Disaster Risk Reduction and Resilience through Social Capital:
A Case Study of the Lived-Experiences from Hurricanes Harvey, Irma and Maria

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DEDICATION

This dissertation is proudly dedicated to…

Mike & Marisol Soler

Thank you for all the sacrifices you have made and hardships you endured that brought me to where I am today. I will be forever grateful for your endless love and support. I couldn’t have done it without you.
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ABSTRACT

This qualitative study uses the critical incident case study method to explore the lived experiences from Hurricanes Harvey, Irma and Maria, in order to identify the disconnect between top-down federal and state emergency policies and grassroots-level efforts through the use of social capital. Using social capital theory to explore the response and recovery process of community members following a disaster, the study yielded five findings: (1) deficiency needs must be prioritized; (2) collaboration and cooperation is essential; (3) communication is key to emergency management; (4) challenges stem from prior conditions; and, (5) federal and state assistance comes with red tape. Furthermore, the conclusions derived from the findings demonstrate how social capital can be used effectively to reduce disaster risk and provide resilience, bridging gaps, offering security and limitless flexibility: Social Capital is a crucial component of disaster recovery.

The outcomes from this study are intended to provide insights that will improve existing policies, and programs, and possibly streamline procedures among federal, state and local governments. Additionally, the recommendations aim to invigorate community leaders to better prepare for and mitigate future disasters.

Key words: social capital, resilience, disaster risk reduction, emergency management, hurricanes, disasters
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LIST OF ACRONYMS

ACCCRN: Asian Cities Climate Change Resilience Network
CARRI: Community and Regional Resilience Initiative
CaRES: Campus Resilience Enhancement System
CCA: Climate Change Adaptation Strategies
CCRAM: Conjoint Community Resilience Assessment
CRF: City Resilience Framework
CRS: Community Resilience System
DHS: Department of Homeland Security
DMA: Disaster Mitigation Act of 2000
DNR: Department of Natural Resources
DRR: Disaster Risk Reduction
DSR: Disaster Resilience Scorecard
EbA: Ecosystem-based adaptation
EMA: Emergency Management Agency
FCDA: Federal Civil Defense Administration
FEMA: Federal Emergency Management Agency
GLO: General Land Office
HMGP: Hazard Mitigation Grant Program
HUD: Department of Housing and Urban Development
IA: Individual Assistance Program
NIMS: National incident Management System
NRF: National Response Framework
PAP: Public Assistance Program

REDI: Resilience to Emergencies and Disasters Index

SFDRR: Sendai Framework for Disaster Risk Reduction

UNISDR: United Nations for Disaster Risk Reduction

UR: Urban Resilience

US: Urban Sustainability
Chapter 1: Introduction to the Study

I’ve been to war, and it looked like a war zone

– Hurricane Harvey Victim

Every time a disaster strikes, it impacts an area differently and requires specific solutions to unique problems. The immediate response to a disaster falls upon the local level jurisdiction, but if the impact exceeds the abilities of local levels, it becomes the responsibility of state and federal agencies to aid. Existing research depicts a relationship between policy and practical implementation concerning disaster risk reduction and resilience, particularly when it comes to meeting the needs of communities (Sanyal & Routray, 2016). The multidisciplinary fields of disaster risk reduction, resilience, and emergency management allow problems to be solved in more than one way, using various approaches. By considering the variety of methods used in addressing the problems of disasters, an assortment of solutions can be created to address them.

While the aim of the study is to improve federal and state emergency processes, policies and programs, to better serve communities, the elements of disaster risk reduction as well as the resilience of communities provide a critical context that is necessary for the study. Disaster risk reduction (DRR) strengthens resilience by lessening exposure to hazards; when communities reduce exposure to hazards, it can lead to strengthening vulnerabilities, which have the ability to lead to sustainable development (UNISDR, 2017). Accomplishing DRR works through proper mitigation and preparation of communities. Stressors such as climate change, dwindling viable resources, and an increase in human development continue to play a part in the increase of hazards and vulnerabilities. Extreme weather phenomena, such as natural disasters, add an extra layer to the ongoing degradation of society and earth (Roseland & Spiliotopoulou, 2016). In preparation for any potential natural disasters, emergency management acts as the managerial
mechanism to establish plans and policies to reduce vulnerabilities to hazards, as well as lead efforts to cope with and respond to disasters through the four phases: preparedness, response, recovery, and mitigation (FEMA, 2018). Despite ongoing efforts and the expectation of the trickle-down effect, when it comes to policies on disaster risk and resilience, local level governments may not always have the capabilities to respond to disasters or minimize exposure to vulnerabilities.

This chapter presents the research issue, its legal and policy context and the research design used to accomplish the objectives of the study.

**Background and Context**

The ferocity of the 2017 hurricane season delivered three category – 4 hurricanes: Harvey, Irma, and Maria. As each storm made landfall it affected millions of people within the United States and caused billions of dollars’ worth of damage. Collectively, Hurricanes Harvey, Irma, and Maria caused at least 265 billion dollars’ worth of damage and, individually, were among the top five costliest hurricanes on record (FEMA, 2018). With failing infrastructure, massive evacuations, relocations, and job losses, these disasters yielded a tremendous impact on the economical, societal, and cultural realms.

Declaring a state of emergency activates several things: state emergency response plans, mutual aid agreements, state emergency operations centers, incident command systems, the expenditure of funds, the streamlining of state administrative procedures (i.e., procurement requirements), and other activities surrounding emergency management. (Emergency Declarations and Authorities, 2017). When a disaster strikes a community, citizens immediately look toward their local government for help and direction. The local authorities make an immediate response and, depending on the size of the disaster, mutual aid from state and federal
agencies is provided. However, federal and state agencies may take longer to respond and assist in the recovery of a community, which leaves citizens vulnerable. The nature of top-down policies requires massive amounts of time for going through the proper protocols, leaving those at the local level with no assistance. Additionally, government agencies must follow a strict mandate with disasters. Oftentimes, community members link together to ensure that needs are met simultaneously, while filling in the gap from the ground level.

Therefore, this study sought to examine resilience through the use of social capital, which is defined as overall community trust that is created through mutually beneficial relationships amongst groups, organizations, and individuals. As communities are left defenseless to the elements, community leaders are the boots on the ground to ensure the safety and recovery of its people.

**Law and Policy Review**

When a disaster such as a hurricane occurs, it is the responsibility of federal, state, and local governments to cooperate and respond to the needs of their citizens when the impact exceeds the capacity of local jurisdictions. Disaster response is governed by federal, state, and local laws and policies that work both separately and together. This section provides a discussion of the law and policy that supports disaster response and explores robust efforts towards resilience.

**Multijurisdictional Efforts**

Before examining U.S. policies regarding emergency management, concentrated efforts that furnish a broader perspective of current recommendations and policies to reduce vulnerabilities and hazards to populations are reviewed. Oftentimes, governments look to experts in the field for recommendations on policy. The City Resilience Framework (CRF) and the
Community Resilience system (CRS) are two methods of approaching resilience. Both include some variation of social capital in their assessment of resilience.

**City resilience framework (CRF).** The CRF, created by the 100 Resilient Cities, is a group of the Rockefeller Foundation, and was formed in 2013. The mission of the organization is to assist cities across the globe to increase their abilities to endure the stresses of physical, social, and economic challenges, in order to become more resilient (100 Cities, 2018). The organization itself is provided with resources to obtain resilience through four main paths. Through the use of a developed roadmap, these pathways offer financial and logistical guidance necessary to establish a chief resilience officer; develop a resilience strategy; access to solutions and partners, both public and private, that have the capabilities to implement the resilience strategy, and has a network of member cities that can learn from one another (100 Cities, 2018). The CRF initially places fundamental city systems into four areas: health and wellbeing, leadership and strategy, economy and society, and infrastructure and environment (CRF, 2015). From those four areas of concentration, three driving factors demonstrate possible actions cities take towards resilience. This framework uses indicators that were initially developed by the Asian Cities Climate Change Resilience Network (ACCCRN) to identify the complexities that contribute to a resilient city (CRF, 2015). Based on the CRF, the goals are performance-based, to assist cities to identify critical weaknesses and actions to be taken to reduce vulnerabilities, as well as to build up and enhance resilience collectively. The CRF attempts to include the social systems that drive human behavior, which often are heavily influenced by their urban environment (CRF, 2015). Analyzing cities as systems in themselves rather than multiple subsystems recognizes the interdependencies these subsystems have with one another. Member cities are not limited to the United States. These cover the span of the globe and include places such as: Amman, Jordan;
Belgrade, Serbia; Bristol, United Kingdom; El Paso, Texas; Surat, India; Lagos, Nigeria, and many more.

**Community resilience system (CRS).** Under the sponsorship of the U.S. Department of Homeland Security, the Community and Regional Resilience Institute (CARRI) built the Community Resilience System (CRS) in partnership with the Merifian Institute (CARRI, 2018). The CRS sought to identify the needs of communities by working with general community members, government officials, researchers, and businesses to provide a Whole Community Approach (CARRI, 2008, p. viii). Using a holistic approach addresses the entire community’s needs in regaining all functionality needed after a disaster or event. Based on the initial research by CARRI (2008), there are four needs that communities have in order to improve their resilience: comprehension of what resilience means to their community; implementable measures for resilience to see a pathway for progress; simple tools and processes to shift towards resiliency; and palpable benefits that coincide with efforts taken (CARRI, 2008, p. viii). CARRI applied this approach to two types of communities: local communities and higher education institutions (Plodinec, Edwards, & White 2014). The CRS consists of six stages that are sequential, with a series of actions honed-in on the community: engagement; assessment; development; planning; implementation; and evaluation and revisions (Plodinec, Edwards, & White 2014). Using the Whole Community approach framework from CARRI offers a well-rounded path to achieving resilience from the ground level up.

**U.S. Actions Taken Addressing Emergency Management**

The first resemblance of the federal government assisting state and local governments with disasters was in 1803, addressing a fire disaster in a town located in New Hampshire (FEMA, 2018). In 1947, the Cold War brought the potential for nuclear warfare. The federal
government provided community efforts through the Federal Civil Defense Administration (FCDA) to address the threat nationwide (FEMA, 2018). The primary function of the FCDA was to provide technical assistance to state and local governments. State and local directors of the FCDA were some of the first officials recognized as emergency management in the U.S. (FEMA, 2018).

Prior to the Disaster Relief Act 1974, responding to disasters was done through various Congressional Relief Acts. The Department of Housing and Urban Development (HUD) held the most authority on disaster response and recovery, with programs such as the National Flood Insurance Program, and the Federal Disaster Assistance Administration (FEMA, 2018). In 1978, President Carter created the Reorganization Plan Number 3 that established the Federal Emergency Management Agency (FEMA), which consolidated emergency preparedness, mitigation, response and recovery under one department (FEMA, 2018).

Policymakers on federal and state levels have continued to make strides throughout the years to make emergency management more effective. The policies start from the top-down, with federal policies dictating laws, appropriations, and programs on emergency management. The federal levels are dependent on the state levels to further support and implement policies through state emergency management agencies. State agencies assist in further implementation of emergency management and disaster policies through coordinated efforts with local level jurisdictions. The following federal policies are currently in place concerning emergency management (FEMA, 2018).

**Robert T. Stafford Disaster Relief and Emergency Act (Stafford Act of 1988).** The Federal Disaster Relief Act was first signed in 1974 and established the process of a U.S. president declaring disasters (Stafford Act of 1988). In 1988, the Robert T. Stafford Disaster
Relief & Emergency Act became law and was most recently amended in 2016. This overarching act establishes the basis for providing aid by the federal government to state, local, and tribal governments, to mitigate damages and suffering from disaster, by:

1. revising and broadening the scope of existing disaster relief programs;
2. encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the states and by local governments;
3. achieving greater coordination and responsiveness of disaster preparedness and relief programs;
4. encouraging individuals, states, and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance;
5. encouraging hazard mitigation measures to reduce losses from disasters, including the development of land use and construction regulations; and
6. providing federal assistance programs for both public and private losses sustained in disasters (Stafford Act of 1988).

By allowing U.S. Presidents to declare national disasters, the Stafford Act supports states with the ability to use federal funds for assistance, thereby creating a federal and state partnership which assists local municipalities. Within the Stafford Act are multiple programs meant to assist local government and individuals with emergency management. The Public Assistance Program (PAP) functions with coordinated efforts between FEMA, state and local governments through the allocations of monies and resources that are project-centered, based off a nationally declared disaster (FEMA, 2018). Projects involved pertain to debris removal, environmental-historic preservation, critical infrastructure, and repair or restoration of public buildings (FEMA, 2018). The Individual Assistance Program (I.A.) is run by FEMA to provide direct assistance to
individuals and involves housing, functional needs, lodging reimbursement, rental assistance, assists people facing unemployment, etc. (FEMA, 2018).

**Disaster mitigation act of 2000 (DMA).** The Federal Disaster Mitigation Act (DMA) of 2000 is part of the Stafford Act and sets the legal base for mitigation planning requirements for state, local, and tribal governments (Stafford Act of 1988). To reduce disaster risk and damages, the DMA requires state, local, and tribal governments to compose a plan that guides hazard mitigation (Berke, Smith, & Lyles, 2012). The DMA of 2000 amended the Stafford Act by updating and replacing existing requirements to plans but remains a continued part of disaster assistance (Stafford Act of 1988). In conjunction with the DMA and Stafford Act, Section 404, the Hazard Mitigation Grant Program (HMGP) allocates financial appropriations that are apportioned among federal, state and local governments, to conduct disaster risk reduction efforts. In order to participate in the HMGP, local jurisdictions must abide by the DMA, and have a multi-hazard mitigation plan in place before being eligible to receive assistance from both state and federal governments.

**National response framework (NRF).** The NRF created by the Department of Homeland Security (DHS), acts as a guide for the nation to respond to various types of disasters and emergencies, such as natural disasters and acts of terrorism (National Response Framework, 2013). It coordinates with the National Incident Management System (NIMS) to delineate the proper structure and mechanisms in place in federal policy concerning incident response (National Response Framework, 2013). The newest edition of the framework contextualizes how communities come together towards national preparedness (FEMA, 2016). The segments of this framework include five indicators: prevention; protection; mitigation; response; and recovery (FEMA, 2016). Within those units, the NRF further delves into detailing the core capabilities,
roles, responsibilities, and coordinating organizations required for incident response, dependent on the threat or hazard (FEMA, 2016). The NRF adheres to the Whole Community Approach concept, which is meant to be inclusive of all stakeholders within a community. Often this includes organizational and community leaders, residents, emergency management practitioners, and government officials (FEMA, 2011). Taking a whole community approach allows a collective understanding of community needs and optimizes methods to strengthen assets, capacities, and interests (FEMA, 2011).

**National incident management system (NIMS).** Initially enacted in 2004, the NIMS established a comprehensive national approach to incident management, and is meant to be applicable on all jurisdictional levels and over multiple functional disciplines (FEMA, 2017). The purpose of NIMS is to improve coordination between public and private organizations through multiple incident management activities, and to establish a common standard for an overall approach to incident management, and is applied to a vast spectrum and size of potential incidents, hazards, and impacts (FEMA, 2017). The establishment of a consistent framework allows for a united response to incidents across jurisdictions, agencies, and public and private sectors. To form a cohesive system, NIMS components consist of preparedness, management of communications and information, resources, command, and continued maintenance and management of a situation (FEMA, 2017).

**Conclusion**

Disaster risk reduction requires a multidisciplinary approach to address the numerous hazards and risks. The coordination between emergency management, disaster risk reduction and resilience are essential to communities. From a multijurisdictional perspective, efforts are made through the guidance of the large organizations with the creation of the City Resilience
Framework and the Community Resilience System. While policies around emergency management have evolved through time to address a variety of issues, the basis of these policies is relatively new in comparison to other domestic policies. It is clear from a broader perspective that efforts are being made to establish implementable practices and policy adjustments. However, current emergency management policies do not necessarily match the needs of impacted communities, which means there is a disconnection in policy, processes, or programming (Koch et al., 2017).

**Problem Statement**

Multiple forces come into play when a disaster strikes: federal and state emergency policies that work from the top-down activate when a disaster is beyond the capacity of the local municipality; community members and organizations band together, depending on each other through the use of social capital, to work from the ground level up, addressing needs as an initial response to a disaster (Koch et al., 2017). This disconnect between policies, decision makers, and community stakeholders is evident when a community is impacted by a natural disaster such as Hurricanes Harvey, Irma, and Maria. At this phase of the research, social capital is defined as community trust through beneficial relationships among people, groups, and organizations, including cultural, economic, and social aspects (Aldrich & Meyer, 2015). Between federal and state policies that strictly lay out protocols from the top level shifting downward to local levels, and community members and organizations that respond to disasters from the ground level while waiting for federal and state assistance, more information is needed to identify the factors that lead to a gap between policies, decision makers, and community stakeholders.
The purpose of this qualitative exploratory case study is to explore the needs of U.S. communities impacted by Hurricane Harvey, Irma, and Maria, and the disparity between community needs and federal and state emergency management policies.

