Effects of Visual Impairment on the Preparation, Response, and Recovery from the 2017 Hurricane Season in Puerto Rico

Kevin D. McCormack
EFFECTS OF VISUAL IMPAIRMENT ON THE PREPARATION, RESPONSE, AND RECOVERY FROM THE 2017 HURRICANE SEASON IN PUERTO RICO

A Dissertation Presented

by

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Submitted to the Office of Graduate Studies, University of Massachusetts Boston, in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2019

Global Inclusion and Social Development
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ABSTRACT

EFFECTS OF VISUAL IMPAIRMENT ON THE PREPARATION, RESPONSE, AND RECOVERY FROM THE 2017 HURRICANE SEASON IN PUERTO RICO

December 2019

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The 2017 hurricane season in Puerto Rico brought rain and wind forces the likes of which had not been seen in 90 years on the island. Some say it will take at least ten years to recover from the damage caused to functional necessities such as roadways, assuming full recovery is possible. While the general populace in Puerto Rico struggled to recover, populations such as people with visual impairments experienced the struggle more acutely. Independent living, limited as it generally was before Hurricane Maria, was further compromised. There was a feeling of abandonment throughout the community of people with visual impairments from government and non-government organizations. Agencies working in the hurricane aftermath struggled to check-in with and appropriately meet the needs of people with visual impairments.
This case study of the 2017 hurricane season in Puerto Rico focused on the phases of preparation, response, and recovery as they related to people with visual impairments. The study used a qualitative approach to gather the perspectives of people with visual impairments as well as representatives from government agencies, relief agencies, and organizations that serve people with visual impairments in Puerto Rico. The goal of this study was to shed light on the experiences of people with visual impairments and related organizations throughout the 2017 hurricane season in Puerto Rico and to highlight their recommendations for changes in practices for future hurricane preparation, response, and recovery. Lessons observed from the findings of this research may be leveraged to facilitate a post-disaster society that is more inclusive and reflective of the needs of people with visual impairments in Puerto Rico. Further research may replicate this methodology to explore the needs of people with visual impairments in other locations in preparation for future natural disasters.
ACKNOWLEDGMENTS

Jesucristo/Isa al-Masih/Jesus Christ. Whether in success or failure, You are my eternal teacher.

Although the by-line will have my name, it should be understood that this is a community effort. There is no way I can do something like this on my own. First, my wife, Elizabeth. You have endured much to get me to this point. I cannot overestimate how important your love, encouragement, and support have been. My boys, Samuel and Timothy. Thank you for taking interest in my work and giving me a child’s perspective. I also received much support from my parents, Don and Shirley, my in-laws, Ed and Gail Henson, and extended family.

I am grateful for the support and guidance of my dissertation committee. First to the chair, Dr. Laura Bozeman: I am thankful for your genuine concern for my development as a scholar and a person. Thank you for the little things like the light-hearted questions about my family after deeply introspective discussions about academic work. To Dr. Sindiso Mnisi-Weeks, you are the master at giving feedback that is both affirming and constructive. Thank you also to Dr. Gretchen Good for your guidance and offers of help that exceeded what I had asked.

Thank you to our community at Highrock Quincy. We made a big cross-country move, and you were with us every step of the way. Thank you John McAllister for being my forerunner, in a sense. Who knew what would come from that little office we shared for many years? Many thanks to my National Leadership Consortium in Sensory Disabilities
crew. You made it possible for me to even get started on this endeavor, and you are giving me professional support that is the envy of my peers.

Many people were a great help to me while in Puerto Rico to accomplish this research. Several went above and beyond: Alpidio Rolon, Wilfredo Figueroa, Ileana Rivera Bartolomei, Sofia Pantel, and Amilcar Leòn Boneta.
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LIST OF ABBREVIATIONS

AARP—American Association of Retired Persons
ABB—Association for the Blind of Bayamòn
ADA—Americans with Disabilities Act
APH—American Printing House
CAG—Core Advisory Groups
FEMA—Federal Emergency Management Agency
FEMA ODIC—Federal Emergency Management Agency, Office of Disability Integration and Coordination
FNSS—Functional Needs Support Services
ILS—Independent Living Skills
MAVI—Movimiento para el Alcance de Vida Independiente
MBDO—Municipality of Bayamòn Disabilities Office
Mirada—The Mirada Program of the Vocational Rehabilitation Administration
NFB—National Federation of the Blind
O&M—Orientation and Mobility
PRDCRN, or the Network—Puerto Rico Disability Community Relief Network
SCR—State Council of Rehabilitation of Puerto Rico
UPRDO—University of Puerto Rico Disability Office
U.S. GAO—United States Government Accountability Office

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CHAPTER 1

INTRODUCTION

Impact of Hurricanes Irma and Maria

The 2017 hurricane season in Puerto Rico greatly impacted infrastructure and life in general, requiring money and complex solutions unlike that which has ever been experienced in U.S. history (Government of Puerto Rico [GPR], 2017). Hurricane Irma hit the northern coast of the island as a category-five hurricane on September 6, causing flooding and electrical power outages that affected more than one million people in Puerto Rico (Cangialosi, Latto, & Berg, 2018; GPR, 2017). Before response efforts were completed, category-four Hurricane Maria directly struck the island two weeks later. Many people were caught off-guard as “hurricane apathy” had set in due to the relative safety that most people had experienced from past hurricanes (Federal Signal, 2012). Maria caused the loss of 472,000 housing units, and potable water became scarce. The recovery effort in Puerto Rico is expected to cost at least $94 billion. The government in Puerto Rico believes it will take perhaps a decade, or more, to recover societal pillars such as employment, agriculture, and the healthcare system (GPR, 2017).

A collaborative study between George Washington University’s Milken Institute of Public Health and the Puerto Rican Government was published nearly a year after Hurricane Maria to get a better understanding of the previously debated low mortality rate. The study...
found that Hurricane Maria caused at least 2,975 deaths, 4,548% higher than the formerly recognized number of 64 (Milken Institute School of Public Health, 2018). The fact that Maria caused all electrical power to be lost on the island was a significant factor in this death toll. A month after the hurricane, only 20% of the electrical power had been restored (Federal Emergency Management Agency [FEMA], 2017a). Three of the largest electrical blackouts in American history happened in Puerto Rico, two of which occurred in 2017. Sizes of electrical blackouts are determined by the number of people affected along with the number of hours without electricity. Hurricane Maria caused the largest electrical blackout in American history. Irma was fourth. By comparison, Hurricane Katrina, a natural disaster which caused the fourth highest mortality rate for hurricanes in U.S. history, ranks seventh in blackout size (Fleig, 2018; Marsters & Houser, 2017).

**Migration and Poverty**

The mass exodus of Puerto Ricans to the U.S. mainland both before and after Hurricane Maria made timely repairs to social infrastructure unlikely. Over the 10 years previous to 2017, about 9% of Puerto Rico’s population moved to the U.S. mainland in search of better economic opportunities (Marans, 2016). With the sweeping damage that Hurricanes Irma and Maria brought, more citizens left the island at a faster rate than ever in the few months following the storms. As of March 2018, an estimated 135,000 people from Puerto Rico migrated to the U.S. mainland due to the 2017 hurricanes, including some with visual impairments (Center for Puerto Rican Studies, 2018; Gonzalez, n.d.).

This mass exodus to the mainland has deeply impacted Puerto Rico’s social infrastructure. Examples of the impact include fewer people to earn money to reinvest into
the economy, fewer healthcare workers, and fewer educators. According to the U.S. Census Bureau (2019), as of 2017, 44.4% of people in Puerto Rico are living in poverty, which is about double the highest rate of any state in the U.S. mainland. Arguments have been made that the main reason for the struggle of poverty in Puerto Rico is because of the historical imperialism imposed by the mainland U.S. (Briggs, 2003). An example is a federal program called the Aid to the Aged, Blind, or Disabled (AABD). The AABD is a monthly amount given by the U.S. Government to people in Puerto Rico with disabilities who are not employed. The amount is $64 per month, about 1.3% of what people with disabilities in the U.S. mainland receive from Supplemental Security Income (SSI), the program equivalent to the AABD (Acevedo & Amiri, 2018; Morton, 2016).

Typically, people with disabilities make up a disproportionate percentage of people living in poverty, but it is more so in Puerto Rico (Kraus, 2017). The yearly Cornell Disability Status Report by Erickson, Lee, and von Schrader (2019a, 2019b) noted that the poverty rate among people with disabilities ages 21–64 in Puerto Rico in 2017 (the most recent report available) was 53.3%, whereas for the rest of the U.S. the rate was 26.1%. Additionally, the employment rate of people with disabilities ages 21–64 in Puerto Rico was 23.7%, whereas the rate for the same population in the rest of the U.S. was 37.3%. As stated above, Puerto Rico has the lowest employment rate for people with disabilities among all other states in the U.S. (Erickson et al., 2019a, 2019b). As a result, people with disabilities remaining on the Island will most likely have fewer means to uproot and seek better opportunities on the U.S. mainland or elsewhere.
Impact on People with Visual Impairments

While the general populace in Puerto Rico struggles to recover, populations such as people with visual impairments experience the struggle more acutely (Blinded Veterans Association, 2018). Consider the following analogy: There is a technique that people with visual impairments who use a long cane employ called “constant contact.” This is where the tip of the long cane stays in contact with the ground while the traveler is walking as opposed to tapping it side-to-side. This technique is used to give the traveler maximum preview information about the ground they are about to walk on (Fazzi & Barlow, 2017). While constant contact has some drawbacks, many people with visual impairments use the technique to feel as secure as possible while traveling independently. A momentary loss of contact with the ground can add to a sense of insecurity for some travelers with visual impairments, depending on their level of experience and/or other disabilities (Jacobson, 2013). With the increased unpredictability of the post-disaster travel environment, the constant contact technique would prove to be useful. However, although the long cane technique of constant contact was still helpful in Puerto Rico, many people with visual impairments had an altered sense of “constant contact” lost after Hurricane Maria. The loss was felt through having no electricity to power assistive technology, no cellular phone communication, and no transportation options that were previously depended upon. In her interview within the present study, a representative of an agency serving people with visual impairments in Puerto Rico described the disconnected conundrum:

The lack of communication drove a lot of people to desperation, to stress, to hopelessness. We’re used to living in a world that is always in constant contact with
one another. After the hurricane there wasn’t any communication, there wasn’t any way to contact people.

Furthermore, a year after Hurricane Maria, there were around 26,000 lost jobs (Cashman, 2018). Since Puerto Rico has the lowest employment rate for people with disabilities among all other states, it is unlikely that people with visual impairments will be given the opportunity to fill jobs that may open during recovery (Erickson et al., 2019a). Additionally, for people with visual impairments, safe city travel for pedestrians was compromised after Hurricane Maria—traffic lights were unusable, street poles and electric cables littered the sidewalks, and public transportation was no longer available. Despite these infrastructure compromises, residents had to find alternative routes to get to food and supply distribution centers. Finding safe alternative routes proved more difficult for many people with visual impairments due to not knowing the locations of dangerous and broken infrastructure. The compromises in regard to electricity and technology affected night travel for all people, but this breach was particularly challenging to people with low vision. The lack of light at night meant that many people with low vision were unable to travel at night with much confidence at all. Additionally, there was no access to cell phone GPS or voice-controlled mobile assistants, which normally can be used to find phone numbers (Rivera-Bermudez, 2018).

In this context, people with blindness and visual impairment in Puerto Rico are dealing with a very long recovery process. Research exists about the differences in the recovery process from natural disasters for people with disabilities compared to people without disabilities (Peek & Stough, 2010; Phibbs, Good, Severinsen, Woodbury, &
Williamson, 2014; Stough, Sharp, Resch, Decker, & Wilker, 2015). Although people with visual impairments are addressed in this research, only two of the previous studies focused specifically on people with visual impairments (Duyan & Karatas, 2005; Good, Phibbs, & Williamson, 2016). These studies were not conducted in Puerto Rico or Latin America. The proposed exploratory single-case study seeks to find lessons observed from the 2017 hurricane season in Puerto Rico regarding the unique needs of people with visual impairments. If these lessons are put into action, they could be used to improve future preparation, response, and recovery in Puerto Rico and elsewhere.

**Definition of Terms**

Preparation, response, and recovery will be defined as follows: Preparation refers to the activities and policies related to readying people with visual impairments to best handle a hurricane before it comes given the current infrastructure and social systems. An example is a blog post by a disaster response agency that includes specific guidance for people with visual impairments in how to prepare for a natural disaster. Response refers to the period during and after the hurricane in which relief agencies and communities take action to move people out of immediate danger. An example would be government response agents who come to a home that has suffered damage from a hurricane to check if anyone is there and, in the case of many people with visual impairments, guide them into a shelter if needed. Recovery refers to individual and corporate efforts to adjust to a changed environment, including restoring or improving the affected area’s infrastructure. An example is when the local government makes plans to rebuild public park facilities destroyed by a hurricane. The rebuilding improvement may include braille descriptions on plaques and bathrooms that
previously did not exist. When the present study refers to all of the preparation, response, and recovery phases as a whole, it will sometimes use the term “disaster cycle.”

Often in natural disaster discussions, mitigation is a fourth element alongside preparation, response, and recovery. The present study, however, does not focus on mitigation. Using the Federal Emergency Management Agency (FEMA) definition, mitigation refers to proactive steps toward reducing the impacts of a natural disaster, whereas preparation, response, and recovery are reaction-oriented. Preparation is considered reaction-oriented because the objective is to best ready oneself for reacting to a natural disaster. The focus in the present case study is on the reactions to the 2017 hurricanes. Additionally, mitigation is often associated with creating more resilient physical infrastructure codes (FEMA, 2018b). The preparation, response, and recovery emphases of this study exist because of its focus on the social environment and the legal standards that affect the experience of a natural disaster by people with visual impairments. Although a possible side-benefit of this study is that civil engineers may further include people with visual impairments in post-disaster restructuring plans, it is not a direct purpose of the research.

In this study, “people with visual impairments” relates to a person who is considered legally blind according to U.S. standards. Legal blindness refers to any range of vision between total blindness (no light perception) to a visual acuity of 20/200 or less in the better eye with best correction or a visual field of 20 degrees or less in the better eye (Cassin & Rubin, 2001). There is some debate within disability research and policy regarding the terminology of person-first versus identity-first (Blaska, 1993; Vaughan, 1993; Dunn & Andrews, 2015; Iriarte, McConkey, & Gilligan, 2016). For this research, the author followed
the United Nations Convention on the Rights of Persons with Disabilities (CRPD) in the use of person-first language. The CRPD was developed by people with and without disabilities from multiple nations (CRPD, 2006). Person-first language is also recommended by the Publication Manual of the American Psychological Association (2010), which was used in this research. When a quote is used, the identity terminology that the interviewee used is retained for accuracy.

Orientation and mobility (O&M) refers to the knowledge base for people with visual impairments that deals with an awareness of where one is within their environment and how to travel through it as safely and gracefully as possible (Wiener, Welsh, & Blasch, 2010). Use of the long cane is common in O&M. The long cane is the primary tool by which a traveler uses O&M techniques. It provides a ground-surface preview for the traveler and tactile feedback of the surface terrain (Fazzi & Barlow, 2017). Independent living skills (ILS) refers to skills that relate to everyday living, such as hygiene, food preparation, and personal organization (Hatlen, 1996). In the present study, skills in independence or independent skills refers to all skills pertaining to O&M, ILS, and the use of assistive technology, such as tools that make text accessible for a person with a visual impairment.

The present study makes a distinction between a natural disaster and a natural hazard. In a seminal study in disaster terminology, Okeefe, Westgate, and Wisner (1976) point out that the negative human impact from natural disasters was caused not only by nature itself but by the social processes that make certain people more vulnerable than others in the context of a disaster. The authors argued for less emphasis on the “naturalness” of natural disasters. In the decades since, more authors have argued for the primacy of the social
process of vulnerability in disasters rather than simply nature itself (Bryant, 2005; Wisner, Blaikie, Cannon, & Davis, 2003). Therefore, within critical disaster studies, it is often argued that “natural” disasters are nonexistent since nature itself is not primarily responsible for human vulnerabilities when disasters strike (Lassa, 2016; United Nations International Strategy for Disaster Reduction, n.d.). Rather, what makes a natural event disastrous to a human, regardless of socio-economic background, has come to be known as a natural hazard. Therefore, in this study the terms natural hazard and natural disaster were given the nuance explained by Nelson (2018) and Wilhite (2000). Both terms imply that there are natural and social processes that cause human vulnerability in a natural event. A natural hazard is the imminence that a naturally occurring event will have an adverse impact on humans. A natural disaster is the historical occurrence.

Finally, the term lessons observed was used in this research instead of lessons learned. The lessons learned terminology is common in the disaster literature (e.g., Bloodworth, Kevorkian, Rumbaut, & Chiou-Tan, 2007; Heppner, Stout, & Brick, 2004; Kailes, 2006). However, as the former administrator of FEMA remarks, many of the so-called lessons learned were simply lessons observed but never put into place (Fugate, 2017). Similarly, Kailes (2006) expressed the concern of lessons not truly being learned from disasters in regard to people with disabilities; she expressed them as “lessons learned but not applied” (p. 4). For example, in Brooklyn Center for Independence of the Disabled v. The City of New York (2013), the court decided that the city of New York failed to adequately plan for the needs of people with disabilities as of 2013 even though previous studies had revealed this as a need from the disaster aftermaths of the terrorist attack in New York in
2001 and Hurricane Irene in 2011, among others (The Center for Independence of the Disabled in New York, 2004; Ensuring Effective Preparedness and Response, 2011). The hope of the present study is that the lessons observed from the 2017 hurricane season will be enacted so that the same issues will not have to be addressed again and truly be lessons learned.

**Purpose of the Study**

Previous to the present study, this researcher had professional and relational experience with people with visual impairments. This researcher worked as an O&M specialist for over 10 years with students ranging from two to 92 years of age. Furthermore, while in grade school, this researcher’s family informally adopted a person with a visual impairment. Additionally, this researcher has had the pleasure of traveling internationally and has developed a strong interest in studying how imported western-based formalized skills in training for people with visual impairments intersects cross-culturally in a variety of world regions. Moreover, this researcher had some professional relationships that were based in Puerto Rico. Through these relationships, this researcher was made aware of some pertinent issues related to people with visual impairments on the island. Due to this researcher’s past experience and interests, the present study was a natural undertaking.

The scope of the impact of Hurricanes Irma and Maria requires an immediate and robust recovery process. As previous studies have demonstrated the marginalization of people with visual impairments in recovery efforts, urgency exists to investigate the progress of recovery efforts for people with visual impairments in Puerto Rico. Previous studies have shown that response efforts can be improved and made more intentional and relevant for
people with visual impairments (Good et al., 2016; Stough et al., 2015). For example, it has been shown that there is a need to use the voices, stories, and suggestions of people with visual impairments in improving hurricane preparation, response, and recovery processes (Good et al., 2016). Additionally, a disability such as a visual impairment increases the challenges experienced in the recovery process through situations such as communication breakdowns and reduced accessibility to the environment (Stough et al., 2015).

As a further argument for urgency, hurricane activity is increasing in the Caribbean region. This increase in activity is linked to the warming of the Atlantic Ocean because of the climate change phenomenon (Mann & Emanuel, 2006). A recent study by the Intergovernmental Panel on Climate Change (2018) found that significant global warming can be lessened by 2030 if drastic changes are made in the human care of the environment on a global scale. If no changes are made, global ocean temperatures will continue to rise, increasing the chances of hurricane development. Over the past few decades, hurricane frequency in the Caribbean has increased five-fold, and this increased activity is expected to remain at this level or greater for at least the next three decades (Goldenberg, Landsea, Mestas Nunez, & Gray, 2001).

For people with visual impairments, oftentimes full recovery from a natural disaster is not realistic due to the resulting changes in key socially provided supports. These changes include the provision of housing in a different location, a change in employment status, and the establishment of new social relationships (Stough et al., 2015). Such changes require more effort and resources to recover for people with a visual impairment (Köberlein, Beifus, Schaffert, & Finger, 2013). Other significant effects of a natural disaster include the
deteriorated conditions of walkways, altered bus routes, and the destruction of familiar landmarks that are critical for orientation. For a person with a visual impairment, attempting to navigate any of these changes can be daunting and often results in a negative impact on self-esteem and self-worth (Good et al., 2016).

However, a hope is that the recovery process will include people with disabilities, resulting in a post-disaster society that is more inclusive and reflective of the needs of this population, thereby positively impacting their sense of self. In comparison to the rest of the U.S., this is no small objective. As of the most recent Cornell Disability Status Report by Erickson et al. (2019a, 2019b), Puerto Rico had the second highest rate of disability among working-age adults in the U.S. at 21.6%, whereas the mainland had 12.7%. Additionally, 6.6% of the population of Puerto Rico reported having a visual impairment, whereas the rest of the U.S. reports 2.3% (Erickson et al., 2019a, 2019b). Some factors in the high rates of disability in Puerto Rico could be a result of emigration, increased life expectancy, and decreased fertility throughout the island over the course of the last generation (Matos-Moreno & de Leon, 2018). The aging population may have a strong influence in the high rate of visual impairment, as the two eye conditions that result in the highest cases of visual impairment in Puerto Rico are associated with aging, i.e., glaucoma and cataracts (Emmanuelli, Izquierdo, & Townsend, 2005; Toro & Cortes, 2010). The World Health Organization (2018) says that access to healthcare is a major factor, among others, in determining the percent of a population with a disability. Puerto Rico’s high rate of disability is partially a result of the fact that the island receives the smallest amount of federal healthcare assistance compared to the rest of the U.S. mainland (Roman, 2015). Therefore,
this study seeks to serve as a piece of the puzzle in creating a more just and inclusive society in Puerto Rico—one that more fully integrates people who are blind and visually impaired.

**Research Questions**

Primary question:

How does having a visual impairment in Puerto Rico impact a person’s ability to prepare for, respond to, and recover from a hurricane?

Sub-questions:

1. What are the lessons observed from the 2017 hurricane season in Puerto Rico regarding the unique needs of people with visual impairments that can be used to improve future preparation, response, and recovery?
2. What lessons can be observed from the institutional tools specific to people who are visually impaired that were in place at the time of the 2017 hurricane season in Puerto Rico?
3. How did the actual response of aid agencies compare to the expressed intent of those agencies regarding people with visual impairments? How would people with visual impairments evaluate the response efforts?
4. What has been done to ensure that people with visual impairments in Puerto Rico have what they need to maximize recovery?
5. What did people with visual impairments do of their own initiative in hurricane preparation, response, and recovery?
Conceptual Framework

The phases of preparation, response, and recovery are common framework points around which much discussion occurs at the intersection of disabilities and disasters (FEMA, 2013; Kailes & Enders, 2007). These phases served as the model by which the study was framed. The model is reflected in the main and sub-research questions. Qualitative methods were used with several populations, such as people with visual impairments and local agencies serving this population. These data were converged to assess the lessons observed from the 2017 hurricane season in Puerto Rico for people with visual impairments as well as for government and nonprofit agencies. These lessons can be generalized for future hurricane seasons in Puerto Rico and potentially other world regions, assuming a factoring of differences such as culture and economic status. The color-coded arrows in Figure 1 demonstrate the researcher’s primary interest in investigations as they relate to each component and what they have to say about preparation, response, or recovery. For example, regarding agencies for people who are blind or visually impaired in Puerto Rico, the investigator was primarily interested in how they addressed the preparation phase for their clients. Furthermore, with the representative of the Federal Emergency Management Agency (FEMA) and the representative of the Americans with Disabilities Act (ADA), the investigator sought answers in regard to how they address all three phases of preparation, response, and recovery.
Figure 1. Conceptual Framework

The following chapters will describe the current issues regarding people with visual impairments in Puerto Rico in relation to the hurricane disaster cycle and suggest future guidance. Chapter 2 will look at the current disabilities and disaster literature and how the present study positions itself to it. The chapter will review the academic literature, and there will be a discussion about the social vulnerability perspective as well as guidance from government and nonprofit organizations, which will be observed and analyzed. Chapter 3 will describe the methodology and research design. The chapter will then describe how the data were collected. Chapter 4 will look at the themes that developed from the data collection.
and discuss their relevance to the present study. Chapter 5 will discuss the results of the study with recommendations for changes in practice and future research.
CHAPTER 2
LITERATURE REVIEW

Studies exist, albeit a low number, relative to the topic of natural disaster preparation, response, and recovery processes for people with visual impairments (e.g., Duyan & Karatas, 2005; Good et al., 2016). While there is no academic research that focuses solely on people with visual impairments in Puerto Rico and their experiences of hurricanes that is published in the English language, there are several published studies that address the topic of people with disabilities and natural disasters (e.g., Casey-Lockyer & Myers, 2017; Kailes & Enders, 2007; Priestly & Hemingway, 2007). Themes from the literature related to people with disabilities and disasters are discussed in this chapter, the closest-related literature is reviewed, and various institutional teachings about disabilities and disasters are addressed.

The goal of this literature review and the current study is to cast an academic light on the challenges of a population that has previously received limited attention, namely, people with visual impairments in Puerto Rico who have experienced a hurricane. There are two overarching contributions of this new research to the literature. The first contribution is the exploration of people with visual impairments’ experience of a hurricane in a cultural context that has not, until now, received academic attention. The second contribution is the representation of perspectives from a greater number of viewpoints than in the previous related literature.
Development of the Phases of the Disaster Cycle as a Unit

In 1979, the United States created the Federal Emergency Management Agency (FEMA) to handle disaster preparation, response, recovery, and mitigation (FEMA, 2019; National Governors’ Association Center for Policy Research, 1979). This categorization of emergencies into the four phases of preparation, response, recovery, and mitigation has provided a framework for policy-makers and emergency managers to address the needs of the general population during times of large-scale disasters. As a result of the formation of FEMA, measures for evacuation plans, sheltering, financial assistance for repairs, and emergency prevention had a united body of administration. Previously, the four disaster cycle phases were handled by separate entities in the United States. The creation of FEMA coordinated entities in the United States that focused on each phase. Thus, discussions on emergency management, as stated by Baird (2010), have generally followed suit in using the framework of the four phases (e.g., Callaway, Yim, Stack, & Burkle, 2012; Wallace & De Balogh, 1985; World Health Organization, 1994). Therefore, the present study utilizes three of the four phases, as discussed in Chapter 1, as the pillars of its framework.

Themes in the Literature

Since little specific literature exists relating to people with visual impairments and their preparation, response, and recovery processes regarding hurricanes, this literature review was expanded by using the search terms “people with disabilities,” “disabled people,” “natural disasters,” and “natural hazards.” These broader searches were considered pertinent to the current study because visual impairments are considered a type of disability and hurricanes a type of natural hazard. Articles from academia, government, and non-
government organizations that pertained to “visual impairments,” and various natural hazards specifically, are addressed later in this literature review. However, in the more general context of “people with disabilities” and “natural hazards,” several themes have emerged regarding the preparation, response, and recovery processes of people with disabilities of all types. These themes include the trauma in response and recovery, the role of inclusion of people with disabilities, disability-related improvement implemented during recovery, and the description of needs for people with disabilities prior to, during, and following a natural disaster.

**Trauma in Response and Recovery**

The first theme that emerged from the literature about people with disabilities and natural disasters is that of the trauma involved in the response and recovery processes for people with disabilities. More specifically, Fox, White, Rooney, and Cahill (2010) relate that the psychosocial effect on people with disabilities of living through a natural disaster is worsened by experiences such as being sheltered in an environment not equipped to meet their unique needs, losing access to modes of independence that they had before the disaster (e.g., accessible housing and employment), and navigating the complexities of locating pertinent assistance information regarding all phases of the disaster experience. The psychosocial trauma of living through a natural disaster and its after-effects are common to all survivors but are often exacerbated for people with disabilities (Fox et al., 2010). The trauma manifests through situations such as being relocated to unfamiliar environments, having to search for services such as housing assistance, and lacking accessible housing and transportation (Stough et al., 2015).
Furthermore, expecting a feeling of true recovery may not realistic for people with disabilities, as was the case of survivors from two of the most impactful hurricanes of the last 15 years, Katrina and Maria. Although many people struggled with aspects such as inadequate post-disaster living conditions and depression about the limited prospects for improvement for the future, the difficulties were exacerbated for people with disabilities (Acevedo & Amiri, 2018; Stough et al., 2015). Factors contributing to post-disaster depression include the experiential changes that occur during the lengthy response and recovery processes, resulting in a way of life that is different from that before the disaster.

Finally, Fothergill and Peek (2004) explain that the more difficulty a person with disabilities has with navigating recovery systems, such as FEMA, the less success they will have in the recovery process. Unfortunately, such navigation is rarely easy for people with disabilities, adding to the trauma of the recovery process (Stough, 2017). The present study is uniquely positioned in the disability and disaster literature in two ways. First, it allowed people with visual impairments in Puerto Rico an opportunity to explain their experience of surviving multiple hurricanes. Second, it provides a rich source of lessons observed that may be leveraged to mitigate the impact of future disasters on people with visual impairments.

**Inclusion**

The second theme that emerged from the disability and disaster literature is the importance of inclusion for improving the preparation, response, and recovery processes among people with disabilities. Several authors concluded that there was little to no inclusion of people with disabilities and then recommended such efforts for policy-makers so as to best address the needs of this population (e.g., Casey-Lockyer & Myers, 2017; Good et al., 2016;
Handicap International, 2014; Kailes & Enders, 2007; Stough & Kang, 2015). Wisner et al. (2003) explain how the opposite of inclusion, exclusion, creates social vulnerability. Social vulnerability in a disaster occurs when a person lacks the capacity to adequately navigate social supports in preparation, response, or recovery (Wisner et al., 2003). Examples include a lack of access to disaster-related information or having little to no political power (Gillespie, 2010). Cutter, Boruff, and Shirley (2003) found that people who are socially vulnerable, such as people with disabilities, have a greater likelihood of living in locations with weak infrastructure. The current study considered the potential social vulnerability of people with visual impairments and the chance that the vulnerability could manifest through their geographic living space.

Furthermore, Peek and Stough (2010) argue that exclusion is evidence of an overall stigma, which impacts the person’s health in the recovery process. Examples of this impact include an institutional lack of priority, such as not receiving accessible and prompt warning messages. Insufficiently staffed shelters, whether through a lack of volunteers or inadequate specialized knowledge among the shelters’ staff members, can negatively impact health through not being able to administer medications as needed. There may also be educational setbacks as well as negative reactions to students with disabilities from teachers and peers in the classroom (Peek & Stough, 2010). Given these findings, the current study sought to discover the degree to which adults with visual impairments in Puerto Rico experience stigma and how this impacted their experience of hurricane preparation, response, and recovery.
The existing preparation and response frameworks in the U.S. have been constructed for people who are non-disabled (Kailes & Enders, 2007). When the needs of people with disabilities are included in the recovery process, their ability to successfully navigate those systems greatly improves (Casey-Lockyer & Myers, 2017; Fothergill & Peek, 2004). White, Fox, Rooney, and Cahill (2006) found gaps between people with and without disabilities regarding pre- and post-hurricane Katrina communication and their level of inclusion. Expanding from this literature, the current study investigated the extent to which people with visual impairments in Puerto Rico were included in the hurricane planning, response, and recovery phases.

In its efforts to promote inclusion, FEMA’s Office of Disability Integration and Coordination (ODIC) asserts both in its mission statement and published fact sheets that it is important to include people with disabilities in disaster preparation and planning (FEMA, 2016; FEMA, 2017b). Disaster planning is more effective if people with disabilities are involved in the development and dissemination processes (Fjord & Manderson, 2009; Good et al., 2016; Phibbs et al., 2014). The present study examined whether efforts to include people with visual impairments occurred before and/or after the 2017 hurricane season based on information obtained from interview participants.

