

## University of Pennsylvania ScholarlyCommons

Master of Science in Organizational Dynamics Theses

Organizational Dynamics Programs

4-26-2017

# Inundated: Holistically Improving Institutional Coordination And Crisis Management Following Superstorm Sandy

James Rausse University of Pennsylvania, jrausseaicp@gmail.com

Follow this and additional works at: http://repository.upenn.edu/od\_theses\_msod Part of the Emergency and Disaster Management Commons, Leadership Studies Commons, Organizational Behavior and Theory Commons, Organization Development Commons, Urban, Community and Regional Planning Commons, and the Urban Studies and Planning Commons

Rausse, James, "Inundated: Holistically Improving Institutional Coordination And Crisis Management Following Superstorm Sandy" (2017). *Master of Science in Organizational Dynamics Theses*. 83. http://repository.upenn.edu/od\_theses\_msod/83

Submitted to the Program of Organizational Dynamics, College of Liberal and Professional Studies in the School of Arts and Sciences in Partial Fulfillment of the Requirements for the Degree of Master of Science in Organizational Dynamics at the University of Pennsylvania Advisor: Derek O. Newberry, Ph.D.

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/od\_theses\_msod/83 For more information, please contact repository@pobox.upenn.edu.

# Inundated: Holistically Improving Institutional Coordination And Crisis Management Following Superstorm Sandy

#### Abstract

This Capstone analyzes institutional coordination and crisis management efforts surrounding Superstorm Sandy in the New York Metropolitan Area. It argues that response and recovery efforts were inconsistent, and at times ineffective, due to the lack of utilizing a holistic and systems thinking approach. Using the Rockaway Peninsula as a fractal exemplar of the region, this document identifies ways to improve preparation, response and recovery in a resilient fashion through improving communication, establishing trust, overcoming cognitive biases, creating a greater linkage between disaster planning and emergency management, and leveraging tools such as risk analysis and needs assessments. Through institutional coordination, crisis management and organizational dynamics research; stakeholder interviews with those involved with response and recovery efforts; and comparative analysis with regional, national and international examples, it develops a set of recommendations for holistic preparation and response in a disaster event, while considering the complex political and geographic structure of the region.

#### Keywords

superstorm sandy, resilience, institutional coordination, urban planning, crisis management, new york, new jersey, rockaway, systems thinking, holism

#### Disciplines

Emergency and Disaster Management | Leadership Studies | Organizational Behavior and Theory | Organization Development | Urban, Community and Regional Planning | Urban Studies and Planning

#### Comments

Submitted to the Program of Organizational Dynamics, College of Liberal and Professional Studies in the School of Arts and Sciences in Partial Fulfillment of the Requirements for the Degree of Master of Science in Organizational Dynamics at the University of Pennsylvania

Advisor: Derek O. Newberry, Ph.D.

# INUNDATED: HOLISTICALLY IMPROVING INSTITUTIONAL COORDINATON AND CRISIS MANAGEMENT FOLLOWING SUPERSTORM SANDY

by

James J. Rausse

Submitted to the Program of Organizational Dynamics, College of Liberal and Professional Studies in the School of Arts and Sciences in Partial Fulfillment of the Requirements for the Degree of Master of Science in Organizational Dynamics at the University of Pennsylvania

Philadelphia, Pennsylvania

2017

# INUNDATED: HOLISTICALLY IMPROVING INSTITUTIONAL COORDINATON AND CRISIS MANAGEMENT FOLLOWING SUPERSTORM SANDY

Approved by:

Derek O. Newberry, Ph.D., Advisor

Janet L. Greco, Ph.D., Reader

#### ABSTRACT

This Capstone analyzes institutional coordination and crisis management efforts surrounding Superstorm Sandy in the New York Metropolitan Area. It argues that response and recovery efforts were inconsistent, and at times ineffective, due to the lack of utilizing a holistic and systems thinking approach. Using the Rockaway Peninsula as a fractal exemplar of the region, this document identifies ways to improve preparation, response and recovery in a resilient fashion through improving communication, establishing trust, overcoming cognitive biases, creating a greater linkage between disaster planning and emergency management, and leveraging tools such as risk analysis and needs assessments. Through institutional coordination, crisis management and organizational dynamics research; stakeholder interviews with those involved with response and recovery efforts; and comparative analysis with regional, national and international examples, it develops a set of recommendations for holistic preparation and response in a disaster event, while considering the complex political and geographic structure of the region.

#### ACKNOWLEDGEMENTS

The opportunity to due this Capstone has been a personal endeavor as it relates to my professional life. It has afforded me to synchronously reflect on two aspects of my professional life that I have cherished the last few years, my experience as the American Planning Association – New York Chapter President, and my enrollment in the Organizational Dynamics Program at the University of Pennsylvania. My time in the Organizational Dynamics Program has bestowed upon me various life perspectives I had been seeking. One of these is understanding who I am as a professional, influencer and leader in the field of urban planning. This document is a culmination of the understanding I have gained.

I first would like to thank Dr. Alan Barstow for making a convincing pitch to get me to enroll in this program, for his continued guidance throughout the program, for allowing me to travel with him, and for sharing with me the finest "trail juice" the Isle of Islay can distill.

Next, I would like to thank my Capstone advisor Dr. Derek Newberry, whose guidance, shared interest in sustainability, and casual way of explaining complex linkages and perspectives made him the right person for the job.

I would be remiss if I did not acknowledge La Bellissima Professoressa, my Capstone reader, Dr. Janet Greco. Dr. Greco was my first and favorite professor in this program. She readily shared her thoughts on how to hone my perspectives, offered quick wit, and tested my rusty Italian.

iv

Of course, I must thank my "croo" from our 2015 New Hampshire trek through the White Mountains. It remains a life-changing experience that I will forever be grateful for, and made me truly feel a part of this program.

I would like to acknowledge my other professors, friends and classmates within the program, particularly Anthony Asciutto, for taking the time to share his Superstorm Sandy experience.

I also would like to acknowledge my American Planning Association colleagues who believed in me and gave me the chance to lead during one of New York City Metropolitan Area's most trying times. Through them, I was able to meet wonderful individuals like Kevin Alexander, David Genaway, Barry Hokanson and others who were partners, and those who shared their experiences with me here.

I show gratitude to my friend, work colleague, and favorite knucklehead, Edwin Molina, for making sure that all my commas and periods remained within my quotes.

Finally, I would like to thank my parents for their love, support, and being a temporary bank; my brother Brian for being my brother; my friends for their neverending patience with me; The Bronx for rearing me the right way; and God for granting me life opportunities like these.

۷

## LIST OF FIGURES

FIGURE	Page
1 Rockaways: Hurricane Sandy Flood Extent and Housing	2
2 Full Extent of the New York Metropolitan Area by County	4
3 Path of Superstorm Sandy	6
4 Superstorm Sandy Wind Speed	7
5 Flooded Rockaway Street	8
6 Rockaway Stores Destroyed by Flood and Fire	8
7 Critical Infrastructure Risk Management Framework	18
8 National Plan Approach to Unity of Effort	18
9 National Preparedness Goal Core Capabilities	19
10 NDRF Community-Focused Recovery	20
11 New York City CDBG-DR Allocations	22
12 Tiered Approach to Resilience Assessment	27
13 Interconnected Levels of Analysis of Mt. Everest Tragedy	29
14 Flood & Climate Perception Risk by Political Affiliation	70

## TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
LIST OF FIGURES	vi
CHAPTER	
1 Introduction Background and Context Literature Assumptions Methodology Summary	1 3 10 10 12 13
2 Literature Review Relationship and Dichotomy Between Planning and Emergency Management During Crises	15 17
Risk Analysis and Needs Assessment Cognitive Biases Trust Communication Holism and Systems Approaches	24 27 31 35 38
3 Methodology The Interviews	41 44
<ul> <li>4 Data and Analysis         <ul> <li>The Planning-Emergency Management Relationship</li> <li>Risk Analysis and Needs Assessment</li> <li>Trust</li> <li>Communication</li> <li>Cognitive Biases</li> <li>Holism and Systems Approaches</li> <li>Tying the Themes Together</li> <li>The Netherlands: A Holistic Management Case Study</li> </ul> </li> </ul>	50 51 56 59 70 73 78 89 99
5 Recommendations Legislatively Mandate that Existing Plans by Planning and Emergency Management Experts be Utilized for Both Resiliency and Response Measures	103 104
Create a Regional Governmental Mechanism to Respond to	105

Disasters that Comprise of New York City, New York	
State, Neighboring Counties, New Jersey, Connecticut,	
Port Authority, Metropolitan Transit Authority, and	
Energy Authorities	
Fund and Conduct Community Plans for All Communities	106
Utilizing GOSR as a Local Model	
Assure Emergency Communication, Power and Transportation	107
Infrastructure are in Place	
Hire Consultants Both Pre- and Post-Event with Expertise in	108
Holistic Management and/or Regional Planning to	
Educate Agencies on Interconnected Variables that can	
Happen Across Neighborhoods, Municipalities and	
Institutions	
Legislatively Mandate a Minimum Amount of Stakeholder	109
Meetings in Impacted and Potentially Impacted	
Communities to Develop Pre- and Post-Event	
Preparation Plans	
6 Reflection	111
DEEDENICES	112
KEFEKENUES	113

## APPENDIX

The meet the state of the state of the state	A.	Interview	Questions	Template
--	----	-----------	-----------	----------

#### CHAPTER 1

#### INTRODUCTION

The aim of this Capstone is to serve as a referential document that advises and better prepares institutions, particularly government entities, not-for-profits and local stakeholders (i.e., residents, businesses, etc), in the event of a storm or other natural disasters of similar magnitude, such as sea level rise, earthquakes or blizzards. To this end, the Capstone presents the Rockaway peninsula as a fractal exemplar of the institutional infrastructure in the New York Metropolitan Area leading up to, during and after Superstorm Sandy. Through the primary lenses of institutional coordination and crisis management, this analysis focuses on the organizational and political structure of the region identifying what went right and what could be improved in terms of planning, collaboration, outreach and implementation both internally to each organization and externally across organizations. It extends the notion of organizational resilience to multicompounded systems that transcend political and technical boundaries when large-scale disasters occur. It utilizes recurring themes in crisis management, disaster planning, organizational dynamics and Superstorm Sandy research to frame the interactions of these stakeholders, institutions and systems. It also studies the results from the actions and programs implemented, as well as the state of both permanent and ad hoc institutions involved with storm resilience and recovery.

To achieve this, the core of my analysis concentrates on the work conducted and relationships developed on the Rockaway Peninsula when I served as President of American Planning Association - New York Metro Chapter (APA-NYM), and by extension make recommendations applicable to systems throughout the region. The Rockaways are representative of the cultural and institutional disparities I witnessed throughout the region. The peninsula is made up of thirteen neighborhoods (including Broad Channel, which is on an island leading to the Rockaways) that historically have had minimal interaction with one another (Figure 1).





This not only made coordination difficult, but introduced a level of competitiveness among neighborhoods, local organizations, developers, outside advocacy groups, and government agencies, respectively.

My research is done in two parts. Primary research stems from a set of interviews with local residents and business owners in the Rockaways, impacted regional stakeholders beyond the Rockaways, and experts in the fields of greater institutional coordination and disaster management. The interviews were a series of individual, semistructured, phenomenological, formal field interviews. Secondary research draws from expert analysis and opinion on institutional coordination; crisis management; urban and spatial planning, particularly around environmental sustainability; organizational sustainability; comparative exploration into holistic approaches, such as sociopolitical adaptability with water management in The Netherlands, as well as issues around the cultural and institutional integration of sustainability and trust in Sweden and Panamá; geometric thinking, which considers situational approaches to dependent and independent variables through a geometric lens covering point, linear, angular and triangular thinking; systems thinking, which studies linkages and interactions between interdependent variables comprising the entirety of a dynamic system or set of systems (Tate, 2009); holistic models of organizational structure that takes a big picture view of interconnectedness between larger systems; and continuative metrics on the progress of recovery efforts.

#### Background and Context

The New York City Metropolitan Area is a complex region comprised primarily of the parts of three states; New York, New Jersey and Connecticut, sometimes including Northeastern Pennsylvania (Figure 2).



Figure 2. Full Extent of the New York Metropolitan Area by County

Within the region are numerous levels of jurisdictional power divided among government, public authorities, civic not-for-profits and the private sector, each having a different role and level of power within each state, and in the case of New York, different roles among municipalities. For example, New York City government has both city and county roles; public authorities cross county and state boundaries; and some utilities would represent portions of two different counties, while another utility would represent the other portion of those counties.

The contribution of this study is to identify and assess gaps around coordination, collaboration and communication during and after Superstorm Sandy for the purpose of making recommendations on how to improve in these areas prior to the next disaster event. Despite emergency preparedness plans being in place, the New York Metropolitan Area was caught completely off-guard by the impact of the storm. Additionally, there is little available research on the institutional dynamics that took place after Superstorm

Sandy. This necessitates deeper research into those interactions to determine the effectiveness of coordination among various types of institutions. I posit that the fundamental problem with institutional coordination and crisis management surrounding Superstorm Sandy was the lack of a holistic thinking approach which led to poor or inconsistent outcomes. I will discuss holism in approaching a disaster event as the primary theme that explores and encompasses related themes such as the relationship between planning and emergency management, risk analysis and needs assessments, trust, communication, and cognitive biases. Exploration of these themes will help planners, emergency managers, elected officials, private institutions, and community stakeholders identify their role and better tools to utilize working in a clear, confident, and collaborative manner.

This Capstone is also personal for me as I led one of the institutions that played a visible role in response and recovery efforts. My experience following the storm was a primary factor for my enrollment into the Organizational Dynamics program at the University of Pennsylvania. Engaging in such reflection not only helps answer many questions with what happened after the storm, but determine ways that my colleagues, myself, and others can be more effective, efficient and helpful when another storm of similar magnitude strikes the area.

On October 1, 2014, I began my Presidency at APA-NYM, the professional organization for urban planners. I ran on a platform focused on expanding educational and professional opportunities for urban planners, improved communication, and stronger advocacy for planning in the region. Twenty-eight days later, everything changed when the largest Atlantic hurricane hit the New York Metropolitan Area. Superstorm Sandy began from a tropical wave in the western Caribbean that evolved into a Category 3 storm, eventually dissipating to a tropical storm (Blake, et al, 2013). By the time it hit the Mid-Atlantic United States it reinvigorated to a Category 2 storm surrounded by a Nor'easter-like winter storm with a diameter of 1,100 miles, the widest radius ever recorded for an Atlantic hurricane. When it turned inland around southern New Jersey, severe flooding from fourteen-foot tides resulted in devastation along the Atlantic shoreline from Long Island through New York City and New Jersey, down to the Chesapeake Bay (Figures 3-6).



Figure 3. Path of Superstorm Sandy (FEMA-b 2013)





Figure 3-57: Wind speed data gathered by NOAA for Hurricane Sandy adjusted to the 3-second gust and compared with ASCE 7-05 design wind speeds.

SOURCE: ASCE 7 WIND SPEED INFORMATION USED WITH PERMISSION FROM ASCE



Figure 5. Flooded Rockaway Street (APA-NYM, 2013)

Figure 6. Rockaway Stores Destroyed by Flood and Fire (APA-NYM, 2013)



In total, there was \$75 billion in damage, and the direct and indirect loss of 233 lives in eight countries (Sosnowski, 2015). In the United States alone, there was an estimated \$68 billion in damage, and 159 direct and indirect lives lost (Finn, et al, 2016).

What compounded the effects of the storm was the region's lack of preparedness. The New York City area rarely sees hurricanes, let alone ones of Sandy's magnitude. Many residents in low-lying areas who were put off by a "false alarm" from the lack of impact from Tropical Storm Irene the previous year, opted to stay despite meteorological and government warnings. Local governments had emergency management units that were either unprepared or unempowered to properly respond to storm. Overlapping jurisdictional responsibility from public authorities also added to the confusion.

While working to mobilize the planners I represented in order to direct them appropriately to assist in the recovery, I felt overwhelmed by the lack of coordination among institutions. There were attempts at a regional planning approach that called for cross-jurisdictional collaboration, but the political will to see it through proved daunting. There were also several pop-up, ad hoc institutions in government, not-for-profit and forprofit sectors that suddenly appeared who jockeyed for position in a free-for-all environment of resilience and recovery. Trying to navigate this complex system proved tiring, aggravating and disappointing. As planners, we strive to assure as many stakeholder voices are heard in a collaborative manner. While we developed great partnerships and accomplished a lot within our organizational scope, much of our outreach was met with hesitation, pandering, mistrust, or outright indignance. Competitive forces looking to be the first or best in the rebuilding process combined with overall fear from not experiencing a storm of such force, and attending to areas with a strong sense of home rule, left many organizations, including our own, without a clear sense of how steps towards resiliency and recovery were managed and implemented.

#### Literature

As previously mentioned, the body of literature specifically on institutional coordination as it surrounds Superstorm Sandy is minimal. Most research has been in the form of partial commentary on this subject, or in the form of articles that have varying definitions of resilience or focus on ecological aspects of the storm. I make references to this kind of research as it helps frame these aspects of storm recovery in order to show the breadth of post-disaster system variables that regions deal with, but I mostly draw on available literature surrounding institutional coordination on both Superstorm Sandy and general disaster recovery; urban planning, particularly spatial planning, visioning and stakeholder engagement; national and international examples of disaster preparedness and response, cultural attitudes towards sustainability and resiliency; institutional sustainability and resiliency that falls both within and outside the disaster recovery frame; and organizational dynamics literature around geometric thinking, systems thinking and holistic thinking. This literature will help me frame the issues surrounding successful coordination among institutions at varying levels when a natural disaster occurs.

#### Assumptions

Based on personal experience and initial research, I posit that overall institutional coordination could have been executed more effectively and efficiently during the crisis. Efforts were inconsistent across the board, with some local New York City agencies and

10

authorities performing well in the moment, while others, particularly ad hoc agencies created after the storm, struggled to find focus and coalesce disparate endeavors from both City agencies and outside actors. Many agencies and municipalities had emergency preparedness plans in place, but this was not the case across the board, nor were there any baseline models or legislation that these institutions worked from. Moreover, given the fact the Northeast United States does not usually experience storms of this nature, many residents and institutions underestimated the preparation necessary to assure agreed upon measures were in place. What resulted was a panicked response that led to impromptu creation of new organizational structures that had virtually no foundation in existing plans or institutional infrastructure.

Furthermore, coordination between various levels of government and municipalities proved to be erratic, and at times ignored. My reasoning for this is the political nature of the New York Metropolitan Area. A combination of three state governments; New York City's mostly isolated approach to storm response; internal jockeying for position among New York City agencies; New York State's secondary role in New York City, but primary role elsewhere; strong home rule mentality on Long Island; and FEMA taking a back seat due to the region's complex infrastructure, where it usually is the lead agency, led to competing agendas and a lack of a collaborative, holistic execution. Opportunities for cross-jurisdictional regional collaboration were subjugated in favor of short-term milestones that were claimed as progress.

Some aspects of the storm that will be acknowledged, but not thoroughly explored due to scope limitations include deeper ecological and meteorological phenomena; financial analysis and impact; quality of the immediate, short-term emergency management and rebuilding construction process; and specific infrastructure and engineering components of resiliency and recovery. The aforementioned facets are important to contextualize through the lens of decisions made as the crisis was managed and how institutions interacted, but this Capstone's primary focus is not environmental, financial, or geotechnical in nature.

