

CASE STUDY OF THE GOLD KING MINE SPILL

A Thesis
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

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In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE

Major Department:
Emergency Management

May 2018

Fargo, North Dakota

North Dakota State University
Graduate School

Title

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ABSTRACT

The Gold King Mine spill happened on August 5, 2015 near Silverton, Colorado when the abandoned mine was damaged during maintenance. This single, holistic exploratory case study uses document review and analysis to answer the research questions of what happened at Gold King Mine, how and why it happened, what was the response, and what are the implications of this event. The findings indicate that the Environmental Protection Agency's negligence, Colorado's lack of regulations on abandoned mines, and the town of Silverton's hesitance to be declared a Superfund site all contributed to the water contamination which negatively impacted the Navajo Nation. The research suggests this is another historic event that will further erode trust and relationships between the United States government and indigenous people. This work also creates a literature review of emergency management in the context of Native American communities.

Keywords: emergency management, disasters, Native Americans, indigenous, water contamination.

ACKNOWLEDGEMENTS

I would like to thank all the people and programs at North Dakota State University that made this research possible.

Thank you to my committee, Dr. Yue “Gurt” Ge, Dr. Daniel Klenow, and Dr. Donna Grandbois for your time and assistance. Thank you also to Dr. Jessica Jensen, Ms. Kate Ulmer, and to Dr. Donald Warne and the people of the American Indian Public Health program.

I would also like to thank Mr. William “Billy” Mills.

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1. INTRODUCTION

During the course of researching and writing this thesis, the Dakota Access Pipeline was given approval at the executive branch level for completion and became operational on June 1, 2017, despite protests that the pipeline poses an undue risk to the Native American land and tribal communities, including the Sioux and the Meskwaki. The Dakota Access Pipeline crosses near Lake Oahe, and therefore the concern is that a leak of any size will contaminate this and other tribal sources of water for drinking and ritual ceremonies.

Many have expressed concern at the building and location of the pipeline. Their concern is not lacking in basis or historical precedent. Unfortunately, the Native American community is familiar with environmental and natural disasters of all kinds that have been caused or exacerbated by the United States government, its colonists, and its agents, as will be demonstrated in the Literature Review. A history of relations between the groups will show that there is a historical precedent for these issues, and that traditionally there have been poor working partnerships between the Native Americans and the U.S. government, which will also be discussed in the Literature Review. This extends in particular to the profound and ongoing violation of trust that has occurred between indigenous communities and the United States government. This thesis will examine a water contamination emergency that has impacted indigenous people by performing a case study analysis of an emergency episode that has impacted Native territory and people in the Southwest region of the United States: the Gold King Mine Spill of 2015.

Coincidentally, this is not the first water contamination emergency that has impacted the Navajo Nation, or even the first in living memory: in 1979, a uranium spill occurred at Church Rock, with ongoing implications as that particular disaster continues to unfold. These two

episodes, nearly three and a half decades apart, are just two of many water contamination emergencies that indigenous communities have experienced at the hands of outside parties, i.e. the U.S. government and its agents. Undoubtedly, this has impacted trust and relationships and will continue to as each new chain of events triggered by the episodes continues to unfold and create new negative consequences. By examining news articles, EPA documentation, reports, and other sources that documented the Gold King Mine water contamination emergency, and viewing them through the paradigm of emergency management, key information can be found that points to important reasons explaining why the Native Americans have suffered such devastating outcomes.

Emergency management is made up of four phases: mitigation, preparedness, response, and recovery. While all four can be discussed academically as distinct phases, in practice there is overlap between the phases, and comprehending how these phases interact to produce various outcomes is beneficial for understanding how disasters unfold. The field of emergency management also seeks to understand through research and the literature how the interconnectivity and relationships between phases can help or harm those experiencing disasters. Poor disaster outcomes have been demonstrated in the disaster literature to have a strong relationship to poor response and preparedness, and this will be discussed in the Literature Review chapter of this thesis. The implications of this are significant: it means that conceivably, poor decision-making before a disaster has occurred can ultimately lead to a poor disaster recovery outcome, and thereby sentence a community to years or generations of hardship. Additionally, there are factors in the disaster literature that appear to have a strong relationship with a poor outcome, which will also be detailed in the Literature Review.

There have been demographic variables that have been demonstrated through the disaster literature to show poor outcomes in disaster recovery, and they are discussed in detail in the Chapter 2. These demographics include race, non-English speaking households, those with low incomes, and unemployment. These demographics apply to the Navajo Nation: they, like most Native American communities have experienced high rates of unemployment, low incomes, and a host of other sufferings as evidenced in the Literature Review where Native American history is discussed. However, these demographics alone do not tell the full story. There are other factors which play a role in the outcome of a disaster, and this thesis will examine them through the paradigm of emergency management.

This thesis will address the following research questions regarding the Gold King Mine spill episode in the context of the Emergency Management Cycle:

- 1) What happened?
- 2) How did it happen?
- 3) Why did it happen?
- 4) What was the response?
- 5) What are the implications?

By addressing these research questions, this thesis intends to explore the details of the Gold King Mine water contamination emergency through primary and secondary sources (e.g. news articles and EPA reports) that documented the disaster episode as it has unfolded. Additionally, this thesis will address aspects of vulnerable populations and discuss the events of the Gold King Mine Spill within the context of social vulnerability.

The case study probes the Gold King Mine spill through the paradigm of the lack of trust between Native Americans and the dominant culture. It describes the actions undertaken by

major actors in the event: the Environmental Protection Agency (EPA), the Gold King Mine administration, state governments (e.g. Colorado and New Mexico), and the Navajo Nation. It describes the tangible losses that the Navajo Nation suffered, as well as the intangible losses, such as the spiritual impact, the loss of confidence in the drinking water's safety, and the effects of strained relationships that suffered a loss of trust. The historical background of the Gold King Mine and what conditions led to the spill are also discussed. The case study also examines the political currents that heavily influenced the swiftly changing evolutions in the event's aftermath and outcome. This includes how the EPA made strong reversals in their communications, actions, and decisions.

The implications of the Gold King Mine Spill are also addressed through the paradigms of emergency management and indigenous peoples. They demonstrate how lack of trust was developed for the Navajo Nation, when clear communication and relationship building could have lessened the impact of the spill. As of this writing, there are thousands of abandoned mines across the western United States, with no clear plan to mitigate their collective hazard potential, and therefore the Gold King Mine spill is a repeatable event. Because abandoned mines are an unmitigated hazard that threaten such a wide expanse of territory, without adequate attention, policy changes, and due diligence, more water contamination disasters impacting Native and non-Native populations are almost a guarantee. The repercussions of this concern and the way this spill was managed are discussed further in Chapter 5.

There is a gap in the research literature that addresses the field of emergency management in the context of indigenous populations. This thesis aspires to fill the gap in the literature by conducting an exploratory case study of the Gold King Mine spill and how it impacted the indigenous population which suffered the brunt of the event. By examining how

this vulnerable population was affected, what caused this event to occur, and what the aftermath of this event appears to be, a better understanding can be achieved. Additionally, this case study and examination of the Gold King Mine spill can provide insight into the treatment of other vulnerable populations who have historically faced discrimination and marginalization, allowing both academic researchers and practitioners in emergency management to utilize the findings.

2. LITERATURE REVIEW

The literature review is divided by subject category and gives a background in areas related to the thesis. It begins with topics related to theoretical frameworks, NIMS, and the phases of emergency management. NIMS is discussed from the context of what it can and cannot do. It has facilitated solving some of the issues seen in emergency management but is not capable of addressing key issues that contributed to the Gold King Mine spill. Next, it contains a selected history of Navajo and other Native American historic events that have contributed to the conditions of life for many indigenous people today, and how this history relates to emergency management. Issues of trust and social vulnerability follow, including marginalized groups in emergency management and significant variables for disaster outcomes, i.e., demographic variables that tell the story for how an individual or household will likely fare in the aftermath of a disaster. Finally, the Literature Review concludes with issues with communication and disaster-related decision making, followed by closely related material: issues with credibility and trust in the messenger and official parties.

2.1. Emergency Management Theories and Principles

2.1.1. Theoretical Frameworks of Emergency Management

A key part of this research involved examining the actions of the Navajo Nation when presented with little risk warning information, of perceived dubious quality, and how the lack of trust influenced the outcome of the Gold King Mine spill. Choice-making and reasoning in disasters falls under classic theoretical frameworks for the emergency management field. Examples of the theoretical frameworks for much of the emergency management risk and warning literature are the theoretical framework of collective behavior; the theoretical framework of rational choice theory, and the Protective Action Decision Model. The theoretical

framework of collective behavior is the sociological study of how large groups of people behave and is a key framework of understanding disaster-based behavior, i.e. that groups in disasters are not inclined to self-serving behaviors or mass panic, but will generally remain rational and will make appropriate choices in a responsible manner (see: Goode, 1992; Miller, 2000). While not directly part of the emergency management core literature, a key social science foundation -- rational choice theory -- is prominent in economics and the study of human behavior when viewing choice making through the perspective of limited information and resources, and is thus applicable to emergency management decision making behavior, e.g. whether to use dubious quality water to irrigate crops versus risk losing them altogether, or heed warnings from sources perceived as untrustworthy (see: Becker, 1962; Elster, 1989). Finally, the Protective Action Decision Model (PADM) is the foundational framework upon which much of the disaster literature is built and where in the literature this study would be included (see: Lindell & Perry, 2012). A meta-analysis paper that discusses the application of the PADM model is Huang, Lindell, and Prater (2016), a study that examined 38 other studies involving real-world responses to hurricane warnings and 11 hypothetical warnings. Understanding the thought processes behind risk warnings and communicating protective action behavior will allow researchers to continue to build on this foundational work. These theories are applied to empirical studies in emergency management by creating the base for which present and future research can be established. The theoretical frameworks establish where the literature is defined and helps to guide the research questions of this study by providing the informational context necessary to determine gaps in the literature and attempt to fill them. Much research has been done pertaining to these theoretical frameworks but there is more to conduct, and this study attempts to fill the gap in the literature, especially of understanding the importance of trust in protective action, risk

communications, and warning literature, and how the underserved population of the Navajo Nation and other marginalized groups interact with the dynamics of emergency management.

2.1.2. What NIMS Can and Cannot Do

Some of the EPA's After-Action Report remedies for its emergency management procedures fall in line with NIMS protocols and procedures, and while these remedies are expected to be an improvement, NIMS is not designed or expected to handle all issues stemming from emergency management deficiencies. NIMS will address certain problems in preparedness and response, as will be discussed in this section, but will not solve issues of historic mistrust, cultural conflicts, social vulnerability, or hazard vulnerability.

NIMS was built on the foundation of the Incident Command System, which came about from fighting wildfires and was developed by firefighting professionals (Jensen, 2010). The National Incident Management System (NIMS) came about from the aftermath of the 9/11 terrorist attacks and became a priority for the country's emergency management system (Jensen, 2010). NIMS was meant to correct areas of vulnerability in the national emergency management system (Jensen, 2010). However, while NIMS may clear some issues that were apparent in the country's emergency response system, it cannot always address all issues all of the time.

NIMS was mandated by the Department of Homeland Security at all levels of emergency management (Department of Homeland Security, 2008). DHS describes NIMS as an all-inclusive, all-hazards approach to managing incidents (Department of Homeland Security, 2008). It provides principles and a framework that gives standardization, interoperability, and coordination for different levels of emergency management in the country (Department of Homeland Security, 2008). NIMS also intends to bring together a variety of stakeholders from government, NGOs, the private sector, and community leadership, and provides them a structure

so that they may work together. However, despite the ambitious objectives of NIMS, and the principle that any measure of hierarchy, organization, and structure is almost certainly better than none, NIMS is not always able to successfully address key patterns that occur in response. Some of this can be due to the fact that some components of NIMS such as the *National Response Framework* (NRF) are more of a vision document rather than an enforceable mandate (Department of Homeland Security, 2016).

Interagency coordination issues are an important pattern in disaster literature (Kearney, 1972; Quarantelli, 1978; Grant, Hoover, Scarisbrick-Hauser, & Muffet, 2002; Ponting & Quarantelli, 1973). In most cases, NIMS will address this well, as this is precisely what it was originally designed to address. Often, the issues with interagency coordination can be boiled down to lack of trust and experience working together. More relationship building and practice with planning, training, and exercising will resolve a lot of this. There will still be some issues where groups who rarely have to work together will have to in the future (see: Grant et al., 2002) but as groups get more practice, that practice will be somewhat ‘transferable’ – meaning, that the more experience one accrues, the better one will be able to handle any kind of emergency and disaster response situation, irrespective of what the particulars may be. The required drills, exercises and creation of plans through NIMS makes this possible and requires people to step through the paces and give consideration to the process and the results.

Language and cultural issues are a recurring issue (McEntire, 2001; Morrow & Ragsdale, 1996). NIMS does not really have the provision to deal with language and culture barrier issues, and this is unfortunate, as this is a growing area of concern in the increasingly multicultural environment of the United States. As it currently stands, NIMS does not address this, but changes could be made that better enable the emergency management field to overcome this

challenge. Planning and training would be the two areas that would likely provide the most benefit for this, and therefore a training package for emergency management professionals teaching them the fundamentals of intercultural communication and cultural sensitivity might provide a better backdrop for this. Clearly, there are no training courses that can practically overcome language barriers (beyond language lessons, which take time and a great deal of dedication), but providing planning and preparedness materials publicly in languages appropriate for one's territory is a way that outreach can be made to those who might not be included or understand hazards, risks, and warning communications otherwise. Additionally, one can factor in probable language and cultural issues that would be encountered in a disaster scenario into exercises. These activities can be undertaken well in advance of disasters and would be the best ways to address these issues given that NIMS does not currently provide much assistance in this area.