Regarding future planning for disaster preparation, response, and recovery, Good et al. (2016) state that these efforts can be improved through the inclusive practice and consideration of the stories of people with disabilities who have lived through disasters. The collection of such stories of people with visual impairments in Puerto Rico is one of the aims of the present study.
Improvement Through Recovery

The recovery process is a natural opportunity to give voice and power to marginalized populations, such as people with disabilities, since the affected community has to re-establish itself (Phibbs et al., 2014). A third theme in the literature is that of improvements to be made through the recovery process. Reddy (2000) and Chang (2010) acknowledge how the disaster recovery process may be viewed by some as simply an opportunity to repair what has been broken. However, these authors along with Phibbs et al. (2014) say that the disaster recovery process can be viewed as an opportunity to right past wrongs in the physical infrastructure that created heightened vulnerabilities for marginalized populations. The present study aligns itself with the notion of improvement through recovery and sought to utilize the recovery phase in Puerto Rico as a case study. The study looked at how the inclusion of people with visual impairments was taking place in the recovery process and how it can be improved in Puerto Rico.

Needs

The final theme in the related literature is the documentation of the needs of people with disabilities in all phases of disaster preparation, response, and recovery. Across the gamut of disabilities, a common thread of reported needs was summarized by Kailes and Enders’s (2007) acronym C-MIST, which stands for “communication, medical needs, maintaining functional independence, supervision, and transportation” (p. 230). C-MIST is a helpful acronym for organizations, caregivers, or individuals with a disability to quickly recall critical function-based needs. Casey-Lockyer and Myers (2017) affirmed the utility that the C-MIST approach can bring to emergency managers in understanding best practices
and identifying related stakeholders. For example, independence (I), can prompt emergency managers to include centers for independent living in discussions about best practices for people with disabilities after a disaster. Barile, Fichten, Ferraro, and Judd (2006) support the value of the C-MIST approach in explaining these same needs for people with disabilities. White (2006) addressed the elements of C-MIST as they apply to people who are deaf or hard of hearing. C-MIST constitutes a standard for many in disaster and disabilities studies, and it became a list by which to compare the needs that came through in the present study of people with visual impairments in Puerto Rico.

Specific to the proposed study, the overall needs of people with visual impairments in the disaster cycle include learning alternate transportation routes, obtaining sheltering information in braille, and orientation to temporary housing (Americans with Disabilities Act [ADA], 2008; American Printing House [APH], n.d.; FEMA, 2010b). Some specific needs for people with visual impairments include communication (with neighbors, family/friends); preparing a “go-bag” (water, food, medications); having an extra cane, weather radio, any other needed assistive devices; service animal materials; keeping a flashlight hung on the door knob (for people with remaining vision), and practicing emergency evacuation routes (APH, n.d.; Duyan & Karatas, 2005; Good et al., 2016; Oklahoma State Department of Health, 2011; Scherffius, 2015). The present study hopes to add to the body of literature in this area by identifying the needs and bringing forth the suggestions of people with visual impairments who were interviewed in Puerto Rico under disaster-related conditions.

As has been described in this chapter, scholars in the disability and healthcare fields have claimed that there is a dearth of literature on the topic of disaster preparation, response,
and recovery processes in relation to people with disabilities and to people with visual impairments in particular (e.g., Peek & Stough, 2010; Phibbs et al., 2014; Spence, Lachlan, Burke, & Seeger, 2007). The present study addresses this paucity in the literature by addressing the various challenges of people with visual impairments in the hurricane disaster cycle in Puerto Rico. That said, there is some literature within disability studies that has focused on people with visual impairments in the context of natural hazards. The next section discusses the findings from these studies.

**Literature on People with Visual Impairments in Natural Disasters**

The first research study that addressed the topic of people with visual impairments during a natural hazard was Good et al.’s “Disoriented and Immobile: The Experiences of People with Visual Impairments During and After the Christchurch, New Zealand, 2010 and 2011 Earthquakes” (2016). The second study that addressed this topic was conducted by Duyan and Karatas (2005) and entitled: “Effects of the 1999 Earthquake on the Completely Blind In and Outside Marmara, Turkey.”

**Article #1: Experiences of People with Visual Impairments in the New Zealand Earthquakes**

The study by Good et al. (2016) was an investigation into the experiences of 12 older people with visual impairments who survived the 2010 and 2011 earthquakes and aftershocks in New Zealand. After the initial earthquake in 2010, the researchers investigated how the participants’ mobility and independence were affected. Following a large aftershock in 2011, the researchers re-interviewed seven of the original 12 participants to understand their
viewpoint in living under the threat of an unpredictable natural hazard as well as their ideas on how to improve preparation and response for people with disabilities.

Good et al.’s (2016) findings can be summarized into the following key points. First, the data emphasized the need for people with visual impairments to communicate their potential post-disaster requirements in advance to their local communities so that a plan is in place when a disaster occurs. Second, skills for independence in a post-disaster environment (such as orientation and mobility) were found to be vital. Due to the unstable nature of government support, the researchers found it was important for people with visual impairments to decrease their reliance on this resource in order to foster greater independence. Third, suggestions were given on how to manage the aftermath of a disaster, such as having spare long canes for mobility and having a copy of medical records in a sealed plastic bag. Fourth, study participants were resilient in their ability to survive and cope with new realities in the aftermath of the earthquake and its resultant aftershocks. Finally, the researchers found that overall social support needed to be bolstered for people with visual impairments throughout the disaster cycle (Good et al., 2016).

Specifically, the researchers concluded that there is a need for “self-esteem, self-worth, capability, usefulness, and social support” to be strengthened for people with visual impairments in the aftermath of a natural disaster (p. 434). The authors discussed a unique area of need for people with visual impairments in regard to preparation in the area of orientation and mobility (O&M). The authors discussed the importance of O&M to navigate novel post-disaster environments. In their article, the researchers incorporated a practical list of suggestions for improving the hazard preparation, response, and recovery processes that
was procured from the interviews with participants with visual impairments. Suggestions from the list can be summarized the following way: communication, plan-making with friends and family, registering with local disability organizations, practical tips, and having materials and information ready if needed post-disaster. This list offered a source of comparison to the lists of suggestions in the current study that came from people with visual impairments, organizations serving people with visual impairments, and response agencies in Puerto Rico.

As of the writing of the Good et al. (2016) study, agencies serving people with visual impairments in New Zealand had not fully incorporated the experiences and suggestions of people with visual impairments regarding preparedness for a disaster. Part of the reason for the current study was to procure suggestions from people with visual impairments in Puerto Rico regarding the disaster cycle to attempt a similar effort and influence organizations that serve people with visual impairments in Puerto Rico as well as related government agencies.

Similar to the present study, Good et al.’s (2016) investigation employed interviews to obtain firsthand reports from people with visual impairments who experienced the earthquakes of Christchurch, New Zealand, in 2010 and 2011. Additionally, their research included input from representatives of an agency designed to assist people with visual impairments. Also, as with the present study, there were ongoing infrastructure recovery issues, such as damage to the clean water system, which was one of the major problems in Puerto Rico post-Hurricane Maria (GPR, 2017). These similarities are important because they support the legitimacy of drawing comparisons between the findings of Good et al. (2016) and those of the present study.
One way that Good et al.’s (2016) article is different from the present study is that it focuses on the country of New Zealand. New Zealand is a country in the Organisation for Economic Co-operation and Development (OECD), meaning it is among the top countries in the world in terms of financial resources. Puerto Rico, however, has an economic GDP ranked 82nd when compared to other countries, and their GDP growth rate is ranked 215 among all 223 countries and territories (Central Intelligence Agency, 2018). Therefore, in New Zealand there are more means within the country to rebuild broken infrastructure compared to Puerto Rico. Puerto Rico has a heavy dependence on mainland U.S. resources to help rebuild (GPR, 2017; Reuters, 2011).

Beyond financial resources, cultural differences exist as well. Some have generalized New Zealand as individualistic and Puerto Rico as collectivistic (Lesley University, 2005; Paton, Bajek, Okada, & McIvor, 2010). For example, Paton et al. (2010) found that, to optimize natural disaster preparedness for a population within a collectivistic culture, community-level participation in developing and understanding preparedness measures has generally been successful. In an individualistic culture, appealing to the needs of the individual is generally a successful approach for maximizing community disaster preparation (Paton et al., 2010). These differences leave the possibility that the manner in which both populations handle a natural disaster would be different and should therefore be a consideration for emergency managers. Although one study found similarities in levels of disaster preparation between collectivist and individualist cultures, the authors admit that there is more to be studied in regard to how culture impacts the experience of a natural disaster (Paton et al., 2010).
Article #2: Effects of the 1999 Earthquake on the Blind in Turkey

The study by Duyan and Karatas (2005) focused on the aftermath of an earthquake in Marmara, Turkey, in 1999. The researchers noted that some studies were done on the general population in relation to this earthquake, but none focused on people with visual impairments. The researchers sought to compare people who were totally blind who lived in the earthquake region with those who lived outside of the region using traits that they found were common to earthquake survivors based on their literature review: self-esteem and anxiety. The researchers cited Erol and Oner (1999) as indicating that because of the severity of the environmental change after a natural disaster, and the feeling of some people that they may have done something to “deserve” it, that lower self-esteem and anxiety were natural by-products (Duyan & Karatas, 2005).

Duyan and Karatas (2005) found that their hypothesis was correct in that the earthquake survivors who were totally blind had generally higher anxiety and lower self-esteem than their totally blind counterparts in Turkey who did not experience the earthquake. The authors concluded that the self-esteem and anxiety of people who are totally blind and are living in earthquake regions should be improved, that they should feel a stronger sense of adding value to the community, and that they should receive stronger supports from the community (Duyan & Karatas, 2005). The authors, however, did not give suggestions as to how these recommendations could be accomplished.

The Duyan and Karatas (2005) article is especially pertinent to the present study because its main concern was to analyze post-disaster outcomes for people who are totally blind. The present study focuses on post-disaster outcomes for people with visual
impairments, so the results of the Duyan and Karatas study can be used to affirm or challenge data from the present study.

Differences between the Duyan and Karatas (2005) article and the present study are that their study focused on an earthquake and that it took place in Turkey. The authors focused only on people who are totally blind, while the present study included everyone on the legally blind spectrum. People who are legally blind include people who have remaining usable vision. Moreover, Duyan and Karatas used quantitative means to compare the self-esteem and anxiety of people with total blindness in Turkey who lived through the 1999 earthquake with those who did not. In contrast to the quantitative approach of the Duyan and Karatas study, the present study used qualitative methods to gain a more nuanced and in-depth understanding of the experiences of people with visual impairments in the disaster cycle (Duyan & Karatas, 2005; Schutt, 2004).

**Comparing the two articles.** Differences in the reporting of the results of the two studies by Good et al. (2016) and Duyan and Karatas (2005) show a further difference in the methodology of the studies. Duyan and Karatas’s was problem-focused, such as investigating low self-esteem and anxiety. Good et al.’s (2016) was solution oriented, such as observing participants’ resilience and independence. The current study shares the approach of Good et al. (2016) in trying to be solution-oriented both in methodology and results.

There are a couple of remaining differences to note regarding these two articles. One difference is in the focus of the spectrum of visual impairment—as mentioned, Duyan and Karatas (2005) studied only people who are totally blind, whereas Good et al. (2016) included people who are blind or who have low vision. The present study took the approach
of Good et al. (2016) so as to encapsulate a variety of perspectives among people with visual impairments in Puerto Rico. Good et al. (2016) gave a list of practical suggestions for people with visual impairments and those serving them, whereas Duyan and Karatas (2005) gave only theoretical solutions without practical applications.

Finally, a couple of similarities in both articles are of note. Both studies used some of the same terminology in their conclusions. More specifically, the researchers from both studies suggested that self-esteem, self-worth, and capability should be increased for people with visual impairments in the disaster recovery process. Additionally, both articles concluded that there is a need for communities to better incorporate the usefulness of people with visual impairments in both pre- and post-disaster environments (Duyan & Karatas, 2005; Good et al., 2016). The current study will add to the literature regarding the inclusion of people with visual impairments in the disaster cycle. Because of these conclusions and those of the other research studies discussed earlier, the notion of “vulnerability” will be addressed in the next section of this literature review.

**Social Vulnerability Perspective**

A discussion from Chapter 1 of the present study was on the terminology of “natural disasters” versus “natural hazards.” The discussion reflected on the development of research over the past 40 years that has considered social and systemic influences that are superordinate to nature regarding human vulnerabilities in disasters. Applied to people with disabilities, this concept has come to be known as the social vulnerability perspective. This perspective is rooted in the social model of disability, which states that disadvantages stemming from disability are defined by the social processes imposed on the individual
Therefore, social vulnerability in the context of disaster occurs for people with disabilities because of phenomena such as social stigma and the acquisition of relatively few resource affordances (Bohara, 2019; Cutter et al., 2003; Wisner et al., 2003).

In contrast, some researchers in natural hazard studies have approached vulnerability as strictly the influence of the natural disaster, which shows no partiality to social demographics (e.g., De Blij, 1994; Frazier, 1979). While in a sense this is true, where one lives and what access one has to preparation, response, and recovery processes figure markedly into the possibility of restoration from the disaster (Kasperson & Kasperson, 2001; Wisner et al., 2003). Stough et al. (2015) said that some relief organizations do not take a social vulnerability perspective but rather a “disaster and emergency viewpoint,” which approaches disability as simply “a medical diagnosis” (p. 4). This means that the perspective of some relief organizations regarding the causes of vulnerability are different than some in the disability community.

The Good et al. (2016) article in this discussion mentions several times the vulnerability experienced by people with visual impairments in the New Zealand earthquakes in the context of a breakdown in social structures. The social vulnerability perspective was a cue to the author of the present research that there could have been analogous social structure breakdowns in Puerto Rico that would impact the experience of the disaster cycle for people with visual impairments. Therefore, the current research is both influenced by and builds upon the social vulnerability literature.
Governmental Guidance

Institutions such as government agencies and nonprofits are involved in the development of and guidance for the natural disaster preparation, response, and recovery processes for people with disabilities. In this section of the literature review, publicly available information from these organizations will be discussed.

The most well-known U.S. institution in emergency management is FEMA. This organization exists to support American citizens during large-scale emergencies and disasters. Their activities include training first responders in large-scale disaster response and providing financial aid to citizens who have lost property due to natural disasters (FEMA, 2018d; FEMA, 2018e). FEMA has had various levels of success since its inception and is in a continuous process of changing to meet modern-day disaster-relief demands (FEMA, 2019a; FEMA, 2019b). An example of an area of improvement from the 2017 hurricane season in Puerto Rico was the finding by the United States Government Accountability Office (U.S. GAO) (2019) that the application for FEMA assistance by people with disabilities was a challenge. The U.S. GAO, therefore, made recommendations to FEMA on ways to improve the application process. The present study will be a source of recommendations for agencies such as FEMA to improve their services to people with visual impairments.

An example of how FEMA has striven to meet the needs of Americans is the creation of FEMA’s ODIC which exists to help communities manage emergencies inclusive of people with disabilities (FEMA, 2017b). The organization has published a fact sheet that explains their goals and efforts to make FEMA’s work with people with disabilities more inclusive.
The document explains that the ODIC wants “to achieve inclusive emergency management practices throughout every step of the disaster cycle, with a specific focus on universal accessibility and full inclusion of people with disabilities and others with access and functional needs” (FEMA, 2016, para. 1). The document references meeting the accessibility needs of people with disabilities in general and of people who are deaf or hard of hearing but does not mention people who are blind or visually impaired. The current study hopes to contribute to the knowledge base of FEMA’s ODIC so that it can include a specific focus on the needs of people with visual impairments in the disaster cycle.

FEMA gives its employees and volunteers guidance in regard to Functional Needs Support Services (FNSS) as they relate to people with disabilities in general population shelters. These services recommended by the FNSS are designed to provide appropriate policy modifications and personal assistance services to help individuals maintain independence in disaster shelters. The FNSS recommends that FEMA workers and shelters consult with schools and organizations serving people with visual impairments to receive guidance on who to include in local leadership in planning throughout the disaster cycle. FNSS suggests that there should be accessible written material or reading assistance for people with visual impairments. FNSS further indicates that in shelters there may be a need for staff to provide orientation and navigation help. Additionally, to support this effort, staff should be trained to understand how to use appropriate guiding techniques and to ask the person with a visual impairment when they are needed (FEMA, 2010). The FNSS document has been an influential resource for the emergency management community by raising awareness about the importance of people with disabilities having access to shelters. FNSS
also explains the need for accommodations within shelters to address the functional requirements of people with disabilities (Casey-Lockyer & Myers, 2017).

In 2004, FEMA published an instructional booklet entitled “Preparing for Disaster for People with Disabilities and other Special Needs” (FEMA, 2004), which gives tips on preparing for large-scale disasters, what to expect regarding government interventions such as warning signals and response crews, and pertinent contact information. This document does not give any specific guidance for people with visual impairments other than giving the website address for the American Foundation for the Blind. Additionally, it should be noted that the booklet addresses disasters in general not of a specific type.

To inform emergency managers, several government agencies collaborated to produce a compilation of research studies regarding disasters and people with disabilities (United States Department of Education [USDE], 2008). Termed a “Resource Guide,” the document brings forth past research regarding disasters and disabilities and seeks to inspire new research (USDE, 2008). Examples of resources in this document are research reports, conference proceedings, and suggestions for further research. The guide addresses general issues common to many disability types, such as access to hazard alerts, as well as specific disabilities. Including people with disabilities to serve in a leadership role during the planning phase in the disaster cycle is discussed in the Resource Guide. However, there is no mention in the Guide about including people with disabilities in the response and recovery phases of disaster.

In specifically addressing people with visual impairments, the Resource Guide advises emergency managers of the need for access to radio, television, and smartphone
alerts throughout the disaster cycle. It also advocates the use of audio signals for exits in buildings for people with visual impairments in the case of an emergency (USDE, 2008). Although this document could be helpful for people with disabilities who reside in Puerto Rico, it does not address the geographic and socio-economic dimensions that differentiate Puerto Rico from the rest of the United States (Gudykunst, Ting-Toomey, & Chua, 1988).

The Americans with Disabilities Act (ADA) offers some guidance related to the proposed study as its legislation applies in Puerto Rico (ADA, 1990). ADA law addresses the need for the community hazard planning and response phases to be accessible to people with disabilities. The ADA literature also includes a checklist to help emergency shelter managers assure they are compliant with ADA law (ADA, 2008; ADA, 2010a). In relation to people with visual impairments, the ADA literature provides guidance for people who serve this population. For example, there is a document that instructs aid workers about text access and the mobility needs of people with visual impairments. ADA’s written materials also address the appropriate environment in a shelter for someone with visual impairments and offer recommendations for how to practically modify that environment if needed. An example of this is the recommendations for how an emergency shelter should set an elevated protruding wall-mounted sign. A person with a visual impairment traveling independently with a long cane may not find this obstacle since the long cane is not able to detect obstacles that only protrude at the upper-body level (ADA, 2010b). The existing ADA literature does not address cultural differences that may impact the application of ADA law. That said, the findings from the present study may illuminate cultural differences in Puerto Rico that could suggest the need for a more contextualized version of ADA law in that location.
A government-initiated public service campaign called Ready has published information on hazard preparedness for people with disabilities. The publication provides several recommendations. One recommendation includes communicating with local authorities regarding transportation needs in the event of an evacuation. A second recommendation calls for checking to assure that there is a local registry of people with disabilities that is consulted by governments and organizations in the response and recovery phases. Tips specific for people with visual impairments are offered as well, such as the importance of having braille labels on disaster-related supplies and including a braille writer in emergency supply kits (Ready, n.d.). The Ready recommendations were used as a reference point when analyzing data from the present study.

Governments and other relief agencies often use disaster registries to respond to vulnerable populations, such as people with disabilities. The literature regarding disaster registries for people with disabilities ranges from strong support to criticizing how they are implemented and whether they should be utilized. Some literature encourages the use of disaster registries and explains how important they are for institutions to be aware of who the people with disabilities are in their regions and to be able to check on them after a disaster. The check-in procedure would ideally be informed by the registry information for each individual so that things such as medical or mobility needs would be known by response staff beforehand (Hoffman, 2008; Norwood, Gerber, & Zakour, 2011; Penner & Wachsmuth, 2008). Hoffman (2008) promoted the use of registries with a needs-based approach—meaning the author focused on the needs of people with disabilities that should be met by emergency personnel utilizing registries. Hoffman’s (2008) approach focused on the social
vulnerabilities of people with disabilities, rather than finding ways to include this population in the development and implementation of registries. There has been some study on the importance and implementation of disaster registries, but not much on their impact (Hewett, 2013). For example, Raja and Narasimhan (2013) explained that disaster registries are often not in multiple formats, so if there is a power outage, an electronic-only registry will not be usable. Most often, there are not clear procedures to enact registries. Without clear procedures, it is possible that a registry may exist but there are never attempts to check-in with the registrants (Raja & Narasimhan, 2013). Finally, registries can create a false sense of security for some registrants so that they do not take appropriate measures to prepare themselves (Norwood et al., 2011). The present study will look at how disaster registries have been utilized in Puerto Rico as they relate to people with visual impairments and observe their effectiveness.

**Hurricane Katrina Spurred Government to Action**

The National Council on Disability (NCD) is an independent federal agency that exists to inform government law-makers of disability issues and policy. In 2006, the Council published its observations of systemic downfalls during Hurricane Katrina as well as recommendations for future improvement for federal agencies, the United States Congress, local governments, and nonprofit organizations in their interactions with the disability population. In general, both the NCD’s report and research by Casey-Lockyer and Myers (2017) found that people with disabilities were unduly impacted during the response and recovery phases of Hurricane Katrina.
In relation to people with disabilities, Fox et al. (2010) reported on the trauma that disproportionately affected people with disabilities as a result of Hurricane Katrina response and recovery efforts and showed the high correlation of social connectedness to resiliency. The NCD also offered specific examples of people with visual impairments not having access to safety information, such as an “audio description of visual displays of critical information, such as maps or lists of affected areas.” (NCD, 2006, p. 5). The warnings and lessons given by the NCD regarding the lack of inclusion of people with visual impairments throughout the disaster cycle in Hurricane Katrina served as a guide for the researcher of the present study to understand potential causes of social vulnerability.

The NCD advocates for the “twin principles of inclusion and accessibility” (NCD, 2006, p. 3). Therefore, NCD’s future recommendations that stem from their Hurricane Katrina report include an acknowledgement of the accessibility needs of people with disabilities and of the value of including people with disabilities in recovery efforts (NCD, 2006). Exclusion and conditions of social vulnerability were also found by Hemingway and Priestly (2006) with victims of Hurricane Katrina. A recent NCD report on the U.S. Government’s efforts in natural disasters in 2017 and 2018 found that there was the unnecessary institutionalization of people with disabilities in the response phase and that there was a lack of access to disaster-related programs and services (NCD, 2019). The present research attempts to further apply NCD’s findings and recommendations for people with visual impairments by shedding light on the specific accessibility needs and discovering the extent to which inclusion occurred throughout the disaster cycle in Puerto Rico for people with visual impairments.
It should be noted that none of the aforementioned government materials addressed differences in culture, such as is generally found when comparing Puerto Rico with the mainland United States. Such a difference can be found in the broad categories of individualist and collectivist cultures. For example, Paton et al. (2010) explain that a person in an individualistic culture will tend to look out for their own goals in a situation of risk and that a person in a collectivistic culture will focus their goals on the shared objectives of the community. The Paton et al. (2010) study acknowledged that there are heightened levels of collectivistic tendencies in the response to a disaster no matter the cultural background, as there is a tendency for people to want help in their community however possible.

Additionally, Milian and Correa (2001) stated that there are traits common to many Latino cultures that should be considered in cross-cultural relations with the U.S. The first three traits the authors list—allocentrism, simpatía, and familialism—deal with the high value of community relationships. The other traits—power distance, personal space, time orientation, and gender roles—have to do with the manner in which people relate to each other. There is potential that any of these cultural elements could impact how a U.S. law, such as the ADA, is handled among the people of Puerto Rico. Further complicating the reception of U.S. Government guidance in Puerto Rico are the history of colonialism, the cultural conflicts resulting from Americanization, and racial discrimination (Milian & Correa, 2001; Rivera Ramos, 2001; Briggs, 2003).

**Nonprofit Organizational Guidance**

Beyond government institutions, some nonprofit organizations have addressed the issue of the impact of hurricanes on people with disabilities. Multiple nonprofits were
involved in the disaster cycle in Puerto Rico and were included in the current study. Thus, it was deemed necessary to review the pertinent literature produced by these nonprofits.

Regarding people with disabilities overall, Portlight Strategies, Inc. offers in-person and online webinars geared toward any organization or individual interested in learning more about natural disasters and disabilities (Portlight Strategies, Inc., 2016). A goal of its teaching is that people with disabilities should be included in the leadership of each of the preparation, response, and recovery phases. Portlight will also work with other organizations to help assure that emergency shelters meet ADA standards. Additionally, Portlight includes people with disabilities in the organization’s disaster response efforts, such as handing out food and cleaning debris.

The American Red Cross has a booklet of recommendations and checklists for people with disabilities that focuses on the preparation phase of the disaster cycle (ARC, n.d.). The booklet includes suggestions such as those mentioned in the above “Needs” section but offers some unique recommendations. The distinctive contributions include completing a personal needs assessment, creating a list of suggested disaster supplies, and placing a list of tips for disaster mitigation in the home and work place (ARC, n.d.). People with visual impairments are encouraged to follow the recommendations and checklists in the booklet. Additionally, the booklet offers specific suggestions for people with visual impairments in preparing for a natural disaster. A unique suggestion for this population is to use braille labels for disaster supplies (ARC, n.d.). Braille labels are brailled stickers applied to objects that explain what the object is. An example would be the brailled word “beans” on a label affixed to a can of
beans. Recommendations from the Red Cross booklet were used as a reference point in analyzing data from the present study.

For people with visual impairments, the American Printing House (APH) has issued guidance on their website for hazard preparation for people with visual impairments (APH, n.d.). The site provides a list of typical things one would need to prepare for a large-scale disaster, such as an emergency kit and a list of emergency contacts. While the document offers helpful advice, when compared to the above “Needs” section, the only unique suggestion presented is the encouragement to develop a plan for the evacuation of a service animal. This document does not, however, address the recovery phase.

Braille Works (2015, 2016) gives suggestions and lists for people with visual impairments in the preparation, response, and recovery processes of a hurricane. Although the intended audience of these efforts are people with visual impairments, most of the suggestions can be utilized by anyone with a disability. Braille Works’ specific guidance for people with visual impairments in preparing for a hurricane comprises the same elements in the lists given in the “Needs” section above. One difference is that it advises people with visual impairments to be aware of the dangers of using headphones during a hurricane since they can mask the sound of important weather patterns or radio alerts (Braille Works, 2015, 2016). Recommendations from Braille Works were used as a reference point when analyzing data from the present study.

The discussion in this section presents what was found regarding the nonprofit literature related to the current research topic. The present study sought to address the gap in the literature of nonprofits that relates to the processes of hurricane preparation, response,
and recovery for people with visual impairments in Puerto Rico. This research study provides an academic lens through which the experience of people with visual impairments who have survived a natural disaster can be better understood.
CHAPTER 3

METHODOLOGY

The primary purpose of the present study is to understand the experience of hurricane preparation, response, and recovery for people with visual impairments in Puerto Rico and to find ways that the disaster cycle can improve for this population in the future. The following chapter discusses the manner in which the researcher chose the methodology for the present research and how the data were gathered and analyzed.

Framework for Research Approach

The present research study used a transdisciplinary approach. This approach to research integrates relevant fields of study and methodology that serve to address the issue in as relevant a way as possible (Bergmann et al., 2012; Leavy, 2011). This “issue-focused” approach is accomplished through means such as integrating multiple cultural perspectives, investigating an understanding of the issue-related demands on the communities involved, attempting to discern the variety of problems, and seeking to develop best practices based on the common good as defined by the actors (Leavy, 2011).

Furthermore, the researcher in the current study has a pragmatic worldview. The pragmatic viewpoint is one that strives to find solutions to problems using whatever accessible means are appropriate (Creswell, 2013). A pragmatic worldview opens possibilities of research approaches to whatever best addresses the issue being studied and is
available in the study context. Pragmatism is also highly concerned with “what works” regarding solutions to social problems. Pragmatism is embedded within transdisciplinarity (Creswell, 2013). Because the researcher did not live in Puerto Rico, available methods for obtaining research participants were used before and during the researcher’s visit to the island. Specific methods will be explained below. Additionally, a pragmatic approach was appropriate because the present study aimed at finding ways of improvement for people with visual impairments in future disaster cycles.

Furthermore, the pragmatic worldview for the researcher extends to the manner in which the topic was chosen for the present study. Before the hurricane season of 2017, this researcher had made plans to study teachers in Puerto Rico who administered services for people with visual impairments. After the broad and extensive impact of Hurricane Maria, the previous topic was not as relevant as dealing with the new reality of post-hurricane life in Puerto Rico. However, before the 2017 hurricane season, it became apparent through personal interactions with people in Puerto Rico that there was an overall feeling of marginalization from the consciousness of the mainland United States. The literature bears this out as well (e.g., Ayala & Bernabe, 2007; Burnett & Marshall, 2001). Instead, the researcher did not want to feed into this perception, even if only from an individual academic endeavor.

Because of the researcher’s usage of transdisciplinarity, the issue was analyzed from multiple perspectives. Moreover, the researcher used a relativist perspective in this study, which acknowledges numerous realities with myriad explanations (Yin, 2018). Presenting the words of the people with visual impairments themselves is a central element of the study.
This approach has to do with the relativist perspective because the researcher desired to know how the interviewees view reality after experiencing the 2017 hurricanes in their context. Furthermore, part of what causes social vulnerability for a people group is having a weak position within systemic structures (Wisner et al., 2003). Therefore, it was of paramount importance that the voices of people with visual impairments in Puerto Rico be a pillar in the data of this study. Finally, to round out the relativist perspective, interviews with disaster relief agencies and agencies for people with visual impairments in Puerto Rico were utilized.

**Globalization, Climate Change, and the Social Vulnerability Perspective**

The concepts and theories of globalization, climate change, and social vulnerability were used in the present study. Globalization, in short, is a global process that covers many facets of the integration of nations and cultures (Al-Rodhan & Stoudmann, 2006). This global process has affected Puerto Rico through its control by the U.S. Government and the potential access the island has to needed resources from other countries. This researcher kept in mind, however, the warnings given by Banerjee and Linstead’s (2001) ominous view of globalization as “little more than [a way] to facilitate assimilation within the dominant ideology” (p. 683). This was done through such methods as the use of local interpreters and member-checking of themes with interviewees, which are explained later in this chapter.

Climate change, as explained previously, assumes there will be an increase in the number and power of hurricanes in the Caribbean. Climate change implies an urgency not only to find environmental solutions but those of social justice as well (Kasperson & Kasperson, 2001; Lugo, 2000; Perry, 2017). Part of the social justice to be sought is that of climate change’s impact on people with disabilities given the social vulnerability ramifications (Wolbring,
Consequently, this researcher thought it was possible that fears could surface in interviews due to reports of future increased quantity and strength of hurricanes in the Caribbean. Globalization and climate change guided the researcher in understanding the hurricane experience for people with visual impairments in Puerto Rico.

The social vulnerability perspective was used as a way of initially understanding any challenges faced by people with visual impairments in Puerto Rico. This perspective refers to the systemic influences that make certain people groups vulnerable during a natural disaster (Stough et al., 2015; Wisner et al., 2003). It has been applied to studies that deal with the intersection of disasters and disabilities (Peek & Stough, 2010; Phibbs et al., 2014; Stough et al., 2015). The social vulnerability perspective impacts people with visual impairments in Puerto Rico in the disaster cycle due to the poverty levels of the island and its historical imperialist relationship with the mainland United States (Briggs, 2003; United States Census Bureau, 2017). The social vulnerability perspective helped the researcher select appropriate research methods and to better understand what factors would be most likely to impact the population in the current study.

