gas available during the weeks after the storm. "Mom and Pop" businesses were also destroyed and may never reopen.

State officials as well as the federal government do not take economic attacks lightly and as a result, conversations are being had over what legislation can be put into place to prevent these storms from causing such intense destruction in the future. There are now debates over changes to building codes in coastal communities to prevent property damage, as well as discussions about whether the root of the problem is truly climate change.[5] If the issue is climate change, then the environmental histories of the areas at risk should be studied in order to develop well-informed plans for rebuilding in these areas.

Environmental History

Environmental history focuses on understanding what the earth was like before human development, and understanding how it has changed with time. Usually, the discipline focuses on certain areas at one time, and not just the Earth in general. The natural ecologies of the land are studied. This involves understanding the native plants that typically grow in specific regions as well as the animals and other members of the biotic community that thrive in certain habitats. Environmental history also studies how lands have changed over time as a result of human activity. This includes different land use methods, how the ecology of the land has changed, and understanding both the positive and negative consequences of these changes.

Environmental history is an important factor in developing a well-rounded view of a specific region. The history can be used to influence decisions about development to ensure that

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[5] Robert Slavin, "NEW JERSEY: Sandy Slams Revenues." Bond Buyer 383.33840 (2013): 7. Business Source Complete. Web. 14 Jan. 2013.

new developments can be sustained in certain regions. Understanding the ecology of specific regions can also aid in deciding how to counteract the negative consequences of climate change. By building in conjunction with the natural features of the land, it is more likely that the structures will be more resilient to natural disasters such as strong and frequent storms.

General NYC Environmental History

The island of Manhattan was originally a large forest that had many streams and supported a large wildlife community. Eric Sanderson is a conservation ecologist for the Wildlife Conservation Society, who has been working for many years on the Mannahatta Project, in order to get a better idea of the original environment of Manhattan before settlers arrived in the region. He used old British maps of the island in order to get an idea of the natural landscape of the island. Sanderson was able to determine the different species that lived on the island and the various native plants that were present on the island and to understand the original topography of New York City. He has developed a visual of how the island looked before it was settled. His visuals and the information that he has gathered regarding the former Manhattan aid in understanding the appeal of the island to its original settlers, and can be used to determine how these appealing aspects can be conserved so that Manhattan can continue to thrive for years to come.[6]

The environmental history of New York City is deeply intertwined with the physical location of the city. New York City has thrived due to the fact that it is physically surrounded by water, since the Dutch settlers founded it in the year 1624. The first piers were built in 1647 in lower Manhattan and by the early 1700s, settlers were beginning to build piers on the Hudson

[6] Eric Sanderson. *The Mannahatta Project* . Video. Wildlife Conservation Society.

River. This enabled settlers to bring goods to shore as well as to load ships with new goods from the recently founded colony in order to bring them back to the Dutch Republic.

With piers being built along the riverside, the settlers began to establish warehouses and build streets along the river, in order to have easy access to new shipments being delivered to the ports. Apartments were built along the river, causing the riverside to become a place people could call home. "In the nineteenth century, from New York's East River…the waterfront became the center of commercial activity and human contact."[7] It is evident that the shores of one of the world's most prosperous and famous cities was always important to New Yorkers, and the shores still remain important to the city's inhabitants today.

Manhattan's opulent shoreline was created as a result of natural processes that occurred over centuries. The island is exposed to various deep-water sources such as the Hudson River, the East River, and the Atlantic Ocean. It was carved out by glaciers from four ice ages that occurred thousands of years before the Dutch settlers arrived. This ideal deep shoreline was then divided up between the new settlers by the Dutch West India Company, in order to delineate plots of land for individual use and for trading use.

Due to the population growth on the island, in 1686 Lt. Governor Thomas Dongen ordered that the new boundary of use of the land for the Dutch West India Company would be marked by the low tide mark, instead of the high tide mark, which previously marked the boundaries of land use. Consequently, the city was able to expand into these newly appropriated areas using landfill techniques. Expansions were also made along the Hudson River at later

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[7] Ann L. Buttenwieser, *Manhattan Water-Bound*. New York: New York University Press, 1987. 10.

dates, expanding the city in all different directions.[8] The city expanded its shorelines on the East River, as well as in lower Manhattan.

The expansion increased development in the city and made it more habitable for the growing population. The people living in the city during the 1600s and the 1700s were mostly fur trappers who relied on trade. The expansions also lead to the development of more ports, thus allowing for more trade. Despite the benefit of the amplification of land and ports, the developers started to move in a high-risk direction. In the late 1700s and early 1800s "the East River expansion was now sanctioned to 420 feet beyond the original low-water line".[9] Industrialism was beginning to encroach on Mother Nature.

In the late 1800s those involved in the docking and trade business realized that the piers that were being built along New York City's waterfront were not being built with the intention of having long life spans, and would not be able to function properly with the introduction of bigger ships. The piers were insufficient because the land on which they were built was always expanding and changing. As a result, the city was not interested in building state of the art piers because they were just going to have to rebuild them a few years later. A plan was proposed in the 1870s to build a set of "sufficient piers", known as the Chelsea-Ganesvoort improvements. These plans were finally approved in 1894 after much deliberation regarding economic issues as well as state boundary issues with the state of New Jersey. The committee also deliberated on the issue of altering the Hudson River and its irreversible consequences. These consequences included how the current could cause the water to shift more toward New Jersey, making the ports in New York more shallow. New York City has always taken pride in its deep ports which allow the city to participate in a large number of transactions.

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8 Buttenwierser, *Manhattan Water-Bound*.

9 Buttenwieser, *Manhattan Water-Bound*, 37.

This was the city's first attempt to built infrastructure that was meant to be long lasting and efficient. It was also among the first set of construction plans that also considered the effects that the project would have on the environment, even if the environmental effects were being deliberated solely because of the effects they would have on the economy.[10] These new infrastructures also contributed to the increasing vulnerability of the island to destruction from natural disasters.

New York City was not only built on a basis to accommodate trade via waterway access. The people who first settled on the islands were mostly of European decent. As a result, the way in which the island was planned out and built was heavily influenced by European architectural techniques. In the eighteenth century British architecture centered itself around the idea that nature and human alteration, through construction were intertwined, and that both would have to work together in harmony in order for architecture to be successful. Therefore the British began, "integrating nature into urban development".[11] This new philosophy was implemented in the British design of cities in their colonies, such as New York City.

There was a "predominance of utilitarian and commercial thinking"[12], that was involved in planning cities during this period of time. Some of these British architectural principles that were actualized in New York City were the construction of a large number of streets in order to promote effortless movement, as well as the issue of constructing a hygienic city.[13] Hygiene was an issue that plagued Manhattan due to overpopulation.

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10 Buttenwieser, *Manhattan Water-Bound*.

