The Perfect Storm: A Narrative of Environmental Injustice in the United States Caribbean Territories post-Hurricane Maria

By
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Department of Environmental Science
Allegheny College
Meadville, Pennsylvania

April, 2019

Submitted in fulfillment of the senior thesis requirements of the Department of Environmental Science at Allegheny College and approved by the senior thesis committee.

	4/29/19		30 Apr 19
Prof. Matthew Bethurem	**Date**	**Prof. Nicole Gross-Camp**	**Date**

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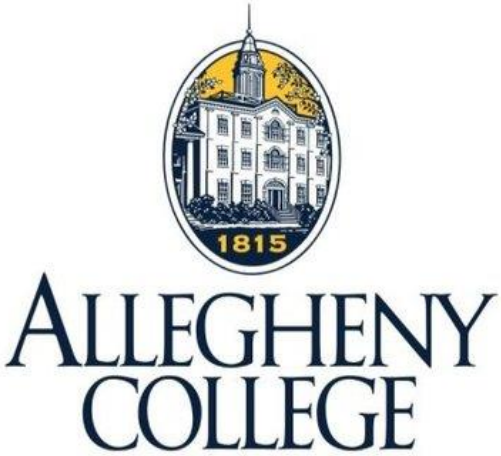
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Pledge

Name: Julia P. Foltz Date: Spring, 2019

Major: Environmental Studies
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Title: *The Perfect Storm: A Narrative of Environmental Injustice in the United States Caribbean Territories post-Hurricane Maria*

Abstract

This project explores the issue of environmental justice within the United States Virgin Islands, particularly St. Croix, after being devastated by Hurricane Maria in September, 2017. Through a series of five semi-structured interviews with Cruzan residents, the goal was to get a true sense of the experiences of the islanders surrounding the event of the hurricane. This portion of the project tells the story of the experiences that these people have suffered over the past year due to natural disasters and other environmental impacts exacerbated by climate change. Later, this report also reviews the response of disaster relief efforts, the recognition of St. Croix and other islands in the Caribbean as a vulnerable region, and the disparities between this recognition compared to similar disasters elsewhere in the United States. Overall, the responses show that these individuals in particular have felt the impacts of climate change through the devastation caused by Hurricane Maria, their perception that they are inherently vulnerable to these impacts, and their opinions on the need for initiatives in environmental action regarding climate change.

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Thank you to both of my parents, without you my experiences at Allegheny would not have been possible. Thank you to my Mom for always pushing me to be the best student I can be and never failing to be there with the advice that comes with being the successful academic that you are. The sacrifices that you make for me will never go unappreciated. Thank you Dad for always being a shoulder to lean on for support and for giving me the inspiration for this project. This could not have been done without all of the work you put in to helping me.

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Finally, I give my highest praises and thanks to my interview participants. Without your contributions, none of this research would have been possible. You have found it within yourselves to talk to a stranger about experiences that no person should have to go through, and did so in order to contribute to a greater understanding of climate change as it relates to the everyday struggles of people around the world. For your time and effort you have received my utmost gratitude.

I would like to dedicate this study to everyone in the US Virgin Islands, Puerto Rico, my family in Puerto Rico and Florida, and every Caribbean Island resident who endured the suffering of the 2017 hurricane season. Your strength is admired and your experiences will not go unnoticed. Hopefully this project does this community justice in the efforts to educate and hopefully end climate change.