**Research Design**

The present research uses a qualitative approach. Qualitative research is useful for deriving strong connections between individuals or groups in relation to the research problem (Leech & Onwuegbuzie, 2007). Qualitative approaches are strong in accounting for cultural context in data gathering and have the capacity to reveal complexity in the description of issues and research participants (Miles & Huberman, 1994). The present research uses a qualitative approach to give study participants an opportunity to address problems and/or
highlight strengths related to the research topic that would not be apparent from an outsider’s perspective, such as that of the researcher.

The present research is a qualitative exploratory single-case study of the 2017 hurricane season in Puerto Rico, where an inductive process produced theory from the research. Case studies focus on studying the context of an issue and the factors that influence it from a single instance of the issue. Examples of case studies can include entities such as an event, a people group, or an organization (Eisenhardt, 1989; Yin, 2018). Regarding this research, the case study was that of the 2017 hurricane season in Puerto Rico and its effect on people with visual impairments. The case study method was used because of the following hallmark signs indicating that a case study is appropriate: the use of “how” research questions, the notion that behavior does not have to be controlled for, and the fact that a contemporary event is being studied (Yin, 2018). Furthermore, this research was an exploratory case study because “lessons observed,” such as are stated in two of the research sub-questions, were sought from the 2017 hurricane season in Puerto Rico. This type of question justifies administering an exploratory study (Yín, 2018).

A common component of a case study is to look at an issue from multiple perspectives and to then triangulate them (Yin, 2018). Input was sought from the following four perspectives of those having experienced the 2017 hurricane season as it impacted Puerto Rico: people with visual impairments, relief agencies that worked with people with visual impairments, leading American disaster relief agencies and policy specialists, and organizations serving people with visual impairments. Additionally, a case study finds outcomes of the issue at hand (George & Bennett, 2004). The purpose of the present research
was to find outcomes for people with visual impairments from hurricanes in Puerto Rico as well as to understand the context under which those outcomes manifest.

Eisenhardt’s (1989) approach to building theory from case studies was used as the model for this study. According to Eisenhardt, the process of building theory in case studies includes defining the research question, gathering and analyzing data, using literature, and forming theory. Although the resultant theory was grounded in the research, pre-existing theories were used in the development and execution of the proposed research. For example, the social vulnerability perspective was not tested as a theory in the current study but used as a way to understand the challenges faced by people with visual impairments in experiencing a hurricane. This understanding helped to form interview questions, which are listed in Appendix B.

**Participants**

Table 1

*Breakdown of Study Participants*

<table>
<thead>
<tr>
<th>Representation</th>
<th>Number of Participants</th>
<th>Interview In-person (IP) or On the Phone (Ph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMA ODIC</td>
<td>1</td>
<td>Ph</td>
</tr>
<tr>
<td>ADA technical specialist</td>
<td>1</td>
<td>Ph</td>
</tr>
<tr>
<td>People with visual impairments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>21</td>
<td>12 Ph/9 IP</td>
</tr>
<tr>
<td>Rural</td>
<td>8</td>
<td>8 Ph</td>
</tr>
<tr>
<td>Those representing organizations</td>
<td>6</td>
<td>3 Ph/3 IP</td>
</tr>
</tbody>
</table>
Relief agencies:

<table>
<thead>
<tr>
<th>Agency</th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMA</td>
<td>Ph</td>
<td>IP</td>
<td>Ph</td>
</tr>
<tr>
<td>Red Cross</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAVI</td>
<td>IP</td>
<td></td>
<td>IP</td>
</tr>
<tr>
<td>Mirada</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organizations serving people with visual impairments:

<table>
<thead>
<tr>
<th>Organization</th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAVI</td>
<td>IP</td>
<td>Ph</td>
<td>Ph</td>
</tr>
<tr>
<td>Mirada</td>
<td></td>
<td>Ph</td>
<td></td>
</tr>
<tr>
<td>SCR</td>
<td>IP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFB-Puerto Rico</td>
<td></td>
<td>Ph</td>
<td></td>
</tr>
<tr>
<td>UPRDO</td>
<td>Ph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBDO</td>
<td>IP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABB</td>
<td></td>
<td>IP</td>
<td></td>
</tr>
</tbody>
</table>

Note. Movimiento para el Alcance de Vida Independiente (MAVI) and Mirada acted as both a relief agency and an organization serving people with visual impairments. They were interviewed as representing each category.

**FEMA ODIC and ADA Technical Specialist**

The Federal Emergency Management Agency (FEMA) and the Americans with Disabilities Act (ADA) were chosen because they are the most expansive federal efforts addressing the research topic, among many other subjects. Their injunctions and efforts apply in Puerto Rico.

Interviews were conducted with a FEMA Office of Disabilities Integration and Coordination (ODIC) representative and an ADA technical specialist. These interviews served a three-fold purpose. First, they rounded out the investigator’s understanding of the stances and teachings of each initiative regarding the preparation, response, and recovery of people with visual impairments. Second, they gave background for the interviews with people with visual impairments in Puerto Rico and the disaster agencies working with these individuals. For example, the investigator learned of the typical level of involvement of
FEMA’s ODIC in the lives of individuals with visual impairments in the response process. This knowledge formed some expectations of responses to certain questions in the interviews with people with visual impairments. Third, the ADA and FEMA interviews provided an expert opinion on policies relating to disaster response and recovery as they relate to people with visual impairments. All interviews were audio recorded by the researcher with permission by the interviewee.

A representative of FEMA’s ODIC was specifically targeted among all FEMA specializations since it was expected that this office would be the most familiar with issues specific to people with visual impairments in the context of a disaster. The interviewee in the present study was selected by FEMA, instead of this researcher choosing who should represent FEMA. This interview was conducted over the telephone since the interviewee was in the mainland U.S. and this researcher was in Puerto Rico at the time.

An ADA technical specialist was chosen because this person has a high level of knowledge about the ADA law and how to help a variety of stakeholders to assure that the ADA law is implemented appropriately. Additionally, the ADA technical specialist who participated in the present study had three personal attributes that were closely related to the topic of research, namely, she is from Puerto Rico, she lived there during the 2017 hurricane season, and she is a person with a visual impairment. These factors added value to the responses because they came from someone inside the culture of Puerto Rico and in the community of people with visual impairments. In this researcher’s efforts to find an ADA representative, it was quickly apparent that this person was an ideal candidate. Her name was among the first to occur on related internet searches, and she was among the first names
mentioned by other leaders of organizations in Puerto Rico when investigating potential interviewees. She was also on the boards of other organizations serving people with disabilities in Puerto Rico, thereby giving her a broad organizational knowledge from which to draw from in the interview.

**People with Visual Impairments**

The purpose of the interviews with people with visual impairments was to understand the perspective of this population in Puerto Rico regarding the hurricane readiness, response, and recovery processes. A total of 21 urban and eight rural interviewees with visual impairments participated. Additionally, six participants in other interview categories had visual impairments. Although these participants were asked questions relating to the organizations they represented, each also gave insight into the experience of the 2017 hurricane season in Puerto Rico as an individual with a visual impairment.

Saturation of the community of people with visual impairments was not expected as each interviewee had a unique experience to share. Four interviewees had a visual impairment for less than a year by the time Hurricane Irma came to Puerto Rico. One interviewee was known to have had an additional disability along with a visual impairment. Because the intent was to obtain interviews with individuals who are visually impaired, an additional disability made it possible that questions about the interviewee’s experience as a person with a visual impairment would exclude a part of the identity of that person. In this instance, the investigator asked questions that related as directly as possible to the interviewee’s visual impairment. Therefore, it was possible that the responses from this particular interviewee did not relate to only being visually impaired. All interviewees were at
least 18 years old. There were no distinctions made regarding the desired number of interviews according to gender nor income levels.

**Interviewee introductions.** The following will describe some of the backgrounds and circumstances of the people with visual impairments who were interviewed in the present study. Pseudonyms are used to protect confidentiality.

**Alondra.** Alondra lives in a rural area with her elderly mother of whom she is the primary caregiver. She said that her mother also has a visual impairment. She received orientation and mobility (O&M) and independent living skills (ILS) training from a representative of the National Federation of the Blind (NFB). She acquired a visual impairment two years previous to the interview because of medical malpractice. She was referred to this researcher by the representative from the NFB.

**Ana.** Ana takes care of her elderly mother in an urban area. In the interview, she expressed highly valuing the concepts of ILS, O&M, and braille in all of life, not only within the disaster cycle. She arrived independently to a monthly NFB members meeting. Ana was referred to this researcher by the NFB representative.

**Carlos.** As of the interview, he had been a person with a visual impairment for two years. He lives in a wooden house with his wife and children. During Hurricane Maria, he stayed with another family member who lived in the higher level of an apartment building to avoid getting flooded in his house. His house was destroyed but was reconstructed as of the interview. His nephew died as a result of leptospirosis, an infectious disease that affected many after Hurricane Maria (Briskin et al., 2019). He was taking lessons from Miguel in ILS,
and Miguel referred him to this researcher. The interview took place at the offices of MAVI as Carlos was there for his training.

**Carolina.** Carolina lives on her own on the first floor of a large federally-funded building. She has older children who live near her home. She had a career as a nurse. She had acquired a visual impairment as an older adult. Carolina said that she had enough eyesight to take walks and appreciate some visual aspects of nature. She was referred to this researcher from Mirada and received training there in ILS.

**David.** David has lived in the same high-level apartment for multiple decades. He lived alone during the time of the interview. He mentioned serving time in the U.S. military about 50 years ago. He has a daughter who lives in the U.S. mainland. He said that he was a person with a visual impairment also as a child. During the Hurricane Maria response, he spent two weeks at a girlfriend’s house.

**Edwin.** Edwin is 72 years old and lives with his wife in a house in a suburban neighborhood. He became a person with a visual impairment as an older adult. He received ILS and O&M training shortly before Hurricane Irma. He has three children who live in other places but were present in his house during both hurricanes. He was referred to this researcher from Mirada.

**Fabiola.** As of the date of the interview, she lived with her parents. She received training in ILS and O&M from MAVI. She was referred to this researcher by Sonia.

**Gabriela.** Gabriela lived alone but spent Hurricane Maria with two friends who came to her home. She currently lives in a condo between tall urban buildings which she believed protected hers. She was previously a social worker in the U.S. mainland. She received
training in ILS and O&M at Mirada as an older adult. The representative of Mirada referred her to this researcher.

**Jorge.** Jorge is in his 60’s and takes care of his elderly father. They live in an urban area and he has a daughter who lives nearby. Jorge expressed that among his challenges during the post-Hurricane Maria phase was that he had to take insulin. He acquired his visual impairment as an older adult. He had not received any training in ILS or O&M. He was referred to this researcher by the representative of Mirada.

**Juan.** Juan acquired his visual impairment shortly after Hurricane Maria as a result of an unrelated condition. Two months later, he got married. He runs his own nonprofit related to helping immigrants coming into Puerto Rico. He was referred to this researcher by one of the interpreters.

**Lorena.** Lorena lived on her own in an urban area. Her house was cement with a steel roof, but the entire house was flooded from Hurricane Maria. During the hurricane, her sister and two sons were present with her. She has a mother whom she helps care for who was 91-years-old at the time. Lorena did not indicate any prior formal ILS or O&M training, but she said she did occasionally use a long cane. She said she has some usable peripheral vision that she implements while traveling. She was referred to this researcher by the representative of Mirada.

**Luis.** Luis was a university student. He did not reveal his age but appeared older than the age of a typical university student. He had previously spent 15 years in the Virgin Islands. He had been a person with a visual impairment for 14 years as of the interview. He was referred to this researcher from Miguel.
Mateo. Mateo is a faculty member at a university. He teaches a technology class and advocates for independence and accessibility for people with visual impairments through a podcast on tips and trends for assistive technology. He has been a person with a visual impairment at least since his elementary school days. He was referred to this researcher by another colleague in the U.S. mainland who knew him as a leader among the community of people with visual impairments in Puerto Rico.

Maya. Maya lives on her own in a rural area and took care of her own needs during the 2017 hurricane season. Some of her family members live nearby. She became a person with a visual impairment shortly before Hurricane Irma. She received some ILS training before Hurricane Irma. Maya was referred to this researcher from the representative of Mirada.

Miguel. Miguel has been a person with a visual impairment for many years. He teaches independence skills for people with disabilities at MAVI. He has a wife and children, and they live on a high level in an apartment building. He was the first person recommended by the director of MAVI to interview and to be a source of finding other interviewees.

Natalia. Natalia lives alone in a rural area. She has family members who live nearby. She did not refer to growing up as a person with a visual impairment and spoke of receiving ILS training as an adult. She takes care of herself and the needs in her home. She was referred to this researcher from the representative of Mirada where she had previously received training.
Omar. Omar lives in a rural area with his wife. He did not grow up as a person with a visual impairment and did not have any formal training in ILS or O&M until several months after Hurricane Maria. He was referred to this researcher from the representative of Mirada.

Rafael. Rafael had been a person with a visual impairment for seven years. He shared that he was previously the president of a camping association and was an environmental educator. He was referred to this researcher by Miguel.

Ramón. Ramón lived with his son in an apartment in an urban area. Shortly before Hurricane Irma, he experienced significant personal changes as he acquired a visual impairment and dealt with the deaths of his wife, mother, and dog. He was a social worker before acquiring the visual impairment. He was referred to this researcher from the representative of Mirada.

Sonia. Sonia grew up in Puerto Rico. She did not state how long she had been with a visual impairment but referred to her experience in the education system as a person with a visual impairment. She mentioned attending college in the mainland and getting her guide dog six-and-a-half years ago. She is on the board of directors at MAVI and operates her own nonprofit which seeks to be an aid to individuals and organizations serving people with visual impairments. She also has a husband, and they live on a high level of an apartment building. Sonia was referred for an interview from another teacher of people with visual impairments who was a previous contact of this researcher.

Valentina. Valentina is a woman who grew up in Puerto Rico and has a visual impairment. Not many days before the interview, she successfully defended her doctoral dissertation. She lives in a house with her husband, daughter, and two dogs. Valentina
referred to receiving training in ILS during her childhood years. Although she had some usable vision when she was younger, she progressively lost more vision through the years to the point that, as an adult, she has tried to learn braille and the use of a long cane. She said that she was deemed to not need braille and O&M skills as a child. She was referred to this researcher from Sonia.

**Victor.** Victor worked for multiple decades for a telephone company and then had to stop because of a degenerative eye condition. He also worked for multiple decades with the Army Reserve. Both of his children have moved out; one got married, and the other moved to the U.S. mainland. As of the interview, he lived alone with his dog in a house in a suburban area. His visual impairment began about 20 years ago, but he received ILS and O&M training about 10 years ago. During Hurricanes Irma and Maria, his ex-wife, children, and grandchildren stayed with him because of the stability and location of his house. They ended up staying with him for five months because of debris cleanup and infrastructure redevelopment near his and their homes. He was referred to this researcher from a representative of MAVI.

**Relief Agencies**

The interviews with response agencies addressed the response and recovery phases of the conceptual framework. There were individuals from four relief agencies interviewed, including FEMA, the Red Cross, MAVI, and the Mirada Program of the Vocational Rehabilitation Administration (Mirada). FEMA received the most mentions from people with visual impairments (13) when asked about what organizations were involved in their aid. The Red Cross was involved because it was mentioned by five interviewees with visual
impairments and two organizations serving people with visual impairments. MAVI and Mirada are also considered organizations that serve people with visual impairments, however, they worked directly in response efforts. MAVI was involved in helping meet the needs of people with any disability type in shelters, and Mirada collaborated with the American Association of Retired Persons (AARP) to distribute bags of food to their clients around the island.

**Organizations Serving People with Visual Impairments**

An additional round of interviews was held with representatives from seven agencies that serve people with visual impairments in Puerto Rico. The purpose of these interviews was to explore the extent of preparation in hurricane readiness that these agencies provided to their consumers, to understand their perspective on the impact of the 2017 hurricane season on people with visual impairments, and to learn how future disaster cycles can improve for the people they serve.

Seven agencies and organizations were chosen because of their relatively large influence in Puerto Rico and their relevance to the study. These include MAVI, Mirada, the State Council of Rehabilitation (SCR) of Puerto Rico, the NFB, the University of Puerto Rico Disability Office (UPRDO), the Municipality of Bayamón Disabilities Office (MBDO), and the Association for the Blind of Bayamón (ABB). Although four of the organizations on this list do not focus solely on people with visual impairments, they do serve this population and have direct influence on the experience of preparation, response, and recovery pertinent to a hurricane. One representative from each organization was interviewed, and they represented the perspectives of their organizations that serve people with visual impairments. Each
representative was in a leadership position of the organization at the time of Hurricanes Irma and Maria.

**Positionality of the Researcher**

The relationship of the researcher to the participants was as an outsider to the culture and citizenship of Puerto Rico. This researcher is from the mainland U.S., which has had a history of colonialism in Puerto Rico (Briggs, 2003; Rivera Ramos, 2001). Moreover, there has been much negative media coverage about the U.S.’s handling of the response and recovery from the 2017 hurricane season (Barron, 2017; Robles, 2018). This fact had potential to heavily affect some interviewee responses. Also, the researcher was not fluent in Spanish which meant an interpreter had to be used. However, since the interpreters were from Puerto Rico and involved in the community of people with visual impairments, they acted as a cultural bridge between the researcher and interviewee.

**Research Methods**

**Sampling Procedures**

For initial contacts with relief agencies, government agencies, and organizations serving people with visual impairments, a prepared email was sent that described the purpose of the study and offered an invitation to participate. If there was no response after two days, the invitation to participate was attempted on the telephone. Interviews with people with visual impairments were found from organizations serving people with visual impairments and other individuals with visual impairments, therefore no formal email prescription was used for these potential interviewees. Prior to all interviews, the interpreter reviewed the consent forms for participation and audio recording with the participant. Five interviews
were conducted in English because of the participant’s preference. In these cases, this researcher reviewed the consent forms with the participant without the aid of an interpreter.

**FEMA and ADA.** To prepare for the FEMA and ADA interviews, an analysis was done on FEMA and ADA documents to understand their positions and efforts in regard to people with visual impairments throughout the disaster cycle. The analysis was done by using publicly available documents, such as their websites and published articles. Additionally, documents were requested from the representatives of FEMA and ADA that make reference to people with visual impairments and natural disasters. These analyses aided the investigator in preparing for the FEMA and ADA representative interviews. The themes of the analysis were shared with FEMA and ADA participants prior to their interviews so that they could approve or modify them.

The interview with the ADA technical specialist occurred at the beginning of the data gathering. The interview with FEMA’s ODIC representative occurred in the middle of the data gathering phase. The FEMA and ADA interviews were conducted via phone and audio recorded.

**People with visual impairments.** To find interviewees among individuals with visual impairments, the investigator started with personal relationships that had been previously established with agencies that serve the needs of people with visual impairments in Puerto Rico. Snowball sampling was then used with these agencies and individual interviewees. “Snowballing” occurs when the interviewer utilizes the interviewees’ connections to other potential interviewees by asking them for referrals. Compensation of $10 was offered to each interviewee in this research phase as it would be enough to cover the
cost of most meals should the interviewee choose to conduct the interview over a meal.

Because transportation and resources were more abundant in San Juan compared to rural areas, most of the people with visual impairments that the investigator had access to were in or near San Juan. However, the perspective of people with visual impairments who lived away from the resources of a bigger city were also sought. A sample of eight interviewees who live in a rural area were obtained.

Interviews with people with visual impairments were conducted at the place that was most convenient for the interviewee. The places chosen included their home, MAVI, and their workplace. Some interviews were conducted on a phone conference call due to the availability of interpreters and their limited ability to travel.

**Relief agencies.** The relief agency representatives who were interviewed were found by snowballing from the specific person with visual impairment previously interviewed who had worked with them in the response and/or recovery phase(s). Using this method, the relationship between the person with visual impairment and the response agency was one-to-one. Thus, only agencies that worked directly with interviewees participated. This was done to find out the names and quantity of relief agencies that were involved with the specific people with visual impairments interviewed. When the investigator knew all the specific relief agencies involved with the people with visual impairments who participated in the study, the interviews with the relief agencies were then arranged.

In many cases the interviewee with a visual impairment did not know the organization or individual involved in their aid, if they had received any. In those cases, they were asked if they knew anyone else who was visually impaired and the organization from
which they may have received aid. This organization would be added to the list of relief agencies to interview. If the person with a visual impairment interviewed was not aware of any organizations that had worked directly with them or anyone else they knew, no snowballing was possible from this person.

Interviews with MAVI and the Red Cross were conducted at their offices. The interview with FEMA was conducted over the phone due to the interviewee being located in another state. The interview with the representative of Mirada was conducted over the phone due to the interpreter being unable to travel.

**Organizations serving people with visual impairments.** The interviews with organizations serving people with visual impairments occurred throughout the data gathering phase. The interviews were conducted at the offices of MAVI, ABB, MBDO, and the SCR. The interviews with Mirada and UPRDO were conducted over the phone because the interpreter was unable to travel. The NFB did not have an office, so an agreement was made to conduct the interview over the phone.

**Measures**

Semi-structured interviews were utilized to allow the interviewee to emphasize what they deemed most important in relation to the research study. Although English is used by some, Spanish is the primary language in Puerto Rico, especially in rural areas. Therefore, interpreters were used who met three criteria: they must have proficiency in English and Spanish, they must have lived in Puerto Rico most of their lives, and they must have professional experience in providing services to people with visual impairments. The interpreter accompanied the investigator on most of the interviews with people who were
from Puerto Rico and was used in part or all of each interview, depending on how much Spanish the interviewee wanted to use. All interviews with an interpreter used a triangular seating arrangement when possible, as recommended by Edwards (1998). The researcher asked a question in English, it was interpreted into Spanish, the interviewee responded in Spanish, and the response was interpreted into English.

The researcher typed transcriptions in English for use in data analysis. These files were shared with the interpreter to check for accuracy. After each interview that utilized the interpreter, the researcher debriefed with the interpreter regarding any “insider” cultural knowledge exhibited by the interviewee. After all interviews, the researcher and interpreter debriefed to check for overall cultural insights within the interview responses. Additionally, as recommended by Patnaik (2013), a reflective journal was amended after every interview. This was done to add validity to the data analysis as the journal was a snapshot of attitudes, observations, and reactions on the part of the researcher while the experience of the interview was still recent.

**Data Analysis**

Data were disaggregated using inductive constant comparison analysis and classical content analysis. Leech and Onwuegbuzie (2007) describe inductive constant comparison as a common qualitative analysis tool where themes emerge from an entire dataset (or subset, as is the case in this research). The interview transcriptions were read, themes were notated, and similar themes across the interview subset (or across subsets) were chunked together as they related to answering the research questions. For example, themes were listed for people with visual impairments as an individual subset. Another set of themes was listed for relief
agencies, for example. Thus, the themes for each subset of data would be separate so as to understand what were the most recurring issues for each. Additionally, similar or contradictory themes could be compared across subsets: resulting in overall implications. Classical content analysis is often used in conjunction with constant comparison analysis, whereby a count of each code is tabulated to aid in understanding the emphases that the qualitative data reveal (Leech & Onwuegbuzie, 2007). The answers to the research questions guided how themes were grouped together. For example, the third sub-research question concerned the response phase and the role of aid agencies. Only those themes that dealt with the response phase and aid agencies, from any subset, were used to guide the response to this question.

Another aspect of the use of the constant comparison analysis is through member checking. Member checking means that, after the themes are developed, the researcher brings them back to the study participants to seek their opinions on theme accuracy (Merriam, 1998). In the present study, after the themes from interviews were coded, interviewees were contacted to check them for accuracy. This checking has the purpose of obtaining interviewee approval of their own themes and their accuracy as well as learning whether they would add or change anything. Member checking increases the uniformity between the researcher and the interviewee(s) (Leech & Onwuegbuzie, 2007).

**Ethics**

All data gathered from the interviews were kept confidential. The interviewees were kept anonymous by not using their names in the research report. Since visual impairment constitutes a low-incidence disability, and the number of individuals and organizations that
serve them are relatively small, it may be possible for some readers of the research report to determine individuals involved in the interviews. However, this was made explicit in the consent form to which the interviewee was required to give assent if they elected to participate. Furthermore, the consent forms addressed other potential ethical issues, including potential risks of participation and access to consent information. Because interviewees were asked to recount difficult experiences, contact information for state counselors was given in the consent forms. Also, due to the variety of text preferences that study participants had, consent forms were available in Spanish, English, braille, large print, audio, and digital formats.

**Conclusion**

Using a transdisciplinary approach, a pragmatic worldview, and a relativist perspective shaped the methodology for the current research. The concepts of globalization, climate change, and the social vulnerability perspective aided this researcher in understanding the research issue and guided the formation of interview questions. This exploratory case study used a qualitative approach, which allowed the researcher to obtain multiple perspectives so that the interviewees were able to use their own words to determine the data. The data were then grouped into themes as they related to the research questions. In the next chapter, the study data will be shared and analyzed.
CHAPTER 4
ANALYSIS

The purpose of the present study was to understand the experiences of people with visual impairments in Puerto Rico following the 2017 hurricane season and to learn what can be improved in terms of government and nonprofit services for this population in future hurricanes. The present study used the phases of hurricane preparation, response, and recovery to frame the ways that data were collected and analyzed.

The majority of the interviews focused on people with visual impairments so as to make their voice the centerpiece of the data. These semi-structured interviews were conducted with people age 18 or older who had experienced the hurricanes from either urban or rural areas. Other perspectives came from representatives from Americans with Disabilities Act (ADA), the Federal Emergency Management Agency (FEMA), other relief agencies, and organizations that serve people with visual impairments. All interviews occurred between November 2 and December 17, 2018.

The data were analyzed using inductive constant comparison analysis and classical content analysis. Themes emerged from the interview data in relation to the research questions. The themes were grouped together in the following discussion within larger themes represented by the following subheadings. A tabular summary of the themes is presented in Appendix C.
Independence of the Individual

Post-hurricane Environment and Independence

This researcher was able to take many strolls through San Juan, the largest city in Puerto Rico. This researcher rented a place in-between the tourist areas and areas more typical to residents of San Juan. When this researcher walked two blocks north, near the big hotels and tourist beaches, there was little evidence of a hurricane a year prior. When this researcher walked one block south of his residence, where most of the year-round citizens of Puerto Rico lived in single-story homes, there was a great deal of evidence of a hurricane a year prior. In walking and observing this neighborhood, this researcher took note of the travel environment, as many orientation and mobility specialists do when traveling to new regions. This researcher observed, even a year after the 2017 hurricane season, the low-hanging electrical cables, the impassable sidewalks broken from uprooted trees, and a walkway completely blocked by a large fallen advertising sign, among other things.

Stump of fallen tree that broke the sidewalk.  
Low-hanging cables above sidewalk.
Although it is possible that these problems were not the result of the hurricanes, the interviewees confirmed similar problems from their experience of the aftermath of Hurricane Maria, such as having to navigate fallen branches, poles, debris, and electrical cables. Even the familiarity of the home temporarily altered a sense of independence as furniture was moved around to avoid roof leaks. Valentina is an independent-minded woman with a visual impairment who had recently defended her dissertation. She kept a busy schedule, so she and this researcher had to reschedule our interview three times because of her unexpected work or family issues with her husband and daughter. Valentina said that during Hurricane Maria,

I had to move stuff [because] when I got rained on, I had to make sure I had enough space to walk around and not fall. I would still bump into stuff no matter what. We were trying to salvage as much furniture as we could.

This was an effort where Valentina had to consider both her own needs and those of her family. Temporarily, Valentina’s independence, which is an important concept for her, was lessened until she took the initiative to move furniture. The furniture, used by the family, was previously moved so that it would not be ruined by the rain coming through their roof.

Multiple interviewees with visual impairments expressed how the post-Hurricane Maria recovery environment adversely affected their outdoor travel more than it did for other populations. One aspect of this adverse effect was the unavailability of ride-hailing services. At an event where people with visual impairments received long canes and at a National Federation of the Blind (NFB) monthly meeting attended by this researcher, the dependence on ride-hailing became evident. At the end of each event, those attendees with a visual impairment who did not have family who drove them would get on their phone and make a
few taps as they listened to their screen reader in extra-fast mode. They would then proceed to the appointed sidewalk curb, some on their own and some being guided by someone else, to await their ride. Without access to ride-hailing services or public transportation, such as was the case after Hurricane Maria, independent cross-town travel for a person with a visual impairment became significantly more difficult.

The post-disaster environment can present a variety of problems for a person with a visual impairment due to power outages and inaccessible roads. Sonia discussed one such problem: the retrieval of groceries. At the cane gifting event mentioned above, this researcher met Sonia, who was recommended by the event organizer as a good potential interviewee. Upon meeting her, this researcher noticed that her English was articulate and without much of an accent, indicating an attention to detail into how she presented herself. Furthermore, she possessed good posture and was well-dressed. Over the following days and weeks, Sonia showed her humility by mentioning, outside of our formal interviews, that she was on the board of directors at Movimiento para el Alcance de Vida Independiente (MAVI) and that she was running her own small nonprofit which sought to improve the lives of people with visual impairments in Puerto Rico. She had a guide dog from a major guide dog school in the U.S. mainland. In order for the guide dog school to award a client with a dog, the client must be able to exhibit a high degree of skills in independence in order to be entrusted with handling a highly-trained animal for travel purposes (Milligan, 1999). A high level of maturity is also important so that the client can help meet the dog’s every day needs. However, one did not need the formal evidence of a guide dog school to note her confidence and prowess. In discussing her background and social connectedness, she maintained eye
contact with this researcher and spoke confidently. When she talked of difficulties she and others experienced during the 2017 hurricane season, however, she would often lose eye contact and her tone would become more serious. She showed immediate interest in the present study and was willing to help in any way possible. Not only did Sonia give an interview, she also helped through providing interview interpretations and finding other individuals for further interviews. Regarding Sonia’s post-Hurricane Maria experience, she said that ride-hailing services were unavailable. This meant that a person with a visual impairment might be able to walk to the grocery store but, as Sonia said, “it’s unrealistic to expect that I can walk back with 10 gallons of water.” A person who uses a guide dog must have one hand holding the leash handle while traveling, and a similar problem would exist for someone who uses a long cane. Thus, after Hurricane Maria, Sonia did not only have to surrender some of her mobility independence, she was also unable to provide some forms of aid for her family in a time of need.

The long cane is a symbolic and practical tool for greater independence for people with visual impairments. Access to long canes is more difficult in Puerto Rico compared to the mainland United States. Part of the reason for this is the Jones Act. It is a United States law passed in 1920 that required shipping between U.S. ports to be carried out by U.S. flag ships (United States Congress, 1958). These ships have more start-up and operating costs than ships waving non-U.S. flags (Isidore, 2017). A result of this law for consumers in Puerto Rico is the increased cost of products shipped to the island. Long canes for people with visual impairments are no exception. The effects of the Jones Act became evident to this researcher while attending the aforementioned cane gifting event, or “cane party.” The cane
party was where multiple people with visual impairments who were students of a certain orientation and mobility (O&M) specialist were to receive new long canes for free. The cane party was possible because of donations that the O&M specialist was able to raise from a crowdfunding website. These efforts were the first time the O&M specialist had tried such an approach to help her students, revealing her creativity and concern for their wellbeing. At the party, there was punch, hors d’oeuvres, and a speech by the O&M specialist to the crowd of about 10 cane recipients and their families. It was a unique and happy occasion for everyone.

Right after Hurricane Maria, multiple people with visual impairments had lost their long canes, according to Miguel. He would know the extent of lost canes as an employee at MAVI, thereby giving him access to information on many people with visual impairments and their experience of the Hurricane Maria aftermath. Lost canes meant that until people could replace these tools for travel, which for some were relatively expensive, they would lose an important option enabling them to travel independently. Based on the excitement and attendance of the “cane party,” many people with visual impairments not only lost an important tool for independence because of Hurricane Maria, but an empowering and emotionally healthy one as well.