**Purpose of the Study**

The purpose of this qualitative exploratory case study is to explore the needs of U.S. communities impacted by Hurricane Harvey, Irma, and Maria, and the disconnect between community needs and federal and state emergency management policies, processes, and programs. Identifying gaps in the response and recovery phases allows for the potential to correct those gaps in preemptive measures of preparation and mitigation. The research intends to inform federal and state policies using community leaders through the lens of social capital theory.

**Research Question**

In order to explore the needs of affected U.S. communities, the question of the research is as follows:

What is the lived experience of community stakeholders during the emergency management response, recovery, and transitional phases from Hurricanes Harvey, Irma, and Maria, and does it identify a disconnect between top-down federal and state policies and community resilience through social capital?

Through the exploration of these lived-experiences, the research calls for further discovery on how to enhance communities through disaster risk reduction.

**Theoretical Framework**

This study uses the conceptual framework of social capital theory as a guide for the research. The concept of the social capital theory is first credited to Pierre Bourdieu and James S. Coleman, who introduced the term systematically but remained completely independent from
one another (Häuberer, 2011). Both scholars conceptualized social capital as a property of relationships and the interactions throughout multiple levels of society, but with a different focus. Bourdieu breaks down his concept of social capital using the three primary forms of capital (economic, cultural, and social), and converts it into a specific good or service (Häuberer, 2011). His perception of social capital views an individual as a resource. Coleman's approach of social capital is defined through its function of existing relations developed between people and social organizations (Häuberer, 2011; Coleman, 1990). Coleman further characterizes the types of social capital based on mutual trust or authority. By establishing these social networks, it holistically becomes a public good. However, neither theorist addresses the issue of inequality and acknowledges the role of informal relationships, such as friendships, that would be outside of the traditional organizational social structure (Häuberer, 2011).

Building upon Coleman's concept, Robert D. Putnam's concept revolves around the idea of civic virtue, and how social interactions add value for individuals (Häuberer, 2011). There are individual and collective aspects of social capital that together contribute to the stability and effectiveness of economic development and government. Using trust through relationship-building enriches public engagement networks and reciprocation efforts that give way to additional types of social capital. When there is a higher level of mutual trust among community members, there is a higher chance for cooperation to arise. Further delving into Putnam's concept, he perceives social capital in two views, inward and outward, that form densely intertwined relations between individuals, bonding and bridging of social capital, respectively (Häuberer, 2011; Siisiäinen, 2000). Social Capital bridging, the outward form, unites a variety of people through a commonality, such as an idea or belief, and can be found within civic movements and religious groups. Social capital bonding, the inward form, connects people that
tend to reinforce homogenous groups through family ties, ethnicity, gender, or social class. Using both bonding and bridging of social capital helps establish a more intertwined community with a higher level of mutual trust.

Another philosopher, Nan Lin, theorizes that social capital consists of embedded resources from one's social network, and views it as a structural entity (Aldrich, 2012; Häuberer, 2011). Lin further interprets social capital as an “investment in social relations with expected returns in the marketplace” (Häuberer, 2011, pg. 119). Lin expands upon social relations in three levels: topmost (membership and identity), middle level (shared resources and information), and bottom (intense interaction and reciprocity) (Aldrich, 2012). Through relationship-building and social interactions, one can establish a network using social bridging and social bonding. Through these open and closed networks, as well as formal and informal structures, established relations contribute to the overall strength of social capital.

**Critics of the Theory**

Critics of social capital theory are skeptical of the theory due to explanatory variables, such as lack of clarification between elements of social capital, including sources, and how these elements can be used to achieve goals (Vorhaus, 2014). Putnam's theory includes elements of social life like norms, networks, and trust, while Coleman's element is defined by function. Lin uses social relations as a form of investment with expected returns concerning social capital; Bourdieu views social capital as a resource woven into social relations and structure (Vorhaus, 2014). Additionally, among each of these concepts of social capital, it is noted that there is inequality in access to both social capital and resources, which can have adverse effects. Things like mob mentality and high mutual distrust or contempt as a collective are not helpful.
**Rationale**

Given that when natural or human-made disasters occur, those affected within the impacted area must recover, it is common to immediately assume that once infrastructures are repaired or rebuilt that people will automatically flock back to an area. However, this may not necessarily be the case. Social capital, through factors such as population density and socioeconomic conditions drastically contributes to the overall recovery of an impacted area (Aldrich, 2012). Therefore, using the theory of social capital with disasters allows the *human factor* to be considered.

**Applying Social Capital Theory**

The concept of social capital is frequently overlooked in policymaking. Previous disaster research mentions that the approach taken to reduce disaster risk frequently neglects the social systems of communities, ignoring the fact that social capital can be the catalyst to resilience. Top-down policies concerning disaster recovery neglect to include social resources and presume that money and guidance lead most efficiently to recovery, but that is not necessarily the case (Aldrich, 2012).

**Definitions**

For this paper, the following terms will be used in relation to disaster risk reduction, resilience, and emergency management. These are common phrases used within the emergency management realm, as well as in multiple disciplines addressing issues of disasters, resilience, and emergency management.

**Disaster:** Any scale of hazardous occurrence that disrupts the functions of a community or society that may lead to exposure to vulnerabilities and hazards leading human, material, economic and environmental losses (UNISDR, 2017).
**Disaster Risk Reduction (DRR):** The prevention of new and existing disaster risk, and the managing of residual risk, which ultimately contributes to strengthening resilience and achieving sustainable development (UNISDR, 2017).

**Climate Change Adaptation (CCA):** An Adjustment of societal and natural systems in reaction to actual or anticipated climate stimuli and its potential effects (Begum et al., 2014).

**Community Resilience:** The capacity to anticipate risk, limit impact, and bounce back through survival, adaptability, evolution, and growth when faced with turbulent change (CARRI, 2013).

**Ecosystem-based adaptation (EbA):** Under the domain of climate change adaptation, but correlates directly to disaster risk reduction, providing an affordable multidisciplinary effort (McVittie et al., 2017).

**Emergency Management:** Managerial mechanism to establish plans and policies to reduce vulnerabilities to hazards, as well as cope and respond to disasters through the four phases: preparedness, response, recovery, and mitigation (FEMA, 2018).

**Hazard:** Consisting of a phenomenon, process or human activity that may result in death, injury, property damage, disruption of social or economic environments, and degradation of environmental systems (UNISDR, 2017).

**Mitigation:** Measurements taken to lessen the impact of hazards (UNISDR, 2017).

**Preparedness:** Capacities by governments to respond and recover communities and individuals through anticipation of any current disasters (UNISDR, 2017).

**Resilience:** The ability of communities and systems to resist, absorb, adapt, and recover from stresses caused by hazards (UNISDR, 2017).
Response: Actions taken during or directly after a disaster to preserve life, reduce health risks, guarantee public safety, and convey the fundamental necessities of affected people (UNISDR, 2017).

Social Capital: Beneficial relationships among people, groups, and organizations that include cultural, economic, and social aspects of a community (Pfefferbaum, Van Horn, & Pfefferbaum, 2017).

Social Bonding: Building relationships within groups and communities (Aldrich, 2015).

Social Bridging: Outward relationship building between groups, organizations, and other social groups (Aldrich, 2015).

Social Linkages: Relationships that link people, organizations, and communities in a variety of levels on a societal hierarchy (Hauberer, 2011).

Urban Sustainability (U.S.): Focuses on the protection of ecological systems, and actively integrates between subsystems while reducing harmful effects on ecological systems (Zhang & Li, 2017).

Urban Resilience (U.R.): Relatively new to the planning world and focuses on how resources from ecological systems are addressed (Zhang & Li, 2017).

Vulnerability: Determined by social, economic, environmental, and physical indicators that leave individuals, communities, or systems exposed to the impacts of hazards (UNISDR, 2017).

Assumptions

Within a pragmatic worldview, there are at least four characteristics associated with pragmatism. One with a pragmatic worldview believes that actions, situations, and consequences affect the environment (Creswell, 2018, p. 10). Because of this pragmatic view, it is assumed that when disasters like hurricanes strike a community, those impacted need and expect some form of
government assistance. The local government provides the initial response to its citizens in times of crisis. When the crisis exceeds the limitations of the local government, the state, then federal agencies intervene to provide additional assistance to communities. Safety and security are the priority for any affected area for the response and recovery process to commence. Cooperation on multiple levels is critical to ensure that necessary needs are met for the community.

Scope and Delimitations

Using the research question as guidance, the scope of the research involved community stakeholders that have experienced either Hurricane Harvey, Irma, or Maria. Hurricanes were chosen because the 2017 hurricane season brought an unusual number of named storms with a central location, two of which hit Puerto Rico. Intended participants included persons that are citizens (18 years old and older), civic leaders (any active community organization, such as Kiwanis/ Rotary, including religious groups), first responders (Fire, Police, EMA), municipal administrators (County/City administrators, departmental heads, and public servants), and elected officials (Councilmen, Commissioners, Board Members) within the designated communities that were declared a national disaster and received federal aid. Additionally, employees from state agencies that assisted the designated communities were included, where possible.

Designation of communities was based on the pathway of Hurricane Harvey, Irma and Maria. They were within the areas declared a national disaster and met the 2010 Census Urban and Rural Classification and Urban Area Criteria. Urban areas are at least 2,500 people with at least 1,500 that reside outside the institutional group quarters. Urbanized Areas (UAs) consist of 50,000 or more people, and urban clusters (UCs) contain at least 2,500 and less than 50,000 people (U.S. Census, 2018). Mega-sized cities, as defined by the United Nations, are
metropolitan areas with a total population of more than 10 million people and will not be considered due to the restraints on the research timeline.

Additionally, open-ended questions were used for the interview, in order to allow the participants flexibility in their answers. The follow-up survey used the Likert scale, as well as yes and no questions, with room to add any additional comments, and was intended to provide an additional method of conveying information that the participant may not have recalled during the initial interview. Using a pragmatic, philosophical worldview granted multiple methods of approach within the research design to find what factors led to policy gaps between federal, state and community needs.

Limitations

While the geographic location of the research area pertained to primary impacted areas, limitations to the study only considered nationally declared impacted areas. However, multiple areas are affected by the impacts of extreme weather events like hurricanes. Many areas are influenced, due to mass evacuations and relocations, depending on the intensity of the storm and the damage incurred. Additionally, because the areas affected by Hurricanes Harvey, Irma and Maria are within a hurricane-prone region, future hurricane seasons may bring another set of extreme weather events, which would alter the data, because the damage incurred may be different from a previous event and therefore difficult to delineate from the perspectives of the participants.

Significance

As natural disasters become more prominent, more communities are impacted by phenomena such as hurricanes, tornadoes, wildfires, and floods. Steps are being taken on multiple levels, through organizations such as 100 Resilient Cities and CARRI, to better prepare
for such stresses. Oftentimes, federal and state policies are in place to address disasters through emergency management, but, because of the policy process, may not be as flexible. Local policies defer to state and federal policies when the impact exceeds the abilities of local jurisdictions. Research surrounding disaster risk reduction and resilience requires a multidisciplinary approach and therefore uses a variety of methods that allow for a variety of contributions. Qualitative methods, such as case studies, are prominent within disaster context research; this may be due to the uniqueness of disasters and the differing impacts to any specific areas (Witt & Lill, 2018).

Impacted disaster areas are varied, which means that existing disaster research consists mainly of qualitative case studies. Particularly for this research, using a qualitative study will allow multiple sources of data with no predetermined constraints of measurement (Creswell & Creswell, 2018). Due to the nature of the intent of the study, qualitative methods allow for a holistic account of a complicated issue; an especially appropriate methodology when it comes to disaster research (Witt & Lill, 2018). Examining the research problem from multiple areas provides a better approach to providing recommendations and solutions based on the case study.

With an increase in the incidence of disastrous weather events, more and more communities are affected. A common concept found within communities, once a disaster strikes, is to rebuild to its former condition, but this is no longer a feasible option, because disasters are increasing, and resources are decreasing (Grayson & Pang, 2014). Therefore, if the policies in place are no longer helpful, policymakers must reevaluate and write with intention. It is crucial to examine the social approach to policymaking. Existing relationships are utilized in times of crisis. However, existing policies do not necessarily consider social relations, which leads to a disparity between what policy dictates and what needs doing. This gap is most prevalent in
emergency management, but by identifying indicators that lead to policy gaps, local jurisdictions can assist in recommendations to policy improvements for all levels, through social bonding. By including the *human factor* that is often overlooked in policy making, decision-makers are more apt to put into place policies that are more sustainable and apt to last not just in emergency management, but comprehensive planning as well.

**Summary**

Altogether, Hurricanes Harvey, Irma, and Maria left destruction and devastation as they crossed the southeast and central region of the United States, leaving billions of dollars’ worth of damage for federal, state and local governments. The impact of natural disasters can be more severe due to other factors, such as climate change, civilization, and depletion of resources. As natural disasters such as hurricanes increase, the policies on federal, state, and local levels do not change to alter to these occurrences. If an extreme weather event, such as a hurricane, impacts an area, the community turns to the government for immediate assistance. However, when the need exceeds the capabilities of local government, federal and state agencies are brought in to assist. However, when waiting for assistance from state and federal agencies, victims are frequently left vulnerable. These trickle-down policies, programs, and procedures do not provide an immediate response or recovery. Therefore, community leaders act as the boots on the ground at a grassroots level to address the vulnerabilities of their community.

Various organizations, as well as the U.S. government, have tried to put mechanisms in place to address the communities’ needs in emergency management. However, it does not resolve the existing problem of the policy gap. This study examines where these policy gaps reside and recommends action to minimize exposure to hazards, using social capital. Existing
literature segues the foundation for the existing policy gaps and efforts to correct the use of social capital.

**Chapter 2: Literature Review**

Coordination is necessary at multiple levels of government when a disaster occurs. Agencies from federal and state levels enact policies that shift through to the local level, but at times do not meet the needs of those affected. Community leaders collaborate from the ground level to compensate for the gap in policy and implementation needs and are most visible directly after an unfortunate event such as a hurricane. The literature suggests that reducing disaster risks can assist in creating community resilience, but most often there tends to be a lack of interdepartmental collaboration. Efforts continue to be made to address methods to increase resilience and reducing exposure to vulnerabilities.

**Literature Search Strategy**

Disaster risk reduction, resilience, and emergency management are multidisciplinary in the sense that such areas can be approached from multiple angles. Therefore, a collection of academic journals, conference papers, nonprofit publications, and government documents and publications were investigated. Based on the initial research, themes involved included the clarification of disaster risk reduction, climate change adaptation, and resilience. Moving forward, scholars in those fields noted that each discipline did not work with one another, and therefore, collaboration was necessary in order to achieve progress within each respective area. Additionally, community resilience through its people and societal relations stood out as a future
research concept within existing frameworks, with the aim of slowly integrating the idea of social relations into resilience and disaster risk reduction.

**Literature Review Related to Key Concepts and Variable**

In order to better understand and prepare for potential disaster impacts, the literature reviewed henceforth touches upon four themes.

First, one must gain a general understanding of the concept of disaster risk reduction (DRR). Within DRR are several concepts, including what should be done or has been done in order to reduce risk. With an increase in climate change, climate change adaptations (CCA) are making their way into DRR policies and practices; the overlapping of both concept goals undergoes an examination.

Secondly, theories and indicators of urban sustainability (US) and urban resilience (UR) assist in creating assessments that determine risks.

Third, the international and domestic frameworks and programs reviewed pertain to reducing risk.

Lastly, the ways in which strong social capital can act as a conduit to strong community resilience are explored.

**Disaster Risk Reduction (DRR)**

To reduce disaster risk, one must understand what disaster risk entails. Disaster risk reduction (DRR), as labeled by the United Nations Office for Disaster Risk Reduction (UNISDR, 2015), intends to restrict and reduce new and existing risk and manage the residual risk, assisting in fostering resilience and sustainable development (UNISDR, 2015). Weichselgartner and Pigeon (2015) emphasized the role of knowledge and how it contributes to risk reduction. The authors believe that knowledge is necessary for disaster risk
reduction research, policy development, and application. Addressing these issues would likely lead to essential advancements in policy and practice. A push for learned experiences, from administrators of policies to scholars, allows knowledge production and integration of various modes to improve the disaster risk reduction science and policy. When comparing linear and nonlinear knowledge production models, it was found that the linear model is adequate for the transfer of knowledge (i.e., communication, publication) to those charged with implementing said knowledge (i.e., developing procedures, policies, and regulations). The nonlinear model concludes that anyone can produce knowledge from their specific perspective on a given problem, but there is not necessarily a flow of knowledge. (Weichselgartner & Pigeon, 2015).

Despite these models, gaps between information and implementation continue to exist within DRR research and policy.

**Climate Change Adaptation (CCA)**

Sustainable development, disaster risk reduction, and climate change are frequently grouped in the area of disaster risk reduction (Begum et al., 2014). Both climate change adaptation and DRR use similar approaches to handle the impacts of stresses, in conjunction with efforts to make communities, and residents within them, more resilient and less vulnerable (Begum et al., 2014). Applications such as prevention methods, mitigation, preparedness, shelter protection, creation, and protection of jobs, assist in reduction of poverty and disaster risks (Begum et al., 2014). Frequently, DRR uses policy frameworks, procedures, and regulatory mechanisms on said efforts for risk reduction.