Introduction

Environmental Justice and Racism

Environmental justice embodies the idea that any person or community, regardless of race, color, nationality, or income, should have the right to be protected from environmental hazards and should be involved in environmental decision-making (EPA, 2019). Particularly in the United States, there have been many distinct examples of environmental injustices over the years, including racial and ethnic minority communities being subjected to landfill toxins that would never be placed near a mostly white suburban area (Bullard, 1993; Zimring, 2015). Another, more recent example of this form of injustice has been seen with regard to pipelines being installed on the lands of Native American populations, which threatens their natural and sacred ecosystems. These populations are targeted for such projects in part due to the fact that many indigenous communities in the US are considered sovereign nations separate from the US government. Because of this, they often lack the governmental legislature, resources, and support that states and counties receive in order to push back against projects like pipeline installations (Harper and Rajan, 2004). While many environmental hazards and issues, such as natural disasters, are beyond the human control, many environmental injustices in the world stem from historical patterns of social inequities between human beings. Marginalized groups including minorities, low-income residents, and rural populations are likely to experience more of the burden of anthropocentric-driven environmental degradation because of long-lasting discrimination and oppression (Schlosberg, 2007). The areas that these injustices are occurring in are often extremely polluted, overpopulated, and not managed very well in terms of sanitation and resource quality (Bullard, 1993 and Bullard, 2004). In the case of natural disasters, this can cause negative impacts on affected communities such as lack of both efficient and sufficient relief efforts, delayed restructuring initiatives, as well as significant recognition from governments and the media (Schultz et. al, 2019; Smith 2016; Veenema et. al, 2019).

With the increased warming of the earth comes the increased risk to everyone on the globe from impacts including sea level rise, increase in storms, ocean acidification, respiratory illnesses in people living in dense cities, the list goes on (Mooney, 2007; Letcher and Vallero, 2013). Mooney (2007) utilizes the well-known work, “The Tragedy of the Commons” by Garrett Hardin, to explore the idea that the actions of the world’s most overdeveloped nations have significant impact on the rest of the world that everyone shares, with developing nations (mostly in the Global South) receiving the brunt of the risks while the Global North reaps the benefits of

continuous development (Hardin, 1968; Mooney, 2007) Overdeveloped (highly industrialized, economically prosperous) nations such as the United States and Canada are the largest contributors to global climate change, but, for example, the US has no effective national climate change policy (Held, et. al, 2011). On the opposite side of the spectrum, small island nations lack the necessary resources and societal structures such as balanced governmental systems and/or developed economies to deal with the increase in the prevalence of natural disasters such as hurricanes, earthquakes, and droughts, that they are more likely to experience (Mooney, 2007; Letcher and Vallero, 2013).

While many small island nations and other vulnerable communities have tried to develop methods to deal with these environmental hazards, or are trying to make the switch to better climate change mitigation policy, many efforts are not supported economically by the government and policy makers, and they continue investing in more capitalist and economic interests instead in order to continue development and growth (Paavola, 2005). For example in St. Croix, which is part of the US Virgin Islands, a large part of their economy relies heavily on the ecotourism industry, which focuses on the surrounding coral reefs and bioluminescent bays. These habitats are suffering from the effects of climate change, such as coral bleaching from rising ocean temperatures and structural damage from frequent hurricanes. However with an already suffering economy, they are unable to address many of these issues due to the risk of slowing down business, which would be caused by limiting the amount of activity around the reefs necessary for rejuvenation (Silva, 2018).

Review of Relevant Literature

For this study, it is important to examine the importance of perceptions of climate change and recognition of vulnerability among people who are experiencing climate change impacts and/or are residing in areas that are inherently vulnerable to climate change impacts, in this case small island nations. Du Bray and colleagues (2019) conducted a survey across almost 300 residents of small island nations about their emotional responses to climate change. The study found that the most common emotions expressed were both anger and sadness, and participants cited concern over the climate change impacts to their islands, concern for future generations, and personal experiences with climate change impacts as reasons for their emotional response (du Bray et. al, 2019). Another study was conducted by Allen (2007) in the wake of Hurricane Katrina, which heavily impacted New Orleans, Louisiana in 2005. Allen conducted interviews with public health officials, who stated that residents had negative

perceptions of public health organizations and state officials who neglected serious issues and concerns such as contamination and problems with debris disposal (Allen, 2007). Sovacool (2012) conducted over 50 semi-structured interviews with local residents of the Maldives, a nation of collective of small islands located in the Indian Ocean, about climate change perceptions and impacts. He found that 97% of respondents reported beach erosion, many reported observation and concern over coral bleaching and increased storms and drought, and many of the reports of concern came from residents in the smallest and lowest-lying (elevation) islands (Sovacool, 2012).

