THESIS

CUT OFF IN CHAOS: COMMUNICATION AND LIFE-SAVING ACTION AMID RISING RURAL WATER DURING THE 2013 COLORADO FLOODS

Submitted by

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ABSTRACT

CUT OFF IN CHAOS: COMMUNICATION AND LIFE-SAVING ACTION AMID RISING RURAL WATER DURING THE 2013 COLORADO FLOODS

During a few days in mid-September 2013, more than a foot of rain fell in the mountains of northern Colorado, transforming streams into torrents and spurring a massive emergency response effort. High water demolished homes, ate away chunks of main highways, and stranded people across the state. Glen Haven, located in rural Larimer County, was among the hardest hit communities (AAR 2015). Cut off and eventually without electricity or telephone access, the community's volunteer fire department served as the primary rescue agency during the disaster and for weeks after, from organizing the initial shelter-in-place order by telephone to assisting in the evacuation effort. Firefighters pulled victims from the water, worked with county, state, and federal authorities to facilitate helicopter evacuations, and provided medical treatment and supplies to many who called Glen Haven their part-time or year-round home.

By the time murky waters receded, the 2013 Colorado Floods claimed ten lives, forced more than 18,000 people from their homes, destroyed 1,882 structures, and cost taxpayers more than $4 billion, ranking it among the most devastating natural disasters in Colorado history (AAR 2015; FEMA 2015; Aguilar and Bunch 2015). While officials later lauded the multi-pronged communication and evacuation efforts that likely saved lives, little research has been conducted to determine how people in the most remote areas of the state, such as Glen Haven, actually learned of the emergency's severity and immediacy. By utilizing interviews and focus groups, this thesis builds on analyses of disaster evacuees' decision-making and communicative

processes. Specifically, this thesis explores how Glen Haven residents relied on community-based social ties, lived experiences, and other warnings to learn of the need to take life-saving measures to survive the 2013 Colorado Floods.

Findings bolster understandings of how residents make decisions to act in times of disaster. Many residents relied on an automated 911 telephone call to first learn about the serious dangers being posed by the flooding, and the Glen Haven Volunteer Fire Department proved to be instrumental in both first communicating the situation's urgency and facilitating a safe evacuation. Meanwhile, media messages about the event went generally unheard in the community, which was left to draw on its own network of social ties, yet news reports remained essential outside the immediately affected area. Building on these findings, I conclude this thesis with a series of suggestions related to the usage of 911 warning systems, the importance of volunteer first responders, and considerations required among media communicators. Results can then be applied to areas prone to floods, wildfires, hurricanes, or other disasters near and far.

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This thesis would not have been possible without several key individuals. First and foremost, thank you Dr. Stephanie Malin for chairing my committee, reviewing drafts at all hours of the day and night, and for always being forgiving — at least seemingly so — when I blew past my deadline. There's a saying we use from time to time in the newsroom: "I love deadlines. I love the whooshing noise they make as they go by." I'm sure you relate. Regardless, thank you for all of your support. Thanks are also owed to Dr. Lori Peek, from whom I learned many of the methodological considerations required for qualitative research. Thanks, too, for continuously demonstrating what empathy, sincerity, humility, and boundless energy look like in academia and in life. And finally, thank you to Dr. Craig Trumbo for your input and willingness to talk about disaster and crisis communications — and the danger of conflating the two.

Words of gratitude are also owed throughout the Department of Sociology at Colorado State University. Specifically, thank you Dr. Lynn Hempel for your guidance in navigating both the fields of contemporary social theory as well as the nuances that accompany social stratification. I continually reference that course and all of its rigor. Thank you Dr. Pete Taylor for helping establish a solid theoretical foundation and for your anecdotes on travel and life. Thanks to Dr. Tara Shelley for the ever-applicable instruction on environmental justice. Thanks to Dr. Pat Mahoney for providing the initial methodological foundation that sparked this project. And thanks, too, to Dr. Mike Lacy, for reaffirming that quantitative research is most decidedly where my mind and talents are not best served.

This program has humbled, frustrated, and inspired me — sometimes all three simultaneously — in ways I could not have imagined. I am fortunate to have gone through this

journey alongside a cohort of dedicated scholars and new, welcoming friends: Rebecca Shisler, Jamie Willis, Becca Eman, Evan Batty, Lucy Carter, and Scott Kaiser. Thank you for being you. Gratitude is owed to my family, colleagues outside of Sociology, and others whose questioning about what it was I was studying forced me to refine my interests and goals — a life skill that extends far beyond the run-down facilities of Clark B-wing and that dreaded conference room.

Finally, I am fortunate to have completed this project while working full-time in an often-unpredictable, deadline-driven industry. To the journalists and editors at the Fort Collins Coloradoan who covered for me, worked around my difficult schedule, and were always supportive of my pursuits outside of daily journalism: thank you.

DEDICATION

I dedicate this thesis to the people of Glen Haven, Colorado, and all of those who experienced the 2013 Colorado Floods and spent hours sharing their stories with me. Above all, I dedicate this project to my wife, Melanie Amoroso-Pohl. Thank you for being patient. Thank you for being forgiving. And thank you for always finding a way to reaffirm my hope and optimism both inside and outside of academia. I could not have done this without you.

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CHAPTER I: INTRODUCTION AND OVERVIEW

The days leading up to the September 2013 flood in the Big Thompson Canyon and across the Front Range could be compared to the time before tropical storm systems make landfall. A slow-moving cold front drifting across Colorado around September 9 clashed with Pacific monsoonal moisture, resulting in a prolonged period of rain along the eastern edge of the Rocky Mountains and Front Range (Gochis 2015; Casamassa 2013; AAR 2015). The front stalled out and unique atmospheric conditions accompanied the days-long rain event that followed. Within seven days, many locations along the Front Range and higher elevations received upward of 12 inches of rain — a year's worth of precipitation in a single week (Gochis 2015; Casamassa 2013; AAR 2015). Forest fires in recent years charred tens of thousands of acres across Colorado, and the blackened hills could not absorb the deluge of water from Colorado Springs to the Colorado-Wyoming border (Casamassa 2013). The National Weather Service and emergency managers issued a barrage of warning messages throughout the week and into the weekend, advising residents across much of the state to exercise extreme caution, evacuate as able, and seek higher ground away from the swollen rivers. First responders across the state went door-to-door, and constant news briefings aided in the early warning and notification efforts. Investigators later praised these efforts as "key strengths" in a comprehensive After Action Report detailing what worked and what did not (AAR 2015: 2).

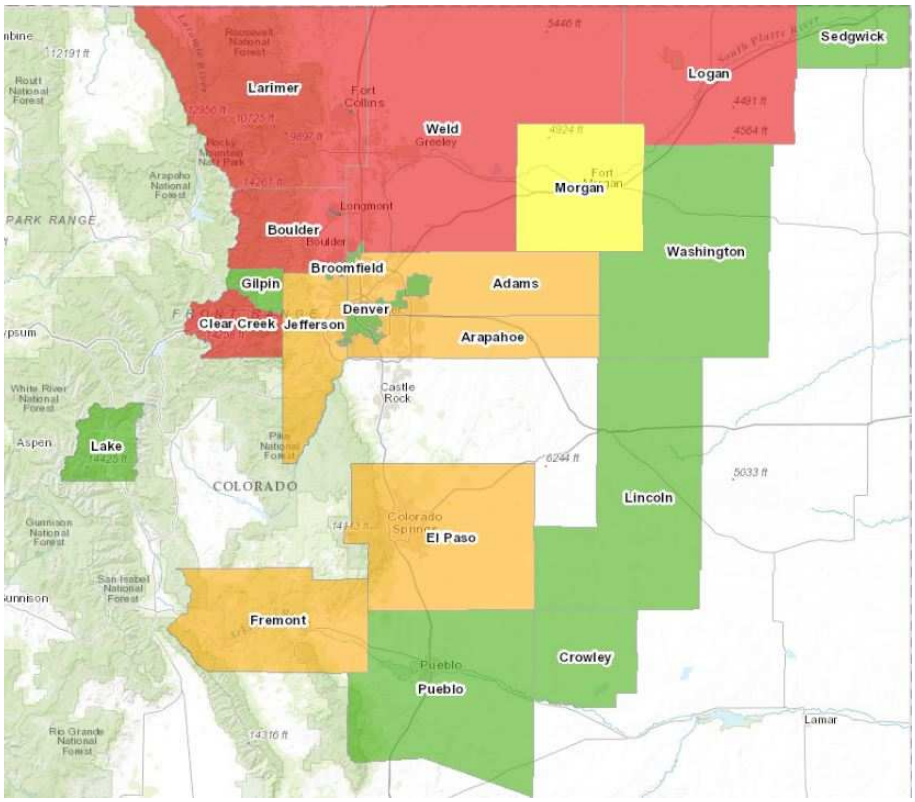

Figure 1: Red denotes counties with "very high" impacts from the 2013 Colorado Floods. Orange, yellow, and green represent "high," "moderate," and "low" impacts, respectively. Larimer, (upper left, red) experienced "very high" impacts *(FEMA 2013).*

There were challenges, however. That same report called for more "clearly defined communication methods and processes for sharing information with stakeholders," including the public, to reduce confusion throughout the disaster (AAR 2015: 2). My research addresses these under-explored challenges by probing how residents utilized each other, local first responders, and outside warnings to make decisions to take action to protect themselves and their families. Notably, my research fills a void suggested in the After Action Review (2015), in terms of understanding evacuations in hard-to-reach, mountainous areas, such as Glen Haven, Colorado. Communities such as this, I show, experienced the 2013 Colorado Floods very differently than many others across the Front Range, creating a rich and important foundation for the following research project.

i. Glen Haven Then and Now

At the time of the 2013 flood, Glen Haven was a rural mountain community with a population that ranged from 165 residents (Census 2010) to more than 600 residents (Dokoupil 2013; Whaley 2014), depending on the time of the year. The downtown area of the unincorporated community was nestled in a gulch a short drive from the tourist destination of Estes Park, about 90 minutes northwest of Denver. It had one main street, the beloved General Store, a handful of boutique shops and a town hall building that served as a primary meeting spot for the middle-aged residents as well as vacationing families or retirees that called the town a part-time or full-time home (Census 2010; Whaley 2014; Dokoupil 2013). Homes were sprawled throughout surrounding foothills.