Begum et al. (2014) define climate change adaptation (CCA) as an adjustment of the natural and societal systems in response to actual or anticipated climate stimuli and the possible effects. Like DRR, CCA is not accomplished in a single event or action, but instead, requires
multiple disciplines and efforts. In attempts to decrease vulnerability, CCA must consider exposure and reduce the sensitivity of a system to the impact of climate change.

Through these frameworks of DRR and CCA, the researchers link the concepts based on the concern of vulnerability reduction and resilience enhancement and, by combining the two, allow for the facilitation of proper planning. Planning, implementation and policy decision making on all levels of government lead to more effectiveness (Begum et al., 2014). For example, combining these two frameworks (DRR & CCA) would allow for more affordable approaches to increasing resilience and reducing the harmful impacts of flooding, heat waves, and intense storms. Linking scattered efforts from DRR and CCA would allow data sharing and coordination through various organizations and government levels. Joint endeavors would increase the reliability of climate data, enable the data to be used to reduce the unpredictability of potential disaster projections and allow improvement of resilient practices.

Within the CCA domain, the ecosystem-based adaptation (EbA) intertwines with DRR practices that can offer cost-effectiveness as well as multidisciplinary efforts to both DRR and CCA. McVittie et al. (2017) examined European-based solutions of EbA and DRR practices to measure the effectiveness of combining CCA and DRR strategies. Due to recent developments and policies, European states have taken note of the similarities between DRR and CCA and then have attempted to create collective policies and procedures encompassing both. Based on these case studies, McVittie et al. (2017) concluded that EbA tactics are typically applied individually or in a variety of combinations. However, within the case studies, no EbA practices were used for risk reduction, therefore leaving a gap in implementation (McVittie et al., 2017).

There are limitations to linking CCA and DRR together. Typically, CCA and DRR each work within their policy realm and level, regardless of any overlap. Technical terms vary within
the field, as well as differentiation in funding and investment. It is difficult to quantify, assess the extent of risk reduction, and avoid disasters within financial terms, due to outlying variables, such as the fact that the CCA and DRR communities worked in isolation from one another previously while focusing on environmental systems and timescale threats, and bypassed underlying causes of vulnerability, such as societal needs (Thomalla et al., 2006).

**Multi-jurisdictional Efforts**

On the practitioner side of urban resilience, Tyler et al. (2016) used the Asian Cities Climate Change Resilience Network (ACCCRN) to establish indicators for both climate and urban resilience. The ACCRN took two conceptual frameworks for climate resilience and collaborated with those in the professional and planning world to generate indicators that had a shared understanding and measurement for the region, to plan and monitor climate adaptation efforts that contribute to city resilience. By determining the general elements of resilience and climate adaptation, their framework allowed users to identify relevant indicators on a local level that could be then measured. Using indicators as a measuring mechanism allows communities to establish the best practices and efforts needed to lessen their vulnerabilities, which would lead to decreasing the gap between policy and implementation. The National Research Council made one domestic approach similar to the ACCRN, in instituting a resilience scorecard.

Further research conducted by Berke et al. (2014) targeted how municipal planners can utilize the resilience scorecard to investigate policies and goals that unintentionally increase vulnerability for those areas or groups. This involves examining different types of plans (i.e., comprehensive, hazard mitigation, or economic) and city policies in order to decrease vulnerabilities properly, and therefore increase resilience. A similar endeavor done by Kontokosta and Malik (2017) benchmarked neighborhood resilience by creating a unified multi-
factor index focusing on a local and regional level – the Resilience to Emergencies and Disasters Index (REDI). This index is intended to be used between municipalities and regions as a continuous measurement over time to increase resilience capacity on the local level and provide performance measurements to estimate returns on investments in resilience building measures. The establishment of REDI provides a comprehensive data repository that identifies relevant indicators to grant local level implementation of resilience.

Like existing frameworks and the creation of standardized measurement, the UNISDR created the Disaster Resilience Scorecard (DSR), to foster the implementation and assess the Sendai Framework for Disaster Risk Reduction (SFDRR). Unlike the other frameworks mentioned above that deal with UR and US, the DSR uses two levels of assessment. The first level focuses on SFDRR targets and uses 47 indicators. The second level contains a detailed assessment involving multiple stakeholder exercises, using 117 indicator criteria. Because this global framework is broad, it allows multiple disciplines to address these targets in numerous ways.

Domestically, one way to address the reduction of disaster and resilience is to look at the work of the Federal Emergency Management Agency (FEMA). When disaster strikes, citizens, municipalities, and states look to the federal government for assistance. Once the recovery phase is reached, FEMA offers the Hazard Mitigation Grant Program (HMGP) to areas deeply affected by the disaster, in efforts to reduce disaster risk. This program partners with the state emergency agency to provide local government funding for various projects that will further provide for a diminished impact after a disaster. Prior research conducted by FEMA proved that every dollar spent on hazard mitigation projects saved $4 worth of damage (FEMA, 2017). The HMGP
funding comes first from federal money from the FEMA, then the state. The local government then pays the remainder, which is 10% - 12% of the total cost (FEMA, 2017). Before the HMGP is implemented, an endorsement from the community, as well as decision-makers, is required by the program.

**Social Capital through Community Resilience**

Planning for disaster risk reduction requires the inclusion of all populations as well as knowledge for informed decision-making and coordinated actions (Weichselgartner & Pigeon, 2015). When entire populations are included in any aspect of disaster management, community resilience is the result. FEMA (2011) recognizes and promotes community resilience as an approach to managing disasters. Focusing on the community level reveals the necessity of the inclusion of community members (i.e., local stakeholders), and allows ownership of the process and localized empowerment (Pfefferbaum, Van Horn, & Pfefferbaum, 2017). FEMA’s (2011) “Whole Community Approach” acknowledges the importance of preparedness and engagement in order to increase security and resilience. Initially, there was no standard operating procedure or guide for communities to achieve community resilience (Plodinec et al., 2014). The Community and Regional Resilience Initiative (CARRI) was tasked by FEMA to establish a process that would enhance community resilience; this process is called the Community Resilience System (CRS), with an additional system called the Campus Resilience Enhancement System (CaRES), geared for institutions of higher education (Plodinec et al., 2014). CARRI piloted the CRS within eight communities, “Annapolis/ Anne Arundel County, MD; Anaheim, CA; Charleston Tri-Counties Region, SC; Gadsden, AL; Greenwich, CT; Gulfport, MS; Mt. Juliet, TN, and St. Louis/ St. Louis County, MO” (Plodinec et al., 2014). These communities were selected due to their variation in size, geography, and urbanization.
As part of community resilience, individual resilience comes from the community in which an individual resides (Plodinec et al., 2014). Most citizens are only as successful as their communities are as a whole when it comes to disaster recovery. For example, this was a key finding within the CRS, and an integral part of enhancing resilience was found through the layers of relationships within the community (Plodinec et al., 2014). Individuals are part of a collective that forms social networks and social capital. Beneficial relationships among people, groups and organizations include cultural, economic and social aspects of the community and form the social capital (Pfefferbaum, Van Horn, & Pfefferbaum, 2017). There are three ways in which social capital is categorized: bonding (affiliations among similar groups), bridging (associations among different members or groups), and linking (networking with various members, institutions and organizations that have higher authority and power) (Pfefferbaum, Van Horn, & Pfefferbaum, 2017).

Aldrich and Meyer (2015) offered numerous designs to measure social capital. First, the attitudinal and cognitive aspects of social capital were assessed by the levels of agreement of statements regarding people. The second approach examined the behavioral manifestations of social capital, such as daily life questions using the Harvard National Social Capital Benchmark Community Survey (Aldrich & Meyer, 2015). The third captured levels of social capital through experimental methods, such as the Prisoner's Dilemma, Dictator Game and Trust Game (Aldrich & Meyer, 2015). When there are high levels of bonding social capital it can lead to higher levels of trust among residents. This in turn can lead to quick and better recovery after a disaster, or improved preparedness. Previous research performed after Hurricane Katrina within the low-income Vietnamese immigrant community in New Orleans was noted. Because of the tight social bonds, as well as linkages to the Catholic Church within the community, the Village de L’Est
was able to recover and rebuild quicker than their more affluent neighborhoods (Aldrich & Meyer, 2015).

Sadri et al. (2016) conducted a mail survey to acquire data on household recovery from four small towns in southern Indiana devastated by tornadoes in March of 2012 that killed around 40 people. Their analysis showed that background characteristics, social connection, and broader community engagement contributed to their recovery process.

Researchers Cohen, Goldberg, Lahad, an Aharonson-Daniel (2016) measured community resilience using the Conjoint Community Resilience Assessment (CCRAM), that provides an empirically-based way to assess community resilience through household sampling. Using small to midsized towns in Israel, the study was able to find a positive relationship between community resilience scores with CCRAM, and the information from municipalities during emergencies (Cohen et al., 2016).

Using the maturity model research, Gimenez, Labaka, and Hernantes (2016) presented a series of various stages that can potentially direct local governments to be more inclusive of the stakeholders throughout the resilience-building of a city. The research gives four principles that are necessary for the engagement of stakeholders in the community resilience process. These standards are collaboration and networking, awareness and commitment, learning and training, and preparedness (Gimenez, Labaka, & Hernantes, 2016). Existing research and literature attempt to quantify and create a form of measurement surrounding social capital and community resilience. These mechanisms vary, but all focus on understanding the actual needs and assets of communities.
Summary and Conclusions

Disaster risk reduction involves a variety of disciplines. Strategies involving climate adaptation, urban resilience, and sustainability efforts usually work independently from one another, which is counter-productive. However, through joint coordinated efforts of disaster risk reduction, communities and policymakers address a spectrum of hazards and lessen exposure to vulnerabilities. Nevertheless, when a disaster strikes, the impacts on communities vary from disaster to disaster and community to community. Existing policies tend to come from the top and trickle down to the most basic level where needs may be dire, which poses a problem because the policies do not always address or consider the essential needs of community stakeholders. The conceptual framework of social capital proposed in this research will lead to reducing the gap between Federal and State emergency management policies and community needs. Building up the relationships between people within communities through social, economic, and structural aspects allows for strong community resilience, particularly after a disaster.
Chapter 3: Methodology

Chapter three discusses the research approach, positionality, participant selection, and data analysis. The study uses a qualitative approach through multiple case studies, allowing an understanding of social situations and processes by examining one or more situations (Richards & Morse, 2013). The study found patterns, missing links or facts that provided solutions to the research question. The central question focused on the exploration of a central phenomenon that was essential for the study (Creswell, 2018, p. 133).

Research Design and Rationale

Using the qualitative research approach allowed data to be collected within the area of the phenomenon with the researcher as the vital data collection component. Several sources of data, such as interviews, documents, and audiovisuals, were collected. The qualitative approach, along with the use of multiple case studies, granted a variety of findings to explain the phenomenon of disaster risk reduction, resilience, and social capital.

Prior research highlighted an issue between policy and implementation pertaining to disaster risk reduction and resilience. While Creswell's points on social issues, such as inequality, suppression, and oppression, resonate, the problem-centered focus of pragmatism is more prevalent and necessary in disaster-related issues. As a disaster strikes, it provides a unique impact to any area, and how an area responds, recovers and transitions to mitigation and preparation is dependent on a consequence of actions conducted by the community as a whole. With a pragmatic philosophical worldview, the research aims to address the disconnect and provide recommendations on how to have more effective policies and programs in place to contribute to resilience and disaster risk reduction. Disaster risk reduction, resilience, and emergency management are multidisciplinary fields that allow problems to be solved in more
than one way, using various perspectives. By considering a variety of methods in addressing the problems of disasters, an array of solutions to different areas was provided.

Case studies were one of the first forms of research within qualitative methodology (Starman, 2013). The use of case studies addresses the multiple factors involved in a disaster. Case-based reasoning yields a different perspective in a practice-oriented field of study, like emergency management (Ruzzene, 2011).

**Methodology**

In the social science discipline, using case studies is increasing due to the inclusion of multiple data sources, which can then be used jointly in the same study (Ruzzene, 2011). Additionally, case studies are found to be valuable in the fields of education management, social work, and public administration (Starman, 2013). Using qualitative case study methods provides researchers the necessary tools to study complex phenomena (Baxter & Jack, 2008). When using a case study approach, several things should be considered: (1) the focal point of the case study is to answer the *how* and *why* questions of a phenomenon; (2) the contextual conditions are relevant to the phenomenon being studied; (3) the researcher cannot taint the manner of those involved in the study; and (4) there is a lack of clarity between the phenomenon and the context (Baxter, 2008). This research examines three case studies surrounding the phenomenon of three hurricanes, how it affects those impacted by it and why there is a policy and programming disparity that leaves people vulnerable to hazards. These factors were taken into consideration in formulating the research question. Determining the research question allows the unit of analysis to be decided, which further helps to determine the type of case study to be used (Baxter & Jack, 2008). Because the topic touches upon disasters and resilience, it was determined to use the critical incident method of the case study. This was first formalized by Colonel John Flanagan,
whose approach to critical incident methodology involved studying human behavior concerning an event or activity (Mills, Durepos, & Wiebe, 2012). For this research the lived-experience of those from Hurricanes Harvey, Irma and Maria were used. Today, critical incident case studies not only explore human behavior, but the cognitive and emotional state, amongst other factors, beyond the individual, and include both internal and external organizational levels (Mills, Durepos, & Wiebe, 2012). Using the critical incident case study method allowed the collection of a combination of comprehensive, evidentiary material that studied the behaviors and influence of individuals and groups within an event. The critical incident case study approach has been successful and has often been used outside of disaster-related fields, in the industrial and organizational psychology, medicine, organizational analysis, engineering, education and other areas (Mills, Durepos, & Wiebe, 2012). Impacted disaster areas vary, which leads existing disaster research to consist mainly of qualitative case studies. For this research, the qualitative study used multiple sources of data with no predetermined constraints of measurement (Creswell & Creswell, 2018). Examining the research problem from multiple areas yielded a better approach to providing recommendations and solutions based on case studies.

**Positionality Statement**

My positionality is derivative of my culture, upbringing, political beliefs, and experience in various aspects of government. Being of Filipino heritage, I grew up in an environment where the cultural sense of community was strong. People were always willing to help one another, whenever needed. Creating strong social bonds among people contributed to a steady social network. Experiencing such a strong communal bond led to my understanding of what a thriving community approach includes and how it is built through strong social capital among its people. My experience led to my philosophical view of pragmatism. Whenever there was a problem, the
community joined together in order to solve the matter. There may not be one way to solve an issue, but being solution-oriented allows me to approach a problem from different angles and disciplines.

With a desire to solve problems, I gravitated towards government and policy in my education and career choices. Obtaining a comprehensive understanding of policy elements helped me to analyze policies, while making those policies and processes more efficient. Working in various levels of government has provided me with an insider perspective of the nuances within governments. My experience as a planner, analyst, grant administrator, and emergency manager contribute something to my research and potential bias. As a practitioner in dealing with emergency management, and living along the coast, I work with all aspects of emergency management - preparedness, response, recovery, and mitigation. When a disaster occurs, it requires a multidisciplinary approach to cover all four phases of emergency management. In my personal experience, the recovery and mitigation stage is the most complicated and highlights inefficiencies within policy and in its implementation.

I aim to research how strong social capital through communities contributes to the recovery and mitigation stages of emergency management. While my bias for strong communities exists, I geared my research towards examining actual disasters and how various cities recovered from them. The recent increase in disaster occurrence has provided me with a plethora of recent data to examine. While I may be an insider in some aspects of emergency management, I consider myself an outsider to other communities affected by disasters, as each impact is different. Each community is different, and their response to a disaster is unique, due to the impact affecting areas differently.
Participant Selection

The research was inclusive of communities directly affected by hurricanes Harvey, Irma, and Maria that were declared national disaster areas, and was granted the opportunity to receive federal funding assistance as a result. The participants consisted of adults 18 years and older who were one of the following: citizens, first responders, municipal administrators, and elected officials. Gender and ethnicity were not necessarily determining factors but rather the role and degree of activity within the community were considered. The size of the cities ranged from small to large. (Mega-sized cities were not considered, due to the time constraints with the research.) The collected data included semi-structured interviews and post-interview surveys with the chosen participants, along with in-depth analyses of documents concerning the response, recovery, and transitional phases of hurricanes Harvey, Irma, and Maria. Using semi-structured interviews allowed for an open framework with a focused conversation. Additionally, while it kept the conversation concentrated, it also provided flexibility to delve into details where necessary. A disadvantage of the use of semi-structured interviews is the amount of planning and preparation required before the interviews, and the substantial number of interviews necessary for a proper comparison.

Purposive and snowballing sampling was used to collect the data. Purposefully selecting participants empowered the research to target specific beneficial characteristics in order to develop the analysis of the study (Creswell, 2014). Additionally, snowball sampling furthered the range of sampling to meet the criteria (Creswell, 2014). The sample size was 26 semi-structured interviews with at least four from each hurricane; this recognized a holistic approach to answering the research question as well as furthering the use of social capital theory.
**Procedures for Recruitment**

The goal of the research question was to identify gaps in current emergency management policies through the lens of social capital theory. By acknowledging factors that contributed to policy gaps, the study aimed to improve federal and state emergency policies as well as comprehensive planning policies and programs to better serve communities.