United States Caribbean Territories

The official website for the United States Department of Homeland Security defines a territory as “a partially self-governing piece of land under US authority. They are not states, but have non-voting representation in Congress and House of Representatives. With the exception of American Samoa, they are considered US citizens.” (USCIS, 2018).

All three of the current United States Virgin Islands (USVI) were historically owned by Denmark starting in 1733. In 1917, the US purchased St. Thomas, St. John, and St. Croix from the Danes, and they were developed for tourism following the Second World War. This tourism industry now particularly focuses on eco-tourism, highlighting historically biodiverse areas such as coral reefs bioluminescent bays, as well as sustainable agriculture (Britannica, 2018). The population of the USVI is over 75% African American or non-Hispanic black, while a large percentage of other residents are white, mainly Americans or Danes with second homes on the islands (Britannica, 2018). This demographic dynamic creates some disparities among the islands’ residents, as many of the white upper-class citizens live in luxury homes while the majority of the rest of the population consists of low socioeconomic status (Britannica, 2018).

Hurricane Maria

On September 19th and 20th, 2017, Hurricane Maria struck the islands of St. Croix, St. Thomas and St. John. This occurred while the latter two islands were still reeling from the category 5 Hurricane Irma, which came through the islands only two weeks earlier, and with St. Croix low on emergency supplies after sending the majority of their resources to St. Thomas and St. John (Andersen, 2018). With little time to prepare in between the storms, St. Croix was left without electricity in all of the homes, schools, and the lone hospital on the island. Power

was not completely re-established on the whole island until early February, 2018- almost six months later (Berríos et. al, 2018; Vandermeer, 2017; Zorilla, 2017). As of two weeks following the hurricane, only 54% of the population had access to clean water, the hospital was forced to establish make-shift operation rooms and birthing units, and had to deal with the slow coordination relief efforts of the US government (Zorilla, 2017). All of the beaches within the USVI were leveled, hillsides succumbed to landslides, and the canopies of the rainforests suffered immense damage which will contribute to the damage of ecosystems and loss of biodiversity to an extent that is still to be fully determined (Berríos et. al, 2018).

The goal of this project is to provide a narrative of the residents of St. Croix in regard to their experiences of Hurricane Maria. Through the use of semi-structured interviews, the focus will particularly be on their experiences of the actual event, along with their opinions of the effects it had on their environment. Additionally, I want to explore the people's opinions on the inequities surrounding climate change justice, and how this has influenced their perspective on their environment and relationship with the environment and the world. This will be done in order to draw focus to the effects that climate change has on disenfranchised populations, particularly addressing the increased amount and severity of natural disasters.

Methods

In order to gain a deep understanding of the experiences and perspectives of the people in St. Croix who survived Hurricane Maria, I conducted a series of semi-structured interview questions designed to allow for interviewees to appropriately reflect on their experiences and to converse in a way that allows them to freely discuss their stories. Interviews help ensure that the data collected truly reflects the depth of these individuals' experiences, which cannot be obtained through survey questions. The interviews are focused on the experiences of individuals during and following the hurricane, as well as their opinions on relief efforts and climate change issues. The interviewees come from a variety of occupations and socio-economic backgrounds including a professional artist, a farmer, pharmacy technicians, and a government employee.

Because this research could not physically be conducted on the islands, I conducted the interviews over the phone. Through the association of a personal contact who lived on the island during Hurricane Maria, I was put into contact with individuals who live or have lived on the island. After being provided initial contact information with the interviewees, this person had no further

participation in the study and had no access to the data that was collected. A snowball sampling approach was also used to secure additional interview subjects, with each interviewee being asked if they could recommend another St. Croix hurricane survivor that might be interested in participating in the study by serving as an interview subject.

The interview questions (see Appendix A) asked participants to provide non-identifiable demographic information. Additional questions asked about basic knowledge relating to environmental issues, specifically climate change, and natural disasters, as well as asking questions meant to uncover environmental justice issues and opinions on these kinds of issues in relation to the experiences of each interviewee.