The community is considered to have two distinct population centers — those who live within the Glen Haven Association in the core of the community and those who live in The Retreat, a satellite population center a few miles away. Similarly, a handful of dirt roads — West Creek, Fox Creek, and North Fork — are named for the respective waterways they parallel leading from the downtown district to the nearby population centers. The Glen Haven Volunteer Fire Department is the primary emergency services agency for the approximately 36-square-mile area, which encompasses about 500 homes and vacation cabins. Because Glen Haven does not have a municipal government, the volunteers with the fire department moved into and remained in leadership roles for rescue, which I examine, and even the recovery and rebuilding phases in the days, weeks, and months after the flood (Young 2014).

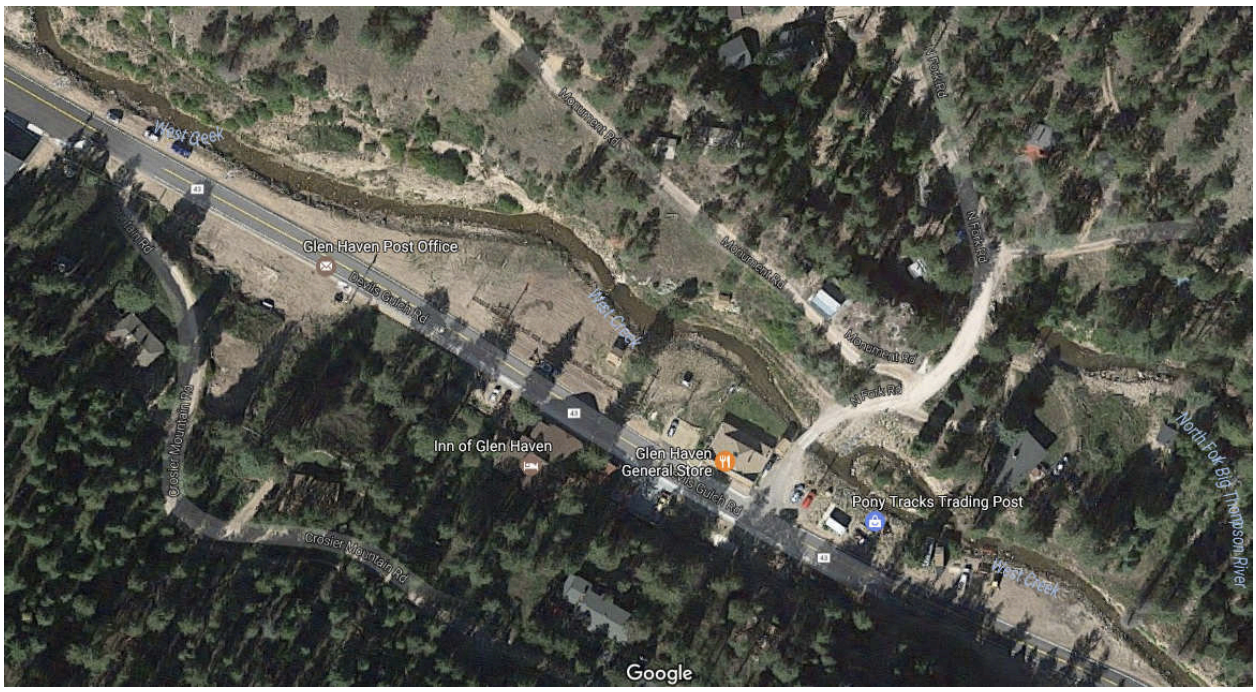

Figure 2: Downtown Glen Haven, as captured in this pre-flood photo. The General Store is right-of-center along Larimer County Road 43. A dirt road forks after crossing West Creek above the store. Most Glen Haven residents live along these roads *(Google 2016).*

During the summer months Glen Haven bursts into life as tourists flock from the Front Range and across the world to access hiking trails, pass through during a scenic drive to Estes Park, or visit the increasingly popular Rocky Mountain National Park. The seasonally open General Store is a gathering space where locals and tourists alike stop to converse and learn about the happenings up and down the hill in the quaint community — the daily made-from-scratch cinnamon rolls also draw a crowd. The population dwindles when many vacationers and part-time residents leave their Colorado escape for their main homes along the Front Range or elsewhere across the country. The tourist traffic slows, the shops close, and "see you next year" is the emanating message in this century-old stopover for travelers en route to the growing hub of Estes Park. At least, this was Glen Haven before water poured over the banks of the creek that parallels Larimer County Road 43 and came rushing through town — taking with it asphalt streets, vehicles, and longstanding housing foundations (Whaley 2014; Young 2014; AAR 2015).

Late-summer, slow-moving rainstorms are not unprecedented in this part of the West. On July 31, 1976, a stationary thunderstorm dumped as much as seven inches of rain in one hour on a rocky area of the Big Thompson Canyon, just a couple miles from Glen Haven (USGS 2006; Pohl 2016). The deluge tore through a canyon bustling with Saturday evening recreationists who were celebrating Colorado's Statehood Centennial, ultimately killing 144 people and injuring at least 250 others. Torrents damaged 418 homes and businesses, 438 vehicles, and much of the same highway that was left in pieces in 2013. The Big Thompson Flood spurred new road signs that now line Colorado canyons urging people to climb to safety — rather than trying to drive downstream — in the event of a flood (USGS 2006). The 1976 Big Thompson Flood remains the deadliest natural disaster in Colorado's recorded history (Pohl 2016; Whaley 2012). It caused significant damage to Glen Haven (Gorski 2013; USGS 2006) and still stands out vividly in the memories of many property owners and residents.

Almost three years following the 2013 flood, even as I conducted this research for my master's degree in sociology at Colorado State University in Fort Collins, the shells of destroyed homes still peppered the improvised miles-long dirt road from the Big Thompson Canyon to Glen Haven. Some homes still had the X-codes spray-painted on dilapidated doors, signaling when search and rescuers first inspected the structure for victims or bodies in 2013. The town hall was destroyed. It took volunteers, driven by fire department personnel with other full-time and jobs, about a year to rebuild the main road through town and to ensure those with homes sprinkled in the foothills to the north and south had access to their property. Many worked seven days a week, planning and fundraising, digging, and rebuilding (Young 2014; Gorski 2013).

In the year after the waters receded, local grants, individual donations, and an impressive team of almost 1,000 volunteers, paved the way for those early recovery efforts that some

referred to as a "community reconstruction effort" (Young 2014). Eventually the Federal Emergency Management Agency awarded a total of $151,000 to seven property owners for repairs to a piece of road. But later, after learning the property belonged to the community homeowner's association — the Glen Haven Association — FEMA asked for its money back (Duggan 2014). Facing community backlash, federal authorities later rescinded their request.

In sum, the progress has been incremental. The General Store has spearheaded efforts to draw people back to the community. Ongoing talks have hinged on how best to bring new commerce to Glen Haven. A white board has been hung outside of the fire station that was under construction pre-flood and served an evacuation shelter and rallying point during and after. Many have reported being cautiously optimistic about the future. But memories about the 2013 disaster remain deeply etched into the minds of those who continue to call Glen Haven home.

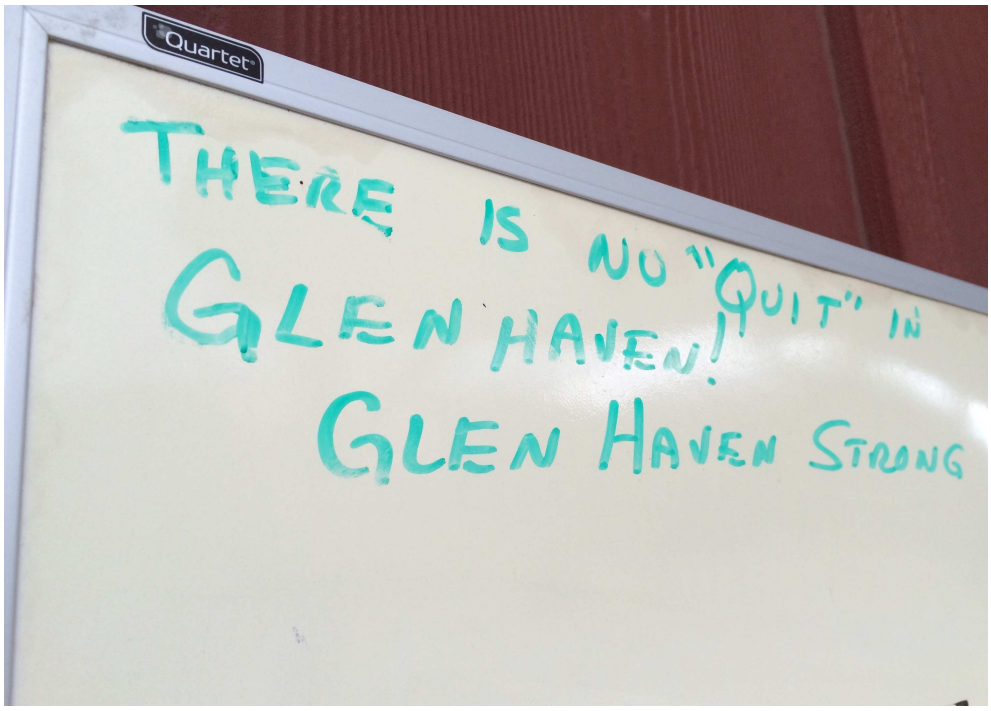

Figure 3: Resident used this white board outside the fire station to communicate while recovering from the 2013 flooding. It's now used to communicate other matters to the community, as I encountered during a visit in 2016.

ii. Relevance

Sociologists study many types of natural disasters affecting different groups in an almost infinite variety of outcomes. As such, I describe numerous definitions and types of disasters in the subsequent literature review. Generally speaking, "Disasters are (a) events that can be designated in time and space, which have (b) impacts on (c) social units. The social units, in turn, enact (d) responses (or adjustments) to these impacts" (Kreps 1984: 311). Building in natural and social dynamics to this study, Perry and Quarantelli (2005) concluded that most research agrees in defining a disaster as something that happens as a result of the confluence of natural, technological, and social conditions. Quarantelli (1988) called for a broadening study of disasters spanning types and scales.