Building relationships is critical for response (see: Ponting & Quarantelli, 1973; Grant et al., 2002). NIMS encourages this, albeit indirectly. There is no good or practical shortcut for relationship building; they can only be built through positive exposure and duration. Relationships are built through time and through planning, training, and exercising together, and since NIMS promotes this, it stands to reason that relationships will likely be built on this foundation assuming that experiences go relatively well. Even in cases where good relationships are not built, familiarity is at least established, along with knowing the particular idiosyncrasies of other participants and stakeholders in the response mix. Consequently, this should go a long way towards addressing the issue of building relationships. Interagency coordination and communication is essential, but requires more planning, training, and exercising over a period of time in order to build these essential relationships.

Probably one of the largest reoccurring themes in response case studies in the disaster literature is that of poor organization, planning, and preparedness, mostly due to complacency (Quarantelli, 1978; Kearney, 1972; Stephens, 1993; McEntire, 1999; Stiles, 1955). NIMS definitely addresses this problem. Structure is needed for an effective response, e.g., clear roles and responsibilities, chain of command, as well as planning, training, and exercising -- and exercises, if conducted properly, should draw attention to these issues. As for complacency, NIMS will likely bring awareness of the issues involved to the attention radar of leaders, but only if they are cognizant and caring: emergency management is only as good as the people involved in it, but at the very least, NIMS brings accountability.

NIMS is not a panacea for all things disaster response, but it does encourage major improvements in response organization, communication, coordination, and preparedness. NIMS is a relatively recent development and therefore will likely continue to evolve as future disasters and policies shed light on areas that can be improved under its guidance. However, NIMS does have some issues – what it does well in terms of coordination and communication, it does not do as well in terms of bridging cultural and social gaps, or bringing together divergent groups outside of the major actors involved in response planning and exercising (e.g., emergent groups and small NGOs).

2.1.3. Relationship Between the Phases of Emergency Management

This Gold King Mine spill case study focuses mainly on the disaster response phase and pending outcomes of the event – but for purposes of context and understanding how the spill happened, one must examine the other phases of the episode. The apparent lack of mine hazard mitigation, disaster planning, and preparedness are discussed in the case study, not only as a matter of highlighting the inattentiveness of the government, but because they have a direct

bearing on the response and ultimate outcome of a disaster. Accordingly, the disaster literature has noted that there are variables that predict what the outcome for disaster victims and survivors will look like. Some of these are demographic variables, and will be discussed in a later section about social vulnerability. Some predictors of disaster outcomes are based upon participant choices and behaviors before and immediately after a disaster has occurred, e.g., the levels of planning and preparedness, and these factors will be discussed in the next section.

The literature indicates that a lack of preparedness persists, despite the advantages of being prepared for disasters (Gettis, 2014). Preparedness is defined by FEMA and DHS as “a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response” (Department of Homeland Security, 2017, para. 1). The literature gives examples of ways to connect with and influence people to make effective decisions by building relationships, forging trust, and connecting with them in a meaningful way – and demonstrates that there are groups with unmet needs that continue to be overlooked by emergency management. Connecting with the groups is part of the problem, but finding ways to achieve risk salience and motivate people to perform disaster planning and prepare to take appropriate protective actions is entirely another matter. The disaster literature continues to explore new ways to achieve this. For example, in the case of pet owners (a group of persons with unique challenges in evacuation decision-making and execution), people can be motivated by animals, such as being motivated by their own pets, or in other cases, by hearing stories of loss where animals or pets were affected in a bad way (see: Trigg, Thompson, Smith, and Bennett, 2015; Due, Thompson, and Every, 2014; see also: Kim, Sorcar, Um, Chung, and Lee, 2009). Media stories and other communications can encourage people to take part in preparedness activities (Paek, Hilyard, Freimuth, Barge, and

Mindlin, 2010; Trigg et al., 2015). Finding ways to fortify resilience and better serve diverse groups in planning and preparedness means they will likely have better outcomes in a disaster event.

Emergency management literature demonstrates that a positive relationship appears to exist between the preparedness phase of emergency management and the response phase of emergency management. As the conditions of preparedness improve, so do the conditions of response. Preparedness can be described as constituted in large part at the organizational level by planning, training, and exercising. Better working relationships among the different levels of emergency management professionals and emergency responders will lead to better working relationships and conditions during a disaster response. Unfamiliarity will lead to poorer working relationships. Exercises and drills as part of preparedness activities can be a way to foster good working relationships. Defining, understanding, and reinforcing roles and responsibilities can also be strengthened when drills take place. The literature appears to show a positive relationship between planning and better response outcomes. Often, the planning process is more valuable than the plans themselves, because the emergency planning process will allow relationships to be built, trust to be formed, and for parties to discuss potential vulnerabilities and risks as well as roles and responsibilities.

2.2. Native American Public Health and Emergency Management: A History

The literature review contains Native American emergency management, past and present, to provide context to indigenous emergency management and a framework for understanding the origins of current day issues. This section is merely a sample of the kinds of indignities that Native people, including the Navajo, have suffered, and the collective history of the Native community is one that will remain in the memories and family stories of many

indigenous people today. Most of the history between indigenous people and the colonial government which became the United States has continuously reinforced and deepened a lack of trust by Native people in the U.S. government and its people, which will be discussed in further detail in this section and the next section.

The indigenous peoples have had a long and painful history with the West. Most of the history of emergency management in Native communities within the United States has been to manage disasters that have been created or exacerbated by colonists and agents of the U.S. government (ranging from official members of government such as President Andrew Jackson to the actions of ordinary people). It began with the original colonization of the territory. The mythology of North America being an unpopulated, overgrown wilderness is part of the historical justification by colonists for taking land that did not belong to them, when in fact, the opposite was true: Natives had cleared land, created roadways, and established civilization (Dunbar-Ortiz, 2014). This trend continued throughout the history of the United States as settlers took land from Native people and forced them out. Indigenous land in the United States had declined to being only 2.3% of its original size by 1955 (Echo-Hawk, 2010; Dunbar-Ortiz, 2014.)

Continuous disasters were forced upon Native populations by the invasion of non-Natives, both directly and indirectly, for reasons ranging from lack of immunization against previously unknown pathogens, to land grabs, to abject cruelty. Diseases like influenza, measles, and the biggest killer -- smallpox, brought by colonists against which there were no native protections, wiped out entire tribes, decimating the numbers of other tribes and wreaking havoc on the health and welfare of the tribes to this day (see: Carlos and Lewis, 2012; Jones, 2004). Relocations that were forced upon Native Americans have added to tribal decimations and

misery -- disasters such as The Long Walk where the Navajo were forced to walk unfathomable geographic distances from Arizona to New Mexico or the Trail of Tears, where tribes had to walk the distance from the mountains of North Carolina, Georgia, and other Southern states to central states such as Oklahoma, as seen in the Cherokee removal (see: Tohe, 2007). Congress passed the Indian Removal Act of 1830 signed by President Andrew Jackson, which was intended to allow for negotiation for land in purchase exchanges, but Jackson abused his political position and used it as ammunition for wholesale forced removal of Native Americans from their tribal lands -- despite Jackson's own claims in December of 1829 that Indians should leave in a voluntary matter and not be forced from their ancestral lands (Cave, 2003; Indian Removal Act, 1830). Jackson and his Secretary of War, John Eaton, both viewed treaties with indigenous people as nothing more than tools of temporary pacification (Cave, 2003). Thus, they did not honor their end of the treaties, even for ones that Jackson himself had personally negotiated, but still coerced tribal members to sign treaties agreeing to give up their lands, and in other cases used government intimidation tactics to frighten those who resisted, or allowed violent White mobs to burn Indian homes and crops while committing atrocities (Cave, 2003). Therefore, tribes were forced to leave their homelands and march in rain, blizzards, and other unbearable conditions, with inadequate clothing and shoes, food, and water resources. Many tribal members fell ill and died along the way due to illness, exposure, and starvation; others were beaten, raped, and killed by soldiers when they couldn't keep pace (see: Tohe, 2007; Lindauer, 2013; Roessel, 1973). Once arriving at their destinations, there were insufficient storages of food, and in some cases Native Americans were expected to miraculously grow their own food. Over 9000 Navajo tribal members were forced to walk to Bosque Redondo during the early and mid-1860s and were settled on poor quality land, held captive in an encampment by the U. S. government until

1868 (Lindauer, 2013). These relocations are not just a footnote in a history book: they have had profound impacts on the lifestyles and health of Native people today – as Natives were exiled to lands deemed undesirable by colonists, or forced onto reservations a fraction of the original size of historic tribal lands, they were hampered in their abilities to provide for their own food and other needs, and ergo were forced to become dependent on food subsidies issued by the U.S. government. The passage of the Dawes Act in 1887 continued the systematic plans of ethnocide by taking tribal land, removing Natives from tribal reservations and political structures and putting them on European-American-style individual farms -- and destroying Native cultures by assimilating them into White society (Black, 2007; see: General Allotment (Dawes) Act, 1887). The tone of the Dawes Act took on a false fatherly quality, masking the true nature of the act's intentions, and serving as moral justification for White superiority by treating Natives as dependents in need of caretaking – and thus awarding Whites the role of their custodian by forcing Native dependence on the government (Black, 2007; see: General Allotment (Dawes) Act, 1887).

Tribal calamities are not limited to the distant past. As a program to “whiten” Native people and indoctrinate them, their children were seized and sent to boarding schools by non-Natives. This occurred not only in historic times, but in living memory, well into the twentieth century: many Native people alive today are either survivors of boarding schools or have family and friends who were (see: Grandbois, Warne, & Eschiti, 2012). Their hair was cut off, they were dressed in Western clothes, and they were punished for speaking in languages other than English, while being taught that their indigenous cultures were inferior and something to be despised. This had the consequence of accelerating the decline and death of many indigenous languages, and subsequently their cultures, as language is tied strongly to culture, and the death

of one becomes the death of the other. Other abuses continued throughout the twentieth century: the very language that Navajo children had been punished for speaking in school would now be recruited as a tool to protect America and her interests (Däwes, 2015). Over 10% of the Native American population – 44,000 -- served in the military for the United States during World War II, including the Navajo “code talkers” who used their indigenous language to keep the Axis powers from being able to decipher Allied wartime communications (Däwes, 2015). Despite their service, Native people came back to the United States only to find that many were not permitted to vote in states such as Colorado or New Mexico, or to take out GI loans (Nabokov, 1991).

While many tribal communities have struggled, some have made great strides towards attempting to provide for their own needs – but this has unfortunately backfired for many of them, leaving them in the lurch without appropriate transitions off of government assistance and programs. Tribes that fared well were swiftly rewarded by having the rug pulled out from under them, living up to the old adage that no good deed goes unpunished. When the Menominee had their tribal rights suddenly terminated by the U.S. government in 1954 because it was perceived that they no longer needed them, the Bureau of Indian Affairs hospital closed, leading to a surge in tuberculosis outbreak (Nabokov, 1991). Additionally, because of the lack of employment opportunities and being forced to pay for services that were once free, such as water, electricity, and sewer, nearly half of the people in Menominee County, Wisconsin had to go on welfare by 1968 (Nabokov, 1991).

The lack of understanding and compassion for Native people continues. Dunbar-Ortiz (2014) describes tensions at the United Nations in 1982 when Spain and the Holy See spearheaded an effort to celebrate 1992 as the joyous Quincentennial of bringing religion and

civility to the indigenous peoples of the New World. Western nations were stunned when the African delegation walked out in protest, later giving speeches about the inappropriateness of celebrating colonialism in the context of the United Nations, an organization that was supposed to put an end to colonialism (Dunbar-Ortiz, 2014). The genocide of Native Americans is seldom talked about, and lingers in the subconscious of many as only a peculiar cultural mystique: Yellow Bird (2004) describes how it would be unthinkable to play with toy Nazis and Jews, yet children and adults think nothing of cowboys and Indians. Even today, Native people are used in offensive stereotypes for sports team mascots as violent and savage cartoon caricatures that only propagate the myth of the Indian as the two-dimensional villain in the American history narrative (see: Yellow Bird, 2004). In other depictions, Native people are viewed in a light that takes away their humanity by showing them as mythological beings instead of humans, and virtually every aspect of their culture is appropriated by outside groups, from their ceremonial traditions, to their beliefs.

Some attempts have been made in recent years to improve emergency management relationships and offer some assistance to Native communities, but there are many hurdles to clear. FEMA has developed programs materials for Tribal Community Preparedness (see: Federal Emergency Management Agency, 2016), but some are lacking in depth and understanding of the reality that many Native people face, particularly on reservations. As an example, Ready Indian Country makes recommendations that are not going to be feasible for many Native people (Department of Homeland Security, n.d.). One suggestion is to have a landline phone in addition to cell phones as cell phones may not work in an emergency (Department of Homeland Security, n.d.). This cost could be prohibitive for Native people, given that approximately 40% of people on the Navajo Nation reservation did not even have

electricity in 2015 (Cabuto, 2015). The materials note that many people on tribal lands live far away from cities and therefore if you don't have a car, to arrange carpooling with someone else (Department of Homeland Security, n.d.). Cars are another unaffordable luxury for many members of the tribal community, and this is a reminder of the suggestions by government officials before Hurricane Katrina struck New Orleans for residents to evacuate in their cars, when many relied solely on public transportation -- and the buses that were supposed to take them to shelters never came (see: Sullivan, 2005). It shows a disconnect between government officials, emergency management officials, and the public, and the response in Hurricane Katrina only served to highlight this. The guide does acknowledge that Alaska Natives may have a difficult time stockpiling emergency food due to the high cost, but it offers no solutions for how to overcome this issue (Department of Homeland Security, n.d.).