A total of five interviews were recorded using the TapeACall recording app installed on my personal cellular device. This allowed me to keep recordings of each interview. All interviews were transcribed verbatim using Express Scribe transcription software. Concluding the completion of the interviews, I coded the qualitative data gathered from the interview responses based on analysis and coding methods created by Schmidt (2004), in which emphasizes developing one's own coding methods based on a formulation of material-oriented analytical categories. The coding and analysis process began with careful reading and re-reading of the transcriptions in order to determine potential themes that could be explored. I not only analyzed the responses for similar topics, words and phrases, but also looked at responses that contradicted one another across the five interviews, and answers that I found surprising or did not expect based upon the findings of previous studies. Each of the thematic categories that were determined were coded differently based on the types of responses given by the respondents. I determined four themes for analysis: Environmental destruction, opposing views on relief efforts, concern for climate change, and recognition. For the Environmental Destruction theme, I coded for words and phrases that particularly described the physical appearance of the environment after the hurricane. For Opposing Views on Relief Efforts, I coded to find contradictory opinions that highlight both positives and negatives of disaster relief for Hurricane Maria. In the Concern for Climate Change Category, I looked to see if the respondents identified particular climate change issues and their impacts on St. Croix, as well as whether they gave personal suggestions for environmental actions. Finally, for Recognition, I identified whether or not the respondents appeared aware or concerned about the vulnerability of small islands to climate change impacts, as well as phrases indicating if they feel recognized by other parties (the government, for example) as being inherently susceptible to climate change impacts.

Results

Environmental Destruction

This section shows the importance of the subjects' perspectives on what they witness outside after Hurricane Maria. The theme of their view of the destruction of their environment and how they feel about it encapsulates the severity of natural disasters and their impact on communities. Throughout the interviews this has been the topic in which some give their most in-depth responses. Analysis revealed many common answers between multiple participants who described the island's biodiversity and environmental importance, and connecting this to their feelings of shock and despair of the damage they saw to the environment after the hurricane.

> *"Prior to the hurricanes we had a major drought. And that debilitated the island to a low point and just when the island was getting itself back from that impact on the environment, we had the impact of the two hurricanes. It was mass destruction of the island within a five-year span" - Subject 4*
>
> *"You know it's just brown. Everything is just brown. Our island is always so green and now it's brown." - Subject 1*
>
> *"I don't remember seeing a single leaf on the trees, it was almost unrecognizable." - Subject 5*
>
> *"As we drove down the road, I could see that people's roofs were gone and I started to panic. As I got to my house, I could see that my neighbor, his roof had flown off and landed on top of my car… I was lucky that I only had a broken window and my porch bannisters blew off. To me the people who were really effected were the ones whose houses were not up to building codes." - Subject 3*
>
> *"My house was completely destroyed, I am now staying at my farm." - Subject 4*

Experiences regarding one's own property highlights the impact on individual lives and wellbeing. In particular, the adjectives they use to describe their environment are anything but what someone would normally expect. The most commonly used words were "destruction" and "devastation."

"I mean it was severe devastation all over the island."- Subject 5

"It was carnage, total carnage. That's the best way I could describe it."- Subject 2

"It was complete chaos and destruction."- Subject 4

"It looked like a warzone."- Subject 2

Opposing Views on Relief Efforts

An important part in the event of a natural disaster is the response in relief efforts. In the case of St. Croix, which is a small island, relief efforts are imperative to the residents there, many of whom are unable to just pick up and leave to go to the mainland US states in the event that there is too much extensive damage on the island. The responses to the relief efforts in within the local government and FEMA varied across the responses, and reflect both positive and negative opinions.

"I think the federally funded programs… they were a little disappointing because they gave people this hope… but would have to wait months for their homes to be fixed." – Subject 1

"I think it was pretty terrible because no one was expecting the amount of damage that happened. Most of the efforts were reactive instead of acting. Roofs are gone and we need tarps, but there wasn't enough tarps, and then it took weeks for more tarps to come" -Subject 2

"I would have to say that the response was way better if you want to compare it to Hurricane Hugo." -Subject 1

"Everybody was kind of helping everybody, and it was that unity that brought us together" -Subject 4

The opinion on relief efforts is one to make note of, particularly because of the contrasting opinions of federally organized relief efforts and between local efforts. Some were luckier than others in terms of receiving power back, such as Subject 2. They lived very close to the hospital where he worked, which received top priority in power line restoration. Meanwhile, other residents such as Subject 4, had to wait months for their homes to be inspected and repaired. The interviewees' responses allowed insight into the possible inconsistencies surrounding the relief efforts on the island, as well as the opportunity for discussion into the recognition of the damage to the island and its residents by the US government and FEMA.