First, a completed thesis proposal for this research was submitted alongside the internal institutional review board application. This application was based around the research question: *what is the lived experience of community activists during the emergency management response, recovery, and transitional phases from Hurricanes Harvey, Irma, and Maria that identifies the disconnect between top-down Federal and State policies and the community social capital?*

Once, approved, initial recruitment commenced, centered around areas that were eligible to receive federal funding, based on the impact of hurricanes Harvey, Irma, and Maria. Because a variety of participants were desired, original names and contact information was derived from people residing in cities with less than 10 million in population, and were sourced from city or organization websites. The compiled master list and recruitment letters were sent via email to those identified.

Additionally, recruitment advertisements were placed in multiple facets of the social network, such as newspapers, social media, and closed networking groups. Once a response was received, a follow-up phone call was conducted to communicate the purpose of the research better and answer any questions. When the participant agreed, a mutually convenient time was arranged to conduct the interview. During the phone conversation, participants were more than willing to give the contact information of additional people that may be helpful to the research. Before the scheduled interview, a confirmation email along with an informed consent document
was given to the participant to review and then sign, allowing their participation in the research. These consent forms were signed and received before conducting the interviews. As stated in the initial recruitment letters, no remuneration was given to participants and this was reiterated in the consent form alongside any potential risks. Due to the subject matter, there was a possibility that participants would incur levels of stress and anxiety when recollecting their experiences of the hurricanes. Therefore, the participants were also made aware that the interview process could be stopped at their discretion at any time.

Furthermore, participants were reminded that the information provided would be kept confidential. Aliases were given to the participants so that no identifiers were used in the final report. The data collected was stored on an encrypted external hard drive as well as a password-protected storage cloud. Access to information remained with the researcher.

**Data Collection**

Conducting case studies on the lived experiences of community members in hurricanes Harvey, Irma, and Maria not only involved interviews and post-interview surveys, but also analysis of documents. As participants were recruited, interviews were conducted via teleconferencing or in-person. A personal recorder, along with teleconferencing software, was used to record both the phone interviews and in-person interviews. An interview protocol that was approved by the institutional review board accompanied a set of questions that varied depending on how the participant was identified. Those identified as not being directly involved in government, such as local leaders, community partners such as nonprofits and businesses, and volunteers, were given a set of questions that differed from those identified as a first responder, public servant or elected official.
Additionally, any pictures or documentation from the participant were accepted and included, as well as any emails, memoranda, notes, or any personal documents the participants were willing to share. A follow-up survey went to the participants that contributed to data collection; this survey was given within three to four weeks following the interview. Other documentation included published reports from FEMA, and other public documents from state and local governments, agencies or media. These include but were not limited to archival records, such as organizational records, maps, or charts, comprehensive plans and reports from different agencies.

**Data Analysis Plan**

Before the collected data was analyzed, the primary data underwent cleaning practices. This included checking for duplication of data, reviewing for illegal values and errors, each of which was either corrected or removed. Once the data had undergone cleaning, the interviews were converted into transcripts. The first cycle of transcription was conducted using software that used artificial intelligence to provide a first draft. The second transcription cycle was conducted by a person, who corroborated the recording and edited the first draft. After the participant approved the final version of the transcript, it was then uploaded onto NVivo, along with collected documents, to begin the coding process. Using NVivo assists in organizing and coding for patterns within the research. Patterns are considered to be consistent or regular occurrences of data and or actions if they appear more than twice (Saldana, 2016, p. 5).

Furthermore, the transcripts, post-interview surveys, and other documents underwent a first cycle of descriptive coding. This type of coding helped identify topics and subtopics but did not necessarily analyze the content (Saladana, 2016, p. 76). As the first cycle of coding was completed, a word graphic depicting coding landscaping was carried out, to examine the codes
through basic texts. Then, pattern coding and axial coding were done to provide a different way of examining the data.

**Trustworthiness**

Qualitative content analysis is deemed trustworthy through the process of collecting, interpreting, and analyzing a variety of data if it ultimately leads to a description of a phenomenon researched (Elo et al., 2014). This process involves three phases, which contribute to the trustworthiness of a qualitative study: preparation, organization, and reporting phases (Elo et al., 2014). This research used the phases of preparedness, organization, and reporting to ensure the trustworthiness of the study. Additionally, Creswell's (2014) key strategies of triangulation, peer-review, or debriefing, and member-checking contributed to the rigor necessary for qualitative analysis.

During the preparation phase, the study used semi-structured interviews and post-interview surveys for citizens, public servants, and elected officials in communities directly affected by hurricanes Harvey, Irma, and Maria. Additionally, analysis of other documents was conducted. Collecting a variety of sources and data through different methods contributed to the rigor of the study through triangulation. Using multiple case studies and data sets provides further in-depth understanding through multiple perspectives (Barusch, Gringeri, & George, 2011).

The organization phase of the study touched upon theories of social capital, which provided credibility to the conceptual framework used. By providing the proper supporting information of the concept used, the study can then be used to assist in the interpretation of the data analysis. Member-checking contributed to the validity of the study, to ensure that
participants’ answers are accurate and were represented accurately (Barusch, Gringeri, & George, 2011).

The reporting phase of the study collectively used peer-review and debriefing as another contributing factor to the validity. Getting an outside perspective on the study allowed any potential gaps in literature and analysis to be addressed and any bias reduced and was done through discussion and challenging the researchers' assumptions (Creswell & Miller, 2000).

Lastly, the proper use of these phases and methods of validity provided the trustworthiness and rigor necessary for the study. It was essential that the research remain unbiased and neutral, and in doing so, contributed to the practices mentioned that resulted in a trustworthy study.

**Ethical Procedures**

It was essential to adhere to the norms of conduct regarding ethical considerations for research. These ethical standards assisted in providing validity through responsible conduct that ultimately assisted in advancing knowledge within the field (Ingham, 2003). Existing federal policies categorize falsification, fabrication, and plagiarism as forms of misconduct within the research realm (Ingham, 2003). These acts of misconduct threaten not only ethical standards, but the validity of the research conducted. As defined by Federal Research Misconduct Policy (2003), fabrication means inventing or making up data, results, or records within the research itself. Falsification pertains to the manipulation of any research materials, equipment or processes. This also includes the omission of data that may alter the findings and not accurately represent the results (Ingham, 2003). Lastly, the term plagiarism describes the act of falsely reporting ideas, data, results, and reports as one's work, or without accurately indicating the
source for proper credit (Ingham, 2003). This overarching misconduct sets a standard across all forms of research and must be considered in any project.

In order to address these forms of misconduct, the methods of the study adhered to an ethical code. Overall, establishing a transparent process for collecting, organizing, and analyzing data helped create an honest, objective, and open environment, diminishing the potential for any error arising out of misconduct.

When collecting data, there were potential risks to participants. Due to the subject matter, the subjects could have potentially incurred levels of stress or anxiety in recollecting their experiences of the hurricanes. However, this was dependent on each subject’s personal experience and the level of comfort the participant had with sharing information. This risk was reiterated to the participant in the initial recruitment, and with the informed consent document before the interview was conducted. Because the research involved human subjects, it was presumable that identifiable information might arise in the interview. However, no personal information was used within the report, in order to maintain confidentiality. Consent forms were reviewed and signed by the participants; this provided a sense of transparency and integrity between the participant and the researcher in ensuring full comprehension of what the research entailed. Upon signing the consent form, only the researcher and the participant were present for the recorded interview, in order to maintain confidentiality. An alias was assigned to each participant to maintain confidentiality. If participants started to feel undue stress they were free to stop the interview at any time. Maintaining confidentiality protected the participant and the research itself by providing trust, which minimized any bias in the answers or results from the data. Confidentiality carried through the entire research project from the collection to the organization of the data. It was reiterated to the participant that any identifying information
provided was kept confidential. All identifying information kept in a password-protected external hard drive, with access given only to the researchers. Other forms of data used in the research, such as other documentation, were given proper credit when cited, with respect to the intellectual property. This contributed to the overall integrity of not only the research conducted but any future research or documentation as well. Next, it was crucial that the researcher remained objective when analyzing the data. Objectivity was reached through minimizing bias, by disclosing personal interests or involvement in the research subject area, as well as objectively designing the research. Noting expertise or positionality within the research minimizes bias and promotes objectivity and transparency. Using norms of conduct throughout all steps of research led to a high standard of overall validity and ethics in the research.

Ultimately, abiding by ethical conduct as found in multiple organizations, such as the National Institute of Environmental Health Sciences, Federal Policy, and American Education Research Association, provided validity to the research and eliminated any potential for misconduct. These norms promoted ethical research, accountability to the public, accountability to the research team, as well as social and moral values that led to public support for the work (Resnik, 2015).

Summary

Disaster risk reduction requires a multidisciplinary approach. Actions taken on the global, federal, state, and local levels are implemented, but often the top-down policies are disconnected from those most affected by them. When a disaster pummels an area, community individuals immediately turn to the government for a response. Policies trickle down from the top and are put in place to respond to a multitude of disasters, both human-made and natural. Grassroots efforts by community stakeholders attempt to fill in the gap between federal, state and local
jurisdictions from the bottom up. However, more information is needed to better identify what leads to the discontinuity between enacted policies, decision-makers and community stakeholders. Utilizing a qualitative method, the research was able to analyze the lived experiences of those affected by these disasters. First-hand experiences gave a deep insight into the needs of impacted communities, and how existing policies can adjust to fulfill better those needs, leading to improved resilience.

**Chapter 4: Findings**

Federal, state, and local government agencies must cooperate when a disaster strikes an area and needs exceed the capabilities of the local government and administration. Initial responses to disasters are derived from the local and state agencies that were in place before the storm. However, while waiting for assistance from the state and federal levels, communities remain exposed to hazards, leaving them vulnerable. FEMA operates to provide a response and establish the conditions to allow for recovery. Community leaders band together to compensate for the gap between federal, state and local governments. Targeting the policy gaps that exist allow for better preparation for future disasters and potentially mitigate the amount of damage. The purpose of this study is to explore the needs of U.S communities impacted by Hurricanes Harvey, Irma, and Maria, which took place in 2017, as well as the disconnect between community needs and federal and state emergency management policies.

This chapter contains a description of the data, its organization and analysis, and the themes that emerged from the analysis. The critical incident case study in qualitative methods was used to explore human behavior as well as the cognitive and emotional state of community members, and how that contributed to their lived experiences. Based on the social capital
theoretical framework, the data collected and analyzed from the community resilience framework reveal several important themes based on the research question:

What is the lived experience of community stakeholders during the emergency management response, recovery, and transitional phases from Hurricanes Harvey, Irma, and Maria, and does it identify a disconnect between top-down Federal and state policies and community resilience through social capital?

Using social capital theory as the lens, the question aimed to highlight the importance and necessity of social capital in a manner that compliments the governments’ mandate concerning disasters. The data collected from the semi-structured interviews, post-interview surveys, and other documents provided a plethora of data that led to the development of multiple findings.

**Description of the Data Collection**

The data collected consists of three data sets: semi-structured interviews; post-interview surveys; and documents. The attributes of the qualitative data are in Table 1.

Table 1

*Attributes of the Data Collection*

<table>
<thead>
<tr>
<th>Interviews</th>
<th>Post-Interview Surveys</th>
<th>Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 aggregate Interviews 16 Harvey 5 Irma 5 Maria</td>
<td>5 aggregate responses</td>
<td>4 aggregate files 1 federal report 1 state report 2 local plans</td>
</tr>
</tbody>
</table>

There were 26 semi-structured interviews conducted in total consisting of 16 participants that experienced Hurricane Harvey, five from Irma and five from Maria. Each of these participants went through the interview process and received the post-interview survey. However, only five
participants responded to the survey. The post-interview survey was conducted anonymously. Lastly, additional documents consisted of federal, state, and local level reports and plans that were produced on behalf of the governing body. These were collected or suggested references from the participants.

**Participants**

Twenty-six people with varying degrees of community involvement consented to participate in the research. Table 2 provides the participant demographics, community role, and experience regarding hurricanes.

Table 2

*Participant Demographics*

<table>
<thead>
<tr>
<th>Hurricane</th>
<th>Harvey</th>
<th>Irma</th>
<th>Maria</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Participants</td>
<td>16</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Community Role</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Local administrator</td>
<td>2</td>
<td>Local administrator</td>
</tr>
<tr>
<td>9</td>
<td>Community partners-Business</td>
<td>1</td>
<td>First Responder</td>
</tr>
<tr>
<td>2</td>
<td>Community Partner-nonprofits</td>
<td>1</td>
<td>Community Partner-nonprofits</td>
</tr>
<tr>
<td>2</td>
<td>Community Leader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>State agency administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>8 males</td>
<td>8 females</td>
<td>4 males</td>
</tr>
<tr>
<td>Prior Hurricane Experience</td>
<td>13</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
These sorted data attributes are by storm, and level of involvement within the community. The description of roles within the community are as follows:

**Local administrators.** This includes those with roles within a county or municipal government, such as city/county managers, departmental heads, planners, civil servants, as well as any quasi-government organization or authority on the local level.

**Community organizations-non-profit.** This attribute includes either those that work or volunteer on local, state, or national level.

**Community organization-religious.** The attribute includes those who identify as being affiliated through volunteering or work with any religious group, regardless of the denomination.

**First responders.** This category includes those who are trained to respond to an emergency, such as those who work within the fields of fire, police, paramedics and emergency medical technicians.

**Community leaders.** Those that may be not active in the workforce but are active among the community.

**State agency administration.** This role pertains to those who work with any state agency such as, but not limited to, the Department of Natural Resources (DNR), General Land Office (GLO), Historic Preservation, and others.

**Federal agency administration.** This role includes those who work for the federal government or an agency within the federal level such as, but not limited to: Federal Emergency Management Agency (FEMA), Small Business Administration (SBA), Secret Service, Army, National Guard, Coast Guard, and others.

**Community organization-business.** This role relates to those who may own, manage, or work within the business field.
From the 26 participants, 13 were males, and 13 were females. Twenty-two had prior experience with hurricanes, and four had no experience whatsoever. Community Roles varied, with the most common being: local administrator, Community Organization-Business, Community Organization-Non-profit.

Use of the above-mentioned attributes assisted in targeting the recruitment of participants in this purposive sample, and in doing so allowed the semi-structured interview questions to contribute to the usefulness of the data in answering the research question.

**Post-Interview Survey**

Once participants completed the interview, a copy of their transcript was sent to them for review and their records, along with a link to a survey. The purpose of the post-interview survey was not to provide quantitative data, but rather to gauge and analyze the participants’ opinions on the response and preparedness for future disasters, as well as another avenue to provide any additional information the participant recalled or wanted to disclose.

This qualitative survey consisted of 12 questions about preparedness for disastrous situations. Additionally, it asked the participant to gauge the job done by multiple organizations concerning preparedness, response, and recovery from a natural disaster or crisis. Of the 26 interviews conducted, only five participants completed the survey. The first part of the survey asked yes or no questions about emergency preparedness and future disasters. Table 3 provides the aggregate responses to the first set of survey questions. Table 3

*Aggregated Responses to Post-Interview Survey Questions*

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Unanswered</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Does your household have an emergency preparedness kit at home to be used in case of an emergency?</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2 Does your household have a plan for disastrous situations?</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
#3 Have you discussed creating a disaster plan with members in your household? 4 1
#4 Have you discussed updating a disaster plan with member in your household? 4 1
#5 Do you have a preparedness kit in your vehicle? 3 1
#6 Do you know how to find the most up-to-date information in case of an emergency such as a natural disaster? 5 0
#7 Have you taken any additional actions to prevent any damage to your home? 3 2
#8 Do you believe you will encounter another natural disaster in your community? 4 0 1

In addition to the information gathered at the interviews and post-interview survey data, reports from federal, state and local agencies were acquired. These reports were either given or suggested references by the participants. Table 4 provides the name and type of documents acquired as part of the research.

Table 4

*Types of Documents in the Data Collection*

<table>
<thead>
<tr>
<th>Name</th>
<th>Data type</th>
<th>Pages of Case File data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricane Harvey: Texas at Risk</td>
<td>State Report</td>
<td>49</td>
</tr>
<tr>
<td>Hurricane Action Plan (HAP)</td>
<td>Local Government</td>
<td>25</td>
</tr>
<tr>
<td>Long-term Recovery Plan: Post Hurricane Harvey</td>
<td>Local Government</td>
<td>141</td>
</tr>
</tbody>
</table>

| **Total**                                | **280**         |
While the primary data was via interview, the documents in Table 4 provided reports from multiple levels of government. These reports assisted in gaining perspective from those levels of government concerning Hurricanes Harvey, Irma, and Maria.