Some interviewees with visual impairments described the negative impact that the extensive community use of generators had on their senses during the recovery phase. Many generators running at the same time for extended periods can create an unusually loud sound and smell of burning gas throughout a neighborhood. Since nonvisual senses are often relied on by people with visual impairments, the sound and smell of the widespread use of generators had an especially adverse effect on travel and daily life. For example, Luis lives in
a neighborhood with individual homes, so each housing unit had a generator. He explained the lengths he went to in blocking out the noise of the generators: “I need some headphones to handle that [because] we have noise from every place. From the front to the back. Every person has a generator, that makes it very difficult with noise.” Luis’s use of noise-canceling headphones helped him handle the difficult post-disaster environment and focus on other things that aided in his recovery, such as listening to audio books. Furthermore, Sonia described the impact that the widespread use of generators had on her when she traveled outside of her residence during the recovery phase: “the noise pollution from people’s generators and the smell was very disorienting.” Although a person with a visual impairment may rely on things like the sound of traffic or the smell of a coffee shop for travel orientation, an unusually strong sound and smell, such multiple running generators, can alter the confidence of independently traveling in a formerly dependable environment (Fazzi & Barlow, 2017).

The differences in the pre- and post-Hurricane Maria travel environment meant everyone had to adjust. For many people with visual impairments, this meant that they should either do the hard work of adjusting and try to travel anyway or stay inside. For those who attempted to travel, they had to overcome obstructed sidewalks and find alternative routes that lacked the security of their previously familiar paths. Mateo was one such interviewee. His position as a faculty member at a university and as an influential leader in the community of people with visual impairments offered professional credibility to his claims and experience. Since his independence and accessibility podcasts could have influence in helping prepare people with visual impairments for events such as a hurricane, this researcher
wondered aloud at the beginning of the interview regarding the best approach to take with him—should he be asked questions that focused on being an individual with a visual impairment or as an influencer who could help prepare others for a natural disaster? Mateo seemed ready and eager to take the interview whichever direction this researcher deemed best—he was simply ready to share his story. In the interview, he described his struggle after Hurricane Maria and the perseverance he employed to find alternative walking paths. His remarks also give insight into the disadvantages of having a visual impairment after a natural disaster:

I went to my work to get to the university using the train, the Metro (the city bus service). After the hurricane, the Metro was closed about three months. So, it was very tough for me to be able to get to my work because I lose the only public transportation that works for me here. So, you can say, “well, it was closed for everybody.” Yeah, but, other persons can drive, or other persons can walk, using specific routes, other things. After the hurricanes, a lot of the routes that I walk have trees, and they were closed. And the sound of the concrete was even taken away. I start to learn other routes, and it was very hard for me because I have to deal with routes that are very strange, sometimes insecure, but I have to do it or I cannot go to my work. Somebody that can see, it is very easy to take an alternative route. And that person can see that tree and just doesn’t even have to walk over there and can make adjustments very easy. But for a blind person that was very hard, very, very hard.

Post-Hurricane Maria, the inability to drive or easily find alternative routes proved to be a challenge for Mateo and other people with visual impairments. Mateo mentioned that the
sound of the concrete was important because people with visual impairments often use reflected sound from their environment to help with orientation when navigating (Long & Giudice, 2010). He also mentioned making adjustments if there was, for example, a fallen tree across the walking path. Not that a person with a visual impairment cannot make the adjustment, but the time, mental effort, and risk it takes to make those adjustments are greater for a person with a visual impairment.

Furthermore, Carlos, with his limited independent living skills (ILS) training, mentioned the inaccessibility of his environment because of post-hurricane debris: “there were obstacles all over the place, and the lampposts were all on the ground, so I couldn’t go anywhere.” Similarly, Ramón spoke of the impact that the lack of neighborhood maintenance had on his safety: “the wild grass and weeds were overtaking so there was no sidewalk or anything, so I was walking along the street.” The risk that these interviewees faced was that of the possible harmfulness of obstacles caused by Hurricane Maria in their walking path. Additionally, there was risk in going around an obstacle and onto a potentially busy street where the traveler may not be accustomed to handling safely. To illustrate such a hazard, Ramón mentioned that he heard a story of a man who was not visually impaired, who walked at night along the side of a street because of debris. Because there was no electricity, the lampposts that were still standing did not work. Because of the darkness and narrow streets, he was hit and killed by a passing motorist.

Sonia expressed a unique challenge she had in the post-Hurricane Maria environment that related to her guide dog. Her statement also highlights a lack of understanding by some public servants about the needs of people with visual impairments:
Because in a lot of cases there was fear. For example, there was a government-issued curfew for safety reasons, but I would have to go out to take the dog to the bathroom, and if I were to run into a police officer and explain my situation they wouldn’t understand because they don’t really interact with guide dogs or blind people very often.

Guide dog handlers are trained to establish and maintain routines with their dogs in order to optimize the performance of the handler and dog as a traveling unit (Franck, Haneline, Brooks, & Whitstock, 2010). Common routines include when and where the dog relieves itself. The post-disaster environment upset these routines for Sonia and her dog. Police officers were not treating them with understanding by demonstrating a lack of knowledge of what Sonia and her dog needed to do despite the curfew time.

The altered post-disaster environment, and resultant decreased independence, added to the mental stress of dealing with post-hurricane life. To illustrate this, the president of the Association for the Blind of Bayamón (ABB) felt that, after seeing to the immediate physical needs of its members, the primary burden of serving them was to create a physical and emotional space to deal with the mental anguish of lacking independence in the post-hurricane environment. He said, “one of my concerns was, this population with their own family during this emergency, they were marginalized. Their own family members put them in the corner and they suffered. I was very worried about that.” As a result, he ensured that the ABB offices had power during the aftermath of Hurricane Maria so that its members could come and have a place to share their experiences because, “you have people with all
these needs, but if you have an emotional breath, you can better support [people with visual impairments].”

In summary, the post-hurricane environment negatively affected the independence of people with visual impairments in Puerto Rico. Issues such as post-hurricane debris, the long-term loss of power, and the more long-term loss of a long cane hampered independence and was a detriment to their mental health during the hurricane response and recovery phases for people with visual impairments.

**Deficient government intervention revealing need for self-dependence.** The government response to Hurricanes Irma and, especially, Maria caused much frustration among many in Puerto Rico. A stroll across a walking bridge in San Juan reveals some of the frustration through graffiti such as “El desastre es la colonia (The disaster is that we are a colony)” and “FEMA es el problema (FEMA is the problem).” The perceived slow government response encouraged several people with visual impairments to express their observations of the importance of skills in independence. They noted that delayed access to support highlighted the need for people with visual impairments to have the necessary skills to sustain themselves until help arrived. For example, Natalia, who lives in a rural area said,

That is unacceptable that it took 35 days for the government [to respond]. You can’t count on the government, you have to rely on yourself and be as prepared as possible because the government will not help you in time.

Natalia did not make the previous statement in a tone of anger but matter-of-factly. She medically could not eat the canned food that was provided by aid agencies, so she had to cook food on her own. Because it took so long for any aid or electrical services to be restored
in her area, she lost over 15 pounds. “Rely[ing] on yourself” does not just refer to things like acquiring a generator or having an extra stock of food, but on having the independence skills to make meals or travel outside safely in a changed environment.

Furthermore, Ana spoke about personal independence in the response phase and its relation to the lack of government help. In person, Ana was polite and appreciative for her involvement in the present study. During the interview, she stressed many times the importance of ILS, O&M, and braille for people with visual impairments. She repeated these three independent skills so much that it felt to this researcher, about mid-way through the interview, that he should already know the answer to the question before it was asked. She stated that “one of the things that blind people have to be aware of is that they need their training. They need to be independent. Because we can’t depend on the government.” These comments can be taken in two ways: that there should be more urgency by people with visual impairments to receive training in independence skills, and that the government and NGOs in Puerto Rico need to do more to ensure that more people with visual impairments have an opportunity to receive such training. Overall, an increased urgency of gaining more ILS and O&M skills that grows out of a lack of government intervention for people with visual impairments could potentially be a benefit for this population.

Organizational Observations on Independence

Organizations that serve people with visual impairments in Puerto Rico noted the difficulties of independent travel in a post-hurricane environment and observed the value of ILS and O&M skills for those who had them. The director of MAVI gave some insight into this. In order to get this insight, this researcher tried to schedule an interview with the
director. However, this proved to be a challenge as her concern for the rights and social inclusion of people with disabilities in Puerto Rico was evident through the busy schedule she kept through trying to coordinate organizational activities as well as being among the leadership of the Puerto Rico Disability Community Relief Network (PRDCRN). We finally had a chance for an interview at the MAVI offices, where this researcher had visited multiple times for previous interviews. There was a rotation of front office receptionists throughout these visits, all of whom were people with disabilities. One of the most respected teachers at MAVI was a man with a visual impairment. Serving, employing, and advocating for the independence of people with disabilities was an evident feature of MAVI. During our interview, the director of MAVI described the direct impact the hurricane had on the independence of its clients in the weeks and months after Hurricane Maria:

People with visual impairments, navigating through our roads and our communities was a nightmare because those paths that they were very used to going out to, those that are independent and actually go out on their own, it was a nightmare for them to get out of their houses and continue living their independent lives.

The director of MAVI is saying that, even in a best-case-scenario where a person with a visual impairment is normally independent, traveling the post-Maria environment for them was a “nightmare.” This leaves the person with a visual impairment with the choice of getting out of their house and facing an enhanced risk to physical safety, or to stay inside where there was commonly no electrical power and community interactions were limited.

Hurricane Maria offered the opportunity for organizations serving people with visual impairments to observe the impact that having skills in independence had on their clients to
successfully navigate the disaster cycle. They observed a correlation between a client’s level of independence skills and their confidence throughout the disaster cycle. The higher the level of independence skills, the greater the client’s confidence in navigating the disaster cycle. The representative of Mirada said, “[Our clients] still felt confident in navigating in their home alone with independent living skill training.” Furthermore, she shared her observations of the impact that their training had on helping to prepare their clients for a natural disaster:

Another thing we learned was that consumers who had already received orientation and mobility prior to the hurricane, once they were visited after the hurricane were more secure, confident in themselves. That if they had the need to go outside, permitting that their surroundings were not in a very dangerous state, they were more comfortable, confident, and secure in their ability to sustain themselves and to be able to do things on their own without personal support, but with the support and knowledge of knowing that they had orientation and mobility instruction and the use of their cane.

Some of Mirada’s clients had received little to no O&M training prior to Hurricane Maria. After Mirada staff made home visits to their consumers, they were able to compare the outcomes between the consumers who had and had not received such training. The representative of Mirada connects being “comfortable, confident, and secure” in the post-Maria environment with O&M training. Furthermore, the president of the ABB explained the value of past training by saying that each person with a visual impairment “has to be prepared to sustain and survive [a hurricane]. Not to depend on the help of other people.
Every individual should learn how to survive during a crisis.” Although it is true that everyone should know “how to survive during a crisis,” the president of the ABB, an organization that serves people with visual impairments specifically, saw survival and independence skills as a particular need among this population.

Although the need for more training to ensure greater independence for people with visual impairments may not be new information, this awareness was further underscored as a result of the circumstances brought about by Hurricane Maria. This awareness became more apparent as a priority for these organizations to focus on in the event of future disasters. Mirada observed, similar to the aforementioned preparation and response phases, the difference between the consumers who had received more training in independence skills versus those who had received less training during the recovery phase:

Those that had received independent living skills prior to the storm were able to manage better and were in a more relaxed state in their homes because they had already had that training of where things were located in their home, how to access things, their own personal wellbeing, and that their homes were very well organized so that they were able to really maneuver within their home environment in a way that felt safe.

Similar to the way the representative of Mirada previously described in preparing for a disaster, the clients who “manage[ed] better,” were in a “relaxed state,” and “felt safe” during the recovery process were linked with having received training in ILS prior to Hurricane Maria. O&M was mentioned earlier by the representative of Mirada as also having made a positive difference. ILS and O&M are major components of independence.
Additionally, the representative of the NFB noted the critical nature of independence skills while talking about the response phase:

This is something that our organization tries to instill in every blind person in society, blind persons need some basic skills in terms of orientation and mobility, living skills, how to live alone, not that you don’t depend on other people but, in the event that you don’t have other people, you can live alone and do things by yourself—being able to read and write braille.

Among other independent skills, the NFB representative mentioned being able to read and write braille. This skill is important in the response phase because, as was the case after Hurricane Maria, most people did not have electrical power. Without electrical power, a person with a visual impairment will not have access to electronic aids such as computers with a screen reader or handheld media players to help pass the time. The ability to read braille, much like the ability to visually read text on a printed page, can be used whether there is electrical power or not.

In a post data-gathering interview with one of the interpreters regarding overall cultural insights, she stated her observation of the value of skills in independence that she sensed from many interviewees: “Most people seem to be grateful for the services they did receive with regards to orientation and mobility and independent living skills in order to feel prepared in their homes.” Therefore, organizations serving people with visual impairments should take note that the services they are providing are helpful in the disaster cycle. Also, the value that these services bring could be used as a way to advocate for resources to expand their reach to more people with visual impairments.
For organizations to consider. Some participants noted the deficiencies in training for people with visual impairments in the disaster cycle. Fabiola stated an overall desire for the community of people with visual impairments to best prepare for future disasters, “People [with visual impairments] should have more independent living skills, training, and other specific preparation so that they’re better prepared and better suited for any type of natural disaster.” Although Maya had become a person with a visual impairment shortly before Hurricane Irma, she understood the need for ILS training as a community of people with visual impairments and its relevance in every facet of life, including handling the aftermath of a disaster. She stated that there should be training for all people with visual impairments to learn to use products that do not require electricity in the event of a loss of power: “We should have the know-how to use things that are not technological, and that don’t need electricity, [so that] we would be better prepared and better served as a community.” Organizations serving people with visual impairments and relief agencies may view statements such as these as a call for increased engagement with the community of people with visual impairments in Puerto Rico. Although there were efforts to engage people with visual impairments throughout the disaster cycle, these efforts can still be improved and expanded.

Some statements by people with visual impairments could be potential testimonials regarding the need for or value of O&M training as it pertained to the experience of the disaster cycle. For example, Omar had relatively short answers in his interview because there were two main ideas he wanted to get across in his interview. First, he struggled with depression before Hurricane Maria as well as during the response phase. Second, he
expressed, several months after Hurricane Maria, how important learning to use the long cane had been to him mentally and physically. He could use his long cane to detect obstacles in front of him which helped him feel more at ease while walking. He stated that in regard to learning O&M skills,

The only preparation I didn’t have which I feel that I really needed, was [O&M] training because with the lack of light I was stumbling and hitting myself often throughout my house. We had a few candles but that didn’t really help (laughs). That was the preparation I needed but didn’t have. Just learning to use the cane has given me confidence and mobility around my home and I have a much more positive attitude and outlook.

Omar connected the lack of training in O&M with his negative experience post-Hurricane Maria. He also showed the mental and physical values his training had provided.

Edwin spoke of the importance of the training he received before and after Hurricane Maria and how it contributed to his wellbeing. He and his wife demonstrated hospitality to this researcher in their home with offers of orange juice and a chair with extra padding. They were glad to have this researcher in their house and to participate in the study. A common theme throughout his interview was his appreciation for the skills in ILS and O&M that he received from trainers from Mirada prior to Hurricane Irma. His wife did not mind interjecting the facts of the timeline that he gave this researcher regarding his training and their relation to the timing of the hurricanes. Edwin was glad for the help in memory. He mentioned the positive emotional impact that these skills had on him and his family as he handled the hurricane aftermath. He said he was taught to “move safely around with the stick
(long cane). And that has been a real change for my life. [The training] has been a blessing for my family and for myself. I came out of the depression.” In this case, O&M training was an aid not only for Edwin but also for his family. Increased confidence in independent movement relates to improved self-esteem which is a benefit for the individual and his/her community (Tuttle & Tuttle, 2004).

Several people with visual impairments expressed a desire for more disability-related trainings to be provided to emergency management staff at organizations and directly to people with visual impairments. These trainings could contribute to the greater independence and dignity of people with visual impairments throughout the disaster cycle. These trainings could be administered by government agencies, nonprofits, or organizations serving people with visual impairments. Lorena addressed her desire for such training. She had the unfortunate experience that her home was flooded, and there was debris and fallen trees around her home. She had to throw away a lot of things from inside the house since it got wet. Insofar as receiving any disaster-related training or information, she did not receive any despite living in an urban area where she would have a greater likelihood of receiving such information. She pointed out the lack of and need for such training, “there should be services in place to inform, prepare, and assist people with disabilities, and there isn’t, and that it is very heartbreaking.” Not only did Lorena point out the lack of services but also the emotional toll that not having those services had. Additionally, another interviewee, Luis, addressed the lack of and need for training in shelter navigation, “I don’t remember anybody telling that they have a training for blind people on a shelter situation. How to get there . . . and how to deal in the situation.” Lastly, Maya recommended pre-disaster trainings,
If institutions were to offer [disaster] trainings or these preparations or seminars monthly or on a bi-monthly basis, that they would do it town by town and each town could identify where people with disabilities are, who is living alone. In that way, when the emergency would happen, they would have easier access to prioritize those people and get to them as soon as possible.

Maya connected the town-by-town disaster training for people with visual impairments with a better organizational awareness of who is a person with a visual impairment in each town. This would make it more possible for organizations to check on them in the response and recovery phases.

**Practical Tips for Independence**

People with visual impairments shared several practical tips that they learned in the experience of the 2017 hurricane season. Some of the lessons observed were not unique to people with visual impairments but rather were generalizable to all people who experienced the hurricanes. For example, some participants stated that they learned the importance of creating a family disaster plan, which is a strategy that would be pertinent regardless of visual status. Another example is to prepare for sustaining oneself with food and water beyond the three to five days that they had been previously told.

Some lessons that were shared, however, relate specifically to people who are visually impaired. More specifically, people with visual impairments shared measures for increased safety and sustainability during the response and recovery phases. The use of gloves was found to be helpful in keeping people with visual impairments safe when tactiley exploring the unpredictable post-disaster environment. Valentina said, “I do think that maybe
learning to use gloves . . . I was getting my hands in every which place and fortunately I
didn’t get myself hurt, but a blind person should be aware that gloves are something to
protect your hands just in case.” Furthermore, Mateo found that the use of gloves allowed
him to engage with his neighbors to help clear debris: “I use gloves to take out all of the
stuff, but that’s something that I really needed to participate and to use my hands.” From
these two interviewees, it can be seen that the use of gloves is not only helpful for people
with visual impairments when moving debris but in navigating the unpredictable living space
after a disaster.

In regard to sustaining oneself during the response and recovery phase, one
interviewee with a visual impairment suggested the use of solar energy to help power
electronic assistive devices. Luis, a student at a university, mentioned many times the
importance of having power for his electronic devices both for helping pass the time, when
there was no centrally-generated power, and to help continue his school work. He said that
for the future, “knowing about most of the equipment that I have to use, it’s power-based,
maybe [I will] get some batteries and solar.” Additionally, several interviewees expressed
their hope that more people would learn braille as that skill becomes more salient when there
is no electrical power. Valentina stated she found that receiving training on how to light a gas
stove was helpful. A second suggestion came from Omar. He lives in a rural area where there
is typically greater distance to access resources. He explained the value of growing a
vegetable garden: “People should plant root vegetables and other things like yuca . . . which
helped me provide food during the time when I couldn’t go to the stores or get food
anywhere.” Although such a suggestion would be helpful for anyone regardless of their
disability status, it would be especially helpful for people with visual impairments due to the possibility of not having access to food markets because of downed transportation systems and altered walking routes.

ILS and O&M skills were negatively impacted because of the 2017 hurricane season. The post-hurricane environment, the lack of government intervention, the lack of training in independence for some, and the resultant lessons observed specifically affected independence, which in turn impacted mental health. Next, the participation of people with visual impairments throughout the disaster cycle will be examined.

**Initiative, Inability, and Ability**

The following section describes the initiative that people with visual impairments showed throughout the disaster cycle. “Initiative” refers to the actions that the person with a visual impairment took to aid themselves or others in relation to the preparation, response, and/or recovery processes without someone doing it for them. Examples are preparing for a hurricane by buying extra canned goods, helping to clear away post-hurricane debris, and contacting FEMA to report damages and attempt to obtain financial assistance. Many of the examples came from people who lived alone, where, in a sense, everything they did in preparation, response, and recovery could be called initiative. On the other hand, many interviewees lived with family and were just out of high school. These interviewees generally had fewer natural opportunities to show initiative. The interpreter debriefed with this researcher after one such interview with Fabiola, who had recently graduated from high school. The interpreter surmised that her short responses, where she mainly described what
others did for her, could have been due to the fact that not much responsibility was expected of her.

The social vulnerability perspective was used by this researcher to understand some of the issues around the population of people with visual impairments in Puerto Rico. Many of the examples described below can be seen as a challenge to the notion of being vulnerable due to social constructs. This does not mean that social vulnerability does not exist among this population, but it is a reminder that people with visual impairments are active agents and exhibited resilience throughout the disaster cycle. The following discussion will first describe the desire of people with visual impairments to initiate meeting needs for themselves or their community during the response and recovery phases, yet with their expressed limitations. The next section will describe what people with visual impairments did within the disaster cycle.

First, people with visual impairments discussed the “hurricane apathy” that existed for them and others before Hurricane Maria. Many interviewees said that over their lifetime prior to 2017, hurricanes predicted to reach Puerto Rico either missed the island or did not cause as much damage as was anticipated. This created a sense of apathy in them regarding preparing for Hurricane Maria.

Although Hurricane Irma caused significant damage, it did not cause deaths in the thousands. Therefore, many people in Puerto Rico felt regarding Hurricane Maria that they had done well enough beforehand and that this time would be no different. Miguel remarked, “For Maria, it was like the story about the big bad wolf that’s coming, but it wasn’t like that, it actually came.” Furthermore, the vastness of the impact of Hurricane Maria was described
as not possible to conceive of previous to its arrival: “our generation never saw a hurricane like Maria.” Ana responded to the question of whether they felt better prepared for future hurricanes based on their experience of Maria with a self-evident line, “I don’t think anybody is prepared for a hurricane like Maria (laughs).” The hope in a once-in-a-generation hurricane is that it can better prepare everyone for future hurricanes, regardless if there is apathy.

Since apathy has the potential to add to trauma for hurricane victims, for some, the constant sound of the blowing wind of a hurricane adds to the trauma. Several interviewees with visual impairments mentioned the unusual sound of Hurricane Maria, which negatively impacted their mental and physical experience of it. The following are some of their descriptions: “The thunder and the roar of the storm and it felt like there was a monster above where I lived,” “the winds were very strong and loud,” “all the noise, all the wind, it was horrible, it was very, very, scary,” “the wind just sounded furious—the noise of it was very disturbing,” “all the roaring sounds that sounded like a monster had descended upon us,” and “It was like a train.” Furthermore, previous to the member-checking of themes developed from the research, there was a theme that addressed the sound of Hurricane Maria as a unique issue for people with visual impairments. However, Valentina noted that although the sound of Hurricane Maria was disturbing, she wasn’t sure that it should be noted as a unique issue for people with visual impairments since everyone, regardless of visual status, was troubled by the sound.

Alternatively, Mateo, knowing the difficulty that many people with visual impairments had with the sound of Hurricane Maria, shared a different perspective. In a
comment that showed his curiosity, structural home security, and independence, he shared how he was able to take advantage of the potentially once-in-a-generation event:

A hurricane, it is a very sensorial experience, and as a blind person I have the opportunity to experience something by hearing and by feeling the winds; that is something unique. In my perspective as a blind person, it was just amazing of the sound of the winds, it is just amazing for me. I was in my home, and I went from one room to another room just hearing. You were able to notice the direction of the winds. A lot of blind people just does not open any kind of window or are very scared. And if you have the security, you don’t have to be scared at all, and you can also use your sense and you will notice that this is a huge event. If I stayed in a room and do nothing, maybe it would be a worse experience because I might think that it’s something worse; at least you have the contact with nature in that moment. It was an experience that I really felt, and it was unique.

Mateo gives insight into his confidence in his independence and curiosity about the hurricane but also into his perception into how many people with visual impairments handled it. He said that many people with visual impairments “are very scared” during a hurricane and “stay in a room and do nothing.” Although these were not the findings among the participants in the present study, it is a perception that is part of the social vulnerability perspective discussed in chapter two (Stough et al., 2015; Wisner et al., 2003).

**Desire to Help, but Inability**

Although many people with visual impairments were able help themselves and others throughout the disaster cycle, there were some limitations that they described. While they
had the desire to help and contribute to the reparation of their community, many felt that their visual impairment inhibited their ability to fully participate. A surprising example of this was from Miguel. Miguel is quick to show his kindness and skills in independence, not as a front, but because it is part of his character. He independently showed this researcher the building and grounds of his place of employment, MAVI. He showed places around the campus to eat and spent extended time helping this researcher to find additional interviews. Two other interviewees in the present study mentioned Miguel as an exemplar person with a visual impairment living independently and being self-determined. Miguel said that in the aftermath of Hurricane Maria, however, “I couldn’t do anything, and that was one of the only times that I felt that my visual condition was limiting me of helping out.” As helpful as Miguel had been to this researcher and others involved in the present study, he felt that immediately after Hurricane Maria he could not help because of his visual impairment. He did not expand on why he felt limited. Given his tendency to help people whenever he can, the conditions must have been extreme enough around his living space for him to not participate for a time.

Similar to Miguel, other interviewees expressed desire to help yet felt limited. Carlos, who relatively recently became a person with a visual impairment and had a family of his own that he was trying to take responsibility for, expressed that he could not help others during the response phase. Yet staying inside did not make him feel useful either: “Being visually impaired, I felt useless in the [response] process, and I felt useless staying at home.” Valentina described her desire to help but felt that she would be more of a hindrance than a help: “being blind is like it’s hard knowing how you can help and not be an obstacle for people when you’re in a situation like this where people are cleaning out water and whatnot.”
The comments from Miguel, Carlos, and Valentina indicated a desire to help during the response phase, yet these interviewees felt that being a person with a visual impairment was a barrier to helping as fully as they would like.

Another illustration of the desire to help, yet not being able to, came from “Rafael.” When Miguel called him to ask for his participation in the present study, Miguel laughed at various times through their conversation. He laughed because Miguel said that Rafael likes to joke around a lot. That was true through our interview. He and his three grown sons were present during the interview, and each had some level of competence with English. They showed their hospitality by offering this researcher bags of chips and bottles of soda or water. There did not seem to be much else populating the kitchen, however. These efforts showed hospitality, sacrifice, and gratitude that this researcher was including Rafael in the study. Gratitude was also evidenced by Rafael’s comments at the end of the interview. During the interview, Rafael described his desire to help after Hurricane Maria, yet there were limits that people in his neighborhood put on him, even though they were trying to be helpful to him:

When this hurricane ended and I was trying to go outside to help the neighborhood, the neighbors were saying, ‘no, you need to go inside.’ And that made me feel bad because I was made to go inside, and I was not allowed to help because of my visual impairment.

Although Rafael is a beloved person in his community who tries to make people feel better emotionally and physically, the people in his neighborhood did not allow him the chance to contribute after Hurricane Maria. Although it was not evident why the people in his
neighborhood did not allow Rafael to help, this act of exclusion was a source of difficulty for him.

Mateo said that he also had heard some people recommend that people with visual impairments should stay inside after a natural disaster. However, he did not follow that advice, as he says in regard to the response phase, “my opinion is that no one can tell me, ‘no, you now go away.’” Mateo is a very independent-minded person who is willing to stand up for what he believes is right. Not everyone has a similar strong-willed approach. However, Mateo’s point about self-determination should be a reality for all people with visual impairments.

Examples of Ability to Help and Provide for Self and Others

Although some interviewees experienced some limitations during the disaster cycle, many other interviewees shared how they were able to provide for the needs of themselves and others. Many interviewees with visual impairments who lived alone before Hurricane Maria prepared for it by going out on their own and getting extra food, water, medications, gas, flashlights, and battery-operated radios. Example statements from participants who illustrate their initiative in preparing for the hurricane included the following: “I got food and gas for the stove,” “I had water, batteries, I had a radio that helped me a lot—a small battery-operated radio,” and “I was able to have clean water, canned food as well as the other necessary things like a flashlight to be prepared for the storm itself.” Additionally, Natalia said,
I was prepared with drinking water; I also had a cistern that had water reserved for house use. All of my fresh food I pre-prepared so that I would have enough meals. And I put storm shutters on the windows that needed it. Certainly, “hurricane apathy” was not an issue for these interviewees. It may have been that preparing for Hurricane Irma helped these interviewees for their preparations for Hurricane Maria. Regardless, they took the steps needed in order to best prepare for a disaster.

Carolina helped barricade her apartment building before Hurricane Maria. Although there was no electrical power after the hurricane, she said “[I] dyed my hair, I did my hair rollers, I made sure to always look good and feel good because to me that is something that is important.” Despite her focus on personal appearance, she did not mind being physically active and potentially getting dirty for the sake of helping others. She was barricading her building but was injured. As she explained,

Two days prior to the hurricane, because I was helping put things up and protect the building, I fell and, in order to not hit my head, I fell on my knee and had a bad accident. So that limited my leg and I just received, two months ago, a knee replacement.

Carolina did not have to help prepare the building as she lived in an apartment where others were already barricading it. But, she volunteered her efforts to help and was allowed to join. She did not express regret helping even though she had an accident.

Research participants with visual impairments who lived alone during the 2017 hurricane season were able to provide for their own needs in the response phase. At multiple points during his interview, David mentioned the advantages of having a telephone land line
as it was one of the few technological devices that worked after Hurricane Maria. He used it to order food and was later able to independently travel to local stores: “There is a company called Food Net, and you order through them from the restaurants they service, and I just ordered food until I got electricity. Then after that it was a matter of going out to the supermarkets.” David showed that he was able to go to the supermarket on his own and was able to use this ability and the obtained food to sustain himself until the electricity came back and the sidewalks were cleared of debris.

Victor used his generator to help with his daily provisions. However, he was aware of the impact of the noise it made at night on his neighbors, so he made adjustments:

I would use my generator during the day, to make sure the refrigerator is running for eight hours during the day, because my neighbors started complaining about the generator at night. So at night I would use the battery of my sleep apnea machine, and I used it that way, and then at night everyone was calm.

Victor was able to make an adjustment to his use of a generator out of respect of his neighbor’s complaints of the noise it made at night. This action helped make the response phase a little more palatable for the him and his neighbors.

Finally, following Hurricane Maria, Sonia traveled to the mainland United States on her own to seek out a mental health professional for therapy related to her experience of the hurricane. She explained her motivation for this temporary move:

I sought psychological services in the U.S. and met with a therapist there to sort of help with the trauma and anxiety. Focusing on my mental health and resting in an environment where I had access to food, water, and basic amenities in the U.S. and
then the training with the Seeing Eye (a guide dog school) was what I did to sort of help myself to be able to come back two weeks later.

Sonia’s statement points to the fact that mental health was an issue to be dealt with after the experience of a natural disaster such as Hurricane Maria. She was able to take the initiative to deal with it by traveling to the U.S. mainland to seek professional help. Although everyone is not as independently-minded as she, it does not mean that mental health services should not be accessible to all people who need it, regardless of the ability to travel.