Concern for Climate Change

Responses in regard to this topic were met with varying degrees of understanding from respondents. Answers ranged from passionate to aloof and disconnected. Interview Subject 1 by far provided the most emotionally-driven argument for their concern about climate change, while Subject 3 was honest about their lack of knowledge or awareness of environmental issues.

Subject 1:

"It doesn't make any sense to me, like, the way we go about using oil. We have so many other things we can try and use oil, and I know it's based on economics."

"There are so many resources we can use to cut back (on emissions) and prosper, but instead we want to continue to make the people in command richer."

Subject 3:

> *"I just like, take it (climate change) into consideration. It's not that I'm not concerned about it… when I'm at work I'm indoors all the time, so I'm not aware of what's going on."*
>
> *"... There's a change in the sea. There's sometimes a discoloration or the waves, the wave level is really high."*

Recognition

The intensity and frequency of hurricanes exacerbated by the effects of climate change is the type of environmental issue that negatively impacts small island nations and territories like the island of St. Croix. Governments, administrations and organizations recognizing these impacts and the vulnerability of certain people and territories to the effects is extremely important when looking at decision-making regarding environmental issues and natural disasters. It is also important to examine is the recognition of vulnerability and impacts by the people themselves. The quotes below show that the interviewees have been experiencing or witnessing drastic changes to their local environment that have been brought on by the effects of climate change.

> *"Our water is getting polluted at an exponential rate, its poisoning our fish, fish we have to eat. We live on an island, the more the water rises, the worse we are going to be." - Subject 1*
>
> *"It's like some people, they kind of ignore the warnings because they're a little superficial thinking 'Oh it will pass, we're going to be good." -Subject 3*
>
> *"Climate change affects the temperature of the oceans and as the oceans increase in temperature, I think there is definitely a correlation to the strength of storms like hurricanes. So I think climate change has significant impacts on islands like St. Croix.*

Those living right on the coast and in the lower-lying areas, I'm sure it's (climate change) is a significant worry for those people as well." -Subject 5

Almost all of the responses from interviewees reflected an acknowledgement that climate change has negative impacts specifically on small islands like St. Croix, and therefore makes them more vulnerable in terms of more frequent hurricanes and other environmental impacts. There are also some viewpoints that show that not everyone may be aware of this vulnerability or susceptibility to harmful environmental hazards.

"I don't think people are relating the two (Hurricane Maria and environmental issues). I think most people think "Oh it's just another hurricane and this time it was just bad." -Subject 2

"Basically I'm indoors all the time for work so I am not aware of what's all going on outside." -Subject 3

Discussion

Environmental Devastation

The responses recorded from all five interviewees showed a strong connection between their experiences during Hurricane Maria and the effects that the hurricane had on their environment. Some of the answers demonstrated an in-depth knowledge of the islands ecosystem and its functionality in relation to the hurricane's impact, while others focused on the destruction that it caused to their homes, schools, and roadways. The US Virgin Islands, along with the rest of the Caribbean, have a long-standing history with environmental disasters, given their location and warm climate and increasing ocean water temperature (Britannica, 2019; Smith and Rhiney, 2015).