2.2.1. Trust Issues

The loss of trust of Natives in the non-Native community can be traced all the way back to colonialism, the violation of treaties, and the concept of Manifest Destiny – where European settlers believed that they were entitled to the land and that it was their noble duty to conquer the territory (see: Black, 2007). Heartache, bloodshed, and the loss of land and independence for Natives all came about from treaties that were signed and are ignored by the U.S. government to this day (see: Nabokov, 1991). Atrocities committed against Natives are rarely discussed in American history schoolbooks (see: Tohe, 2007). However, Natives are keenly aware of their own histories, often through oral stories and collective memories (see: Tohe, 2007; Black, 2007). Black (2007) discusses how Lake (1991) notes that Native people are deeply aware of the history of bad relationships between Native and non-Native European settlers. Furthermore, Lambert (2014) discusses how historical trauma is the root cause of profound mental health problems in

Native communities today, ranging from high suicide rates, to substance abuse – they can be traced back to being dismissed, devalued, and dehumanized as individuals and as a collective culture. To think that this knowledge does not come to mind in Native communities, nor factor into perceptions of governmental interactions today, seems short-sighted and difficult to fathom.

Because of this ongoing history of abuse of trust, there are implications today for Native people when dealing with government entities. Demonstrating that historical and cultural context is important, Grandbois et al. (2012) note the importance of taking culture and history into consideration when providing nursing care for elderly Native patients. Many Natives are fearful or distrustful of government and institutions, due in large part to horrific firsthand and secondhand experiences, as discussed by Grandbois et al. (2012) when describing an elderly man who explained to Grandbois that he can't swallow pills given to him because of mysterious, forced medications given to him in boarding school with no rational basis or need.

Further eroding trust and confidence in the tribal community for non-Natives and forming partnerships with their institutions is the preponderance and disproportionate amount of unethical, illegal, and poorly conducted research that tribal communities have been subjected to by non-Natives. In one infamous study of the Havasupai people who live by the Grand Canyon in Arizona, blood samples were taken from tribal members under false pretenses and used to study tribal members without their knowledge or consent (Solomon, 2014). Tribal members were told that the study would be for diabetes, but the researchers instead used the samples to study inbreeding, schizophrenia, and the ancestral origins of the tribe, all subject matter that would be considered culturally taboo and offensive (Solomon, 2014). The researchers also broke their promise to keep the specimens at Arizona State University and instead willingly sent the materials to other research centers around the world (Solomon, 2014). The Journal of the

American Medical Association did not perform due diligence and was duped into publishing a dubious account from a medical student named Shetal Shah about an elderly tribal member's suicide (Solomon, 2014). The account contained personal details that uniquely identified people in this small Alaskan village, describing them in an embarrassing and insensitive light rife with cultural stereotypes, while other parts of the account turned out to be fabrication by the author (Solomon, 2014).

Another abuse involving Alaska Natives was a research project that eventually appeared in *The New York Times* and other media after the researchers sent out shocking press releases, publicizing the alcohol addiction of tribal members and portraying the community as a stereotype of Natives engaged in drinking and violence due to a windfall of oil money (Solomon, 2014). As a result, many tribal communities have either closed their communities to research or will only conduct it through partnerships involving tribal Institutional Review Boards (IRBs) (Solomon, 2014).

The loss of trust due to the history of indigenous peoples and abuses in their treatment has led to developments and special cultural considerations that extend to relationships. For example, in research, native researchers emphasize that there are key differences that must be taken into account when doing research with tribal members or within a Native community (Wilson, 2008). For some members of the tribal community, research itself has come to be a dirty word because of its negative connotations and associations with past abuses committed by outsiders (Lambert, 2014). Wilson (2008) discusses the importance of a Native research paradigm as opposed to the dominant paradigm that research tends to be constructed through, demonstrating that there are vast cultural differences that the dominant culture does not perceive nor understand. It also speaks to the mistrust of institutions and organizations that will directly

influence trust, relationships, and communication with non-Native entities. Those who do not perceive authorities such as the various levels of government issuing risk communications as trustworthy are far less likely to pay attention to their communications or to take action based upon the risk communicated.

2.3. Social Vulnerabilities: Significant Variables of Disaster Outcomes

Disaster survivors must undergo a true ‘trial by fire’ when they recover from a disaster. Many disasters will bring unimaginable hardships in their wake, and the disaster management literature has researched what happens to the survivors and what their recovery outcomes will tend to be. It is nearly universal in the disaster literature that people struggle to rebuild in the wake of disasters (Dash, Morrow, Mainster, & Cunningham, 2007; Finch, Emrich, & Cutter, 2010; Zakour and Harrell, 2003; Ibanez et al., 2003; Forgette, Dettrey, Boening, & Swanson, 2009; Kamel and Loukaitou-Sideris, 2004). Often the ability to return and rebuild successfully is a function of race, class, and gender (Finch et al., 2010; McDonnell et al., 1995; Hori and Schafer, 2010; Kamel and Loukaitou-Sideris, 2004). Age and whether or not one is a nursing home resident is another factor in determining recovery outcomes (Finch et al., 2010; Zakour and Harrell, 2003; Ibanez et al., 2003; Forgette et al., 2009; Kamel and Loukaitou-Sideris, 2004.) Additional demographic characteristics that will largely determine the outcome in recovery for survivors include special needs (Finch et al., 2010; Zakour and Harrell, 2003), level of education (Finch et al., 2010; Ibanez et al., 2003; McDonnell et al., 1995), single parent or female-headed households (Finch et al., 2010; Zakour and Harrell, 2003), the unemployed (Forgette et al., 2009; Finch et al., 2010; McDonnell et al., 1995; Zakour and Harrell, 2003; Hori and Schafer, 2010; Kamel and Loukaitou-Sideris, 2004) and language barriers (Dash et al., 2007; Kamel and Loukaitou-Sideris, 2004).

Beyond characteristics of disaster survivors, the research also shows that there are other factors which will determine the outcome of recovery. A large issue for disaster survivors is the loss of income after a disaster has struck (Dash et al., 2007; McDonnell et al., 1995; Zakour and Harrell, 2003; Hori and Schafer, 2010; Kamel and Loukaitou-Sideris, 2004). Contractor fraud (Dash et al., 2007; McDonnell et al., 1995; Ibanez et al., 2003) was found to be a problem, as was the neglect of authorities (Finch et al., 2010; Dash et al., 2007; Zakour and Harrell, 2003; Forgette et al., 2009; Ibanez et al., 2003; Kamel and Loukaitou-Sideris, 2004). Lack of knowledge and resources, particularly economic resources, was a huge deficit for survivors of disaster (Kamel and Loukaitou-Sideris, 2004; Finch et al., 2010; Dash et al., 2007; Zakour and Harrell, 2003). People also lacked the ability to successfully deal with essential entities after a disaster such as insurance companies and legal entities (Zakour and Harrell, 2003; Kamel and Loukaitou-Sideris, 2004; Dash et al., 2007; Forgette et al., 2009). Finally, it was also found that people needed technical assistance (Ibanez et al., 2003; Zakour and Harrell, 2003; Forgette et al., 2009; Kamel and Loukaitou-Sideris, 2004; Dash et al., 2007). Disaster survivors felt a multitude of negative feelings after disasters. Household stress has been shown in the literature to be a problem for those who have survived a disaster (McDonnell et al., 1995; Zakour and Harrell, 2003; Ibanez et al., 2003; Forgette et al., 2009; Dash et al., 2007). Additionally, survivors have reported emotional problems and feelings of hopelessness (Hori and Schafer, 2010; Ibanez et al., 2003; Zakour and Harrell, 2003; Forgette et al., 2009; Dash et al., 2007; McDonnell et al., 1995).

The disaster literature demonstrates that there appear to be relationships between race, language barriers, and poverty in disaster outcomes for individuals and households. Furthermore, the literature also shows that people struggle in the wake of disasters with dealing with bureaucratic agencies (e.g., the government, legal entities, and insurance companies), and

this is frequently compounded with stress and emotional issues that survivors experience. The Navajo people tick many of these boxes. Not only are they a marginalized minority group, speaking English as a second language, and have less access to educational opportunities, but they also face high levels of unemployment, tend to have low economic resources in reserve, and already have high baseline levels of negative feelings, stress, hopelessness, and suicide rates. Thus, the literature predicts that groups like the Navajo Nation will suffer disproportionately poor outcomes in disaster events.

2.4. Issues with Risk Communications

2.4.1. Risk Communication and Warning

One of the earliest documents that discusses risk communication and warnings through an emergency management paradigm would be Samuel Prince's Catastrophe and Social Change: Based Upon a Sociological Study of the Halifax Disaster. Published in 1920, this historical document is based on eyewitness narratives of the 1917 Halifax disaster – and this work is considered to be the first scientific study of a major disaster, and a catalyst for major changes in areas such as hazardous materials management and maritime safety (MacDonald, 2017). In the century since this document was published, many advancements have been made, but there is still work to be done in order to make risk communication and warnings more effective. By analyzing risk communication literature, certain trends appear to emerge that could explain the ongoing difficulties between Native and non-Native communities. These sections will discuss issues with communications and decisions, problems with official communications, and issues with credibility, through the perspective of how they impact trust, relationships, and effective outcomes, both with the general public, and with marginalized groups.

2.4.2. Marginalized Groups

Communicating with non-English speaking communities has become a priority as the Western world continues to become more multi-cultural. Aguirre (1988) discusses how the lack of warnings before the Saragosa, Texas tornado were a problem for the Spanish-speaking community who did not receive messages because they were not broadcast on the Spanish-speaking television channel, and how a mistranslation of the warning for the radio audience failed to establish how urgent and present the danger to the community was. This study clearly demonstrated that the needs of diverse populations are not being met and that they have often been overlooked by emergency management, an issue which is attempting to be remedied by present day solutions.

There are other populations that are highly vulnerable in disaster situations that have not received adequate consideration for risk communication and warnings. Engelman et al.(2013) did a paper which studies a highly-underserved group in emergency management: deaf and hard-of-hearing individuals. Very little literature and research exists on this topic, and thus this was an exploratory study. It assesses deaf and hard-of-hearing related emergency preparedness training needs for state emergency management agencies and deaf-serving community-based organizations. The study's findings show a major gap in emergency preparedness training for serving the needs of those with hearing disabilities. In addition, local interviews found gaps in training within deaf-serving community organizations. These gaps have implications for preparing for and responding to emergencies and meeting the needs of this special population (Engelman et al., 2013).

2.4.3. Problems with Official Communications

2.4.3.1. Traditional Warnings

Often there is a disconnect between risk warnings and their reception, interpretation, and perception by the public – and all communication is not created equal. Call (2009) did a survey of National Weather Service (NWS) warning coordination meteorologists to determine their salience of ice storm hazards, warning procedures, and community contact. The study found that weather offices maintain independence and this contributes to the wide variety in the length, tone, and content of the warning messages provided in advance of ice storms. It was also found that educational resources were not offered consistently to the public from the different offices.

Anthony et al. (2014) examined the Texas hurricane warning system including National Weather Service (NWS) forecasters, emergency managers, and broadcast meteorologists and how they communicate. The authors note that little research has been done on the perceptions of communication and collaboration of hurricane warning system members in the formulation and dissemination of forecast and warning messages. The themes that came from the research were tensions surrounding accuracy and timeliness of information dissemination, and tensions surrounding information access and attribution. The interview process uncovered strained relationships between emergency managers and National Hurricane Center personnel and their relationships with broadcast meteorologists and forecasters at the National Weather Service. As has been observed in disasters in the United States, interagency and intra-agency coordination is essential for effective communication, and the larger and more complex the span of government and unofficial groups becomes, the more important it is for them to work together and communicate effectively.

Emotion and fear can play a role in risk communication, but sometimes scare tactics in disaster warnings can backfire. Perreault, Houston, and Wilkins (2014) examined the effectiveness of new messages developed by the National Weather Service (NWS) that contain stronger language reflecting the seriousness of a weather emergency and more concrete directive about what to do in its event. The results showed that the research participants were not affected by any of the experimental messages and in fact gave more credibility to the regular messages versus the newly updated scarier messages.

Luo and Liang (2015) did a study to determine how the number of warning information sources affected decisions made by individuals to take protective action during tornadoes. The dependent variable in the study was whether or not participants chose to take protective action. The results of the study show that having two or three sources of warnings as opposed to just one greatly increased the probability that the participant took protective action. Those who had emergency preparation plans were more likely to take protective actions upon receiving the warnings. But despite having many media sources (e.g. TV, radio, Twitter, siren, etc.) the researchers also found that 21% of respondents in Joplin and 6% in Tuscaloosa received no warnings at all.

Hammer and Schmidlin (2002) investigated protective actions taken by residents whose homes sustained F4 or F5 damage from the May 1999 Oklahoma City tornadoes. Of the mediums disseminating warnings, TV was the most commonly cited source of the warning (89%), followed by phone (37%), sirens (37%), and AM/FM radio (25%). 55% of respondents received the warning from more than one source. Almost half of the residents fled their homes before the tornado struck. The researchers hypothesized that those who sheltered at home would be more likely to be hurt. No one who chose to evacuate on foot or by vehicle was injured. 30%

of those who sheltered at home were injured. Participants gave reasons for not evacuating explanations such as thinking it would not happen to them, it was too late to leave, not having access to a vehicle, or having no shelter accessible.

Balluz, Schieve, Holmes, Kiezak, and Malilay (2000) examined the March 1, 1997 Arkansas tornado event and how people responded to tornado warnings. Factors that were positively associated with people responding to warnings included: having at least a high-school education; having a basement in their homes; living in an area that was in the tornado path and receiving a tornado warning; having heard sirens; and having a prepared plan of action. Most survey respondents indicated some degree of pre-tornado preparedness as well. This speaks to the issue of education and for providing people with actionable choices to take when faced with risk communications.