11 Ali Madanipour, *Designing the City of Reason: Foundations and Frameworks*. New York: Routledge, 2007. 94.

12 Madanipour, *Designing the City of Reason*, 96.

13 Madanipour, *Designing the City of Reason.*

The British also incorporated nature into their cities by establishing parks and by planting trees to line streets. This influence can be seen with the construction of New York City's Central Park, which was completed in the 1860s. Some reasons behind building the park include the need for clean air in the city, and the acknowledgment that the land was not sufficient to build on. These realizations imply that the people of Manhattan knew that their developments had effects on the natural environment, and that some environmental products, like clean air, were important for human life.[14]

As mentioned above New York City had problems with hygiene due to overcrowding and overpopulation. These issues caused the city to experience some terrible disasters that ultimately lead to changes in regulations in order to protect the city from further harm, as well as from natural disasters. In the early 1900s, New York City was brimming with small and crowded factories as well as tenement housing units. The fact that people were crammed into tight spaces that were filled with machinery denotes that safety was not a major issue at this time. However the issue of safety became more relevant on March 25, 1911, when hundreds of women working in the Triangle Shirtwaist garment factory fell victim to overcrowding, when a fire erupted in the building. Many of the women could not escape and the fire killed 148 people.

After the tragic Triangle Shirtwaist Fire, New York City came to terms with the fact that they would need to implement new safety regulations for buildings. Eventually they changed the zoning codes in order to protect citizens. In 1916 New York City made changes to its zoning policies that "established use requirements for different areas or zones within the city". [15] The city was divided into commercial, manufacturing or industrial, and residential or restricted zones.

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[14] Sarah Waxman, "The History of Central Park." November 12, 2007. http://www.ny.com/articles/centralpark.html.

[15] William G. Ramroth Jr., *Planning for Disaster: How Natural and Manmade Disasters Shape the Built Environment*. New York: Kaplan, 2007. 70.

This protected residents of the city from the dangers of living next to factories and other industrial buildings. "By the end of the 19th century, the most densely populated corner of the world was in New York City,"[16] and the city knew that changes needed to be made in order to maintain a healthy city that would be a suitable place for its people to live. These laws also changed the way that urban development would shape the city from this point forward.

History of Hurricanes in Manhattan

"Hurricanes are the most powerful weather disturbances on earth."[17] Hurricanes in the Atlantic Ocean start as thunderstorms off the Western coast of Africa, that get sucked out into the Atlantic Ocean collecting warm, moist air. By the time a storm reaches the northern hemisphere it spirals in a counterclockwise motion, sucking the warm moist air through the center of its spiral. The storm is considered to be a hurricane when the winds are moving at a speed of at least 74 mph. "Atlantic and Northern Pacific Ocean hurricanes are categorized by intensity using a scale called the Saffir-Simpson Hurricane scale."[18] The scale was created in 1969 and measures the intensity of the storms based on the velocity of the winds and the height of the storm surges. These storms usually hit the North Atlantic anywhere between the months of June to November. They are extremely dangerous and have the capability of imposing great destruction on exposed coastal lands, such as New York City.

New York City has been home to millions, due to the fact that it provides many opportunities to participate in the consumer market, and gives people the hope of economic achievement. Manhattan's geography has made it a perfect place to establish markets and trade. The city has grown exponentially since the 1600s. The land expanded with the use of landfill

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16 Ramroth, *Planning for Disaster,* 79.
17 Ramroth, *Planning for Disaster,*124.
18 Ramroth, *Planning for Disaster,* 124.

technology, more ports and piers were established to promote economic activity, and the city has been planned according to zoning laws and architectural techniques that make it suitable for the number of people that inhabit the island, and for the activities that take place there on a daily basis. Despite the fact that government planning altered the land in order to suit commercial and economic needs, the possibility of natural disaster still threatens the development. Hurricanes are one of the natural disasters that act as a menace to the city of New York, and intimidate the stability of the island of Manhattan.

Manhattan has always been vulnerable to Hurricanes, but only a few have been strong enough to inflict serious damage. One of the first recorded hurricanes in the city of New York took place in 1821, and flooded everything below Canal Street. The next serious hurricane occurred in 1893. This 1893 storm damaged buildings in the City, took down trees, and caused a severe surge of the City's waters, which was very damaging. After this hurricane came "The Long Island Express" storm in 1938, and later a category 3 storm hit New York City in 1954, known as "Hurricane Carol". "Statistically, the New York area is hit by one of these monster storms every 75 years, or so, "[19] One can see from this brief summary of New York City's hurricane history, that serious storms are an issue for New York City that cannot be disregarded. This is especially true after Sandy.

Hurricanes Exacerbated by Climate Change

The environmental problem at hand is what is known as anthropocentric climate change. That is, the human population is contributing to the emission of green house gases (GHGs) such as Methane, Nitrous Oxide, and Carbon Dioxide through among other things, the emission of fossil fuels and the use of fertilizers. When green house gases enter into the Earth's atmosphere

[19] Aaron Naparstek, "Storm Tracker." *Reader's Guide* Sept. 2005, 31 ed. *EBSCOhost*. Web. 5 Apr. 2013.

they remain trapped there, where they later absorb the sun's rays and contribute to a rise in global temperature. The atmospheric temperature increase has negative consequences for the entire planet Earth. The consequences include the melting of the polar ice caps in the North and South Poles, which is resulting in rising sea levels.

This has caused ocean temperatures, as well as temperatures on the Earth's surfaces to increase. As a result, wind patterns begin to change across the globe. This then alters the Earth's wind and storm patterns. An alteration in these patterns is very detrimental. Areas that did not previously experience very serious weather patterns are now beginning to see signs of more catastrophic storms. The 2007 Assessment of the Intergovernmental Panel on Climate Change reports that, "There is observational evidence of an increase in intense tropical cyclone activity in the North Atlantic since about 1970." [20] Thus there are signs that climate change has begun to have a detrimental affects across the globe, and could possibly cause irreversible damage to certain habitats and ecosystems.

Recent and unprecedented storms have impacted habitats that were not meant to withstand weather patterns of this nature, and as a result they suffer greatly. For example, the way in which Hurricane Sandy decimated houses on the New York shorelines of Staten Island and Breezy Point. Strong winds and powerful water surges in these naturally unprotected areas inflicted harm on people, animals, and other members of the biotic community in these regions. The infrastructure in these areas has also been affected in a very detrimental manner and this poses severe consequences for the future of these structures. It has been shown that with the rise in sea levels and the increase in tropical storms in certain areas, these regions will no longer be habitable for humans, and that current members of the ecosystems in these areas will be

[20] Intergovernmental Panel on Climate Change. "Climate Change 2007: Synthesis Report." (November 12, 2007): 1-22.

eradicated. Eradication of the ecosystem also contributes to the issue of widespread biodiversity loss (which is currently occurring across the globe and poses a great threat to the benefits provided by the natural process of evolution). A decrease in food availability and the possibility of widespread disease, as a result of the destruction of infrastructure and ecosystems, will have negative impacts on the human population.

In response to the increase in the amount of hurricanes that were occurring in the United States in the 1900s, and the devastating effect on the people, the government decided to implement legislation in order to protect those that may be affected by future storms. The National Flood Insurance Act was put into place in 1968. In 1973 the Flood Disaster Act was enacted.[21] In passing these acts the government felt it was prepared to protect citizens who suffered property destruction and flooding, damages similar to what had occurred after past hurricanes.