In the aftermath of Hurricane Maria, people with visual impairments took initiative in the community at large. A prime example is Ramón. To understand the impact of his aid, both for his community and for himself, some of his background should be explained. Throughout the interview with this researcher, the steadfast nature of Ramón’s character came through in his calm and gentle tone. Toward the beginning of the interview with Ramón, he explained that shortly before Hurricanes Irma and Maria, his dog had died, his wife had died, and he had become legally blind. A few minutes after he said that his wife had died, this researcher noticed a big, high-resolution picture on Ramón’s living room wall of them embracing each other and smiling for the camera at the beach. This was a visual representation of a treasured love that was lost. This researcher could not imagine the heartbreak that Ramón had experienced. The process of healing, however, came through his acts of service after Hurricane Maria. He explained that he and a friend decided to create a new ministry called Quick Response. Essentially it goes and helps out older people or people who don’t have enough resources and they know that there
is no help that will get to them. So the ministry goes to these people and helps them in any way that they need.

Ramón further described his efforts in Quick Response and its impact on others and himself.

He said that the ministry has been

like a school in the sense that I’m not only helping others, I’m helping myself. To experience the poverty and the level of need that people had, it’s really difficult, but then again it gives you a sense of purpose and that God has a bigger and greater plan with me and I’m here to help.

Ramón’s story is a reminder of the grave circumstances that many people faced in Puerto Rico after Hurricane Maria. He also points to the healing power of staying in community and helping others in need after a natural disaster, even during some of the most emotionally difficult circumstances. Ramón was eager to share his story during the interview and seemed to have processed his losses only about a year afterward, allowing him to share his story in such an even-keel manner. Surely, as he said, his efforts in helping others contributed greatly to his own healing.

The reader may recall Rafael’s expressed desire to help in his neighborhood, yet his neighbors were not allowing him to help. He did, however, find a way to help during the Hurricane Maria response phase, even though he jokingly referred to himself as being treated as a pawn by his family and friends as a means to get ice quicker:

My cousin would come and pick me up and take me over to the lines to buy ice because then he wouldn’t have to make the really long lines. And it was like, “what, what are you guys doing, are you taking me as a, hmm (laughs).” So everyone was
coming but I was like, “yeah, it’s fine, if this is the way I can help them, this is how I’m helping.”

Rafael was referring to the separate lines for ice and aid supplies that were created by relief agencies for people with disabilities. These were typically much shorter lines than the ones for people without disabilities. Rafael would not only utilize the shorter lines for himself but would go back with others in his community to get supplies for them. Although Rafael may not have been offering much physical action in the aforementioned way of helping, and did not think he was honest in how he utilized the lines intended for people with disabilities, he did appreciate being helpful in some way.

Other examples of people with visual impairments helping during response and recovery are providing meals to people in the local community, working at shelters, getting ice for others, purchasing generators and bringing them to families in other cities, helping the elderly access water, and giving money to a church to help them distribute food. One woman who lived alone had two friends come to her condominium because she felt that her home was a more secure place for her friends to be during and immediately after the storm. Four interviewees with visual impairments helped clear debris.

Gabriela was fortunate to have reliable electricity and was able to make ice and provide it to people who needed this resource:

Since I had electricity, I would store ice, make bottles of waters and give to my friends that didn’t have electricity. So they came every other day to get ice from my house. I helped. I feel very good about that, yes.
The notion of “helping” in the present study is broadly defined as any way that a person could use their own resources to give assistance to someone else. This could include examples such as physically moving debris or, as in the previous quote, making ice and giving it to others. All participants in the study expressed a positive experience from helping.

Victor was able to use his skills and tools from previously working with the telephone company to help his neighbors during the recovery phase: “I have instruments and materials to check cables for what is and is not working. So I checked around the area to see what kinds of damages there were with the tools I had.” He worked for the telephone company before he became a person with a visual impairment, and although he did not work in that capacity anymore, he felt confident enough to check electrical cables. This proved to be a unique way he could contribute to his community after Hurricane Maria.

Sonia focused on helping people in her neighborhood with the mental anguish they experienced in dealing with the hurricane: “I did sort of sit and talk with a lot of people and try and give myself and others emotional support, which was helpful to sort of talk through things.” It was discussed above that Sonia took initiative to address her own mental health needs. She also sought to help those with these needs in her community. Additionally, Mateo expressed the fact that he did not want to be left out of the response activities in his neighborhood. Instead he said, “I was very helpful with my neighbors . . . I helped to remove trees from the trail.”

Finally, Miguel described what he did to provide food for his family when there was no electrical power in his building: “I lived on the 16th floor, so I had to walk all the way up floors with no power, like, go all the way up the stairs and come down. Even with food, after
going grocery shopping.” Miguel consistently uses his long cane to increase his safety in travel. One can imagine him in this instance holding the long cane while simultaneously trying to manage multiple bags of food. His determination to provide for his family leads him up the 16 flights of unairconditioned stairs in the hot September weather of Puerto Rico. After the interview with Miguel, the interpreter told this researcher that, in Puerto Rico, many men with a family feel pressure to be the primary provider of finances and living necessities. This burden was mentioned by other men involved in the present study.

In relation to helping in the household, Lorena said that because of her high level of preparation for Hurricane Maria, she was able to take care of the needs of others in recovery: “I was able to take care of myself and my sister that were together, as well as my son and 91-year-old mother.” This comment did not come from explaining her normal duties in the family, but that because she prepared for Hurricane Maria so well, she was able to take care of others in her household. Valentina mentioned her caretaking responsibilities and that they continued through the recovery process:

I am the chief of my home, I make sure that my family, children, and grandchildren are fed, and I supported them and took care of them throughout the [recovery] process. That was my contribution to the family—in the home, doing as much as I could to help them.

In this case, Valentina described her normal caretaking duties, and that because she was able to continue them throughout the recovery process, she saw that as her contribution.
Adjusting to New Needs

Multiple interviewees with visual impairments explained ways that they used initiative to adjust to new needs that emerged during the recovery phase of Hurricane Maria. Natalia decided to use her savings to better prepare for a future disaster after her experience with Hurricane Maria: “I am saving up money to get solar panels to at least power my refrigerator and the lights in my home.” Lorena found ways to use water cisterns during the extended recovery phase:

After the storm, the rain water that was collected had been utilized and put into a spout and was used in a basin, and that’s where all of our basic laundry was done, with soap and water, hand washed, hung out to dry on clothing lines. I rigged the hose to the water tank and the spout, and it still resides in front of my house, and I am going to keep it there for the foreseeable future because it was very useful during the time without water and periodic episodes where water has been cut.

Lorena did not only have the idea to use water cisterns and how to utilize them, she was able to make it work on her own. It turned out to be a long-term help for her family. Additionally, Lorena found another use for cistern water during the recovery period, which she described as follows: “I would put out the water gallons in the sun so they would warm up and be a decent temperature in order to shower with them.” As in the above example, Lorena not only had the idea of how to help, she was also able to carry it out.

Victor responded that having O&M skills was helpful both for himself and his ability to help others. He said that his ability to handle the recovery from Hurricane Maria came because of “the fact that I am able to do everything independently. That I can move, I can go
places, I can help out, that I am able to do all of those things because of the training I have received.” He not only mentioned the value that O&M skills had on his wellbeing regarding independence, but also how his practice of O&M allowed him to go places with some confidence so that he could help others after Hurricane Maria.

Finally, the representative of Mirada, gave an example of how some of their clients’ ability to build community helped facilitate their own recovery. They made “alliances or created their own network in their community to find support, help, and people to assist them.” These networks contributed to the wellbeing of people with visual impairments for receiving aid supplies and/or mental health support.

Influencing Organizations

People with visual impairments explained their initiative during the recovery process in how they tried to influence change in organizations. Ramón started a response ministry through his church, as was discussed above. Additionally, the ministry aided in long-term recovery efforts as well because they put together modular homes and delivered them, as he explained: “The ministry has done four houses . . . We build modular houses here, we put them on a truck, and then take them to wherever the person needs and drop it off there.” Not only were Ramón’s efforts influencing those in the most need during the response phase, but the ministry he helped to start was also bringing long-term aid such as modular homes.

Mateo took steps during the recovery phase to try to influence people who operate the government meteorologist website to be more accessible for future hurricanes. He said of his interactions with the central meteorologist representatives, “they said to send the recommendation. I sent the recommendation, but they have not yet implemented. Everything
we can do in that effort, it would be a benefit for us.” Not only did Mateo inquire about making the meteorologist website more accessible, he also followed through with making the formal recommendation as he was directed. Mateo was hopeful that these efforts in making hurricane information more accessible would continue. Such accessibility would be a benefit to many people with visual impairments in regards to their inclusion, empowerment, and safety.

Four representatives of organizations who participated in the present study as well as the ADA technical specialist are people with visual impairments. These representatives used their positions to influence change within their own organizations or others for the benefit of people with visual impairments in the recovery phase. The presidents of the ABB and NFB held meetings with their members to improve mental health, as stated previously. [Furthermore?] The coordinator of the University of Puerto Rico Disability Office (UPRDO) advocated with university administration for the needs of students with visual impairments, and the ADA technical specialist met with other organizations to improve their ADA compliance. Finally, the Municipality of Bayamón Disabilities Office (MBDO) representative contacted organizers of a benefit concert and successfully raised money for people with disabilities in disaster recovery in Bayamón.

In summary, there were many examples of people with visual impairments taking initiative within the disaster cycle. Although in some ways it can be argued that people with visual impairments in Puerto Rico are socially vulnerable, many have instead shown resilience and initiative throughout the disaster cycle.
Abandonment

A sense of abandonment by many people with visual impairments and the organizations that serve them was made evident through expressions of appreciation that the present study was being done. Several expressed their gratitude for the present study by stating, off the record, that they were glad that someone was paying attention to them and that this researcher had chosen Puerto Rico for such a study. Valentina stated that it was “touching that somebody cared” about the community of people with visual impairments in Puerto Rico and their experience of the 2017 hurricanes.

This researcher sensed from participants in the study an eagerness to participate and help the community of people with visual impairments in Puerto Rico. Although the interviewees with visual impairments were offered a $10 compensation for their interview time, about a quarter of them either rejected it or asked for it to be donated. They not only wanted their participation to be helpful for people with visual impairments in Puerto Rico but for the money to be used in ways that helped the community as well. Others told this researcher to keep the money, seeing it as a way to contribute to the cause of people with visual impairments in Puerto Rico; that the present study was helping to shine a light on a population that needed it in the context of disaster recovery.

A sense of urgency, because of abandonment, on the part of study participants may also be seen through the way in which interviewees were obtained in the present study. Three of the four representatives of organizations who helped find interviewees in the following discussion expressed that part of the reason for their help was so that more attention could be paid to the population of people with visual impairments in Puerto Rico.
Urgency due to abandonment can be seen in the following illustration. This researcher had originally planned to use a certain government agency to find most of the study participants. However, because of heightened security risks at the time, the agency was not going to be available for this researcher. Fortunately, other individuals at organizations serving people with visual impairments sacrificed their time to contact their clients to ask them to participate. This researcher was in Miguel’s office for an hour-and-a-half, during the break time during his work day, while he called current and former clients to tell them about the present study and ask for their participation. This researcher could hear a sudden and positive tone from many who Miguel called even though they were not on speakerphone. Because of this, this researcher wrote in his reflection notes from that day, “I think people are eager to share their stories.” By the end, Miguel had printed out a list for this researcher of eight names and phone numbers of interested participants, some with interview appointment dates. In the following weeks he continued contacting clients to continue helping this researcher and periodically checked in to find out the progress of the research. Multiple times after his check-in with this researcher, Miguel added that he was glad to help with the current study.

The representative of Mirada also recruited current clients in person and called former clients over the course of four weeks to help find interviewees. When this researcher expressed appreciation for her work on his behalf, she said, “we are so grateful to collaborate with you.” Both Miguel and the representative of Mirada did not just respond to this researcher’s requests for contacts on the day they were solicited. Rather, they continued to initiate unprompted contacts with this researcher for more potential interviewees and to
check-in on this researcher’s progress. These examples were further evidences of the urgency to contribute and of the importance of the study to the community of people with visual impairments in Puerto Rico.

Another example of the eagerness of people with visual impairments to participate in the present study began from one of this researcher’s ride-hailing drivers early in his time in Puerto Rico. When the driver found out about this researcher’s work through casual conversation during the ride, she said she knew someone at her other job who might be able to help in the research. Additionally, in the interview with the ADA technical specialist, she recommended that this researcher talk to someone in particular. The driver and the ADA specialist were both talking about the same person. An email exchange took place later, and this researcher began to be in contact with the coordinator of the MBDO. He was in an unusual position in Puerto Rico in that he is a person with a visual impairment and is employed in a relatively high-level government position. He was highly regarded by those who recommended him and his fellow co-workers. He said that he wanted to have this researcher over at the office so that not only he could be interviewed but that he would invite representatives of multiple other organizations that work with people with visual impairments. Because of schedule conflicts and unexpected issues, this appointment was put off until the end of this researcher’s stay on the island. A couple of days before the appointment, this researcher made a phone call to confirm the meeting. Perhaps there was a miscommunication, perhaps there was a misunderstanding, but the MBDO representative said that he wanted to know how this researcher wanted to interview 30 people with visual impairments that he was going to bus in—one-on-one or in groups. Thirty people with visual
impairments?! As generous an offer as this was, this researcher felt that the effort that the MBDO representative would have to undertake was going to be too large of a burden for him, so the offer was declined. The MBDO representative’s efforts and the willingness of all who wanted to be involved, however, were appreciated. In this researcher’s notes of observations from the day at the MBDO office, a comment was entered noting that everyone’s responses were “passionate.” This meant that the responses from that day had been thought through by the interviewees and given without hesitation. By the end of the interviews with organizations at the MBDO office, the representative of the MBDO presented a gift of appreciation to this researcher of a large tactile map of the Caribbean region. They would use such maps to teach students with visual impairments about tracking hurricanes.

The representative of the NFB was also very willing to contribute much local and unplanned help to this researcher. When he found out that there was a need to transcribe interview consent forms into braille, he did them all for free. He also suggested and made audio recorded versions of all consent forms in the case that a potential interviewee preferred that format. He personally contacted many NFB members to ask if they wanted to participate in the present research and invited this researcher to an NFB meeting so that potential interviewees could be found. His purposeful involvement in the present research was further evidence of the eagerness to contribute that was shown by many study participants.

**Abandonment as Related to Stigma and Paternalism**

Twenty-five interviewees with visual impairments expressed a negative impression that they have felt from society because of their disability. Many related their feeling of
social stigma as adding to their difficult experience throughout the 2017 hurricane season. For example, Lorena stated that she, as a person with a disability, felt abandoned by the government throughout the disaster cycle: “In general, there is a feeling of being abandoned. No attention was paid to people with disabilities.” Lorena related the general treatment of being abandoned by the rest of society as a person with a visual impairment to the lack of attention given during the disaster cycle.

David stated that people with visual impairments were not getting the appropriate teaching in independence skills because of an over-protective society. He expressed that difficulties for people with visual impairments in experiencing a natural disaster happen because “a lot of blind people are too dependent, and that is motivated by society. Even though we have laws that establish teaching of independent living for blind people, the reality is that blind people are not getting those skills.” David’s comments pointed to the problem of over-dependence and lack of empowerment experienced by many people with visual impairments. He also acknowledged that there were laws and organizations whose goal is for people with visual impairments to get training in independent living, but that there was still not enough being done to meet the need in Puerto Rico.

For the purposes of the current study, paternalism is defined as a caring hierarchical relationship where the intent of the one giving care did not lead to empowerment of the one receiving care. Aycan (2006) argued that paternalism may be seen as positive or negative, the opinion of which is heavily weighed by whether the culture is collectivistic or individualistic. The interviewees who mentioned paternalism in the present study discussed paternalism in a negative way. Paternalism and empowerment are at odds (Swift, 1984). Based on the
comments of the people with visual impairments in the present research regarding paternalism, this is a population that has been abandoned as it relates to empowerment. For example, Sonia addressed the paternalism/empowerment dichotomy with her comments on social attitudes toward people with visual impairments:

Because of the barriers that society has put on [people with visual impairments], which is more protective, we want to help them, and the way we help them is by keeping them at home and making sure that they are safe. Rather than empowering them or giving them any tools for independent living.

Sonia acknowledged the side of paternalism that was an attempt by many to be helpful, yet it can have disempowering affects.

**Empowerment of People with Visual Impairments Should Be Increased**

Some participants with visual impairments mentioned issues dealing with a lack of empowerment and the desire to use the post-disaster phase as an opportunity to improve. Even though she had only been a person with a visual impairment for two years, Alondra stated that, in the context of the recovery phase, she had goals of increasing empowerment for her local community of people with visual impairments: “But there are [people with visual impairments] where family members don’t think that they could be independent. My vision and mission is to get those people out of their house. Teach them that they can do things.” As of the interview, Alondra did not share specific plans on how she would accomplish her desire to teach people with visual impairments. However, the desire she shared was itself a comment on the need she saw in her community, and that she hoped to be a part of the solution.
Sonia explained the over-protectiveness of much of society toward people with visual impairments, as discussed above. She further explained these attitudes and expressed the importance of raising awareness of the positive influence that a greater empowerment of people with visual impairments could have on society in Puerto Rico:

The problem is that there is a lot of misconceptions that blind people are unable to do anything; there is very little consideration taken into how to prepare these people for independent living. And oftentimes in these kinds of situations of natural disaster there’s an idea that those people would be a hazard if they were to leave their homes. So I think that those stigmas would need to be lifted and we need to continue raising awareness that people with visual impairment are members of society and can be productive and helpful and accounted for. And they rarely are in my experience and other people that I’ve known.

Sonia addresses three things in the above comment: first, of the societal misunderstandings of the capability of people with visual impairments. Second, that there was a systemic and social lack of effort on how to provide ILS to more people with visual impairments. Third, that there was a prevailing societal understanding that people with visual impairments should stay indoors after a natural disaster. She referred to these issues as “stigmas” that need to be eliminated so that people with visual impairments can be seen as contributors during the disaster cycle, as well as in all aspects of social life.

Several organizations serving people with visual impairments made observations regarding a lack of empowerment in the recovery phase. The representative of the State Council of Rehabilitation of Puerto Rico (SCR) offered a story of a couple who are visually
impaired and of the compromises and difficulties they encountered in the recovery phase, partly due to the lack of alternatives when electrical power was down:

They live independently, and they depend a lot on Uber. But after the hurricane since the Internet wasn’t working, you cannot use Uber. So the mobility for them was very compromised. They had to rethink how they would move to do all the things they need, to buy food, buy medicine, etc. I know for them it was hard.

Although it is probable that everyone who is directly impacted by a natural disaster has a compromised independence, it is more so for people with visual impairments. The SCR representative said that the burden was on the couple with visual impairments to come up with alternatives for acquiring needed materials after Hurricane Maria. There were no published materials available to them or well-known common practices for people with visual impairments to consider after a natural disaster. With the relative up-hill battle a person with a visual impairment faces for independence and empowerment, being affected by a hurricane minimizes some of the advantages gained, such as utilizing a ride-hailing service to access needed supplies.

The representative for UPRDO explained the lack of support for post-disaster needs for people with visual impairments, which relates to a lack of empowerment:

There really needs to be a plan and strategy in place to prepare and assist those that are visually impaired in times of crisis . . . so that there would be renewed efforts to assist the blind in everyday situations that are twice as hard for people with visual impairments than they are for people that aren’t disabled, such as going to the pharmacy, or grocery stores, or preparing their everyday needs.
The representative for UPRDO, who is himself a person with a visual impairment, acknowledged that there were no organized efforts in general to assist and empower people with visual impairments after a natural disaster. His hope was that there would be “renewed efforts” for such post-disaster assistance and empowerment. He described that the everyday life of a person with a visual impairment after a natural disaster is “twice as hard,” pointing to the difficulty of access to basic needs such as food and medicine.

Finally, the representative of Mirada described observations of clients who have some remaining vision but had not developed the habit of using the long cane. She said that if these clients had kept in practice in the use of their long cane, it would have been an empowering aid for them in the recovery process:

But going through the experience of the hurricane [those clients] realized that in the instances where they did need to leave the home, post-Hurricane María—because they needed to go to the supermarket or do personal errands or just regular life things—the cane would have been a very useful tool.

Given the previous discussion about paternalism, it is possible it influenced the fact that some people with visual impairments did not use their training in O&M. The long cane is useful in finding obstacles in the walking path. The use of the long cane was especially helpful in a post-hurricane environment since there was a high amount of scattered debris and debris-piles from government-funded waste pickup on sidewalks.

Expressed anxiety about shelters. None of the interviewees with visual impairments spent time in a shelter. However, the sheltering process still showed up in interviews as an area of concern, suggesting that there is anxiety associated with this aspect of the disaster
cycle. Five participants mentioned shelters in their interview, and they all knew people who had stayed in them. Miguel volunteered at a shelter. The following quote from Luis highlights the anxiety around shelters for this population by explaining a possible scenario and the lack of training for dealing with shelters:

In here it is very easy for me to move in the house, I don’t use the cane at home. But you are someplace else like a shelter . . . So I say, “Oh, OK, I’ll wait here and I have to go and somebody will put me in a car and put me someplace.” OK, you’ve got the person, you’ve got the transportation, it’s far away, and when you get there what are they going to do? Remember you’ve got training but you don’t have training to be sleeping side by side with another person that you don’t even know. All that kind of stuff. Where you walk, you will get up and go to the bathroom, where’s the bathroom there? And what, you will walk on the head of somebody else? What are you going to do? You are not supposed to be in that situation to go to a shelter and a person will guide you there with another 30 or 40 persons in the place . . . I don’t remember that anybody talk about how to deal with a shelter. Because I know that some people use a basketball court, and they sleep on the floor. So now, OK, you have to go to the bathroom, but there are people on the floor. Will you hit them with the cane in the head? That was a nice dream and it was interrupted (laughs). Maybe since Maria they will, but it’s been past a year and past the peak of the season, September. I don’t remember anybody telling that they have a training for blind people on a shelter situation.
Luis’s comments captured the concerns that other people with visual impairments shared about post-disaster shelters. First, he supposed he would have to passively wait for someone to come pick him up to take him on a long trip to a local shelter. He referred to someone that would “put me in a car and put me someplace.” He supposed would not be an active agent in this part of the process. Next, he said that the shelter would be far away. This may not always be the case, but it was possible. Luis’s comment showed that he would favor being near to his place of residence if he had to be in a shelter. Furthermore, even though he had training in ILS and O&M, he had never been told with how to deal with a post-disaster shelter. Luis was specifically concerned about navigating the shelter with many people laying on cots on the ground while he tried to find, in his example, the bathroom. Luis also shared his concern that, as of a year after Hurricane Maria, he had not heard of anyone addressing apprehensions such as his in a post-disaster shelter. If shelter organizers took more action and exhibited more confidence that the needs of people with visual impairments would be adequately addressed in shelters, anxiety about shelters from people with visual impairments would likely be reduced.

**Lack of Information Accessibility**

Multiple interviewees described issues specific to their visual impairment in the experience of preparing for a hurricane. Specifically, they referred to the fact that hurricane preparedness materials from the Government of Puerto Rico were not received by them in braille, audio, or large print. Although 18 interviewees mentioned the use of the radio throughout the disaster cycle, Gabriela relied on the television. She mentioned that the information given regarding news of coming hurricanes on the television was not accessible
to her. She said, “it was difficult because I have a hard time watching TV, I can hear it, but I
cannot see it clearly.” Since television is both an audio and visual medium, there were times
when communications were primarily given visually, thereby excluding people with visual
impairments. Although a service such as descriptive audio, where an additional voice
describes visual communication on television, was not widely available for news
programming, a text-reader of a scrolling news-ticker would be a possibility for television
stations to add. This was a recommendation given by the representative of the NFB in the
present study.

Additionally, Sonia described in more detail how the meteorologist on television did
not give accessible audio information:

Previous to the storm there was a fair amount of information. It wasn’t incredibly
accessible because meteorologists are not accustomed to describing the various visual
descriptions. It shows a map and the graphics, and so I needed someone, usually my
husband or a family member, would assist me by explaining what the map was
saying.

There is currently no formal guidance on how meteorologists should describe visual
information on televised media for people with visual impairments.

Mateo described the problem of accessibility of the meteorologist website associated
with the Government of Puerto Rico. He offered solutions of providing more text that can be
read by screen readers for people who are visually impaired:
Something that I really think needs to improve and can be done, is the accessibility of
the webpage of the local meteorologist . . . using the same webpage that everybody
uses, and just provide it in text and with certain accessibility guidelines.

As mentioned previously, Mateo contacted the government office for meteorologists to
advocate for increased accessibility. He was not only able to point out a problem but offered
the specific solution of providing text for visual images that could be read by screen readers.

Mateo also offered some specific ideas of accessibility for response organizations to
utilize as they consider meeting the needs of people with visual impairments:

I really hope that these [response] agencies take into consideration our blind
population here and that is something that is very easy to do. For example, specific
preparations of how do you prepare for an event in braille, in large screen, in audio, in
alternative formats. I’ve never seen any of that information in alternative formats.

One of Mateo’s chief concerns for people with visual impairments was that of information
accessibility. In his experience, it was not that there was information on local disaster shelters
in braille and that he was advocating, for example, for a more accurately transcribed version.
Mateo was saying that there was no version at all, thereby completely leaving out people
with visual impairments.

ADA law requires that shelters provide emergency-related services and information
in accessible formats, such as braille (ADA, 1990). This was seen as an area of improvement
by the ADA technical specialist involved in the study. She stated that in Puerto Rico,
“another challenge for visually impaired people in emergency related services is the
information, how the information is provided. If it is in an accessible format for them. That’s
a very important issue.” The ADA technical specialist was not downplaying the importance of having accessible formats for people with visual impairments throughout the disaster cycle. She described the accessibility issue as a “challenge” for people with visual impairments. If emergency-related information was instead readily available, perhaps the shelter anxiety discussed above would be lessened. The ADA technical specialist also said that accessibility was “a very important issue.” Part of the ADA technical specialist’s job is to bring awareness of the need for accessibility to government and nonprofit agencies. If accessibility were a more important issue among these agencies, the awareness efforts of the ADA technical specialist and others would be lessened. Additionally, the representative of MAVI stated that effective communication throughout the disaster cycle, such as audio descriptions of visual images, is a common problem when organizations try to serve people with visual impairments.

**Concern Over a Systemic Lack of Priority for People with Visual Impairments**

The MBDO and MAVI representatives and the ADA technical specialist noted that the systems in place for the response phase were not appropriately serving people with visual impairments. For example, the representative of the MBDO, who also has a visual impairment, described the lack of priority he was given from others in government because of his disability. Because of this lack of priority, he was unable to fulfill his duties of checking on people with disabilities in the response phase of Hurricane Maria. His tone was clear, and he had no need to pause to consider how to say what he needed. This indicated that he had previously thought about and talked through this issue before:
I am requesting more participation and integration of the leadership of the central emergency organization that works directly with the disabled community. It wasn’t considered directly during this emergency. That’s why I said that personally I felt alone, and as an employee, I was left behind, too. Even though I’m the person that is in contact, working with the plans, identifying the persons in the regional area where I work . . . but I wasn’t considered.

He further added straightforwardly, “I think that it was a discrimination that really the government doesn’t see that this is a blind person, that I can help.” This researcher felt as if the MBDO representative wanted to speak to the leadership through this very interview to explain the injustice of not being given the list of people with disabilities and of not being properly integrated into the hurricane response leadership to appropriately fulfill his duties. He was evidently not being heard otherwise. As described previously, the MBDO representative was well-liked and respected by many. Still, he “felt alone” and “left behind” as a person who could have contributed much more in the response efforts. He was not shy about calling his example of abandonment “a discrimination.” Furthermore, he did not expect anything systemically to change in the future for people with visual impairments in relation to the experience of the disaster cycle: “Right now, I don’t see that we move in a good direction for people with visual impairments. Everything is going to be like before because I don’t see any moving forward from this experience.”

Furthermore, the MBDO representative addressed the lack of priority for people with disabilities in queues to get ice: “people with disabilities in emergencies stay in line for hours just for one bag of ice. Because nobody thinks, ‘oh, this guy is in a wheelchair, or this one is
blind, let’s give them priority.” Although several interviewees reported that there were separate queues for people with disabilities for ice and gas, those queues were not utilized in all regions of the island based on the data of the present study.

The MAVI representative and the ADA technical specialist noted problems regarding shelters as they related to people with visual impairments. The MAVI representative noted the lack of reliable layouts of shelters and how that impacted people with visual impairments: “Shelters were challenging for [people with visual impairments] as well because cots were moved, everything was moved around, so they didn’t have the structure to navigate across the different scenarios they had.” The MAVI representative described one of the challenges for a person with a visual impairment in a shelter, where the floor plan can change because of people moving their sleeping cots as well as their belongings that might be spread into a walkway. Although many people will make way for a person with a visual impairment when they are walking with a long cane, making way in a shelter may not always be possible (Welsh, 2010). The unpredictable environment of a changing shelter landscape has potential for inducing anxiety for some people with visual impairments (Welsh, 2010). Furthermore, the ADA technical specialist explained a problem that a woman with a visual impairment had in not being allowed to bring her guide dog into the shelter: “I knew about a lady who has a service animal and wasn’t allowed to have it in the shelter, and she’s blind.” ADA law requires that people who use a service dog be allowed to bring them into an emergency shelter (ADA, 1990). Additionally, it was discussed previously that the ADA technical specialist explained the problem of inaccessible information for people with visual impairments in emergency shelters. If government systems more adequately addressed ADA
law related to information accessibility, the ADA technical specialist would be less likely to express this concern.

The researcher interviewed an interpreter post-data gathering for cultural insight, and she explained her observation that although life had returned to normal for participants a year after Hurricane Maria, this unfortunately meant that the organizations serving them had not changed in how they interacted with them, either. Mateo summed up the feeling of many in navigating government and non-government systems in the Hurricane Maria response phase:

In terms of my experience as a blind person and the response of the agency, it was not a good response for any agency. We are blind persons, we are not a priority in any preparation or any plans. The agencies have been very, very late and has not done good to respond to any person, just imagine to a blind person . . . It is like, “well, this is something we have never experienced.” And they don’t know how to deal with that.

Mateo stated that, although the response was not adequate for everyone, regardless of visual status, it was especially tough for people with visual impairments. Nor did he feel that people with visual impairments were a priority in the preparation phase. He characterized relief agencies as behaving like they had never interacted with a person with a visual impairment.

Evidence of Lessening Abandonment

Contrasting with the impact of abandonment, multiple interviewees with visual impairments mentioned the hope they had that things would be better for them through the recovery process. This hope was contrasted with the struggles of abandonment that they have had because of their disability. For example, Rafael mentioned the marginalization of people
with visual impairments but that through the recovery process, more attention may be a benefit: “Unfortunately, people with disabilities are a marginalized community. It’s not until something like this happens, this devastating, that the marginalized group is taken into consideration.” Such an admission indicates the belief that Rafael held regarding the position of people with visual impairments as a marginalized group.

Mateo expressed the hope that through the recovery process the low rate of employment of people with visual impairments would improve:

I really hope that we will learn from our experience . . . The unemployment of blind persons is very, very high. And this situation has also frustrated a lot of blind persons that I know because you have a situation that all of our day-by-day has been impacted. We’re still recovering, and blind persons are at a disadvantage. If it is hard for any person to get a job, just imagine for a blind person.

Although Mateo conveyed frustration with employment possibilities for people with visual impairments, especially in light of the additional economic challenges produced from Hurricane Maria, he does express hope. He hopes that society in general continues to change to the point of easing the employment burden on people with visual impairments.

Organizations have made efforts to improve the inclusion of people with visual impairments through the recovery process. The representative of Federal Emergency Management Agency’s Office of Disability Integration and Coordination (FEMA’s ODIC) described how their Community Advisory Groups (CAG) helped after Hurricane Maria to develop more inclusive practices of people with disabilities in the recovery phase and that these groups were expected to continue developing: “And we work very closely with our
state and local partners to ensure that they are also including the needs of people with disabilities, that they plan, prepare, respond, etc. [The CAGs] facilitate that ongoing relationship.” Additionally, the CAGs collaborated with the PRDCRN which resulted in expanding the possibilities of the Network to better meet the needs of people with disabilities in the aftermath of Hurricane Maria.