Liu et al. (1996) examined tornado preparedness, warning system effectiveness, and decisions to seek shelter two Alabama areas after tornado warnings. In the area without sirens, only 28.9% of 194 respondents heard a tornado warning; of these, 73.2% first received the warning from radios or television. In the area with sirens, 88.1% of 193 respondents heard a warning, and 61.8% first received the warning from a siren. Knowledge of warnings, access to shelter, and education were key predictors for seeking shelter. The findings indicate that installing more sirens, having shelter access and education for appropriate responses to warnings are important elements of effective disaster mitigation and preparedness.

Compared to many other areas of emergency management research which are still in the early stages, risk communication and warnings have been studied for a longer period of time and with more diversity and depth than other subjects. The implications for this for what we know are beneficial, in that the more depth of literature and the more repeated the studies, the more

credibility is lent to the idea of establishing statistically significant predictors of human behavior in disasters with regards to how people will respond to risk communication and warnings. This means therefore that by being able to isolate those predictors that are and are not significant, emergency management practitioners can better understand how to craft effective risk communication and warning messages that will effectively convey useful information to the public and persuade them to take the desirable protection actions.

2.4.3.2. Emerging Technologies and Unofficial Communication

As technology and communication continue to evolve, so will the methods of risk and warning communication, and new ways to connect with people means new opportunities of reaching them more effectively and more quickly. This could be an important strategy both for immediate risk communications and warnings as well as for ongoing messaging such as public information and education campaigns. The internet provides a flexible and economical tool for reinforcing mass communication in public behavior campaigns (Abroms and Maibach, 2008). However, research has shown that in order for mass communication to be effective and long-lasting in its effects, people need to be attentively engaged with it (Hill, Lo, Vavreck, and Zaller, 2013). The perception of communication as effective by its recipients appears to have a positive relationship with how effective the messaging actually is (see: Noar, Palmgreen, Zimmerman, Lustria, and Lu, 2010; Dillard and Peck, 2000; Dillard, Shen, and Vail, 2007; Dillard, Weber, and Vail, 2007).

Parker and Handmer (1998) found that unofficial warnings play a significant role in warning the public of a disaster situation – and therefore this would lead one to conclude that dismissing this out of hand and only relying on official warning systems to warn a population is not an efficient means of distributing risk communication and warning information. The

researchers found high levels of dissatisfaction with warning systems. Examining flooding in England, the researchers found that 80% of 549 floodplain resident participants first became aware of flood warnings through unofficial means (Parker and Handmer, 1998).

While much of the risk and warning communication research has been conducted in the USA, this is changing, and examining world cultures and communication will allow for more effective messaging in a diverse society. Romo-Murphy, James, and Adams, (2011) did their study in Aceh province, Indonesia. The role of radio was evaluated during and after the 2004 Asian tsunami disaster. It was an exploratory study that showed how people rely on social and community networks, particularly when other forms of communications are down or not available. This study supports previous literature findings that suggest mixtures of media for best practices in communicating risk and warnings. Primary sources of information in the first 24 hours of the event were family, friends, people on the street, prayer halls, and members of the community. Most people did not receive warnings and found out about the tsunami from observing other people.

Even in an era of advanced technological development, warnings aren't always successfully issued. Brotzge and Erickson (2010) ask why, from 2000 to 2004, slightly more than 26% of all reported tornadoes across the USA happened without an NWS warning being issued. The findings from this study were that tornadoes with the greatest chance of not being warned were those that struck outside of public awareness. Singular tornado events and the first tornado of the day were the most challenging warning scenarios, with more than 50% of all single tornado events not warned. Geographic areas that experienced a significant proportion of weak, single, or night tornadoes had a much higher ratio of missed warnings. Stronger tornadoes were more likely to have warnings.

While examining the past is important, it is essential to plan for the future, by exploring new ways to reach the public. Social media has been the latest development in risk communication and warnings, and it bears promising potential, though the technology is only in its infancy. Sending tweets on Twitter has become a way to spread content that is determined to be valuable and relevant by its user base. This has interesting implications for emergency management professionals, as for perhaps the first time ever in society, there is a quantifiable, meaningful way to track which messages from which sources are deemed the most valuable, thus providing emergency management research with valuable information as to which messages the public finds the most informational, and from which parties they were sent. By tracking the retweeting of such messages, it also provides a relational context: unlike risk communications of yesteryear, which were many to one communications or one to one communications, there are no logistical and no societal restrictions on how messages may be distributed, thus demonstrating through examples the nature of unrestrained risk communications and warnings and how they are organically considered and redistributed when left to the discretion of the recipient without any filters imposed. Sutton, Gibson, et al. (2015) covered this ground in their study on the Boston Marathon bombing event and how tweets were resent during that time period. More traditional forms of risk communication have also been examined, and they are not to be dismissed in light of new technologies, but rather, to compliment them.

Sutton, League, Sellnow, and Sellnow (2015) attempt to fill the research hole of how to design effective social media messages for use in a public health emergency, studying health-related warning messages sent by public safety agencies over Twitter during the 2013 Boulder, CO, floods, discussing how social media has great potential for crisis communication in public health emergencies, but that it is not (yet) well understood. Even short messages delivered via

Twitter can provide information about the hazard event, its impact, and useful instructions for self-protection (Sutton, League, et al., 2015).

The internet seems like a panacea for risk communication and warnings, but this is not always the case. Demuth, Morss, Lazo, & Hilderbrand (2013) found that for National Weather Service website visitors, the results seem to be that the default presentation of the information on the website about watches and warnings was also the least useful, and that boxes drawn around the information and start and stop times for the watch and warning periods helped respondents to better understand the watch and warning information being presented.

2.4.4. Issues with Credibility

2.4.4.1. Credibility and Trust in the Messenger

Credibility is everything in risk communication: the messenger is as important as the message, and in many cases, even more so. Ripberger, Silva, Jenkins-Smith, & Carlson, et al. (2015) analyzed the relationship between credibility, accuracy, and warning response, and found that trust in the National Weather Service would mean a greater likelihood that the warning recipient would take protective action upon receipt of a warning. They also found that perceptions of accuracy changed the trust in the NWS, and therefore the reactions to issued warnings. Related to this is the issue of trust in the messenger. Perry, Lindell, and Greene (1982) examined the issues that are involved with communicating emergency evacuation information to minority communities. They found that Mexican Americans were far more skeptical of warning messages than White Americans. Irrespective of how specific the warning information was, the Mexican Americans interpreted the same warning messages believing there were lower levels of personal danger than White Americans, and that Mexican Americans were less likely to take protective actions when compared to White Americans.

2.4.4.2. Risk and Warning Interpretation and Comprehension

Understanding what causes humans to choose to listen to warning messages and choose to take or not take action based upon its contents is an interesting area of study (and a complex one). Baker (1979) discusses the outcome of examining numerous variables in evacuation studies and trying to ascertain which ones are predictors of evacuation behavior and which ones are not, determining that it is challenging to say which ones are and which ones are not. This means that it is a complex decision analysis that people make, and that there is not a one-size-fits-all solution. However, key to the comprehension and interpretation of risk and warning communications are trust and credibility, as they relate to how seriously the communications are taken.

Comprehension of warning messages, or lack thereof, can compound the challenges in risk and warning communication. Aucote, Miner, and Dahlhaus (2012) did a study which explores comprehension and understanding of warning signs about falling rocks in a coastal cliff environment. Face to face interviews were conducted in two schedules: one with people on the beach who were in the vicinity and disobeying the warning signs in order to find out the rationale for their behavior, and the second schedule with those who were on the beach performing high-risk behavior (in the danger area) and low-risk behavior (not in the danger area). The results showed that people varied considerably in the interpretation of the warning signs. Only 2 out of 5 participants correctly identified the meaning of the signs. Furthermore, 2 out of every 5 people observed in the dangerous area incorrectly assumed that they were being compliant with the warnings (Aucote et al., 2012).

Blanchemanche, Murette, Roosen, & Verger (2010) studied the issue of what to do when health advice is distilled down to the point of being almost meaningless, and is given to the

public without context or additional information in order to facilitate rational decision making. This is done allegedly because people are crippled in the face of decision making with regards to risk when they have imperfect and insufficient information. Their paper asks the research question: can a regulatory tool based on rational choice theory be efficient in reducing risky behaviors? The authors attempt to address this question using a study involving fish consumption and the risk of mercury levels. The researchers found there was no effect from the treatment because individuals did not largely change their behavior to comply with the treatment given (i.e. the advice to limit consumption). This would tend to indicate that people will not change their behavior if they do not understand a good reason to, or take risks and precautions seriously if there is not compelling evidence to do so, particularly when it is an inconvenience or goes against tradition and custom to do so.

Wiegman, Boer, Gutteling, Komilis, and Cadet (1992) describe the various reactions to warning messages among people living within a 3-kilometer radius of a hazardous chemical complex and by people living at least 10 kilometers from an industrial site in three European countries: France, Greece, and the Netherlands. The findings showed that participants who did not reside in the neighborhood of the hazardous site were, in general, more inclined to trust the warning messages than participants who resided in the neighborhood were. It is conceivable, then, that familiarity breeds a certain sort of contempt.

Paul and Dutt (2010) examined dissemination of the warnings for Cyclone Sidr in Bangladesh, evaluated the warning responses, and discovered the motives of why people chose not to evacuate. 75% of respondents were aware of the storm and had received warnings. However, the findings show that people frequently chose not to take action and stayed in their homes despite being ordered to evacuate. Field data also revealed several reasons why

evacuation orders were not followed. These were: those involving sheltering issues (e.g. whether shelters were perceived as available, accessible, and safe); the characteristics of the warning message itself; and characteristics of the respondents themselves. Risk communication bears little weight if so many people refuse to take the protective actions it recommends.

Ripberger, Silva, James, & Jenkins-Smith (2015) examined the influence of consequence-based messages on public responses to tornado warnings. The researchers note that respondents who perceive that tornadoes pose a high (10) risk to them or their family were a bit more likely to opt for protective action than respondents who have a low (0) risk perception. Respondents who know more about tornadoes were slightly more likely to opt for protective action than respondents who are less knowledgeable. Respondents who indicated that they have a response plan were more likely to select a protective action than respondents who indicated that they do not have such a plan. Male respondents were less likely to choose a protective action than female respondents. And finally, respondents who scored high (10) on the fatalism indicator were less likely to select a protective action option than respondents who scored low (0) on the same indicator (Ripberger, Silva, James et al., 2015).

Kiisel and Vihalemm (2014) examine risk and warning communication health risks stemming from manmade and natural disasters. Responses to the warning messages depended on verification of its contents where possible. Disaster scenarios where the participants had no prior experience to refer to, such as nuclear events, evoked the most uncertainty and the strongest feelings among participants. The lack of the frame of reference and context made it difficult for the participants to know how to respond or what protective actions to take. This would tend to suggest that unfamiliar hazards will be the most difficult to warn people about, as people will

have no frame of reference or personal experience which informs them that danger is impending and action is required.

Comstock and Mallonee (2005) compared reactions to two severe tornadoes in one Oklahoma community: the May 1999 F5 and May 2003 F3 tornadoes in the community of Moore, Oklahoma. Television and tornado sirens were the most common warnings each year; however, more 1999 residents received and responded to television warnings. Residents who took less action explained that their rationale for this decision-making process was insufficient warning and shelter. The researchers found that firsthand experience of tornadoes prompted people to heed warnings when adequate notification is received and to take effective protective action when adequate shelter is available. Thus, for hazards that do not have a frequent occurrence such as a mine spill, additional public awareness and education may be required.

Mileti and O'Brien (1992) focus on public perceptions of risk and response to risk communications in two California counties affected by aftershocks during the Loma Prieta earthquake event. In the findings, 73.6% of people in Santa Cruz and 76.8% of people in San Francisco reported that they used the media more than usual because of the earthquake. They also found that the more damage a community sustained, the more likely the participants in it heard warnings of aftershocks. However, less than 50% of participants in each locale were able to describe the specifics of the aftershock warning messages, leading the researchers to conclude that this suggests that people dichotomize risks. The researchers conclude further from the findings that perceived risk has a direct and positive relationship with taking protective actions in response to warnings received. Also, they conclude that warning information and quality and quantity have a direct positive relationship on response, pre-event awareness of risk enhances response, and that demographics may bear some influence on risk perceptions and beliefs.

This literature review has discussed research relevant to the Gold King Mine spill event in order to provide context for this case study. Without appropriate context and background information, the case study cannot be effectively utilized by practitioners or by academia, and thus it becomes necessary to discuss literature from divergent categories of subject matter and synthesize them to provide this essential background. This literature review therefore highlights key events from Native American emergency management history, along with theoretical frameworks of emergency management literature, and studies demonstrating key findings including vulnerable populations, marginalized groups, and issues of trust, communication, and relationship building. This, along with discussing what the literature has found significant in relevant topics related to the Gold King Mine, including NIMS-based changes to the EPA's emergency management structure and risk and warning communication, will show what is predicted to be beneficial for mending the apparent ongoing breach of trust and poor relationships between the U.S. government and marginalized groups such as the Navajo Nation.

3. METHODOLOGY

This thesis is constructed as an exploratory case study, which uses research questions to guide the research to study one unique event. Yin (2013) describes a case study as an “empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p. 18). It is a single, holistic case study (see: Yin, 2013). This case study examines the Gold King Mine event from its occurrence on August 5, 2015 to the present. Thomas (2011) discusses the importance of boundaries in order to define the case study and what it covers. For comprehensive understanding, the case study therefore does include pre-event conditions that speak directly to the mine spill itself, e.g. when the mine became inactive, why the mine was allowed to lie dormant with leftover toxic substances, work orders for the mine prior to the 2015 spill, and what preparedness actions had (or had not) been undertaken before the spill event occurred.