#### Methodology

For this Capstone, I utilize a combination of research and interviews with participants in Superstorm Sandy recovery and resiliency efforts. As previously mentioned, the research focuses around available literature surrounding institutional coordination on both Superstorm Sandy and general disaster recovery; urban planning; national and international examples of disaster preparedness and response, and cultural attitudes towards sustainability and resiliency; institutional sustainability and resiliency that falls both within and outside the disaster recovery frame; and organizational dynamics literature.

Interviews were conducted with twelve colleagues from government, the not-forprofit and private sectors, disaster planning consulting, and local residents, who I worked with during the short-term and medium-term stages of storm recovery and resiliency efforts while I was President of APA-NYM. The series of questions asked were tailored to each individual's experience as, for example, a government employee would have a different frame of reference than a local not-for-profit executive or disaster planning consultant. My role in the writing approach alternates between researcher and narrator. As a researcher, I present relevant literature and topics pertinent in assessing the institutional coordination that took place during and after the storm, as well as the overall approach to crisis management by these institutions. As an interviewer, I narrate and incorporate the experiences of colleagues from various backgrounds, including government employees, not-for-profits, consultants and residents. I take these experiences and analyze them through the lens of institutional coordination and crisis management around my postulation that effective coordination was negatively impacted by ad hoc approaches, the lack or dismissal of emergency preparedness and impact analysis plans, inconsistently executed responses among institutions, and obstacles created from political jockeying among institutions.

#### Summary

My aim with this Capstone is to present a document that helps stakeholders in disaster-prone areas, and particularly New York City during the next natural disaster, to be aware of and better address obstacles in achieving effective institutional coordination and crisis management techniques. Through real-life testimonies, it tells the stories of those who responded to look deeper into what went right and what could be improved on a more personal level. It underscores the influence of politics on the decision-making process during and following a disaster. It recommends strategies to take a more holistic and regional approach with disaster recovery through the lenses of organizational, cultural and environmental sustainability and resiliency. The aim is to bridge the gap between institutional, jurisdictional and cultural disparities that prevent effective coordination and collaboration by recommending strategies for institutions and communities to better achieve a successful holistic approach that aims to address the immediate and long-term needs of as many stakeholders as possible in a timely and efficient manner.

#### **CHAPTER 2**

#### LITERATURE REVIEW

Much of the research I came across discusses broader themes of crisis management in organizational settings and general disaster management. There was only a moderate amount of information available regarding these topics as it relates to Superstorm Sandy. The data that were available for Superstorm Sandy were largely government reports that discussed a specific agency's or municipalities' efforts. Effective collaboration and communication were addressed, but in a manner focusing what is needed in future disaster recovery efforts, and less reflective if collaboration and communication were effective during and after Superstorm Sandy. Many articles discussed personal experiences, environmental issues or offered broad critiques that did not propose clear solutions to prevent destruction of similar magnitude. The few articles that linked any of these areas and themes presented below are utilized here. This sparse data necessitated interviews with government, not-for-profit, private and resident stakeholders to garner a variety of perspectives as it relates to effective coordination, disaster management and response.

Though the amount of data around Superstorm Sandy was scarce, the number of different variables addressed made it difficult at times to hone in on a specific topic. These variables in of themselves can represent the competing interests present during response and recovery. Narrowing the scope and identifying the variables that most relate to the impact on institutional coordination and crisis management through the lens of planning and politics is a goal of this Capstone. Despite all these seemingly competitive variables, certain themes appeared throughout literature related to Superstorm Sandy, disaster crisis management and organizational crisis management. They are as follows:

- Relationship and Dichotomy Between Planning and Emergency Management During Crises
- Risk Analysis and Needs Assessments
- Cognitive Biases
- Communication
- Trust
- Holism and Systems Approaches

From these themes, I use this Capstone to address the gaps around institutional coordination and disaster management pertaining to Superstorm Sandy. I look at the obstacles that prevented successful and timely implementation of disaster recovery and resiliency practices, offering techniques that can better help crisis managers and disaster recovery specialists more effectively and efficiently respond in the future. My research addresses the influences of politics and cultural disparities when making decisions during and after a crisis. These influences are both guided by and have an impact on individual and institutional trust, communication flow and cognitive biases that create ingrained habits and behaviors that can hinder disaster recovery and incorporation of resiliency measures. It examines the commonalities between disaster planning and emergency management, and how the two cyclically advise each other, disputing the notions of some that they are mutually exclusive steps in the disaster recovery process. It will look at both steps through holistic and systems thinking lenses to show the interplay between the two, and how the utilization of both reflective and forward-looking tools such as risk analysis and needs assessments can be used to magnify the linkages between planning and emergency management. Much of the literature discussed components of holistic

thinking, but did not present it as a thematic whole. Utilizing the themes extrapolated from the literature and interviews I conducted, I argue that taking a holistic approach to management and coordination will effectively address issues surrounding communication, timeliness, trust, and social capital in a disaster event.

## Relationship and Dichotomy Between Planning and Emergency Management During Crises

Being an urban planner by trade, much of the literature that I research guides me toward associated themes. In disaster crisis management, planning plays a unique role in that for the most part there seems to be a call for it in official government reports and guides, as well as by field experts. This indicates that planning may be lacking or subjugated either as policy or during a crisis, thus necessitating that it be identified. These documents recognize the importance of the relationship between planning and emergency management, the latter of which becomes the focus during and immediately after a crisis.

All levels of government have stressed the need for planning surrounding disaster events in various forms. At the Federal level, for example, the United States Department of Homeland Security (USDHS) stresses the need for planning in both the National Infrastructure Improvement Plan (USDHS-a, 2013) and the National Preparedness Goal (USDHS-b, 2015) report. NIPP is referred by USDHS as the "National Plan," which will focus to build upon a "critical infrastructure risk management framework" that is effective when there is "an understanding of the criticality of assets, systems and networks, as well as the associated dependencies and interdependencies of critical infrastructure," calling on partners and municipalities to assist in its development

(USDHS-a, P. 8) (Figures 7 and 8).



Figure 7. Critical Infrastructure Risk Management Framework (USDHS-a, 2013)

### Figure 8. National Plan Approach to Unity of Effort (USDHS-a, 2013)



The National Preparedness Goal sets to achieve "a secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk" (USDHS-b, P. 5). Implementing the goal relies on three interdependent core capabilities, Planning, Public Information and Warning, Operational Coordination (P. 5), to be executed among the five mission areas stated in the goal (Figure 9).

Prevention Protection	Mitigation	Response	Recovery
	Planning		
Pub	lic information and v	Warning	
(	Operational Coordina	ation	
ntelligence and information Sharing	Community	Infrastructure s	Systems
Interdiction and Disruption	Long-term	Critical Transportation	Economic
Screening, Search, and Detection Forensics and Attribution Attribution Cybersecurity Physical Protective Measures Risk Management for Programs and Activities Supply Chain Integrity and Security	vuinerability Reduction Risk and Disaster Resilience Assessment Threats and Hazards Identification	Environmental Response/Health and Safety Fatality Management Services Fire Management and Suppression Logistics and Supply Chain Management Mass Care Services Mass Search and Rescue Operations On-scene Security, Protection, and Law Enforcement Operational Communications Public Health, Healthcare, and Emergency Medical Services	Health and Social Services Housing Natural and Cultural Resources

Figure 9. National Preparedness Goal Core Capabilities (USDHS-b, 2015)

<sup>6</sup> Planning, Public Information and Warning, and Operational Coordination are common to all mission areas.

Equally, FEMA recognizes the importance of planning in its National Disaster Recovery Framework (FEMA-a, 2011). The Framework lists nine themes as core principles, one of which is Pre-Disaster Recovery Planning (FEMA-a, P. 7), which includes recovery and mitigation planning (P. 8). The Framework also encourages the necessity for all stakeholders to be involved to assure that the planning process is comprehensive and coordinated to enhance post-disaster collaboration and decision-making that will implement resilient actions that will reduce negative impacts (P. 10). This inclusion is meant to assure an efficient segue from planning stages to the implementation stages (Figure 10).



Figure 10. NDRF Community-Focused Recovery (FEMA-a, 2011)

FEMA's post-Sandy Mitigation Assessment Team Report (FEMA-b, 2013) identifies that "facility owners and operators should develop holistic plans to limit disruptions of critical functions" (FEMA-b, P. 203). Again, linking planning and action.

The linkage between planning and emergency management are further recognized on the state and local levels. New York State launched the NY Rising program housed in the Governor's Office of Storm Recovery (GOSR) that has created several community reconstruction plans in affected communities. GOSR's 2015 NY Rising Report recognizes the need to appropriately balance long-term planning with urgent action (GOSR, P. 8). New York City's One City, Rebuilding Together (Goldstein, et al, 2014) itself is a plan that puts structure to the troubled Build It Back Program, an ad hoc response program which aimed to assist homeowners with property rehabilitation or reconstruction, repair reimbursement and rental assistance (Goldstein, et al, P. 6). The program was quickly organized and implemented, and only sparsely utilized existing plans related to disaster recovery. The One City, Rebuilding Together plan lays out the spending of the City's allocation of Federal Community Development Block Grants for Disaster Recovery (CDBG-DR), which includes over \$169 million towards Administration and Planning, almost \$73 million of which is set aside specifically for planning (P. 8) (Figure 11). In moving forward, the plan highlights "Enhanced policy and planning of long-term climate resiliency efforts across the city and region..." as a goal (P. 5).

CDBG-DR funds allocated to NYC and	CDBG-DR Allocations		
their current allocation program name	1st Allocation	2nd Allocation	Total
Housing Programs	\$648,000,000	\$1,047,000,000	\$1,695,000,000
Build it Back Rehabilitation and Reconstruction	\$381,000,000	\$641,000,000	\$1,022,000,000
Build it Back Multifamily Building	\$140,000,000	\$206,000,000	\$346,000,000
Rental Assistance	\$19,000,000	-	\$19,000,000
Public Housing Rehabilitation and Resilience	\$108,000,000	\$200,000,000	\$308,000,000
Business Programs	\$293,000,000	(\$27,000,000)	\$266,000,000
Business Loan and Grant Program	\$72,000,000	(\$30,000,000)	\$42,000,000
Business Resiliency Investment Program	\$90,000,000	\$20,000,000	\$110,000,000
Neighborhood Game Changer Investment	\$90,000,000	(\$6,000,000)	\$84,000,000
Resiliency Innovations for a Stronger Economy	\$41,000,000	(\$11,000,000)	\$30,000,000
Infrastructure and Other City Services	\$360,000,000	\$445,000,000	\$805,000,000
Public Services	\$237,000,000	\$130,000,000	\$367,000,000
Emergency Demolition	\$1,000,000	\$1,000,000	\$2,000,000
Debris Removal/Clearance	\$8,000,000	\$4,500,000	\$12,500,000
Code Enforcement	\$1,000,000	-	\$1,000,000
Rehabilitation/Reconstruction of Public Facilities	\$15,000,000	\$309,500,000	\$324,500,000
Interim Assistance	\$98,000,000		\$98,000,000
Resiliency	\$294,000,000	\$10,000,000	\$284,000,000
Coastal Protection	\$174,000,000	\$50,000,000	\$224,000,000
Residential Building Mitigation Program	\$120,000,000	(\$60,000,000)	\$60,000,000
Citywide Administration and Planning	\$177,820,000	(\$8,000,000)	\$169,820,000
Planning*	\$89,820,000)	(\$17,000,000)	\$72,820,000
Administration*	\$99,000,000	\$9,000,000	\$97,000,000
TOTAL	\$1,772,820,000	\$1,447,000,000	\$3,219,820,000

#### Figure 11. New York City CDBG-DR Allocations (Goldstein, et al, 2014)

Many of the researchers I have come across emphasize the importance of both adequate planning as part of the disaster response process and integration between planning and emergency management. Klein-Rosenthal (2014) in her article, Superstorm Sandy and the Age of Preparedness, discusses the difficulty climate adaption planners and hazard mitigation specialists have had working in concert with one another. Asking the questions, "Are there anticipatory practices that may help to prevent or mitigate future devastation while enabling and fostering healthy and thriving communities?" and "How can planning and design lead in developing healthy communities under uncertain conditions?," Klein-Rosenthal suggests that planners work towards achieving social benefits while acknowledging the need to be fiscally prudent (Klein-Rosenthal, P. 30). She refers to an incident where New Jersey Transit neglected to implement long-term resilience measures based on their belief that the likelihood of disaster from storm surge was too small to warrant the cost. The decision resulted in \$300 million worth of damage after Superstorm Sandy hit. This is an example of an instance where planners and emergency management specialists could have worked in concordance to develop a cost-efficient resiliency strategy.

Donovan Finn, Divya Chandrasekhar and Yu Xiao take a slightly different approach by studying the institutional coordination response to Superstorm Sandy at different levels of government through the lens of spatial planning. Finn, et al noted that flexibility is important when linking planning and implementation. They believe that New York State and City had more effective responses than New Jersey, as they had done extensive community and institutional outreach to develop plans and coordinate programs to spend Federal funds to rebuild, whereas New Jersey placed more limited and stringent requirements on the ability to hire planners and implement rebuilding projects (Finn, et al, P. 130-131). They note that the disaster response relationship between New York State and City was negligible as they only partially collaborated with one another, and New York City's approach was more ad hoc and siloed (P. 120, 126). At the end of the day though, both were more effective than New Jersey because they took the time to develop solid plans that were implementable based on their flexibility.

Not all researchers believed that planning should be a priority in the recovery process. E.L. Quarantelli argues in *Disaster Crisis Management: A Summary of Research Findings* that there is only a partial correlation between preparedness planning and effective crisis management as planning can be poor in the first place or can encourage poor management activities (Quarantelli, P. 374). He emphasizes tactics, which he associates with emergency management, over strategies which he associates with planning (P. 375). He contends that it is impossible to determine tactics ahead of time as they will likely be associated with a specific crisis situation (P. 375). Good crisis management is the applicability of tactics to situational contingencies of a disaster.

Quarantelli's approach is an ad hoc one that separates planning and emergency management. Conversely, a holistic approach would see a relationship between the two areas. In the Data and Analysis Chapter, I will explore the impact taking an ad hoc approach had on Superstorm Sandy as derived from available data and interviews conducted. I will also compare it to examples of more holistic approaches to disaster management.

#### Risk Analysis and Needs Assessments

If there is a workable relationship between disaster planning and emergency management that results in improved preparation and response, there must be recognizable strategies to engage and tools to utilize available for institutions and stakeholders. 24

Already identified among planning strategies in government documents is risk analysis, coupled with needs assessments. While not exclusively planning documents, both risk analysis and needs assessments are ways both planners and emergency managers can prepare for the next crisis. Various types of risk analysis and needs assessments are inherent in all forms of government. The government documents identified in the previous section all incorporate a level of risk analysis, needs assessment or both in the planning and recovery process. There are a variety of software tools among different agencies that generate such reports. One example is HAZUS-MH, a loss estimation and risk assessment program developed by FEMA covering earthquakes, hurricanes, and flooding. The program models the physical world of buildings and structures and then subjects it to the complex consequences of a hazard event (USDOT, 2017). The following articles look at different types of and ways to go about analyzing risk and assessing situational needs.

In *Predictable Surprises: The Disasters You Should Have Seen Coming*, Watkins and Bazerman review scenario planning and risk assessment. Effective scenario planning involves developing a knowledgeable and creative group of people from inside and outside an organization to review company strategies, digest available information on external trends, and identify critical business drivers and potential flash points (It is essential to include outsiders in this group as a counterweight to the self-serving biases of employees) (Watkins & Bazerman, P. 9). The established group constructs various scenarios to anticipate potential surprises that could emerge. These scenarios form the basis of preventive and preparatory design measures (P. 9). Risk analysis, on the other hand, combines a systematic assessment of the probabilities of future events and an estimation of the costs and benefits of possible outcomes. The authors feel this is extremely helpful overcoming biases affecting organizations by combining subjective (group discussion) and objective (assessment) evaluations (P. 10).

Risk assessment and resilience assessment are posited as two different but related actions in *A Generic Framework for Resilience Assessment* by Hans Rudolf Hienimann from the International Risk Governance Council Resource Guide. Historically risk assessment has been utilized to predict low-probability – high-consequence events, by answering the questions "what can go wrong? What are the consequences?" (IGRC-Hienimann, P. 1). Here, risk assessment is a pre-event strategy, based on the precautionary principle, which cautions against proceeding with actions that produce uncertain or debatable results. Ongoing urbanization has pushed many socio-technical systems to critical states of complexity in a new behavioral domain which is providing 'outliers' (Black Swans, Dragon Kings) in the tail of distribution, making reliable predictions of extreme events challenging or even impossible (P. 1). Hienimann calls for post-event strategies that prioritize resilience assessment and management to boost system's recovery, reconfiguration and adaptation (P. 1).

In *Tiered Approach to Resilience Assessment*, by Igor Linkov and Cate Fox-Lent, resilience management is viewed through a tiered framework to make decisions about maintaining critical functions and services during and after a disruptive event (IGRC-Linkov & Fox-Lent, P. 2). Each tier of the approach manages uncertainty with increasing levels of precision (Figure 12). These include:

i. By identifying tools that do simple ranking at a screening-concept level (Tier I),ii. To those that quantify based on metrics and performance in a systems model
(Tier II),

iii. And finally methods to represent uncertainty probabilistically (Tier III).

Figure 12. Tiered Approach to Resilience Assessment (IGRC, 2016)



Overview of tiered approach to resilience assessment

# Cognitive Biases

The presence of cognitive biases can influence an organization's decision-making process resulting in lack of clarity, missed opportunities, dissent or even greater disaster. A cognitive bias is a systematic error in thinking that affects the decisions and judgments that people make (Cherry, 2016). They can situationally vary, but all cognitive biases can skew the understanding or defining of these situations into a perceived reality based on preconceived notions.

Michael Roberto, in Lessons from Everest: The Interaction of Cognitive Biases, *Psychological Safety, and System Complexity,* identified how certain types of cognitive biases, as opposed to tactical errors, led to the death of five hikers led by an experienced expedition team on Mount Everest (Roberto, P. 136). Many standard procedural requirements were ignored, including lack of adequate oxygen supplies and continuing ascent too late in the day. Roberto argues that three types of cognitive biases contributed to this tragedy: overconfidence, failure to ignore sunk costs (escalating commitment based on prior investment), and tendency to overestimate (P. 138). The leaders of the expedition were overconfident in their own leadership ability and overestimated the ability of the team they were leading, while the hiking team overestimated the leadership ability of the expedition leaders and did not want to turn back as they already had enough "sunk costs" invested by making it that far up the world's tallest mountain. These three biases are applicable to any organization where leadership is driven by personality, and stakeholders fear losing more than they already have. This view is a narrow perception that ignores the interconnectivity between the individual (cognitive limitations), organizational (shared beliefs) and systemic levels (system complexity) of a situation that can lead to success or failure (P. 138) (Figure 13). Taking a more holistic, complex systems perspective can show multiple, interconnected breakdowns that can happen among human, technological and natural systems that would prevent such failures (P. 138).



# Figure 13. Interconnected Levels of Analysis of Mt. Everest Tragedy (Roberto, 2002)

Returning to *Predictable Surprises: The Disasters You Should Have Seen Coming* to give greater breadth of the types of cognitive biases, Watkins and Bazerman lay out the following common examples: creating illusions that things are better than they really are, weighting evidence that supports our own existing preconceptions, paying too little heed to what others are doing, maintaining the status quo while ignoring future consequences, and the failure to consider or address a problem unless we have considered it (Watkins & Bazerman, P. 5).