**Settings**

Setting the stage for case studies is an integral part of the research process, and as part of the critical incident method, exploring an event or sets of events helps the research to be perceived critically (Hancock & Algozzine, 2017; Mills, Durepos, & Wiebe, 2010). Further information on Hurricanes Harvey, Irma and Maria describe the paths taken by each of the storms. Understanding the tracks of the hurricanes advances the development of using the critical incident method in comprehending the behaviors of people in relation to events and their outcomes (Mills, Durepos, & Weibe, 2010).

**Hurricane Harvey.** Hurricane Harvey initially started on August 12, 2017, as a weak tropical storm by the Lesser Antilles, but gained strength to a category four on the Saffir-Simpson Hurricane Wind Scale as it moved over the Bay of Campeche on the southern area of the Gulf of Mexico. Harvey first made landfall onto the Texas coast in mid-August and lingered over the Texas coast for four days (Blake & Zelinksy, 2018). As Harvey continued to hover along the Texas coast, it brought over 60 inches of rain, estimated 132 mph winds, 10 feet of storm surge, 52 tornadoes, and at least 68 deaths as a direct effect of the storm (Blake & Zelinksy, 2018). Hurricane Harvey brought record rainfall, causing storm surge, and multiple tornadoes causing at least 125 billion dollars’ worth of damage.

**Hurricane Irma.** This hurricane originated as a tropical wave from the west coast of Africa on around August 27, 2017. It moved towards the southeastern area of the United State, including Puerto Rico and the U.S. Virgin Islands via the eastern Atlantic mid-level ridge and the
warm waters of the Florida Straits, caused Irma to intensify into a category 5 per the Saffir-Simpson Hurricane Wind Scale as it first hit the U.S around the southeastern part of Key West, Florida (Cangialosi, Latto, & Berg 2018). While in the Keys, Irma brought winds estimated at 132 mph and 5-8 feet of storm surge. Before moving through north and central Florida and southeastern Georgia, Irma lessoned to a category 3, and eventually turned into a tropical storm before dissipating over Alabama. It is noted that the figures do not portray the actual size of hurricane Irma, but rather the avenue throughout the Atlantic. Irma caused 10 reported direct deaths, 82 indirect deaths, and an estimated $50 billion in damages (Cangialosi, Latto, & Berg, 2018).

**Hurricane Maria.** On September 12, 2017, just off the west coast of Africa, Maria was a distinct tropical-wave system that moved west towards the Atlantic. By September 18, Maria had strengthened into a major hurricane, and within 12 hours transformed into a category 5 (based on the Saffir-Simpson Hurricane Wind Scale) with winds reaching up to 167 mph as it passed Dominica and St. Croix (Pasch, Penny, & Berg, 2019). By September 20, 2017, Hurricane Maria made landfall onto the southeast coast of Puerto Rico with winds at 155 mph before moving northwest diagonally through the island. Three to five feet of storm surge swept across the northeastern coast of Puerto Rico, with three small tornadoes, and at least 22.8 inches of rain, and an estimated 90 billion dollars in damage (Pasch, Penny, & Berg, 2019).

**Data Analysis**

As noted in Chapter 3, the data analysis plan, the data collected underwent cleaning methods that involved checking for duplicates, correcting errors in transcription, and renaming files to remain consistent with the data management plan.
Cleaning and Pre-coding the Interview Data

The conducted interviews and the recorded files were uploaded onto Nvivo software to undergo the first cycle of transcription. Next, the initial draft underwent another transcription cycle to authenticate the recording and the first draft. Edits consisted of missed words, corrected words, and various syntax corrections. Lastly, the second draft was finalized and then sent to the participant for confirmation of the transcript. If changes were necessary via the participant, a third draft was made and sent for confirmation. Otherwise, after confirmation, the final transcript was then uploaded onto Nvivo. As transcriptions underwent their second cleaning, precoding was done due to specific quotes, words, or phrases used worth noting (Saldana, 2016).

First Cycle of Coding. After the completed pre-coding, the transcripts underwent the first round of coding. The descriptive coding technique was used to identify topics and subtopics. However, a provisional list of codes was determined before any coding. Because the study is qualitative, having a foundation helps keep the research focused on the initial intent of the research (Saldana, 2016). Table 5 is a list of the provisional list of codes developed before coding. Provisional coding allows for anticipation of categories that may arise from the data (Saldana, 2016). Therefore, the list of codes is from the literature reviews, conceptual framework and the research question.

Table 5

Provisional List of Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation of code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvey</td>
<td>Any reference to Hurricane Harvey that included the pathway or storm itself</td>
</tr>
<tr>
<td>Irma</td>
<td>Any reference to Hurricane Irma that included the pathway or storm itself</td>
</tr>
<tr>
<td>Maria</td>
<td>Any reference to Hurricane Maria that included the pathway or storm itself</td>
</tr>
<tr>
<td>Federal Level</td>
<td>Reference to government or any agency at the federal level that assisted or was referenced by participant</td>
</tr>
</tbody>
</table>
**State Level**
Reference to government or any agency at the state level that assisted or was referenced by participant

**Local Level**
Reference to city or county government or any agency at the city or county level that assisted or was referenced by participant

**People**
Reference to community, friends, or family

**Emergency Management**
Any reference in relation to the EM field such as preparing, responding, recovering, or mitigating a disaster

**Second Cycle of Coding.** Using the holistic approach, through lumping the data, leaves room for more detailed sub-coding as the data is processed (Saldana 2016). After the first cycle of coding, the list of codes extended from those in Table 5 to an additional 20 codes, which resulted in 28 codes from the first cycle of coding. Table 6 lists the most-used codes from the 28 codes initially created.

Table 6

*Top 14 Codes after 1st Cycle*

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation of code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of Community</td>
<td>Instances/examples of people feeling connected to their community</td>
</tr>
<tr>
<td>Preparation</td>
<td>Pertaining to being prepared before the hurricanes hit, and being more prepared for another hurricane</td>
</tr>
<tr>
<td>People</td>
<td>Reference to community, friends, or family</td>
</tr>
<tr>
<td>Federal &amp; State Levels</td>
<td>Reference to government or any agency on the federal or state level that assisted or was referenced by participant</td>
</tr>
<tr>
<td>Recovery</td>
<td>Reference to any action or information to the recovery process after the hurricanes</td>
</tr>
<tr>
<td>Partnerships</td>
<td>Pertains to agreements, or outreach from government, organizations and/or businesses;</td>
</tr>
<tr>
<td>Needs</td>
<td>Pertaining to but not limited to immediate needs of people, communities, organizations</td>
</tr>
<tr>
<td>Local Level</td>
<td>Reference to city or county government or any agency on the city or county level that assisted or was referenced by participant</td>
</tr>
<tr>
<td>Experience</td>
<td>People’s general experiences that pertains to the storm or contributed to their perspective</td>
</tr>
<tr>
<td>Damages</td>
<td>Person, place, or things that were broken, destroyed or resulted in loss and/or injury</td>
</tr>
<tr>
<td>Communication</td>
<td>Exchanging information or news via people, telephone, social media, news, and/or publications of any sort</td>
</tr>
</tbody>
</table>
As seen between the provisional coding list and the list established after the first cycle, there was a shift in the codes. The researcher took an analytical approach by reviewing the transcripts and creating additional codes based on the information given by the participants. It is worth noting that the federal and state level codes were initially separated in the provisional coding list. While it remained separated among the documentation, the data from the participants did not always see a delineation between the two levels, concerning assistance. Therefore, the two codes combined were federal and state level. Additionally, the codes started to shift to become more people and community focused.

After the first round of coding, the data underwent a second round of coding. The second cycle of coding included pattern coding; this method yields a way of grouping the existing codes into a smaller number of categories and themes (Saldana, 2016). Keeping with the first cycle of codes, the researcher reviewed the data as well as the matching recordings of the interviews to further target overarching themes.

**Third Cycle of Coding and Analysis.** In the third round of coding, coding was conducted by the axial coding method. The process of using the axial coding allows themes to be linked with sub-themes and pushes further analysis as to why those themes and subthemes are related (Saldana, 2016). Based on the second cycle of coding, reviewed transcripts were placed alongside the recorded counterparts, as well as a review of the documents and field notes. Some of the relabeled codes were part of the axial code process. *Preparation* was relabeled into

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Obstacles or problems participants dealt with in relation to their experience of hurricane Harvey, Irma and Maria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships</td>
<td>Social connections to people, groups, places, and our social and cultural ties</td>
</tr>
<tr>
<td>Emergency Management</td>
<td>Any reference in relation to the EM field such as preparing, responding, recovering, or mitigating a disaster</td>
</tr>
</tbody>
</table>
Preparedness due to an inference of the term around the feeling or thought of being prepared rather than the steps to prepare something. Preparedness seemed to be more encompassing of the data. Additionally, outliers from the second cycle of coding were brought in and combined to create subcategories among the coding.

**Post-Interview Surveys.** After the interviews, participants were given a copy of the transcription for their records as well as a link to a post-interview survey. This qualitative survey was through the software Qualtrics. From the 26 participants, only five completed the survey. The questions from the survey were centered around preparedness, response, and recovery of the community, government agencies, and organizations among the communities.

The first part of the survey asked yes or no questions concerning emergency preparedness and future disasters. Table 3 provides the aggregate responses to the first set of post-interview survey questions.

**Question 1:** Does your household have an emergency preparedness kit at home to be used in case of an emergency?

- Yes – 4
- No – 1

**Question 2:** Does your household have a plan for disastrous situations?

- Yes – 4
- No – 1

**Question 3:** Have you discussed creating a disaster plan with members in your household?

- Yes – 4
- No – 1

**Question 4:** Have you discussed updating a disaster plan with members in your household?
• Yes – 4
• No – 1

Question 5: Do you have a preparedness kit in your vehicle?
• Yes – 3
• No – 1
• Unanswered – 1

Question 6: Do you know how to find the most up-to-date information in case of an emergency such as a natural disaster?
• Yes – 5

Question 7: Have you taken any additional actions to prevent any damage to your home?
• Yes – 3
• No – 2

Question 8: Do you believe you will encounter another natural disaster in your community?
• Yes – 4
• Unsure - 1

The next two questions on the survey were open-ended questions asking, what would you do differently if another natural disaster were to impact you and what would you do differently if another natural disaster impacted your community? Table 7 shows the responses to the questions from the five participants.

Table 7

<table>
<thead>
<tr>
<th>Responses to Open-Ended Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>What would you do differently if another natural disaster were to impact you?</td>
</tr>
<tr>
<td>Increase supply of water</td>
</tr>
</tbody>
</table>
Try to get all the stuff together that was mentioned in the previous questions
Nothing
Start preparation earlier

Create a post-disaster plan for the building department
Nothing
Start preparation earlier and use experience gained from Harvey to benefit community
I hope that I would accept that all will be right again. I doubted that many times in the beginning.

Lastly, the final three questions the participant answered were gauging the ability of agencies and organization on preparedness, response and recovery. Figure 1 provides the answers given by the participants for question nine.

Question 9: How would you rate the job being done by the following to help you prepare for a natural disaster or other crisis?

Figure 1
**Responses to Question 9 Rating Disaster Preparedness**

Four out of five participants rated the federal government as doing a *good* job in helping them prepare for disasters. Three out of five respondents rated the state government and local government as doing a *good* job in assisting with preparations for disasters. Three out of five respondents ranked nonprofit organizations/civic groups as doing a *very good* job with preparations, and four out of five respondents ranked church or faith-based organizations as doing a *good* job in preparedness. Two out of five respondents ranked local businesses as doing a *somewhat good* job, and three out of five ranked corporate businesses as doing a *somewhat good* job with preparations before a disaster.

Figure 2 demonstrates the rankings given by the respondents to the job being done pertaining to a response after a natural disaster.

**Question 10:** How would you rate the job being done by the following in RESPONSE to a natural disaster or other crisis?
Figure 2

Responses to Question 10 Rating Disaster Response

Of the organizations listed, four out of five respondents rated nonprofits/civic groups as doing a very good job in handling the response duties after a disaster, with three out of five respondents ranking church and faith-based organizations as doing a very good job as well. Two out of five respondents ranked the local government as either doing a good job or not good job in response to a disaster. The other organizations were ranked across the board by the five respondents.

Figure 3 demonstrates the final question of the post-interview survey, which was concerned with the job done by organizations and agencies with respect to the recovery of an area after a disaster.

Question 11: How would you rate the job being done by the following in RECOVERY to a natural disaster or other crisis?
Figure 3

*Responses to Question 11 Rating Disaster Recovery*

Four out of five respondents ranked the local government as conducting a *good* job in assisting the communities with recovery after a natural disaster. Three out of five respondents rated nonprofits and civic groups as doing a *very good* job in helping communities to recover after a disaster. Other agencies and organizations, including FEMA, were rated by respondents across the scale.

Table 8 provides the list of provisional codes used for the post-interview survey.

Table 8

*Codes for Post-Interview Survey*

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation of code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparedness</td>
<td>State of readiness to natural disasters or other crises</td>
</tr>
<tr>
<td>Response</td>
<td>Actions carried out immediately after a natural disaster</td>
</tr>
<tr>
<td>Recovery</td>
<td>Actions used to return a community to normal conditions before natural disaster hits</td>
</tr>
</tbody>
</table>

The codes used to analyze the post-interview survey were preparedness, response, and recovery. These are the phases within the emergency management field that were established to assist in policy and planning for disasters. The survey used three different styles of questions to gain insight into the participants' thoughts regarding themselves, as well as local, state and federal governments, nonprofits, local businesses, corporate businesses, and faith-based organizations. The first part of the survey involved “yes”, “no” or “unsure” as responses to questions concerning respondents’ and their households’ preparedness, response, and recovery. The second part of the survey asked open-ended questions based on the future actions of the respondent if another disaster were to affect themselves and the community. The final part of the survey was designed to allow the respondent to rank the overall job being done by the local, state
and federal governments, nonprofits/civic groups, local businesses, corporate businesses, and faith-based organizations. All responses were coded using the three codes found in Table 8.

**Reports.** There were four reports acquired through participants or referenced by participants within the interviews. The reports underwent the same coding process as the interview transcripts, using the provisional codes in Table 5. After the first round of coding the reports underwent multiple cycles of coding. Essentially, the reports offered a different perspective through holistic and pattern coding, adding weight to the themes and findings.

Components, such as context, conditions, interactions and consequences of a process, allow the researcher to know if, when, how and why something happens (Saldana, 2016).

Finally, after the coding was completed with the semi-structured interviews, surveys, and reports, three themes were derived from the analysis of the data obtained. These themes were demonstrated to be consistent among all data sets. Table 9 provides the themes, subthemes, and number of coded segments from the data.

**Table 9**
*Themes and Subthemes Derived from the Data Analysis*

<table>
<thead>
<tr>
<th>Superordinate Themes</th>
<th>Subordinate themes</th>
<th># of Coded Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Needs</td>
<td>Housing</td>
<td>2,169</td>
</tr>
<tr>
<td></td>
<td>Mental Health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Needs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outreach</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preparedness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emergency Management</td>
<td></td>
</tr>
<tr>
<td>Lessons Learned</td>
<td>Resilience</td>
<td>3,175</td>
</tr>
<tr>
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Axial coding in the third cycle led to the three themes below, based on the second set of codes used in the second cycle of coding. The overarching theme of Overall Needs was used to encompass immediate needs as well as other aspects related to disaster risk reduction. Lessons Learned is a derivative of multiple issues that include physical damage, challenges participants endured, interactions between federal and state level agencies, gaps in programming and policies, and becoming more resilient through the recovery process. Lastly, the Sense of Community theme was inclusive of the non-physical infrastructure that allowed participants to feel connected to their area. Subthemes included communication, local level agencies, people, relationships created and established, the perception of participants to their community, and from those relationships, and established partnerships, both informal and formal.

**Superordinate Theme #1: Overall Needs**

Overall needs encompass the general necessities that participants mentioned concerning their lived-experience, and is derivative from a multitude of subordinate themes, including emergency management, housing, preparedness, needs, outreach, and mental health.

**Emergency Management.** Local administrators, emergency management, and first responder prioritized immediate needs on multiple scales in all phases of emergency management. Within the preparedness phase, the focus was split among personal and community; this was confirmed by a first responder from Hurricane Irma. Though federal, state, and local governments have plans in place for preparation, individuals and families must prepare themselves for impact as disaster becomes imminent. Those that identified as a local
administrator, emergency management, and first responder prioritized needs on multiple scales and confirmed by a first responder from Hurricane Irma.

“I asked my family to leave, and they did, which was helpful for me. I didn’t have to worry about them, then I can concentrate on what my obligations are to the city, which was pretty significant. First of all, I'm in charge of my men and women that are working here, and I want to make sure that they're safe. And then also we have a responsibility to the community to provide safety in that regard. So, I didn’t want to lose my focus by worrying about my family.”

This first responder had multiple obligations but ensuring the safety of his family allowed him to focus his energy on the larger task of his employees and their community. Further supporting this is the statement from a first responder from Hurricane Harvey.

“So as far as the family, the first thing, I can't do my job if I'm concerned about them. And she [my wife] understands that. So, they've evacuated the whole time. And it is difficult to be away from your family, but the thing about it is also during hurricane time, there's just so much going on, you know, you really don't have time to think about anything else other than the task at hand.”