The ADA technical specialist mentioned that progress had been made during the recovery phase in regard to the participation of people with disabilities (including people with visual impairments) in disaster preparation thanks to FEMA’s efforts:

The participation of people with disabilities in the processes of natural hazard planning was limited, but it has expanded since Hurricane Maria. The voice of people with disabilities is being heard more thanks to efforts by FEMA to improve for future emergencies.

Although the ADA technical specialist did not explain how the efforts by FEMA were hearing the voices of people with disabilities, the current study revealed some work toward this end. FEMA’s CAGs include individuals and organizations who serve people with disabilities. Also, FEMA’s collaboration with the PRDCRN was a way to include organizations who serve people with disabilities, some of which have leadership members with disabilities.

The representative of UPRDO explained efforts that they made so that students with visual impairments would be better included (in this case accommodated) as the student body returned to campus during recovery:
After the hurricane, once the student body in general was informed that the facilities of the university had been cleared of any debris and were restarting classes, our office was directly working on their accommodations. What we particularly focused on was the ability of students, especially the visually impaired students, to not be penalized for being absent or unable to return to class in time because we understood the limitations of access that those people had to come back to the campus.

The representative of UPRDO pointed out to university administrators that the students with disabilities, particularly students with visual impairments, would have added difficulties in getting back to campus.

Although there is some evidence of lessening abandonment for people with visual impairments in the disaster cycle, evidence of abandonment remains. This evidence was discussed in the previous section, which included the eagerness of people with visual impairments to participate because of past abandonment, feelings of social stigma, paternalism, lack of empowerment, lack of support, anxiety about shelters, inaccessible disaster information, and feelings of being a low priority among institutions. The next section will discuss the efforts organizations have made to impact people with visual impairments throughout the disaster cycle.

**Efforts to Maximize Organizational Impact**

Government and non-government organizations strove to meet the needs of all people impacted in the 2017 hurricane season in Puerto Rico, including people with visual impairments. Two relief agencies that participated in the present study described common needs of people with visual impairments as they discovered them through the response phase.
The Red Cross representative expressed that common issues for people with visual impairments in the response phase are, “mobility, transportation, and communication.” The executive director of MAVI noted that for people with visual impairments, “areas that usually tend to fail in emergency response efforts . . . [are] the notification process, the evacuation process, the sheltering process, provision of medical equipment and medical services, and effective communication during this whole process.” Although it is probable that the executive director of MAVI had done some personal study on issues affecting people with disabilities in the disaster cycle, her experience alone offers much credibility to the conclusions she shared above. As a native of Puerto Rico, she had lived through numerous hurricanes. Even in the few years as the executive director of MAVI, she has had to manage how to best meet the needs of people with disabilities in the community after multiple natural disasters. Additionally, she was one of the primary members of the PRDCRN and helped develop a training program for organizations in planning for people with disabilities in a disaster.

In various ways, the organizations that participated in the present study both tried to meet the aforementioned needs and fell short. Additionally, organizations showed unity unlike had been experienced before 2017 as well as gave practical help in response and recovery. Yet, there were still areas in need of improvement found in the current study. The organizational efforts made and the areas to improve will be discussed in the following section.
Organization Unity

Relief agencies and organizations serving people with visual impairments discussed the newfound partnerships forged with each other through the experience of Hurricane Maria. As can be seen in the quote below, these partnerships will potentially enhance future preparation efforts for people with visual impairments in Puerto Rico. For example, the representative of the Red Cross said, “I think this combination of governmental efforts and NGO efforts will be the key to improve the response to emergencies and the preparedness for emergencies in Puerto Rico.” Additionally, MAVI leadership, who was also involved in creating the unified network, the PRDCRN, explained that before Hurricane Maria there was a problem of a lack of unity among organizations and that it took away from meeting the emergency needs of people with visual impairments. Furthermore, she explained how collaborations, such as the PRDCRN, can better prepare people with visual impairments for future disasters:

Because past hurricane, everyone was working parallel. So I was doing this, there was another agency doing this, there was another . . . and I’m sure there was a duplication of efforts that we have not been able to account for. That’s what we want to avoid. So that’s one of the lessons learned is that we need to establish beforehand what these collaborative efforts are going to be and what each of us is going to bring to the table. The inefficiencies of organizations not collaborating in Puerto Rico were highlighted after Hurricanes Irma and Maria. The heightened response needs precipitated the coming together of the organizations that formed the PRDCRN so that they could best meet pressing needs among people with disabilities. It is notable, given the past lack of unity, that the Network
continued their collaborations a year after Hurricane Maria with plans on expanding their influence.

**Cross-organizational relationships were strengthened.** Aid agencies worked together as a result of Hurricane Maria in ways that they had not before. Foremost among these collaborations is the PRDCRN. As described above, the PRDCRN was formed out of efforts between government and nonprofit agencies collaboratively trying to meet post-Hurricane Maria needs of people with disabilities. The Network is composed of MAVI, the Institute of Developmental Disabilities, the state Council on Developmental Disabilities, the Protection and Advocacy system of Puerto Rico, and the Puerto Rico Technological Assistance Program. Additionally, the PRDCRN collaborates with FEMA and the Red Cross.

As this researcher prepared for the present research, he found out that the PRDCRN had been regarded as an exemplar on inter-organizational unity and its resulting impact. In being introduced at a “disasters and disabilities” conference, representatives of the PRDCRN were lauded as examples from which to learn. An ADA webinar featured representatives from the PRDCRN and the work they had done (Ramos, Pagan, & Roa-Mendez, 2018). They were able to organize shortly after Hurricane Maria and collaborate with many outside organizations eager to help in response and recovery. Furthermore, participants in the present study alluded to the value of the PRDCRN including individuals with visual impairments, the ADA technical specialist, MAVI leadership, and the representative of FEMA’s ODIC. The existence of the PRDCRN goes against what Sonia expressed regarding how organizations serving people with disabilities normally work in Puerto Rico. She said that organizations
normally look out for their own interests in order to survive rather than working together for the good of the people they are supposed to serve.

The director of MAVI stated that the mission of the PRDCRN is “that every person with a disability is safe and secure before, during, and after a disaster.” Therefore, the Network was not only concerned about meeting the needs of people with disabilities in the response phase, which is what precipitated their collaboration, but also with preparation and recovery. After Hurricane Maria, the PRDCRN became a unified effort to meet the needs of people with disabilities, including visual impairments, in shelters across Puerto Rico.

Member organizations of the PRDCRN also became call centers for people with disabilities in the response and recovery phases. MAVI’s involvement in the PRDCRN allowed it to become a collection center for supplies for people with disabilities. Finally, the PRDCRN became a unified hub of outreach to inform partners in the mainland U.S. regarding needs of support and funding (Ramos et al., 2018). As of a year after Hurricane Maria, the PRDCRN continued to hold meetings to improve their services in the long-term recovery process and to be better prepared for future natural disasters. A member of the PRDCRN stated that the present study would be helpful for the future work of the Network. This illustrated the Network’s desire to continually improve their services.

Furthermore, the director of MAVI said that since Hurricane Maria, she had worked with FEMA to create CAGs. She said that these groups are being formed at regional levels trying to bring together different community organizations. And we’re trying to identify what the resources of each organization is
so that come a disaster we have a network that’s already established, and we know who to go to whenever we need whatever that agency has to offer.

FEMA’s involvement in the work of the PRDCRN helped the Network to expand their influence to regional communities throughout Puerto Rico.

Another cross-organizational effort that formed as a result of the Hurricane Maria response was Mirada and the American Association of Retired Persons (AARP). This partnership was formed to best meet the needs of older people with visual impairments in Puerto Rico in the response phase. Mirada was able to hand out food and equipment, such as battery-powered radios, to their clients in the Bayamón and Arecibo region “as part of the collaborative agreement we had with AARP.”

FEMA’s ODIC focuses on inclusion for people with disabilities through every phase of the disaster cycle (FEMA, 2016). They were able to do this through their collaborations with local organizations such as MAVI and the PRDCRN. The FEMA ODIC representative summarized their collaborative inclusive efforts:

It’s real important to ask the emergency managers and the disability community organizations in the room together to start to have that dialog to address what they felt was the challenges and gaps, unique to Puerto Rico, to then together develop solutions.

As mentioned previously, the collaborative and inclusive efforts of FEMA were demonstrated through their CAGs.

She continued to list three things that have been learned from their experience from the 2017 hurricane season in Puerto Rico, one of which directly related to the inclusion of
people involved in services for people with disabilities. The three things she expressed were “the need to have robust communication infrastructure, power infrastructure, and really good networks between disability stakeholders and emergency managers.” Although she termed these three things as “lessons learned,” it remains to be seen if they will be better implemented for future natural disasters in Puerto Rico. However, as long as the PRDCRN continues to grow and it collaborates with FEMA, the third point of having good networks “between disability stakeholders and emergency managers” could not be merely a lesson observed but a lesson implemented and, therefore, learned.

The Red Cross offered a further comparison of a relief organization’s intent versus actual response as it related to cross-organizational relationships. Part of the vision of the Red Cross is to partner with organizations local to a disaster (ARC, 2019). These collaborations occurred as a result of the 2017 hurricane season in Puerto Rico, as explained by the representatives of organizations that participated in the present study. The representative of the SCR explained that the Red Cross collaborated with them for the purpose of educating the public to more appropriately meet the needs of people with disabilities. She explains the collaboration in the following way: “after the hurricane we started to collaborate with the Red Cross to help improve and see how we can help with the process to better educate and help people with disabilities to prepare for an emergency.” Like the PRDCRN, the collaboration between the SCR and the Red Cross was a reaction to Hurricane Maria and not of proactive efforts previous to the hurricane. Nonetheless, the value of the collaborative efforts were acknowledged through long-term involvement as the
Red Cross representative stated that they are working with the PRDCRN by promoting their work and attending meetings.

Finally, the representative of the Red Cross stated that its collaborative efforts are for the purpose of improving supports for people with disabilities in an emergency. She explained,

we are trying to make a good effort to unite different nonprofit organizations that work with the community of people with disabilities. That will make the initiative of the Red Cross stronger because now we have collaborations of entities who are working and making a plan together, to be a real alternative support in an emergency.

An overall result of Hurricane Maria was that organizations collaborated more than they did previously in order to meet urgent needs. The response phase helped to begin some partnerships and strengthened others, such as was mentioned above by the Red Cross representative.

**Organizational collaborations during the recovery phase.** Government and non-government organizations worked together as a result of the extreme conditions in post-Hurricane Maria. These collaborations proved to be beneficial to people with visual impairments in the recovery process. For example, the representative of Mirada, a government agency, explained their collaboration during the recovery phase: “We had a collaborative agreement with AARP where they were giving these workshops focused on mental health and mental wellbeing after a hurricane.” Although the NFB and ABB individually tried to meet some mental health needs of their members, the collaboration
between Mirada and AARP was an example of leveraging a partnership to address mental health.

The forming of the inter-organizational PRDCRN benefited people with visual impairments in the recovery phase as well as in response, as discussed above. During recovery, the PRDCRN provided trainings to individuals and organizations that focused on the needs of people with disabilities in general as well as people with visual impairments in particular, especially during disasters. The director of MAVI, in representing the PRDCRN, described the trainings:

We started providing it to consumers and now we’re going into communities, to elderly homes, to agencies—private and public agencies, and we’re providing the trainings all across the island right now. There are two different trainings, one is geared toward individuals, and the other is geared toward agencies.

Fueled by the power of collaboration within the PRDCRN, they were able to launch an awareness campaign, for individuals and organizations, of the needs of people with disabilities throughout the disaster cycle.

Additionally, the PRDCRN used the ongoing recovery phase to improve their services through refining their activities and securing funds for operation, which ultimately benefited people with visual impairments. The director of MAVI described these ongoing efforts of the PRDCRN a year after it was formed: “And today we are still meeting, we are still giving the network structure and trying to find funding so that we can ensure the continuity of the network and we can ensure that we can get the resources.”
Finally, as discussed previously, the SCR and the Red Cross worked together after Hurricane Maria to help ensure they would be able to meet the needs of people with disabilities in future natural disasters. A goal of this partnership was to utilize the recovery phase to educate others on how people with disabilities can best prepare for future emergencies.

However, people with visual impairments still saw a need for institutional unity. Several interviewees with visual impairments said that they hoped that government and non-government agencies could work together better in future disasters. To illustrate, Fabiola stated, “There should be more movement among organizations and associations to help people with disabilities. There was no unification or movement on behalf of those organizations to help people with disabilities and visual impairments.” This comment was an evidence of the lack of unity among organizations prior to Hurricane Maria. Additionally, Ramón explained that funds should flow better from the government to the nonprofit sector and cited the work of Mirada:

There should be more organizations like Mirada that are dedicated to service people, or more churches, or anyone who would do more volunteer work in the community. If the government would give resources to these different organizations, then the resources are more likely to get to the people because there is not a lot being used in administration.

Ramón’s idea was that organizations serving the needs of people in a disaster cycle should receive more resources from government. Although it is outside the scope of the present study to recommend how government resources are spent, it can be said that the greater the
collaboration between government and non-government entities, the greater likelihood that resources are distributed appropriately.

**Practical Help from Organizations**

**Creative contact efforts.** The NFB, ABB, MBDO, MAVI, and Mirada tried to utilize lists of people they had previously served as a way to check on their status post-Hurricane Maria. However, these efforts were limited in part because of the destruction of the electrical infrastructure. Therefore, the employees of Mirada made efforts to visit people they had served that they could not contact otherwise. The representative of Mirada uses the term “consumers” of the people that they serve in the following quote regarding the description of what the Mirada employees did in the Hurricane Maria response:

My staff showed a huge commitment coming in to work in those days afterward when there wasn’t any communication and making the biggest effort possible to get in touch with any of the active consumers that they [knew] were accessible. Even the inaccessible ones that were unable to be reached over telephone, the staff took risks going out onto the roads not knowing if those roads were going to be accessible or that they were going to be able to contact the consumers. They still went out there and made sure to get in touch with as many people as possible.

The staff of Mirada did not allow the difficult terrain of the Maria aftermath to impede their efforts in checking on their consumers. They were willing to take personal risks in order to investigate the status of the wellbeing of people with visual impairments.

Similarly, MAVI was limited by the downed electrical infrastructure. The executive director explained their solution this way:
And I want to help the people that we are seeing, but phones weren’t working, there was no signal with cell phones or anything. So there was no way for us to start calling our consumers and verifying how they were, if they needed any assistance . . . So what I told my employees is, “you’re going to stay in the municipality in which you live in . . . [and] I want you to go into the shelters, and I want you to see to the needs of people with disabilities within the shelters.”

Through the executive director of MAVI’s experience, she knew that people with disabilities in shelters would struggle with having their needs met appropriately. The request for MAVI staff to be an aid to people with disabilities in shelters was her main requirement of them.

MAVI and Mirada were not the only agencies to try to check on their clientele after Hurricane Maria. Although not considered “aid agencies,” the NFB and the ABB called or visited their members to check on their wellbeing. The MBDO tried to use their registry but was unable due to the bureaucratic inaccessibility of their list, as discussed previously.

Needed supplies were distributed. Relief agencies were able to distribute supplies related to immediate needs after Hurricane Maria. FEMA, the Red Cross, MAVI, and Mirada participated in these distributions. The representative of Mirada gave an example of their involvement by stating that they “were able to supply them with bags of food that lasted up to three days, and battery-powered radio sets, lanterns, and in some cases the water purifiers that AARP was handing out.” Access to radio was a helpful aid that many people with visual impairments stated they heavily utilized during the most difficult days of the response phase.

Three study participants received relief supplies from FEMA. Natalia, who lives in a rural area, mentioned her long wait for the supplies: “FEMA came after a few months [of
Hurricane Maria] to bring bags of food and supplies.” The only other evaluative comments of FEMA from people with visual impairments were of home assessments related to potential property damage assistance. Seven people with visual impairments described these experiences. The evaluative statements had to do with whether or not they received financial aid. For example, Juan stated about his visit from a FEMA representative, “they came here, and I showed them the videos [of the hurricane damage]. They didn’t cover anything.”

**Organizational offers of help.** Multiple organizations serving people with visual impairments explained either recommendations that they gave to their clients/members regarding how to handle the recovery phase of Hurricane Maria or provided direct long-term help. Mirada recommended that their clients spend the recovery phase with family, even if it meant going to the United States mainland: “We recommended that they find family members that it’s possible to stay with, and some did have family members in the U.S. where they were able to go and visit.”

The ABB saw a need to help meet the mental health needs of their clients during the recovery. They recommended that their clients gather at the ABB offices for the purpose of addressing mental health, as described by the then-president of the ABB:

> It was important, the mental health status of people. That’s why I tried a lot to get the participants to the facilities. So they can keep together there, have support so they can make better when they get back home. Because it was too many hours a day, you have people with all these needs, but if you have an emotional breath, you can support better this group. I was worried as the president, I wanted to regroup the members of the association to give them moral support, emotionally, maybe food and
with all the limitations they had but share the little we had for the benefits of the members of the association.

The president of the ABB had to go through the effort of trying to gather his members, the success of which would have been dependent on how accessible their homes were to the ABB offices. For those who were able to come, they were able to find a place to express difficulties experienced during and after Hurricane Maria with other people with visual impairments and obtain food. The focus of the president of ABB’s concern, however, was mental health since he felt the members needed emotional support beyond what they may have received from their home communities.

The long-term check-in process was also evident from this researcher’s experience at an NFB meeting. The president of the local NFB invited this researcher to a meeting to meet potential interviewees since the attendees would be people with visual impairments. Ana and David were two of the attendees who participated in the present study. The meeting was held in San Juan in a large Baptist church—very accessible via public transportation or ride-hailing services. This researcher showed up about 10 minutes early and helped move tables and chairs together near the front of the main sanctuary. The start time came and went as attendees continued to show up, many with family members accompanying. At about 15 minutes past the start time the meeting was called to order. Agendas were handed out according to format preference, print or braille. The entire meeting was in Spanish. The organizer gave this researcher an opportunity to introduce himself and the study being conducted. The president translated. Next on the agenda was the member check-in (listed as, “¿Cómo estamos?”). Although it was an open question to all attendees, nearly everyone
responded. The answers related to how they were faring from the previous year’s hurricanes. Because this researcher did not have a translator for the meeting, he did not understand everything that was spoken, however the tones of what was said seemed to be positive. These meetings are held monthly and, among other things, give attendees an opportunity to express what may or may not be going well in the wake of the 2017 hurricane season.

**Areas of Improvement for Organizations**

**Support systems that already exist should be strengthened.** Multiple organizations serving people with visual impairments mentioned the formal and informal support systems that exist for people with visual impairments and that they should be improved going forward. A member of the board of directors at MAVI discussed mental health needs and the impact a strengthened informal social system of people with visual impairments would have:

There is also the level of the psychological component and the mental health preparation that I think would be a helpful component in recovery efforts that isn’t talked a lot about. But that understanding . . . that maybe blind people could have talked to one another about what each other was doing to help each other out in the process and commiserate what has been helpful, that could be something that could be further developed.

The gap in services mentioned by the MAVI board of directors member showed more of the value of the check-in meetings of the NFB and ABB mentioned above. The board of directors member noted that mental health from a natural disaster was not addressed appropriately overall in Puerto Rico. These services could be further expanded by organizations serving people with visual impairments.
Mirada and AARP collaborated during the recovery phase to provide mental health workshops to people with visual impairments. These workshops were not planned by Mirada previous to Hurricane Maria but were developed as a result of the difficult post-hurricane environment. Therefore, with a relationship established between these two organizations, experience with post-Hurricane Maria mental health workshops, and time to consider ways to improve them, these workshops may be strengthened for future disasters.

Although technology is helpful for people with visual impairments in multiple ways, the representative of UPRDO lamented that students on campus with visual impairments were letting technology make them live more individualistically. This made it more difficult for people with visual impairments to support each other, especially through the recovery process:

I’ve noticed that despite students currently having more advantages in terms of assistive technology that supports and helps them do things more independently, that has caused a sort of rift in the community being a support system for each other, and that visually impaired students mostly do things on an individual level, on their own, with the support of friends but not necessarily with the support of other visually impaired students.

Although the UPRDO representative acknowledged the positive side of technology for the students with visual impairments, he regretted its impact on the lack of community. He felt that the sense of community among students with visual impairments was a vital missing component to handle post-disaster mental health more positively.
Capacity building at the local level. Originally, this researcher developed a theme for response agencies in the data analysis titled “work at the local level.” The researcher checked themes with the representative of FEMA’s ODIC, and she wanted to change the name of the theme to “capacity building at the local level.” This renaming emphasizes the intention that FEMA’s ODIC has in building capabilities locally. The interviews with representatives from FEMA and ADA showed that by initiating contact with organizations that serve people with disabilities that are local to the natural disaster, they show a high priority on engaging them throughout the disaster cycle. One piece of evidence of a local engagement is the creation by FEMA of CAGs. However, there was still room to improve as evidenced by the representative of FEMA’s ODIC stating that there was a “need for increasing engagement of the disability community for the emergency managers to ensure effective preparedness, response, and recovery going forward.” Furthermore, she explained that what was needed was “getting people to the table so that the emergency managers are familiar with the disability organizations in their communities and what the disability community make-up is.” These statements show that FEMA was trying to work with local disability-related organizations after Hurricane Maria, and that there was an ongoing effort to improve these engagements.

The ADA technical specialist spoke of ongoing efforts for multisectoral collaboration initiated by ADA advocates:

What we are trying to do in this work, and in these groups that we are creating, is to have an organized structure of support at different levels, from the community level, state governmental level, and federal level to have an effective communication
before, during, and after an emergency—to be able to assist people with disabilities.

As the ADA requires, and as they deserve, right?

The ADA technical specialist expressed her hope that the collaborations that ADA advocates started in Puerto Rico would result in formalized multisectoral support for the purpose of improving communication throughout the disaster cycle. An end result of better communication would be more appropriate assistance for people with disabilities.

**Inadequate engagement.** Some participants with visual impairments offered their insights on the limitations of the efforts of aid agencies during the response phase. Mateo noted that, in his experience, aid agencies did not offer services specialized for people with disabilities or had volunteers who specialize in disabilities. He stated that relief agencies “don’t do alternative methods or have specialized people to do that. That does not exist at all.” He was referring to alternative methods such as offering materials in braille or having volunteers who understood respectful ways of interacting with a person with a visual impairment. An example would be that a volunteer would ask the person with a visual impairment about their preferred mode of travel rather than assuming it was acceptable to grab their arm to guide them. Natalia expressed that the government should increase priority for people with disabilities in the response phase. She stated, “the government should be the one to take on the responsibility of identifying people with disabilities and that those people should be a high priority during natural disasters.” She was not aware of FEMA’s ODIC, whose mission is to serve people with disabilities in a disaster as appropriately as possible.

During Lorena’s interview, she expressed multiple times her high level of preparedness and doing what needed to be done to sustain typical life patterns, such as
rigging water cisterns for doing laundry, as discussed previously. Multiple times she also
shared her criticism of the institutional response to populations such as the elderly and people
with disabilities. She shared her disappointment in organized responses to her own needs and
expressed hope that it can improve in future disasters:

I felt abandoned. There weren’t any services or anything provided. Not one bottle of
water, not one person brought anything to my home. The hope is that in the future
there would be more attention paid to people with visual impairments.

Although it is true that many people express abandonment in Puerto Rico, regardless of their
visual statuses, it was observed by Lorena that she not only felt abandoned as a person with
basic needs for food and water, but also as a person with a visual impairment. Whereas
multiple organizations made efforts to address people’s needs, they were not able to meet
everyone’s needs, and therefore, they have room to improve. The areas of improvement
included how to best prepare people for a disaster so that they might require less assistance,
and to be able to access more people in the response and recovery phase as appropriately as
possible.

Furthermore, upon completion of all interviews, a wrap-up interview with an
interpreter was conducted. On the topic of overall cultural insight, the interpreter felt that
there was a sense of abandonment that people with visual impairments felt from
organizations involved in response and recovery. She said, “People with visual impairments
on the islands felt mostly that without the help of family or friends they did not receive much
support from agencies locally or U.S.-based.” Additionally, Sonia described the lack of
support from organizations and the resultant reliance on family:
None of [the organizations] provided any service particular to people with disabilities, and what I’ve heard from a lot of other visually impaired people was that mostly they relied on their families, which was in my case. Even just non-disabled people, culturally here, everyone sort of grouped up with their family and relied on each other more than on external agencies.

Although the present study revealed some ways in which relief agencies tried to meet the needs of people with disabilities, there was also evidence that this did not occur. Furthermore, the overarching feeling among interviewees with visual impairments was that appropriate services for people with disabilities were not given by relief agencies. Local communities were the most reliable source of support in response and recovery.

In getting the perspective of FEMA’s ODIC, this researcher went through a controlled process according to the FEMA system in order to get an interview. FEMA controlled who would be interviewed and the time, and they had their own interview approval process. Although this interview was completed over the phone, there was at least one other person in the room with the interviewee. Furthermore, FEMA had publicly received criticism over their response to Hurricane Maria. Noting the cautious government process and the possible desire for the organization to protect itself from further criticism, this researcher perceived the careful manner in which the FEMA ODIC representative seemed to relay information in the interview, especially in regard to areas of improvement. She did explain many of the positive things that FEMA had done in the Hurricane Maria response and in admitting an area of improvement, she said that there “was probably insufficient engagement” with local populations. As stated above, however, there were
efforts to improve collaborations between government disaster responses and organizations that serve people with disabilities.

The need for awareness. An observation made by the ADA technical specialist was that the 2017 hurricane season highlighted the need for increased awareness among government and non-government entities of what the ADA law is and how it should be applied. She stated, “We are still educating on the subject [of ADA law]. There is still a lot of lack of knowledge about the ADA and how to comply with it.” The interviewee facilitated trainings regarding ADA for government officials before and after the 2017 hurricane season because, “we don’t see that [ADA] is enforced in Puerto Rico.” Furthermore, the interviewee offered multiple examples of the lack of ADA enforcement regarding multiple populations in shelters:

We know that there was a lack of interpreters in shelters. Also, physical access wasn’t compliant with the ADA in some shelters, and we even know about shelters where people with chronic disabilities such as people who need oxygen and things like that, and the shelter wasn’t prepared for this kind of people. Also, I know that some people with service animals that wasn’t allowed to some shelters.

In all, the impact on the lack of awareness of the needs of people with visual impairments as related to ADA regulations translated to another challenge for this population. Examples of the challenges were a lack of access to emergency-related information, a lack of appropriate access to emergency shelters, and misunderstandings of mobility requirements for people with visual impairments.
Additionally, the representative of the MBDO stated that in his experience, the ADA law was not evenly applied from government activities to the private sector. According to him, a greater awareness and application of ADA law should occur outside of government activities. He stated, “We have the ADA law that applies to Puerto Rico. This law can apply to the government, inside the administration of the government. But when you go outside to the private sector, it’s not effective.” He is not saying that ADA regulations were not successful outside of the activities of the government. He means that ADA laws were not followed in non-government activities, as noted by law. A greater awareness of ADA law throughout the public and private sectors would likely result in a greater application of these laws and would create less challenges for people with visual impairments.

**Increase awareness and usage of registries by the government.** Several interviewees with visual impairments spoke of the need for a registry of people with visual impairments that could be checked on by governments or relief agencies in the aftermath of a natural disaster. Although such registries existed, they were not utilized, according to the participants in the present study. For example, Miguel, speaking as an employee of MAVI, said,

I told a lot of people that have visual impairments to register . . . and it was my experience as well, that no one ever really called or no one came to check on them. So they did register but there was no response from the other side.

Though post-disaster registries exist, it was evident that some interviewees with visual impairments were not aware of them. For example, Jorge, who lives in the same metropolitan area as Miguel showed a lack of awareness of a registry:
Another thing is the government, or I don’t know who, [should] have a list of all the people [with a visual impairment] and after something happens they will come to your home and ask how are you feeling, do you need food, do you need medicines, do you need insulin, do you need ice, what is it? And then they will go back and follow up on their list.

Although Jorge lives in an urban area, where it was more likely that awareness of a disaster registry would exist, he did not know of one.

Natalia expressed a sense of both urgency and hope for the government to procure and utilize a post-disaster registry of people with disabilities:

The government should be the one to take on the responsibility of identifying people with disabilities and understanding that those people should be a high priority during natural disasters and in that way having them identify knowing where they are, it would make it easier for the government to provide services and reach those people as soon as possible because those people are more likely to suffer damages, suffer injury, to potentially die.

Government disaster registries need to be made both more available to people with visual impairments and better utilized in a way that will consistently work. Given the above comments, people with visual impairments had ideas on the potential usefulness of registries and how they could be implemented. The ideas for the use of registries was evidence that people with visual impairments should be a part of a better implementation of disaster registries in Puerto Rico.
Conclusion

The findings described in this chapter reflect the experiences of individuals and organizations involved in the 2017 hurricane season in Puerto Rico as they relate to people with visual impairments. These findings provide insight into the perspectives of various stakeholders and illustrate both areas of strength and those in need of improvement relative to the available support services during hurricanes for people with visual impairments. The themes identified from the data will serve as a point of reference from which an informed discussion of the research questions will be offered in the next chapter.
CHAPTER 5

DISCUSSION

Based on the data collected from the current case study, several qualitative themes were extrapolated from government, nonprofit, and individual perspectives related to the experience of individuals with visual impairments from the 2017 hurricane season in Puerto Rico. Overall, the study found that people with visual impairments both utilized skills in independence for their wellbeing and desired to have more of these skills. Various levels of abandonment were felt by many people with visual impairments throughout the disaster cycle. Organizations serving people with visual impairments found greater effectiveness through collaborations. People with visual impairments both received and gave aid in response and recovery. The social vulnerability perspective was shown to be both true in Puerto Rico and was also challenged through the resilience and initiative shown by people with visual impairments. The areas of deficit and improvement will be discussed in this final chapter. The primary research question and each sub-question will be stated followed by a discussion.
Primary Question: How Does Having a Visual Impairment in Puerto Rico Impact a Person’s Ability to Prepare for, Respond to, and Recover from a Hurricane?

It was shown that training in independence prior to the disaster was a great help for people with visual impairments throughout the disaster cycle. Independence was shown to be important in the case that aid does not arrive or is late, as is also stated by Good et al. (2016). Furthermore, people who had not received adequate training in independence before the 2017 hurricane season wished that they had. Formal trainings in independence skills should continue to be utilized, and it is recommended that organizations serving people with visual impairments receive all possible aid in carrying out these trainings.

Additionally, an awareness of and concern by the general population over some post-hurricane effects that impact the independence of people with visual impairments can increase urgency to make appropriate changes. Examples discovered in the present study are an abundance of loud generators and limited outdoor walking. Future changes could include an investigation into government-subsidized generators that are quieter yet affordable. Another possibility could be for government or organizations to adopt an advertising campaign to encourage noise dampening methods for generators.

Because the notion of skills in personal independence was mentioned in all phases of the disaster cycle by 22 people with visual impairments and six organizations, it is evident that independence is a crucial topic for this population. Independence was seen as important in the event that aid after a disaster will not arrive, as mentioned above. Independence also contributed to the wellbeing of those who had these skills. For individuals who did not, they wished they had had those skills during the disaster cycle. The American Printing House and
Braille Works are two organizations mentioned previously that also address the importance of independence within the disaster cycle (APH, n.d.; Braille Works, 2015, 2016).

Throughout the disaster cycle, a feeling of abandonment impacted multiple areas, which exacerbated the difficult experience of preparation, response, and recovery for people with visual impairments. For example, people with visual impairments stated that they did not feel that they were a high priority among government response efforts. A clear example of this is when the director of the Municipality of Bayamòn Disabilities Office (MBDO), who is visually impaired, was not granted access to the emergency registry of people with disabilities in his territory. Abandonment in Puerto Rico of people with visual impairments as applied to emergency management is evidence that is in accord with the social vulnerability perspective (Wisner et al., 2003; Stough et al., 2015).