Thomas (2011) emphasizes that the case study is ideal for research that looks at “relationships and processes” (see: p. 11), and this study does precisely that: it looks at the relationships between the Navajo Nation, the Environmental Protection Agency, mine ownership, and political figures involved in the Gold King Mine spill, and what processes led to the spill and the unfortunate aftermath. This research aspires to bring together diverse data, using triangulation where possible to better assure data integrity (see: Yin, 2013). Yin (2013) discusses the concept of a mental framework to be used as a guidance tool while performing the case study to ensure that data collection and analysis are appropriate. Using the research questions as the mental framework, this enables the researcher to examine sources and determine their place and appropriateness in the boundaries of the case study – in other words, does the

source shed light on what happened at the Gold King Mine, how and why it happened, and what the response and implications are? The researcher also attempted to use Yin's technique of rival explanations – actively looking for alternative explanations to the research questions through data collection and analysis to ensure that the information is balanced and multi-faceted in order to provide a more complete picture (Yin, 2013).

This case study used document review and analysis to conduct this study. Babbie (2001) notes that there are limitations to using archived communications, and that this can lead to questions about a study's reliability and validity. News articles and journalistic reporting can contain biases and inaccuracies, and compound this issue (see: Babbie, 2001). However, news articles provide a unique perspective of capturing an event as it unfolded, as well as providing direct quotes from key people who were involved with the event and its aftermath. Therefore, they are incorporated into the case study.

Generalizations from a case study are dicey, and cannot generally be made (see: Yin, 2013; Thomas, 2011; Babbie, 2001). Thus, the objective of this case study is not to make generalizations, but to gain a deeper understanding of the event and gain insight into cultural tensions that clearly exist, and have been expressed – and to shed light on these tensions and the indicators that this is part of the ongoing history of lack of trust between the parties.

The purpose of selecting this water contamination emergency and creating this analysis is multifold. The first objective is to present a cohesive description of the Gold King Mine spill episode that is comprehensive, yet succinct. However, while this background information is essential for understanding the events and answering some of the research questions, this case study seeks to address the research questions through the paradigm of the four phases of emergency management, as well as through the viewpoints and perspectives of the participants in

the Gold King Mine spill episode. This includes the Environmental Protection Agency (EPA) as well as other agencies and members of the government ranging from the Government Accountability Office (GAO), to members of the U.S. Congress. The Gold King Mine personnel and management are also included in the discussion. This case study also includes the perspectives and views of the Native American community who were injured by the series of events that created the Gold King Mine episodes: the Navajo Nation and its members. Gray, Williamson, Karp, and Dalphin (2007) state that one cannot understand current human behavior unless one has an understanding of the cultures that produced it. Thus, this water contamination episode was selected for analysis because it provides insight into sovereign Native American and United States government relations, and what issues complicated events and relationships and created the series of events leading to this water contamination disaster.

This qualitative case study draws from secondary sources that also contain direct quotes from firsthand eyewitnesses who experienced the event, e.g. news articles. The analysis selectively draws from the pool of available, relevant news articles written from August 2015 (when the Gold King Mine Spill occurred) to the present (August 2017) as recovery issues, legal issues, social issues, and other issues continue to emerge from the aftermath of the spill. Using the LexisNexus Database, a search for Gold King Mine Spill on their collection of newspapers returns 660 total articles in newspapers (when excluding duplicates). This includes 211 articles in the Farmington Daily Times (New Mexico), 160 from the Denver Post, and 24 from The Salt Lake Tribune. Local and regional papers give the most comprehensive and frequent coverage of this event. However, national and international newspapers also covered the story as it achieved prominence. As an example, the LexisNexus Database includes 25 non-restricted articles from McClatchy Tribune, 10 from the New York Times, 9 from The Guardian (London), 6 from The

Washington Post, as well as articles from USA Today, The Christian Science Monitor, The Chicago Daily Herald, and other sources. This figure does not include the additional sources of press releases, newswires, magazines, journals, and websites, some of which are utilized as appropriate in the thesis.

Gray et al. (2007) emphasize the importance of validity in accounts from primary sources, noting that some sources and records are inherently more probable to contain reliable information than others. Where possible, and where validity and legitimacy of content is likely, archival data, primary sources, and running records are used where suitable and available. For example, online information from the Environmental Protection Agency (EPA) is used where appropriate. The EPA has a 328-page report called *Analysis of the Transport and Fate of Metals Released from The Gold King Mine in the Animas and San Juan Rivers* that discusses the EPA's investigation and findings after the spill. The EPA has additional documents such as press releases, response information, and a follow-up report released a year later in August of 2016 titled, *One Year After the Gold King Mine Incident: A Retrospective of EPA's Efforts to Restore and Protect Impacted Communities*. Additionally, they have released a report called *In the Rearview Mirror: Implementation of the Gold King Mine After-Action Review*, which details what remedies the EPA has prescribed.

In addition to the EPA, other government agencies have produced related reports or released details related to the spill event and the environment that created it. Information from the U. S. Government Accountability Office, the U. S. Geological Service, the Department of the Interior, and the Bureau of Reclamation is examined and incorporated into the analysis. There is also a Congressional Bill pending regarding the aftermath of the spill that is discussed that

provides context and additional insight into the government's perspective on the water contamination emergency.

4. THE GOLD KING MINE CASE STUDY

4.1. Introduction

The Gold King Mine Spill Event occurred on August 5, 2015. It happened near Silverton, Colorado when EPA contract workers who were attempting to repair the mine created the spill. The water contamination emergency became critical when delays in communication and action complicated the situation, allowing what would have been a minor emergency to escalate, affecting multiple states. The water contamination episode also impacted the Navajo Nation, bringing back echoes of other environmental disasters that have impacted both the Navajo as well as other indigenous people who have suffered impacts to their water and soil from non-Native activities. This chapter will discuss the Gold King Mine spill, how it happened, why, and what the outcomes of the disaster have been to date. By examining these research questions, this thesis hopes to clarify some unanswered questions regarding the intersection of emergency management and marginalized populations, and make scholarly contributions to the emergency management interdisciplinary literature by addressing gaps that have received little attention. This research utilizes 6 documents from the EPA, 4 from the Department of Homeland Security, 2 from the Department of the Interior (one jointly written with the Bureau of Reclamation), a Government Accountability Office report, 8 news articles from local news sources in Colorado, 5 Associated Press articles, 5 other national news articles, 2 international news articles, and an editorial written by the president of the Navajo Nation in order to address the research questions.

To better understand the Gold King Mine spill, it needs to be viewed in the context of history and culture. Water contamination issues are unfortunately systemic throughout North American history of colonial governments and indigenous peoples. As an example that has

occurred in modern history, water on Navajo land was contaminated by a uranium spill in 1979, rendering the water harmful and unusable. Known as the Church Rock spill, it occurred when United Nuclear Corporation's uranium mining water breached its tail pond and traveled down the Puerco River to the Navajo Nation in Arizona. Despite knowledge of cracks in the dam, foundational weaknesses, and recommendations to conduct inspections, United Nuclear took no action beyond a patchwork repair of the initial cracks (Young, 1981). The risk was not communicated effectively and the nature of the spill and its severity was concealed from the tribal members. Unaware of the danger, human and animal members of the Navajo Nation came in contact with the water and consumed it – also walking around on the shores of the river where the contaminated water had been. Injuries ranged from severe burns, to amputations, to animal deaths (Kuletz, 1998).

The Church Rock spill is characterized as being worse than Three Mile Island, and the worst radiological release in U.S. history (Brugge, deLemos, & Bui, 2007). Over 1000 tons of radioactive waste and millions of gallons of other mine waste ended up in the Puerco River (Brugge, deLemos, & Bui, 2007). After the Church Rock spill, the water contained 6000 times as much radiation as the legal drinking limit, and deposits found downstream included uranium, polonium, thorium, radium, as well as metals such as cadmium, selenium, and molybdenum (Rangel, n.d.). There is no evidence in FEMA's records that the Governor of New Mexico declared a Federal Disaster Area for this event, and this would have had the effect of keeping the local people from receiving assistance – as tribal communities at that time were unable to request a federal disaster declaration as a grantee (see: Carter & Peek, 2016; Federal Emergency Management Agency, 2018.). Cancer levels much higher than average have been detected in patients in the region over the past few decades. It is not known what the exposure was because

research did not take into account all exposure possibilities, pathways, and types of radiation (Brugge, deLemos, & Bui, 2007; see also: Taylor, 1982). Thus, this second wave of the Church Rock episode is still waiting to fully unfold as while some people have already developed cancer and various pulmonary related illnesses, others are forced to take a ‘wait and see’ approach while living with the constant worry that they too will become sick. Also shocking was that even though the Church Rock spill happened just months after the infamous Three Mile Island event, it received comparatively little media coverage and had a lackluster response (Brugge, deLemos, & Bui, 2007). Hungate (2005) discusses how the Navajo’s trust was betrayed by the United States government: “Despite the federal government's trust responsibilities to the Navajo guaranteed through treaty stipulations, the US actively worked against the Navajo in many ways, rather than serving as their trustee and advocate with the mining companies” (p. 85). He details the ways that the U.S. government and the mining companies conspired in a mutually beneficial arrangement to exploit the Navajo, running the gamut from paying Navajo workers 30% less wages than White workers, to lying about the hazards of working in the uranium mines, to cutting corners on critical health and safety necessities such as ventilation (see: Personal interview with William Chenowith, Grand Junction, Colorado, May 25, 2003 (as cited in Hungate, 2005.)) Haphazard conditions and lack of concern for the Navajo Nation’s wellbeing would facilitate the conditions that led to the spill.

It is almost a certainty that this prior water contamination emergency was in the forefront of the Navajo Nation’s consciousness when the Gold King Mine spill occurred 36 years later. The context of the prior emergency in living memory combined with the tenuous relations between indigenous peoples and the U.S. government would no doubt lead to distrust even under the most open of circumstances. But the curious behavior of the Environmental Protection

Agency during the spill, the response, and the recovery would likely only add to the cloud of suspicion that hangs over them and their role in the episode.

4.2. What Happened?

The Gold King Mine water contamination emergency occurred when contractors for the Environmental Protection Agency (EPA) attempted to drain ponded water from an earth mound dam. The dam was being used to hold back a pool of leftover contaminated water that had been used in extracting gold at the abandoned mine. Despite initial plans to do so, the contractors at Gold King did not use a drill rig on the top of the mine that would have allowed them to check the mine pool and verify its level before removing the backfill (Bureau of Reclamation, 2015). Had they done this, they would have recognized the issue and chosen alternative actions that would have averted a blowout (Bureau of Reclamation, 2015). The workers were using heavy equipment at the precarious site and caused the plug to fail during their work, causing the release of toxic water into the Animus River, turning the river a distinctive, bright orange color (Paul & Finley, 2015). According to the report produced by the Department of the Interior (DOI) and the Bureau of Reclamation (BOR) called *Technical Evaluation of the Gold King Mine Incident: San Juan County, Colorado*, it was unclear to the Bureau of Reclamation why the EPA chose to hurriedly dig out the plug and not recruit technical aid from the BOR as was directed by the EPA's own project manager (Department of the Interior & Bureau of Reclamation, 2015). The water contained acidic water, a mixture of heavy metals and other chemicals and elements that could cause irrevocable harm, and therefore the river was closed until August 14, 2015. The spill traveled along the river until it reached the San Juan River in New Mexico, and Lake Powell, a reservoir for the Colorado River located on the border of Utah and Arizona.

The EPA contractors attempted to patch the spill but told no one about the breach – not even the EPA – until over an hour had passed, citing communication technology difficulties (Kovaleski, 2015). The blowout occurred within a matter of minutes, and the crew was lucky to escape with their lives (Kovaleski, 2015). By this point, the blast of ponding water had leaked from the mine and poured into Cement Creek, which feeds directly into the Animas river (Colorado Public Radio, 2015). The EPA originally underestimated the amount of water that was spilled, but admitted 4 days after the spill began that the release was 3 million gallons – three times as great as their original estimate (Colorado Public Radio, 2015). It is likely that the delays in contacting the EPA and recruiting their immediate assistance meant that the spill was even larger than it could have been under alternate circumstances. This event triggered a water contamination emergency episode that inflamed tensions between the marginalized Navajo Nation and the United States government, compounded by lack of transparency and communication that will likely lead to continued and ongoing deterioration of relationships and trust between the parties.

4.3. How Did It Happen?

The previous part of the case study chapter discusses what happened by chronicling the basic facts of the Gold King Mine spill event as it unfolded. However, the circumstances are more complex than an accident by a few EPA workers, and understanding what circumstances precipitated this event will enable one to understand how the event came to be – by viewing them through the paradigm of cultural, social, and political factors.

To comprehend how the Gold King Mine episode came to be, it helps to understand the timeframe of how the Gold King mine came to be in the condition it was. Mining was a common industry in the area until the 1990s. The Gold King mine is an old mine: mining

activities were abandoned in 1923 and the mine has remained in a state of non-use since then (Colorado Public Radio, 2015). However, this is not the first time that the mine has been a concern: it has required maintenance and repair work in order to keep it from leaking highly acidic water. By 2005, it was allegedly estimated to be leaking 200 gallons of acidic water per minute into Cement Creek – until the mine partially collapsed, effectively damming its own wastewater (Thompson, 2015).