**Preparedness.** Additionally, ways to prepare for disasters such as hurricanes include having emergency plans for the family. When asked about how one prepared personally for hurricanes, a local administrator emphasized his family plan.

"We also kind of had an emergency evacuation plan. It's like if for some reason on the remote chance we're evacuated and where are we going...and then also telling our families same thing as like, you guys gotta be ready for this [disasters]."
Another participant within the emergency management field laid out the family plan, which is a requirement for his job and all employees within the organization.

“We have a requirement and anybody that comes on board...and we have about 340 employees. You have to sign off that you have a family plan, and if you do not and you make an excuse during an emergency, it's actually punishable. My family plan is an annual cycle, we stock up on literally everything every year leading up to hurricane season. So, by the time June rolls around, we have restocked all the water, we have restocked all the nonperishables.”

Having a preparedness plan is emphasized by federal, state, and local governments. While these plans may vary, having one helps the local administration, emergency management and first responders to focus on their community.

Also, having a neighborhood emergency plan was beneficial to this Hurricane Maria participant:

“I was the president and the chairman of the board of this neighborhood association, and I was responsible for making it a controlled access area. Prior to the storm hitting us, when we knew the storm was going to come, I dusted off the emergency response plan, the hurricane response plan that I have put together some decades back, updated it, and distributed among all of the neighbors, and we had a number of meetings to try to determine the rally points and where we would gather or collect items that if people need it or if it was required.”

It became a neighborhood effort to assist each other in preparing for hurricanes.

**Needs.** There is a need to prepare one's home in order to help mitigate potential damage, such as by flood, fire, or exposure to other hazards. Preparation assists in ensuring the safety of
the home and peace of mind of the resident. One Hurricane Irma Participant, when asked what their immediate needs were, responded;

"The first thing is everyone's power. Everyone wants to know that they [their homes] were unaffected."

Further supporting immediate needs was stated by another participant that was affected by hurricane Irma.

"Obviously, food, water, we also need to get gasoline. There were so many different types of different resources that we needed."

As seen above, the priorities of immediate needs varied post-disaster, with a focus on themselves and family. When asked the same question to those who are public servants, particularly local administrators and first responders, the priorities shift. Those within the first responder field are less concerned about their own needs, and more with immediate community needs, especially within the response level. For example, as Hurricane Harvey hit, a first responder from Hurricane Harvey talks about an issue that arose during the response phase,

“All of a sudden buses start showing up from other cities and we're having to shelter them. And so neighboring cities are getting on buses...we don't have the resources to take care of them...Now we're having to, to provide food and shelter for resource on have our shelters are limit to, you know, 800. Now we've got a thousand and now we've got to find other shelters.”

Outreach. Citizens within a community depend on public servants to provide aid when their own needs exceed their capabilities. A first responder from Hurricane Harvey recalls the challenges with trying to meet the immediate needs of its citizens:
“All of a sudden every helicopter that you can think of around was coming in, going and picking off people off house tops at other cities and come and dropping off. And say, call 911. So now we're having to, on top of everything else, we've got people being dropped off in parks and, you know, just in neighborhoods and in every like five, six, 10 people that now we have to pick up and we've got to figure out what we're going to do with.”

For those public servants that responded to the hurricanes, and those within the communities, a recurring reference to immediate needs was the concern of lack of the resources. As additional challenges arose out of the hurricanes, the capabilities and amounts of provisions were limited.

**Mental Health.** Dealing with a traumatic experience, such as hurricanes, comes a spectrum of emotions that test people in unexpected ways. While physical needs and damage are easily visible, there can be psychological effects as well, as mentioned by one Hurricane Harvey Participant:

“There’s just so many variables to what has happened…because you didn’t have that physical damage or because you weren’t a FEMA recipient, or you weren’t one of the businesses with half of the building gone or something to that effect, people don’t see that you’re going through this too. They just don’t see the emotional side and connections you make. Maybe people tend to try to keep it close so that you make everybody else’s day feel better, you know?”

With a multitude of things that needs to be taken care of directly after a hurricane, it can be an overwhelming process. Another Hurricane Harvey Participant further states;

"I could not mentally wrap my mind around what I was dealing with. I had three devastated properties and had no clue where to start…I went into a bad place."
When faced with an overwhelming feeling, disaster victims go through a range of emotions. However, it's important for people to remember that they are not alone. Hurricane Maria Participant within the psychiatric field states;

“There is evidence-based methodology that you can control your own emotion and you can help other people to control their emotions because the first thing that the people have to know is they’re not alone in this disaster. We are together. So, the first thing is I look directly to the eyes of the other people and say I’m here to help you. You’re not alone, and together we are going to recover from this disaster.”

The participant further discussed the increase of suicide rates for people that have been directly impacted by disasters, because of depression sets in. There is also commonly an increase in people suffering from Post-Traumatic Stress Disorder (PTSD). A Hurricane Harvey participant mentioned:

"I remember the whole time I was in the military and wartime…I know what it feels like to be just worn, ragged…I kind of felt that PTSD and thinking what did we just go through?"

For people directly impacted by hurricanes and disaster, discussion of mental health was alongside what participants believed to be survivors' guilt. Though mental health may be stigmatized at times, addressing the trauma associated with unfortunate events is an overall need.

**Superordinate Theme #2: Lessons Learned**

As a disastrous event occurs, a multitude of things coincide with it, and as people react to such an event as time passes, a review of the challenges faced arises. Lessons learned consist of issues, policy and programming gaps and physical damage. The subordinate themes within the
lessons learned include federal and state levels of administration, challenges, damage, normalcy, gaps, recovery, and resilience.

**Federal and State Levels.** When asked about the response of federal and state agencies, one Hurricane Harvey participants response was:

"That's the kind of bureaucracy bullshit I've had to deal with. I'd rather go through 10 storms than go through the crap you [FEMA] put me and my family through over the last year and a half."

The Federal Emergency Management Agency (FEMA), the federal level agency that controls programming and funding for emergency management agencies among states, was helpful at times, but was considered not helpful overall by participants. Participants that chose to apply for the Individual Assistance program were denied but offered a loan with the Small Business Administration (SBA). One Hurricane Harvey Participant explains her experience with FEMA:

"I tried to get hold of FEMA. I filed with them. Every time I try to get into my account, they told me I wasn't registered. Meanwhile, I had my registration number and everything, but they kept telling me I wasn't registered."

Further supporting this notion of the complications of FEMA, another Hurricane Harvey Participant recalls:

“You know, we were just really, really devastated. So, then it was just back and forth fight with FEMA and SBA and all that stuff. Every day we learned something else and then send us somewhere else and do something else.... We've got all our paperwork done. And then, FEMA started giving us excuses why they couldn't give us money on my house. And we had the inspectors come out. She [Inspector] told us, she says, Hey, your house is gone. We [FEMA] should get rid of the whole, the maximum amount. And they
kept giving me excuse after excuse that we didn't prove we owned the house...You have the deed. I've sent it to you. I sent everything from the court house.”

The intention of FEMA and SBA aid was supposed to be the last resort to fill in the gaps that insurance would not cover. However, this still posed a problem, and is explained further by another Hurricane Harvey Participant:

“FEMA and Texas Wind Insurance Association (TWIA), and every other insurance companies would come in and say, well, we think that's flood and the flood insurance would say we think that was caused because your roof blew off and neither one pays them[damages]. That's what happened to my roof before the storm. That's why I paid for it that time because nobody wanted to pay for it. They [FEMA, TWIA and other insurance companies] were blaming it on each other and they both finally said, we're not paying for it.

Because a hurricane affects each area differently, there can be difficulty claiming damage especially when the damage was caused by flood and wind. Something noted from other participants was the amount of paperwork and the problems dealing with the damages for the victims of Hurricane Katrina. Hurricane Harvey Participant 4, mentions his concern after meeting with FEMA representatives:

“Well, we found out when FEMA got here, and they came to our emergency operation center for the meetings that we had three times a day. FEMA said, you know, we have not closed out our last Katrina case. 12 years later, we still haven't closed out the last Katrina claim and all of it's just kind of hung our heads like, cause this [Harvey damages] is going to outlive us.”
This participant highlighted the concerns surrounding FEMA and other state agencies when dealing with the recovery aspect of the storms and is further supported by a participant who was affected by Hurricane Maria.

“there are many other infrastructure sectors that typically are not considered part of the recovery or response efforts by FEMA but were affected by Maria.”

Additionally, FEMA released an After-Action report that further reviewed federal actions taken and examined the process, amount of money spent, and future improvements based on the agency information gathered.

**Challenges.** As participants recalled their lived experiences with hurricanes, the challenges mentioned in their experiences were related to existing problems within the community. One Hurricane Maria participant states:

"We have in Puerto Rico, way too many laws, but very little enforcement. So, people built in areas where they're not supposed to, and people don't build up to code."

On the local level, income disparity among communities was a problem before Hurricane Harvey. A Hurricane Harvey Participant explains below:

“Unfortunately, there’...a really high-income disparity. Like you've got the haves and the have nots, you've got a whole bunch of people have retired here, have second homes here that aren't even here all the time...And then there's just the working class people and there's not a lot of middle class. So, the low-income people got really, really impacted and didn't have a place to come back to. So, we saw a lot of loss in population, particularly in that low-income demographic.”

With income disparity, affordable housing poses an additional problem. Hurricane Harvey Participant 1 expounds upon the existing housing problem and how a storm worsens it:
“When it comes to the housing market, we are challenged to find reasonably priced housing for folks, particularly those that are missing, that are displaced at a mobile home. People that live in trailers now tend to some degree in some cases just barely making it to start with, and then they get hit with a hurricane Harvey or a major flood, uh, and they've lost everything. And so there's very, there's very few options for them in terms of housing. Um, we've seen it, over the last 10 years, just continue to get worse.”

These existing problems with income disparity and affordable housing worsened after the hurricanes. Multiple participants have alluded to the fact that there is no solution for affordable housing post-disaster.

Another layer added to the challenges at the local and community level is inadequate infrastructure. Hurricane Harvey Participant 16 recalls issues before Harvey:

"We [Local Businesses] had been fighting flooding down here pre-Harvey because what they [local government] did with the road and drainage system is all wrong. I mean this store has flooded five times pre-Harvey."

This Hurricane Harvey Participant continued, noting that after Harvey hit, the area flooded worse, and the area incurred multiple damage, and the local government only became eligible for monies to repair the infrastructure issue because of Hurricane Harvey.

**Damage.** Hurricanes and other catastrophic events leave behind a horde of destruction and damage in their pathways. With hurricanes, the problems can range from tornadoes, storm surges, wind, rain, and more. A Hurricane Harvey Participant recalls watching the hurricane work:

"I opened the door and watched the trees blowing by, falling down all of my fences, $110,000 worth of fences within the first four hours of the storm were gone."
Additionally, another Harvey Participant recalls words from their mayor:

"Our mayor had described it like somebody shook the city for 12 hours straight."

Not only do hurricanes bring strong winds, but also the potential for tornadoes and storm surges. One Participant recalls first-hand how both tornadoes and the storm surge directly affected them as Harvey passed through:

“We heard things crashing against the house outside...we knew this is a tornado...and it started shaking the house...we felt the house shift a couple of times really violently shift, then we felt it lifting up like we were in an elevator...and then the house just dropped out of the air probably 10,15, 20 foot off the ground...As I looked at my wife, the back of the kitchen window blew out and a wall of water came over the top of her head and hit the counter...then hit me, and I did a back flip over the couch and when I came back up the house is already floating away and I was already waist deep in water.”

The amount of damage victims deal with can vary, but it is certain that those directly affected by hurricanes deal with debris and damage in some way. One Hurricane Maria participant recalls:

"All the streets were blocked with debris...finally a week passed, and I could go with the national guard to Humacao to check on my family."

Damage took on many forms, based on the participants' experience.

**Normalcy.** Going back to a routine of sorts contributes to the overall recovery of a community. One Hurricane Harvey Participant demonstrated the need for it as follows:

"We had to have the normalcy. We couldn't keep going with 'we got to put that off cause of Harvey...we have to do what's right for the community."

The routine of normalcy can boost morale, as a Hurricane Harvey Participant mentions:
"we started trying to tidy up... to make it bearable and gives us something to do…to get back to the way it was."

After disasters, there was a dire need to resume operations, but it was a challenge due to the damage. A Hurricane Irma Participant emphasizes the need:

“We [organization] want is to resume operations in each one of our counties as quickly as possible because we serve the public...We do that every day from the vaccinations in some cases. I hate to say it, primary medical for the lower end of privilege. Also, with our women infant children program, food vouchers for those who don't have a lot of money.”

Getting back to normal operations allowed organizations to assist the public, but if a hurricane drastically affects an area, then assistance to those who need it most is delayed or nonexistent for some time. Those dependent on programs such as these already have limited resources before a disaster strikes.

**Gaps.** The subordinate theme of Gaps incorporates a myriad of disconnections between policy, programs, materials, and more, which lead to exposure to vulnerabilities. One Hurricane Harvey participant recalls having an emergency plan and laying actions out with unanticipated issues:

"We better start enacting our 72- hour plan. We didn't realize that 40 hours later Harvey would be making landfall. So, our 72-hour plan wasn't great. It wasn't effective."

Even after a phenomenon like hurricanes, gaps exist, especially in response and recovery. A Hurricane Maria Participant emphasized:

"The first line of response is not government. People cannot depend on whatever the government is going to be able to do on their behalf following a response. People have to do it on their own."
Another Hurricane Harvey participant described the chaos of trying to find the proper avenue of help:

"We started asking them [RedCross] what do we do? They said, ‘well go to FEMA’…so first day we found FEMA, and they [FEMA] told us to go SBA, so we ask where SBA is and were told to call them. Well we don't have phones."

Disconnects in policies, programs, and processes contribute to the added frustration of hurricane victims and delays the recovery process.

**Recovery.** As part of the emergency management phase, this subordinate theme pertains to the processes, experiences, and detail involving hurricane victims recovering after the initial response. As part of this process, FEMA assists to a degree but relies on locals in an area to facilitate. One Hurricane Maria participant recalls:

"I was the liaison, the go between [FEMA and Puerto Rico], so I was involved with the Secretary of Education on her staff, addressing issues and trying to provide resources, and coordinating with FEMA to make sure the tasks were carried out as quick as possible."

The multitude of tasks involved in recovery makes it no easy feat, as explained by a Hurricane Harvey Participant:

"The hardest part is afterwards recovering and everything, my house had 9 inches of water in it [house] so I ended up having to try and get that organized and taken care of."

The road to recovery involves time and is not an overnight, weekly or even monthly undertaking. A Hurricane Irma Participant pointed out, when asked about the community recovering:
"There are still homes affected from Hurricane Matthew that are under construction and being repaired…so we still have a few years dealing with those effects and Hurricane Irma damage..."

**Resilience.** As part of mitigation efforts, resilience includes methods taken by those affected by Hurricanes Harvey, Irma, and Maria towards improving disaster risk reduction and exposure to hazards. Becoming resilient can be done through updating existing codes, as stated by a Hurricane Harvey Participant:

"No privately-owned building was destroyed…that's a testament to the fact that new builds in most cases were built to a different code, a more updated code"

Building to new guidelines assists in the resilience process. Another Hurricane Harvey participant stated:

"My foundation went up an additional 33 inches, which puts us at 46 inches of concrete, but I told them [developers] to dig the bracings down six feet so that they [bracings] could have 2 feet of undisturbed soil"

Additionally, a Hurricane Maria participant stated:

"We added in the design of the house cement lattice that double as stairs to the roof, just in case."

This Participant and family had to be rescued from their home previously via the national guard, but had no way of accessing the roof, which led to the added design feature in the home.

Furthermore, local agency reports laid out a long-term recovery process that aims to make the community more resilient. The report itself emphasizes the existing FEMA programs but highlights local initiatives such as coordinating volunteers and local land use plans.
Superordinate Theme #3: Sense of Community

The societal threads that include communication, relationships, partnerships, and local level government make up the superordinate theme of a sense of community, which arises from the data.

Communication. People use all forms of communication not only to talk but also to find out information. Communicating the most-up-to-date information informs people about where to go, what to do, and what to avoid in case of a disaster. People want to know information about their community. A Hurricane Harvey participant that chose to stay during the storm used his personal social media account to document what was going on in the area. He recalls:

“I was doing a lot of like posting on social media. So, I was posting like, cause we have family in Massachusetts, we have family in New Hampshire... I got contacted by ABC News or CNN around like 11 o'clock, CNN international, this woman reached out to me and says, ‘Hey, I'm with CNN, would you be interested in doing an interview? And I said, yeah, sure.’”

He further explains the interview process and how people within the area were also contacting him to get the latest information about their area. When asked about communicating with the public during a disaster, a Hurricane Irma Participant spoke about the information they sent out.