Paternalism was seen in the present study as negatively impacting the experience of people with visual impairment and their experience of the disaster cycle. Paternalism ultimately minimizes independent living skills (ILS), which makes the experience of the disaster cycle even more difficult for people with visual impairments and is disempowering. As discussed previously, Swift (1984) also revealed the dichotomy that paternalism has with empowerment in that the more paternalized a person was, the less empowered they felt, such as the minimized use of ILS and orientation and mobility (O&M).

Themes associated with the current research question relate either to organizations or to practical concerns of people with visual impairments throughout the disaster cycle. One practical concern, anxiety about shelters, is reflected in the study by Phibbs et al. (2012) who found that people with disabilities were anxious about the unknowns in potentially going to a
shelter. Duyan and Karatas (2005) also found traits of anxiety about the overall experience of post-disaster life in people with visual impairments in earthquake regions. Some of the practical concerns of people with visual impairments, such as anxiety about shelters, could be alleviated through actions that organizations could take. Examples of these actions include offering more shelter orientations to people with visual impairments and ensuring that all shelter volunteers are familiarized with working with people with visual impairments, such as suggested by Casey-Locker and Myers (2017).

As was discussed in the response to the current research question, the notion of personal skills in independence was pervasive throughout the various interviews. Abandonment, paternalism, and anxiety about shelters were also seen as impacting people with a visual impairment in Puerto Rico throughout the disaster cycle.

**Sub-question 1: What Are the Lessons Observed from the 2017 Hurricane Season in Puerto Rico Regarding the Unique Needs of People With Visual Impairments That Can Be Used to Improve Future Preparation, Response, and Recovery?**

The one-two-punch of Hurricanes Irma and Maria were unprecedented events over the span of two weeks in Puerto Rico. Nothing of such magnitude in impact on infrastructure and lives lost had been experienced in Puerto Rico before. However, such an event can potentially help better prepare people for future hurricanes, no matter the size. The lessons observed from a hurricane such as Maria, because of its vast impact, have the potential to better cover the needs of all people in Puerto Rico in future disaster cycles, including the unique needs of people with visual impairments. The following discussion in relation to the present research question shares some similarities with the discussion of the above research.
question, namely the notions of independence and organizational struggles to meet the needs of people with visual impairments throughout the disaster cycle. Overall, the themes related to the present research question relate to independence skills for a person with a visual impairment, the value of collaboration between organizations, and the use of a disaster registry.

Lessons Observed by People With Visual Impairments

Increasing skills in independence for people with visual impairments was a theme that developed in the preparation and response phases in the present research question. The Mirada representative gave insight into this fact in explaining that the organization observed that its clients who had extensive training in independent living skills better handled the response and recovery phases compared to clients who had received little training. This fact could be a catalyst to support the work of organizations involved in the teaching of ILS and O&M skills for people with visual impairments. Additionally, the stories of success of Mirada clients (and other people with visual impairments in Puerto Rico not associated with Mirada) that had extensive ILS and O&M training can be used to explain to future recipients of such training its value in the experience of the disaster cycle. These success stories may also be used to show to the general public of the value of ILS and O&M training. These findings agree with what Good et al. (2016) found in their study of the value of personal agency and usable O&M skills in the experience of an earthquake.

Additionally, themes discussed in the previous chapter—increasing preparation, training, and empowerment—add to the notion of independence as lessons observed regarding unique needs of people with visual impairments in the present study. Phibbs et al.
(2012) noted the disturbance that a post-disaster environment could have on the independence of a person with a disability. The representatives of the Rehabilitation Council and the University of Puerto Rico Disabilities Office noted problems with people with visual impairments feeling disempowered during the disaster cycle but did not offer solutions. Natalia, however, offered the solution that government or nonprofit organizations should take more action to ensure that more people with visual impairments know who to contact and how in their region for information specific to their disability in the event of a natural disaster. Such efforts are part of the mission of the Federal Emergency Management Agency Office of Disability Integration and Coordination (FEMA ODIC) (FEMA, 2010b). However, these efforts are currently in a process of implementing best practices, and many potential recipients of their services are not even aware of the Office. The greater the efforts made toward imparting knowledge of how to handle hurricanes and the more that people with visual impairments are involved in government and non-government decision-making, the greater the sense of empowerment will be, as suggested by Maton (2008).

Some disaster-related practical suggestions were offered by participants in the present study that were not found in previous related literature (e.g., APH, n.d.; ARC, n.d.; Braille Works, 2015, 2016; Good et al., 2016). These included having a fruit and vegetable garden (in lieu of trying to use inaccessible post-disaster paths leading to grocery stores) and that agencies serving people with visual impairments should teach what kind of soap to use when hand-washing laundry. It cannot be assumed that everyone would know the correct kind of soap to use, as this was not known by Lorena: an independent-minded study participant. One suggestion, the use of gloves in handling unfamiliar post-disaster objects, was mentioned.
previously by only one source as part of an emergency plan for a school district in the U.S. (Burke, 2010).

The practical lessons mentioned above specific to people with visual impairments could have also been the result of a reaction to hurricane apathy rather than making observations based on a high level of readiness. As described previously, hurricane apathy is the lackadaisical approach to a coming hurricane due to relatively safe experiences from previous natural hazards (Federal Signal, 2012). However, several people with visual impairments and multiple organizations involved in the present study had specific resolutions on how they would prepare better for a future hurricane. It remains to be seen if resolutions made by interviewees will manifest in future imminent natural hazards.

**Lessons Observed by Organizations**

A theme of the lessons observed from the 2017 hurricane season dealt with the experiences of organizations collaborating together. Organizational collaboration was found to be a strength in the present study, yet with room to improve. Collaboration is part of the mission of FEMA’s ODIC, and they were able to do it to an extent, as shown in the present study (FEMA, 2010b). Collaborations such as that of the Puerto Rico Disability Community Relief Network (PRDCRN) should be looked at as an example for other world regions as an inspirational and methodological basis for other potential joint efforts. Furthermore, although there were support systems among organizations for people with visual impairments, it was found that these systems should be strengthened. Social connectedness, both on the organizational and personal levels, was found to be linked to resiliency during the disaster
cycle, as it was in the case of Phibbs et al. (2012). Fox et al. (2010) also found this to be true in their study of the experience of people with disabilities from Hurricane Katrina.

As a further argument for organizations to increase their connectedness to the people they serve, post-disaster check-in lists (or registries) were a source of lessons observed from the 2017 hurricane season. These lists existed for multiple organizations; some were utilized and some were not. Government-created lists of people with disabilities need to be brought to the attention of those who are responsible for assuring they are utilized in the case of disasters. It should also be ensured that they are aware of all protocol for the process of checking-in with registrants. Although registries can be helpful, as directed by such organizations as Ready (n.d.), there is some question as to their effectiveness in relation to encouraging over-dependence on organizational services (Ranghieri & Ishiwatari, 2014). Good et al. (2016) suggests instead to focus more on individual and community preparedness as well as to develop strong personal networks. Regarding the present study, it is recommended both that organizations strengthen their registry processes and that people with visual impairments prepare themselves and their own networks for future disasters.

Organizations struggled to meet needs, yet efforts to meet needs were made individually and collaboratively. Organizations struggled to reach all of the people they intended to, however, for those who they did reach they were able to give physical aid and provided for mental health. Although organizational collaborations have brought much value, many people with visual impairments perceived that such organizations had abandoned them. Organizational abandonment is one reason that Good et al. (2016) suggested that people with visual impairments should not over-rely on government supports in a disaster. The prime
example in the present study was when MBDO was not allowed to use the emergency registry of people with disabilities in its region. Efforts toward streamlining the communication between the municipal government of Bayamòn and the MBDO is suggested.

Overall, the lessons observed from the present study are the value of skills in independence throughout the disaster cycle, the importance of organizational collaboration, and the effective use of disaster registries. Theoretically, the more that government and non-government organizations collaborate, the better services will be for people with visual impairments, which will positively impact the quality of teaching skills in independence as well as the quantity of recipients of such teaching. Better organizational collaboration will also potentially have a greater impact on communication streams in the use of disaster registries.

Sub-question 2: What Lessons Can Be Observed from the Institutional Tools Specific to People Who Are Visually Impaired That Were in Place at the Time of the 2017 Hurricane Season in Puerto Rico?

Although the current research question does not relate directly to shelters, this researcher expected to find people with experience in shelters, which would more fully answer the question. However, this was not the case. Nevertheless, the following response to the current research question is based on the data available.

Institutions such as FEMA and the Red Cross used the 2017 hurricane season to put into practice their priorities of engaging local populations as well as to find ways to improve those engagements for the future. Although FEMA utilized Core Advisory Groups (CAG), the representative of FEMA’s ODIC admitted that there was still a “need for increasing
engagement of the disability community” in Puerto Rico. FEMA’s collaborations with the PRDCRN is a step in the right direction. These efforts concur with Good et al.’s (2016) and Duyan and Karatas’s (2015) conclusions about raising up social supports for people with visual impairments throughout the disaster cycle.

The representative of the Americans with Disabilities Act (ADA) spoke of the ongoing efforts that ADA advocates in Puerto Rico have made for multisectoral collaboration. The local collaborations, such as the PRDCRN and FEMA’s CAGs, should continue the synergy started from the 2017 hurricane season to best prepare for future disasters as they relate to all people, including people with visual impairments specifically.

One element of ADA law is that emergency-related information should be made available in accessible formats, including braille. The availability of braille and audio descriptions was found to be lacking in the present study and is therefore an area in need of improvement. Accessible formats for emergency-related information were also determined to be a need from the aforementioned report of the NCD (2005) and the U.S. Department of Education’s emergency management resource guide (USDE, 2008). Additionally, awareness campaigns can be undertaken so that government agencies, nonprofit organizations, and individuals will be more aware of ADA law so that it might be increasingly adhered to in Puerto Rico during, before, and after a natural disaster.

Although government registries of people with disabilities existed, they were not always utilized or made accessible to the people that could best put them to use, such as the MBDO, as mentioned above. Other than FEMA, no other government agencies participated
in the current study and so any information they may have on lessons observed in this area is unknown.

Organizations have made efforts to improve disaster services for people with visual impairments. The emergency lists of needs of people with visual impairments that were given by organizations show intentionality in trying to best meet the needs of this population in a disaster. However, the lists were not presented by the participants as “lessons observed.” The lists that organizational participants gave, rather, existed before Hurricane Maria and were confirmed by their experience in the response and recovery phases. The representative of the Red Cross gave a list of specific needs for people with visual impairments. The Movimiento para el Alcance de Vida Independiente (MAVI) director detailed a list of areas that are typical challenges for people with disabilities in the disaster cycle. These lists can be compared with Kailes and Enders’s (2007) list for emergency managers regarding people with disabilities, C-MIST (communication, medical needs, maintaining functional independence, supervision, and transportation). Elements of the Red Cross and MAVI lists are found in C-MIST and therefore support it. Good et al. (2016) had a list (communication, plan-making with friends and family, registering with local disability organizations, practical tips, and having materials and information ready if needed post-disaster) that fully agrees with what was found in the present study. Furthermore, disaster-related practical needs lists related to people with visual impairments were given previously to the current study by the Red Cross, the American Printing House, and Braille Works (APH, n.d.; ARC, n.d.; Braille Works, 2015, 2016). The needs lists grounded in the current research are consistent with and can be added to the previous lists.
In review, there were several lessons observed from institutional tools related to people with visual impairments as a result of the 2017 hurricane season. The current study found that efforts by institutions to improve social supports gained valuable experience, institutions learned how to collaborate with local stakeholders, accessibility to disaster-related information should have been increased, government registries needed to be more effective, and lists of needs of people with visual impairment in a disaster were helpful guides.

**Sub-question 3: How Did the Actual Response of Aid Agencies Compare to the Expressed Intent of Those Agencies Regarding People with Visual Impairments? How Would People with Visual Impairments Evaluate the Response Efforts?**

As response agencies, FEMA and the Red Cross offered comparisons in the present study of intent versus actual response efforts regarding people with visual impairments. Since the way that MAVI and Mirada served their clientele in the response phase was similar to that of a disaster response agency, they were considered as such for the purposes of the current research question. However, since neither MAVI nor Mirada were previously considered disaster aid agencies, they did not have a formal emergency response agenda prior to the 2017 hurricane season. Yet, as will be seen in the following discussion regarding the theme of contacting clients, distributing needed supplies, and collaborating with other organizations, they were able to fulfill their overall mission of serving people with visual impairments through their response efforts. Although the present question does not ask directly about shelters, they are relevant to the activities of the response phase. It was expected that people who had experienced shelters would help answer the question, however,
no participants personally experienced a shelter. Therefore, the experience of shelters from the 2017 hurricane season in Puerto Rico cannot be evaluated.

Three of the four themes that relate to the present research question correlate to positive outcomes for the relief agencies involved in the study. These three themes (creative contact efforts, needed supplies were distributed, and cross-organizational relationships were strengthened) relate in some way to the mission of each organization, either generally or specifically. The fourth theme, inadequate engagement, relates to perceptions of people with visual impairments of areas lacking in the response of aid agencies. Although FEMA’s ODIC addressed many of the concerns expressed by people with visual impairments, their influence was not pervasive enough for the 2017 hurricane season. Additionally, the representative of FEMA’s ODIC said there was “insufficient engagement” with the local population. If the organizational collaborations, such as the PRDCRN and FEMA’s CAGs continue to improve, their influence will potentially be more pervasive in the community of people with visual impairments, and the engagement with this population will increase. Emergency management collaborations are the ideal avenue for public and private entities in best addressing needs throughout the disaster cycle (Waugh & Streib, 2006).

Relief agencies made some efforts that were positive for people with visual impairments in the 2017 hurricane season in Puerto Rico. These efforts include collaborations, using creative means to contact people with visual impairments, involvement in distributing aid, involvement in mental health efforts, and efforts for inclusion. Regarding collaboration, the PRDCRN proved to be respected within and outside of Puerto Rico. Despite what Sonia said, who was familiar with how organizations had historically looked
out only for themselves, the PRDCRN showed to be a break-away regarding its spirit of collaboration that ultimately better met the needs of people with visual impairments. As further evidence of the atypical development of a Network such as the PRDCRN, the World Health Organization and The World Bank (2011) stated that coordination of organizations for people with disabilities throughout the disaster cycle was frequently deficient.

Conversely, response agencies struggled in some ways during the 2017 hurricane season in Puerto Rico. Examples include the lack of provision of registry information, people with visual impairments not being able to utilize set-aside queues for people with disabilities during response aid, people with visual impairments not feeling like a priority in the disaster cycle, the struggle of some aid agencies to engage local populations, and the need for more public awareness of the needs and abilities of people with visual impairments throughout the disaster cycle. A glaring example of a breakdown in the response phase to people with visual impairments was when the coordinator of the MBDO, who is himself visually impaired, was not allowed access to the disaster registry of people with disabilities in his region. The struggles of aid agencies found in the present study are further evidence of what Good et al. (2016) suggested in regard to the need for social supports to be strengthened for people with visual impairments throughout the disaster cycle.

Regarding the second part of the present research question under discussion, there was a small quantity of relief agencies that interacted with people with visual impairments, based on the data collected for the present study. Therefore, because of the lack of knowledge between interviewees with visual impairments and personal experience with response agencies, there was relatively little in the way of evaluation of aid agencies by
people with visual impairments in the present study. The data that exist related to response agency evaluation can be summarized by the following: it was felt by many people with visual impairments that many organizations did not prioritize them in the disaster cycle, namely, “I felt abandoned.”

When a study participant mentioned an interaction with a relief agency, it was mostly with FEMA; a few interactions were with the Red Cross. The related evaluative statements regarding these two agencies are discussed above. Furthermore, several participants with visual impairments took advantage of services given by response agencies through utilizing queues for food, water, and/or gas. However, it was not known by the interviewees who was providing these goods. A few participants received some post-disaster food and supplies either from a military service organization or their local municipal government. Some interviewees mentioned the help that MAVI gave to others with visual impairments that they knew. No interviewees with visual impairments in the present study stayed in a shelter.

Overall, the response agencies involved in the present research made attempts to address needs of people with visual impairments in the disaster cycle. The agencies were able to use means accessible to them in efforts to contact people with visual impairments post-Hurricane Maria, they distributed needed supplies, and cross-organizational relationships were strengthened, which ultimately benefited people with visual impairments. A need was found, however, for increased engagement of people with visual impairments throughout the disaster cycle.
Sub-question 4: What Has Been Done to Ensure That People with Visual Impairments in Puerto Rico Have What They Need to Maximize Recovery?

Three main themes provided the answer to the present research question and have been mentioned previously. These are organizational collaboration, organizational offers of help to the clients/members, and efforts made toward inclusive practices. Organizational collaboration, such as the aforementioned PRDCRN, has helped utilize strengths of a variety of organizations in recovery for people with visual impairments. Multi-sectoral collaborations are seen as a need, as described in the Sendai Framework for Disaster Risk Reduction (United Nations, 2015). Thus, the collaborations that developed as a result of Hurricane Maria are a strength found in the current study.

Organizations utilized their knowledge unique to the people they serve to help in the recovery process, such as Mirada’s knowledge of the economic and independence level of some of its elderly clients. Mirada also suggested that these clients temporarily go to family in the mainland if possible. Additionally, organizations were able to distribute supplies to those who needed them post-Hurricane Maria. Some organizations sought to meet the post-hurricane mental health needs of their members with visual impairments. These efforts were a step in helping people with visual impairments to be set up for success during the long-term recovery phase. However, there was still a need for better long-term support systems for people with visual impairments, there was inadequate engagement of the community of people with visual impairments in the disaster cycle, and disaster registries were in some cases mishandled.
Finally, organizations utilized the recovery phase to improve their inclusive efforts by having people with disabilities, including visual impairments, involved in decision-making throughout the recovery process. These efforts are in accordance with the suggestions given by Good et al. (2016) and Duyan and Karatas (2015).

Three themes were discussed in relation to the current research question regarding what has been done to maximize recovery for people with visual impairments. However, one problem discovered in relation to people with visual impairments maximizing recovery was revealed by the representative of the University of Puerto Rico Disability Office. He stated that because of a lack of funding from the university, some of their students with visual impairments had a more difficult time (in some cases, were unable to) continuing their studies. In order for these students to experience greater inclusion along with their sighted peers, more work should be put into ensuring that they have the funding and allowances they need to keep up with their studies. Efforts such as these would help build the capacity, and therefore inclusion, of people with visual impairments (Lord & Hutchison, 2003).

**Sub-question 5: What Did People with Visual Impairments Do of Their Own Initiative in Hurricane Preparation, Response, and Recovery?**

A sense of abandonment was felt among people with visual impairments in the present study. This sense came through an overall negative impression from society, a feeling of no attention paid to them, that they did not acquire skills in independence because of an over-protective society, inaccessible information throughout the disaster cycle, and a lack of empowerment. Despite these perceptions, many people with visual impairments contributed throughout the disaster cycle in their households and communities and provided for
themselves. These contributions offer another perspective on the prism of social vulnerability. Social vulnerability focuses on the social and institutional processes that make a population vulnerable in a disaster event (Cutter et al., 2003; Stough et al., 2015; Wisner et al., 2003). The notion of resilience is seen as the opposite of vulnerability (Wisner et al., 2003). “Contributing,” or being active agents of aid within the disaster cycle, may be seen as a third side, as found by the current study, of the experience of a natural disaster by someone in a marginalized community, such as was also investigated by Abbott and Porter (2013). Wisner et al. (2013) also acknowledged the capabilities of people with disabilities for giving aid post-disaster.

People with visual impairments prepared the living space, helped people in their communities, helped in their households, provided for their own needs, adjusted to new recovery environments, and influenced organizations. These initiatives were not under the umbrella of the themes found in the literature review of trauma in response and recovery, the role of inclusion, implementations of improvement during recovery, and the description of needs for people with disabilities within the disaster cycle. Initiative was mentioned but not emphasized in the two studies that focused on people with visual impairments and disasters (Duyan & Karatas, 2005; Good et al., 2016).

Summary of Findings

Overall, the findings of the current study can be encapsulated by two themes that are contrasting yet influence each other: independence and abandonment. If, for example, a person with a visual impairment has many skills in independence, they will rely less on social supports. If those supports are lacking, that deficit will feel less like abandonment by the
individual. However, if a person with a visual impairment has minimal skills in independence, the reliance on social supports will be higher. If those supports are lacking, so will there be an increase in the sense of abandonment (Welsh, 2010). Similarly, if a social support, such as shelter information in braille, is not provided, a sense of abandonment will be felt by an individual with a visual impairment, regardless of their skills in independence (Wisner et al., 2003). The influence of independence and abandonment among people with visual impairments in Puerto Rico throughout the disaster cycle will be shown in the following summary of findings.

**Influence of Independence**

It was shown that skills in independence for people with visual impairments was a key factor in the handling of the response and recovery phases, such as discussed in Duyan and Karatas (2005) and Good et al. (2016). Individuals with visual impairments who had little-to-no training in ILS or O&M wished that they had the training previous to the hurricane as it would have helped them navigate the response and recovery phases. Those individuals with visual impairments who had extensive training in ILS and O&M prior to Hurricane Irma explained that they utilized those skills throughout the disaster cycle, and it was an aid to their physical and mental wellbeing. Some of the ways that skills in independence were aids included giving people with visual impairments some tools to provide for the post-disaster needs for their local community and for themselves. Furthermore, organizations serving people with visual impairments noted the differences in wellbeing between their clients who had received a relatively high amount of training in ILS and O&M versus those individuals who received minimal training.
The notion of independence was also seen in how people with visual impairments handled the potential of spending time in an emergency shelter. Although none of the study participants experienced a shelter during the 2017 hurricane season, they did express anxiety about the potential of spending time in one. The higher the skills in independence, the less anxiety in potentially spending time in a shelter (Welsh, 2010). Similarly, there were two things that institutions could do to help alleviate fears of shelters. First, the more that institutions developed their systems to accommodate people with visual impairments in emergency shelters so that the population was integrated in the development, the less overall anxiety there would be (Casey-Lockyer & Myers, 2017; Duyan & Karatas, 2005). Second, anxiety could be better alleviated with increased awareness efforts by organizations given to people with visual impairments of the accommodated systems.

Social connectedness was another important factor in wellbeing during the hurricane response and recovery phases. Skills in independence related to social connectedness in that it allowed increased tools for the individual to be physically present with others. Physically being with other people for social purposes was the only possibility after Hurricanes Irma and Maria as outlets such as social media were eliminated due to the extended failure of the electrical power system. Connecting with others socially was a benefit to the mental wellbeing of hurricane survivors with visual impairments, which contributed to confidence throughout their lives, part of which involves skills in independence, such as was found in Heller, Swindle, and Dusenberry (1986).

Finally, independence was an element regarding the discussion on the use of disaster registries in the current study. If there was not a registry in a certain region, or if the
individual was not aware of one, then having skills in independence was an important factor in handling the lack of an institutional safety net. It was suggested multiple times by people with visual impairments that there should be a disaster registry. The suggestions came both from people who had a relatively high amount of training in ILS and O&M skills and those with minimal training. Without the proper utilization of registries by institutions, the weight of response and recovery wellbeing was placed more on the skills in independence of the individual with a visual impairment. It should be noted that Good et al. (2016) suggested that people with visual impairments should focus more on individual preparation and strengthening personal networks than depending on having their name on a disaster registry. Good et al.’s (2016) suggestion does not absolve local and federal governments from improving their disaster registry systems.

**Findings Related to Abandonment**

Besides the notion of independence, many themes in the current study related to the concept of abandonment. Abandonment by institutions and informal social systems impacted independence as it created less opportunities for people with visual impairments to pursue formal training in skills in independence (Welsh, 2010). Abandonment happened through inadequate funding of organizations serving people with visual impairments and through social stigmas such as showing pity toward a person with a visual impairment when in a public scenario. Additionally, the present study found that people with visual impairments did not have equitable access to information related to preparation, response, and recovery, such as was also found by Stough and Kelman (2018). People with visual impairments expressed that they were perceived as a low priority by emergency-related institutions.
In the above independence-related discussion, the concept of anxiety about spending time in an emergency shelter was reviewed. If emergency-related institutions more highly prioritized (i.e., did not abandon) people with visual impairments, and people with disabilities in general, the concern about spending time in a shelter would likely be reduced (Duyan & Karatas, 2005). Giving higher priority to this population may mean including them more in how emergency-related frameworks are created and sustained (Stough & Kelman, 2018). Assuring that disaster registries of people with disabilities are correctly utilized before and after a disaster is another way to show high priority to this population.

Not only did disaster registry lists relate to the notion of independence, as discussed above, but also to systemic abandonment. Disaster registries did not exist in all regions of Puerto Rico or, when they did, the participants in the study were not aware of it. Also, in regions where there was a disaster registry for people with disabilities, it was not utilized fully. The representative of the MBDO, who is a person with a visual impairment, was not given access to the disaster registry for his region because of his visual impairment, as he explained. Findings on the shortcomings of disaster registries for people with disabilities are not new (e.g., Fox, White, Rooney, & Rowland, 2007; Good et al., 2016; Phibbs et al., 2012).

Finally, although it was helpful for people with visual impairments to socially connect with each other after Hurricane Maria, this was not always possible. These limitations were due to a failed infrastructure or the physical inability for participants to mobilize outside of their homes. Nevertheless, part of the reason for a lack of social connection, according to participants in the study, was because institutions and informal social systems suppressed the discussion of mental health needs after a disaster. The problem
of a lack of discussion of post-disaster mental health was true for most people, regardless of their visual statuses (Freedy, Kilpatrick, & Resnick, 1993). The more that post-disaster mental health was discussed in Puerto Rico, whether through organized or informal efforts, the greater chance for specific solutions.

**Other Findings**

Organizations serving people with visual impairments collaborated because of the aftermath of Hurricane Maria. These collaborations were remarkable because of the history of lack of inter-organizational partnership. As was found in the present study, Chang (2010) discussed that in the aftermath of a disaster, individual, communities, and organizations were more likely to work together for an important and immediate cause. Not only did the organizations in the PRDCRN collaborate during the response phase, but they have continued to meet and have sought ways to improve the Network to best serve people with disabilities long-term.

Overall, the hurricane response and recovery efforts of the relief agencies that participated in the current study aligned with their organizational purposes, such as delivering aid supplies and providing financial assistance. However, some study participants expressed that they did not receive such aid when they needed it. Relief agencies were in a process of learning how to best engage local individuals with disabilities and related organizations (FEMA, 2017b).

Many people with visual impairments were able to provide needs for themselves and contribute to the community throughout the response and recovery phases. Although people with visual impairments were considered a socially vulnerable population, the resilience and
initiative shown by the study participants counteracted some of the typical effects of social vulnerability (Centers for Disease Control, 2018; Wisner et al., 2003).

Finally, organizations that participated in the study made lists of needs of people with disabilities throughout the disaster cycle. The following lists are repeated here for ease of access. Other lists regarding people with visual impairments in the disaster cycle found from the literature review are given in Appendix D.

MAVI—areas that tend to fail emergency response efforts for people with disabilities:

- The notification process
- The evacuation process
- The sheltering process
- Provision of medical equipment
- Medical services
- Affective communication throughout the disaster cycle

Red Cross—biggest challenges for people with visual impairments after a disaster:

- Mobility
- Transportation
- Communication

Extension of Findings

A similar dichotomy to that of the above discussion on independence versus abandonment was that of empowerment versus paternalism. Empowerment and paternalism were both mentioned by study participants as a tension they experienced throughout their lives, including the disaster cycle. For example, as described by Welsh (2010), if a person
with a visual impairment had a high degree of skills in independence, they would likely feel empowered to be an active agent within the disaster cycle. If a person with a visual impairment had limited skills in independence, it was more likely that the effects of a paternalistic culture would be felt more acutely during the disaster cycle. However, if a society did not make efforts to empower people with visual impairments (or any marginalized group), it was less likely that this population would seek skills in independence and would be more susceptible to the challenges of paternalism (Welsh, 2010).

The dichotomies of independence versus abandonment and empowerment versus paternalism can be extended to other relationships, such as that between the U. S. mainland and Puerto Rico. Puerto Rico has been the recipient of colonialism, cultural discord from Americanization, and racial discrimination (Briggs, 2003; Milian & Correa, 2001; Rivera Ramos, 2001). For decades, voters in Puerto Rico have lacked enough of a majority opinion on whether to seek independence, to seek statehood, or to keep the relationship with the U. S. the same (Pantojas-García, 2013). These island-wide votes have occurred because of the U. S. and its abandonment and paternalistic relationship to Puerto Rico (Briggs, 2003). Examples of abandonment and paternalism can be seen throughout the 2017 disaster cycle as well. There was a “dissimilar urgency and priority” on the part of the U. S. toward Puerto Rico when compared to the 2017 U. S. mainland hurricane response and recovery efforts (Office of the High Commissioner for Human Rights, 2017, para. 7). Furthermore, laws such as the AABD, as discussed previously, create increased conditions of social vulnerability for people with visual impairments within the disaster cycle. The reader may recall the graffiti mentioned in chapter 4 which stated “El desastre es la colonia (The disaster is that we are a
“location)” and “FEMA es el problema (FEMA is the problem).” Therefore, sentiments such as abandonment and paternalism expressed by people with visual impairments in their community’s relationship to society in Puerto Rico were echoed in the overall relationship of Puerto Rico to the U. S.

**Summary of Recommendations**

The recommendations given from the present study are summarized below. They are organized from wide-ranging influences to specific recommendations.

First, the study revealed the critical nature of skills in independence for people with visual impairments within the disaster cycle such as was recommended in Good et al. (2016). Organizations serving people with visual impairments should continue these efforts. Additionally, it should be encouraged that financial supporters and related government agencies reassess the possibilities of additional funds and resources to be granted such organizations. These funds can be used to increase the number of ILS and O&M specialists and to retain them long term, as recruitment and retention of teachers throughout the education system has been a challenge (Trines, 2018). Furthermore, as an advocacy point for organizations to negotiate for increased resources, stories such as those found in the present study regarding the value of ILS and O&M may be used. The importance of skills in independence may also be used for organizations serving people with visual impairments to recruit more clients.

Second, there was a connection between the inclusion of people with visual impairments in leadership throughout the disaster cycle and empowerment (Maton, 2008). Therefore, people with visual impairments should be more included in leadership throughout
the phases of planning for a disaster, response, and recovery, such as was also argued by Fjord and Manderson (2009). The reader may recall the instance where the representative of the MBDO, who is a person with a visual impairment, was not given access to the list of people with disabilities to use during response. This specific city government, as well as all others in Puerto Rico, should reassess how they are including people with disabilities in their operations related to the disaster cycle, given that exclusion of this population is all too common (Stough & Kelman, 2018).

Organizational collaborations are an ideal as recommended by the Sendai Framework for Disaster Risk Reduction (United Nations, 2015). The PRDCRN not only organized their efforts during the response phase but continued their efforts into the recovery phase with an intent to increase their influence among organizations and individuals with disabilities. The Network should be seen as an example for other world regions to learn from in that cross-sectoral collaborations are achievable, such as is recommended by Waugh and Streib (2006). Additionally, a study of the PRDCRN could reveal methodological approaches that could be considered for aiding partnerships in other world regions. The United Nations Office for Disaster Risk Reduction may also further study the PRDCRN and use the Network’s efforts to encourage other regions to make similar efforts.

Disaster registries of people with disabilities existed in many regions in Puerto Rico. However, the participants in the current study did not find that they were utilized. In some cases, the participants were not aware that a registry existed. For the regions that have a disaster registry, there should be a reassessment on how they can be better utilized in the future. Furthermore, the more that inter-sectoral collaborations are strengthened, such as in
the PRDCRN, the better chance there will be that disaster registries will be fully utilized (Chang, 2010).