But why do people and organizations cling to cognitive biases even though there may be a known risk of disaster or inability to properly recover from a disaster? In *How to Avoid Catastrophe*, Catherine H. Tinsley, Robin L. Dillon and Peter M. Madsen believe there are two primary cognitive errors that prevent corrections from being made (Tinsley, et al, P. 1). The first is normalization of deviance, which is the tendency to accept anomalies if there has been no previous error. The second is outcome bias, in which the observer only focuses on why a situation was successful, not the embedded errors within that could have produced a different outcome (P. 2). When these two biases conspire, it makes it more difficult for leaders to grasp the significance of present errors, which results in missed opportunity for organizational improvement or leads to unforeseen disaster (P. 10).

How does an individual or organization work to overcome cognitive biases? The answer is based around the commitment to change course. In *Reframing Crisis Management*, by Christine M. Pearson and Judith A. Clair, leadership commitment, and maintenance of individual and shared stakeholder presumptions are crucial in assuring organization-wide commitment to prepare for disaster and prevent failure in responding (Pearson & Clair, P. 12-13). To achieve this commitment, stakeholders must see causal links between salient features. In *The Opposable Mind*, Roger Martin confirms the influence of previously presented biases, and argues that making these causal links from available salient information to an individual and organization is the only way to overcome these biases (Martin, P. 46). The major hurdle is the ability to differentiate the objectivity and subjectivity of salient information for an individual or organization to take a stance (P. 117). Reverse engineering by working backwards from an anticipated conclusion or preferred outcome can help hone an approach from a contented model, where salient information gathered is used to support an adopted theory, to an optimistic model, where situational complexity is explored, to find a solution (P. 125-131).

<u>Trust</u>

To gain commitment and overcome cognitive biases from individuals, one's own organization or other organizations, trust needs to be considered as an important decisionmaking variable. Often when suggesting a course of action, the proposers will find frustration with lack of commitment as they feel the course of action should be decided solely upon on its merits or their own view of the course of action as logical. What is frequently underappraised is the value and influence of trust. In situations of sustainability, resiliency, disaster prevention and crisis management, trust is especially crucial as they involve complex systemic shifts that vary in time and capacity. A lack of situational understanding, experience or pre-established relationships will result in individuals or organizations choosing to "go with what they know," because the known seems more trustworthy than do the unknown proposal from others, even if that "known" course of action proves catastrophic.

Bob Doppelt, in *Leading Change Toward Sustainability: A Change Management Guide for Business, Government and Civil Society*, stresses resistance will ensue if change happens too fast for people to assimilate or adjust to prosper (Doppelt, P. 94-95). This resistance can be visible and dangerous, or covert and persistent. A lack of trust, feeling stupid, history, or broken promises exacerbate it. People need a certain guarantee of their well-being and an understood sense of "What's In It For Me?" (Moussa, Boyer & Newberry, P. 7).

In public or large-scale situations, such as a disaster, trust develops around social capital. In *Social Capital: A Missing Link to Disaster Recovery*, Yuko Nakagawa and Rajib Shaw define social capital as "the trust, social norms and networks which affect

social and economic activities" that allow a society to interact and function effectively (Nakagawa & Shaw, P. 6). Coleman explains that social capital is comprised of a variety of different entities with the presence of a social structure that can influence the actions of stakeholders within this structure (P. 6). Trust established from social capital contributes to social, political and economic capital in ways that are measurable.

Trust can be both political and cultural, and the lack of it in either situation can negatively impact whole societies. In two papers, James Rausse, AICP, discusses the influence trust can have in adopting sustainable habits and incorporating resilient measures, and how the lack of it reinforces existing cognitive biases. In Institutional Impediments and Opportunities Protecting Panamá Bay, Rausse studies the interplay between system variables that have polluted Panamá Bay. One important variable is waste disposal habits. Residents in the Panamá City Metropolitan Area have opportunities to improve waste disposal that would have a positive impact on the Bay, their neighborhoods and drinking water quality, but the lack of infrastructure joined with a longstanding cultural framework of improper waste disposal, the failure of institutional oversight, and the public's mistrust of institutional accountability has largely prevented change in the status quo (Rausse-a, P. 25). In an interview, Javier Mateo Vega who works with indigenous communities to survey and restore natural forests in Panamá, noted a general sense of mistrust in Latin America where it is presumed "everybody lies," either through trying to say what someone else wants to hear, lack of trust, or someone trying to get over. He emphasizes the importance of building direct relationships with stakeholders, particularly face-to-face interactions, to develop trust long-term commitments (P. 22). His belief is reinforced through the work of Esperanza, a

community organization aimed at assuring that impoverished existing residents in the historic Casco Viejo neighborhood of Panamá City have an opportunity to be part of its revitalization. Esperanza created a five-year plan based around Intervention, Integration and Prevention (P. 22). Key to the Intervention stage is building trust and social capital by demobilizing gangs through 8-week personal and professional development courses coupled with counseling intended to reduced crime. Results have been positive, as participants have gained employment and worked to improve neighborhood conditions.

In A Pragmatic Approach to Openness: The Nordic and Scandinavian Way, Rausse discusses, in contrast, the success Nordic countries have had integrating economic prosperity and sustainable practices by approaching situations holistically, collaboratively and pragmatically. This approach is largely rooted deep in Scandinavian culture, which combines various notions including Lutheran pragmatism, positive experiences with sustainable practices and the Swedish concept of "lagom," which translates to "enough" so that both the individual and others can have a level of well-being (Rausse-b, P. 3, 5). Swedes call this approach the "middle way."

Often seen as more socialist than other areas of Europe, Nordic countries have similar tax rates and social investment as do Southern European countries, who are often seen as on the brink of economic crisis. How do similar economic practices result in different economic results? The answer is trust. Nordic countries were first to adopt more social capitalist practices in Europe. Many other countries later adopted these practices, but did so prima fascia, and did not consider how these practices would integrate with their existing society. Nordic countries have a greater ability of trust strangers. When surveyed, more than 60% of those in Nordic countries trusted strangers, while ranging between 21-34% by country in Southern Europe. Lack of trust in the workplace often leads to low-production or non-participation in a normalized economy due to job dissatisfaction (P. 10). This argument is further bolstered by the fact that 60% of Scandinavians are satisfied with their job as compared to 30% in Italy and 15% in France (P. 10).

It is not necessarily that Southern Europeans simply do not trust others, but their culture dictates when trust is achieved. Many Southern Europe countries base business and socially interactions around family and local connections. Trust is hard to establish, but once established, maintaining the relationship is tantamount. This cultural aspect is deeply rooted tradition and hierarchy, resulting in more rigid attitudes. "The culture...is family-oriented, people enjoy leisure activities and have a strong regard for traditions. Businesses tend to have a traditional and hierarchical structure and so personal networks can help to open doors and foster connections with the right people." (Heinze, 2013). At the same time "being trustworthy, respectful, and loyal will certainly facilitate business operations. People are generally warm and open to dealing with foreign nationals in business." (Heinze, 2013). Trust and respect develop for Southern European cultures only after acceptance into the traditional framework is established. This rigidity results in a tendency to lean on existing cognitive biases, often leading to an inability to adapt to crises, such as the near economic collapses of Greece, Portugal and Italy after the "Great Recession."

Issues of trust not only exist in cultural regions, but are also present with evacuation decisions prior to disasters. Kirstin Dow and Susan L. Cutter studied if evacuation decisionmaking by residents can be influenced by the feeling that officials and experts have inadvertently created false alarms in the past. Dow and Cutter concluded in studying Hurricanes Bertha and Fran that false alarms had only minor influence in the decisions to evacuate by residents, who leaned more on official meteorological reports, likelihood given geographic location and past experiences as their guides (Dow & Cutter, P. 249-250). Issues of geographic trust is a theme that will be discussed in the Data and Analysis Chapter.

In New Jersey, Penn classmate Anthony Asciutto, who worked for Kinder Morgan, a mid-stream petroleum company located in Carteret, NJ, noted the importance of trust and communication in their ability to be the first energy supplier to get up-andrunning in the region (A. Asciutto, personal communication, 2017). Trust helps deal with chaos and builds relationships and relying on your team in such situations. This ability helped them deliver fuel to John F. Kennedy Airport just hours before an airport wide shut down that would have canceled hundreds of flights.

## **Communication**

Related to trust, and probably the most important aspect in disaster preparedness and recovery is communication. Communication, though a standalone issue, is an umbrella variable that influences different aspects of crisis management. During Superstorm Sandy, communication's critically significant role can be seen in the disparities between and among agencies and municipalities, different responses by emergency management personnel, and decisions made by residents, businesses and other stakeholders.

#### In Hurricane Sandy: Lessons Learned, Again, an editorial by David M.

Abramson, PhD and Irwin Redlener, MD, the authors discuss the decisions made by both residents to evacuate and response teams. They found that despite considerable investment into standardizing command and communication to assure appropriate and adequate supply chains were maintained, communication and coordination remained more of an issue than capacity and capability (Abramson & Redlener, P. 1). Coordination occurred in "fits and starts," as opposed to a seamless process. This was also the case with evacuation procedures. Many residents decided to remain, despite warnings and previous, but smaller, flood incidences. It is crucial to find a way to better inform at-risk populations. One way to accomplish this is to include more diverse and emergent groups to address the breadth of communication, social and cultural issues at hand (P. 2). As with the false alarm premise in the *Crying Wolf* article, getting a better sense of cultural differences among groups, even geographically, can better inform communication methods.

Revisiting Quarantelli, he defines the communication process as what is communicated, not how, thus emphasizing the actual information being relayed is what is crucial in a crisis, as opposed to the means of communication (P. 375). Poor, incomplete or inefficient information flow are the root causes of communication problems. Many times, within organizations the number of staff or stakeholders will significantly increase to handle the increased workload or account for unknown variables. This in-of-itself can be a problem as sometimes the system itself cannot handle additional participants and may overload the system. Here is where Quarantelli's de-emphasis on the "how" becomes murky. Crisis situations do not follow a normal chain-of-command, becoming complex and forcing people into non-routine tasks and adopting new roles, which complicate established information flow. This holds true beyond an individual organization and into organizational systems, where communication issues can be exacerbated with multiple two-way and chain communication processes among multilayered groups (P. 378). Both what is being communicated and how are important in establishing trust with the stakeholder audience to assure clarity and buy-in, thus making the communication process easier.

During Superstorm Sandy, communication played an enormous role. On the positive side, along with the presence of existing plans and past experience, communication was key for the New York City Metropolitan Transit Authority in restoring much of the subway system in a short period. In the Rockaways, the Rockaway Development and Revitalization Corporation's (RDRC) ability to mobilize within a 24hour period, better positioned themselves to be a resource for affected businesses they represented. On Long Island, the Town of Islip successfully set up an ad hoc communication and response system among planners and emergency managers utilizing generators, despite losing grid power. Conversely, though, the ad hoc response of many levels of government led to significant delays. According the Long Island planning consultant I interviewed, other areas of Long Island, lack of communication across levels of government resulted in lack of power and fuel for weeks (LI Consultant, 2016). The Long Island Power Authority (LIPA) became the poster child of dysfunctional and uncoordinated response efforts. In New York City, several ad hoc agencies appeared that seemed to compete with the existing Office of Emergency Management. Additionally,

37

several startup not-for-profit groups created confusion as to who was responsible and legitimate for addressing recovery needs at various stages.

## Holism and Systems Approaches

Collaboration, outreach, and interconnectivity are themes, in the very least, touched upon throughout my research. Although some of these texts and interviews may not explicitly examine these themes, they can all be examined as elements of holistic, geometric and systems thinking approaches. These approaches attempt to look at situations and problems from an interconnected, big-picture perspective that aspires to connect relationships among seemingly disparate systems and solicit input from all stakeholders, thus making the resulting whole a greater product rather than the sum (or less than the sum) of its parts. Michael C. Jackson, in Systems Thinking: Creative Holism for Managers, explains that systems thinking developed during the mid-20<sup>th</sup> Century out of a need to address the complexity that biological and social systems embodied, that reductivist traditional scientific methods were unable to resolve (Jackson, P. 11). Systems thinking and holism can be applied among a variety of fields, including management theory, physical sciences, biological sciences, social sciences and philosophy. There are two types of applied systems thinking approaches: hard systems thinking, which applies to real-world problems and soft systems thinking, which addresses maintaining relationships in addition to goal-seeking to solve problems (P. 16 & 181).

Systems thinking and holism are applicable to this research given the layers of complexity Superstorm Sandy exposed. It involved many layers of government interacting amongst themselves and with other stakeholders, such as residents, businesses

38

and not-for-profits. The storm influenced environmental, socioeconomic, cultural and moral variables and their interplay in response and recovery. Disagreements also emerged around how to protect the waterfront, how best to rebuild and compensate affected stakeholders, and who makes decisions in regards to recovery and preparing for the next storm. Systems thinking looks to find linkages between seeming disparate and incongruous variables to paint the full situational picture.

Peter Senge, author of *The Necessary Revolution*, offers organizational strategies in moving toward a more inclusive and holistic approach. First, it is important to establish a sustainable value framework to determine internal and external drivers on both a shortterm and long-term basis, which will develop strategies to recognize unseen patterns and trends that can identify opportunities for innovation or progressing mindsets (Senge, P. 175).

Another way to address crisis situations holistically is understanding people's thought patterns from a geometric approach. Robert W. Keidel, in *The Geometry of Strategy: Concepts for Strategic Management*, presents four geometric methods of thinking. The first, point thinking, addresses the world in either/or situations that does not consider complexity (Keidel, P. 22). Second, linear thinking considers options along a straight-line spectrum between two variables. An example of this would be a yardstick or hierarchical ranking system (P. 26). Next, angular thinking, takes those two variables and places them along a new dimension represented by a x-y axis represented as grids or matrices to determine the best option from a black-and-white perspective (P. 39). Finally, triangular thinking introduces a new variable to the equation, looking for the optimal solution by combining form and content (P. 62). In organizations and among different

organizations, it is the tradeoff between Cooperation, Control and Autonomy (P. 63). Some tradeoff must exist between the three, where one or two of the elements will influence the situation more, otherwise indecisiveness, inaction and stagnation can occur. This stagnation is represented in the center of the triangle. Triangular thinking helps structure complexity and studies the interplay between complex systems and variables (P. 64). Understanding thought patterns in this way can help this document analyze the decisions that were made in both preparation and response to the storm.

The intersection of these themes will be addressed in the Data and Analysis with their interplay presented via a case study in the closing chapters. In addition to other case studies and the interviews, this paper will study the Dutch experience with flood management, sustainability and resiliency. The country of The Netherlands consists of some of the most at-risk delta geography in the world. The natural conditions there have forced the Dutch to integrate adaptability into their culture; constantly improving conditions and correcting mistakes, while engaging a long-term vision. To analyze this, I utilize *Delta Urbanism: The Netherlands*, an edited collection of articles studying the history of Dutch delta adaptation from a planning perspective. The book studies the dynamics, landscaping, construction, governance, management and cultural development of the Dutch delta system. The approaches that the Dutch have taken over time incorporate the themes presented here to varying degrees over the last thousand years.

### CHAPTER 3

# METHODOLOGY

My methodological approach to this Capstone combines grounded theory research and first-person perspective interviews with Superstorm Sandy recovery and resiliency stakeholders. My methodological role in this Capstone alternates between researcher and narrator. As a researcher, I present relevant literature and topics pertinent in assessing the institutional coordination that took place during and after the storm, as well as the overall approach to crisis management by these institutions. As an interviewer, I narrate and incorporate the experiences of colleagues from various backgrounds, including government employees, not-for-profits, consultants and residents. I take these experiences and analyze them through the lens of institutional coordination and crisis management relative to my postulating that effective coordination was negatively impacted by ad hoc approaches, the lack of or dismissal of emergency preparedness and impact analysis plans, inconsistently executed responses among institutions, and obstacles created from political jockeying between institutions. I utilize a grounded theory method to inductively look for common themes throughout the interviews and research that supports my postulation (Russell, P. 430).

My primary research is derived from eleven interviews with twelve individuals in a semi-structured interview format. Attached are a set of standard interview questions I asked each of the participants. Additional questions were tailored specifically to each individual's storm and recovery experience. Interviews were conducted both in-person and on the phone subject to availability, and recorded for verification purposes. Interviewees were given the option of being fully represented in this Capstone or remain anonymous. Those who chose to remain anonymous agreed to have general descriptive indicators applied to them within the document to reference their involvement and experience. To achieve as broad of a perspective as possible, I sought to interview a diverse cross-section of stakeholders professionally, geographically and demographically. In addition to diversity, interviewees were chosen based on experience, familiarity, interviewee availability and interviewer time constraints.

Interviewees were chosen based on familiarity with the interviewer and on their experience. Familiarity is a criterion based on the ability to gain access for an interview, as time constraints are such that expediency is required. This Capstone is prepared to be submitted no later than May 2017. Availability for some of these interviews have taken months to arrange given professional and personal schedules.

As it pertains to experience, most of the interviewees were chosen given their professional relevance to Superstorm Sandy. Two of the interviewees were chosen because of their personal experiences as residents, and one was chosen given the balance of professional and personal experience. Professionals working across multiple levels of government agencies were necessary to give a tiered perspective of the storm from the public realm. The interviews consisted of:

- A consultant formerly with the Federal Emergency Management Administration (FEMA)
- A disaster recovery planner with experience around the United States
- An employee of the New York State Governor's Office of Storm Recovery
- An employee of the New York City Office of Emergency Management (OEM)
- A senior employee at the New York City Department of City Planning

- A Staten Island architect who served as a former New York City Commissioner
- A former planning commissioner in Islip on Long Island
- A planning consultant who has worked throughout Long Island
- An executive with a community development corporation in the Rockaways
- An employee of an energy provider based in Carteret, New Jersey
- Two seasonal Rockaway residents

The interviews were with seven men and five women. Ten of the interviewees are White/Caucasian, two of the interviewees are Black/African-American/Biracial, and one interviewee is Hispanic/Latino. I worked with ten of the interviewees at some point during APA-NYM's storm recovery efforts as President of APA-NYM. Diversifying interviewees is important to gain different perspectives on Superstorm Sandy response and recovery. Hurricane Katrina exposed the difference in response among richer and poorer, as well as racially. Poorer minority neighborhoods that were impacted more due to their topography received a slower response than did wealthier, whiter neighborhoods. While Superstorm Sandy impacted coastal neighborhoods that ranged across incomes and cultures, preconceived notions of different races and cultures on a neighborhood-byneighborhood basis impacted the willingness to collaborate in both preparation for and response to the storm. Government response in New York was fairly equal across-theboard with respect to both race and class, but preconceived perceptions led to an added layer of tension that negatively impacted coordination.

I categorize the interviewees two ways. First, organizationally among four sets of stakeholders: government, consultant, local and private/not-for-profit. The government perspective includes stakeholders from Federal, New York State, New York City and municipal Long Island. The consultant stakeholders include a disaster planning consultant who has had experience throughout the country advising on disaster planning issues, and a Long Island planning consultant who has worked with most municipalities on Long Island. The local stakeholders include two sisters from the Rockaways and a Staten Island design professional who was also a New York City Commissioner that did not work on Superstorm Sandy issues in that role. The private/not-for-profit stakeholders include the President of the Rockaway Development and Revitalization Corporation, a former employee at New Jersey fuel supplier Kinder Morgan, and my own perspective as former President of the American Planning Association-New York Metro Chapter. Categorizing interviewees in this fashion portrays the different dynamics and perspectives that took place around Superstorm Sandy. For example, government officials have one perspective working with one another, while having a different perspective of various outside individuals and entities. Local stakeholders can give realtime accounts of their personal experience, their dealings with various institutions, and their progress in the recovery process.

The second categorization is geographically. Although my primary case study is based around APA-NYM's work in the Rockaways, it is important to give a regional perspective to discuss the interconnected dynamics taking places between different jurisdictions. Interviews were conducted in the most impacted areas of New York City, the Rockaways and Staten Island, Long Island, New Jersey, and from a national perspective both through the Federal government and national disaster planning realm.