“We have a hurricane action plan...we just kind of constantly sent emails to all of our hotels and our attractions and said, again, this is what we are doing. We're building the website page, informing our groups and meetings are here. We're trying to be a hotline. We've posted all the information, give visitors what they want to know…. It’s on our website. So, the good thing is that the hotels began referring their guests to our website...Our external message was right on target.”
Sending out accurate messages helps accurate information get to the people and contributes to the communal ties that create a sense of community. Communicating with other people helps strengthen those relationships and has shifted to more than face to face means. After the hurricanes struck one area, a community activist felt compelled to do her part in helping her community after the disaster. This participant started a social media page for people that wanted to volunteer or help. The participant recalls:

“So, I started a Facebook page. I know it sounds crazy, but um, it was the little bit that I felt like I could do right at that moment. So I started a Facebook page and it was a cleanup page, and within probably three weeks, I had over 6,000 people in that had joined the page...So actually the lady that was kind of heading up some groups of people that needed help, we have different subdivisions. And so she and I had never met, but she knew I had that Facebook page and we also lived in the same neighborhood. So, she, so she reached out to me and said, yeah, I've got all these people that need help. Um, and you've got that page, do you have people coming? And I said, yes. So it was really cool because she and I worked together to team up and match volunteers with people who needed volunteers.”

This participant was able to gain volunteers not just locally, but from multiple areas, and rerouted people to those within her community who needed the assistance. Additionally, she led them to a community member who created a local relief camp. This relief camp became a tent city for those with no shelter left, and no food because of the impact of Hurricane Harvey. However, there were those instances where people felt that the community was not doing enough or did not see the need to help one another. Multiple participants mentioned the negative side of
social media and the amount of negativity surrounding their community. A Hurricane Harvey Participant recalls:

"It was very trying on the nerves of the community. So, there was a lot of stuff going on on Facebook that was very negative and hurtful and ugly...If it ever happens again, I probably will get off of Facebook for about six months because it brought such a negative energy to everything."

Another Hurricane Harvey Participant further mentioned the lack of sense of community by people in the neighborhood:

“People haven't been there [homes] for two weeks, but yet their debris is all sitting there, but then it's impacting everyone else. So before you know it, you're like, hey, we just need to get together and do this. And it's interesting...because on an entire block, you might have had four people doing that and other people who were there choosing to just take care of their own.”

Despite the naysayers, when people within a community share an experience, particularly a traumatic event, it connects them. The outreach of assistance from multiple levels contributes to those at the grassroots level contributing to a sense of community.

**Relationships and Partnerships.** One Hurricane Irma Participant stated:

“You know, you'll hear this cliché, it's all about the relationships, and that's true.”

Regardless of the role within the community, building relationships with people assists in creating mutually beneficial partnerships. Another Hurricane Irma participant stated:

“So, my job really is about those relationships and strong relationships with the county levels of jurisdictionally. So that would be emergency management agencies, all the first responder groups, anything that would entail an emergency operation. I've got to know
those people. I need to be able to communicate with them on a regular basis because we have limited staff and each one of the counties and they're going to be busy. So I did the coordination for them.”

As this participant mentions, due to the multiple levels of government, one deals with, relationship building is vital for coordination and cooperation. To further support this, another Hurricane Irma participant stated:

“We have a very robust public partnership with about 40 agencies in total. So it was a lot of coordination as far as getting the meetings, perhaps getting a location for our police, fire and public works, place of refuge to go to at a high point of land, get them prepped to make sure people had logistics as far as food cots, a place to stay during the storm.”

There are multiple agencies involved within a community that must go through all the phases of preparedness, response, recovery, and mitigation in order to ensure that the community can withstand a disaster such as a hurricane. From a functional standpoint, the local levels conceived Memorandums of Understanding (MOU) that formalize these relationships and partnerships and contribute to ensuring relief on multiple fronts. For example, after a disaster such as a hurricane, the effects can vary but often exceed the capabilities of the local government. A participant from Hurricane Harvey emphasized the importance of a lesson learned:

"We've learned this in the past like as really good as far as the emergency management. They've [local government] really set up a lot of packages and stuff and, and contracts with food would help out."

Additionally, MOUs are not just within government but are also created amongst organizations, as mentioned by this Hurricane Harvey Participant;
"So with Southern Baptist and Operation Barbecue Release, we have MOUs, memorandums of understanding that we have established with them in the past. And, we activate those agreements. For instance, with the Baptist in most cases they'll furnish everything they need [equipment], and we purchased the food."

While having some form of formalized partnership is important, informal relationships are beneficial as well. One Hurricane Irma Participant commented:

“We have great partnership with all our big box stores... to be able to get their supplies back in to be able to give back to the community or the food essentials that they can take. We didn't have it in a formal MOU, but we have great relationships with the store owners and knowing how important and how useful they [big box stores] are to our citizens that stayed behind it and the ones that are trying to come back in.”

By utilizing those relationships between organizations and people, the necessary partnerships become beneficial to the overall community. These relationships extend past the local level and reach out to the regional and state levels, particularly with community organizations such as nonprofits or religious groups. Often, other branches of existing local levels of partnerships collaborate to assist when needed. Hurricane Harvey Participants emphasized cooperation:

"We always try to work with our partners in a way that doesn't strain anybody in terms of our goal. Our goal is for everybody to get out there and to produce those meals that you know are so needed when we get out to the site."

Agencies and organizations amongst themselves produce these relationships, which lead to cooperation in times of duress. When Hurricane Harvey hit one affected area, it wiped out all the
power structures to multiple areas. However, due to the cooperation and collaboration within the power company, resources were sent to assist. A Hurricane Harvey Participant commented:

“Well, whenever they [Lineman] came out here after the hurricane and the trucks started rolling in, they were from four or five different states. I remember seeing trucks from Kentucky, Ohio, Tennessee, and Florida. They were all rolling in and they were, they just kept coming...we had over 1200 workers living in man camps...within our 400 acres.”

The assistance of power partner companies reduced the turnaround time to restore devastated area. When formal relationships and informal relationships help construct partnerships that lead to improved collaboration and cooperation, it could improve the experience of the community in a time of need.

**Local level.** The local level within the data dealt with local government, agencies, and grassroots efforts amongst the community in dealing with any phase of emergency management. Hurricane Harvey Participants emphasizes how the local level agencies came together:

"Our government officials are community leaders, businesses, chamber, law enforcement. Our EOC meetings were community-wide, preparing every aspect, protecting our animals, our residents, our hospitals."

Neighborhood associations helped each other and were active in making emergency plans. As one Hurricane Maria participant described:

"With our board members, we walked the streets and made sure that people pulled down or brought in anything that could be debris…and after the storm the board members gathered to assess what had happened."

Grassroots efforts were able to reduce vulnerabilities on a local level, as mentioned by this Hurricane Harvey Participant:
"This woman set up a relief camp on her property for people that did not have a place to go or needed food. She'd serve a couple of meals a day to people affected by the disaster and the workers that came in to help clear the area."

Additionally, local agencies, like the Chamber of Commerce and the Marketing and Tourism Agency, assisted in disseminating information to the public. One Hurricane Harvey Participant mentions the Chamber’s actions:

“We were tasked with getting information from the streets, various sources, law enforcement, members in the community to keep them informed.”

This Hurricane Irma Participant further supports getting information out as mentioned:

“We knew we had to get all the information from the hotels and start posting in on our website and create a hurricane information page.”

Furthermore, the local documents highlighted local actions taken, with all emergency management phases, to assist people within their respective communities. Actions and plans ranged from a specified hurricane action plan that laid out the step by step processes necessary for the organization to assist, to long-term disaster recovery plans.

Findings

It's like everything compounds a ripple effect.

-Hurricane Harvey Participant

Based on the data gathered and analyzed from the semi-structured interviews, post-interview surveys, and reports, three themes emerged, leading to five findings. There was no significant proof of discrepancies among the data that would require the distinction in findings from one hurricane to the next.

Findings 1-Deficiency Needs Must Be Prioritized
With disasters, a range of deficiency needs are necessary, including power, shelter, food, water or safety. However, the priority of needs is based on the role of a participant within the community and those needs can overlap between work and private life.

**Findings 2 - Collaboration & Cooperation is Essential**

Relationships established both formally and informally on multiple levels are essential to collaboration and cooperation within a community in all phases of emergency management.

**Finding 3 - Communication is Key to Emergency Management**

Communication was key in all phases of emergency management and was essential to creating relationships that in turn built a strong sense of community through community activism, starting at the grassroots level, and under extreme pressure can either help or hurt a community after a disaster.

**Finding 4 - Challenges Stem from Prior Conditions**

The challenges people face concerning the disaster existed prior to the disaster and became exacerbated once the exposure was imminent.

**Findings 5- Federal and State Assistance come with Red Tape**

Assistance from Federal and State agencies was beneficial to those that had a set of traits that fitted and could maneuver within the bureaucratic system. It helped those that could navigate through the red tape, but at a price.

**Summary**

So, it was a lot of adrenaline, a lot of caffeine, a lot of working together with our agencies.

-Hurricane Irma Participant
The purpose of collecting the data was to produce findings that would contribute to answering the research question regarding policy gaps between the levels of government and grassroots efforts. The Findings in Table 10 contributed to the intent of the study in providing solutions to policy and programming gaps and is explained further in the next chapter.

Table 10

*Aggregate Findings*

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Chapter 5: Conclusions and Recommendations

I would say we can always do better. There’s no doubt that we can always do better.

– Hurricane Harvey Participant

In 2017, Hurricanes Harvey, Irma, and Maria dismantled parts of the United States, including Puerto Rico, ultimately causing 265 billion dollars’ worth of damage (FEMA, 2017). The Hurricanes have the distinction of being among the costliest hurricanes on record for FEMA, and their impacts resonate far after the hurricane itself has passed. After a hurricane strikes, the community first turns to the local government and its public servants for help. When the capabilities of the local level government cannot provide enough assistance, the federal and state government level and their agencies step in to reinforce the community. When higher level assistance occurs, it comes from the top-down, leaving those at the grassroots level exposed to vulnerabilities. Those at the grassroots level band together using social capital, the beneficial relationships among people, groups and organizations (Aldrich & Meyer, 2015), to address community needs after a disaster impacts an area and while waiting for aid to trickle down from government and other agencies. The intent of this study was to identify the discontinuities between federal and state level agencies and local level agencies that result in exposure to vulnerabilities, and to reduce disaster risk using social capital that can ultimately lead to resilience.

Summary of the Study

The purpose of this qualitative exploratory case study was to analyze the lived experience of those within U.S communities affected by Hurricanes Harvey, Irma, and Maria, and the disengagement between community needs, and federal and state emergency management policies. The intent of the study was to explore these factors, identify problems, and recommend
solutions for preparation and mitigation practices, to reduce disaster risk and increase resilience in hurricane-prone areas.

**Summary of the Literature Review**

Existing literature around disaster risk reduction (DRR) and social capital explores a multitude of subthemes that contribute to the overall goals of resilience. The importance of resilience centers around communities and their ability to absorb, resist, adapt, and recover from stresses such as natural disasters (UNISDR, 2017). Within DRR practice, utilizing multiple approaches is in order to reduce community risk to vulnerabilities. Climate Change Adaptation (CCA) and multi-jurisdictional efforts highlight the variety of disciplines and strategies used. Frequently, DRR is inclusive of CCA that include sustainable development and ecosystem-based adaptation. The literature shows that Climate Change Adaptation (CCA) and DRR are not accomplished after one event, but instead require multiple events and efforts to reduce community vulnerability. However, at times, these strides in DRR and CCA are proven to be counterproductive, due to the tendency for efforts within the respective fields to work in silos.

The literature discusses multi-jurisdictional efforts that include a plethora of global organizations and governments and finds ways to measure resilience such that benchmarks can be charted to follow progress. For example, the Asian Cities Climate Change Resilience Network (ACCRN) set forth indicators for climate and urban resilience based on a conceptual framework (Berke et al., 2014). Additionally, the Resilience to Emergencies and Disasters Index (REDI) used multiple factors within the index to benchmark strides towards resilience, through comprehensive planning that included hazard mitigation, economic, and land use (Kontokosta & Malik, 2017). Lastly, FEMA addresses disaster risk reduction through their Hazard Mitigation Grant Program (HMGP), which was established prior to FEMA research showing that for every
dollar spent on potential HMGP projects four dollars’ worth of damages is saved (FEMA, 2017). Initially, the funding for this program comes from the Federal government, then goes through the state emergency management agency, making its way to the local government where applicable.

Preparedness for a disaster is inclusive of all individuals within a community. FEMA’s Whole Community Approach to preparedness acknowledges the significance of communities being prepared in order to reduce risk and increase security and resilience (Plodinec et al., 2014). An essential part of community resilience falls to the individual, and the relationships one establishes through the community. The societal relationships formed are through interactions between multiple facets, creating social capital. Research shows that most communities can potentially only be as successful as a whole if strong social capital exists. In efforts to raise community resilience, the Community Regional Resilience Initiative created the Community Resilience System (CRS), which integrated the relationships within communities (Plodinec et al., 2014). Collectively, the individuals that make up the community are part of some form of social network and social capital, which encompasses mutually beneficial relationships among groups, organizations, and people (Pfefferbaum, Van Horn & Pfefferbaum, 2017). Therefore, when a disaster such as a hurricane impacts an area, the imprint it leaves may be as unique as the community itself. While individuals await assistance to trickle down from the Federal level to the local level, community leaders draw from the established relationships to create social capital, in order to lessen the gap of exposure to vulnerabilities.

Summary of the Methodology

The qualitative research approach allowed the acquired data to be from multiple sources, including interviews, surveys, observations, and documents. The critical incident case study method pertains to human involvement around a specific incident or event (Mills, Durepos &
Weibe, 2012). The critical incident method not only investigates human behavior, it also considers the cognitive and emotional state in the individual as it is relevant to their contribution to groups, as influenced by exposure to an event (Mills, Durepos & Weibe, 2012).

The case study involved communities that were directly affected by Hurricanes Harvey, Irma, and Maria, impacting different geographic areas in 2017, and which could have been eligible for federal aid. While sizes of cities studied varied in population, mega-sized cities (populations of 10 million plus) were excluded as potential sources of participants for the study, due to time restraints. Participants were recruited who were at least 18 years of age and identified within any fields including, but not limited to: first responders, emergency management, municipal administrators, educators, elected officials, local business owners, civic leaders, and people involved in non-profits. Participants underwent semi-structured interviews and follow-up surveys. Sampling techniques included purposive and snowballing methods, in order to collect the data. This method allowed researchers to intentionally recruit participants with characteristics that would be the most beneficial to the study (Creswell, 2014). Once the interviews were conducted, the collected data underwent multiple rounds of coding and analysis, based on the lived experiences of those affected by Hurricanes Harvey, Irma, and Maria.

**Summary of the Findings**

Five findings emerged from the analysis of the data collection, which included 26 semi-structured interviews, observations, notes taken during the interviews, information from the follow-up survey, and the 280 pages of report data, as detailed in Table 11.
Table 11

Findings of the Study

<table>
<thead>
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<td>The challenges people face in relation to the disaster exist prior to the disaster and become exacerbated once it is determined that exposure is imminent.</td>
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<th>Findings 5: Federal and State Assistance come with Red Tape</th>
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<td>Assistance from Federal and State agencies are beneficial to those that have a certain set of traits that fit and can maneuver within the bureaucratic system. It helps those that can navigate through red tape, but at a price.</td>
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The findings encompass all phases of emergency management because there is not necessarily a delineation among people that dictate when a phase stops and another one starts. The intent of the research is to identify policy and programming gaps, as well as solutions and recommendations, to address the gaps from both top and bottom levels.

Discussion of the Findings

The outcome from the semi-structured interviews, observation notes, and reports further support the necessity of social capital concerning disaster risk reduction and resilience. By highlighting the findings and conclusions based on the lived experience of those affected by Hurricanes Harvey, Irma and Maria, the study outcomes contribute to the literature establishing
an on-going need for more focus on preparedness and mitigation, which ultimately leads to resilience and overall disaster risk reduction.

In Relation to the Literature Review

The literature review initially examines the multidisciplinary approaches to disaster risk reduction (DRR), applicable efforts from numerous jurisdictions and prior research involving social capital and disasters. Three conclusions were formed from the literature. First, despite the multidisciplinary approach to disaster risk reduction, strategies within the DRR realm work in silos, and reducing disaster risk involve a series of efforts rather than one event. Functioning independently from one another led to efforts becoming counterproductive (Begum et al., 2014; Thomalla et al., 2006). Second, because of the flexibility of disaster risk reduction, global efforts have been established from a plethora of organizations locally, regionally, and nationally. Multi-jurisdictional efforts involved the implementation of measuring mechanisms and indicators that laid out best practices for communities to decrease exposure to vulnerabilities and hazards, such as the Asian Cities Climate Change Resilience Network (ACCCRN), the Resilience to Emergencies and Disasters Index (REDI), and the Disaster Resilience Scorecard (DRS). However, not all communities or disasters are the same, which makes it challenging to create a standard set of recommendations. Third, (as acknowledged by FEMA and other studies) is that social capital is an essential part of disaster risk reduction. To better plan for disasters, a community approach must be taken that involves all in its preparations (FEMA, 2011). However, there are no standard operating procedures to guide communities to community resilience (Plodinec et al., 2014).