However, the government was not prepared to deal with the devastating outcomes and flooding that occurred after recent storms, such as in New Orleans after Hurricane Katrina in 2005, and in New York City after Hurricane Sandy in October of 2012. The City of New York had never experienced damage from a natural disaster like the damage from Hurricane Sandy. There were not only high winds, but also high tides and intense storm surges. Entire neighborhoods were destroyed in Breezy Point, Rockaway and in Staten Island. New York realized that it is no longer as hurricane resistant for the future compared to its relevant resistant ability to withstand storms in the past.

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[21] Ramroth, *Planning for Disaster.*

Environmental Economics

Environmental Economics is a social science discipline embedded in the study of environmental policy. One of the main debates in the field on Environmental Policy is whether or not the Earth will be able to sustain the current and future population, and the ways in which people are currently living their lives. There are arguments over how people should be using ecosystem goods and services in order to ensure that the earth's natural resources are not over used, to the point where they are no longer available. Economics is used to help solve these issues by aiding in understanding how ecosystem goods and services can be distributed among the population, in such a way that enables the population to benefit from the resources without depleting the availability of the resources. The overuse of these resources also leads to many environmental issues, such as global warming. Economists work to maximize the benefits of resource use, but at the same time weighing the benefits of their use against the harm this use causes. The desire for the market to be as lucrative as possible causes people to lose sight of the fact that these benefits will be short-lived if the resources run out or start to cause irreversible damage. It is believed that "by recognizing the conflict between human well-being based solely on market output and long-run environmental integrity, we can make strong sustainability consistent with… physical reality."[22]

Economic Turmoil Post Sandy

Super storm Sandy had strong economic impacts that will continue to affect New York, New Jersey, and the United States for years to come. For the hundreds of people on the coast of New York, such as in Staten Island, the Far Rockaway's and Long Island, and those on the coast of New Jersey, who lost their homes and businesses, their economic situations have been turned

[22] John M. Gowdy, "Terms and Concepts in Ecological Economics." *Wildlife Society Bulletin* 28, no. 1 (2000): 33.

upside down. The insurance companies and FEMA have stepped in to asses the damages so that they can help these individuals get back on their feet.

One region in particular, Breezy Point, had over two hundred burn to the ground due to an electrical fire that started as the result of flooding and high winds during Hurricane Sandy. The people that owned these homes are left with absolutely nothing and the decision of whether or not they can rebuild their houses, and are uncertain about where else they could possibly move. Other individuals that did not lose their homes such as those in the Hudson Valley region of New York and in parts of Connecticut, suffered damage to their homes due high winds, downed trees and flooding must also face the costs of rebuilding their homes and businesses. Many owners of gas stations also suffered a decrease in income because the gasoline supplies were low after the storm due to transportation to ports in New York City and New Jersey being blocked. This also affected businesses who could not get supplies. All of these issues negatively impacted the gross income from tax revenue for the states involved for the year of 2012.[23] This in turn negatively impacted the economy of the entire country for that year as well, which is what occurred when Hurricane Katrina hit New Orleans in 2005. If severe storms continue to hit, then the country will continue to suffer economic loss.

Widespread Economic Impacts of Hurricane Sandy

In August of 1954, when Hurricane Carol hit the coast of New York City and Long Island, the lands that were hit experienced a great deal of damage and suffered adverse economic impacts. The storm imposed damage on a total of eleven states, was responsible for 68 deaths, economic loss which totaled to $460 million. When Hurricane Carol reached the land in New York it had become a category 3 storm. The storm surges were so large that LaGuardia Airport

[23] Katherine Kocijanski, "Rebuilding - After Sandy Blew Our Houses Down." Hudson Valley Business Journal 1.11 (2012): 1. Regional Business News. Web. 14 Jan. 2013.

and parts of the Montauk highway were flooded. The state experienced many power outages and many of the coastal lands experienced damage. When the hurricane was over only one person from New York State was found dead and there were only $5 million of damages for New York state alone.[24]

While the economic impacts of Hurricane Carol on New York were extremely detrimental during the period in time when the storm hit, they do not compare with the economic damage the state is currently suffering in the wake of Hurricane Sandy. Sandy not only impacted the city of New York, but the surrounding counties of Westchester, Rockland, Waasaic, and Suffolk. The total economic cost of the storm for New York State is estimated to be about $32 billion of which the damage to New York City alone is estimated to be about $19 billion. There were also 53 deaths reported in the state of New York alone. These costs are a result of a number of different contributing factors.[25]

New York City has changed and developed to a great extent since it was first settled in the 1600s and even since the 1950s. While these developments have helped the city to become one of the wealthiest cities in the entire world, they have also been the source of negative economic issues for the city. For example, the increase in the city's population caused more people to be affected by the storm, and therefore more people needed government aid. The construction and expansion of the subway system also left the city more vulnerable to damages in the most recent storm. Modern infrastructure such as Manhattan's bridges and the railroad systems that were not in place in earlier centuries, were also points of susceptibility to devastation from the storm. The economic issues regarding the bridges and the railroads were

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[24] Wikipedia. "Hurricane Carol." 2000. http://en.wikipedia.org/wiki/Hurricane_Carol.

[25] "Effects of Hurricane Sandy in New York." http://en.wikipedia.org/wiki/Effects_of_Hurricane_Sandy_in_New_York.

not just in their repairs, but these modes of travel were shut down during the days after the storm for safety reasons. The loss of revenue from the tolls required to cross the bridges and from the tickets bought in order to use the railways, caused the city and state of New York to lose out on critical income during 2012.

Another result of Hurricane Sandy that negatively impacted New York City was the gasoline shortage that the city and the surrounding regions experienced in the days following the storm. "The storm's destructive powers were bad enough – knocking out equipment and power at oil terminals and … disrupting shipping for days because of debris in the harbor."[26] The inability of ships to enter the New York harbor and the loss of power on oil refineries due to storm surges resulted in an economic crisis for the New York and New Jersey area. It is estimated that there are about 60 million people in this region, all of who rely on about 6% of the world's oil.[27] For days after Hurricane Sandy, many gas stations in both New York and New Jersey were not able to sell any gas, and some of those that were able to sell gas could not pump the gas or take credit cards because the pumps and machines were down due to a loss of electricity. Another economic issue that affected the gasoline market was oil spills. For example, "at the Motiva fuel terminal in Sewaren, New Jersey… two storm-damaged tanks were leaking diesel – nearly 380,000 gallons in total."[28] This adds to the economic loss suffered by this region because the affected waterways had to be cleaned up.

Future Plans to Protect the Economy

The catastrophes that have occurred as a result of Hurricane Sandy have warranted the help of environmental economic thinking. For example, the issue of overdependence on fossil

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[26] Joshua Schneyer and Selam GebreKidan. "New York Oil Supply: How Sandy Taught Empire State A Tough Lesson About Fuel." Huffington Post.

[27] Schneyer and GebreKidan. "New York Oil Supply", Huffington Post.

[28] Schneyer and GebreKidan. "New York Oil Supply", Huffington Post.

fuels became evident with the gasoline shortage after the storm. Suggestions about focusing on the production of alternate fuel resources were made. It is evident that sever storms such as Hurricane Sandy are becoming more commonplace, and that changes are going to have to be made in order to protect regions like New York and New Jersey from suffering from shortages of necessary resources, such as fuel.