Below, I review relevant sociological research related to flood vulnerability, social ties, and emergency message communication, all of which link in important ways to the flood evacuation and decision-making behaviors experienced in this community. My research yielded fascinating results about rural community dynamics and isolation, reliance on neighbors, and the varying ways emergency efforts from the 2013 Colorado Floods affected longtime and seasonal residents alike.

iii. Research Questions

With the following review of literature serving as a foundation for further inquiry, I sought to answer the following research questions:

- *1) How did residents in Glen Haven learn about the flood and the need to take life-saving measures?*
- *2) To what extent did Glen Haven residents rely on social ties to learn of and respond to the 2013 Colorado Floods?*
- *3) How does this compare to residents' consumption of warnings communicated through the media during the same period of time?*

Moreover, these overarching research questions served as a guide to answer the following sub-

questions: a) What role did the Glen Haven Volunteer Fire Department serve during the emergency effort?; b) How did first responders communicate to the community during the disaster?; c) How were community dynamics displayed during the natural disaster?; d) What challenges emerged during the disaster?; e) What was the relationship between residents and leaders during the evacuation?; f) What do leaders and evacuees wish they or others had done differently during the disaster?

iv. Personal Interest

My interest in Glen Haven's efforts related to the 2013 Colorado Floods stems from my professional work reporting on disaster and my personal time exploring the foothills and mountains surrounding this idyllic community. I have lived in Fort Collins, Colorado, since 2008 and have passed through or driven by Glen Haven — about 45 minutes away — for years, often captivated by the community dynamics that were akin to my rural and mountainous Southern California hometown. I attended Colorado State University as an undergraduate and became interested in the sociology of disaster my sophomore year after taking my first course on the issue. Since then, I have become captivated by topics related to emergency management, decision-making, evacuation, and communication. I majored in sociology and journalism and became particularly interested in bridging the two fields.

I was working as a newspaper journalist covering public safety issues along the Front Range at the time of the 2013 Colorado Floods. I was also in the process of beginning a two-week vacation for my mountain wedding not far from Glen Haven. As the National Weather Service issued flood warnings across the region, my to-be bride and I scrambled to find a way to ensure our ceremony on September 14 could go on as planned, despite much of the landscape being decimated by the raging floodwaters. Our wedding went on amid the disaster, and I still

remember driving along the stretch of highway where I read news reports on a cell phone about the disaster's path of destruction. Once back to work after a week out of the state, my newsroom colleagues and I forged a plan for continuing coverage of the disaster. I began graduate school the following fall and stayed driven to further examine elements of the 2013 Colorado Floods, drawing on my background as a reporter, sociologist, and trained emergency medical technician and wildland firefighter.

v. Positionality

Any time a researcher enters the field, he or she must be conscious of his or her positionality and social identity in relation to research participants. Here, positionality refers to research roles and social locations in relationship to the context and setting of what is being studied (Ravitch and Carl 2016). This is important to recognize because "the researcher is the primary instrument in qualitative research" (Ravitch and Carl 2016: 10). A researcher crafts a project based on their own history and social identity, which is shaped by gender, social class, culture, or numerous other variables. Recognition of these components is vital for researcher reflexivity, defined as "the systematic assessment of your identity, positionality, and subjectivities" through a constant assessment of roles and influences during a project (Ravitch and Carl 2016). It is essential to continually reflect on positionality and social location throughout data collection, memoing, and research writing.

vi. Negotiating Insider-Outsider Status

It is worth noting my role generally as an outsider to the community but with some insider background related to my proximity, familiarity, and shared background characteristics with the Glen Haven community. As such, I fall somewhere in the middle of the insider-outsider continuum (Dwyer and Buckle 2009; Bucerius 2013), acceptable so long as I remain reflexive.

"The core ingredient is not insider or outsider status but an ability to be open, authentic, honest, deeply interested in the experience of one's research participants, and committed to accurately and adequately representing their experience" (Dwyer and Buckle 2009: 59).

vii. Personally Shifting Roles

In embarking on this project, I grappled with shifting between my roles as a journalist and a sociologist. I had spoken to a few community members while reporting on wildland fires in the area as I worked as a journalist at the *Fort Collins Coloradoan* newspaper. After the floods, I wrote numerous articles that involved the community in various capacities — generally about funds post-flood, fires the department responded to, or events in the area. I also worked for a publication that covered the 2013 floods. I anticipated that some respondents might not think favorably of the news organization, the flooding coverage, or the journalism industry more broadly. To ensure transparency and minimize those concerns, I made it clear to each potential participant during recruitment that this Colorado State University master's project was in no way related to the news organization and their information could remain confidential.

The aforementioned efforts were sufficient in negotiating these challenges. Though many respondents were middle-aged, blue-collar men and women and I was a researcher and writer in my 20s, I do not think this hampered our interactions. I attribute this to my transparent approach and rapport-building efforts as I conducted research and met with residents, coupled with a genuine interest in hearing participants' stories. This is invaluable in good qualitative research (Lareau 1996; Fothergill and Peek 2015; Watson 2009). Working with gatekeepers and informants (Peek and Fothergill 2009) necessitated extra rapport-building efforts, and these steps helped me to earn entre into the community for the fieldwork process.

viii. Site Selection Justification

I chose Glen Haven as the site for my case study research for a number of reasons. First, while the 2013 Colorado Floods affected people across Colorado, the exceptionally hard-hit Larimer County community of Glen Haven (AAR 2015) presented numerous unique circumstances that can help add to existing sociology of disaster literature. The community is rural and, as I have discovered and corroborated, it is also largely without cellular phone reception (Opensignal 2016). This means residents might not have received many of the warning messages transmitted by emergency personnel along the Front Range, especially once water destroyed landline telephone service and electricity was knocked offline.

Figure 4: Glen Haven (red pin) in relation to the entire state Colorado (*Google 2016)*

This presented a special opportunity to study social ties and the improvised disaster communication. The community's geographic layout had already segmented the population. The Glen Haven Association, the property owners' group, spans much of the downtown area and

surrounding foothills. The Retreat Landowners Association is about two miles down the road. Each is generally comprised of older residents, many of whom live in Glen Haven part of the year or have longstanding property in the area. The floodwaters separated the former association into several segments and the latter association into an island of its own. This forced leaders and rescuers to craft creative ways of communicating among the multiple groups of people and among each other. In addition to examining social ties, Glen Haven's rurality and its residents' attachment to property — some of which has been in families for generations — provided interesting asides for exploration. Because Glen Haven is only a 45-minute commute from my home in Fort Collins, I was able to conduct frequent visits and on-the-ground research with residents.

CHAPTER II: REVIEW OF LITERATURE

Disaster researchers have examined evacuation and warning processes spanning sociological, psychological, and communicational boundaries. The following discussion explores key findings related to disaster research and begins by clearly defining and conceptualizing disasters. It then explores literature about the action-taking process, consumption of messages, conceptualizations of risk, and vulnerable demographics. This review then transitions to communications-based research into new media platforms — where much investigation into hazard warning is currently taking place — and efforts to better inform publics during disasters. It ends with existing research from the 2013 Colorado Floods.

i. Taking Action During Disaster

People move through key social psychological processes when making decisions to act and take protective action during crises and disasters (Mileti 1995). Often-cited elements of this five-pronged understanding include: a) hearing a message; b) making sense of the content; c) believing the message, d) personalizing how it can affect oneself; and e) deciding on a course of action. Warning systems that consider these five phases are considered among the most beneficial in working with vulnerable populations prior to an emergency (Mileti 1995).

The first stage centers on hearing — or reading — the warning message. This might include a warning siren, as is often the case in areas prone to tornadoes, or it might include a text-based warning that scrolls across a television news broadcast (Mileti and Sorenson 1987). Though hearing a message is understandably the first step in initiating evacuation protocols, residents might hear a message and instead dismiss its content as irrelevant or excessive (Anderson 1969; Mileti 1995).

Once the message is heard, it must be understood. By understanding, researchers refer to the process where residents attach meaning to the message (Mileti 1995; Foster 1980). That meaning can vary accordingly, depending on each recipient's own understanding of a situation. For example, when someone hears a flood warning has been issued, his or her interpretation might be of a wall of water racing down the river, akin to a dam burst, whereas other recipients might understand it as a gradual rising of the waters to the point where they crest the banks and inundate a community. Much research has been devoted to better comprehending individual understandings of events and efforts to foster a more generalized understanding. This is where emergency management planners devote a significant amount of educational time because "a public that is educated about a hazard, long before warnings are ever issued, will more readily understand warnings when they are issued in the future" (Mileti 1995: 2).

The third step in an evacuation process involves people believing the messages they hear. This relates closely to the second stage of understanding — notions of source credibility coupled with individualized experiences contribute significantly to the believability stage in hazard warning research (Quarantelli 1980, 1984).

Fourth is the personalization step, in which message recipients decide whether the hazard they are being warned about will directly affect his or her family, or if the risks being communicated are instead for another subsection of the population (Drabek and Boggs 1968, 1971; Mileti 1995). Levels of response to disasters are directly related to the degree that a hazard is personalized for the message recipient.

Only after warning recipients experience these stages do they then decide to respond to the warned hazard. It leads to confirmations and fosters more expansive information-seeking patterns where recipients will actively pursue details about the evacuation, the hazard, the

response and anything else related to the event (Mileti and Sorenson 1990). “Rarely are people overwhelmed by information in a warning context. Instead, there is an information void caused by uncertainty, particularly when rare or unfamiliar events are about to occur” (Mileti 1995: 3).

These five phases have particular relevance to Glen Haven’s flood disaster in September 2013. As will be discussed in the follow chapters, the first phase (hearing a message) might have proven to be among the earliest challenges for action-taking behavior. If it was heard in the rural community, part-time residents and vacationers who comprise much of the summertime population might not have been able to make sense of the content, or they might have doubted it in the first place. Others who experienced the 1976 Big Thompson Flood might have expected a wall of water and instead encountered days of steadily swelling streams. These are significant empirical questions to systematically explore. As the 2013 Colorado Floods continued, it is expected a greater degree of personalization occurred, ultimately resulting in certain varied courses of action. This remains another significant empirical question to explore here.