In addition to the ecological damage from the hurricane previously mentioned in the introduction, some responses indicated that the island was already struggling ecologically from other environmental events prior to the hurricane. St. Croix and other Caribbean islands are most vulnerable to droughts and hurricanes/tropical storms (Smith and Rhiney, 2015). While these two weather events appear to be on opposite sides of the spectrum and therefore balance each other out, the back-and forth of these extremes leads to extensive damage to the islands ecosystems in such a way that it is unable to adequately recuperate and function normally (Smith and Rhiney, 2015). This predicament was described to me by Subject 4 in their interview. Many responses highlighted in the results section reported the differences in the appearance of the island, stating that the island looked browner as opposed to green, and that there was a significant number of trees lost and damaged. These reports are similar to the findings in the research conducted by Álvarez-Berríos and colleagues, who confirmed that the Caribbean lost approximately 31% of its greenness (defined as leaf area, canopy cover and structure) after Hurricanes Irma and Maria (Berríos et. al, 2018). St. Croix is home to a few federally protected parks and ecosystems, including the Buck Island National Reef Monument and the Salt River Bay Historical Park and Ecological Preserve (Lavasseur, 2018). The storm caused immense sediment displacement and debris in and around the reefs, as well as the sinking of approximately 90 boating vessels in the area that also caused damage (Lavasseur, 2018). Both Subjects 1 and 5 specifically discussed the impacts that hurricanes and climate change have on the coral reef systems and other ocean ecosystems. The damage done to these ecosystems also inflicts negative impacts on St. Croix's economy which relies heavily on eco-tourism of sites such as these (Silva, 2018); this will be discussed later in this section.

All of the respondents reported damage to their private homes and personal property, as well as damage to the places where they were residing during the actual storm if they chose to temporarily stay elsewhere. These damages ranged from broken windows and flooding rooms to complete destruction of roofing or to the home as a whole. Subject 4 stated that their home was rendered unsafe to live in: *"My home was completely destroyed so I know reside on my farm."* While only two of the subjects specifically mentioned power loss in their homes, the whole island of St. Croix was left without power unless one owned a backup generator, which are very expensive and can only be run for short amounts of time (Silva, 2018). The power outages caused by the hurricane also led to other hazardous problems on the island such as disruptions in water and sewage treatment facilities, which polluted streams and caused health risks to residents (Silva, 2018; Veenema et. al, 2019). The perceptions of the interviewees in this study this event is not a representation of the experiences of the Cruzan population as a

whole. However, by being able to tell of their experiences with the hurricane and what they saw happening to their ecological and personal environments, helps bring attention to how these disasters affect the individual person and individual families as well as examine how climate change-driven hurricanes negatively impact small islands like St. Croix.

Positives and Negatives of Relief Efforts

The relief efforts for Hurricane Maria in the US Virgin Islands is a topic of much contention (Einbinder, 2018), and the responses from the subjects reflected some of this as well. Two of the respondents seriously criticized the government aid, which was through the Federal Emergency Management Agency (FEMA), stating that the response time was slow and that many people had to wait for supplies like tarps and for support in getting their homes repaired. The other subjects also acknowledged the slow response time, but attributed it to the fact that island was still recovering from Hurricane Irma and sending supplies to St. John and St. Thomas to help with those efforts. This is congruent with the findings from Allen (2007), who also found in their interviews that the residents of New Orleans felt unsupported and not recognized by health officials and the local government in terms of relief efforts following Hurricane Katrina. The subjects also made many comparisons between Hurricane Maria and the last category five hurricane to hit the island 28 years prior, Hurricane Hugo, stating that this time they felt the island was more ready in terms of preparation, more up-to-date building codes, and managing local enforcement. Many cited these reasons as to why the relief efforts were more organized, however that the aid they received from the US was still not efficient in time or sufficient in amount, particularly when you compare the aid that the USVI and Puerto Rico received compared to similar events in other parts of the US.

There are significant disparities between the amount of relief aid given to the USVI and Puerto Rico compared to Texas and Florida which were hit by Hurricanes Harvey and Irma, respectively, within the same 25-day span. According to research conducted by Nicole Einbinder for PBS Frontline, based on information she gathered from FEMA, there are very large differences between the amount and types of aid given to the two states compared to the Caribbean territories. The first kind of aid was basic supplies like meals, water and tarps, with the biggest difference being in tarps. Compared to Texas, PR and USVI received four times fewer tarps, even with over one-third of the homes having being severely damaged or destroyed (Einbinder, 2018; FEMA, 2017). Subject 2 also commented in their interview that there were not nearly enough tarps to go around, and what tarps they did receive were not distributed quickly

or were not delivered to the island until several weeks after the storm. With so many homes destroyed, there also needed to be federally-funded housing assistance given to residents who required immediate reconstruction of their homes. Residents in Texas were able to get on average, approximately $7,000 per household, which is much higher than the $3,000 offered to residents in the Caribbean who were able to receive it, as only about half of Caribbean residents who applied for housing assistance were approved by FEMA (Einbinder, 2018). One subject stated that the people on St. Croix had to wait months for anyone from FEMA to review and reconstruct their homes.