It is evident that if the average temperature of the Earth's climate continues to increase, then the frequency of tropical storms and cyclones in the North Atlantic will also increase and will continue to affect the same coastal regions. If nothing is going to be done to prevent anthropocentric contribution to climate change then other actions must be taken in order to protect the economies of coastal regions, and areas in the vicinity. Perhaps limits on where people will be able to develop coastal land will need to be implemented. While this may initially damage revenue produced on beach front property, it may prevent economic issues such as relying on government aid and insurance companies to fund the clean up of these areas when they are ripped apart by natural disasters.

The Federal Emergency Management Agency (FEMA) was first put into action in 1803 under the Congressional Act of 1803. With the emergence of more and more natural disasters throughout the country there was an increase in the amount of government emergency response programs put into place. Finally, in 1979 President Carter made an executive order that listed numerous emergency response programs under the control of FEMA. Some of the first issues that were dealt with by the agency were the Love Canal and Three Mile Island.[29] Now FEMA is dealing with issues such as Hurricane Sandy. FEMA "approved over $600 million in direct

[29] FEMA. "About The Agency." http://www.fema.gov/about.

assistance to hundreds of thousands of individuals impacted by the storm."[30] This aid does not include the emergency response centers that the agency set up in disaster areas, which provided the people in these areas with necessary resources such as food, and water. The government will not be able to sustain itself if it has to provide this amount of aid for future disasters if they are becoming more frequent. Consequently, the government may have to change the standards that determine the victims for whom they provide aid, after natural disasters. These programs may also have to reconsider the areas, such as the coastal communities of New York and New Jersey, which they currently protect.

If these storms become more frequent and people continue to choose not to vacate these areas, it is possible that insurance companies may also have to change their policies so that these regions are no longer protected under insurance, as they are clearly unstable places to live. Victims of Hurricane Sandy are already experiencing issues with insurance companies because the companies are refusing to cover some of the damages from the storm. For instance, some owners of Allstate insurance policies have been paying for hurricane insurance for many years in order to protect their homes, in the case of an emergency like Hurricane Sandy. However, after the storm these people were told that hurricane insurance does not include flood insurance, and that they would not be covered for any of the damages that occurred as a result of flooding. People, such as Reverend James F. Kelly, my uncle who was a resident of the Breezy Point Cooperative since it was founded, had paid hurricane insurance to Allstate for many years. When the house was assessed after Hurricane Sandy Reverend Kelly received less than $3,000 to cover the damages. The whole foundation of the house had been moved due to flooding and as a result the house needs to be demolished and rebuilt. The $3,000 is clearly not enough money to

[30] The White House. "Ongoing Response to Hurricane Sandy." http://www.whitehouse.gov/the-press-office/2012/11/15/ongoing-response-hurricane-sandy.

cover the cost of the reconstruction.[31] This clause in the Allstate Insurance policy on Hurricane Insurance is just one example of how the victims of the storm are not receiving the aid they need in order to recover from the storm. It is possible that in the future, insurance companies may have to further limit the protection they offer for hurricanes in the New York coastal region, if the storms become more of a frequent occurrence.

More programs may also have to be put into place to prepare for storms such as the severe tropical ones that have been hitting the North Atlantic more frequently in recent years. These programs may include plans such as architectural designs to protect against the high swells, such as those that affected New York City's Harbor. Other programs may ensure that gasoline will be able to reach areas affected by severe weather no matter how bad the storm. This may require storing the gasoline in these regions as a precautionary measure. All of these proposals require significant change and planning as well as cooperation from different groups of people such as those living on the coasts of the affected regions. Some of the suggestions are also ones that may negatively impact the economy as we know it and that is why it may be necessary to solely focus on protecting the aspects of our economy that can be saved, such as putting more focus on protecting businesses.

This question of how to solve these economic issues has required the help of the environmental economic mode of thinking, as mentioned earlier. Are habitants of New York and New Jersey overusing the resources of the coastal lands by over populating these areas? Are people over dependent on resources such as fossil fuels, causing the economic impacts of tropical storms to hit harder? Is New York City over maximizing capital benefits by building infrastructures that increase commercial ability, but at the same time leave the city vulnerable to

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[31] Personal Allstate Insurance Claim.

damages from tropical storms? All of these issues have come to light in the aftermath of Hurricane Sandy. In the period of reconstruction after the storm, decisions will have to be made on how to address these issues in a way that allows people to continue to benefit economically in the affected regions, but not in ways that will eventually lead to their downfall.

Environmental Politics and Urban Planning

Environmental Politics

Political Science is a social science that determines what activities should or should not be carried out, with the sole intention of benefitting the community that these decisions affect. In order for political science to work it has to interest those in charge of making decisions in the field in which the science is being applied as well as in the field of other related subjects. The science must be able to prove that certain decisions will improve a situation.[32] The goal of environmental policy is to improve the state of the environment so that events such as global warming and biodiversity loss do not destroy the planet. In order for environmental policies to be put into place they must work with other areas that implement policies such as building codes, and government programs that will have to comply with new environmental policies. Therefore the world of policy is intertwined and the decisions made by one subset of political actors must be agreed upon by various other subsets.

The economic issues that have come about as a result of Hurricane Sandy have now manifested themselves as political issues in the White House. Decisions must be made as to how aid should be distributed to those in need. A total amount of $60.4 million was requested by the White House to provide help to the victims of the storm. Part of this amount was also going to

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[32] John Gerring and Joshua Yesnowitz, "A Normative Turn in Political Science?" *Polity* 38, no. 1 (January 2006): 101-33. Jstor.

repairing different forms of transportation such as railway tracks and subway stations that were damaged due to the storm. Part of the money was also being used for other rebuilding projects within the communities affected. The federal government must decide on how they are going to deal with the economic burden that has been placed on them by this severe and devastating hurricane.[33] Other political issues that have resulted from Hurricane Sandy are the resurgence for a push for action on climate change, as well as the need for the implementation of better health standards in some areas, such as Breezy point.

The problem of Environmental justice is intertwined with the issue of politics and health. The government must figure out ways to protect all people living in the affected areas for the future, not just the wealthier areas that can pay to rebuild in concurrence with better building codes. All of these issues must be studied when developing policies to protect the public against future natural disasters.

Geography and Urban Planning

Geography and Urban Planning is a discipline within the field of Humanities. This field studies the ways in which the areas that people live in are planned out according to the geographies of these lands. Geography and Urban planning is an:

> Arena that necessarily involves both those whose geographical understanding can contribute to better planning practice as well as those seeking to understand how planning influences the spatial distribution of social and economic activity. [34]

Planning of cities and towns should be done in order to maximize the social and economic benefits for the region while being mindful of the environmental impacts that certain developments may have. It is important to take into account all of the interactions that a region

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[33] "Paying For Hurricane Sandy." Congressional Digest 92.1 (2013): 15. Academic Search Complete. Web. 14 Jan. 2013.

[34] Derek R. Diamond, "Geography and Planning in the Information Age." *Transactions of the Institute of British Geographers* 20, no. 2 (1995): 134. JSTOR.

may have with its environment, such as the kind of weather patterns an area may experience. Construction in these areas should then be based upon these natural occurrences as well as on the ability of the land to withstand the certain constructions that are being carried out.