Mileti, Bourque, Wood, and Kano (2011) provide a slightly revised and more contemporary discussion about public motivations in preparing for and taking action during disasters. The authors wrote the key factors that influence the public to take action rely on a) seeing action others have taken — information observed; b) seeing information from multiple sources over multiple channels — information density; and c) receiving information about what preparedness action to take that explains how to cut losses and is consistent across messages — information content. “Partnerships between information-providing organizations are critical to maximize effectiveness, and leadership (much like an orchestra leader) is needed to weave the actions of partners together” (Mileti et al. 2011: 29). Applying this framework to a community such as Glen Haven which relied on different sorts of partnerships and information-providing

organizations during the 2013 Colorado Floods, presents an opportunity to add to this important literature.

ii. Messaging

The message is important to examine alongside the medium. Disaster researchers have long suggested that source, message consistency, clarity, medium, and guidance, among various other factors, are vital in conveying hazard information before and during hazard situations (Mileti 1995). That is to say, agencies issuing warning information must be clear to not contradict messages disseminated by other organizations (Clifford 1956; Mileti et al. 2011; Veil, Buehner and Palenchar 2011), and they also must provide clear messaging that fosters a greater sense of self-efficacy — the notion that individuals can take immediate steps to protect their own lives and property by following issued orders, which must be administered (Mileti 1995; Gruntfest 1977). It is important to understand what affects community and individual responses to specific hazard-related messages. This arena can generally be parsed into understandings of environmental cues, social settings, social ties, socio-demographic characteristics, psychological characteristics, and pre-warning hazard perceptions (Mileti 1995).

A great deal of overlap exists among environmental learning cues, social setting, and social ties. Environmental learning cues refer to the specific conditions at a given time that might affect how likely one is to take action if a hazard warning is issued (Drabek and Boggs 1968; Quarantelli 1980; Cutter and Barnes 1982). For example, residents who hear a flood warning are less likely to take action if there are clear skies — as will be examined in following pages, this was the case across a swath of the Front Range during Colorado's flooding event in 2013. The same phenomenon helps researchers understand why many at risk of a churning hurricane might be slow to react in the days before the system makes landfall. Weather conditions might remain

pleasant and not suggestive of a looming storm, despite the well-understood dangers. Environmental cues can contribute significantly to the message hearing, understanding, and ensuing action (Mileti 1995).

Social settings also contribute to residents' decisions to take action with knowledge of a looming emergency. Much research has documented the role of family unity at the time of a warning can affect the internalization of the message and ability of household leaders to take action (Fothergill and Peek 2015). In some places, a neighbor or friend choosing to evacuate can affect others' decisions and sense of urgency (Drabek and Boggs 1968,; Drabek and Stephenson 1971; Mileti 1995). Social ties research offers similar findings as it relates to small communities and reaction to hazard warnings. As experienced in Glen Haven, many residents relied on each other to both learn of the disaster and physically flee the area when waters tore through the community. In a way similar to the sandbagging efforts that spurred a community to band together as waters rose during the Grand Forks, North Dakota, flooding in 1997 (Fothergill 2004), residents in a geographically segmented Glen Haven worked together in small neighborhoods during the early days of the 2013 Colorado Floods.

There is not an all-encompassing set of determining factors that explains the evacuation behaviors for all people, and evidence continues to mount that depicts evacuation as a "contagious and cascading behavior" (Stein, Duenas-Osorio, and Subramanian 2010: 832) in which neighbors survey and communicate with other neighbors, increasingly conforming with the predominating social behavior (Stein et al. 2010). This notion of social ties is reinforced throughout existing research, showing the value of being engaged in one's community and drawing on social cues and collective perceptions in deciding when or when not to flee (Clifford 1956; Gruntfest 1977; Mileti 1981; Sorensen and Richardson 1984; Dash and Gladwin 2007).

Undoubtedly, multiple factors contribute to one's decision to evacuate and the question of who leaves and who does not during a flooding event. Age is among the most reviewed demographic factors, and findings indicate older individuals are less likely to heed evacuation warnings than are younger individuals (Mileti 1975). Gender research related to disaster finds that women are generally more likely to take evacuation messaging more seriously than their male counterparts (Fothergill 2004; Mileti 1995). And individuals and families who live in poverty are more vulnerable to natural disasters due to a number of factors including but not limited to residential siting decisions, types of structures, and constraints in taking important preparedness measures such as purchasing insurance or developing plans in the event that disaster strikes (Fothergill and Peek 2004; Mileti and Sorensen 1987). "These social and demographic traits are thought to represent constraints on, but not necessarily predictors of, the evacuation behavior of individuals, independent of their perceived risk, location in a designated evacuation area, and sources of information about evacuating" (Stein et al. 2010: 818). Moreover, fatal or injury events are more common in rural than urban areas due to resource and access limitations (Spitalar, Gourley, Lutoff, Kirstetter, Brilly, and Carr 2014).

There are other demographic variables that can affect one's ability to hear, understand, personalize and act upon hazard warnings and evacuation warnings. These include race (Fothergill and Peek 2004) as well as marital status, family situation, and other variables (Mileti 1975). For my research I focus on those elements most associated with the location in question, a predominately white rural community comprised of middle-aged and elderly men and women, many of whom are on fixed incomes or are engaged in blue collar work. Additionally, many participants reported being proud of their perceived independence, which they said has always permeated across the mountain community. This mentality (Spitalar et al. 2014) coupled with

aforementioned demographic characteristics provides an opportunity to add to the research and better understand how this all combined during evacuation efforts in the 2013 Colorado Floods.

iii. Risk Perception, Communication, and Messaging for Action Research

People's perceptions of risk before a disaster and the way a population interacts with actual warning messages, modifying behaviors accordingly, are pertinent toward understanding what happened in the early days of the 2013 Colorado Floods in Glen Haven. While this thesis addresses how residents learned about the flood and the need to take life-saving measures and ultimately evacaute through various dynamic social processes, it is important to note that people rely on lived experiences and intuition a great deal, even when faced with mandatory warnings (Slovic 1987). I provide a brief description of risk perception literature below, followed by discussion about the focus of this paper: communication and messaging from official agencies, news media, and social media, that contributed to evacuees' actions before the event as well as decisions to move to safety and act upon a hazard warning.

The word "risk" denotes many things and is used across many different contexts. Generally speaking, risk for the project at hand is defined as the "things, forces, or circumstances that pose danger to people or to what they value" (Stern and Fineberg 1996: 215). Broadly, this is defined with likelihoods or probabilities and can be used in discussing the chances of being victimized in a crime to sustaining property damages in natural disaster. Understandings of these risks change over time and influence behaviors, such as buying insurance or risking one's life. This awareness is dependent upon social, cultural, and psychological influences that can affect one's thoughts and actions before an event as well as during a disaster (Slovic 1999; McComas 2006). It is the communication of these risks during in the early days of the 2013 Colorado Floods that the remainder of this thesis explores — the ways residents learned about the threats

to their property and safety more generally and the ways those threats were communicated and acted upon by employing an array of communicative tools and social networks.

While communicating risk to the public differs significantly from crisis communication more tailored toward public relations, some overlaps have been noted in recent literature that are relevant to the project at hand. Among the most cited examples in communication research focusing on emergencies in the 21st Century is the Social Mediated Crisis Communication Model (SMCCM), which builds upon decades of communication research and bridges gaps among organizations, officials, and a variety of publics (Hughes and Palen 2012; Stewart and Wilson 2016; Liu, Horsley, and Levenshus 2010). As will be explained in more depth below, the SMCCM conceptualizes various different publics with various different connections to information regarding a situation, such as a natural disaster. The model then diagrams the ways in which that information might spread and, further, where officials can shape the messages being transmitted.

In developing the SMCCM, researchers expanded upon the dominant paradigms of Situational Crisis Communication Theory and Image Repair Theory. The former encourages decision makers to assess categories during an organizational incident including (a) crisis type; (b) severity of the damage; (c) crisis history; and (d) relationship history (Coombs 2007; Coombs 2015). Weighing the event on a continuum, it becomes easier to conceptualize the situation and identify an appropriate response strategy, according to the model. The latter addresses elements of image perception among the broader public and key stakeholders and provides a framework to address organizational image threats (Benoit 1997; Liu et al. 2012). For our purposes, this theory helps understand the tactics leaders can make in an effort to shape disaster-related messaging.

To be sure, crisis communication in an organizational or public relations context should not be conflated with risk or natural disaster messaging and encouragement to act. Crisis and risk communication are both essential in discussing disaster communication. Recognizing the overlap and associated research exploring source credibility and new technology is important in tracing the evolution of the SMCCM, which is continually being revised and now stands at a crossroads as a communications tool and as one of the methods by which emergency officials and publics can benefit in tandem.

Social media platforms and technologies have evolved to better accommodate needs and shape experiences (Hughes and Palen 2012; Stewart and Wilson 2016; Liu 2010). At the time of this research, 65 percent of American adults use at least one social media site, and that number has marched upward in recent years, increasing from a mere 7 percent in 2005 (Perrin 2015). A staggering 90 percent of adults age 18-29 now use social media, and the number of users 65 years and older continues to climb (Perrin 2015). Social media usage defies racial boundaries, and though it is more heavily used among affluent populations, the gap between lower and higher income households continues to narrow (Perrin 2015). These figures are representative of all adults — not just those who use the internet — and they demonstrate the degree to which social media is now ubiquitous in the United States (Perrin 2015). With disaster communications research increasingly exploring the role of social media platforms such as Twitter and Facebook (Houston, Hawthorne, Perreault, Park, Hode, Halliwell, McGowen, Davis, Vaid, McElderry, and Griffith 2014) interesting opportunities arise when probing the small number of communities, such as Glen Haven, that might not benefit due to connectivity limitations and rurality.

The phrase "social media" is considered "an umbrella term that is used to refer to a new era of web-enabled applications that are built around user-generated or user-manipulated content,

such as wikis, blogs, podcasts, and social networking sites" (Perrin 2015). They are also considered tools and/or applications that allow content exchange among and between audiences and organizations (Wright and Hinson 2014). Facebook and Twitter drive much of the academic research within the SMCCM, but social media may be expanded for these purposes to include blogs, forums, photo, and video-sharing platforms, social bookmarking outlets, and social networking sites more broadly (Austin, Liu, and Jin 2012).

Teams of public relations personnel and communicators in a corporate setting now create policies to handle social media-based product recall announcements or potential crisis events (Kim, Avery, and Lariscy 2009; Liu, Jin, Briones, and Kuch 2012; Taylor and Perry 2005; Coombs 2006; Schultz, Utz, and Goritz 2011). Similar uses of the SMCCM are also being emphasized outside of organizations. Emergency planners now take swift and serious steps to create direct relationships with residents and publics during emergencies (Hughes and Palen 2012; Stewart and Wilson 2016; Liu et al. 2010).