This multi-case study involving Hurricanes Harvey, Irma, and Maria highlights how social capital can overcome these functioning silos and how existing practices can be improved
by involving all members of the community. Existing silos that limit DRR and Climate Change Adaptation (CSA) include a lack of overlap or cooperation (Thomalla et al., 2006). This study finds that the use of social capital can provide safety nets to individuals and families within communities and go beyond that in reaching the local economy. While immediate needs were deficiency needs, such as power, fuel, food, water, and shelter, by those affected from hurricanes, the study finds that community members were able to help fulfill those needs while waiting for government aid from the federal and state level agencies. The findings demonstrate how people and communities were able to work together to address problems.

Moreover, this study directs attention to the informal and formal relationships that yield better collaboration and cooperation among multiple levels. In reference to the REDI benchmarks on neighborhood resilience, the findings show that building of formal and informal relationships leads further support to the notion that social capital can secure the local economy through its local people. This contribution helps the overall vitality of the long-term economic development of the area, as evidenced in indicators of measurement from multijurisdictional efforts and community involvement (Kontokosta & Malik, 2017). Furthermore, the findings of the study demonstrate how communication is essential in all phases of emergency management, contributing to a knowledge of how social capital expands boundaries through technology, such as social media, and existing informal infrastructures.

Additionally, FEMA and state agency mandates limit agencies’ powers, and put into place bureaucratic layers; both levels acknowledge the need for immersive community involvement but restrict how much and what can be provided to those affected (FEMA, 2017). Social capital has the flexibility to maneuver the bureaucratic system to compensate for the restrictive boundaries of government agencies. In all phases of emergency management, only so
much can be done by government entities, as has been found throughout all the case studies encompassed within the overall study, which also noted that social capital is a crucial component in reducing disaster risk and can ultimately lead to community resilience. This current study further engages the use of social capital not just as an approach, but as a mechanism to be utilized within the field of disaster risk reduction and resilience. If used properly, social capital can lead to an increase in community resilience.

**In Relation to Social Capital Theory**

Theorists of social capital, such as Pierre Bourdieu, James Coleman, Robert Putnam, and Nan Lin vary in their interpretation of social capital. Each of the theorists explains the multiple levels and how people interact with one another, contributing to the overall social fabric of a community. Both Bourdieu and Coleman theorize social capital as a series of relationships and interactions among all levels of society, but vary in focus (Häuberer, 2011; Coleman, 1990). As Bourdieu converts social capital into an economic, cultural, and societal aspect of a good or service (Häuberer, 2011), this study further supports his concept. Concerning a disaster, social capital is used as a good or service to assist people and others within a community.

Additionally, the study further supports Coleman's concept of social capital, which involves existing relations developed amongst social organizations and people (Häuberer, 2011; Coleman, 1990). The study finds that having relationships, both informal and formal, among people contributes to the conversion of goods and services by using social capital. The existence of these relationships is most notable in the response and recovery phases after hurricanes but can be used for continuous improvement after a disaster. Putnam's theory of social capital encompasses the notion of civic virtue and the added value of social interactions contributing to the overall stability of economic development and government (Häuberer, 2011). The study
bolsters Putnam's ideas through grassroots involvement of those within a community, and how social capital provides a safety net not only to individuals but to local businesses as well, leading to improved economic development and stability through social capital bridging. Within the study, local business owner participants were able to prepare either their business or home for the impending hurricane. Most business owners chose to prepare the business first because it was their form of income, relying on the community’s needs in order to make a living. The owners desired to not only provide resources to the community at a time of need but also relied on the community to be a driver of the economy. Lin's social capital theory uses social relations in numerous levels: identity and membership, shared resources and information, and fundamental interactions and reciprocity (Aldrich, 2012). Of the theorists, Lin's concept of social capital is the most encompassing, and the study contributes to her overall structure of informal and formal relationship-building on multiple tiers, that lead to social networks and social bridging. In relation to the impact of hurricanes, the findings build from those informal and formal structures and relationships that can convert into goods and services which contribute to community resilience. However, because social capital is from existing relationships, there is a certain amount of "buy-in" from an individual. Accessibility to social capital and its resources requires effort from individuals and cannot always be expected. This study's outcomes show that communication is essential to assemble those relations, especially at the grassroots level. As regards to social capital theory, the study can further contribute to multiple theories based on closed and open structures of social capital. Including informal and formal community relationships can contribute to community resilience over a long-term spectrum.
Conclusions

Through the lens of social capital theory, the results of the research findings the conclusions listed below, providing answers to the research question: *What is the lived experience of community stakeholders during the emergency management response, recovery, and transitional phases from Hurricane Harvey, Irma and Maria; and does it identify a disconnect between top-down Federal and State policies and community resilience through social capital?*

Table 12 further offers more encompassing answers to the research question above, based on the data collected from the responses of 26 participants experiencing at least one of the major hurricanes of the 2017 U.S. Hurricane season, 5 survey responses post-interview, and 4 reports in relation to hurricanes.

Table 12

**Aggregate Conclusions**

<table>
<thead>
<tr>
<th>Findings 1: Deficiency Needs Must Be Prioritized</th>
<th>Conclusion 1: Social Capital bridges gaps.</th>
<th>Social Capital can compensate for the existing gaps with federal and state agencies by providing safety nets for individuals and family.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findings 2: Collaboration &amp; Cooperation is Essential</td>
<td>Conclusion 2: Social Capital offers security.</td>
<td>Social Capital has the ability to improve the security guarantee for the local economy and is vital to the long-term economic recovery of an area.</td>
</tr>
<tr>
<td>Findings 3: Communication is Key to Emergency Management</td>
<td>Conclusion 3: Social Capital can be limitless</td>
<td>Social Capital expands using communication mechanisms and informal infrastructures.</td>
</tr>
<tr>
<td>Findings 5: Federal and State Assistance come with Red Tape</td>
<td>Conclusions 4: Social capital is adjustable</td>
<td>Social Capital has the flexibility to maneuver bureaucratic hurdles that otherwise restrict government agencies.</td>
</tr>
<tr>
<td>Findings 1-5</td>
<td>Conclusion 5: Social Capital is key.</td>
<td>Social Capital is a crucial component to reducing disaster risk and can ultimately lead to improved community resilience.</td>
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</table>
These conclusions, derived from the findings, show how social capital, when utilized, can reduce disaster risks, which can ultimately lead to resilience. All federal, state, and local government bodies must adhere to a strict mandate that dictates its boundaries; there are processes, policy, and programmatic disconnects as a result of these mandates. Therefore, the use of social capital can compensate for the existing disconnects.

Whenever there are deficiency needs for those affected by the hurricanes, the linkages and networks of social capital compensate by bridging the gap, allowing people to help one another through sharing resources. One Hurricane Harvey Participant further supported this concept:

"Our local Baptist Church has become the volunteer coordinator and as a resident, if you have a problem, you go to them and get registered and say, I’m in need."

On the grassroots level, social capital through its social bridging, connecting outward towards other groups and people, helps the local economy to recover, using programs such as fundraising or simple everyday purchases. When asked about local efforts after the storm, one Hurricane Harvey Participant, provided examples:

“Whataburger and HEB, Whataburger opened a trailer and was selling a dollar Whataburgers…We had a business that purchased land just before the storm... I think it was 30 days after the storm, we were having a ribbon cutting…the whole community came out, television came out, our mayors, our judges, we all came out just to support them and they said we're going to be part of the rebuilding groundbreaking.”

Social capital expands an individual's networks through facets like social media and other social networking. Daily interaction, as well as formal and informal relationships, allow for communication, especially in times of crisis. For those affected by Hurricane Maria, a Participant
recalls "the only person that has been an outspoken advocate on behalf of Puerto Rico and why the federal government needs to really own up to the recovery of Puerto Rico has been the mayor of San Juan." The mayor was able to use multiple forms of communication to get to the people via social media, news, press releases from her office, etc.

However, government agencies must follow a strict set of guidelines, protocols, and procedures when a disaster strikes, which often leaves citizens frustrated with the processes. Social capital has the flexibility to maneuver around these government restrictions, in order to further assist people. One Hurricane Harvey Participant corroborates:

"you can't necessarily depend just on the government. We have done it ourselves, but with huge outsource outside support from the Mennonites, the good Samaritans, Samaritan's purse. … but thousands and thousands of volunteers have come."

A Hurricane Maria participant shares this sentiment:

"You cannot count on the government. You need to be prepared for the first two weeks at least two or three weeks…because you don't know how hectic it's going to be at the time."

Using social bonds, social bridging, and social linkages, social capital, if used effectively, can reduce disaster risks, which can ultimately lead to resilience. The findings of this study demonstrate, with social capital theory, how social capital can compensate in a way that federal, state, and local government agencies cannot. The grassroots efforts can work from the ground up, while the government policies work from the top-down to fill in the gap. They meet somewhere in the middle.
Implications for Practice, Policy and Additional Research

This study, using the critical incident case study method and social capital theory, provides a variety of avenues and implications for practice, policy, and future research. This section will provide further detail into what those implications entail.

Implications for Practice

“Recovery has got to be locally driven. Action from a state agency or from a national agency to come in and tell a local community how to run the recovery is a little bit misguided because local communities should be trained and should be capable of doing it.” Hurricane Harvey Participant

The findings of the case studies further support the existing problems of individuals and communities concerning disasters. The findings highlight that the existing applications of policy and programs are not necessarily the most beneficial, and the restoration of communities to pre-storm conditions is not always the best use of resources. When a disaster occurs, federal and state agencies assist local governments when the damages exceed their capabilities. However, federal and state agencies are meant to respond and establish conditions among communities that allow for the community to manage recovery at the local level. Communities and their people believe that government entities such as FEMA and state emergency agencies should restore everything to pre-storm, but the study found that the federal and state levels do not have the capabilities for full restoration.

Therefore, it must be up to those on the local level to properly prepare, respond, recover, and mitigate amongst their communities, when dealing with disasters alongside government agencies. Just as each disaster leaves a unique imprint on communities, the study finds that
communities should utilize informal and formal infrastructures that help the community function regularly and have the mechanisms in place before disasters occur. As FEMA (2011) has acknowledged in its "Whole Community Approach," involving community stakeholders ahead of disasters leads to a quicker recovery. Hence, those community leaders on the grassroots levels must engage others within the community in localized programs. Just as governments tend to work in silos, so do community organizations, and the infrastructures within them, but they have the flexibility to communicate and break down existing silos. The involvement of existing programs within the education realm, such as nursing, medical, or Reserved Officer Training Corps (ROTC), at secondary and higher education levels, as well as other groups among communities that would be able to mobilize or can be trained to assist, would be beneficial to the communities.

Additionally, just as local governments have an emergency operations center, communities should take it upon themselves to create a similar area, or at least have a plan and contact list in place prior to any disaster. Having some type of community emergency center allows more accountability through proactiveness, rather than just as a reaction. As Aldrich and Myer (2012) found, those with tight social bonds, as seen in Hurricane Katrina, were able to recover at a quicker rate than others. Engaging people at the grassroots level can compensate for the gap between federal and state level agencies.

**Implications for Policy**

“It was admitted by the government and the Commissioner of Emergency Management and has been transmitted that people cannot rely on them for the first level of response.”

- Hurricane Maria Participant
Disaster and emergency management policies and programs are derivative of the top-down design, leaving little guidance at the grassroots level. The implications of the findings from the case studies feature the need for flexibility within policies. Existing top-down policies and programs do not consider critical infrastructure systems that are not necessarily physical structures such as roads, bridges, water systems, and others. Furthermore, the focus of existing policies and programs is more reactionary, with less attention given to mitigation and preparation. Existing policies on preparation and mitigation currently involve a plethora of red tape mazes and complicated programming that leave little motivation to local agencies and people for maneuvering the requirements necessary for any assistance prior to a disaster striking. This study is an example of the effects of the problems within the realm of existing policies. Similar policy problems occurred among all the case studies because of the top-down policy design, whereby the Stafford Act dictates programming and policies for state and local authorities.

Therefore, the data collected from the studies should be used to revamp existing policies and programs and shift the focus towards preventative measures. National and state levels acknowledge that more money would be saved through disaster mitigation, but little effort is currently made to help further mitigation and preparation needs (FEMA, 2014).

**Implications for Further Research**

The case studies of Hurricanes Harvey, Irma, and Maria, present numerous angles for future research. First, the study furnishes a unique structure, involving critical incident case studies with protocols that could be replicated and employed to further research any disaster. Results would potentially yield pragmatic findings and be implementable on multiple levels. If the occurrence of disasters such as hurricanes increases, additional case studies will offer robust
discussions not only in emergency management areas but will also extend to engineering, urban planning, the education curriculum, public health, economic development and more.

Additionally, the breadth of future studies can expand past the United States and into a global perspective. Though policies may differ from country to country, the effects of disasters know no bounds. Therefore, conducting research surrounding disaster risk reduction and exposure to hazards will facilitate further discussion and future comparisons on existing best practices and potential new approaches.

Furthermore, the case studies involved were in the direct pathways of impending hurricanes. Because the research contained multiple case studies, future research can analyze each storm individually to delve into the nuances of each hurricane. However, disasters such as hurricanes impact more than the directly affected area. The consequences of mass evacuation, socioeconomic status, and damage incurred give way to future research that offers an additional examination of the driving factors of a community and the ripple effect caused by disasters to other areas.

**Recommendations**

The purpose of this qualitative exploratory study started with the initial question: *What is the lived experience of community stakeholders during the emergency management response, recovery, and transitional phases from Hurricanes Harvey, Irma, and Maria, and does it identify a disconnect between top-down federal and state policies and community resilience through social capital?* It intended to explore the needs of U.S communities impacted by Hurricanes Harvey, Irma and Maria and the detachment between grassroots community needs and federal and state policies.
Recommendations for Practice

From the findings and the conclusions of the study, there are three recommendations. First, since social capital on the grassroots level could provide safety nets territorially, local level agencies and governments should better utilize and be more inclusive of existing community components, such as civic groups, quasi-government agencies, organizations, and education systems. This can be done through improved programming and planning with a focus on preparedness and mitigation. However, in order to move forward, the study shows that a “champion” is necessary to organize and lead forth the cause. This role is not limited to a singular person or entity, but rather can be undertaken by leaders among the community.

Secondly, the study concluded that social capital has the flexibility to maneuver around bureaucratic red tape to compensate for government restrictions but remains excluded from policies. Therefore, it is recommended, to further improve existing policies and programs like FEMA’s Whole Community Approach and Hazard Mitigation Grant Program, that a broad set of operating procedures be created for communities that focus on implementation at the community level. Improving existing policies not only adds clout to the existing policy but shifts the policies in a forward manner. Additionally, mainstreaming existing procedures within existing programs, like Public Assistance and Individual Assistance, can lessen the amount of red tape and set conditions for recovery at a quicker pace.

Furthermore, the study found that the challenges faced by people prior to the disaster worsened after it, as a direct result of the disaster., and concluded that social capital is a crucial component in reducing exposure to hazards. It is recommended that further practice within the field of disaster risk reduction, resilience and emergency management facilitate additional discussions connecting grassroots levels, which will strengthen community resilience on a local
level. "The key to these hurricanes is the resilience of the people themselves and taking it seriously." – Hurricane Irma & Maria Participant

**Challenges and Overcoming Limitations**

The study faced challenges and limitations as part of the research process. Disasters such as hurricanes impact multiple areas at one time. The limitations of the research included geographic location and the recovery processes from the hurricanes. Due to these limitations, challenges of accessibility to participants and other resources, occurred.

**Geographic Location**

The study limited its boundaries to nationally declared disaster areas, particularly those directly impacted by Hurricanes Harvey, Irma, and Maria. Additionally, FEMA declared a national disaster in the areas, making these locations eligible for public and individual assistance. However, other communities impacted included outlying areas that took in mass evacuations, relocations, and people that provided aid. Overcoming this limitation involved people that directly assisted in these damaged vicinities. After the disaster, people flocked to the stricken area to provide immediate and direct assistance.

**Limited Resources**

Another limitation of the study was the lengthy process of recovery. Despite the research being initiated a year and a half after the hurricanes, participants were still dealing with the aftermath. With limited resources available to the hurricane survivors, communication with the participants was difficult at times. But, traveling to the locations, and having participants willingly act as the champion for the area, assisted in moving the study forward. Oftentimes, those that championed also assisted in locating a safe place in which to conduct the research, and further encouraged community participation. However, getting participants to fill out the post-
interview survey after the transcript was sent to them was a challenge. Of the 26 participants, only five filled out the post-interview survey.

**Concluding Thoughts**

The case studies intended to shed light on how social capital can compensate for federal and state policy and programming gaps, particularly for those affected by Hurricanes Harvey, Irma, and Maria. The data collected and analyzed contributed to current research surrounding disaster risk reduction and resilience by taking the social capital approach. The use of social capital establishes and reinforces the existing societal, cultural, and economic threads that create a community. The resilience of a community can be traced to the strength of its social capital, which in turn yields a strong sense of community. There can be power at the grassroots level when it comes to disaster risk reduction and resilience, but it requires more action from the ground up. As one Hurricane Irma and Maria participant stated: “Citizens have to step up and be aware and take charge of themselves.”
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