The destruction that was imposed upon the infrastructure and various communities in New York as a result of Hurricane Sandy was devastating. Many people lost their homes and businesses, and the city took days to return to running on its normal schedule. Certain strategies are now being proposed to deal with the geographic and structural damages of Hurricane Sandy. Hopefully, these new ideas can be implemented and will help protect New York City from future natural disasters. The existing government policies that were put into place to deal with storms were clearly not able to handle storms of the magnitude of Hurricane Sandy. Changes need to be made with regard of Urban Planning in order to keep our citizens and our city safe.

New Policies Regarding City Planning and Climate Change

Budget issues for aid are just one of the few political issues that have developed as a result of the destruction from the hurricane. The insurance companies are not able to provide the victims of the storm with the funds they need to recover, and the federal funding is also not enough to cover the damage either. While FEMA has stepped in and provided direct monetary aid, in the total amount of $600 million[35], for those affected as well as aid in the form of goods and services, they are still not able to meet the needs necessary for people to return to normal lives. The government has therefore had to develop plans in order to figure out ways to help the victims of Hurricane Sandy in a more effective manner.

The aftereffects of Hurricane Sandy provoked both federal and state governments to respond with new policies in order to aid in the rebuilding process. These new policies include

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[35] The White House. "Ongoing Response to Hurricane Sandy." http://www.whitehouse.gov/the-press-office/2012/11/15/ongoing-response-hurricane-sandy.

action under federal government agencies such as the Internal Revenue Service (IRS). FEMA has marked out which areas require federal assistance, and the IRS has then provided these areas with tax relief, based on the geographic area and the type of taxes that individuals pay. The IRS is providing tax relief in to specific counties in the states of Connecticut, New Jersey, New York, Rhode Island, and Maryland.[36] The IRS provides the victims of Hurricane Sandy with New Releases regarding tax relief, local news releases on the issue, as well as legal guidance on the issue. [37] Another program under the control of FEMA is the National Flood Insurance Program. Congress passed a bill on January 4, 2013 that would provide the National Flood Insurance program with $9.7 billion, "to fill claims stemming from damage caused by Hurricane Sandy and other disasters."[38] Without this allowance from congress the program would not have enough money to fill all of the claims that have been filed as a result of the hurricane.

State governments are also working to develop programs that will help their residents recover from the hurricane. For example, Governor Andrew Cuomo of New York State and his committees, have developed different plans that, when enacted, will help New Yorkers recover from the aftermath of the storm. These plans were submitted by the Governor to the federal government on March 12, 2013. The plans included programs that will provide people who suffered damages to their homes and businesses with aid coming from the $60 billion that President Obama declared would be used to help victims of the storm.[39]

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[36] IRS, "Help for Victims of Hurricane Sandy." http://www.irs.gov/uac/Newsroom/Help-for-Victims-of-Hurricane-Sandy.

[37] See Appendix 1.

[38] Raymond Hernandez, "Congress Passes $9.7 Billion in Relief for Hurricane Sandy Victims." New York Times. http://www.nytimes.com/2013/01/05/nyregion/house-passes-9-7-billion-in-relief-for-hurricane-sandy-victims.html?r=0.

[39] Office of Emergency Management, "NYS Sandy Help Programs for Homeowners." http://www.dhses.ny.gov/oem/mitigation/homeowners.cfm.

Another issue that has developed is the issue of Climate Change and how American Policy makers are working to deal with issues in light of recent events. Climate change advocates have been stressing for a long time that reducing certain human practices that lead to climate change can help save money and will in turn be beneficial to the economy of the United States. For instance, it would be beneficial to the United States to look into reducing its Green House Gas (GHG) emissions because this seems to be the cause of the increase in severe weather. Americans have also become over dependent on fossil fuels, as seen in the gasoline crisis caused by Hurricane Sandy, which lead to the increase of Carbon dioxide in the atmosphere. If people chose different modes of travel other than driving automobiles, such as riding a bike to work, than less GHGs would be emitted into our atmosphere. This could then help reverse climate change, which would then contribute to a reduction in the amount of severe tropical storms that have been hitting the North Atlantic region, and that have been the cause of monumental economic detriment.

Despite these warnings, the United States has continued to refuse to sign the Kyoto Protocol, and international treaty put forth by the United Nations that requires all of the countries involved to reduce their emissions. The United States refuses to sign the protocol because the treaty is designed to work with developing and developed nations to prevent economic disparities that could result from reducing emissions.[40] The United States is threatened by the fact that developing countries would not have to reduce their emissions by the same standards as the developed nations. The United States is also threatened by the fact that other developed nations are refusing to sign the treaty. As a result of this inability to cooperate on a national level, the United States remains as one of the largest contributors of green house gases in the

[40] Wikipedia, "Kyoto Protocol." http://en.wikipedia.org/wiki/Kyoto_protocol.

world. Those that claim that the climate change campaign is based on false scientific evidence have also influenced policy makers. The people who promote this anti climate change campaign believe that those that are working to prevent climate change are really just trying to sabotage capitalism. They believe that by implementing climate change policies, such as putting restrictions on emissions, the economy of the United States will be harmed.[41]

According to the aforementioned IPCC report, the amount of GHGs in our atmosphere continue to rise to unprecedented levels and this phenomena is very closely linked with the natural disasters that are occurring more frequently. Policies need to be enacted in order to prevent future and irreversible damages that these events can cause. Our government should take part in treaties such as the Kyoto Protocol, in order to reduce global emissions that hurt the environment. Also, a stop should be put to the campaigns made to refute the scientific evidence provided that proves that climate change is a real and serious issue.

New York City, as well as some other cities across the country, has taken initiatives to combat climate change. Mayor Bloomberg has implemented the PlaNYC program in New York City. This program's main initiative is to maintain the prosperous qualities of the city such as the ability to house a large number of people, participate in the global economy, and having state of the art infrastructure, all while focusing on reducing the effects that these actions have on climate change and the environment. The plan believes that it will be able to reduce the effects of climate change by participating in activities such as making buildings more energy efficient, focusing on recycling and using organic wastes, and by encouraging more sustainable transportation practices like carpooling and bike riding. The plan is a conglomeration of small

[41] Naomi Klein, "Capitalism vs. The Climate." The Nation.

practices, but these simple changes have had positive effects so far, and hopefully the city will see more improvements as a result of the plan in the near future.[42]

There are many specific projects included within PlaNYC that are being enforced in order to combat climate change. These projects include cleaning up the city's waterways in order to restore natural environments. The PlaNYC program is working to update the wastewater treatment plants in order to ensure that there are fewer combined sewer overflows during heavy rainstorms. This will prevent sewage from entering the waterways, and will make these waterways safer habitats for plants and animals. The plan is also working to restore the ecosystems of the coastal communities and is working to make sure that these communities are able to withstand harm inflicted from climate change. Design projects are also being developed to combat sea level rise and storm surges. One project in particular is the development of the South Bronx Greenway. This project is working toward making the waterfront in the Hunt's Point area of the South Bronx into a more recreational space. The goal is to improve the ecosystems along the waterfront in these areas by improving the environment of this area with the resurgence of green space. By improving coastal ecosystems and the environmental quality of these areas such as the area of Hunt's Point, New York City will be able to become a healthier place to live, and will increase its resilience in regards to the negative consequences of climate change.[43]

New York City is working hard to become a more sustainable city, in order to make the city a more habitable place for its residents, as well as to ensure that the city will be able to withstand future events due to climate change. Mayor Bloomberg recognizes that climate

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[42] NYC.gov PlaNYC 2030. http://www.nyc.gov/html/planyc2030/html/theplan/climate-change.shtml.