## The Interviews

The Federal government has a historical role in responding to natural disasters. Their perspective is key in understanding how the Superstorm Sandy response compared and contrasted to other regions. An interview was conducted with a former temporary employee of FEMA, who is usually the lead Federal agency to respond in natural disasters. This perspective includes Barry Hokanson, a planning consultant who has worked with Federal agencies in the region and around the country.

New York State played the lead role in the recovery process outside of New York City. Most Federal appropriations are disbursed to states who either manage the recovery process themselves, or allocate funds and resources to counties and municipalities. Therefore, it is important to get a perspective from the New York State Governor's Office of Storm Recovery. Also, professionals were chosen geographically to represent a spectrum of experiences in New York City, Long Island and New Jersey. For New York City, this includes viewpoints from different neighborhoods.

Locally, within New York City, interviews were conducted with an employee of the New York City Office of Emergency Management (OEM), who officially are the lead agency in response to natural and man-made disasters. As will be discussed, this role played out differently than formally recognized given the presence of ad hoc agencies created immediately after the storm. Requests for interviews with members of these ad hoc agencies, the Housing Recovery Unit and Special Initiative for Rebuilding and Recovery (SIRR), were discussed but not scheduled due to availability conflicts.

An interview was conducted with a Staten Island design professional and Masters-level professor who was a former New York City Commissioner. This interviewee's perspective is important given the multiple roles he played during the storm that assists this Capstone. Aside from being impacted while residing in another New York City neighborhood located in a different borough than the Rockaways, APA-NYM worked with an organization he is affiliated with on Staten Island that hosted charrettes to develop local goals and a vision for the island, as they felt New York City was laggard in conducting at the time. This experience will bring different insight to local efforts and institutional coordination in response to crisis. Also, as a New York City Commissioner, he will be able to bring additional insight as a high-level City employee, though his work with the storm in this capacity was minimal. Finally, as a professor, an academic outlook of storm recovery can be attained.

On Long Island, interviews were conducted with a former planning official for the Town of Islip, as well as a former planning director in East Hampton, who was a planning consultant at the time of the storm.

Outside of the government realm, an interview was conducted with Kevin Alexander, President and CEO of the Rockaway Development and Revitalization Corporation (RDRC), a community development corporation based in the Rockaways. RDRC focuses primarily on economic development and businesses support services on the Rockaway peninsula. RDRC was chosen given the relationship the interviewer had with the organization while President of APA-NYM. RDRC and APA-NYM worked together on a business recovery plan for the peninsula. This Capstone utilizes the Rockaway peninsula as its primary case study within the Capstone. The relationship developed allows for deeper insight into the dynamics taking place during and after the storm, given the level of established trust between the interviewer and interviewee.

A perspective from the private sector and New Jersey is also presented here through an interview with a Penn classmate, Anthony Asciutto, a former United States Army Captain who was working for Kinder Morgan, an energy supply company with storage tanks located in Carteret, NJ, at the time of the storm. Anthony's perspective is not only important given different geographies, but also given the supply side of storm recovery. His company was the first to have fuel delivery services restored in the region, which proved crucial in maintaining operation of regional infrastructure, including local airports. Their reaction to the storm is a unique one as they were not only energy suppliers, but also impacted local residents. Furthermore, Kinder Morgan employed several former Army personnel, which incorporates a different type of organizational understanding in a response setting than the others interviewed here.

Finally, interviews were conducted with two seasonal residents in Breezy Point. Two sisters interviewed co-own a seasonal house in Breezy Point, a land cooperative located at the westernmost point of the Rockaway peninsula. It is important to portray a perspective from a non-institutional standpoint to understand the day-to-day decisions and mechanisms taking place in trying to rebuild one's home. Considering full disclosure, one of the sisters is a New York City employee and a member of APA-NYM, but the perspective given is told as that of a homeowner, particularly by her sister, who holds the deed to the home.

My research focuses around available literature with institutional coordination and crisis management surrounding both Superstorm Sandy and general disaster recovery; urban planning; international examples of disaster preparedness and response, and cultural attitudes towards sustainability and resiliency from The Netherlands, Sweden and Panamá; institutional sustainability and resiliency that falls both within and outside the disaster recovery frame; and organizational dynamics literature, particularly surrounding institutional coordination and crisis management. The research consists of books, peer-reviewed articles, non-peer-reviewed articles, government reports and testimony, organizational reports and guidelines, and white papers, including my own literature.

Government reports researched here are utilized to provide relevant examples of how the public sector views and incorporates the different themes discussed in the Literature Review (i.e., planning, risk analysis, communication, etc.). The reports are not comprehensive as hundreds of reports existing among dozens of agencies at different levels of government. The purpose is to provide some insight to the train of thought government institutions frequently involved in disaster recovery have in drawing parameters for recovery and resiliency. These government institutions include FEMA, the United States Department of Homeland Security, the Governor's Office of Storm Recovery, Federal and State public hearings, and New York City elected officials.

There is one instance of overlap between interview and research that I am categorizing under research with Donovan Finn, PhD, an Assistant Professor at the State University of New York at Stony Brook teaching in the Sustainability Studies Program's Environmental Planning, Policy and Design major. Professor Finn is a colleague of the author with whom discussions have taken place as they pertain to Superstorm Sandy and disaster planning and recovery, in general. Instead of a formal interview, Professor Finn offered to share his ongoing work as it relates to Superstorm Sandy and some of his references. That work is incorporated and referenced in this Capstone.

Other forms of research were derived from multiple sources. Some came from obtained materials as part of the University of Pennsylvania's Organizational Dynamics program, for which this Capstone is being written. Additional research was obtained

48

utilizing both the University of Pennsylvania Libraries' Scholarly Commons search tool and Google Scholar. These tools were key for extrapolating both peer-reviewed and nonpeer-reviewed articles related to Superstorm Sandy, disaster planning and recovery, resiliency and sustainability, institutional coordination and crisis management. For referencing and document organization, Zotero software was utilized to arrange research structure and reference material.

#### **CHAPTER 4**

# DATA AND ANALYSIS

This chapter will analyze the influence organizational and political structures had on the effectiveness of institutional coordination and crisis management surrounding Superstorm Sandy as extrapolated from semi-structured interviews and grounded theory research utilizing the six recognized themes identified in the Literature Review. While each of these themes have been independently discussed in previous literature as influencing institutional coordination and crisis management, this analysis will draw connections among these themes in a way that has not been done before by linking them under the umbrella of holistic and systems thinking. The analysis will utilize the actions and experiences surrounding Superstorm Sandy derived from both literature and interviews to show the importance of taking a holistic approach. These actions and experiences will show that more successful responses utilized elements of holistic and systems thinking. The gaps experienced by many institutions was a result of taking a more ad hoc, top-down or linear approach to response, recovery and resiliency. The Capstone will use the assessment from the analysis to develop recommendations to ensure a more effective response to disaster events that leverage these themes under a holistic thinking approach.

The influence of these structures varies in breadth while overlapping horizontally across governmental, cultural, private, not-for-profit, local stakeholder, and advocacy realms, and vertically within each realm. The data from the interviews relayed here will be discussed under the aforementioned themes, while leveraging additional research from experts in institutional coordination, crisis management, organizational management and dynamics, urban planning, emergency management, environmental management, sustainability and resiliency.

The themes will be first presented sequentially as laid out in the Literature Review, then summarized to determine the interconnectivity of the themes and if any theme or themes are prioritized over the other. They will be used to draw conclusions as to the overarching influences that determined courses of action for various stakeholders. Then, the next Chapter will deduce general commonalities of what were effective response, recovery and resiliency endeavors, the obstacles in achieving stability, successful rebuilding and making communities more resilient, and recommend improvements in preparation for the next storm.

# The Planning-Emergency Management Relationship

"Planners are not doers" is historically a common refrain among non-planning government officials, engineers, architects and the development community. Conversely, many times engineers, disaster response teams and at times elected officials are criticized for failing to see the "big picture." While there may be inherent differences among realms of the design and development communities, there is an interdependency in effectively responding to a crisis. This transcends all types of situations and institutions, whether it is a natural disaster, unexpected drop in a company's stock price or a scandal within a government administration.

In all my interviews, respondents emphasized the importance of planning in some fashion, while most agreed that there is an intrinsic interdependency between planning and crisis management. Not all interviewees felt a balance existed between the two, and some research went so far as to discount the importance of planning in a crisis situation.

As discussed in the Literature Review, Quarantelli deemphasizes the importance of planning and in some cases, considers it a dangerous hindrance (Quarantelli, P. 374). He argues there is a high risk of poor planning which can lead to poor emergency management, and that individuals and institutions can never truly know what to expect in a natural disaster. Each one is unique and further guided by geography. Dependency on a rigid plan does not consider the volatility of a situation. He questions the scalability of plans and sees it as limiting. He reasons that there is a role for planning but only as a general strategy. Strategies are not actions. He instead favors emphasis on good tactics, which he believes are impossible to anticipate ahead of time (P. 375). Most of the problems in disaster management are within the response itself (P. 375- from Dynes). As such, tactical improvement will come from changing the behavior of emergency management organizations (P. 375– from Kreps). This improvement comes addressing organizational problems such as what is communicated, not the means by which information is communicated.

Quarantelli identifies five categories of organizational problems: intraorganizational, interorganizational, organization  $\rightarrow$  public, public  $\rightarrow$  organization, and within organizational systems (P. 376). Within organizations, normal communication becomes complex during a crisis due to non-routine tasks and changing roles (P. 376). Instead of planning, resources should be allocated to creativity training to help responders think quick during a crisis. Among organizations, planning cannot identify previously unrecognized stakeholders. This can only be done in the moment of a crisis where

assessment of immediate need takes place. Two-way communication between organizations and the public is a matter of organizational understanding and capacity (P. 377). What the public is looking for may not be the expertise an organization has. If an organization sticks only to what it knows or to its existing plan, then the organization's role becomes situationally useless or may encounter backlash from the public (P. 377). Conversely, an organization may not be able to handle the ability to respond. Depending on existing information sources may prove inadequate, as new sources may appear and information needs may change (P. 378). Quarantelli believes the emphasis should be on assuring the organization is agile enough to respond while the crisis is underway. Finally, within an organizational system Quarantelli argues that planning may be helpful identifying which systems need to be operative, but only emergent tasks and entities will know how to handle them (P. 379). Effective implementation is a product of exercise of authority and ability to coordinate. Efforts should be made to strengthen these aspects of an organization to assure that it is both empowered to act and agile enough to coordinate complex systems.

Quarantelli presents important points about responding to a crisis. Emphasizing the need to empower the means to execute, assuring a creative and flexible response environment that recognizes complex systems, ability to handle change and the unexpected, and a strong, coordinated communication operation are keys to disaster management and response.

Given these varying foundational viewpoints, I decided to see if those interviewed confirmed either of these, and if other existing research would verify them. Broadly, most respondents had a more holistic point-of-view on this topic, feeling there was an interconnectivity between the disaster planning and emergency management. Given that many of the interviewees were either planners or had some exposure to planning, the responses largely emphasized the importance of planning in crisis situations.

Barry Hokanson, a disaster planning expert with deep experience in resiliency planning across the country, found frustration with the allocation of resources to disaster recovery and resiliency efforts. Hokanson believes that planning, while often identified, is constantly diluted by the emphasis on emergency management (B. Hokanson, personal communication, 2016). He finds that when planning is recognized as a necessity, it is often put in the hands of emergency managers and engineers. He feels there is a tendency to be reactive as opposed to proactive, resulting in poorly executed recovery plans dominated by well-meaning, but authoritative emergency managers whose focus is to quickly get things done. He explains this approach leaves out important stakeholder dialogue that is crucial to effective disaster recovery. Hokanson references FEMA's Pre-Disaster Mitigation program as an example where planning funds are restricted to being allocated to emergency management agencies for implementation. While this may be necessary for municipalities that do not have the capacity to house a planning department, recovery work is often done on a county level. Most counties in the United States have some form of a planning department. Focusing on emergency management expertise presents a limited view, as it comes from a point or linear frame of reference that is reactive and focuses primarily on the crisis that happened. He believes that most resources should be put into planning and risk assessment, as emergency managers need a solid foundation to work from when a crisis approaches. Every crisis is different, so there will be a need for some ad hoc response, but he was firm in his belief that planning

should drive the recovery and resiliency process. These are fields that should advise one another. He considers it a "great folly" to not connect planning with recovery management, particularly around issues of sustainability, resilience, risk management, vitality and viability (Hokanson, 2016).

David Genaway, currently Geographic Information Systems (GIS) Manager for the Town of Huntington, and both former Planning Commissioner for the Town of Islip during Superstorm Sandy and part of the Community Reconstruction team at GOSR, had an opportunity to present a multi-faceted view of the connection between planning and emergency management (D. Genaway, personal communication, 2017). Reflecting on the storm over four years later, he believes the Town of Islip's response was the most successful on Long Island. He attributes this to utilizing both a local and national framework in preparation for the storm. Locally, the town preemptively began mapping neighborhoods of anticipated impact using GIS, prepared evacuation prep plans based on weather report patterns, and shared evacuation plans with multiple forms of media immediately prior to the storm, so that residents knew how to react before the storm hit.

Islip's evacuation plan rollout was based on a national framework for organizational response called the Incident Command Structure (ICS). The ICS was developed post-Hurricane Katrina as a scalable and modular structure that more easily allows local government to communicate with higher levels of government. The structure can grow and shrink as necessary and allow local governments to reinvent themselves during a crisis. His role in the ICS as Planning Commissioner was to be the Planning Coordinator responsible for transmitting information to the Incidence Commander, who could make various informed decisions such as the evacuation plan. Genaway feels ICS

55

training is necessary for all municipalities as it effectively prepares them for all types of natural disaster. He cites evidence of success in that most Islip residents in impacted areas effectively evacuated, primarily to the homes of family and friends on higher ground, and that the town could successfully transmit and share data with fire departments, harbor police and other emergency managers to assure quick responses by those agencies.

### Risk Analysis and Needs Assessments

There are many ways to plan. When an institution is faced with a decision on executing an action plan, conducting a risk analysis and/or needs assessment helps determine the proper course of action and account for any unforeseen hazards. Risk analysis can be qualitative or quantitative. Qualitative risk analysis often involves a predetermined ranking system to prioritize what risks to deal with and how to approach them. Quantitative risk analysis incorporates data and analytics, and is often run on computer software. Some steps of risk analysis include formulating the problem, gathering data, building a model, verifying and validating the data, developing a plan, communication and implementation (Hornbacher, 2015). Needs assessments help organizations identify priorities, make organizational improvements, or allocate resources by determining the needs, or gaps, between where the organization envisions itself in the future and its current state (Grimsley, 2015).

The usefulness of a risk analysis or needs assessment is clear in many examples derived from the interviews. In the Rockaways, RDRC had completed a comprehensive plan immediately prior to the storm, which laid a preparatory foundation for the organization to begin response operations within twenty-four hours (K. Alexander, personal communication, 2017). When RDRC noticed that gaps still remained, particularly with serving and helping to reestablish their business constituents, they reached out to APA-NYM to jointly develop a business recovery plan, *Getting Back to Business: Addressing the Needs of Rockaway Businesses Impacted by Superstorm Sandy*, that identified opportunities, gaps and potential resources. This document and the previous comprehensive plan helped RDRC apply for government and institutional grants that led to business assistance programs and capital projects, which included the redesign of Beach 20<sup>th</sup> Street Plaza as a central hub of the Far Rockaway commercial district.

This type of preparation was also evident in the Town of Islip and at Kinder Morgan. Islip heavily relied on the ICS structure to guide them as they prepared for the storm. It established a clear line of communication and reporting among team members, while they honed in on which areas would be most impacted so they could prepare resource allocation in case the storm presented physical and logistical obstacles in reaching these areas (Genaway, 2017). At Kinder Morgan, familiarity of failsafe measures with a systems-wide view of their operations allowed employees to quickly adapt after the storm (Asciutto, 2017). Also, the familiarity with formalized crisis command structures given the number of employees with a military background beneficially added a level of preparation and adaptability to act after the storm. These cases show that establishing system protocols and anticipating need when a crisis occurs leads to efficient and effective response.

The importance of risk analysis and needs assessments are identified in several Federal reports and guidelines related to disaster response, as well as among international

57

institutions assessing crisis management. Many of the agencies identified in the Literature Review that note the importance of planning, include either or both risk analysis and needs assessment as a strategy to predict crises, prepare for a natural disaster and where to allocate resources in responding to a crisis or disaster. The International Risk Governance Council Resource Guide released A Generic Framework for Resilience Assessment by Hans Rudolf Hienimann to utilize risk analysis as both pre-event and postevent policy (IGRC- Hienimann, P. 1). He argues that most risk analysis when a natural disaster occurs has been conducted reactively and focused on what went wrong. He instead suggests that a post-event approach utilize risk analysis to adapt and reconfigure by taking bold approaches to make communities more resilient. This approach would fall in line with the recommendation of a senior New York City Department of City Planning staffer I interviewed, who felt planners should be empowered to make bold choices regarding coastal retreat and creative design that both elevates structures while maintaining neighborhood character (City Planning Staff, personal communication, 2017). Understanding the cost-benefit ratio of implementing said choices can provide greater confidence among all stakeholders that such bold changes can be done correctly.

Communities and institutions that either did not have plans in place, ignored existing plans or did not solicit qualified help in risk analysis or needs assessments tended to fare worse. Strong leadership is needed to make sure that valid data and reports are recognized and utilized. New York City OEM had years of experience and multiple plans in place tailored to different aspects of disaster management, but New York City leadership decided to subordinate those plans in favor of ad hoc responses. This led to confusion and delays in many neighborhoods throughout the City, especially Staten Island. In Breezy Point, an evacuation plan existed but skepticism of outside weather reports and evacuation orders, along with residents being allowed to flout property codes for years, led it to be not widely followed. Leadership at Breezy Point was unable to effectively address concerns and implement the existing plan (Breezy Point Sisters, personal communication, 2017).

For leaders to better understand what type of approach and data are necessary, Linkov and Fox-Lent present a tiered approach to assessing resilience. This approach combines both qualitative and quantitative risk analysis that relies on pre-event ranking as well as metrics. The first tier of analysis involves identifying tools to conduct a ranking to properly screen options. This will identify the broad functions of the system and create a general pathway following a crisis (IGRC- Linkov & Fox-Lent, P. 2). The second tier is to quantify an approach based on metrics and performance in a systems model. This will describe the system or systems in detail by preparing alternatives that are not mutually exclusive (P. 3). Finally, the analyst should develop methods that represent probabilistic uncertainty. This will consider and anticipate the interaction of system components based on stakeholder criteria and test developed criteria utilizing an internal feedback system as scenario responses are implemented (P. 3).

#### <u>Trust</u>

Plans and other preparation mechanisms are important tools in crises, but do little if there is not stakeholder buy-in. Was trust an issue in the response to Superstorm Sandy, and if so, to what extent did it influence actions by decision makers and stakeholders before, during and after the storm? Trust is an important variable in complex, overlapping

59

systems. As previously presented, Quarantelli identifies five types of organizational problems based around communication. A subset of effective communication, as well as actions taken, is trust. Relationships, experience, accurate data and sense of understanding all play a role in developing trust in crisis situations. Trust is a factor both internally and externally to organizations, as well as across different systems. Unfamiliarity breeds fear, which places a greater dependency on trust. If there is a gap in trust, then individuals and organizations are forced to either "go with what they know" or make ad hoc decisions they feel are right for the situation. Sometimes the bases for these decisions are self-serving, but without a level of situational understanding, those who act fast are given deference to perceived expertise. Therefore, establishing trust early on and building cohesive teams are crucial to response in crisis situations.