Because mining was such an important part of the financial and cultural environment of Colorado and other parts of the American West, much of the situation that fostered an environment ripe for the Gold King Mine spill came about due to state laws. Ginny Brannon, the Colorado Division of Reclamation Mining and Safety Director, discussed how mining companies were not compelled to do anything regarding mine cleanup until the 1970s, when laws began to change: “Folks could go out and do what they want and walk away from the sites, and this is one of them” (Kaplan, 2015, para. 15; see also: Paul & Finley, 2015). This ‘Wild West’ culture of allowing parties to do whatever they wish with the land with little regard for the consequences of their actions could be described as diametrically opposed to the culture of indigenous people such as the Navajo and their stewardship of the environment and its resources. It is this very lack of forethought and policy that has created the conditions favorable for toxic spills of mine waste into the water systems of the Western United States.

Lack of communication can be seen from the mine administration and the EPA, not only from a perspective of negligence, but also from a perspective of lack of trust. There are conflicting accounts between what the EPA and the mine administration say they knew, and when they knew it. Both parties initially claimed that they had no knowledge of the risk for spillage or blowout. However, internal EPA documentation shows that this is untrue (see:

Associated Press, 2015). In 2014, a work order for Gold King Mine stated that the mine's entrance had partially collapsed in 1995 and that the mine had not been accessible since then – and a May 2015 plan discusses the risk of blowout at Gold King (Associated Press, 2015). This was also not the first time that the EPA had done mine work or been informed of the risk of blowout: the Bureau of Reclamation details how the EPA had consulted them on the nearby Red and Bonita Mine project in 2011 that was leaking into Cement Creek (Department of the Interior & Bureau of Reclamation, 2015). The EPA was informed of the risk of blowout and were asked how they would manage a large volume of water if it were discovered in the mine – as it turned out to contain (Department of the Interior & Bureau of Reclamation, 2015). Todd Hennis, the owner of the Gold King Mine, said very little initially in the wake of the spill (Castillo, 2015). However, following the disaster, he told CNN in an interview that he knew there was a potential for a spill, and had attempted to do something to rectify the problem for 14 years. (Castillo, 2015). Thus, mine management and the EPA both knew of the impending possibility of a blowout at the Gold King Mine. Furthermore, they knew that there was damage to the mine's entrance and had a work order for a year earlier to make repairs to the collapsed entrance, knowing it meant that water was likely impounded (Associated Press, 2015). The EPA contractors misjudged the amount of water that was backed up in the mine, and the amount of pressure that had accordingly built up. Their inept and untrained actions led to the immediate circumstances of the mine blowout, but that was only the beginning of the Gold King Mine incident. The events that followed in the ongoing weeks and months would only compound what could have been managed as a minor water contamination emergency into a full-blown crisis.

4.4. What Was the Response?

Relief operations in the wake of the disaster brought further scrutiny and attention to the EPA. Because of the water shortage, emergency drinking water had to be distributed in containers. The containers given to the Navajo to use for ferrying emergency drinking water were contaminated with a visible thick coating of oil inside them (Laylin, 2015). The EPA dismissed the initial statement by Joe Ben, Jr., a Shiprock, New Mexico Farm Board representative, that the water was contaminated and unfit for use, portraying him as an unbalanced individual wishing to escalate growing tensions between the Navajo Nation and the EPA (Laylin, 2015). The president of the Navajo Nation, Russel Begaye, expressed his disgust to the media after initially accepting the EPA at their word until he arrived and witnessed the dirty containers for himself (Laylin, 2015). This incident, along with the EPA's attempt to conceal information and not be forthright and timely with warning information about the disaster that they had themselves caused in the first place, further damaged Navajo and U.S. government relationships and trust.

Once again, communication was assuredly a complicating factor, and the members of the Navajo Nation were not the only ones frustrated with the EPA's slowness and lack of interaction. New Mexico Governor Susana Martinez noted that the state's first communication about the spill did not come from the EPA, but from members of the Southern Ute Tribe, saying, "It's completely irresponsible for the EPA not to have informed New Mexico immediately after the spill" (Garrison and Kellogg, 2015, para. 31). Initially after the event, it took the EPA over 24 hours before they informed residents and officials of the spill (see: Morgan, 2015; Associated Press, 2015). This also includes the New Mexico State Environment Department, whose State Environment Secretary Ryan Flynn called the EPA's poor response to the spill "cavalier and

irresponsible” (Garrison and Kellogg, 2015, para. 32). This delay in communication and information means that people could have come in contact or consumed the water without having any clue of the risk to themselves or to their animals and crops. Additionally, members of the Navajo nation were suspicious and mistrustful of the EPA data that was also slow to be collected and released to the public. Because some of the indigenous people were hesitant to believe the data provided by a government entity with untrustworthy behavior and history, they elected to keep their irrigation ditches closed despite assurances that the water was now safe to use, because they didn’t want to run the risk of using unsafe water – and ergo lost crops because of the lack of trust in the EPA and the information they provided (Shinn, 2017).

The issues from the Gold King Mine spill were not resolved quickly, but continued to drag on into what should have been the disaster recovery phase of time for the Navajo Nation – but instead of being provided with the resources and assistance to perform appropriate disaster response and recovery so they could rebuild their lives and community, the Navajo Nation continued to face costly delays and difficulties with even being heard and acknowledged by the United States government. Other entities besides the EPA did provide response activities -- once they were notified of the spill. The Bureau of Reclamation and the U.S. Geological Service both did water testing; the Fish and Wildlife Service tested fish (Department of the Interior, 2015). The EPA claim that they performed some disaster response activities in the wake of the spill. They monitored the water, and claimed the water quality improved quickly and returned to drinkable quality shortly after the event (Environmental Protection Agency, n.d.). They also added sodium hydroxide and lime to the water to reduce the acid levels and bring the pH of the water to a higher number (Environmental Protection Agency, n.d.). This also caused the metals in the water to separate and deposit on the bottom of the river (Environmental Protection

Agency, n.d.). However, despite these response activities, the EPA appeared to be unable or unwilling to accept responsibility for their role in causing the spill, and thus dragged their feet at providing any ongoing assistance, particularly in the form of financial compensation to the injured Navajo Nation.

Ethel Branch, the Attorney General of the Navajo Nation, discussed the significance of the river in the lives of the Navajo, and how the spill impacted their community:

The river has always been a source of life, of purification, and of healing...Now it's been transformed into something that's a threat. It's been pretty traumatic in changing the role of the river in the lives of the people who rely on it (Reston, 2016, para. 17).

Branch recognized the uncertainty of the situation and that the full effects of the water contamination event might not materialize for some time:

We're not going to know the health impacts of the exposure to the water for five to 10 years -- maybe more... And it's not just direct exposure, the community is also concerned about eating food that's been watered with contaminated water, or eating livestock that has consumed the water (Reston, 2016, para. 20).

When EPA leadership commented that the Gold King Mine was just one mine out of 160,000 problematic mines in a dozen states, Branch commented on the EPA and its evasive behavior, giving a perspective on how their actions appeared to the Navajo:

From the very beginning, the EPA tried to shift the conversation to the overwhelming nature of dealing with abandoned hard rock mines in the West, in my view to dilute the significance of what occurred and the need for them to be accountable and to clean up the contamination or address it in some way (Reston, 2016, para. 25).

On April 20, 2016, Russell Begaye, the President of the Navajo Nation, published an editorial that explained the hardships that his nation faced:

The EPA has not paid the Navajo Nation or individual Navajo people a single dollar to address the harms caused by the poisoning of the San Juan River. When the Navajo Nation submitted its expenses to the EPA, pleading for recovery, the agency responded with criticism, skepticism, and an insulting offer to pay a miniscule percentage of the costs (Begaye, 2016, para. 4).

Begaye also explained the real costs endured by the Navajo from this event due to the EPA's actions:

Costs from the spill are mounting. Contamination of the San Juan River takes a profound economic, cultural, and spiritual toll on our people whose daily lives are intricately bound up with the River. The Navajo people already face a daunting unemployment rate of 42%. Farming and ranching are critical means of survival and supporting a family. Yet our subsistence farmers and ranchers watched their crops die and relocated their livestock away from the River at great expense. These families lost crucial income and are still suffering. The loss of a growing season's worth of corn pollen has interrupted ceremonial practices that bind Navajo families together and keep our traditional way of life intact (Begaye, 2016, para. 5).

Begaye also talked about the betrayal of trust that his people had experienced through the broken promises and stonewalling by the EPA:

EPA Administrator McCarthy promised Congress the EPA would work with the Navajo to quickly compensate victims of the spill and accept responsibility for its conduct. That has not happened. The EPA has repeatedly pledged to the Navajo Nation and the Navajo

people that it will work with us to ensure fair and effective compensation. Yet every request we've made has been met with resistance, delay, and counter-demands. The White House has also been silent, with the president seemingly ignoring calls to assist our people (Begaye, 2016, para. 7).

On January 13, 2017, in the last days of the Obama Administration, the EPA made an announcement that they were unable to pay any claims under the Federal Tort Claims Act (Environmental Protection Agency, 2017a). The agency's independent claims officer made the argument that the act was created by Congress to protect government agencies from lawsuits so that they could perform actions that are 'discretionary' without concerns of punitive results, and that the work done by the EPA would fall under the classification of 'discretionary function' – with the murky definition that this means work of a 'governmental nature' that involves judgment (Environmental Protection Agency, 2017a). EPA spokesperson Nancy Grantham stated, "The agency worked hard to find a way in which it could pay individuals for damages due to the incident, but unfortunately, our hands are tied," (Associated Press, 2017a, para. 4). It seemed as though this would be the unfortunate end to the financial aspect of the Gold King Mine event, but this was not the case.

Representative Scott Tipton (R- Colorado) was shocked by the announcement and explained the agency had said they were going to help. "The news today is a complete departure from that commitment, and our states, local governments, and tribes can rest assured that we will continue to work to make the EPA accountable for the mess they have made" (Associated Press, 2017a, para. 9).

Three Democrat New Mexico politicians -- Sens. Tom Udall and Martin Heinrich and Rep. Ben Ray Lujan, were also stunned by the agency's reversal, and gave the following statement:

We are outraged at this last-ditch move by the federal government's lawyers to go back on the EPA's promise to the people of the state of New Mexico - and especially the Navajo Nation - that it would fully address this environmental disaster that still plagues the people of the Four Corners region (Associated Press, 2017a, para. 11).

In February of 2017, Russell Begaye testified before the Senate Indian Affairs Committee that the Navajo Nation had been passed from one bureau to another without receiving substantive help during the crisis (Kimbel-Sannit, 2017). The tribe had contacted FEMA, the Department of Health and Human Services, and the Department of Agriculture, and were subsequently referred to the EPA (Kimbel-Sannit, 2017). Although the EPA reluctantly claimed responsibility for the spill, the agency refused to pay out any compensation to the tribe for damages. Additionally, Begaye claimed that FEMA told the tribe that it does not respond to emergencies where there is a liable party – but Begaye brought up the point that this policy did not seem to apply in the case of the Deepwater Horizon oil spill in the Gulf of Mexico (Kimbel-Sannit, 2017).

The Gold King Mine spill became such a critical issue for the EPA that it was cited as being one of the key reasons for the nomination of the new EPA director, Scott Pruitt. In February 2017 while Pruitt's candidacy was still being debated, Senator Cory Gardner, a Republican from Colorado, said:

[Pruitt] assured me that he is going to make it right and that he is going to work with the people that EPA injured — and those who experienced economic losses — and make sure that they are fully compensated... he agreed to come to Colorado shortly after his

confirmation to make sure that the people of Colorado know that he will fulfill the promises that were failed under the Obama administration (Paul, 2017a, para. 9). Scott Pruitt himself stated during a tour of the spill site on the two-year anniversary of the episode: “EPA should be held to the same standard as those we regulate... A new review is paramount to ensure that those who have, in fact, suffered losses have a fair opportunity to have their claims heard” (Coffman, 2017, para. 3).

Initially, the EPA attempted to avoid responsibility by claiming protection under the Federal Tort Claims Act, but their stance has undergone a series of evolutions. According to EPA documentation, the disaster site was not visited by President Obama, Vice President Joe Biden, nor the head of the EPA at that time, Gina McCarthy (Environmental Protection Agency, 2017b). Two years after the spill, EPA head Scott Pruitt visited the site as he pledged he would during his confirmation hearings, and claimed that there would be a change (Environmental Protection Agency, 2017b). The 79 claims that were initially denied by the EPA have been largely revisited – 77 of them have been contacted by the current administration EPA and are being reconsidered for compensation (Environmental Protection Agency, 2017b). While this new consideration is a positive turn of events, it does not mean that adequate financial compensation is assured – and what this will ultimately mean for the Navajo remains to be seen.

4.5. Why Did It Happen?

The Gold King Mine spill did not occur in a vacuum: it took the combination of political, social, cultural, and operational factors to cause this to occur. The operational factors (i.e. the poor decision making, skills, training, and communication of the EPA and its personnel) explain the immediate actions that caused the spill event. However, the factors that created the social vulnerability and cultural conflicts of the dynamic were set into motion long before the event.

The community at large in the Gold King Mine region also played a role in precipitating this water contamination event. Additionally, the political environment not only created the hazard profile, but also led to a challenging and erratic disaster response and recovery.