The ADA law applies in Puerto Rico. However, many government and non-government entities were not aware of its application including toward people with disabilities throughout the disaster cycle. ADA laws may be included as part of the teaching in efforts such as the MAVI disaster training for organizations. The ADA technical specialist works to bring awareness of ADA to organizations, so the present study may be used to support such efforts. Awareness of the ADA law is an ongoing struggle on the part of people with disabilities and institutions (Kaufman-Scarborough & Menzel Baker, 2005).

Although some people with visual impairments were able to physically meet during response and recovery to support each other, it was still found that such meetings were an issue to continue to be addressed. Part of the purpose for these meetings were for small- and large-group discussions to assist with mental health, such as was suggested by Heller et al. (1986). When the electrical power system failed after a disaster, group meetings were more salient since the use of electronic communication devices were not available. Transportation to such meetings may also be limited. However, it is recommended that all possible methods for physical meetings be explored. Such investigations would be a natural opportunity to include people with visual impairments into how such meetings would be possible, such as recommended by Stough and Kelman (2018). Furthermore, organizations serving people with visual impairments should consider ways to address mental health needs with their clients to prepare them for a natural disaster. Addressing mental health concerns before a natural disaster is advisable for everyone regardless of visual status, but organizations
serving people with visual impairments have a natural opportunity with their clients while they are receiving services from the organization (Freedy, Kilpatrick, & Resnick, 1993).

A lack of funding for transportation, housing, and educational accommodations prevented some students with visual impairments from continuing their studies after the response phase at the University of Puerto Rico. While it is understandable that university finances would be decreased after a natural disaster, it is recommended that the funds disseminated for students with disabilities for after-disaster accommodations be reassessed. Additionally, the financial reassessment should occur also because Bryan and Myers (2006) indicate that people with disabilities are historically an underserved population at universities.

Multiple people with visual impairments mentioned their unease about possibly spending time in an emergency shelter. Individuals with visual impairments and organizations serving people with visual impairments can collaborate with relief agencies on ways to make shelters as accessible to people with visual impairments as possible. Organizations serving people with visual impairments can also prepare their clients by educating and practicing emergency shelter navigation (Bina, Naimy, Fazzi, & Crouse, 2010; Casey-Locker & Myers, 2017).

The challenge of the sound and smell from the widespread use of generators was mentioned by multiple interviewees. There are quieter generators, but they are usually more expensive. There are also ways to dampen the sound. It is recommended that government and non-government organizations consider ways to reduce the cost of these measures and to increase awareness of the negative impact that the sound and smell of generators can have on
people with visual impairments, as well as the general public. The sensory challenges raised by the widespread use of generators during the 2017 hurricane season in Puerto Rico were acknowledged by Allen (2019).

Finally, people with visual impairments made some specific suggestions for the response phase that were not widely found in previous literature. These suggestions can be added to future disaster check-lists and can be added to disaster-related curriculum for organizations serving people with visual impairments (e.g., Braille Works, 2015, 2016). The suggestions were to develop and maintain a fruit and vegetable garden, to be aware of the type of soap to use when handwashing clothes, and to use gloves when navigating an unpredictable post-disaster environment.

**Limitations**

As mentioned previously, this researcher conducted his research as a person outside of the culture and experience of people from Puerto Rico. Biases may have influenced the results, so caution in generalizing the conclusions of the study should be taken. This researcher was not fluent in Spanish; however, interpreters were used who were from Puerto Rico and were in professions that served people with visual impairments. The interpreters, however, were not always available or able to travel, so some interviews were conducted over a phone conference call. In these instances, the visible surroundings and facial expressions of the interviewee were not observable by this researcher.

As stated previously, migration from Puerto Rico was a hallmark issue of the 2017 hurricane season. In the present study, however, no one with a visual impairment who migrated because of Hurricane Maria was interviewed, so this perspective was not present.
Although many interviewees experienced difficulty from Hurricane Maria, no one had a relatively large loss caused by the hurricane, such as the complete loss of a home or a member of the household. It was possible that only the people who had a minimally traumatic experience through the hurricane volunteered for this study. If someone had had substantial tragedy due to the 2017 hurricane season, they may not have wanted to relive it, so they elected not to participate. Additionally, no one in the present study experienced loss to the point that they had to stay in a shelter. As a result, shelter experiences were not a factor in the present study.

Since the researcher was snowballing from adult rehabilitation agencies and only accepting interviewees who were 18 years of age or older, this decreased the chance of attracting participants who were born with a visual impairment. This is because, typically, a large percentage of clients that adult rehabilitation agencies serve are people who acquired their visual impairment as an adult (Welsh & Tuttle, 1997). Therefore, people who were born with a visual impairment were underrepresented. Furthermore, the perspective of children with visual impairments and their families were not included. Also, snowballing from a rehabilitation agency meant that all participants with visual impairments had some exposure to formal training in ILS and/or O&M.

Perhaps because all study participants had the relational connections to be associated with an organization or rehabilitation agency, none seemed to live in a relatively low-income scenario. This researcher did not inquire about income levels from any of the interviewees, so the consideration about whether or not the participants were in a low-income situation is based on this researcher’s observations. As stated previously, 53.3% of people with
disabilities ages 21–64 in Puerto Rico live in poverty (Erickson et al., 2019a). Low-income levels were not represented in the current study’s sample. The social vulnerability perspective posits that many people with disabilities live in geographically vulnerable areas to natural hazards (Cutter et al., 2003). However, perhaps because of the relational connectedness of the study participants, there were no such geographically vulnerable residents represented.

The current study focused the interviews on people with visual impairments in order to assure adequate representation by this population. Although government and nonprofit agencies were represented, there was comparatively less representation of these groups. More representation of government agencies was desired in the present study but was not possible due to temporary heightened security risks as a result of a separate mismanaged research study.

**Future Studies**

The present study discovered issues unique to people with visual impairments in Puerto Rico during the disaster cycle. It was stated previously that there remains work to be done regarding the de-marginalization of people with visual impairments. The present study hopes to be a step in the direction of empowering this population. The following recommendations for future studies may be able to contribute to this effort.

**Future Studies Regarding Individuals with Visual Impairments**

The people with visual impairments that participated in the study were found primarily by using connections from organizations that serve people with visual impairments. This means that these interviewees had at least some exposure to formal training in skills for
people with visual impairments and that they were not socially isolated. Therefore, a next step from the current study could focus on people with visual impairments in Puerto Rico who have not had any formal training. There may also be a future study on the population of people with visual impairments who live in poverty. Specifically, in the literature review discussion about social vulnerability, it was mentioned that part of what makes a people vulnerable is the geographic area that they inevitably live in due to lack of income (Cutter et al., 2003). This was not the case among the participants in the present study. Therefore, a future study should focus on people with visual impairments who, due to low income levels, live in geographic areas vulnerable to natural hazards.

The participants in the current study could be revisited and interviewed regarding their level of hurricane apathy and their resolutions regarding better readiness for future hurricanes. There may also be a future study that focuses on people with visual impairments who have other disabilities in order to understand the perspectives of this segment of the population. Two other aspects of the population of people with visual impairments not addressed in the current study and that could be further explored are the experiences of children with visual impairments under the age of 18 and of their parents/caregivers in navigating the disaster cycle and to investigate more fully the experience of the disaster cycle of people with visual impairments in rural areas of Puerto Rico. Further research could also be conducted on the experiences of people with visual impairments who migrated to the U.S. mainland after Hurricane Maria and compare those with the experiences of those who stayed in Puerto Rico following this disaster. Finally, an investigation of the experiences of people
with visual impairments that focuses on those who stayed in emergency shelters should be conducted.

**Future Studies Regarding Organizations Serving People with Visual Impairments**

Issues for further study related to organizations arose from the present study. Because there were problems related to emergency registries of people with disabilities, a study may be conducted on more government entities and NGOs that keep and utilize emergency registries of people with disabilities and their effectiveness. A case study could be conducted on the PRDCRN in how it began, how it continues its collaborations, what can be learned from the Network, and what it would suggest for organizations in other world regions. Multiple organizations tried to address mental health among victims of Hurricane Maria in the response and recovery phases. Additional study on paths for best practices in planning for mental health needs during future disasters are suggested. This suggestion was affirmed by Stough et al. (2015) who stated that a theme of their findings was that mental health was a barrier to successful long-term recovery for people with disabilities. Specifically, a study on specific aspects of mental health related to people with visual impairments in Puerto Rico during the disaster cycle should be further delved into. Moreover, a survey of relief agencies may be conducted so as to learn about the workers’/volunteers’ understanding of how to interact with people with visual impairments and their recommendations for how to improve services for this population. Additionally, the representative of the University of Puerto Rico Disability Office (UPRDO) gave the following recommendation for organizations to consider: a feasibility study could be conducted of creating a post-disaster electrical and Internet station for people with visual impairments. This location would be restricted to
people with disabilities who depend on electrical technology for daily living tasks to recharge or to get needed information. It could also be a mobile base that is brought to them. Although such a station would be helpful for everyone, the representative of the UPRDO recommended the electrical and internet station, “in order to have that safe space as well as access to communication with others, which is very difficult for those that are visually impaired when they don’t have access to leave their homes.” Exclusive access for such a station would be important for people with disabilities as it would potentially be overwhelmed by the general public seeking the highly desired resource of electricity and internet services.

Finally, more investigation is needed to find the cultural translation of U.S.-created dictates such as the ADA to Puerto Rico either in general or specific to the issue of disasters and disabilities. Furthermore, a study similar to the present one could be conducted in a different geographic and cultural context. Although there may be some similarities between the population in the present study to that of others, the conclusions found in the present study should not be assumed to apply to other Latin or island contexts, for example.

Conclusion

As stated in the first chapter, Hurricane Maria was the natural disaster that had the largest societal and economic impact in Puerto Rico in the last 90 years. Given this experience, today’s generation in Puerto Rico may be more proactive throughout the disaster cycle going forward. That said, there is no guarantee that apathy will not return before another large hurricane directly hits Puerto Rico. Occurrences of natural disasters are, at this point, not preventable, and estimates from climate change scientists are that the number and
power of natural hazards will probably increase. Additionally, there has been few academic studies in the past on people with visual impairments and their experience of natural disasters, and none in Puerto Rico. The current study helps to fill a gap in the knowledge base for this population. Additionally, it is essential that the recommendations suggested by the findings from this study be acted upon sooner rather than later so that the needs of people with visual impairments in particular be included in decision-making and accommodated in Puerto Rico for future natural disasters.

The social vulnerability perspective was both confirmed and challenged by the results. Examples of the marginalization of people with visual impairments were evident through an overall sense of abandonment that many people with visual impairments felt in the response and recovery phases. Yet, people with visual impairments showed resilience and initiative to contribute to the response and recovery efforts in their communities. The results of the present study may be able to guide emergency managers in Puerto Rico and other regions regarding the unique issues and concerns of people with visual impairments throughout the disaster cycle. The importance of and need for greater skills in independence can serve as further evidence of the importance of individuals with visual impairments and the organizations that serve them to obtain/facilitate these skills. The spotlight in the current study on the PRDCRN can be an encouragement to other organizations in emergency management to unify their efforts to better serve the people in their region.

This researcher was limited by being “outside” the culture of Puerto Rico and not fluent in Spanish. However, the present study aims to be a benefit for people with visual impairments and the organizations that serve them in Puerto Rico to take further steps to
address the unique needs and concerns of people with visual impairments. The approach of the current study was to make the voice of people with visual impairments central. A benefit of the current study is that it gave people with visual impairments in Puerto Rico, who had expressed feelings of abandonment in various forms, a chance to have a formal voice in explaining their experience of a natural disaster and of how it can potentially be better for them in the future. For future efforts in emergency management that regard people with visual impairments, it will be crucial for this population to have a voice in its structuring. As Mateo stated,

It is a big responsibility for us, as a blind person here in Puerto Rico to let our voice be known. And we have to be leaders in this process if we can expect that the next time will be better.
APPENDIX A

SEQUENTIAL INTERVIEW STEPS

1. Conduct a FEMA and ADA analysis on people with visual impairment and natural disasters.

2. Interview a representative of FEMA ODIC and an ADA technical specialist.

3. Interview about 30 people with visual impairments in Puerto Rico.

4. Interview representatives of relief agencies associated with the people with visual impairments that were interviewed.

5. Interview a representative of each of six agencies serving people with visual impairment in Puerto Rico (step #5 could be completed any time after step #2).
APPENDIX B
INTERVIEW QUESTIONS

There were no pre-formed interview instruments used in the current research. Many questions were influenced by the list of survey and interview questions in the appendices of Phibbs, Woodbury, Williamson, and Good (2012). Semi-structured interviews were utilized in each of the following categories. This means that each interview followed the basic format described below but varied depending on the level of detail given by each participant.

**FEMA ODIC and ADA Technical Specialist**

1. What tools specific to people who are blind or visually impaired already existed before the 2017 hurricane season in Puerto Rico (such as an Americans with Disabilities Act checklist or FEMA plans)?

2. Were those tools used? If so, what was their effectiveness? If they were not effective, what should be done differently?

3. Do you know of reports of how aid workers did (in the case of FEMA) in their interactions with people with visual impairment in the response to the 2017 hurricanes? If so, please tell me about them. (For ADA:) What is your assessment of the effectiveness of ADA regarding people with visual impairments from last year’s hurricanes in Puerto Rico?

4. How are people with visual impairments included in the current institutional (in either FEMA or ADA) preparation, response, and/or recovery process or plan?
5. What would you say were some lessons learned from last year’s hurricanes in Puerto Rico?

6. Have any people with visual impairments reported back to you on what worked and what didn’t in your efforts from last year’s hurricanes in Puerto Rico? If so, what were those things?

7. Is there anything else I should know regarding my topic from the perspective of FEMA (or ADA)?

People with Visual Impairments

1. Explain as much of your story as you would like regarding your experience of Hurricane Maria before, during, and after.

2. Did you live alone or with others before the hurricanes last year?

3. What things did you do on your own to prepare for a hurricane?

4. How well prepared did you feel for handling the hurricane response and recovery, based on your training from [blind rehabilitation agency or school that they attended, if at all]?

5. Do you feel any better prepared for a hurricane now compared to last year?

6. Did you encounter any barriers to accessing emergency information when the hurricane struck? Any barriers to accessing information related to sheltering and recovery?

7. How would you have made the preparation for last year’s hurricanes better?

8. Explain your experience in the days and weeks following Hurricane Maria.

9. Tell me about your specific experience of the response efforts.
10. What did you do on your own as the hurricane was happening to ensure your safety and that of those around you?

11. In the days and weeks following Hurricane Maria, did you feel supported by FEMA? Have you felt supported by local agencies for the blind?

12. How would you have made the response from last year’s hurricanes better?

13. What could FEMA, response agencies, and/or blind rehabilitation agencies have done better in the response process for you?

14. What individuals or organizations have helped you since the hurricanes? If none, have you heard of any that have helped people that are blind or visually impaired?

15. Tell me about your experience in a shelter if you were in one?

16. Explain your experience in the process of recovering from the hurricane.

17. Did you encounter any barriers to accessing information related to recovery?

18. What has helped you recover from hurricane Maria?

19. What have you done on your own to help the recovery process?

20. What are your hopes for you and other people with visual impairments in the recovery process?

21. How would you make the recovery from last year’s hurricanes better?

22. Through the recovery process, have you felt supported by FEMA? Have you felt supported by local agencies for the blind?

23. What can FEMA, response agencies, and/or blind rehabilitation agencies do better in the recovery process for you?
24. To what measure do you feel you have input into how it goes with anything related to hurricane preparation, response, and recovery for yourself or other people with visual impairments?

25. Are you aware of any plan for a process of recovery for you and/or your community? How have you been included in those plans?

26. How would you compare your life from before to after the hurricanes?

27. What is the general feeling of people in Puerto Rico toward people with visual impairments?

28. What would you say were some lessons you learned from last year’s hurricanes in Puerto Rico?

29. What is the most important thing I should know about hurricane preparation, response, and recovery for people who are blind or visually impaired?

30. Is there anything else you would like to tell me about hurricane preparation, response, and recovery for people who are blind or visually impaired?

**Representatives of Relief Agencies**

1. Tell me about the response efforts that [agency] was involved in.

2. What materials did you have, if any, regarding preparation for hurricanes for the blind and visually impaired?

3. What would you say were some lessons learned from last year’s hurricanes in Puerto Rico?
4. Are there any ways you would improve the training for your volunteers/employees in working with people with blindness or visual impairment during a hurricane response?

5. Have any people with visual impairments reported back to you on what worked and what didn’t in your efforts? If so, what were those things?

6. To what extent are people with visual impairments involved in the development of measures to take in regard to hurricane preparation, response, and recovery?

7. What is the most important thing I should know about hurricane preparation, response, and recovery in regard to people with visual impairments?

8. Is there anything else you would like to tell me about hurricane preparation, response, and recovery for people who are blind or visually impaired?

**Representatives of Agencies Serving People with Visual Impairments**

1. How did [organization] prepare people with visual impairments for Hurricane Maria, and how were you able to support them in response and recovery?

2. As the recovery process continues in Puerto Rico, what are your hopes, as an organization, for people with visual impairments?

3. Does your organization have a plan or partnership whereby you are aiding in the recovery process? If so, please tell me about it. How are people with visual impairments included in this process?

4. How do your clients see the process of recovery going? What are their desires in going forward?
5. How have people with visual impairments been involved in preparation, response, or recovery?

6. Could you summarize the lessons learned from Hurricane Maria?

7. What is the overall feeling in Puerto Rico toward people with visual impairments?

8. Is there anything else I should know about hurricane preparation, response, or recovery for people who are blind or visually impaired?
APPENDIX C

THEMES

Primary Question: How Does Having a Visual Impairment in Puerto Rico Impact a Person’s Ability to Prepare for, Respond to, and Recover from a Hurricane?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stigma Further Impacting the Disaster Cycle</td>
<td>The extent to which social stigma exacerbated the experience of the hurricanes</td>
<td>25 PVIs 2 RAs 4 OSPVIs</td>
</tr>
<tr>
<td><strong>Preparation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Hurricane Information Accessibility</td>
<td>People with visual impairments not having appropriate access to information about a hurricane before it comes</td>
<td>3 PVIs</td>
</tr>
<tr>
<td><strong>Response:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety About Shelters</td>
<td>Anxiety expressed by people with visual impairments of the potential of entering an emergency shelter</td>
<td>5 PVIs</td>
</tr>
<tr>
<td>Concern of a Systemic Lack of Priority of People with Visual Impairments</td>
<td>Expressed concern about people with visual impairments not being adequately considered in government and non-government systems</td>
<td>14 PVIs 3 OSPVIs ADA specialist</td>
</tr>
<tr>
<td>Limited Ability to Help</td>
<td>People with visual impairments expressing their desire to help after Hurricane Maria but not being able</td>
<td>4 PVIs</td>
</tr>
<tr>
<td>Preconceived Organizational List of Needs</td>
<td>Organizations that utilized a list of needs in disaster response of people with visual impairments procured previous to Hurricane Maria</td>
<td>2 RAs</td>
</tr>
<tr>
<td><strong>Recovery:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited Outdoor Walking Ability Affecting Daily Life</td>
<td>Post-hurricane impacts on outdoor travel for people with visual impairments</td>
<td>6 PVIs 1 OSPVI</td>
</tr>
</tbody>
</table>
Widespread Use of Generators Causing Disorientation
- Impact of the sound and smell of multiple generators being used simultaneously in close proximity
- 2 PVIs

Lack of Electricity Affecting Education
- Negative effects of being without electricity on continuing formal education
- 1 PVI
- 1 OSPVI

Previous Training Aided Recovery
- The help that previous training in O&M and/or ILS gave in the recovery phase
- 10 PVIs

Sub-question 1: What Are the Lessons Observed From the 2017 Hurricane Season in Puerto Rico Regarding the Unique Needs of People with Visual Impairments That Can Be Used to Improve Future Preparation, Response, and Recovery?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
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</thead>
<tbody>
<tr>
<td><strong>Preparation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase Preparation Training</td>
<td>Expressed desire and/or evidence for more training for people with visual impairments for future natural disasters</td>
<td>11 PVIs</td>
</tr>
</tbody>
</table>
| Increase Awareness and Usage of Registries by the Government | The desire for disaster registries to either be procured or to be better utilized | 6 PVIs
| ADA specialist
| 1 OSPVI |
| Increase Skills in Independence | The desire to increase skills in O&M and ILS related to the preparation phase for either the individual or community of people with visual impairments | 13 PVIs
| 4 OSPVIs |
| The Value of Organizations Working Together | Observations of the value-added of government and non-government organizations collaborating | 1 RA
| 1 OSPVI |
| **Response:** | | |
| Increase Skills for Independence | Observations of the importance of increasing skills in O&M and ILS related to the response phase | 9 PVIs
| 2 OSPVIs |
| **Recovery:** | | |
| Increasing Institutional Unity | The viewpoint of people with visual impairments that organizations should be more unified | 5 PVIs |
Empowerment of People with Visual Impairments Should Be Increased

Support Systems that Already Exist Should Be Strengthened

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Engage Local Populations</td>
<td>Institutions learned the value of and manner in which to utilize city and neighborhood resources</td>
<td>1 RA ADA specialist</td>
</tr>
<tr>
<td>The Need for Awareness</td>
<td>More awareness of ADA law is needed among government and non-government institutions</td>
<td>ADA specialist 1 OSPVI</td>
</tr>
<tr>
<td>The Need for Accessible Formats for Emergency-related Information</td>
<td>Accessible formats such as braille and audio description were described as areas of needed improvement</td>
<td>ADA specialist 1 OSPVI</td>
</tr>
</tbody>
</table>

Sub-question 2: What Lessons Can Be Observed from the Institutional Tools Specific to People Who Are Visually Impaired That Were in Place at the Time of the 2017 Hurricane Season in Puerto Rico?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Creative Contact Efforts</td>
<td>Efforts made by organizations despite post-hurricane limitations</td>
<td>2 RAs 2 OSPVIs</td>
</tr>
<tr>
<td>Needed Supplies Were Distributed</td>
<td>The distribution of needed supplies by organizations</td>
<td>4 RAs 12 PVIs</td>
</tr>
<tr>
<td>Cross-organizational Relationships Were Strengthened</td>
<td>Organizations collaborating as a result of Hurricane Maria</td>
<td>3 OSPVIs 2 RAs</td>
</tr>
<tr>
<td>Inadequate Engagement</td>
<td>Organizations not taking advantage of local resources during the response phase</td>
<td>3 PVIs 1 RA</td>
</tr>
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</table>

Sub-question 3: How Did the Actual Response of Aid Agencies Compare to the Expressed Intent of Those Agencies Regarding People with Visual Impairments? How Would People with Visual Impairments Evaluate the Response Efforts?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
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<tbody>
<tr>
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<tr>
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<td>Organizations collaborating as a result of Hurricane Maria</td>
<td>3 OSPVIs 2 RAs</td>
</tr>
<tr>
<td>Inadequate Engagement</td>
<td>Organizations not taking advantage of local resources during the response phase</td>
<td>3 PVIs 1 RA</td>
</tr>
</tbody>
</table>

194
Sub-question 4: What Has Been Done to Ensure That People with Visual Impairments in Puerto Rico Have What They Need to Maximize Recovery?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Collaborations</td>
<td>Collaborations across organizations helped to maximize recovery for people with visual impairments</td>
<td>3 OSPVIIs, 2 RAs</td>
</tr>
<tr>
<td>Organizational Offers of Help to Their Clients/Members</td>
<td>Organizations serving people with visual impairments explained their offers of help in response and recovery</td>
<td>5 OSPVIIs</td>
</tr>
<tr>
<td>Efforts Made Toward Inclusive Practices</td>
<td>Descriptions of efforts that attempt to include people with visual impairments in the recovery process</td>
<td>1 RA, ADA specialist, 1 OSPVI</td>
</tr>
</tbody>
</table>

Sub-question 5: What Did People with Visual Impairments Do of Their Own Initiative in Hurricane Preparation, Response, and Recovery?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Preparation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared the Living Space</td>
<td>Descriptions of what was done in the home in preparation for hurricanes</td>
<td>8 PVIs</td>
</tr>
<tr>
<td>Response:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helping Others</td>
<td>Descriptions of how people with visual impairments initiated aid to their community in the response phase</td>
<td>12 PVIs, 2 OSPVIIs</td>
</tr>
<tr>
<td>Providing for One’s Own Needs</td>
<td>People with visual impairments shared ways that they provided for their needs during the response phase</td>
<td>10 PVIs</td>
</tr>
<tr>
<td>Recovery:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusting to New Needs</td>
<td>Descriptions by people with visual impairments about how they adjusted to the new recovery environment</td>
<td>3 PVIs, 1 OSPVI</td>
</tr>
<tr>
<td>Helping in Household and Local Community</td>
<td>Descriptions by people with visual impairments of how they initiated help in their household and community</td>
<td>4 PVIs</td>
</tr>
<tr>
<td>Influencing Organizations</td>
<td>Efforts by people with visual impairments to bring helpful change to organizations during the recovery process</td>
<td>6 PVIs (including representatives of 3</td>
</tr>
</tbody>
</table>
PVI = People with Visual Impairments
RA = Relief Agencies
OSPVI = Organizations Serving People with Visual Impairments
APPENDIX D

LISTS FROM THE LITERATURE REVIEW FOR DISASTER READINESS FOR
PEOPLE WITH VISUAL IMPAIRMENTS

Red Cross

1. Store a talking or braille clock or large-print timepiece with extra batteries.
2. Have at least one extra white cane.
3. Mark your disaster supplies items with fluorescent tape, large print, or braille.
4. Mark your gas, water, and electric shutoff valves with fluorescent tape, large print, or braille.
5. Store extra magnifiers.
6. Have an extra pair of glasses if you wear them.
7. Make photocopies of your information lists (i.e., emergency contacts, medical information, disability-related supplies and special equipment) (ARC, n.d.).

American Printing House

1. Compile an emergency kit—include a three-day supply of nonperishable food and water, a flashlight with live batteries, prescription medications, a first aid kit, hand-crank radio, extra batteries, important papers (home deed, insurance, etc.) and your low vision aids and appliances
2. Know the locations of emergency exits.
3. Learn about transportation systems and routes that are different from the ones you usually use.
4. Prepare a list of emergency contacts and numbers.

5. Practice emergency evacuation plans.

6. Develop a buddy system and contacts with individuals and agencies both local (such as the local fire house or Red Cross affiliate) and out of state.

7. Make sure that contacts outside your area are aware of your emergency plans (APH, n.d.).

**Braille Works**

1. Create a plan, having a strategy should always come first. Figure out evacuation routes/family plans, emergency contact information, as well as who and what is going with you- do all this well in advance of the emergency.

2. Have copies of your most important documentation, keep them safe in water tight containers or in ziploc bags. Putting Braille labels on things for your own sake, can help keep you organized if you need to find something in a hurry on your own. Some examples to include are: medical prescriptions and records, social security cards, birth certificates, passports, military ID’s, mortgage documents, and even proof of your current address. Just remember to keep these copies safe and secure at all times, including when it’s not Hurricane season.

3. Have a network of neighbors, friends, and family that can alert you to emergencies and evacuation orders when you’re not aware. Having someone give you a warning call can give you precious extra time get out and stay safe. This network should also know how to contact you after you evacuate due to a hurricane.

4. Keep the car’s gas tank full. You never know when disaster will strike, during Hurricane Season be extra vigilant in how often you and your family fill the family car up with gas.
Having a full tank of gas means having one less worry during a stressful situation. You may not be driving the car, but you feel just as responsible for its passengers.

5. Keep a Hurricane Kit or go-bag in the car. We’ve provided an example of what we’d pack below, but agencies like the Federal Emergency Management Agency and the Red Cross, suggest packing for what you and your family would need to survive for three days after a disaster.

6. Pack an extra cane. If there’s any assistive devices that you absolutely couldn’t live without, grab these on the way out— but only if you have time! You can always replace technology, you can’t replace a life.

7. Set aside and mark or label some money that you can use during an emergency. Credit and debit cards might not work, especially if the power is out. Having money set aside like this can help you keep on top of things; not having to rely on someone to tell you what denomination a bill is will also give you piece of mind.

8. Make plans for your service animal as well. If you have a seeing-eye dog, think about alerting the shelter where you plan to evacuate to that you have a service dog before hand. Think about bringing food and water for your service animal too. This is also going to be a stressful time for them, so this forethought will give you both some comfort (Braille Works, 2015).

Second List from Braille Works

1. Get in touch with your local fire and police departments in advance and let them know a person who is visually-disabled is residing at your address. This will allow officers to take the proper precautions while responding to your call.
2. Meet with your neighbors and coordinate a contact-plan. Promise to check-in with each other when bad weather is on its way, regardless of whether you are in town or not. This will keep your neighbors from spending valuable time looking for you if you’re not home. This also allows you to receive a “warning” phone call from people who care about your well-being just in case you’re not aware of the approaching storm(s).

3. Contact close family and/or friends to inform them of when and where you’re taking shelter. Check-in with each other periodically. They should know the exact location in your house you will be taking shelter. If necessary, they can contact emergency officials on your behalf.

4. Pay close attention to the local news and weather forecasts during hurricane season. Do your best at staying aware of any upcoming weather related events by having a NOAA weather radio with an emergency alert system that goes off automatically whenever there’s an emergency in your area.

5. Keep the weather radio in a centrally-located place where you can easily hear it. If your budget allows; it’s also a good idea to have a second radio in your safety area, the place that you plan to take shelter during a hurricane. Make sure to purchase only “wind-up” radios that don’t require batteries. This way you won’t be dependent on batteries when the electricity goes out.

6. Beware of using headphones around the house during tumultuous weather patterns as it will keep you from hearing what is going on around you and in your area via the TV, radio and mobile devices.
7. As long as you still have electricity or an internet connection; utilize social media to state your whereabouts and condition. Keep people updated so no one worries about you.

8. Emergency drills should be practiced with your family in advance. Knowing where to go in times of emergency is very beneficial and could save a life in extreme cases. Designate one person to be in charge of rounding up any pets. Guide/service dogs are usually kenneled at night or sleep close by so it won’t be difficult to get their attention.

9. Make sure you have up-to-date emergency food rations and water. Store these items in or near your shelter area, not in your kitchen.

10. Store your flashlights in handy places. Your best bet during a hurricane is to have wind-up flashlights rather than ones that require batteries. Flashlights can be a big help in rescue efforts.

11. Keep your cell phone and other mobile devices close by. This step is simple since most of us always carry our phones in our pockets or purse. Obtain spare chargers for your devices and store them in or near the shelter area. It’s wise to have a basic land line in your home for communication as well in case cell service is unavailable. Remember that if you have a cable phone service a power outage also means no phone service.

12. Keep your wallet or purse and medications near so you can take them with you when seeking shelter. Or you can simply move them to your shelter location as soon as a hurricane watch is announced.

13. Store an extra white-cane near your shelter location and/or bedside. This way if you need to evacuate, you’ll have your cane with you without having to search for it.
14. If your home has a security system, get a key fob with a panic button (shown below) and keep it accessible. Key fobs are useful when trying to alert rescue personnel to your location.

15. Trim trees and bushes around your home in an effort to make them more wind resistant.

16. Consider investing in a home generator. This isn’t essential, but home generators can save you a lot of stress in the event of a prolonged power outage.

17. If you work in an office, make sure your co-workers are aware of your schedule so they can warn you if you’re not already aware of evacuation orders. Try to keep a radio or television on during hurricane season if your employer allows you to do so” (Braille Works, 2016).

List of Needs of People with Disabilities as Described by Kailes and Enders (2007) for Emergency Managers

C-MIST:

- Communication
- Medical needs
- Maintaining functional independence
- Supervision
- Transportation
REFERENCES


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