Based on the interviews, the presence of trust issues and influence of trust varied from situation to situation. In the Rockaways, trust played an extremely important role in the recovery process. On the peninsula, there existed an already compromised level of trust between neighborhoods. There are varying disparities among the peninsula's thirteen neighborhoods, most noticeably that it is generally poorer with a higher concentration of minority residents the farther east you go, whereas higher incomes with a higher concentration of White residents are present headed west. While there are similarities in that the peninsula is made up of primarily blue-collar and service workers, the networks established are fairly siloed. For example, Breezy Point has a numbered of uniformed service employees, such as firefighters, police, sanitation workers and so on. These are professions with strong unions and familial connections established over generations.

Both Kevin Alexander and the sisters from Breezy Point identified different examples of trust issues present on the peninsula. First, Alexander discussed the reaction of many residents on the eastern end of peninsula immediately after the storm as emergency vehicles bypassed their neighborhoods and headed towards western end neighborhoods, like Breezy Point, where there was widespread devastation (Alexander, 2017). Eastern end residents found both frustration and lack of surprise as the population has a greater percentage of residents from historically marginalized communities. Not only did it create additional levels of existing frustration with other communities on the peninsula, but created a lens of skepticism among eastern end residents that they were either forgotten or secondary to wealthier and whiter residents farther west. Furthermore, while giving bike tours to both visitors and disaster response professionals, Alexander experienced discomfort as he led these teams through western end neighborhoods, where many residents paused and stared as they passed through. Alexander believes this was due to both ethnic makeup of the tours, as well as to the mode of transportation. In more conservative circles, bicycle transportation is often derogatorily labelled as communist, European or "hippie." Given the western end's more uniformed, blue-collar nature, voting patterns tend to be more conservative. For example, in the 2016 Presidential Election, starting in Rockaway Park and Broad Channel and heading west, between 55 and 78 percent of voters voted either Republican or Libertarian. Percentages generally increased the farther west along the peninsula (Ali, 2016).

The sisters in Breezy Point confirmed that the neighborhood tends to be an insular community. Breezy Point is a land cooperative, which is an established corporation with a board that not only makes policy, but votes on who can or cannot live there. As a corporation, decisions can remain private, and reasons do not have to be not shared for acceptance or rejection of an applicant. They highlighted that trust impacted the evacuation process on a more geopolitical level. Given the conservative nature of many residents, there is deep skepticism of climate change (Breezy Point Sisters, 2017). This view leads to decisions that subordinate actions to make the neighborhood more resilient, such as burying powerlines. Cost is prioritized over scientific data as reported by the media. Additionally, lack of experience plays a role in decision-making. In 2011, many Rockaway residents had evacuated prior to Tropical Storm Irene. The storm had minimal impact on the immediate New York Metropolitan Area, and instead devastated the Hudson Valley and Western New England. This led to the belief by many residents that warnings for Superstorm Sandy were a "false alarm."

The "false alarm" theory was explored by Dow and Cutter after Hurricanes Bertha and Fran in the Carolinas. They found that the theory had only a minor impact on decision-making, and instead that experience and official meteorological data were better indicators of whether residents evacuated (Dow & Cutter, P. 249-250). There is a seeming disparity between recounting from the interviews and Dow and Cutter's research. One possible explanation could be cultural and experiential differences in geography. As with the differences in the trust cultures of Northern and Southern Europe, there may be an experiential trust difference between the Southeastern and Northeastern United States. The Carolina coast is often subject to hurricanes and tropical storms. In many ways, it is part of the culture (i.e., the Carolina Hurricanes NHL team). The Northeast, on the other hand, almost never experiences hurricanes of great force. A gap could exist with levels of trust based on experiences of natural disasters between the two
regions. Southeasterners must prepare for storms more often and are culturally-ingrained to anticipate and look for signs of an oncoming storm. Conversely, the lack of experience of hurricanes and tropical storms in the Northeast makes its residents more dependent on expert information and strength of local networks to help them make decisions on whether to evacuate. If they feel that this expertise is compromised in any way, then residents will make decisions based on their own experience and sense of expertise.

The Rockaways were not the only place where the belief that Superstorm Sandy would be a "false alarm" prevailed. The Long Island planning consultant I interviewed noted that many communities on Long Island refused to evacuate given the change in course of Tropical Storm Irene the previous year and that hurricanes of great magnitude do not hit the Northeast. Furthermore, she noted that many residents view themselves as "rugged individuals" who had deep roots in their communities and did not give up easily (LI Consultant, personal communication, 2016). They believed that outsider reports were made by people who overreacted and did not understand Long Island as they did. This, in part, reflects what Bob Doppelt discussed in Leading Change Toward Sustainability: A Change Management Guide for Business, Government and Civil Society, where people often fear feeling stupid or being misled, particularly in situations where people feel rushed or forced into assimilating to new paradigms (Doppelt, P. 94?). If people understand better "What's in it for me?" in making rapid, sweeping changes to deeply ingrained beliefs and action patterns, then these changes will be easier to implement in a crisis (Moussa, Boyer & Newberry, P. 7).

An important variable in establishing trust is "social capital." Social capital is defined as "the trust, social norms and networks which affect social and economic

63

activities" that allow a society to interact and function effectively (Nakagawa & Shaw, P. 6). In establishing trust, it is important to highlight the connections between the information being disseminated and actions to be taken with the maintenance or improvement of the quality-of-life of a resident or business during a natural disaster. In the case of Eastern Rockaway residents, social capital is important in trusting that government and institutions will address the needs of their community equally to that of Western Rockaway or other affected areas. For Western Rockaway, the social capital necessary is trusting that warnings or actions taken by government and institutions will not disrupt their way of life in a way that destroys neighborhood character.

Trust appears to be an issue impacting the Rockaways, but were issues of trust a universal theme throughout the region following the storm? I spoke with a design professional from Staten Island who was a former New York City Commissioner. Staten Island was among the most devastated locales throughout the region. Some neighborhoods were leveled, homes were found floating in marshland, and the response was comparatively slow. The design professional was part of a grassroots consortium of other design professionals on Staten Island run through the State Island Chapter of the American Institute of Architects (AIA-SI). Months into the recovery process, many neighborhoods had still not seen proper debris clearance or follow-up from City officials. This led the consortium to reach out to local community groups, the Staten Island Borough President's Office and APA-NYM to facilitate local discussion in affected communities (SI Design Professional, personal communication, 2017). Collectively, we hosted a series of charrettes in three locations on Staten Island to identify ongoing problems, where response was lacking and how the island should rebuild. APA-NYM and APA assisted by bringing in planning consultants, Sasaki Associates from Boston, to run the charrettes. The process was partially successful in that conversations were held with local experts and stakeholders, and produced a final report. Where it fell short was the lack of resources and institutional support to formally present the plan to the City and have it be adopted by the City. The endeavor was a volunteer effort and up against several outside groups with larger resources and City support competing against other efforts.

The trust issues that lay here were two-fold. First, there was a lack of trust with the City itself. New York City took a long time to clean up and reach out to affected areas after the initial damage assessment was complete. AIA-SI and other stakeholders assisted with this assessment and expected a more formal and continual process to be implemented. This did not take place in a timely fashion. Second, even within the grassroots process itself, local stakeholders were wary of the partners they themselves had brought on board. There were clashes between AIA-SI and APA-NYM in fear from the former that the latter intended to take over "their" initiative. Also, partnership with the Staten Island Borough President's Office appeared at times tenuous, where the consortium felt they oscillated from being a strong partner and not doing enough. In totality, the fact that local stakeholders felt the need to develop their own entity was not only based on experience, but also general lack of trust that government and outside institutions would be active participants.

From an organizational perspective, I will utilize the experiences of APA-NYM to characterize trust issues with other organizations and municipalities that were prevalent throughout the region. APA-NYM attempted to work with several other design-oriented organizations in the region. There was collaboration on many fronts, including the Post-Sandy Initiative led by AIA-New York with participation from seven other design organizations, including APA-NYM, but there was also competition that led to duplicative efforts. APA-NYM worked with RDRC developing a report for business recovery on the Rockaway peninsula. Halfway through this process, New York City announced a design competition for Beach 116<sup>th</sup> Street with AIA-New York. Neither APA-NYM, nor RDRC was notified. There were examples like this all over the region, which created trust issues and a reactive desire to not collaborate.

APA-NYM also experienced a deep sense of distrust on Long Island. The organization did minimal work there as many of their offers to assist were rebuffed. In one instance, the city manager of a municipality asked "what's your angle?" when offered volunteer help. After I explained what our organization does, the response was "thank you for offering, but we are already working toward a plan on our own." Another example on the Eastern End of Long Island, APA-NYM discovered we had a common partner with a municipality. After that municipality was contacted, there was initial excitement to partner. When APA-NYM expressed interest in working with neighboring municipalities during the conversation, we were interrupted with municipality stating "we could care less if those towns drown, this is our initiative". The partnership did not move forward. Finally, when I reached out to a like-minded planning organization on Long Island, its Executive Director and I discussed an outreach and communication partnership to help link municipalities to resources based around resiliency. After she brought in one of her primary consultants into the conversation, the consultant started yelling about outsiders coming in thinking they know better than locals. When I responded that many

of our members are locals, the response was skeptical and exacerbated into personal attacks. I replied tersely that his response was unprofessional, at which point the Executive Director hurriedly said they would consider our partnership, hung up, and did not return phone calls or emails from APA-NYM.

In other conversations, trust was not necessarily highlighted as a primary issue. When asked if trust was a major issue with coordination among various levels of government and among City government agencies, a senior official from the New York City Department of City Planning (DCP) responded that trust was not so much the issue, as was control. New York City was somewhat unprepared for the level of destruction the storm brought, and most government officials scrambled to develop a plan to respond, despite a plan being in place at OEM. He saw this as a combination of the Northeast's lack of experience with a storm of this kind, fear that respective agencies would not respond appropriately enough, and ego among agencies and between levels of government as they wanted to be the ones to save the region from ruin (City Planning Staff, 2017). While trust can be a subset of control, the senior DCP official felt these three variables were most important in how the City responded.

While I did not ask former Town of Islip Planning Commissioner David Genaway, whether trust played a major role in preparation and response, much of the context he presented in the interview indicated there was a significant level of trust present among town officials to effectively respond. The trust I sensed was a trust in the process and the surrounding team. Genaway noted that retrospectively he feels Islip had a more successful response than other towns (Genaway, 2017). At the same time, he talked about the preparation and anticipatory actions that Islip engaged, and the universal understanding of Town of Islip employees that they would use the ICS system as a foundation to implement their response. Having a sense of structure and a plan to work from breeds a sense of direction for responders and stakeholders, which in turn creates a trust in the process and other team members.

This sense was also present when I spoke with Anthony Asciutto, formerly of Kinder Morgan. The company hired several local people and former military personnel over the years. Being an energy supply company, there were many standard engineering operating procedures in place that they had experience with every day. When the storm had passed, there were both an existing culture and structural foundation they could work from (Asciutto, 2017). Military personnel are familiar with formal structures and placing trust in one another in difficult situations. Furthermore, given the high concentration of local residents, many of whom were impacted by the storm, a sense of understanding and camaraderie was present that necessitated an efficient response to get operations up and running. Given that most employees had the knowledge to do so from standard procedures, allowed Kinder Morgan to return to normal operations quickly and become an active, productive participant in first responder procedures.

A sense of ownership within a cultural structure appears to play a major role in trust. With the Town of Islip and Kinder Morgan, familiar plans and operating procedures were in place along with a sense of "we're in this together" among the different employees. They saw the importance of their role not only internally, but how they could positively impact others. In the Rockaways, Staten Island and parts of Long Island, distrust was a leading factor implementing a response. In the Rockaways, distrust among neighborhoods and with government institutions due to the peninsula's geographic isolation led to a disjointed and competitive response. Staten Island as a geographicallyisolated borough, not accessible by the New York City subway system, lower-rise and closer to New Jersey than the rest of New York, led it to feel like they are the "forgotten borough." Like Breezy Point, Staten Island is also a more conservative borough with a high concentration of uniformed service professionals. There is more of a top-down, "goit-alone" approach that further silos Staten Island from the rest of New York. Insularity breeds distrust of others. When this distrust is in many ways verified by the City's slow, uncoordinated response on Staten Island, it exacerbates divisions among institutions.

W.J. Wouter Botzen, Erwann Michel-Kerjan, Howard Kunreuther, Hans de Moel, and Jeroen C.J.H. Aerts found political affiliation also influences trust in terms of natural disasters. In *Political Affiliation Affects Adaptation to Climate Risks: Evidence from New York City*, the authors found from over 1,000 residents surveyed after Superstorm Sandy that Democrats were more likely to trust the government to manage flood risk (47% to 31% compared to Republicans), expected Federal disaster relief (40% to 27%), and that the disaster relief would cover a high percentage of their property damage (27% to 15%) (Botzen, et al, P. 356-357) (Figure 14). There was also a greater belief that climate change will impact flooding among Democrats (71% to 47%). This study backs up the evidence that, while not mutually exclusive, conservative/Republican areas have less trust in government and the impact of climate change.



Figure 14. Flood & Climate Perception Risk by Political Affiliation (Botzen, et al, 2016)

Fig. 1 Statistically significant (p-value < 0.05) differences in flood risk perceptions and expectations of federal relief between Democrats and Republicans

Interestingly enough, the Town of Islip who had a highly-coordinated response, has historically had primarily Republican leadership. Also, former New York City Mayor Michael Bloomberg (who regularly changed political affiliations), who was in office at the time of the storm, ran as a Republican. Based on the interviews, it may indicate that political attitudes may be more of an indicator than solely formal party affiliation, as recent history has had Rockefeller Republicans (socially-minded) and Reagan Democrats (fiscally conservative).

## Communication

Communication is key throughout crises and disasters. Ineffective or non-existent communication can lead to confusion, conflicting reports, improper implementation, vulnerability to additional damage or crises, and systemic breakdown. The lack of trust and need for control displayed around Superstorm Sandy created and was created by an inconsistent communication structure that caused confusion, competition and delays in the response cycle. Those institutions that had a communication structure based on an existing plan tended to have more productive response and recovery efforts.

To assure proper communication exists, all potential stakeholders must be identified, contacted and solicited for input in a crisis communication plan. Abramson and Redlener identified that having communication and command structures in of themselves are not sufficient (Abramson & Redlener, P. 2). They could have been created in a silo, top-down or non-inclusive fashion. Also, the influence of cognitive biases can result in blind spots that render all types of, not just communication, plans inoperable. These were reasons why evacuation plans were largely ignored. Those that created these plans needed to reach out to more diverse and divergent groups that may have felt marginalized in certain ways. Not being part of a plan leads such groups to feel ignored or resentment, so when it comes time to coordinate and communicate, outreach either does not reach them or is shunned. This approach was confirmed in the *Crying Wolf* article that discussed the influence of "false alarm" premises in crisis situations.

The difference in communication styles was exemplified in Long Island. The Town of Islip conducted significant outreach to anticipated impacted communities and first responder agencies prior to the storm. Their communication and command structure was based around an ICS model (Genaway, 2017). This model would not have been effective, regardless of how strong it was internally, without the inclusive approach the town took. Comparably, other towns and institutions did not coordinate and succeed as well in their response. This was most emblematic with the Long Island Power Authority (LIPA). There were overly rigid protocols followed in response to communication issues on Long Island between village, town and county governments (LI Consultant, 2016). LIPA's decision not to act and wait out for these communication issues to be resolved, while not properly communicating the delays to the public, led to the eventual takeover of LIPA by New Jersey energy company PSE&G. This resulted in LIPA becoming the Superstorm Sandy poster-child for ineffective disaster response and crisis management. This can be contrasted to the New York City Metropolitan Authority's ability to get most of the subway system running based previous experiences with delays and needing to inform the public of their actions. Also, while Kinder Morgan as a company focused on efficiency of their operations, which in some cases is a siloed approach, they appointed an external affairs contact to be the point person with various government agencies to not only assure compliance, but Kinder Morgan's progress (Asciutto, 2017). Once Kinder Morgan had operations in place, they were able to reach out to government agencies and institutions to let them know they were available as a valuable asset in the response and recovery process. This led to fuel being delivered to JFK Airport hours before they were to run out of it, shutdown the airport and cancel all flights for the foreseeable future.

A vital understanding is that crisis situations are complex that will divert and put a strain on the normal flow of operations. Quarantelli argues that adaptability and what is being communicated as opposed to how, are key in addressing this complexity (Quarantelli, P. 375). An institution which recognizes its employees or members will be strained from additional responsibilities, normal operating procedures not being sufficient, and presence of additional participants can negatively impact an individual or team's ability to respond, will more likely be able to adapt and anticipate the complexities and needed flexibility to develop in-the-moment tactics that will be appropriate for the specific crisis situation (P. 375). Multi-layered groups with multiple

communication and command processes will tend further to hamper operations (P. 378). This was again seen with LIPA, as well as conflicting efforts within New York City government among OEM, SIRR and the Housing Recovery Unit, and between New York City and New York State government, where residents and businesses were given different directions on the appropriate way to apply for funding, conduct assessments and file for insurance claims to recover from property damage.

## **Cognitive Biases**

A cognitive bias can prevent effective communication from happening and can stem from perceived presence of or lack of trust. Cognitive biases are systematic errors in thinking that affect decisions and judgments people make (Cherry, 2016). Why are cognitive biases important to recognize and what role do they play in disasters situations? In times of crisis, confusion, deviation from the norm, communication breakdown and power struggles often ensue. What drives much of these actions are dependencies on one's preconceived perception of an individual, institution or situation. These preconceived perceptions may not be grounded in reality, and can exacerbate these actions resulting in greater crisis or disaster.

During Superstorm Sandy, cognitive biases were present throughout the evacuation, response and recovery processes. When trust was discussed earlier in the frame of the decision to evacuate, many residents and businesses relied on their cognitive biases, as opposed to field experts warning them to evacuate. The change of course of Tropical Storm Irene confirmed a cognitive bias that the "experts" did not necessarily know what they were talking about and were overreacting for the need evacuate before Superstorm Sandy, just like they did with Irene. This view further confirmed the belief that hurricane-force storms do not affect New York and New Jersey like they do in other parts of the country. Also, playing a role into this decision was self-perception of the individual living in a flood-prone area. As mentioned previously, interviews with stakeholders in the Rockaways and Long Island showed that many residents perceived themselves as "rugged individuals" who chose to live in coastal areas and had successfully dealt with floods and wind damage before (LI Consultant, 2016, Alexander/Breezy Point Sisters, 2017). In essence, many became experts in their own mind base on the belief they knew better than the experts because they previously survived, and that the experts had recently been wrong.

Cognitive bias also played a role in the political response to the storm. The Northeast is a complex political region with some of the nation's oldest and most established communities. Not only are there many levels of government and representation, but the definition of representation spans beyond government to strong community groups, not-for-profits and advocacy organizations playing a role where government cannot. While, for the most part, this complexity works well, it creates for delays in implementation given the broad scope of bureaucracy. It can become confusing and harrowing during times of crisis when multiple stakeholders jockey for position and focus more on the visibility of their role in the process, as opposed to implementation of effective and efficient measures. Stakeholders often focus on executing their own agenda due to the complexity of the system or achieving a personal (individual or institutional) agenda. Watkins and Bazerman laid out the types of biases that would fall under these categories, including painting situation as better than they really are, verifying our own existing preconceptions, paying too little heed to the actions of others, assuring the status quo is maintained, and the failure to consider or address an unfamiliar problem (Watkins & Bazerman, P. 5). It is also evidence of Michael Roberto's three types of cognitive biases that contributed to the aforementioned Mount Everest tragedy: overconfidence, failure to ignore sunk costs, and tendency to overestimate (Roberto, P. 3). Many residents felt they had invested too much in their livelihoods to leave and were confident in their ability to recognize when to leave. In the end, they overestimated their ability to weather the storm, even though many properties were physically unprepared to handle a storm of this magnitude.