[43] NYC.gov PlaNYC 2030.

change is a serious issue that threatens the city of New York, and that actions must be taken in order to protect the city against future harm. The Mayor has put together the New York Panel on Climate Change (NPCC) in order to develop plans to deal with, and combat certain issues that are projected to occur as a result of climate change. [44]

The NPCC is fully aware that the coastal infrastructure of the city of New York is at risk for damages, due to climate change consequences like sea level rise, that are predicted to occur in the near future. Therefore this panel is developing plans to protect coastal communities and structures. These plans include implementing infrastructure that will be able to withstand temperature rise, sea level rise, and events of extreme weather like Hurricane Sandy. The NPCC is aware that certain climate change issues will cause the materials of certain infrastructures to erode, will increase flooding of the sewers and buildings with basements, and will increase the amount of pollution in the water due to combines sewer overflows, among many other issues. The city must build with these threats in mind and should take steps to create infrastructures that will not fall victim to these threats.[45] New building standards should include building at higher levels instead of at ground level and using materials that will be able to withstand extremely hot and cold temperatures, as well as materails that will hold up during storms that bring strong winds and flooding.

One other political issue that has arisen as a result of Hurricane Sandy is a health issue. This issue was especially transparent in Breezy Point, NY. As mentioned in the case study, when Hurricane Sandy hit Breezy Point, it disrupted the rudimentary cesspool system that was in place there. Decisions are being made on how to go about enforcing the cleanup of these

[44] NYC Panel on Climate Change. "Climate Risk Information: NYC Panel on Climate Change." NYC.gov.
[45] NYC Panel on Climate Change. "Climate Risk Information: NYC Panel on Climate Change." NYC.gov.

areas as they are now extremely toxic. Discussions are also being had over the building codes in this community. How is it that this community is one of the only few communities in the city of New York without a sewer system? This is an issue of Environmental Justice that must be handled. The people that are planning to rebuild in this community deserve a healthy environment to live in, that will also be sustainable in future storms. These severe weather patterns result in serious political decisions and involve many actors on both the state and federal levels to step in and take control so that the damage can be taken care of in a timely, effective, and safe manner.

Environmental Justice

Environmental Justice is a movement being made to question why certain groups of people are forced to live in unsafe environments that can cause severe health issues and can put them at a higher risk for death. Many marginalized groups have suffered the effects of environmental injustice and changes need to be made. Certain groups are now questioning unsound practices in poorer areas and are demanding that changes be made to ensure the safety of the people in these areas.

One example of environmental injustice is the tragedy at the Union Carbide plant in Bhopal, India that killed, injured, and disabled many people living within close proximity to the plant. This tragedy provoked the implementation of environmental policies and required an examination of the relationship between the developed and developing nations involved to make sure that an incident like this never occurred again. In 1984 at the Union Carbide plant in Bhopal, India there was a leak containing a toxic insecticide in one of the storage tanks, and this leak was ultimately the cause of a devastating explosion that killed and injured many people. Union Carbide was a corporation based in the United States that began to focus on outsourcing

its business in countries such as India where the labor was cheaper, people were willing to take jobs that Americans considered to be dangerous, and where there were less environmental restrictions, which made it easier and cheaper for the company to carry out its work. The safety regulations at the plants outside of the U.S. were also less strict, and even though the workers in the plants were first brought to the U.S. to train, the process became too expensive, and the company put an end to this practice. These factors left the people working in the plant less knowledgeable and the plant at higher risk for breaches in regulation practices, which ultimately put the people working there and living near the plant at risk if anything were to happen, which it did.[46]

Overall, the disaster that occurred at Bhopal was the result of the exploitation of the developing nation of India by the developed nation the United States, and a complete disregard for the justice of the people working in and living near the plant. India clearly accepted the opening of the plant because it would provide people with jobs, and would generate revenue in the region, and ultimately better the economic situation of the Indian people. Union Carbide understood this and took advantage of the situation, knowing that they would be receiving cheap labor and escaping strict environmental policies they dealt with in the United States. While the Indian people were benefiting from the plant in a short-term sense, they were ultimately being treated unjustly. The people in charge of Union Carbide were well aware of the risks of not training employees and not having strict regulations, but they did not stress these risks because in

[46] Nancy Coppola, *Environmental Protection: Solving Environmental Problems from Social Science & Humanities Perspectives*. N.p.: Kendall/ Hunt Publishing, 1997.

reality these risks would only effect the health of the Indian people exposed to the plant, and the heads of Union Carbide would never suffer the burden.[47]

The issues with the cess pools and the lax building codes in Breezy Point are another prime example of environmental discrimination. The city of New York did not want to take the time or money to insist on the implementation of the proper infrastructure that would protect the people in this less afluent area of the city. The people did not know any better and the city did not want to make the effort to convince them otherwise. Consequently, these people were left vulnerable to the dangers of sewage leaks, and flooding and many of them lost everything as a result.

While interning at New York City's Department of Environmental Protection, I was exposed to much information regarding New York City's Sewer System. At one tour of the Newtown Creek Wastewater Treatment Facility, one of the supervisors bragged about how almost all of New York City was connected to the sewer system, with the exception of sections of the Far Rockaway's, including Breezy Point. It was clear from his speech that the government of New York City was fully aware of the benefits of being connected to the sewer systems and that it was an issue that these few areas were not connected. Despite having knowledge of this problem, the government had not taken any actions to make the necessary changes to protect the people in these areas thus far, and there were no definite plans to do so in the future. Therefore, when Hurricane Sandy hit Breezy Point, the dangers of having cess pools were clearly exposed, and the residents suffered the ramifications.

Action has been taken to determine how communities such as Breezy Point will rebuild after Hurricane Sandy. Homes in Breezy point such as that of Reverend James F. Kelly, have

[47] Coppola, *Environmental Protection: Solving Environmental Problems from Social Science & Humanities Perspectives*.

been determined unsafe and the city is mandating that homes in similar conditions be completely destroyed and rebuilt. New building codes have not been decided on for this region yet. However, proposals about what to do with the land have been made. State Senator Joseph Addabbo, suggested that it was possible that the people in Breezy Point may have to rebuild their homes so that they are elevated, instead of rebuilding the bungalows that the people were previously inhabiting. Government Cuomo has also suggested a plan to buy out the owners of the homes in the flood lands in order to build dunes and other structures to prevent against future flooding.[48]

There are many political issues that have come about as a result of Hurricane Sandy. These include how much aid the federal government is willing to grant for those who suffered in the storm and the programs that the state governments are working to put in place in order to distribute these grants fairly. Funding is not the only political issue that is being decided on in the aftermath. Issues surrounding the question of rebuilding, such as possible new building codes being put into place are being decided on as well. All of these decisions will affect those that fell victim to the destruction of the hurricane, and the outcomes of these decisions will impact the ways in which these victims ultimately recover.