Importantly, the model distinguishes among three different publics that exist during an upset event (Liu et al. 2011; Liu et al. 2010; Austin et al. 2012). The first grouping of users is described as the *creators* of the social media and messages. These are the influential social media creators, including government organizations or emergency management groups that produce messages for others to consume. Second, social media *followers* receive and consume the message from the aforementioned social media content creators. The third grouping, the social media *inactives*, are people who receive and consume messages indirectly. The latter of these three publics may receive a message through word-of-mouth from acquaintances who belong to groups one or two. Additionally, social media inactives might receive crisis or risk communications via traditional media outlets that received the message directly from an

influential social media creator (Liu et al. 2012). These three publics comprise groups of people who consume messages before, during, and after crises, both directly and indirectly (Liu et al. 2012; Liu et al. 2010; Austin et al. 2012). This has significant ramifications for disaster communicators and sociologists, especially as these forms of communication remain widely used during events, including the 2013 Colorado Floods.

Still, there remains a debate about how *individuals* use those previous experiences to process those warnings and what leads them to take action (Lindell, Prater, and Peacock 2007). This is where risk communication and channel variety factors in, as is the focus in probing the 2013 Colorado Floods and communication in Glen Haven. Evidence indicates that traditional media outlets such as television news or online news sources might have stronger influence outside the evacuation zone and little influence inside the warned area. That is, outside of impact areas, media seem to heighten fear and unease, even though they may not directly influence people in evacuation zones to pack up and flee (Stein et al. 2010). Rather, in-person social experiences in some communities might contribute more significantly toward action decisions than other media warnings. For instance, "Civic associations, neighborhood schools, and parent-teacher organizations might be mobilized before hurricane season as an outlet for customized information about whether, when, and how to evacuate and respond to an approaching hurricane" (Stein et al. 2010: 832).

This speaks to the importance of having social ties with people who were leaders or were otherwise "in the know" about the increasingly dangerous situation. Past experiences and historical expertise also contribute to this idea. Many residents in Glen Haven vividly remember a destructive flood in 1976 that tore through the area, causing similar damage and resulting in similar evacuation efforts. I suspect, and the literature supports, that residents with that historical

knowledge used this information in making their decisions September 2013 and brought that information to their social networks.

While studies examining the effectiveness of government messaging through old media (television and newspaper bulletins) have shown mixed results (McComas 2006; Rowe, Frewer, and Sjoberg 2000), little research has been conducted that evaluates how effective new media like Twitter and Facebook have been. A recent blend of social media literature and risk and crisis communication research has resulted in new sets of best practices on the part of government agencies and disaster response units, and it affords great opportunity for future development (Veil, Buehner, and Palenchar 2011). Social networking sites have changed the way initial information is disseminated after natural and man-made disasters, spanning wildfires and floods to terrorist attacks and civil uprising. "Firsthand reporting by people on the scene possessing nothing more than a cell phone provides almost instantaneous news which then spreads rapidly among peoples' networks of contacts and friends" (Veil, Buehner, and Palenchar 2011: 110). In some ways, new media act as a "democratizing agent in lesser developed countries" (Liu 2010: 1176) post-disaster.

> …[S]cholars have called for research that bridges disciplines to accommodate these changing media conditions and combines community informatics with crisis management to understand how 'information and communication technologies should be designed and deployed to engage, inform, and mobilize volunteer and citizen networks (Veil, Buehner, and Palenchar 2011: 111; Shankar 2008: 116).

When it comes to research for this thesis it is important to bear in mind that these developments are related to online-oriented communication patterns through, among other channels, social media. However, as will be explored in subsequent sections, other communication channels played an equal or even more important role in Glen Haven during the 2013 Colorado Floods.

Specifically, residents depended on face-to-face communication and in-person social connections — some stronger and pre-established and some weaker and newly formed — in learning about rising water and potential risks to life and property. Granovetter (1978) provided some framework that helps us understand how a group of residents nears a threshold of sorts when it comes to deciding to evacuate. Likewise, there is strength in weak ties (Granovetter 1973), meaning that a range of less-formalized or regularly drawn-upon interpersonal social ties can influence individuals across a community such as Glen Haven as residents weigh what actions to take. People can be influenced by the decisions of their peers in learning both what life-saving activity they might consider as well as choosing whether to stay or go. Evolving forms of communication reiterate the need for further investigation of the blurred lines between social media and interpersonal, face-to-face, communications during times of disaster (Widener, Horner, and Metcalf 2013).

iv. Credibility and Trust

Credibility in both information channel and originating source generally refers to user-based perceptions that might include elements of believability, accuracy, and fairness (Gaziano and McGrath 1986, as cited in Johnson and Kaye 2015). Audience retention before, during, and after a disaster is largely dependent on perceptions of credibility. That is, if credibility in a person or group providing information or in the information channel itself drops, populations might migrate to a separate source or opt for a completely separate medium that they deem trustworthy (Johnson and Kaye 2015). This has ramifications during disasters.

Uses and gratifications theory helps explain why people consume different media messages from distinct media outlets in varied ways. Related research examines: a) how people use media to fulfill various needs; b) what motives are behind media behavior; and c) what

functions or consequences follow from needs, motives, and behavior (Katz, Blumler and Gurevitch 1974 as cited in Bryant and Oliver 2009: 166). Uses and gratifications research appears sparsely in emergency communication research, primarily in explaining the psychological reasons for why people comment on blogs or use certain forms of social media (Johnson and Kaye 2015). Gratification of social needs, as opposed to informational needs, is an emerging area of research in the realm of social mediated communication. Credibility research, in an ever-diversifying media landscape, will likely expand in coming years (Johnson and Kaye 2015).

Media also fulfill more generalized needs including information seeking, socialization, and emotional support (Urista, Qinwen, and Day 2009). Social Information Processing theory, computer mediated communications, and areas of research surrounding of the effects of Internet usage (Bryant and Oliver 2009) are also ripe with developments and areas for future research as it relates to crisis management via all forms of communications, particularly the social media variety.

Message dissemination and content sharing (including links to traditional media articles or first-hand reports) remain a hotbed for communication and sociological inquiry. Newly rigorous research interrogates the types of tweets shared during both crises and natural disasters, and findings indicate that cautionary or adversarial message creation is often the most dominant type of message (Imran, Elbassuoni, Castillo, Diaz, and Meier 2013). That category is followed by messages that link to traditional media reports or other website information, outlets to donate toward a cause, or specifics about damages or fatalities (Imran et al. 2013). Greater research focused on Twitter usage is also being conducted regarding the role of emergency planning organizations in the lead-up to a disaster. Spence, Lachlan, Lin and del Greco (2015) found that

Twitter's popularity is both a blessing and a curse in the run-up to natural disasters such as hurricanes. While specific, proactive messages are generally viewed as a benefit, those cautionary messages of preparation and steps to ensure safety are often lost amid a crescendo of other messages (Spence et al. 2015).

Researchers have also begun to evaluate the rampant spread via social media during and after natural disasters of three types of information: a) secondhand accounts (news sources); b) messages coordinating relief efforts; and c) messages memorializing victims (Takahashi, Tandoc and Carmichael 2015). Additional publics are identified in regards to individuals in the affected region or outside of the affected region (Takahashi et al. 2015). This echoes many of the theoretical foundations of the SMCCM.

Building upon the SMCCM, research has shown that social media consumers use the platforms during upset events and crises so that they can obtain insider information and to check in with family or friends (Austin et al. 2012). Whereas traditional media sources are used to better understand a situation, audiences rely on Facebook, computer-mediated communication, and text messaging to share or obtain information as insiders as well as communicate with friends and family (Austin et al. 2012). As will be explored in more depth, family members of Glen Haven residents combed social media channels in search of any information, photo, or tip that their loved ones were safe.

There is nowhere near a universal acceptance for how exactly new social media tools should be embraced for issuing hazard warnings (Kim et al. 2009). Contradictory suggestions about the role of sympathy during crisis (Coombs and Holladay 2012) linger, even after years of examination. Methodologically, experimental surveys involving fictitious events have yielded results that boost many claims, yet it remains difficult to conduct longitudinal studies of

organizations' crisis communication efforts and the effects on image and reputation (Veil, Buehner and Palenchar 2011; Utz, Schultz, and Glocka 2013).

v. On-Scene Communication

As it relates to disaster communications, the role of the public information officer, speaking on behalf of emergency response organizations, has changed in recent years. Incident commanders and public information officers increasingly use Twitter as an information pathway for both text and images to communicate to multiple traditional media that, still today, are the predominant disseminating source of disaster warnings and public safety threats (Hughes and Palen 2012). Similarly, in times of disasters, many emergency management practitioners have blazed trails in the field of social mediated crisis communication, as was seen during the 2013 Colorado Floods. St. Denis et al. (2014) found that a team of crisis communicators and emergency management leaders were among a minority in the field due to their extremely aggressive use of social media, especially Facebook and Twitter, during a deadly days-long emergency. The study speaks volumes to the ever-changing field of disaster and crisis communications in a landscape full of social media options. "We can have conversations with the citizens, and they with one another, in a public forum for all to see. Through this type of dialog you start to understand your community and what is important to them," a practitioner told the authors. "That is invaluable**"** (St. Denis et al. 2014: 7).

This review of literature spans a variety of bodies of research exploring areas related to communicating disaster. These aforementioned topics are especially relevant in understanding what happened in Glen Haven, Colorado, during the 2013 Colorado Floods. First, it is important to understand the processes that residents historically move through in deciding whether they will take action upon receiving word of a natural disaster. As was unique to Glen Haven,

evacuating before the storm was less of an option, and the physical barriers of rising rivers prevented many in the community from getting out. Second, understanding the types of messages and mediums employed during the disaster is important, as is understanding how those messages were used by leaders and consumed by residents. It appears many messages went unheard in Glen Haven due to connectivity issues in this rural mountain community, raising interesting questions about how residents remained informed about dangers and evacuation efforts. And third, tracing the network-driven communications among residents and juxtaposing that against disaster communications studies will advance understandings about reaching isolated populations in the early stages of natural disasters.