This presented itself within the response of New York City. The creation of ad hoc agencies, despite the existence of actions plans by the existing OEM, gave the illusion that the City was on top of things and working toward maintaining the status quo. Also, that New York City and New York State were working parallel in response to the storm with little overlap created confusion among residents and businesses as to what the correct measures needed to be taken to properly rebuild. This created in duplicative paperwork and serious delays in reception of resources for these residents and businesses. Outside of government were not-for-profits and advocacy groups trying to position themselves as "saviors" while assisting affected areas. Some of these institutions either did not have a capacity to handle needed responsibilities or did not have legitimate responsibility to play a significant role in recovery. The belief that their services were required without properly assessing the need exacerbated delays and created competition among these institutions. This diverted the focus from actual recovery need to securing the institution's status in the recovery process. This focus at times would be intensified if the institution was politically-connected enough to gain the support of a government agency or elected official, even if that institution only played a minor, short-term role and did more to market their efforts than make a productive impact.

Another way to look at cognitive biases relates to the perception following Tropical Storm Irene and the affect it had on the response to Superstorm Sandy are blind spots. Tinsley, Dillon and Madsen look at the false perception of when things do not appear to go wrong, that they are okay. They present two cognitive biases that prevent corrective measures. The first is normalization of deviance, which is the tendency to accept anomalies if there has been no previous error. The second is outcome bias, in which the observer only focuses on why a situation was successful, not the embedded errors within that could have produced a different outcome (Tinsley, et al, P. 2). There were two different reflective viewpoints of Tropical Storm Irene, one from residents and businesses, and the other from government. Many residents and businesses affected by Superstorm Sandy felt that evacuating during Tropical Storm Irene was a waste of their time as they believed there was no serious problem. They ignored that many homes still received some level of damage to property exteriors, flooding and temporary loss of power. The ability to, for the most part, have quickly recovered from minimal damage led to the lack of implementing preventative measures, such as elevating structures, paying for flood insurance, landscaping properties to be more resilient and advocating for more protective seawalls, as well as the decision by many not to evacuate.

From the government perspective, that a significant number of people evacuated before Tropical Storm Irene, combined with minimal damage done to coastal areas, allowed the City and State to believe that their approaches were successful. The damage

76

that was actually done did not lead to more protective measures, as there was no political clamoring for it. Also, there was a sense that since many residents and businesses evacuated after Irene, then they would evacuate after the government issued warning to evacuate for Sandy. They did not anticipate the aggravation residents and businesses felt in that they believed they had needlessly evacuated before Irene, and would thus ignore future warnings from the government and other experts.

To overcome these cognitive biases, a leader must be able to solicit commitment from stakeholders by identifying salient features in a crisis, then effectively communicate what they are in a manner that both convinces stakeholders and closes gaps in understanding that would reinforce these biases. Pearson and Clair suggest that leadership commitment is necessary to gain organization or neighborhood-wide commitment in a crisis or disaster (Pearson & Clair, P. 12-13). Confusion and unfamiliar situations must be met with the belief that leaders have full situational buy-in and confidence in either their expertise or organizational execution of a plan. The best way for a leader to understand a crisis and win commitment is to develop causal links understood by stakeholders from the crisis' salient features (Martin, P. 46). Roger Martin maintains that leadership must be able to differentiate between objectivity and subjectivity to take a stance that makes sense to stakeholders to win their commitment. It is crucial for a leader to sway stakeholders away from preconceived biases and convey where the organization and stakeholders need to be. The best approach to this is first identifying the desired outcome, then work backwards utilizing reverse engineering where salient information is gathered from a contented model that affirms existing theories or biases, thereby developing a solution by

exploring the situational complexity through an optimistic model that searches for the best available answer (Martin, P. 125-131).

## Holism and Systems Thinking

The region needed to think big after Superstorm Sandy. The storm did significant damage from the Chesapeake Bay all the way up to Cape Cod. Given the unprecedented multijurisdictional impact, particularly in the New York Metropolitan Area, there were several calls by advocacy and community organizations to think regionally and work together collaboratively on recovery, rebuilding and resiliency. What followed was a disjointed effort that had some organizations, government agencies and communities working collaboratively, while others chose to go it alone. At times, the same entity would act collaboratively on one level, but proceed siloed on another level. This proved to lead to confusion and delays as a recovery, design and funding programs rolled out.

Donovan Finn, Divya Chandrasekhar and Yu Xiao compare and contrast the response effectiveness in the region at the New York City, New York State, New Jersey and Federal levels in *Planning for Resilience in the New York Metro Region After Hurricane Sandy*. They argue that opportunities for mitigation and resilience are hampered by the multijurisdictional form of governance in the United States (Finn, et al, P. 120). This set-up permits different types of decision-making at different levels. Neighboring entities may choose different paths, even though their individual decisions may impact one another. Jurisdiction A may choose a more top-down, home rule approach that contrasts to Jurisdiction B's approach of being more internally inclusive, but externally siloed. Plans and actions of one jurisdiction could negatively affect the

other jurisdiction without prior knowledge by the latter until it is too late. They believe that New York State took the most holistic, and thus most effective approach, of the different jurisdictions.

Starting at the Federal level, FEMA played a different role after Superstorm Sandy than usual. Most jurisdictions impacted by natural disaster tend to be smaller jurisdictions, such as small cities or counties, rural towns and villages. In these instances, FEMA often takes the lead trying to fill in the capacity and resource gaps these jurisdictions often face. When approaching post-Sandy conditions, FEMA found its role to be both diminished and undefined, as the New York City Metropolitan Area has robust, multi-layered networks of government entities and not-for-profit organizations that daily conduct an intense level of planning, response and implementation (FEMA) Staff, personal communication, 2016/Hokanson, 2016). Whereas FEMA normally identifies stakeholders, their potential roles and a collaborative plan of action, they found that numerous entities had already began the process on their own. This resulted in FEMA's taking a backseat in the coordination effort, becoming more of a secondary resource. The former FEMA housing specialist I interviewed confirmed this. Within New York City, she said FEMA's role was "value add" as the City had already established various recovery initiatives (OEM, SIRR, Housing Recovery Unit). The real opportunity on the New York side from her perspective was on Long Island, where not all jurisdictions had the capacity to respond, and were not working with more successful jurisdictions (FEMA Staff, 2016). In one example, David Genaway explained that while the Town of Islip worked collaboratively and efficiently on an internal basis, they had

virtually no contact with other towns regarding their efforts. FEMA had an opportunity to step in to direct these jurisdictions to various Federal resources.

Beyond FEMA, the Federal government's directive to act after Superstorm Sandy came from August 2013's Hurricane Sandy Rebuilding Strategy (Finn, et al, P. 121). In an attempt to regionally address the need for resiliency, a number of proposals were submitted for the Rebuild By Design competition, an enterprising design-based initiative that sought to fund large-scale projects that would have significant impact environmentally, socioeconomically and aesthetically protecting the most vulnerable areas (P. 122). Rebuild By Design was overseen by the United States Department of Housing and Urban Development (HUD), in partnership with a team of local not-forprofit planning and design partners. The initiative saw 44 proposals that resulted in over 350 stakeholder meetings and 64 public workshops that whittled down the proposals to ten finalists, and eventually six winners in New York City and Nassau County, NY and Hoboken, NJ (P. 122). The Federal government found a way to inject itself as a leader in the rebuilding conversation, despite early lack of role definition, by successfully developing a program with regional focus that incorporated the viewpoints from a vast array if stakeholders. Rebuild By Design did create a well-marketed sense of engagement, but the far-reaching plans are only funded for initial design and early implementation stages. It will be seen how much of what was created can be implemented.

On the New York City level, certain systems successfully restarted quickly, such as the subway system. This was due to the MTA's prior experience with flooding, an established command and communication structure and clear objectives for employees to

achieve to get most of the subway system running. Also, the City reacted quickly to assess the damage and allow some homeowners in affected areas to begin the rebuilding process. These efforts were not consistent across-the-board with every City agency. As mentioned, the City took a rushed, ad hoc approach to recovery, rebuilding and resiliency. Existing plans were subordinated. OEM, who developed many of these plans, had to cede control to not only the new ad hoc agencies, but existing agencies as well. Agency outreach and collaboration both internally and to affected communities was inconsistent with various agencies conveying conflicting information. Finn, et al note that while New York City has invested considerable time and resources to sincerely find solutions to make the City more resilient with ambitious projects, the mindset has been tactical and reactive which has resulted in continually changing costs of implementing resiliency measures (P. 132). This stems from the aforementioned need for control in a crisis situation. The top-down approach has led to considerable frustrations and delays throughout the City. The Build It Back program, for example, has still not adequately addressed the needs of impacted homeowners. Per a 2015 report by New York City Comptroller Scott Stringer, only 960 of over 20,000 applicants had met with the Build It Back team by December 2013, with no applicants receiving funding (Stringer, P. 2). By August 1, 2014, only 686 applicants had received any type of program benefits (P. 2).

These difficulties were characteristically confirmed by both the OEM housing specialist and former FEMA employee now working for the City. The FEMA employee explained that New York City seemed to have multiple semi-overlapping plans that were not clearly defined, but noted they put a lot of effort and made progress towards rebuilding (FEMA Staff, 2016). The OEM housing specialist went further saying that efforts were not transparent and relationships among agencies, particularly the new ones created after the storm, were poor. She characterized politics and personality conflicts as the primary drivers of the need to control and rush the recovery process, which instead resulted in slowing it down (OEM Specialist, personal communication, 2016). She noted the outside relationship with other levels of government vacillated. OEM maintained a good relationship with FEMA, but was frustrated by their inability to carve out a role early in the process, and delays with issuing new flood maps. The relationship improved over time as FEMA established joint field offices to coordinate working with various agencies, but it was clear they did not have experience working in large cities. The relationship with New York State was more hampered. The City worked with the State to participate in the Code Enforcement Disaster Assistance Response (CEDAR) program, which conducted tens of thousands of structural assessments with the help of municipalities, architects and engineers, but OEM had internal capacity issues to adequately participate that were not effectively resolved by other agencies, such as the Housing Recovery Unit (OEM Specialist, 2016). Otherwise, there was not much overlap between the City and the State's efforts.

Finn, et al feel New York State had more success in holistically addressing the long-term needs of impacted communities. Many of these communities were either too small or did not have the capacity to engage long-term planning or strategic implementation. They also were not part of initiatives like Rebuild By Design. New York State created the New York Rising Community Reconstruction Program (NYRising) overseen by the Governor's Office of Storm Recovery (GOSR) to address these needs (GOSR, P. 126). NYRising is a \$650 million community-based planning process funded through Federal Community Development Block Grants-Disaster Recovery (CDBG-DR) addressing areas affected by Superstorm Sandy and Tropical Storms Irene and Lee (P. 126). The program was modeled after FEMA's Long-Term Community Recovery process aimed at five Upstate New York communities hit by Tropical Storm Irene or Lee (P. 126). NYRising identified 124 localities that received between \$3-25 million in funding based on need (P. 126). These communities needed to complete Community Reconstruction Plans developed by a local steering committee under the auspices of GOSR, in coordination with planners from the New York State Departments of State and Transportation. GOSR assigned private planning consultants utilizing \$25 million of the \$650 million allocation. Communities were encouraged to collaborate and apply together if their individual capacity proved limiting. At the end of the process, 66 plans were created (P. 127). GOSR is continually working to implement the plans with aim to draw down from the CDBG-DR program.

I interviewed a housing specialist at GOSR to get a personal view of NYRising in relation to other levels of government. The specialist generally saw NYRising as an effective, streamlined program that primarily addressed two areas: Housing Buyout or Recovery, and Infrastructure and Economic Development (GOSR Specialist, personal communication, 2017). I asked what type of organization was GOSR and how did they work with other levels of government and outside organizations. He characterized GOSR as a "greyhound," whereas other programs were "starving dogs" (GOSR Specialist, 2017). He saw GOSR and NYRising adapt over time. GOSR started out flat organizationally where input was relatively equal. As the program grew and managers hired, the flatness of the organization became competitive leading to conflicts among staffers. Thus, GOSR became more hierarchical. He saw this as positive because the structure allowed for more sophisticated communication. Staff could openly provide input, but it established a "pecking order" where decisions could be finalized with less conflict.

Regarding GOSR's relationships with outside entities, the agency depended on HUD CDBG-DR funds to implement NYRising. Working with a "boss" created a bureaucracy that conflicted with GOSR's timeline and standards, and may not have met stakeholder need. This resulted in delays that he chalked up to normal government bureaucracy. He also found in New York City that the Infrastructure and Economic Development unit was more effective than the Housing Buyout or Recovery unit. He could not pinpoint an exact reason why accelerating housing programs were more difficult in New York City than outside the City, and as compared to the Infrastructure and Economic Development unit, but he identified serious issues with coordination and uncertainty as who to talk to on the City level, both from a GOSR and stakeholder standpoint.

Finn, et al then contrasted New York State to New Jersey's Post-Sandy Planning Assistance Grant Program (PSPAG) managed by the Governor's Office of Recovery and Rebuilding (GORR). New Jersey is a state with strong home rule. The state is comprised of 565 municipalities, 57 percent of which contain fewer than 10,000 residents. As such, most of these municipalities have a hyper-localized decision-making process with little or no capacity to engaging planning (Finn, et al, P. 128). PSPAG is a two-phase process that allocates up to \$30,000 to identify initial mitigation and recovery objectives, followed by second phase of plan preparation funded by up to \$50,000 that would make municipalities more resilient and encourage sustainable economic growth (P. 129). PSPAG offered no implementation funds, prevented compensation for staff salaries, and required the hiring of certified planning consultants from the American Institute of Certified Planners (AICP) or New Jersey Board of Professional Planners (PP). The scope of the program is very limited as only \$13.77 million of New Jersey's \$4.17 billion allocation went to PSPAG. This is significantly less than not only NYRising's \$650 million, but also New Jersey's \$25 million post-Sandy marketing campaign, Stronger than the Storm (P. 129). As of May 2015, 110 plans in 36 municipalities had received \$5.78 million to develop their plans (P. 130). New Jersey's administrative, bureaucratic and limited approach has led the plan development process in several of these communities to remain stagnant due to unaddressed capacity issues (P. 131).

Based on Finn, et al's assessment, it appears that New York State took the most forward-looking, holistic approach. Both the Federal government and New York City had disjointed success stemming from an initial inability by the Federal government to determine their role, and New York City's rushed, reactive approach to rebuilding and recovery. New Jersey took a disconnected approach to plan development by treating it as a limited, underfunded, bureaucratic function than an opportunity to engage and empower communities. Much of the New Jersey's CDBG-DR funding went to top-down, insulardesigned projects directed from the state level that were not necessarily implementable.

What organizationally differed between these various levels of government that affected how they approached the rebuilding and recovery process? A significant amount of the answer lies within the lenses each government entity viewed their role in the process. I will first contrast the different approaches between New York State and New Jersey utilizing Robert Keidel's four geometric methods of thinking: point, linear, angular and triangular thinking. Point thinking is a non-complex approach that views the world in an either-or choice (Keidel, P. 22). Linear thinking considers options along a straight-line continuum between two variables (P. 26). Angular thinking offers a black-and-white perspective of two variables along a x-y axis grid (P. 39). Triangular thinking considers complexity systems by adding new variable to the equation looking for an optimal solution among Autonomy, Control and Cooperation (P. 62).

Based on these methods of thinking, New York State took the most triangular approach by creating a well-supported, well-structured, flexible program that expressively sought stakeholder input. It sought to balance the sense of autonomy desired by local municipalities, a sense of control by establishing clear jurisdictional oversight by GOSR, and cooperation by creating local stakeholder committees, while allowing flexibility for municipalities to partner as compensation for capacity issues.

Contrastingly, New Jersey took point and linear thinking approaches with PSPAG. The state approached the process from a point thinking perspective in that it was not flexible in terms of how funds were to be spent, including restricting funds from being used for personnel or implementation. From a linear perspective, New Jersey set a limited number of funds to be spent for PSPAG, but allowed municipalities to identify their needs within the capacity frame of the available funding. These approaches limited municipalities from being able to complete plans or implement projects.

The Federal government and New York City had more inconsistent approaches that ranged along Keidel's spectrum of thinking. FEMA's initial engagement post-Sandy

86

was a point thinking approach to their holistic coordination support. The agency was used to being the lead initiator of collaborative communication and coordination efforts as most communities they engaged had capacity issues. When it arrived in the New York Metropolitan Area, FEMA was at a loss determining their role. They had not anticipated taking a backseat to a geographic area with well-established networks and organizations that had already launched into action. Confused, they saw their initially saw their role as either-or because if they could not take the lead, the only role they could play was a "value add" participant. As time went on and the Obama Administration released the *Hurricane Sandy Rebuilding Strategy*, the Federal role became clearer. Both HUD and FEMA took a greater leadership role, with the most holistic and triangular approach being the Rebuild By Design process, which encouraged significant outreach and stakeholder engagement.

New York City's role seemed to volley back-and-forth among all four geometric thinking methods. Prior to the storm, a set of comprehensive plans developed by OEM after years of coordination and outreach existed, which indicates a triangular slant. After the storm, the City took a reactive, top-down, control-based method aimed at starting the rebuilding process as soon as possible. This was more linear as the objective became simply to start the rebuilding process quickly, with the actual means of doing so not as important from a collaborative and holistic standpoint. At the same time, many City agencies and local authorities took what can be most identified as an angular approach based from more technical and engineering experience in getting specific systems back online, such as the subway, electrical grid or sewer system. One of the variables was to do it or not do it, but the second, how to do so, was steeped in a range of options developed from previous experience. What resulted at the New York City was an inconsistent and dichotomous response best reflected in the efficient way the MTA got most of the subway system back online in a few days, while initiatives such as the Build It Back Program face significant delays with conflicting and confusing requirements for residents to follow given the lack of initial planning and outreach. From a triangular thinking perspective, this vacillation in the Build It Back Program resulted in inaction and is represented in the center of the circle among Cooperation, Control and Autonomy.

Taking a holistic, systems thinking approach addresses variables that are limited in traditional scientific methods. Cultural, socioeconomic and even biological systems do not normally adhere to the deductive approach most scientific method is based in. Michael C. Jackson describes the need to address crisis situations with both hard systems thinking, which looks to resolve real-world problems, and soft systems thinking, which relies on goal-seeking and maintaining relationships to resolve crises (Jackson, P. 16 & 181).

Moving from a simple, linear and deductive approach to crisis management is needed. Deductive reasoning limits looking at a situation simply as it is, with whatever data is available. Roger Martin calls on leaders to take a more abductive approach that develops generative reasoning. A leader needs to determine "what should I do?" not "what should I think?" (Martin, P. 16). Leaders must be integrative thinkers to answer this by wholly looking at problem features to determine what is salient (P. 41). Taking a holistic approach better improves causal links between salient features. Inductive logic is the next step up from deductive logic. Inductive logic infers general rules from empirical observation (P. 145). Abductive logic takes it a step further. Complex systems require looking at situations and systems in ways that cannot be easily explained with available data. Abductive logic looks at what could possibly be true (P. 146). Answers may not exist from available data, but hypothesizing potential answers or paths results in creative alternative options that looks beyond either-or possibilities. This method advises generative reasoning, which encourages trial and error while working backwards from the desired goal to identify salient features to develop causal relationships between these features (P. 151). Several techniques can help assist this process. Feedback loops can generate new resources by continually assessing relationships between variables (P. 152-153). Multi-layered modeling can help expose causal relationships between these variables and is applicable between different systems (P. 155). Assertive inquiry looks to resolve conflicting models by filling in gaps from a sincere search of a variety of stakeholder views (P. 157). Looking back on approaches from the different levels of government, NYR sing appears to best represent a method of generative reasoning. The program incorporated a significant outreach effort and created local committees to address needs and gaps, while maintaining and encouraging flexibility to identify salient features while relying on collaboration to develop causal links that would breed resolutions. Resultantly, participating communities are in a better position to implement realistic resiliency plans that will prepare them better for the next storm.