Urban Planning Strategies: Old vs. New

Previous Building Standards

Certain strategies are being proposed to deal with the impacts of Hurricane Sandy and will help protect New York City from future natural disasters. There were strategies already in place before this destructive tropical storm hit the coast of New York. However, some of the previous standards that were in place, as well the structures that were put in place to protect the city

[48] Karen Frantz, "Breezy Point Slow to Rebuild After Sandy Left Few Standing." Times Ledger.

against damage from these types of storms did not protect the city in the ways that they were intended to. As a result both the private and the government sectors have suggested implementing new strategies to protect against natural disasters in the region. These proposals can then be compared with the existing government policies that were put into place to deal with storms, in order to determine the ways in which the city can be better protected.

Various government agencies have had plans in place for a number of years to protect the Country's lands against destruction from natural disasters. Many plans were in place to protect the New York City region against hurricane damage. As mentioned before the Federal Emergency Management Program has gained more and more responsibility as the government has grown to protect a larger population against more frequent natural disasters. The program was not always in control of disaster relief and, "prior to 1979, disaster management in the United States was a patchwork of on-the-spot legislation, local, state and federal agencies and volunteer groups." [49] When Hurricane Sandy hit, the program had become part of the Department of Homeland Security. The agency was in charge of preparing people for natural disasters as well as aiding in the relief process. Parts of the taxes paid to the government are also set aside to be potential funds for disaster relief.

These programs put in place under FEMA to aid in disaster relief are beneficial because they ensure that there will be help available to those affected by disasters. There is money set aside to give victims of natural disasters, and plans are in place for dealing with specific disasters. However, as was evident after Hurricane Sandy, these funds that are set aside are not enough to help all of the individuals and businesses harmed during natural disasters. The programs that are in place also focus more on disaster relief instead of on disaster prevention.

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[49] Seth Grabianowski, "How Stuff Works "FEMA Responsibilities"." FEMA.

More needs to be done to make sure that vulnerable communities and individuals are protected against potential harm.

Suggestions for the Future

There are different approaches to urban planning that will protect vulnerable regions against disaster. Some suggestions have been made in regards to changing cities in order to make them more suitable to live in. People have suggested that cities transform into more suburban like areas, in order to support economic growth and environmental beauty. This process involves eliminating large buildings that house too many people, and creating more green space.[50] These suggestions are beneficial because decreasing the amount of living space for people in cities will force a decrease in population. This will ultimately contribute to disaster relief because it will ensure that less people will be harmed by natural disasters such as the hurricanes that have recently begun to plague the shores of New York City. Other suggestions include creating projects that adhere to specific geographies and consider different zoning identifications for different cities, in order to create healthier cities.[51] It is evident that New York City has over stepped some geographical boundaries and this has ultimately led to the destruction of infrastructure. It is important to be more mindful of where structures are built and the possible consequences of building in these areas.

There are also various committees that have formed in disaster areas such as New York, that are focusing on reconstruction projects post Sandy. The Design for Risk and Reconstruction (DFRR), is one of these committees functioning under the American Institute of Architects in New York (AIANY). This committee is dedicated to collecting information about how New

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[50] Thomas Gale, *Urban America: Opposing Viewpoints*. Farmington Hills: Greenhaven Press, 2005.

[51] Jason Corburn, *Toward the Healthy City: People, Places, and the Politics of Urban Planning*. Cambridge: The MIT Press, 2009.

York can rebuild after the storm, and is working to determine how the rebuilding process can incorporate the natural environment in order to ensure that new infrastructure are sustainable. Their goal is to gather this information and share it with others so that those affected are aware of steps they can take to participate in the rebuilding process and so that others working in different disaster areas can work together to come up with comprehensive strategies. Members of the commmitee include Fordham professor, Denisha Williams, who is working on dealing with New York's waterfront rebuilding process. Other members of the committee, such as Illya Azaroff, are working to promote legislation to enforce environmentally sound rebuilding methods as well as legislation for proper aid for those affected. Mr. Azaroff is one of the writers of the not yet released 2100 report for Governor Andrew Cuomo, which is an outline of future plans for the city.[52]

The DFRR committee is tackling a wide range of issues that are plaguing the city post Sandy. The initiatives being taken by this committee are very beneficial for the city of New York. Rebuilding New York in a more sustainable manner will enable to city to be more resistant against future natural disasters. The committee is also focusing on the political and economic factors of recovery. This extensive compilation of recovery strategies and elements will better help the city to recovery quickly and effectively.

In a new report on which the DFRR collaborated, "Post Sandy Initiative: Building Better, Building Smarter: Opportunities for Design and Development May 2013" there are many suggestions on how to design in the future. The plan suggested that flood zones be updated as sea levels are projected to rise six feet by the year 2100. The rezoning would prevent people from living on certain lands and would provide the city with more opportunities to incorporate

[52] Meeting with AIANY DFRR committee.

green spaces such as the expansion of dunes and the implementation of natural estuaries, that can act as buffers during storm surges and events of heavy precipitation. Some other suggestions that were made to reduce flooding are constructing floodwalls around the coastal areas of the city. However, the effectiveness of these walls is being questioned, and many design methods are leading more toward implementation of "soft" building techniques, also know as techniques that incorporate the environment. These techniques include understanding the ecology of specific regions and understanding the ways in which these areas are projected to change with climate change. With this knowledge, structures can be built that adhere to the specific characteristics of these ecologies. Other suggestions are to implement green infrastructure techniques such as sidewalk gratings on city streets in order to catch and contain floodwaters in local areas. An example of these gratings would be a bench that had openings in it so that it can also act as a catch basin during periods of heavy rain. Temporary solutions were also suggested, including enforcement of mandatory building codes, that would force people in coastal communities, such as Breezy Point, to raise their houses a few feet above ground level to prevent flooding.[53]

Conclusion

Hurricane Sandy was a devastating tropical storm that rattled the city of New York and many surrounding regions. The storm claimed the lives of 285 people, and impoverished thousands of others by destroying their homes and businesses. The city of New York suffered physical damages to its infrastructure and to the environments that were hit hard in the storm. The subway system and the railroads endured stress from water damage as well as damage from downed trees and other factors that resulted from the storm. The state government of New York

[53] AIANY. "Post Sandy Initiative: Building Better, Building Smarter: Opportunities for Design and Development May 2013."

as well as the Federal government of the United States have dealt with serious natural disasters in the past, but they were not completely prepared to deal with the wrath of this most recent hurricane. This storm was more violent than other tropical storms that have hit the North Atlantic region in the past. These violent storms are starting to become stronger and more frequent due to the change in wind patterns, water temperature and land temperature due to climate change. If climate change continues to be an issue then these changes in weather patterns will continue to threaten cities, such as New York, and people across the globe.

Climate Change is a serious issue that is affecting the global community in a variety of ways. One way in particular is the increase in tropical storms and cyclones in the North Atlantic Ocean that is harming the North Atlantic coast of the United States. The damages that have been inflicted on human lives, businesses, homes, and other structures in this region are truly devastating and lend themselves to other long lasting issues. As a result of climate change in the North Eastern Coast of the United States, the people living in the affected communities have experienced many economic setbacks and have been forced to deal with this issue on a political level. The climate change in this area has also caused issues regarding geography and urban planning methods.