In an age of disaster communications when so much emphasis is placed on social media outreach that targets all at the click of a button, isolated communities such as Glen Haven remain an important outlier. While there is much that is known about new media and messaging, it is important that not all research abandon rural communities that rely on a complicated mix of media communication new and old, social ties, and historical personal intuition in making life-saving decisions during life-changing natural disasters.

CHAPTER III: METHODS AND RESEARCH DESIGN

Qualitative research can provide an opportunity to learn about residents' lived experience regarding situations spanning disciplines (Ravitch and Carl 2016; Weiss 1994; Emerson, Fretz, and Shaw 2011; Ragin, Nagel, and White 2004). Qualitative research seeks to: a) add depth rather than breadth to a topic; b) learn about how and why people behave, think, and act the way they do; c) study micro and macro-level occurrences; and d) discover rather than verify (Ambert, Adler, Adler, and Detzner 1995). As I discuss in the following pages, I used several qualitative research methods to address the aforementioned research questions. Methods included focus groups, in-depth semi-structured interviews, participant observation, and document analysis involving online media and video. Using multiple methods allows research to answer relevant questions more completely and accurately (Ravitch and Carl 2016). Data collection spanned January to October 2016, and I continually refined my research questions to ensure they were meaningful, answerable, and reflective of the gap in research surrounding emergency evacuation communication in rural communities during flood events. This iterative process is part of the qualitative research process (Lareau 1996; Curtis, Gesler, Smith, and Washburn 2000).

Total participants in research study	N=20
Focus group participants	N=9
Individual interview participants	N=11
Average age of participants at time of flood	61.3 years
Median age of participants at time of flood	62 years
Glen Haven estimated year-round population	165

Figure 5: Project and community figures

i. Target Groups

I worked with two distinct groupings of people. The first consisted of individuals who served in some capacity as leaders during the 2013 flood emergency in Larimer County and Glen Haven. By leaders, I mean people to whom others looked for information, guidance, or assistance during the event and which helped shape their decision-making processes (Mileti 1995). For this project, these leaders consisted of members of the Glen Haven Volunteer Fire Department, which was and continues to be the primary emergency response agency for the community. I also included representatives from the Larimer County Sheriff's Office, which has jurisdiction in the area, as well as elected officials from the Glen Haven Association, which served as the informal leadership group for the community. Glen Haven is unincorporated, so there is no town board or city council. Additionally, I considered journalists as leaders due to their essential role in communicating news about the disaster to the general public outside remote areas as well as their powerful role in publishing information and setting the tone across the Front Range in the opening days of the disaster. I identified these individuals by reviewing print and television media reports from the disaster, as well as community and county planning documents and reports during the recovery efforts.

Upon identifying several leaders, I sent emails asking for their participation in a Colorado State University master's thesis project and explained the value their input could have for other populations that might be prone to similar disasters (Appendix II). These individuals lived in the area year-round. It was easier to schedule a time for an interview with them in the winter and spring months, a time when many property owners live outside of Glen Haven or outside of Colorado more generally. To begin forming my network sample of leaders, I drew on existing contacts and built on my initial rapport with them, which helped in recruiting efforts with some

first responders. This group of leaders provided an official recount of the evacuation efforts and logistical considerations that helped to guide subsequent inquiry. Additionally, some respondents also served as gatekeepers to the second segment of participants, and they helped accommodate purposive snowball sampling (Ravitch and Carl 2016; Bucerius 2013; Biernacki and Waldorf 1981), or network sampling. In total, I interviewed five people whom I characterized as leaders.

The second grouping of people for this research project encompassed people who were property owners or residents at the time of the 2013 Colorado Floods. I recruited participants through snowball sampling and with the assistance of a gatekeeper who served on the community's neighborhood association. I contacted these individuals in the summer and interviewed them throughout summer — as indicted previously, many people reside part time in Glen Haven. I used two focus group arrangements in addition to semi-structured interviews to interview a total of 15 individuals whom I categorized as evacuees. This brings the total number of participants, both from interviews as well as focus groups, to 20.

It is also worth noting these 20 participants represented many characteristics of Glen Haven residents. In total, I recruited 11 men and nine women, the majority of whom lived in the community year-round and were also retired or semi-retired. Additionally, participants in this project spanned a range of professions, both past and present. Two participants worked with the fire department during the flood, and two more were affiliated with the volunteer agency either as board members or retired officials — important given the focus here on immediate disaster response. Adhering to selection criteria and recruiting participants from a host of backgrounds, first responders to elderly couples, findings thus represented much of what it meant to experience the 2013 disaster in Glen Haven.

ii. Gaining Entrée

In qualitative research, it is essential that researchers both situate themselves and consider how they will gain access — entrée — to the populations in question (Ravitch and Carl 2016; Fothergill and Peek 2015). I drew on numerous personal characteristics in working with my first segment of participants, the leaders, which helped establish my credibility. Specifically, I emphasized my journalistic background and especially my familiarity with working with first responders. I also highlighted my experiences with investigating disasters and similar public safety situations, ranging from wildland fires that forced evacuations to vehicle crashes that closed area roadways. Upon meeting with the firefighters, I revealed my training as a wildland firefighter and emergency medical technician, both of which furthered my rapport and broke down some researcher-participant power discrepancies (Wallerstein 2002). In interviewing the journalist who reported on the floods and recovery, I drew on existing professional connections. I already had rapport with several journalists.

For entrée with displaced individuals, I drew on a newly established relationship with a leader of the neighborhood association that governs most of the community. Identifying this leader through news reports and contacting him through email, and then an in-person interview, proved beneficial, as he introduced me to a crowd of more than 100 people at the association's annual meeting. Twice at this widely attended gathering of part-and-full-time residents, this gatekeeper vouched for me and encouraged residents to sign up for an interview to assist in my research. This facilitated recruitment of many project participants. As an aside, this meeting served as an important site for participant observation that helped better inform my understanding of governance within Glen Haven and the ongoing recovery efforts from the 2013 Colorado Floods.

iii. Interviews

I conducted semi-structured in-depth interviews with 11 participants. In-depth interviews are one of the hallmarks of qualitative sociological research and can act as a lens into other people's lives (Weiss 1994; Ravitch and Carl 2016). Interviews are a major source for data in qualitative research because they help develop contextualized descriptions of experiences and perspectives, allow for the integration of multiple perspectives, add depth to a concept, and can bridge intersubjectivity between researchers and participants (Weiss 1994; Ravitch and Carl 2016). Interviews allow for a wide range of questions including those about: a) experiences and behaviors; b) opinions and values; c) feelings; d) knowledge; e) senses; and f) background or demographics (Ravitch and Carl 2016: 153). Interviews have been used with great success across disciplines (Weiss 1994) and are particularly useful in studying post-disaster environments (Fothergill and Peek 2015).

For my research, I crafted a detailed interview guide (Appendix IV) and regularly added and subtracted some questions as research questions evolved. I drew on my skills as a journalist who interviews people professionally, and this allowed me to stay flexible and adjust question sequencing based on what each respondent says (Weiss 1994). Rather than having to probe for answers to each of my 30-plus questions, participants regularly answered subquestions as they shared chronologies of their evacuation experience. This allowed me to check off each subquestion throughout the interview and avoid redundancies, thus allowing for a more fruitful interaction during our time together, generally spanning one-to-two hours at respondents' homes. It made follow-up questions more natural and ensured we addressed all pertinent topics within the allotted time (Weiss 1994; Lareau 1996).

iv. Focus Groups

In addition to semi-structured interviews, I conducted two focus groups, which allowed for interaction with nine participants. A focus group can be considered a "carefully planned discussion" that is aimed at collecting perceptions on a pre-determined area of interest (Peek and Fothergill 2009: 31, drawing on Krueger 2002). Focus groups are a data collection method where the interaction in a group is the source of data, and the researcher plays an active role facilitating that in-group discussion (Morgan 1996). These methods incorporated into the evacuee phase of the research project facilitated group discussion and furthered my understanding of residents' lived experiences during the flood, especially on topics I had not foreseen such as the role of the automated 911 telephone call advising residents to seek shelter or the ways in which respondents interacted with each other and the National Guard early in the disatster. Focus groups allowed this to occur in a more relaxed environment where participants could engage with one another organically rather than face potentially overly regimented researcher questions (Weiss 1994).

While similar to group interviews, a focus group's goal is to encourage interactions between participants rather than back-and-forth exchanges with the researcher. The first focus group was comprised of four participants, the second focus group was comprised of six, and both were held at the fire station in downtown Glen Haven in August 2016. As expected, the conversations had throughout both of these group interactions illuminated much about their shared experiences as well as further illustrated how socially tied residents in this community were. I had planned to conduct focus groups more widely throughout the research project. However, scheduling conflicts with the first group of leaders and first responders posed logistical challenges (Peek and Fothergill 2009) and made this unrealistic. To adjust, I incorporated individual interviews — including two with married couples — that were easier to schedule.