## Tying the Themes Together

It is important to delineate how the themes are structured and framed to better understand how the themes interact and advise one another. Communication is central as improved communication creates a bridge between disparate field and groups and is best achieved by establishing trust and cognitive biases through a holistic approach by applying tools such as risk analysis and needs assessments. Linking these themes must be able to help fill in the gaps identified from the case of Superstorm Sandy through creating clear preparation and response plans, while improving resiliency as a preventative measure. A case study from The Netherlands historical approach to flooding and resiliency will provide insight to the amount of adaptable effort and long-term vision it takes to succeed in addressing improved performance surrounding a disaster event.

There is a clear dichotomy that exists between disaster planning and emergency management. Depending on the author or interviewee, weight was given to one aspect of response and recovery more than the other. In its purity, these viewpoints are limited to a point thinking frame that pits one against the other. In particular, Quarantelli, while not entirely discounting the need for planning, diminishes it to an almost perfunctory capacity. Similarly, but to a lesser extent, Hokanson decried the overemphasis on emergency management that various levels of government in the United States has supported, while advocating the need for planning to drive the conversation.

Most literature and interviews found some level of middle ground by identifying the importance of planning in some capacity and laying out effective response tactics. Though the authors of these documents leaned more toward their area of expertise between the two, there is an apparent growing understanding that planning and emergency management advise one another- an angular approach. Almost every government report or guideline that I reviewed called for planning and outreach, risk analysis, and/or needs assessment. Risk analyses and needs assessments are part of the planning process. Planning and planning tools provide the foundation and preparation that emergency managers can work from. Quarantelli may be correct in that every disaster has its own unique variables that needs a specified tactical response, but many municipalities do not have the experience or capacity to work instinctually to handle such a crisis. The best example of a mutually beneficial relationship between the two was the Town of Islip's response which utilized the ICS model and leveraged strong institutional relationships to effectively maintain a level of order in assuring effective recovery. Lessons learned from Islip's tactical response and emergency management can better advise the plans and preparations for the next storm. Post-disaster risk analyses and needs assessments can be conducted to gather data in developing the next or a new plan. Data gathered can be compared to what was available pre-storm to better evaluate what tools, resources and resilient protections are needed to better weather the next disaster.

Planning is important. It validates expertise and creates trust amongst those who value expertise. Tools that are often associated with planning and pre-action strategies, such as risk analysis and needs assessments, are useful tools post-action, or in this case post-crisis scenarios. They can be utilized as learning mechanisms to link where we were to where we are to where we need to be.

Effective plans and implementation are not achievable without proper outreach. Good outreach informs and prepares stakeholders in the event of a crisis, and makes response and recovery a more seamless process. This cannot be achieved without a strong communication structure in place, or established trust between disaster response leaders and stakeholders, and among stakeholders themselves. Gathering input and facilitating involvement of a diverse set of stakeholders can lead to better plans and responses. If stakeholders can positively answer "what's in it for me?," then a level of trust is established when calls to evacuate or for volunteers are made. Not every stakeholder needs to be directly involved, but if someone part of their identified group participates as a trusted representative, then messages can be effectively conveyed and understood. When the goals and needs of a crisis situation are readily understood, stakeholders have a better ability to overcome cognitive biases which can be steeped in preconceived notions, sunk costs, and misconstruing where expertise lies. Relinquishing cognitive biases also bridges gaps between seemingly disparate groups, as was the case with neighborhoods on the Rockaway peninsula and neighboring Long Island towns. The ability to do so is furthered if goals are understood, a chain of communication is identified, and trust is established.

Trust and strong networks are crucial. RDRC got up and running within 24 hours and became a central repository for concerned Rockaway businesses and residents. Despite jockeying for position by competing, outside interests that diminished RDRC's effectiveness, they stayed the course as they had outside help from organizations like APA-NYM and select local leaders, which allowed them to maintain a visible presence as a local resource. Islip overcame cognitive biases by having a strong trusted internal network that followed a strong modeled plan with clear communication chain pathways. When the time came, Islip came out ahead. The only problem is that they acted in a silo, when it came to neighboring towns. Silos in less established or less collaborative entities can lead to chaos and delays, as was the case on Staten Island, Breezy Point and Long Island. On Staten Island, silos and lack of communication lead to City and institutional mistrust. On Long Island, towns ignored or pitted themselves against one another when applying for funds or engaging recovery plans. Those that did not have capacity and

92

opted to partner with other municipalities fared better. In Breezy Point, an overwhelmed board in a siloed community with a strained communication network led to some residents acting on their own.

Sometimes siloing can build camaraderie. There was a positive effect of siloing in Breezy Point with the strong networks established among residents. When official channels failed, most residents pieced together a recovery strategy by talking with their neighbors. On Staten Island, an established group of architects provided a bridge for action on the island, when the City was setback by delays, by hosting workshops. The issue is not so much siloing in of itself, but the influence siloing has in skewing trust and creating cognitive biases due to a narrowing of perspectives. Overcoming cognitive biases are key. For stakeholders, strong plans, open communication processes and assuring quick tactical response teams in place assist this. Communication is necessary to help stakeholders understand why taking a slower approach that has a long-term perspective benefits them more.

Much being discussed here falls under taking a holistic approach to disaster recovery. Entities such as New York State and APA-NYM had called for a collaborative and regional approach to response and recovery after the storm, but many municipalities and institutions opted to endeavor alone and at times compete with one another for prestige and resources. Numerous existing plans, such as in New York City, were ignored, and regional approaches were inconsistent. New York State seemed to have the most effective collaborative approach through GOSR with NYRising. Even so, New York State allowed New York City to develop their own response strategy with minimal overlap. Furthermore, it is unclear how much New York State collaborated with New Jersey, whose approach was more limited and siloed by focusing on stringent, but underfunded plans that did not have the capital for implementation. What lacked in these calls were identifying effective tools and an understanding of what necessitates a regional approach.

Establishing linkages between different aspects of disaster response and recovery is key for stakeholders to take a long-term, holistic approach that benefits as many parties as possible. Identifying stakeholders is an important first step for any leader involved in the disaster process. Next, identifying what is important for each stakeholder group is a crucial data gathering point that can be attained through a needs assessment. Once that data is assessed, fostering trust between disparate stakeholders is vital to bridge gaps and build towards acceptance and participation to developing a plan or respond. This involves finding a way to convince stakeholders in overcoming their cognitive biases, which can only be done if the politics of the situation are fully understood. Stakeholders and institutional leaders have vested interests that need to be addressed. A perfect plan can be undermined by a skeptical, confused or self-interested stakeholder who is influential and can leverage a political situation either towards their favor or against an otherwise agreed-upon plan or strategy. This can lead to an imbalanced distribution of resources where relationships take precedence over need.

Explaining holistic and systems thinking elements in a way that stakeholders can understand is central to achieving the most impactful and appropriate outcomes. Too much jargon may dissuade potential partners as they may see concepts, strategies and tactics as too complicated. It is incumbent upon leaders to understand the elements of holism and systems thinking to transform it in a way that integrates the concepts into a basic understanding for stakeholders.

Entities need to identify what kind of thinking and strategies are appropriate at different moments in disaster response and recovery. Point and linear thinking can be useful as they leverage authoritative, short-term actions that are necessary in assuring evacuations and immediate clean up take place. As the initial stabilization in disaster response occurs, institutions need to take a broader view operating from a triangular approach that effectively balances Collaboration, Control and Autonomy in a manner appropriate to the situation.

Senge advises developing strategies to identify patterns and trends that will foster innovative opportunities and progressing stakeholder mindsets. Patterns and trends are difficult to see. It is crucial to determine the systemic structures via a sustainable value framework that catalyze these patterns and trends, so stakeholders can create mental models to determine what needs to change to assure these patterns and trends shift to prevent future events from occurring (Senge, P. 175). The sustainable value framework will determine both internal and external drivers of a crisis that can be framed both short and long-term.

Strengthening social accountability is key. This can be accomplished by shifting from a continuous loop of shifting burdens and problems to others where nothing gets done, apathy prevails, and both society and the environment are degraded, to a loop where partnership and regenerative sustainable solutions are created (Senge, P. 198). Institutions need to be ready to improve dialogue by engaging in personal reflection to determine what their own values are, those of their stakeholders, and what they are trying

95

to achieve by employing a sustainable value framework. They then need to initiate conversations with like-minded people, and convene an informal team with commons concerns to explore issues and develop a strategy.

In considering the benefit of, impact of and linkages among each theme, better plans, improved crisis management, and significant improvement with institutional coordination can be easily undermined if the weight of politics in any disaster event is poorly considered. Politics manifests an influential role surrounding disasters when there are trust gaps in the decisionmaking process, and when there is an opportunity to exert power and control during a rushed or unclear situation. Within New York City, the need to control the narrative on part of the Bloomberg Administration undermined their own existing plans and efforts to respond in a crisis. The Administration took advantage of the Northeast's lack of familiarity with major hurricanes and floods to give the appearance of quick, confident action by leveraging successful local efforts from first responders and institutions like the MTA, and creating ad hoc agencies that had little substance behind them. They outflanked New York State, who took a more deliberate, long-term approach, and FEMA, who had difficulty determining their role given their unfamiliarity with the dynamics of the New York Metropolitan Area. Such a position allowed the City to make the argument that New York City was unique and needed their own approach separate from what was intended statewide or regionally. In the long-term this worked to their disadvantage as it created an unclear and disenchanted environment among City agencies, which made communication with and implementation in impacted communities difficult. NYCOEM, who was charged with developing recovery plans, found their role diminished and work created made secondary. The ad hoc agencies created (Housing

96

Recovery Unit and SIRR) pulled staff and resources from existing agencies to piece together programs and a recovery strategy. Of the two agencies, SIRR had more impact in developing a working document that agencies, institutions and communities could utilize, but it initially had worked in a silo in trying to establish its role. The City was also inconsistent in their partnerships and outreach to communities. In Rockaway Beach, the City partnered with AIA-NY to develop a streetscape plan for Beach 116<sup>th</sup> Street unbeknownst to the local community, despite existing local plans and recovery efforts. The City also brought in large, national firms to develop plans under the guidance of NYCEDC with little public input.

On Long Island and in New Jersey, strong home rule initially led to siloed efforts where municipalities did not work with one another or outside institutions. Sometimes siloing played out well as it did in Islip, who had strong internal networks and followed a national model of planning and disaster response, as did the internal resident network in Breezy Point, where the strong sense of community filled in the communication gap from government entities. Overall though, siloing led to harried, unclear responses or stagnant implementation. LIPA allowed rigid, local municipal communication protocols take precedence over their own charge to re-establish the power grid. This resulted in significant delays and backlash, and led to calls for privatization of LIPA and eventual takeover by New Jersey energy company PSE&G. In response to siloing, New York State and New Jersey took two different approaches through their allocation of CDBG-DR funds. New York State conducted significant outreach in developing a holistic, regional recovery plan that allowed flexibility for applicants. This included the allowance of municipalities to partner with one another if each felt they did not have capacity. Furthermore, adopted plans contained implementation funds to assure that resiliency measures could be implemented. New Jersey, on the other hand, deferred to local home rule and limited how funds could be spent. Municipalities could not partner with one another and did not have funds for implementation. New Jersey took a linear, top-down approach focused more on compliance than meeting the sustainable needs of impacted areas, and thus reinforced siloing.

Each of the themes presented has unique value in the disaster response and recovery process. They all have elements that bolster and play off one another in a nonsuccessive manner, that can be, but is not necessarily cyclical. The interplay among these themes can be summarized as disaster planning and emergency management can advise one another, but it is best to develop a plan first, even if prior experience is lacking. Risk analyses and needs assessments can be helpful in achieving this, as they can be conducted both pre- and post-disaster.

The best way to plan and implement is in a holistic fashion that involves as many stakeholders viewpoints as possible. Doing so gives a full picture of a situation and broadens the range of options. Gathering this input is done through outreach via an identifiable communication plan or strategy where stakeholders can effectively understand where their input is having effect. Establishing trust and overcoming cognitive biases are necessary to gather this data, as preconceived notions, group identity, and group or local politics can take precedence as an influential factor, particularly where past experience cannot be used as a reference point.
#### The Netherlands: A Holistic Management Case Study

An excellent case study in long-term, holistic approach to resiliency and disaster management is The Netherlands. The New York City Metropolitan Area has had a historical and geographical relationship with the Dutch. Founded as New Amsterdam, New York Harbor is often compared to the Dutch Delta System when discussing port economies and sea level rise Informational exchanges between the two regions in the form of events and workshops happen on a regular basis.

The Netherlands lies in one of the most challenging delta systems in the world. Climate change and sea level rise has had an impact on geography and development for thousands of years as one-third of the country lies below sea level (Meyer, et al, P. 21). As a whole, Dutch society has been historically receptive to new sustainable technologies, approaches and policies when it comes to making their country more resilient (P. 21). After living on flat plains peppered throughout the region, early Dutch settlers began to construct mounds to live on around 500 BCE to escape sea level rise (P. 23). The first manmade attempts to control sea level rise led to widespread depletion of natural peat bogs by 1000 CE. By the 13th Century, erosion control measures in the form of dikes, which create new outflows for encroaching water, were implemented to respond to the impact of development (P. 23). As the construction of dikes and canals continued, the Dutch government realized the need to institutionalize a water management system. Initially, they required landowners to be liable for drainage as construction and management was seen as a community issue as opposed to a private one (P. 24). Disputes among individual communities eventually led to the establishment of regional water boards to assure the construction of an uninterrupted dike system that would benefit the

country as a whole (P. 25). This coordination led to opportunities of exploring new technologies which brought levels of sophistication that would become a mainstay of water management and Dutch society. By the 14th Century, dam construction began as well as the diversion of river branches to different tidal inlets. The 16th Century saw the advent of windmills to resolve waterlogging caused by tidal inlets. Around this time, technological improvements allowed for the prevention of land sinking and depletion. Reclaimed land became suitable for agriculture (P. 27). The construction of larger windmills and introduction of the steam engine in the 17th and 18th Centuries, allowed land and lake reclamation to occur at rapid pace thanks to improve drainage systems (P. 27).

As technology improved and economic opportunities broadened, The Netherlands continually shifted both geographically and economically. The Rhine-Scheidt and Zuiderzee area in Zeeland were early Dutch economic centers given their access to rich fishing ports (P. 71). As flooding increased and technology improved, the center shifted to regions that had less swampland and the most up-to-date technology. In the 13th Century, dike towns had the power. By the 17th Century, power shifted to polder towns, which were mounds constructed around managed waterways. With the advent of dam technology, which provides the best management, protection and an easy ability to be cleaned, cities like Amsterdam and Rotterdam thrived (P. 67). By 1916, continued floods led to the closing of the Zuiderzee, which transformed into a region of agriculture with high flood protection measures (P. 79).

Closing off the Zuiderzee, gradually led to a change in mindset as to how the Dutch approached water management. New man-made barriers and other closed-off areas followed. In 1953, a storm that claimed 1,853 lives and inundated 165,000 hectares led to the Delta Project, which created new dams and sea barriers that used hydrodynamics, which looks at the motion of fluids as they interact with solid bodies, and coastal zone morphology (P. 34). This approach was based on a probabilistic model that determined risk by multiplying inundation probability by investment value (P. 35). By 1979, the Dutch realized that defending against nature was not working efficiently. They decided to take a more integrated, environmental approach by relying on natural storm barriers, which was beneficial to both humans and nature, as well as more cost efficient (P. 35).

Though a monarchy, The Netherlands has governed as a decentralized unified state (P. 102). In 1848, the country limited the powers of the monarchy, while allowing for strong municipal self-government. This has worked well for the most part, but has caused some issues surrounding strong home rule and confusion around national policy. There is no national or spatial plan to work from, and edicts from the national government must be interpreted by local municipalities appropriate to the specific issues in their region, despite the regular issuance of Memorandums on Spatial Planning and National Water Management White Papers (P. 36, 83, 103).

What has centralized Dutch culture is the realization to work together to survive and maintain society. The 20th Century saw an evolution from a localized and regionalized water management system to one that was ingrained into national policy (P. 65). This national water management policy has afforded The Netherlands to be world leaders in addressing climate change, sustainability and resiliency. Many of their policies influenced overall European Union environmental policy (P. 108). Moving forward The Netherlands will need to figure out its role in delta management as the European Union is a critical juncture as to whether Europe becomes more unified and power is taken out of individual nations or more populist, which can lead to a more closed and siloed atmosphere, and a return to pre-19th Century localized water management systems.

Every country, region and municipality has its challenges. Although the future of Dutch policy around water management remains to be seen, the last thousand years of Dutch society has been one of growth and holistic adaptability. The Netherlands is a good representation of "the economy is the wholly subsidiary of nature, not the other way around" (Senge, P. 103). The difference is that one is not subsidiary of the other, but national policy prioritizes the confluence of the two. Continued openness to innovations, altering of geography and economy, willingness to adapt policies has allowed Dutch culture to remain intact and flourish, despite natural hardships. The Dutch approach has shown successfully addressing crises is a long-term, deliberative, and continually adaptive process that requires widespread buy-in from and benefits for stakeholders. It has been used as a model by the European Union and similar delta systems throughout the world.

### CHAPTER 5

### RECOMMENDATIONS

The goal of this Capstone is to identify the gaps with institutional coordination and crisis management surrounding Superstorm Sandy, and develop recommendations to fill those gaps and minimize the influence of arbitrary political decisions to assure that input is solicited, potential impact is identified, and resources are fairly distributed. Through available research and interviews, the Capstone calls for a more holistic approach by extending the notion of organizational resilience to multi-compounded systems that transcend political and technical boundaries when large-scale disasters occur by recognizing recurring themes to frame the interactions of these stakeholders, institutions and systems.

It also studied the results from the actions and programs implemented after the storm, the state of both permanent and ad hoc institutions involved with storm resilience and recovery, and incorporated holistic models that could advise future approaches to disaster events, including geometric thinking, feedback loops, assertive inquiry, sustainable value frameworks, and international comparisons of holistic approaches in crisis situations. It is also an opportunity for the author to reflect on his experiences as part of one these institutions after the storm to better advise his own role in future events of similar magnitude.

Below is a list of recommendations to how New York City, the surrounding Metropolitan Area, and invested stakeholders can achieve better coordination, and identify linkages among seemingly disparate groups and variables to fill in gaps surrounding planning, communication, collaboration, and emergency response management.

## Legislatively Mandate that Existing Plans by Planning and Emergency Management Experts be Utilized for Both Resiliency and Response Measures

When Superstorm Sandy hit the shores of New York City on October 29, 2012, OEM had plans and established relationships in place with both Federal agencies and regional stakeholders to establish a foundation to work from in such a crisis. Immediately, New York City government chose an ad hoc, virtually go-it-alone approach that subjugated the efforts of OEM and related agencies. While the new agencies coalesced expertise from both other New York City agencies and leaders in disaster response outside of New York City, these agencies had no organizational foundation to guide them. They, instead, had to develop a culture in a confined timeframe while adhering to top-down, politically-motivated mandates from New York City leadership. At the same time, New York State and FEMA had trouble establishing their roles in a confused and siloed atmosphere.