Determining and utilizing the perceptions that natural disaster survivors have on the relief efforts they receive is imperative to improving future relief efforts as well as preparation efforts. However, the perception of local and community disaster relief is much more favorable and optimistic. Subject 3 and 5 praised local law enforcement and fire departments for ensuring that the roads were kept as safe as possible and also by establishing a curfew which not only allowed for safer travel but also helped prevent looting of stores. Subject 4 described how they, along with numerous amounts of other Cruzan residents, found comfort and relief in volunteering for local organizations that helped with distribution of supplies. Some of the comments on this included, "*Everybody was kind of helping everybody,*" and, "*It was that unity that brought everyone together."*

Concern for Climate Change

An important part about addressing climate change issues is local acknowledgement of these issues and the effects that they have to personal livelihoods as well as their surrounding environment. All of the respondents provided insight into their personal observations of climate change impacts on St. Croix that are harmful to their environment, including coral reef bleaching, warming ocean temperatures, and an increase in hurricane activity and severity. The majority of the interviewees also reported being concerned about climate change and the future affects that it may have on St. Croix, with Subject 1 making particular points about the use of fossil fuels and the inequalities that come with emissions and capitalism. My findings of the responses in regards to concern about climate change are congruent with the findings of the du Bray (2019) and Sovacool (2012) studies on climate change perceptions. Both studies found there to be legitimate concerns for climate change impacts among residents of island nations, with du Bray citing emotional responses, particularly when it comes to the impact that climate change on future generations of islanders (du Bray, 2019). Sovacool (2012) found that people

reported concern over coral bleaching, rising sea levels, and losing fish to ocean temperatures, which is similar to responses from Subject 1. Only one subject reported not being overly concerned over climate change, citing lack of outside activity as the particular reason. Nevertheless, the responses provided by interviewees compared to the previous literature show that the perceptions and experiences of local residents in regards to climate change and the concern of the potential impacts to the island is important to take into consideration when looking at the vulnerability and subsequent environmental action of small islands.

Recognition

St. Croix, the Caribbean islands, and other small island nations around the world are an inherently vulnerable population when it comes to the impacts of climate change. Being a small island, St. Croix is at risk of coastal erosion from sea-level rise, and the increase of ocean temperatures has led to coral bleaching in federally protected coral reef systems as well as increased the frequency and severity of hurricanes (Lavasseur, 2018). The location itself of the USVI makes the islands vulnerable to hurricanes and tropical storms due to naturally warm ocean water temperatures and low wind shear, both necessary elements for intense hurricanes (Schultz et. al, 2018). Being an island already presents disadvantages as it makes it more difficult for residents to evacuate before the storm or to relocate after the storm (Schultz et. al, 2018). Subject 3 noted this in their response; *"Being on an island, you're just covered by water. You can't jump on a bridge, you can't jump from state to state like how people evacuated in the Florida Keys. We can't do that, we basically just have to ride it out."*

St. Croix also showed signs of being in an unfortunate economic position before the 2017 hurricanes even hit. Employment on the island was down 15%, and GDP down 27%, largely in-part due to the closing of the island's oil refinery in 2012, which contributed a substantial amount to the economy and also left many Cruzans unemployed (Bram, 2018). Subject 3 also mentioned in their interview that there are many people on the island whose homes and businesses were not up to the building codes implemented after Hurricane Hugo, and it was these buildings that suffered the most damage. The lack of affordable housing due to the expensive cost of development on St. Croix has been another part of how residents are more at risk for dangerous damage to their homes and livelihoods (Silva, 2018).