Focus groups can be used as a stand-alone method during a research project. They can also be used to shape survey development or precede more in-depth semi-structured interviews. They can provide a "breadth" of information that interviews can then explore in greater "depth" (Morgan 1996: 134). The gold standard for the number of focus groups to be incorporated into a study is three to five (Peek and Fothergill 2009) or four to six (Morgan 1996). This is the point at which data become saturated. Likewise, research suggests managing three-to-five individuals in a group is ideal, though group size can vary widely (Peek and Fothergill 2009; Morgan 1996). I encountered this group size variation when I met with both groups and community members invited others to join. Rather than turning anyone away, I welcomed the chance to hear his or her perspective. Smaller groups tend to foster a greater sense of equality among participants and a greater sharing of the metaphorical or physical stage for conversations (Peek and Fothergill 2009). Still, it is important to think through power dynamics, potential risks, and ways of overcoming challenges before sitting down for the interaction. Follow-up questions individually with some participants after the interviews accommodated further exploration of some themes that emerged during the focus group interaction (Peek and Fothergill 2009).

v. Data Saturation

These two in-person forms of data collection were essential to understanding the lived experiences of individuals and to better ascertain the situation that unfolded in Glen Haven. Though the in-person data collection efforts could have continued indefinitely, I was bound by practical limitations of both time and funding. For that reason, I conducted research until I reached data saturation, a qualitative research standard that guides purposive sample sizes and is regularly met after conducting interviews with approximately 12 participants (Guest, Bunce, and Johnson 2006). Though there are a number of ways researchers have described the concept,

Bowen (2008) wrote that "…saturation is reached when the researcher gathers data to the point of diminishing returns, when nothing new is being added" and it is "the point at which no new insights are obtained, no new themes are identified, and no issues arise regarding a category of data" (Bowen 2008: 140). I absolutely encountered this upon interacting with my 20th participant. At that point, neighbors' renditions about the events had been corroborated multiple times and a clear picture emerged about the early days of 2013 Colorado Floods.

vi. Other Data Sources

Interviews and focus groups comprised the bulk of my research. However, I incorporated additional qualitative research methods, including document analysis and participant observation to more completely understand the disaster as well as the community's dynamics more broadly. Several government agencies have produced and disseminated "official documents" (Ravitch and Carl 2016: 171) that summarized the disaster's effects. These reports included publicly available state and county-level after action reports that chronicle response actions, successes, and areas for improvement. There were also numerous meteorological documents available that traced the formation of the storm system as well as press releases that were published by local, state, and federal emergency management agencies and relief organizations. These records were available online and helped shape my understanding of the means and channels used in communicating hazard information throughout the event. Moreover, I compiled and referenced Twitter postings that the Larimer County Sheriff's Office disseminated during the flood, ultimately gleaning that some messaging had been targeted for the communities in question, as I initially suspected. As indicated previously, emergency organizations and residents are increasingly using social media outlets during disasters, and this area is ripe for development (Houston et. al 2014; St. Denis, Palen, and Anderson 2014; Liu et al. 2012).

I also engaged in participant observation during the community meeting. Participant observation involves spending time with the residents in question, observing how people interact with one another. These rich details can provide a "yardstick" (Becker 1957: 28) that can help researchers measure completeness of a project. Additionally, these details can be captured in lengthy fieldnotes that then become another source of data for analysis (Emerson et al. 2011). To capture some of this rich detail and more completely uncover the lived realities in this community. The nearly two-hour community meeting opened with a prayer and remembrance of the community members who passed away during the 12 months prior. It then turned to discussions about the disaster recovery and ongoing rebuilding efforts, leaving many to voice questions and concerns about their property. Importantly, I was struck by how it seemed everyone knew everyone, each attendee referred to the other by name, and there was no shortage of people willing to volunteer to serve on additional boards or civic groups — all ideas that further shaped my research questions and understandings of the community's social ties. Utilizing this method ensured my final report was as specific as possible. This is essential for compelling qualitative research. "…Description calls for concrete details rather than abstract generalizations, for sensory imagery rather than evaluative labels, and for immediacy through details presented at close range" (Emerson et al. 2011: 58).

vii. Data Management

As it encompassed the bulk of my research project, managing the data was a regimented and systematic process. All interviews were recorded on my personal iPhone and then promptly uploaded to my personal MacBook Air computer. I then loaded them into iMovie, slowed them down to an appropriate speed, and transcribed verbatim into a Microsoft Word document. During the transcription process, which followed the bulk of the interview phase, I made in-page memos

using the software's insert note option. These memos included details that I recalled while transcribing (i.e. whether a participant decidedly avoided eye contact while answering a certain question) as well as thoughts I have while listening to interviews (i.e. possible codes, themes, or other questions that come to mind). This technique built on Emerson et al. (2011) who encouraged maintaining, "a brief written record of events and impressions captured in key words and phrases" (p. 29) while in the field and throughout the research process.

I used a similar method for the focus groups. I captured audio on my personal iPhone and then uploaded these files to my personal computer for verbatim transcription, memoing and pre-coding. Each transcription included a face sheet that documented basic information about the interview location, time, date, participants, and elements of consideration (Saldaña 2016). I included field notes and other related memos to these transcriptions, all of which provided a wealth of information for supplemental data analysis. Fieldnotes are essential within this type of qualitative research, and I worked to meticulously document thoughts and reflections after every trip to Glen Haven.

As stipulated in my Institutional Review Board protocols, all physical paperwork including consent forms and written notes were kept in a secure location during the research process, and they will remain stowed for three years. I stored digital files including audio-recorded interviews and digitized transcriptions on my personal computer as well an external USB drive. To aid in providing a safe interview environment, I made it clear to participants that their statements could remain confidential if they wished. Nobody requested confidentiality, and each participant was willing to recap in-depth their experience. One participant, however, asked that her name not be used in the final report. As a precaution, I created pseudonyms for each of

the 20 participants. As expressed in Ravitch and Carl (2016), "preserving confidentiality can be complicated" (p. 348). This is especially true in case study research.

viii. Coding

My primary data for analysis included field notes as well as verbatim focus group and interview transcripts. I reviewed each through an iterative, on-going process of review and coding. First, I pre-coded (Saldaña 2016) the text and used highlighting/bolding/jotting pattern to make a cursory analysis of the transcripts (Emerson et al. 2011). I then moved through more systematically and applied codes to my transcripts using Saldaña's (2016) approach and understanding of a code as "a short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldaña 2016: 4). This type of first-cycle coding allowed for the emergence of numerous codes that I grouped together and analyzed more systematically.

These codes included explicit words and phrases participants said such as "check on me," "isolated," and "tightknit community." I identified dozens of these key words and phrases and maintained lists of them. I then grouped them into categories, such as "resourceful," "role of telephone," and "neighbors helping neighbors." Continuing this iterative process, I made a third pass through transcripts and revisited my codes, ultimately identifying seven distinct themes in the form of short sentences that related to the research at hand. I was ultimately able then to connect these themes to the explicit research questions and derive my conclusions and assertions (Saldaña 2016). In addition to coding, I distinguished meaningful quotations that spoke directly to emerging themes, and I provided analysis to each (Ravitch and Carl 2016; Emerson et al. 2011).

While there is significant overlap between coding individual interview transcripts and focus group interview transcripts, there are some important distinctions. I had to be conscious of what level of analysis I was using — the group or the individual. Focus group transcriptions were coded at a general level (open coding) and then analyzed for patterns. This can all be done in a way similar to individual interview coding, and then I derived broader themes (Peek and Fothergill 2009). In probing how researchers can be consistent with their reports and themes that stem from qualitative data, Armstrong, Gosling, Weinman, and Marteau (1997) wrote "there is indeed a degree of consensus in the identification of themes between the different analyses but that the 'packaging' of these themes showed a number of different configurations" (p. 604).

Systematic inquiry and reflection throughout data collection and analysis has shown, as outlined in this chapter, that refining a project's focus and carefully considering data stand to bolster overall research findings. Flexibility is paramount. "In my efforts to capture social reality as comprehensively as possible, I forgot about the need for a focus" (Lareau 1996: 223).

ix. Ethics and Logistics

I received Colorado State University Institutional Review Board approval in October 2015 to conduct my research. While there was some variation in questions, timing, and exact methods since first proposed, the project generally continued as planned. As mentioned previously, most qualitative research seeks to ensure participant confidentiality. However, this becomes more complicated in rural communities where residents will most likely be identifiable among one another based solely on their role or lived experience. This was an area of consideration that I continually grappled with in preparing this final thesis. All but one resident knowingly and voluntarily agreed to have his or her name associated with research. However, erring on the side of caution, I used pseudonyms for each participant. Though they will likely

recognize who is who if they read this document, efforts taken to ensure some anonymity only help to bolster the rigor of this research project.

That key ethical consideration aside, I sporadically encountered minor ethical concerns that arose but was able to negotiate each, many of which regularly accompany post-disaster research (Peek and Fothergill 2015). Some of this was unavoidable. After all, I asked participants to share stories from some of the most difficult days of their lives to an outsider (Dwyer and Buckle 2009; Bucerius 2013). What they shared and what I put into a final report could showcase some unresolved conflict that has stemmed from the disaster between groups of people or individuals, and this could create harm. To mitigate the former I drew on my skills as an interviewer and active listener, showing an appropriate amount of empathy and willingness to understand. I reminded respondents that the stories they shared stood to benefit others who might be experience similar situations post-disaster. This, I think, empowered many respondents and helped to keep the interview focused.

If the community is interested, I would like to prepare a one-sheet of findings and share this with Glen Haven residents during a public forum. My research adds to the academic literature that seeks to better understand decision-making and life-saving action and patterns within a disaster. Equally important, I believe my findings deserve to be shared with the community, potentially empowering residents or leaders with new insight into what happened when the rains started falling in September 2013. This will also be a chance to interact with interested residents, showing that my research was not exploitative or merely for my own benefit but rather the benefit of everyone involved.

x. Limitations

No study is perfect, and mine is no exception. I have identified three limitations with this research design and my efforts to address each. First, these interviews were conducted nearly three years after the disaster happened. While rebuilding efforts are ongoing and residents continue to reflect on this disaster, the time since the disaster no doubt affected the quality and richness of the data. This is regularly a challenge with natural disaster research. (Kreps 1984). It is possible that some participants might not remember exact details about the disaster, or their thoughts might have been influenced over the years as a result of continued conversations on the matter. To combat these closely related memory-based imitations, I used in-depth interviews (Ravitch and Carl 2016) and was careful to recognize interview markers (Weiss 1994) while deploying a rigorous guide (Weiss 1994) designed to help elicit the rich details that might at first contact seem to fade away. Further, where possible I encouraged participants to consult diaries, photos, or other items prior to and during our meetings so as to jog any lapsed memories and ensure the richest and most accurate recall possible (Moore and Zoellner 2007; McKinnon, Palombo, Nazarov, Kumar, Khuu, and Levine 2014).

Second, while the population of Glen Haven is relatively small, it is unrealistic for this particular master's thesis to interview every resident who was affected by the flooding. As such, there was the potential that some lived experiences might have gone unheard for this study, or others that do not necessarily represent realities of others could be highlighted in the final report. However, my project addresses this concern by employing numerous recommendations throughout qualitative research literature regarding: a) purposive sampling to identify the most rich experiences to answer the research questions (Ravitch and Carl 2016; Biernacki and Waldorf 1981); b) gatekeepers to receive access to the population (Ravitch and Carl 2016;

Bucerius 2013; c) focus groups to expand the sample size (Ravitch and Carl 2016; Peek and Fothergill 2009; Morgan 1996); and d) member checks and multiple qualitative methods to ensure data corroboration and quality qualitative research (Ragin, Nagel, and White 2004; Ravitch and Carl 2016; Small 2011). Following Lareau (1996), I continuously referenced my research questions and kept focus on answering those as clearly as possible. My evidence from interviews with these participants provides a rich set of narratives that are generally representative and encapsulate what it meant to experience the disaster in Glen Haven.