Certainly, part of the precipitating conditions that caused the Gold King Mine event were the apparent lack of mitigation, planning, and preparedness that extended to almost every aspect of the episode, which contributed to poor communication, information sharing, and transparency. The EPA's water testing is a prime example. In order to understand what contaminants had affected the river, the EPA did plume analysis that evaluated the contents while modeling the movement and the mass and volume of the plume (Environmental Protection Agency, 2017c). The EPA lists 13 data providers in their report titled *Analysis of the Transport and Fate of Metals Released from the Gold King Mine in the Animas and San Juan Rivers* that analyzed surface water and sediment at points along the Animas and San Juan rivers, conducted by partners in the area (Environmental Protection Agency, 2017c). However, the EPA was criticized for failing to inform the state of New Mexico about the spill, as well as not releasing information about water sample results, both before and after the spill, allowing parties to make informed decisions about water safety (Morgan, 2015). EPA culpability was also noted by an Army Corps of Engineers peer reviewer of the Department of the Interior and the Bureau of Reclamation's technical report on the Gold King Mine failure when discussing why the EPA had inexplicably altered their mine work plans at the last minute and failed to contact the Bureau of Reclamation for technical backup assistance: "He pointed out that the actual cause of failure is some combination of issues related to EPA internal communications, administrative authorities, and/or a break in the decision path" (Department of the Interior & Bureau of Reclamation, 2015, p. 78). Even more curious, the EPA claims it did not have a disaster plan in case of mine

blowout, and this is why there were such delays in notifying the state of Colorado about what happened (Kovaleski, 2015). Lack of consistent, standardized procedures to be used by government agencies and their contractors for abandoned mine repairs are likely a contributing factor that created the Gold King Mine spill (Department of the Interior & Bureau of Reclamation, 2015). Furthermore, the Bureau of Reclamation notes that emphasis in technical manuals and guidelines is placed on abandoned mine water sampling and water treatment, while glossing over the technical difficulty and skills required for some mines, and that this expertise often is not provided (Department of the Interior & Bureau of Reclamation, 2015). It was this very lack of technical knowledge that created the blowout: knowledge of the water pressure built up in the mine, lack of understanding of the network of subterranean groundwater systems that linked the mines in the area to each other, and lack of planning for mine failure and what to do if materials were released (Department of the Interior & Bureau of Reclamation, 2015). Lacking emergency management basics such as information sharing capabilities and a disaster plan for a federal government agency seems unfathomable, particularly for an agency charged with the environmental protection of the United States. This would clearly facilitate the conditions that would lead to mine blowouts and water contamination disasters – but it also speaks to a cultural and political arrogance that underscores the problems between the United States government and marginalized groups such as the Navajo Nation: it gives the appearance that the government is above performing even the most perfunctory of tasks to protect the very people that entrust their lives to the government that is supposed to serve them. Russell Begaye noted this in his essay regarding the spill, and compared the Navajo Nation’s experience to the marginalized victims of another major water contamination emergency inflicted on people by government:

Our hearts go out to the sufferers of the Flint water crisis. We understand what it's like to face an uncertain future caused by those we expect to protect us... And our people deserve to know that the dangerous conditions in the mines will be addressed once and for all (Begaye, 2016, para. 9).

The Navajo (and others) are at risk from mines that are even closer to home than the mines in Colorado. On the Navajo Nation, there are numerous uranium mines – estimates range between 520 and over 1300, mostly used to make Cold War weapons and fuel (Diep, 2010.) As of 2010, the costs to the EPA just for assessment of these sites was \$12 million a year – and the cost to perform cleanup of these mines is many times this amount (Diep, 2010). Thus, the cost to clean up all of the abandoned mines that are estimated to exist across the western United States is unfathomable -- and prohibitive. However, the alternative of allowing toxic chemicals and radioactive substances to leech into the environment unmitigated could be viewed as a poor one.

While it is apparent that the EPA had culpability in the Gold King Mine spill, the greater community's role in this water contamination event has to be considered as a factor in what caused the event to occur. Part of the controversy in the Gold King Mine spill was that the people of Silverton, Colorado were reluctant to be named as a Superfund site (Paul, 2017b; Elliott, 2015.)

Designation as a Superfund site means that while the area is required by Federal law to be cleaned and decontaminated from toxic substances and hazardous waste, this also puts public attention on the area and can negatively impact tourism and other local businesses. This sets up a 'Catch-22': sites that need attention and treatment may not receive them because the community is hesitant to receive the bad publicity and economic consequences that stem from being named a Superfund site. Thus, while the greater community is not directly responsible for

the spill, this issue contributed to the conditions that allowed this to incubate and set the stage for the blowout and spill. Since then, Silverton and local tribal stakeholders requested Superfund status to the EPA (Environmental Protection Agency, 2016). A year after the spill, Gold King Mine was named a Superfund area, along with 47 other sites in the area (Hopkins, 2016). However, there are numerous abandoned mines across the Western United States – and the conditions that led to the Gold King Mine water contamination event are not rare – according to the Department of the Interior and the Bureau of Reclamation, they are surprisingly common (Department of the Interior & Bureau of Reclamation, 2015). If this is extrapolated to other communities across the western United States where abandoned mines are located, it is quite conceivable that other communities are equally hesitant to be designated Superfund sites and are not receiving the proper attention and treatment that the cleanup sites require. Thus, the Gold King Mine event is one that is perfectly capable of being repeated time and again.

4.6. What Are the Implications?

What the final implications of this action will be are yet to be seen. The outcomes for these disasters are not certain, or determined: the story and the ultimate outcome of the Gold King Mine spill is still unfolding. To demonstrate how water contamination disasters can have long range impacts that affect multiple generations of people: cancer rates in the Navajo Nation near the 1979 Church Rock uranium spill have skyrocketed, and are affecting Natives in unprecedented rates. Finite disasters can cascade and morph into other disasters, both slow-onset (such as the cancer public health crisis of the aforementioned Church Rock spill) as well as disasters with speedier onsets (such as the loss of cattle and crops in the wake of the Gold King Mine spill). Recovery is not a certain outcome after a disaster; communities have collapsed and failed in the wake of disaster (Alesch, Arendt, and Holly, 2009). This means that a happy ending

to the Gold King Mine story is by no means a guarantee. Understanding what can lead to a poor recovery outcome is beneficial for a better understanding of effective emergency management -- and why the Gold King Mine spill is not merely an isolated episode, but a symptom of greater and ongoing problems.

Contaminants from the Gold King Mine spill have not vanished: as the spill cloud continued to move downstream, much of the contaminants settled into the bottom of the river systems. This means that the hazard has not been eliminated: it is conceivable that a future event could agitate the settlement and cause the contaminants to spread into the water (or into the riverbed soil) and cause a future issue (see: Morgan, 2015). Administrators associated with the Gold King Mine spill have expressed that they anticipate finding metals in Lake Powell (Elliott, 2017). Furthermore, it could scarcely be said that the danger has been averted. While noting that the Bureau of Land Management and the U.S. Forest Service had difficulties with determining estimates, the Government Accountability Office calculated there are an estimated 161,000 abandoned hard rock mines in the Western United States (Government Accountability Office, 2011). The number could potentially be higher as these government agencies do not have the authority to collect certain data (Government Accountability Office, 2011). While the United States Geological Service compiles some information on mine production through surveys, it does not collect mine land ownership data, and thus the net result is that this information is not comprehensively gathered and freely available (Government Accountability Office, 2011). Many mines are not even mapped in any official capacity: these hazards sit unmitigated and ergo are a potential hazard for a future disaster.

The future story of the Gold King Mine spill will largely be legal. As of this writing, lawsuits are pending against the Environmental Protection Agency from the Navajo Nation, the

state of New Mexico, and the state of Utah, as well as the 77 claimants whose cases have been reopened for further examination (see: Elliott, 2017). This not only has the impact of what claimant payouts are awarded, but also what legal precedents these decisions could set for future environmental contamination events. The Gold King Mine Spill has also served to highlight attention to the problem of abandoned and active mines spread throughout the West. It remains to be seen what additional mining areas will be declared Superfund sites, and what will be done to address these hazards. A Congressional Bill was introduced into the House of Representatives in early January of 2018 by Rep. Steve Pierce (R) of New Mexico that seeks to provide compensation to injured parties and perform additional water testing – but the future of this legislation is also unclear (see: Gold King Mine Spill Accountability Act of 2018, 2018).

Cultural, trust, and communication problems continue to unfold. The Navajo Nation has asked the Environmental Protection Agency to show flexibility and cooperation on the kinds of documentation that they require for the reimbursement process, as tribal members did not always retain receipts for damages incurred (Associated Press, 2017b). Considering that the EPA was the party who created the issue in the first place, accommodating this request as much as reasonably possible would be a tangible example of how the U.S. government could work to build trust and foster better relationships with tribal groups.

Meanwhile, the EPA is participating in the ongoing recovery from the Gold King Mine spill by providing financial support, creating appropriate plans for the greater mining region, conducting water testing, monitoring, and ongoing research to better understand how contaminants move through rivers (Environmental Protection Agency, 2017d). The incident reached the attention of the United Nations as one of 40 significant mine spills from the past decade, noting in their report that while the frequency of such spills is becoming less, the

consequences of each spill are becoming more severe because the amount of waste spilled is becoming larger (Brown, 2017). This would appear to be a worldwide problem as it is estimated that there are approximately 30,000 industrial mines in the world and hundreds of thousands of mines that are no longer being used, but will almost assuredly leak toxic waste into the environment if left indefinitely (Brown, 2017).

The EPA has taken additional steps in the wake of the Gold King Mine spill to improve emergency management. The EPA produced an After-Action Report (AAR) in the wake of the Gold King Mine disaster, though for some reason, did not make it immediately available on their website (Shinn, 2017). In the report, titled *In the Rearview Mirror: Implementation of the Gold King Mine After-Action Review*, there are ten key recommendations that the EPA made (and largely implemented) in the wake of the Gold King Mine episode. They created a National Incident Management Assistance Team to deploy to locations to work with response within the Incident Command System (ICS) (Environmental Protection Agency, 2017d). The other recommendations include standardization and improvements to data, communications, planning, and notifications, as well as instituting an ICS-based training program to give consistent information to the EPA, and clarifying roles and responsibilities (Environmental Protection Agency, 2017d). While these recommendations are beneficial, they speak largely to the preparedness and the response activities of the emergency management phases cycle. These activities do not address mitigation and prevention aspects, i.e. dealing with the hazard of abandoned mines that contain toxic substances. They also do not directly address the issues of building relationships, trust, and inclusivity, or how to better serve socially vulnerable and minority populations. Their recommendations address symptoms of mine spills, but will not address the root causes of the problem: the hazards themselves and the vulnerability of the

populations who often bear the worst outcomes in disasters. The lack of communication, transparency, and consistency will no doubt contribute to the loss of trust. Trust building is a cumulative process: positive experiences will lead to growth over time while negative experiences will deepen the rift between people. It also produces the appearance of hypocrisy when governments claim to want to protect marginalized groups, yet marginalized communities continue to bear a disproportionate level of harm from preventable disasters.

4.7. Results

Findings on the Gold King Mine spill are summarized below:

The Environmental Protection Agency has accepted culpability and was the direct cause of the Gold King Mine spill, when their contractors used improper equipment and procedures to perform repair work, causing the blowout and spill that contaminated Navajo Nation water and land. The EPA and the Gold King Mine management were both aware of the potential for mine blowout. Appropriate due diligence was not taken by repairing the mine earlier, and using precautions not to damage the mine when it was known that it was in a precarious condition.

Poor communication, lack of timely information updates, and untrustworthy behavior contributed to a poor outcome. The contractors did not notify the EPA instantly. Once the EPA was aware that there was a problem, it took them over 24 hours to notify others that there was a problem – both state and tribal governments as well as the public.

The community of Silverton, Colorado was reluctant to be declared a Superfund site due to negative publicity and economic concerns, and this meant that the Gold King Mine was not given appropriate priority. Thus, the community's hesitancy for bad publicity meant that the problem was allowed to fester, instead of being cleaned up. The culture of the Old West allowed

mines to be created and abandoned without regard for the environment, and legislation has only begun to address the problem in recent times.

Key demographics have been demonstrated by academic literature that predict what groups will experience disproportionately poor outcomes in disasters. The variables include race, non-English speaking households, low incomes, and unemployment. These demographics apply to the Navajo Nation and other Native American communities.

Indigenous people have a tenuous and mistrustful relationship with the United States government due to historic mistreatment both distant and recent. Emergencies that are caused by the government and non-Native groups, especially those that are poorly managed such as the Gold King Mine event, will likely contribute to poor relationships and the loss of trust. The EPA's slow response, lack of communication, and issues with distributing safe, emergency drinking water contributed to this problem – as well as the EPA's initial refusal to pay any claims for costs associated with the water contamination event caused by their own people.

The EPA has made changes to their structure to incorporate practices in line with emergency management and ICS best practices. These changes should help with communication, roles and responsibilities, and leadership awareness, but will not help with the core issues of the Gold King Mine spill: restoring relationships, building trust, reducing vulnerability, and mitigating the hazards of toxic mine pollutants.

The overwhelming issue is the problem of thousands of abandoned mines across the Western United States. Without legislation and a system of inspections to mandate cleanup and proper disposal of materials, wastewater will continue to be stored in earthen dams and pose a contamination hazard, either through catastrophic failure such as at Gold King Mine, or through

seepage that will contaminate the environment due to slow leaks that have the potential to go unnoticed.

4.8. Timeline

Major events from the Gold King Mine episode are summarized below:

1923: The Gold King mine was abandoned and remained in a state of non-use until the present.

1995: The entrance to the Gold King mine partially collapsed and made the mine unusable.

2005: The Gold King mine was leaking contaminated water into Cement Creek.

2011: The EPA consulted the Bureau of Reclamation on the Red and Bonita Mine project (located near the Gold King mine) and were informed of the risk of blowout.

2015 (May): Plans for the Gold King mine discussed the risk of blowout.

2015 (August 5): The Gold King Mine spill occurred when EPA contractors were doing maintenance work on the mine and caused the blowout. EPA contractors did not inform the EPA about the spill until over an hour later, and did not recruit the Bureau of Reclamation for technical assistance.

2015 (August 6): The EPA first notified the public and government entities about the spill, admitting that they were behind it.

2015 (August 14): Oily, contaminated containers were given to the Navajo Nation for emergency drinking and agricultural water.

2016 (April 20): President Russell Begaye published an editorial that explained the hardship that his nation faced, describing how the Navajo Nation had not received any help and had been stonewalled by every government entity they had contacted.