While the interviewees from St. Croix demonstrate an awareness of the impacts of climate change on their island, the recognition, or lack thereof, that is given by the outside world is also an important topic to examine. When many think of the 2017 hurricanes, Puerto Rico is

the place often comes to mind first. Like St. Croix, Hurricane Maria devastated the island, leaving thousands of people without homes and the whole island without power for several months. Headlines about Puerto Rico, Florida, and Texas were across news outlets daily, but there was very little coverage about the impact of the hurricane on St. Croix and the USVI. USVI Delegate Stacey Plaskett cited this as the reasoning for the lowering morale of the Cruzan people, feeling as though they are not acknowledge by the government or the American people (Scott, 2017). In part due to the USVI's status as a US territory and not a state, there has been a long history of disengagement from the government and the media, but also possibly in part to the fact that the USVI, and St. Croix in particular, is a predominantly black population directly from African or Afro-Caribbean descent (Scott, 2017; Gillum, 2018). In a letter to the editor of the Cambridge University Press in response to the Schultz study on the vulnerability of small island nations, Richard Gillum MD, makes a direct comparison between this issue with USVI and with the Ninth Ward of New Orleans after Hurricane Katrina in 2005, stating they share similar vulnerabilities and lack of recognition from media and government (Gillum, 2018).

Conclusion

Because these interviews were conducted as a method of data collection, it is important to note that the set of responses from these individuals should not be taken as representative of the experiences of everyone on the island of St. Croix. The results of the interviews are only meant to examine individual experiences of Hurricane Maria and personal perceptions of climate change justice. Some factors contributed to a smaller number of interviews conducted than as desired, including potential participants not responding back to inquiries and also the short window of time in which interviews could be conducted. Some of the interviewees struggled to speak on the feelings that they experienced during the onset of the storm, citing that the trauma of the event was difficult to relive and talk about. This led to some answers in that section of questions to not be particularly in-depth or emotional. Four of the respondents identified as a racial minority, were of lower socioeconomic status, and their jobs were significantly impacted by the hurricane. This made them considerably more vulnerable and therefore may have made them more inclined to give answers that were more critical of relief efforts and more concerned over climate change impacts. In addition, none of the participants were under the age of 35, so it is possible that they have considerably more knowledge of the impacts of climate change on local environments than someone who is younger. For future research it is important to interview a larger number of participants, in order to include more

individuals of diverse races and ethnicities, socioeconomic status, and ages, and therefore obtain a more diverse set of responses.

The results of these interviews show that residents on the island of St. Croix, USVI, have been significantly impacted by the destruction of Hurricane Maria, and are aware and concerned about the impacts that climate change has had and will continue to have on their island environment. Some have expressed the desire to for more effective environmental policy based on emissions, use of fossil fuels, and relief following hurricane impacts. Based on this study, I believe further research needs to be done which focuses particularly on climate change concern in the Caribbean. The responses in this study show that these individuals were overall concerned about climate change impacts on St. Croix, so therefore if this is a concern for many others in the Caribbean islands as a whole, it may be beneficial for future implementations of effective climate change policy. Furthermore, it should be of significant importance to look into possible routes and plans for environmental policy in the USVI and other Caribbean islands. Effective recognition and subsequent environmental policy in small islands is imperative due to their disengagement from governmental organizations and media and their vulnerability to the impacts of climate change.

Appendix

A.) Interview Questions:

1. Tell me a little bit about yourself. What is your;
    a. Occupation
    b. How old are you?
    c. What would you consider your race or ethnicity?
    d. How long have you lived on the island?
2. Please tell me about your experience during Hurricane Maria.
    a. Where were you?
    b. What did you see the next day?
3. What were your feelings during and after the storm? What do you think about the relief efforts that happened after Hurricane Maria?
    a. What about relief efforts within the island communities specifically?
    b. What about relief efforts that came from outside sources?

4. Please tell me what you know about climate change and its effects. How do you think climate change can affect small islands like St. Croix?
5. Is climate change an issue you are personally concerned about?
6. Has the experience with Hurricane Maria changed your previous feelings about the environment or environmental issues?

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