New policies are needed in order to combat the negative consequences of climate change, so that this devastation does not repeat itself in the future. Some suggestions for the future of New York City include incorporating more green space along the coastline of the city in order to restore the city back to its natural environment. Manhattan was once an island covered by forests, according the Mannahatta project, and this environment allowed the island to thrive ecologically. With time, and with the increase in population and capitalist activities on the island, the landscape has changed very much and has become more vulnerable to destruction.

Therefore, in order to decrease this vulnerability, lands in flood zones and coastal communities should incorporate more green spaces, such as natural estuaries and the addition of more dunes. This will protect the island from devastating floods due to storm surges and sea level rise.

Environmental History of the areas in which we live should be studied in schools across the country. Change starts with education. Children should have a better understanding of the areas in which they live and the history behind these areas. If they have a better understanding of their environment these children may feel more obligated to protect the environment. Also, having an understanding of the natural environment can inform better building techniques. People will know more about the types of weather patterns the area is accustomed too, and the environmental impacts the area is able to withstand. Also, by restoring some of the elements of the natural environment to specific areas, these areas will become more resilient to climate change.

Building codes should also be updated for coastal areas that are vulnerable to flooding. Small bungalows, such as those found in Breezy Point, should be raised so that they are not knocked down and flooded during the next powerful storm. It is possible that building should not be allowed in these areas in the future, as it is evident that these areas will become even more vulnerable than they are today, due to projections regarding sea level rise in the region. However, is this fair to all of the people who have lived in these areas their whole lives? The issue of where the government would relocate these people is also daunting. Breezy Point should also receive more government attention, and a sewer system should be implanted in the area so that raw sewage does not flood into the residents' homes in the next flood.

Policies regarding how aid will be distributed to help people rebuild their homes and businesses is also necessary. Victims of Hurricane Sandy have received aid from government

programs, like FEMA, and have gotten some money from their private insurance companies. However, the money they have reieved is not enough to cover the damages. The government needs to decide on a plan to help these people rebuild. Issues of Environmental Justice should also be taken into account in the rebuilding plans. Less affluent areas of the city should not have to bear the biggest brunt during the next storm, simply because they were rebuilt in a cheap and improper manner.

Lastly, both the State and Federal governments should also put Climate Change policies in place. The Federal government needs to take a stand against GHG emissions. The Federal government should sign the Kyoto Protocol, promising that it will cooperate in the global initiative to reduce GHG emissions in order to combat climate change. Plans such as PlaNYC should also be enforced in cities all around the country, so that the country as a whole is dedicated to protecting its natural resources and is dedicating itself to green infrastructure.

Ultimately, New York City is in a current state that demands that serious decisions be made, which will affect the way the city functions in the future to combat the issues at hand, including climate change. New York has evolved over the years and has not been vigilant about taking the proper precautions to protect the city against current environmental dangers. The city has also not modified its building codes or updated its infrastructure in ways that are necessary for dealing with environmental changes. This has left parts of the city vulnerable to destruction from tropical storms such as Hurricane Sandy. Consequently, the city has suffered greatly and has had to deal with economic, political, and urban planning issues as a result. The only way to protect New York City against future damages and more distress, both economic and emotional, is to develop plans to rebuild the hard hit areas of the city in a sustainable and resilient way. Legislation must also be passed to decide on the standards to which the rebuilding process will

be held. Policies must also be enacted to deal with the pressing issue of climate change and to deal with the distribution of aid for the victims of Hurricane Sandy. If all of these elements are able to come together to make the necessary improvements, then New York will be able to restore itself to function as the strong accomplished city that it has always been.

Appendix 1

Hurricane Sandy News Releases and Legal Guidance

News Releases

IR-2013-16, IRS Extends Tax Relief to Some New Jersey and New York Victims of Hurricane Sandy; Return Filing and Tax Payment Deadline Extended to April 1, 2013

IR-2012-96, IRS Gives Additional Time to Small, Automatically Revoked Tax-Exempt Organizations Affected by Hurricane Sandy

IR-2012-94, IRS Extends Hurricane Sandy Diesel Fuel Penalty Waiver to Dec. 7 for New Jersey and Parts of New York

IR-2012-93, Retirement Plans Can Make Loans, Hardship Distributions to Sandy Victims

IR-2012-91, IRS Warns Consumers of Possible Scams Relating to Hurricane Sandy Relief

IR-2012-91SP, IRS Advierte a Consumidores de Posibles Estafas Relacionadas a Las Ayudas por El Huracán Sandy

IR-2012-88, Treasury, IRS Announce Special Relief to Encourage Leave-Donation Programs for Victims of Hurricane Sandy

IR-2012-88SP, Tesoro y IRS Anuncian Alivio Especial para Estimular Programas Que Permitan La Donación de Días de Paga a Víctimas del Huracán Sandy

IR-2012-87, IRS Expedites Charity Applications, Urges Use of Existing Charities

IR-2012-87SP, El IRS Acelera Las Solicitudes de Organizaciones Benéficas, Recomienda El Uso de Caridades Existentes

IR-2012-86, Treasury and IRS Expand Availability of Housing for Hurricane Sandy Victims

IR-2012-85, IRS Waives Diesel Fuel Penalty Due to Hurricane Sandy

IR-2012-84, IRS Announces Qualified Disaster Treatment of Payments to Victims of Hurricane Sandy

IR-2012-84SP, El IRS Anuncia El Trato de Pagos Por Un Desastre Calificado para Las Víctimas del Huracán Sandy

IR-2012-83, IRS Provides Tax Relief to Victims of Hurricane Sandy; Return Filing and Tax Payment Deadline Extended to Feb. 1, 2013

IR-2012-83SP, IRS Ofrece Alivio a Víctimas del Huracán Sandy; Extiende Plazo de Presentación de Declaraciones de Impuestos y Pagos al 1 de Febrero de 2013

IR-2012-82, IRS Gives Additional Time to Taxpayers and Preparers Affected by Hurricane Sandy; File and Pay by Nov. 7

Local News Releases

Tax Relief for Victims of Hurricane Sandy in Connecticut
Tax Relief for Victims of Hurricane Sandy in Maryland
Tax Relief for Victims of Hurricane Sandy in New Jersey
Tax Relief for Victims of Hurricane Sandy in New York
Tax Relief for Victims of Hurricane Sandy in Rhode Island

Legal Guidance

Notice 2013-21, Postponement of Deadline for Making an Election to Deduct for the Preceding Taxable Year Losses Attributable to Hurricane Sandy
Notice 2012-71, Postponement of Deadline for Transitional Relief under Notice 2011-43 for Certain Small Organizations Affected by Hurricane Sandy
Notice 2012-69, Treatment of Certain Amounts Paid to Section 170(c) Organizations under Certain Employer Leave-Based Donation Programs to Aid Victims of Hurricane Sandy
Notice 2012-68, Low-Income Housing Credit Disaster Relief for Hurricane Sandy

Return to Help for Victims of Hurricane Sandy

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