2017 (January 13): The EPA announced no claims would be paid under the Federal Tort Claims Act. Multiple politicians expressed outrage at the EPA's decision.

2017 (August 4): EPA Administrator Scott Pruitt announced the EPA would reconsider the 79 claims previously denied under the Federal Tort Claims Act.

2017 (August 5): Scott Pruitt visited the Gold King mine on the two-year anniversary of the spill and pledged to help.

2017 (September 7): The Gold King mine area was declared a Superfund site.

2018 (January): A Congressional Bill was introduced into the House of Representatives by Rep. Steve Pierce (R) of New Mexico to provide compensation to injured parties and perform additional water testing.

4.9. Response Outcomes in Disaster Case Studies: Analysis of Key Factors

This section discusses case studies of various disaster responses and what the key findings were, through the context of how those response outcomes were created and what relevant response issues exist in common with the Gold King Mine disaster. This analysis compares common issues found in the disaster literature in studies undertaken of previous disasters and shows how these key factors are relevant to this case study of the Gold King Mine. While the objective is not to generalize findings in an academic sense, this does show that there appear to be ongoing issues that continue to repeatedly arise in response situations, irrespective of the kind of disaster or the scale and scope. By examining these factors, a qualitative understanding can be obtained of the common problems that come about from poor response and what can exacerbate or alleviate these issues.

Interagency coordination issues are not uncommon in disaster response: clashes between local, state, federal, and tribal governments occur, as well as with other groups both formal and

informal that respond to disaster events. Interagency coordination among different levels can occur, such as in the case of the Shanksville, PA Flight 93 disaster (one of the planes hijacked on 9/11 that crashed into a field), where another party assumed command and control of the scene (Grant et al., 2002). Another example of interagency coordination issues and the resulting tension was in a 1973 Columbia, South Carolina snowstorm case study, where local and state officials did not see eye to eye (Ponting & Quarantelli, 1973).

In some cases, language issues and cultural barriers play a role in inhibiting the effectiveness of a response. In the example of the March 28, 2000 Fort Worth tornado, there were many households that were Spanish-speaking households, and communication issues contributed to some hiccups in a case study response (McEntire, 2001). Culture shock and lack of training played a role in FEMA's response to Hurricane Marilyn: islanders from St. John had a positive attitude and were used to managing without modern conveniences, but were somewhat perplexed by FEMA and the discrepancy in services received when compared to those that the islanders of St. Thomas received (Morrow & Ragsdale, 1996).

When disaster response is ineffective, people will take matters into their own hands. Emergent groups can form in many cases, but especially in situations where unmet needs are perceived. Due to the lack of coordination, training, preparedness, and trust relationships within these emergent groups, it could explain why there are often varying levels of effectiveness in these disaster response situations. Due to poor communication from the Dominican Republic government, there were many emergent groups in the wake of Hurricane Georges attempting to bridge the needs gap (McEntire, 1999). In other cases where unmet needs existed, they were met with creative solutions by already existing groups, as in the case of the 1994 Northridge earthquake, where survivors had housing needs that had to be met by unorthodox (but effective)

means (see: Nigg, 1997). While the Gold King Mine spill does not directly involve emergent groups, this speaks to the idea of dissatisfaction with response efforts and what happens when unmet needs, poor communication, low information, and lack of trust exist, and what decisions people choose to make in these situations.

As the disaster literature demonstrates, not all governments are equal, and as noted in the Gold King Mine spill, sometimes the government is the problem. In the Hurricane Georges study, people were highly upset with the Dominican Republic government's lack of action and were very distrustful of them as opposed to the NGOs working there (McEntire, 1999). Citizens so strongly distrusted the government that they were vocally outraged by the government's failures at basic communication and simple response: NGOs carried the literal and figurative weight of response in the case study (McEntire, 1999). This can also be seen in the U. S. Virgin Islands Hurricane Marilyn study, where the FEMA responding in that situation was not the same FEMA that had responded to Hurricane Hugo six years earlier in the same region – that FEMA was more concerned with protecting its own people and regarding the local people as a suspicious afterthought, rather than humans in need of help (Morrow & Ragsdale, 1996). The Italian government in the Vaiont Dam overtopping disaster is a striking example of what happens when government goes badly. This was evidenced by the heavily military response reflecting the structure of the Italian government, the highly pluralistic society, and the civil authorities unwilling to make too many decisions (see: Quarantelli, 1978). They also had years of notice that landslides were going to be a problem (as compared to disasters such as Shanksville, PA, with zero warning and low probability of occurrence (see: Grant et al., 2002)) – thusly the Italian government had adequate warning and time to mitigate and prepare for the known problem of landslides and dam failure (Quarantelli, 1978). Even in cases where the response organization is

highly structured, this does not always lead to a desirable outcome. The command and control structure of the response in the Fort Worth tornado likely contributed to issues seen in the response (along with communication issues and copious amounts of broken glass) (see: McEntire, 2001). When structure turns to rigidity, inflexibility, and uniformity, this will also lead to response problems.

Building relationships takes time, but provides valuable payoff in the crucial minutes of a disaster response. In cases where people trusted one another and had previous working experiences such as the local response groups in Shanksville, this paid off well – but in cases where there were strained relationships such as with the FBI in Shanksville, there was unfamiliarity, and therefore a lack of trust and knowledge of how to work together (Grant et al., 2002). Another example of this would be the 1973 Columbia snowstorm, where local groups performed well together and things went smoothly, but there were tensions between local and state authorities that surfaced during the snowstorm event, highlighting a lack of knowledge and trust of each other (Ponting & Quarantelli, 1973). These case studies demonstrate that the time spent on trust and relationship building in disaster management has value: relationships brought about trust, as well as familiarity with procedures and proceedings (as were missing in the case of Flight 93).

Other behaviors explain the success or failure of response efforts. Communities that devote time to planning, training, and exercising almost invariably have better response outcomes than those that did not devote time to these activities. Acts of heroism and altruism are the story in situations such as the Texas City disaster (a massive, deadly ammonium nitrate explosion and subsequent fires, see: Stephens, 1993) as opposed to the frequently recounted disaster myths of mass selfish behavior in the aftermath of disasters that are disproportionately

reported such as role abandonment, flight, and panic. Previous disaster experience not only impacted the behavior of individuals and households, but also organizations, as seen in the Jonesboro, Arkansas May 1973 tornadoes case study where the town was living in the shadow of another tornado that had struck only a few years earlier in 1968 (Kueneman, Smith, Taylor, & Waxman, 1973).

Perhaps the largest theme that emerged across the case studies directly related to the outcome of the response was complacency. Complacency led directly to poor planning, training, exercising, relationship building, and mitigation efforts, which invariably led to the downfall of the community. The Vaiont Dam case study in Italy is a textbook example of complacency, where it was well known that landslides and dam overtopping could be a potential problem, yet nothing of significance was done to mitigate or prepare for the possibility (see: Quarantelli, 1978). Yuba City's flooding was another example of this: the breaches in the levees were not reported or repaired in time, and the spillway was managed ineffectively – despite the knowledge that Yuba City was highly prone to flooding and that there had been incessant rains which could lead to this outcome (Stiles, 1955). Buffalo Creek Hollow in West Virginia had a story which echoed much of Yuba City's: the people at the mine failed to take swift action despite obvious clues that the coal mine dam was about to give away, and had virtually no planning or capacity to deal with this (Kearney, 1972; Stiles, 1955).

Case studies in the disaster literature demonstrate what can and will go wrong in a disaster response situation. Poor procedures or lack thereof completely not only contribute to initial disasters, but also to poor responses. This was especially true in cases like Buffalo Hollow Creek and Texas City, where the disasters should have been predicted in advance and better

prepared for. It should come as little surprise that these responses were chaotic as the groundwork had been failed to be laid adequately.

The disaster plans themselves in these case studies were not of interest, but groups that had gone through the planning process together demonstrated smoother and more coordinated responses – showing that planning and preparedness are important for response. Conversely, those that did not perform these functions showed poor response outcomes. The groundwork that is laid in advance of a disaster will largely determine the effectiveness of the response phase. Consequently, better planning and relationship building means that there will be more trust and smoother response efforts by all parties involved in response. Finding ways to build trust and strengthen the pre-disaster ties is essential for both emergency management practitioners, community stakeholders, and the communities they serve.

5. CONCLUSION

There is an unfortunate coda to the concerns of environmental pollution by the pipelines that were approved by the Trump administration that were discussed in the Introduction: the Dakota Access Pipeline has already leaked 84 gallons of crude oil in April 2017, coupled with leaks on the Keystone pipeline that totaled 210,000 gallons in South Dakota -- demonstrating that fears of environmental contamination are not unrealistic (Cuevas & Almasry, 2015). This ongoing problem of water contamination events that affect indigenous communities and other marginalized people will continue to erode trust and relationships. The Navajo have not been reticent nor unclear in expressing their displeasure with the EPA and the United States government. The president of the Navajo Nation, Russell Begaye, stated directly to the media when interviewed, "I don't trust the EPA." (Laylin, 2015, para. 30). It is likely that his sentiments are echoed widely.

Also concerning is the apparent capriciousness of disaster solutions according to the whims of a few administrators and their political affiliations. The use of disaster aid as a political tool to incentivize or intimidate the public should be perceived as an alarming development, and this can be measured by the elasticity of decisions rendered and aid awarded: in the case of the Gold King Mine spill, one administration denied all of the claims, whereas they were later reopened by another administration, and 77 out of 79 claims opened were being reconsidered. Such a dramatic reversal indicates that there is not a standardized checklist that claims are compared to in order to objectively meet criteria, but that it is subject to the opinion and discretion of whoever the current administrator is (and the president and political party that appointed them). Such wide swings in outcome also add to the dynamic of lack of trust: the perspective that results are not based on a fair and unbiased measure where there is equal

opportunity for consideration, but that only those with sufficient political clout and favor with the administration du jour will receive attention and awards. It furthermore continues the appearance of a government that says one thing and does another, with thinly veiled intentions to harm Native populations either through intentional malice or as a side effect of greed, as there is a long historical precedence for this conduct (see: Black, 2007). This is especially concerning in cases such as the Gold King Mine Spill where the original disaster was actually caused by the U.S. government, and thus the bar for claimants should be set lower as they would be given the benefit of the doubt in situations where there are undue burdens for them to overcome (e.g. deadlines, sufficient documentation, receipts, etc.)

This research case study conducted document review and analysis to answer five research questions about the Gold King Mine: what happened at the mine, how and why did the water contamination emergency occur, what was the response to the event, and what the implications are (and will likely be). The findings from this study demonstrate that the EPA bears considerable culpability, but that the situation is more complex: multiple cultural conditions came together to form the perfect storm, unfortunately leaving behind a landscape littered with abandoned mines that pose an ongoing threat to water systems and vulnerable people across the western United States. While the case study seeks to answer the research questions of what happened, how, and why from the microcosm (EPA contractors damaged the plug containing the wastewater in the mine) to the macrocosm (the Old West cultural legacy infringing on sovereign Native American territory, people, and culture), this study also seeks to fill a gap in the research literature about how emergencies and disasters have driven a wedge between Native American communities and the United States government and its people. As discussed in the Literature Review, Native Americans have experienced countless disasters, many caused by the United

States government, and many currently live on reservations in a precarious state of poverty and humanitarian crisis. The genocide of the Native Americans is perhaps one of the least discussed and acknowledged genocide events in human history, and to not view emergencies that negatively impact Native American communities such as the Gold King Mine event through the paradigm of this history means that no understanding of how poor disaster response and communication destroys trust and relationships will take place. This research notes the factors and demographic variables that have been found to predict the outcome of population groups after a disaster has occurred. These factors point not only to what people will suffer a disproportionately poor outcome (such as members of the Navajo Nation), but should also be used to anticipate future outcomes and what tools and resources available to the emergency management field will prevent future poor outcomes.

The implications of this study for the field of emergency management range from mitigating hazardous mines that can impact much of the United States, to improving communication, relationships, and trust with indigenous people, to determining ways to reduce social vulnerability. Clearly, there is work to be done with regards to connecting with marginalized groups and providing better service for their needs. Planning, training, and exercising could be used as opportunities to build relationships and establish trust with members of these groups, and it remains to be seen whether the new EPA emergency management policies and procedures as outlined in their After-Action Report will extend outwards from an insular and internal approach, towards improving emergency management practices through outreach and external approaches.

The implications for interdisciplinary emergency management academia and related areas of research are the scholarly contributions that this thesis intends to make to the literature. This

case study featuring the Gold King Mine should provide the academic community with a better understanding of the hazards mines pose, particularly to vulnerable populations, and the lack of mitigation, preparedness, and response plans for managing this ongoing and pervasive problem. This research also produces a literature review of emergency management in the context of Native American communities, an area of research which has been overlooked and understudied.

Limitations for this study include the fact that the study is a holistic, single case study, and this means it will not be as robust as other types of case studies (Yin, 2013). This study attempts to conduct an exploratory broad overview of the Gold King Mine water contamination event and its aftermath, and thus a balance must be achieved between inclusion and conciseness. The document analysis of this study means that it is limited to the forms of media available to the researcher and the mental framework process involved with determination of boundaries and document inclusion (see: Yin, 2013).

Future research could explore the locations and assess the risks mines pose to their communities, as well as the feasibility and costs associated with their cleanup. It could also explore the future outcomes of the Gold King Mine spill as the episode continues to unfold, with unknown future consequences – in particular legal, financial, public health, and social consequences. Policy changes are almost a certainty in order to mitigate and manage the hazard of mines, but future research will be needed to determine what these policies should look like and at what levels of government they need to be implemented: at the national, state, or local level, or some combination therein. Making the process as inclusive as possible to serve the very communities that are being harmed and ignored will be essential for a successful outcome.

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