Plans are only as effective as their allowance of power. To prevent the delays, confusion and power struggles that took place after Sandy, the New York City Council must enact legislation that identifies the lead agency pre-disaster. This agency would be charged to develop a pre-event plan advised by previous crisis experience with coordination among other agencies. In the instance of another storm or flood event of a similar magnitude to Superstorm Sandy, it would make sense that OEM and the Mayor's Office of Recovery & Resiliency (ORR) partner as lead agencies. OEM's years of

104

experience in developing disaster plans and coordinating relationships, and ORR's recent development out of SIRR would provide the needed expertise in developing an appropriate pre-event action plan that would contain risk analysis and needs assessments. Efforts from individual agencies would advise these plans, such as DCP's update of the Flood Resiliency Text Amendments, MTA's successful response after Sandy, and New York City Housing Authority's internal resiliency assessment needs.

# <u>Create a Regional Governmental Mechanism to Respond to Disasters that Comprise of</u> <u>New York City, New York State, Neighboring Counties, New Jersey, Connecticut, Port</u> <u>Authority, Metropolitan Transit Authority, and Energy Authorities</u>

One of the biggest obstacles to effective, efficient and expeditious recovery after Superstorm Sandy was a siloed approach despite overlapping jurisdictional power. In the Rockaways, geographical isolation was compounded with difficulty in restoring power by being physically located in New York City, but dependent on LIPA, which primarily served Nassau and Suffolk Counties. If an established regional body comprised New York City, New York State, neighboring counties, New Jersey, Connecticut, Port Authority of New York & New Jersey, MTA, and energy authorities, coordination and communication plans recognizing jurisdictional needs and containing contingency mechanisms could be realized. Representatives from each jurisdiction and subordinate agencies should have some experience in planning, emergency management and institutional coordination to assure that the entity has the professional expertise to maintain a clear, adaptable structure, while understanding the need for jurisdictional and local stakeholder outreach. This entity would hold the primary responsibility for coordination with Federal agencies who can assist in leading and funding recovery efforts.

Positive steps are evident in New York City's both *One City Built to Last* (2014), which specifically identifies internal and regional coordination from a sustainability and energy standpoint, and *One New York: The Plan for a Strong and Just City* (2015), which champions the need for holistic collaboration with NYRising, New York State Regional Economic Development Councils, and local community stakeholder groups, particularly around environmental cleanup and resiliently retrofitting buildings (MOLTPS, P. 75/City of New York, P. 333). More needs to be done to assure that collaboration is truly holistic and not just field area-specific. The proposed regional entity would be able to successfully address and enhance this collaborative need.

# Fund and Conduct Community Plans for All Communities Utilizing GOSR as a Local Model

Of all the entities involved, GOSR achieved the most success in developing implementable plans and garnering stakeholder participation after Superstorm Sandy. New York State's initial misstep in letting New York City begin recovery and resiliency efforts on their own was made up by a successful endeavor that contained a long-term vision allowing for flexible coordination and implementation of allocated Federal funds. GOSR had lessons to learn along the way, as did most stakeholders, but allowing the organization to work from an adaptable, principally flat organizational structure permitted GOSR to develop a clearer, more formalized structure as recovery efforts continued. It also empowered communities by building social capital through fostering a sense of trust through solicited input, clear deliverables and timelines to work from. Building such social capital makes it easier to re-establish relationships when the next disaster occurs.

### Assure Emergency Communication, Power and Transportation Infrastructure are in Place

One of the direst situations throughout the New York Metropolitan Area was the collapse of infrastructure networks. This includes access to cellphone, land-line phones, broadband internet access, fueling stations, alternative transportation access, and large-scale power generators. Whereas some entities successfully could coordinate, such as the MTA for much of the subway system, and the Town of Islip, many others were left stranded without the means to develop and utilize contingency measures.

Long Island, in particular, faced an energy crisis given the delays by LIPA and the lack of accessible fueling stations. The island's geographic isolation makes it difficult to transport fuel when roads, railroads, docking ports and bridge are damaged or washed away. The need for emergency infrastructure, such as town backup generators and fueling tanks are crucial to assuring entities can rebuild in a timely fashion. The best example of this was Kinder Morgan's ability to re-establish near-normal operations to prevent Kennedy Airport from shutting down due to the lack of fuel. Similarly, if it were not for the efforts of RDRC in coordinating the local business communities on the Rockaways, the local business corridors could have been entirely vacant for months or years given the damage to access roads, bridges and subways, and the unfamiliarity of the peninsula's LIRR station.

Taking a needs assessment of a community or institution that includes infrastructure is vital, as restoration of this infrastructure is among the highest priorities of first responders. Access to communication, energy and transport services help clear debris, allow access for medical needs and bring in needed resource materials for rebuilding.

<u>Hire Consultants Both Pre- and Post-Event with Expertise in Holistic Management and/or</u> <u>Regional Planning to Educate Agencies on Interconnected Variables that can Happen</u> <u>Across Neighborhoods, Municipalities and Institutions</u>

The call for holistic approaches, regional entities and stakeholder empowerment can easily fall of deaf ears without the presence of expertise in the areas of holistic management or regional planning, particularly in a traditional geographic region with a strong sense of home rule. New York City hired outside consultants, some with extensive experience in disaster assessment, but also some with little familiarity of New York Metropolitan Area communities and their politics. These consultants also were hired to follow the lead of the City administration and not necessarily advise on how to take a more collaborative approach to recovery and resiliency. Hiring of outside consultants can be beneficial as they may view a disaster situation through a different lens, allowing for new perspectives, but it is important that these consultants are familiar with holistic, collaborative non-linear methods.

This is not only a local concern for the New York Metropolitan Area. Hokanson in his experience encountered the difficulty of implementing holistic and regional efforts as a nationwide problem. The broken link between disaster planning and emergency

108

management was a variable he repeatedly identified as hampering efforts in disaster recovery and establishment of resiliency measures. Federal funding for planning efforts in some programs disallowed planning agencies to participate.

Experts that are skilled with concepts such as double-loop learning, which utilizes the continual evolution of goals and decisions in complex situations through leveraging experiential learning; understanding when different types of geometric strategic thinking are appropriate in a situation (i.e., point and linear thinking for immediate emergency response, triangular thinking for long-term recovery and pre-event plans); and sustainable value frameworks that help recognize patterns and trends by determining short and longterm internal and external situational drivers; will be the most valuable for developing long-term collaborative strategies that meet stakeholder needs through creating linkages between seemingly disparate groups and variables, thus filling in the gaps around institutional coordination and crisis management.

## Legislatively Mandate a Minimum Amount of Stakeholder Meetings in Impacted and Potentially Impacted Communities to Develop Pre- and Post-Event Preparation Plans

Creating social capital is something repeatedly mentioned in this Capstone. Social capital is important to recognize as it is based in establishing trust and social norms that overcome cognitive biases which hamper stakeholder participation, and thus reducing political obstacles towards successful coordination. This will not only assure comprehensive information is gathered, but also build social capital among local stakeholders, government and institutions that will foster a sense of mutual ownership. Legislatively mandating a minimum amount of stakeholder meetings surrounding a

disaster event creates referential assurance that a stakeholder or stakeholder group will be involved in determining their future. It diminishes power struggles, both presumed and actual, and answers the question of "What's In It For Me?" with "We're In This Together."

### **CHAPTER 6**

### REFLECTION

My experience with Superstorm Sandy was monumental personally, professionally and emotionally. I was thrust into a confusing, harried, and consuming realm of disaster recovery less than a month after I began my tenure as President of APA-NYM. The organizational magnitude of determining our role, responding to our members as to what role they can play, identifying institutional leaders and partners, understanding the breadth of devastation and capacity on impacted communities, all while working a full-time job managing a county-level capital budget, left me questioning my own ability to lead, and our region's ability to meet our constituents needs. This experience was a major factor in my application to the Organizational Dynamics Program at the University of Pennsylvania.

This Capstone has afforded me the opportunity to reflect not only on my own experience, but utilize the knowledge, strategies and perspectives I have learned in the Organizational Dynamics Program to look at Superstorm Sandy through a different set of lenses to better understand what worked, what needs to be improved, as well as the experiences of other stakeholders involved in recovery and resiliency efforts. As a planner, I and many of my colleagues, champion collaboration, developing communal visions, working regionally, and gathering verifiable data, to develop plans that empower communities and breakdown barriers to resources. This is often hampered by urban planning being a humble profession by nature. The phrase "planners are not doers" is not merely an insult, it plays out when government officials, private clients, not-for-profits, and community stakeholders discard or put our plans on a shelf to collect dust. It has been important to learn better communicative strategies and ways of thinking to assure that planners like myself play a role in the process. In this instance, the process is disaster recovery and implementation of resiliency measures to stave off future storms.

My hope is this Capstone will not only influence planners to be doers, but to provide a vital assessment of the Superstorm Sandy experience for all stakeholders involved in disaster response and crisis management. Identifying real strategies that have proven organizationally effective in crises, recognizing the hidden and apparent influences of politics, and making recommendations that incorporate holism and systems thinking practices to improve institutional coordination and crisis management before, during and after a disaster event are the takeaways I hope any reader gathers from this document.

### REFERENCES

Abramson, David M., and Redlener, I. (2012). "Hurricane Sandy: Lessons Learned, Again." *Disaster Medicine and Public Health Preparedness* 6, no. 4. 328–329.

Alexander, K. (2017, January 17). Personal interview.

Ali, T. (2016, November 9). How Every New York City Neighborhood Voted in the 2016 Presidential Election. Retrieved March 7, 2017 from <u>https://www.dnainfo.com/new-york/numbers/clinton-trump-president-vice-president-every-neighborhood-map-election-results-voting-general-primary-nyc</u>.

American Planning Association-New York Metro Chapter (2013, May). Getting Back to Business- Addressing the Needs of Rockaway Businesses Impacted by Superstorm Sandy: A Report by the American Planning Association-New York Metro Chapter for the Rockaway Development & Revitalization Corporation. New York, NY.

Asciutto, A. (2017, January 18). Phone interview.

Blake, E., et al. (2015, February 12). Tropical Cyclone Report: Hurricane Sandy (AL182012) 22 – 29 October 2012. Miami, FL: United States National Oceanic and Atmospheric Administration's National Weather Service, National Hurricane Center.

Botzen, W. J., Michel-Kerjan, E., Kunreuther, H., de Moel, H., and Aerts, J.C.J.H. (2016, September) "Political Affiliation Affects Adaptation to Climate Risks: Evidence from New York City." *Climatic Change* 138, no. 1–2. 353–60.

Breezy Point Sisters. (2017, January 16). Phone interview.

Cherry, K. (2016, May 9). What Is a Cognitive Bias? Definition and Examples: Mental Mistakes and Errors. Retrieved January 15, 2017 from <u>https://www.verywell.com/what-is-a-cognitive-bias-2794963</u>.

City of New York. (2015, May 8). One New York: The Plan for a Strong and Just City. New York, NY.

City Planning Staff. (2017, February 15). Phone interview.

Doppelt, B. (2010). Leading Change Toward Sustainability: A Change-Management Guide for Business, Government and Civil Society. Sheffield, UK: Greenleaf Publishing.

Dow, K. and Cutter, S. (1998, January 1) "Crying Wolf: Repeat Responses to Hurricane Evacuation Orders." *Coastal Management* 26, no. 4. 237–52.

Federal Emergency Management Agency (FEMA-a). (2011, September). National Disaster Recovery Framework: Strengthening Disaster Recovery for the Nation. Washington, DC.

Federal Emergency Management Agency (FEMA-b). (2013, November). Mitigation Assessment Team Report: Hurricane Sandy in New Jersey and New York- Building Performance Observations, Recommendations, and Technical Guidance. Washington, DC.

FEMA Staff. (2016, November 22). Phone interview.

Finn, D., et al. (2016). Planning for resilience in the New York metro region after Hurricane Sandy. Chapter A3 in Spatial Planning and Resilience Following Disasters: International and comparative perspectives, edited by Stefan Greiving, Michio Ubaura and Jaroslav Tešliar. Bristol, UK. Policy Press.

Genaway, D. (2017, February 21). Phone interview.

Goldstein, W., Peterson, A., and Zarrilli, D. (2014, April). One City, Rebuilding Together: A Report on the City of New York's Response to Hurricane Sandy and the Path Forward. New York, NY. for Recovery, Resiliency and Infrastructure. City of New York Housing Recovery Office and Office of Recovery and Resiliency.

GOSR Specialist. (2017, February 13). Personal interview.

Governor's Office of Storm Recovery (GOSR). (2015). NYRising: A Report from the Governor's Office of Storm Recovery. New York, NY.

Grimsley, S. (2015). What is Needs Assessment? Definition & Examples- Video & Lesson Transcript. Retrieved March, 15 2017 from <u>http://study.com/academy/lesson/what-is-needs-assessment-definition-examples-quiz.html</u>.

Heinze, A. (2013, May). Southern Europe. Retrieved July 14, 2015 from <u>http://businessculture.org/southern-europe/</u>.

Hokanson, B. (2016, November 27). Phone interview.

Hornbacher, K. (2015, September 12). Lecture conducted at the University of Pennsylvania in Philadelphia, PA.

IRGC (2016). Resource Guide on Resilience. Lausanne: EPFL International Risk Governance Center. v29-07-2016. Heinimann, H.. A Generic Framework for Resilience Assessment IRGC (2016). Resource Guide on Resilience. Lausanne: EPFL International Risk Governance Center. v29-07-2016. Linkov, I. Fox-Lent, C. A Tiered Approach to Resilience Assessment

Jackson, M. (2003). Systems Thinking: Creative Holism for Managers. Hoboken, New Jersey. Wiley Publishing.

LI Consultant. (2016, December 1). Personal Interview.

Keidel, R. (2010). The Geometry of Strategy. New York, New York: Routledge.

Klein-Rosenthal, J. (2014, January). Superstorm Sandy and the Age of Preparedness. Cambridge, MA. Harvard Design Magazine. 30-35.

Martin, R. L. (2007). The opposable mind: How successful leaders win through integrative thinking. Boston, Mass: Harvard Business School Press.

Mayor's Office of Long-Term Planning and Sustainability (MOLTPS). (2014, October 6). One City Built to Last: Transforming New York City's Buildings for a Low-Carbon Future. New York, NY.

Meyer, H., Bobbnik, I., Nijuis, S. (2010). Delta Urbanism: The Netherlands. Chicago, IL. APA Planners Press.

Moussa, M., Boyer, M. and Newberry, D. (2016). Committed Teams: Three Steps to Inspiring Passion and Performance. Hoboken, New Jersey. Wiley Publishing

Nakagawa, Y. and Shaw, R. (2004) "Social Capital: A Missing Link to Disaster Recovery." *International Journal of Mass Emergencies and Disasters* 22, no. 1. 5–34.

OEM Specialist. (2016, November 4). Phone Interview.

Pearson, C. and Clair, J. (1998, January). "Reframing Crisis Management." *The Academy* of *Management Review* 23, no. 1. 59.

Quarantelli, E.L. (1988) "Disaster Crisis Management: A Summary of Research Findings." *Journal of Management Studies* 25, no. 4 (1988): 373–385.

Rausse, J. (2015, September). A Pragmatic Approach to Openness: The Nordic and Scandinavian Way. Unpublished manuscript. University of Pennsylvania. Philadelphia, PA.

Rausse, J. (2016, April). Institutional Impediments and Opportunities Protecting Panamá Bay. Unpublished manuscript. University of Pennsylvania. Philadelphia, PA. Roberto, M. (2002, Fall). Lessons from Everest: The Interaction of Cognitive Bias, Psychological Safety, and System Complexity. Berkeley, CA. *California Management Review* Vol. 45, No. 1. 136-158.

Russell, B. (2011). Research Methods in Anthropology: Qualitative and Quantitative Approaches, 5th Edition. Blue Ridge Summit, PA. AltaMira Press.

Sanandaji, T. (2012, February 29). The American Left's Two Europes Problem. Retrieved July 12, 2015 from <u>https://www.aei.org/publication/the-american-lefts-two-europes-problem/</u>.

Senge, P. (2010). The Necessary Revolution: Working Together to Create a Sustainable World. New York, New York. Broadway Books

SI Design Professional. (2017, February 14). Personal interview.

Sosnowski, A. (2015, October 2). How Will Joaquin Compare to Superstorm Sandy, Hurricane Isabel?. Retrieved September 20, 2016 from <u>http://www.accuweather.com/en/weather-news/how-will-joaquin-compare-to-</u> <u>superstorm-sandy-hurricane-isabelle-east-coast-impact-new-jersey-north-</u> <u>carolina/52693970</u>

Stringer, S. (2015, March 31). Audit Report on the Administration of the New York City Build It Back Single Family Program by the Mayor's Office of Housing Recovery Operations. New York, NY. City of New York, Office of the Comptroller.

Tate, W. (2009, May). The Search for Leadership: An Organisational Perspective; Basic principles of systems thinking as applied to management and leadership. Devon, UK: Triarchy Press. Retrieved from November 23, 2016 from <a href="http://www.systemicleadershipinstitute.org/systemic-leadership/theories/basic-principles-of-systems-thinking-as-applied-to-management-and-leadership-2/">http://www.systemicleadershipinstitute.org/systemic-leadership/theories/basic-principles-of-systems-thinking-as-applied-to-management-and-leadership-2/</a>

Tinsley, C., Dillon, R., and Madsen, P. (2011, April). How to Avoid Catastrophe. Cambridge, MA. Harvard Business Review.

United States Department of Homeland Security (USDHS-a). (2013). NIPP 2013: Partnering for Critical Infrastructure Security and Resilience. Washington, DC.

United States Department of Homeland Security (USDHS-b). (2015, September). National Preparedness Goal, Second Edition. Washington, DC.

United States Department of Transportation- Federal Highway Administration (USDOT). (2017, January 21). Appendix F: Hurricane Evacuation Models and Tools. Retrieved January 31, 2017 from

https://www.fhwa.dot.gov/reports/hurricanevacuation/appendixf.htm

Watkins, M. and Bazerman, M. (2003, April). Predictable Surprises: The Disasters You Should Have Seen Coming. Cambridge, MA. Harvard Business Review.

### APPENDIX A

### Interview Questions Template

- Name, Position
- What role did you play during Superstorm Sandy recovery?
- In your role, what is your observation in terms of the effectiveness of recovery coordination efforts?
  - How would you assess recovery efforts in terms of a coordinated regional approach?
- Individually, what is your assessment of the recovery efforts of NYC? NYS? Federal government? Not-for-profits? Private sector?
- Were there effective elements in place to respond to a storm/flood that surprised you? Were there elements lacking that surprised you?
- What did you feel regional stakeholders did right in response and recovery?
- What is the most valuable advice you can give for the NYC Metropolitan Area to prepare for the next storm?
- Name, Position
- What is the function of your agency?
- What role did you play during Superstorm Sandy?
  - Particularly the Rockaways
- Internally, what kind of organization would you say your agency is? How did it function?
  - Hierarchical? Flat? Matrix? Dysfunctional?
  - o Did you have clear goals, roles, norms?
  - Top down? Bottom up? Center out?
- In preparation for the storm or one like it, did you have any plans available and if so, can you briefly describe them?
  - Were they adhered to?
    - If not, why not?
- What are your thoughts on the institutional coordination that took place with other NYC agencies? NYS? Not-for-profits? Private sector?
  - Were efforts consistent across neighborhoods or did you notice disparities?
  - What kind of disparities?