Lastly, the 2013 Colorado Floods presented an unusual situation in this community that might not result in findings that are generalizable to other areas of the U.S. or even elsewhere in Colorado. Communities near and far might differ, as might disaster risks and the ensuing response. However, the strength in qualitative research is not necessarily about creating broad generalizable findings. Rather, the strength of qualitative research is adding a degree of depth and context to situations, further exploring lived realities and how they differ across groups of people (Ravitch and Carl 2016; Weiss 1994; Emerson et al. 2011; Ragin, Nagel, and White 2004). Still, as I explain throughout this thesis, these findings offer insights that can prove useful far beyond the quaint mountain town of Glen Haven, Colorado.

xi. Other Remarks

When rains started falling across Colorado in September 2013, it might have seemed like a typical late-summer monsoonal storm. But what occurred in the following week was a catastrophic flooding event that claimed 10 lives, destroyed 1,882 structures, forced more than 18,000 from their homes, and directly affected 18 counties across the state. Fourteen counties were declared state and federal disaster areas before the waters receded. And on September 14, 2013, President Barack Obama signed a major disaster declaration for Colorado — the fourth in

14 months (FEMA 2015; AAR 2015). The state that fought wildfires a year prior found itself struggling to find its footing and ability to adjust to the new normal of tragedy.

The torrents that poured down the mountain decimated Glen Haven. The aftermath reminded many longtime residents of the devastating flooding that happened 37 years prior in the nearby Big Thompson Canyon. Forecasters would deem both floods as 1,000-year events, meaning they had just a 1 in 1,000 chance of occurring in any year (AAR 2015; USGS 2006). Residents now are keenly aware of the increasing social and economic costs associated with natural disasters in the United States and abroad (CRED 2015; World Bank 2010). And as rebuilding efforts continue, a cloud hangs over several who wonder how long it will be until the next disaster strikes this idyllic northern Colorado mountain town.

In the chapter that follows, I examine and interrogate my data, identifying important patterns in my findings and connecting them to my research questions and larger theoretical and sociological issues.

CHAPTER IV: FINDINGS AND ANALYSIS

It was 5 a.m. on September 12, 2013, when Eliza Elwell called her son's school, trying to alert a bus driver that her teenager would have to get picked up for class farther up Larimer County Road 43, nearer downtown Glen Haven. A swollen West Creek was lapping over her driveway, among the first dirt paths to peel away from the often-busy northern Colorado tourist route. As the rain poured down in the pre-dawn light, she remembered the bus garage boss chuckling at her suggestion. Eliza did not know why until he began talking about roads up and down the canyon disappearing at an alarming rate. A bus was out of the question. It was not just her driveway that affected by rising water. "We knew nothing about further downstream," she said. "Nothing."

About that same time Thursday, just a couple miles down the road from Eliza, retired physician Tom Ferrell awoke in his sprawling log home at the end of a dirt road, perched on a hill overlooking Fox Creek. The home phone rang, and an automated voice advised him to shelter in place. He walked outside to inspect his rain gauge that holds about 3.5 inches of water. He emptied it before he went to sleep Wednesday night. It needed to be emptied again.

Over a steep hill and across the now-raging Fox Creek lived Dan and Sarah Gandy, who spent the previous night putting final touches on the basement they remodeled in the family cabin, a stone's throw from the normally trickling North Fork River. But on this morning, water climbed closer to the footbridge connecting the road to the decades-old log home that Dan Gandy had helped build. He knew the foundation could handle a little water, but he was getting worried. The roots of towering pine trees soon lost their grip and crashed across roads, into waterways, and onto homes. The Gandys stuffed some valuables into a trash bag and waited to

make their escape up the steep hillside behind the house. “It was unbelievable,” Dan Gandy said. “The river was already coming up. It was getting louder. It was getting louder. It was getting louder… I mean it was flooding. But it was just a glimpse of things to come.”

Twenty miles down the winding Big Thompson Canyon, the river had swelled beyond its banks and chipped away at Highway 34, a bustling tourist route connecting the mountain getaway communities with the more populated Front Range. Here, Sean and Laura Jeffs awoke to a pair of phone calls. The first was an automated voice talking about the road being compromised near Glen Haven. The second call, about 15 minutes later, was from their son who was staying at the family cabin in Glen Haven. Water was up to the steps and climbing higher, he told them. He and his wife needed somewhere to go. Fast.

Before the sun rose that Thursday, hundreds of residents received automated phone calls urging them to shelter in pace. Nate Carr was digging his heels into one of the most exhausting communication campaigns of his career as a public information officer for the local sheriff’s office. Christine Buel, a journalist at Colorado’s largest newspaper, did not yet know she would be the *Denver Post* reporter assigned to the disaster. And nearly two dozen firefighters with the Glen Haven Volunteer Fire Department began to realize how the flood would change lives, showcase skills, and test their town over the next 10 days and beyond.

These are just a few of the hundreds of experiences from people directly affected by the 2013 Colorado Floods in the otherwise sleepy mountain community of Glen Haven. As the water made its three-mile tear down Fox Creek and North Fork River, it wiped out low-lying structures, vehicles, and trees, creating a series of cut-off communities of people ranging in age and ability. At its confluence in downtown’s West Creek drainage, the water jutted to the left, its volume far surpassing anything people had witnessed before. Residents realized the rising water

was different from the benign, high runoff of spring snowmelt. The river then barreled to the east, paralleling the two-lane Larimer County Road 43 for 9 miles before emptying into the Big Thompson River. For days, the water took shark bites out of U.S. Highway 34, effectively isolating mountain communities such as Glen Haven from the outside world, from loved ones, and from massive information and evacuation efforts developing across Colorado.

Given their community's remoteness, Glen Haven residents did not often have reliable cell phone reception even on a clear day. During the disaster, residents and first responders had to utilize alternative means to communicate about the emergency, largely through automated 911 telephone calls to landlines in town. Hours later, however, that telephone and electrical infrastructure was decimated, leaving residents to innovate new ways to communicate with one another — sometimes with handmade signs waving across the river and other times with a hand-written note stuffed in a plastic bag with a rock, heaved back and forth across the water.

Residents rallied one another during the evacuation, ultimately working extensively with the Glen Haven Volunteer Fire Department and the U.S. Army Air National Guard in a major zipline and air rescue effort. Though Glen Haven was prone to issues with isolation and other physical barriers, the community's experiences provide important lessons for other rural communities and emergency planners preparing for natural disasters.

Figure 6: A Glen Haven resident uses a zipline to cross from the residential area of Glen Haven to the side where the fire department and other responders are staged, as captured in a frame from Dan Gandy's widely viewed YouTube video.

In what follows, I use rich detail and thick description captured from interviews with nearly two dozen Glen Haven residents and others involved in the natural disaster, all individuals who experienced the flood during an approximately one week period in September 2013. I do this in three primary sections. First, I explore how residents and property owners learned about the rising floodwaters, expanding on how those early messages were spread and shared among the approximately 200 residents in Glen Haven at the time. Second, I examine the ways residents worked with and relied upon each other in subsequent days, from commiserating over wine and steak to rigging makeshift zip lines across the dangerous torrents. The community's volunteer fire department was instrumental throughout the emergency, and I highlight examples of their efforts throughout these two sections. Third, I interrogate how people outside the evacuation zone relied on both social and traditional media for information about their homes, neighbors, and loved ones. Importantly, this section will review how media information — which sits at the crux of much ongoing disaster research analyzed in the review of literature — was all but useless

to those in the immediate area, the very people intended to receive those sorts of evacuation and warning system communications.

These three distinct sections address the research questions crafted at the onset of this project and raise further opportunities for sociological inquiry about rural communities prone to natural disasters. While I connect these analyses throughout this section to central concepts in the relevant literature, the Discussion chapter will cover these concerns in greater depth.

IV-I. HOW DID RESIDENTS LEARN THIS WAS NO ORDINARY RAINSTORM?

For some, a telephone call — automated or otherwise — started it all. For others, knowledge about the dangerously high waters that swelled from Fox Creek, West Creek, and North Fork River came from looking out the window or driving down the road. Importantly, nearly every participant interviewed, and the networks to which they referred, received a landline-based automated 911 telephone call urging them to shelter in place. This call, which was organized by the Glen Haven Volunteer Fire Department, went out about 5 a.m. Thursday, September 12, in turn spurring residents to seek visual cues to affirm the messaging about rising floodwaters. It then created a ripple effect, causing some to wake their neighbors and alert them to what was going on as well as discuss what it was they were seeing, hearing, and planning on doing. Combined, automated calls, improvised messaging, and visual cues were instrumental in residents across Glen Haven learning that they needed to take life-saving measures.

The first section of this chapter is divided into three subsections, each of which is related to specific pieces of my research question. First, I describe the communications systems that were available at the time of the flood in Glen Haven, paying special attention to the automated 911 telephone system that residents, to varying degrees, relied on to first learn about the disaster in addition to their own observations. Second, I explore the various ways some residents drew

upon social ties to glean information about the disaster even before receiving this automated telephone call. Third, I investigate how the Glen Haven Volunteer Fire Department learned of the increasing dangers posed by the floodwaters and communicated that information to the community and rescuers outside the region, demonstrating the department's importance to the isolated community. Brief analyses are interjected throughout these subsections, with further analysis provided in the next chapter.

i. Effectiveness of Communication Systems in Glen Haven

At the time of the flood (and currently) almost no residents in Glen Haven had reliable cell phone reception or high-speed internet. Instead, nearly every participant I interviewed relied on landline telephones. Virtually no one could depend on a cell phone to first learn about increasingly hazardous floodwaters. Because of this context, the reverse 911 calling system remained centrally important for most Glen Haven residents I interviewed. This included a range of residents, from those who lived at the end of North Fork Road overlooking the river to families living downstream along West Creek near the entrance to downtown. What varies is the order different groups learned of and responded to dangers posed by the 2013 Colorado Floods.

Henry Morrison, a soft-spoken and sharp-witted 82-year-old old man, had choir practice in Estes Park the evening of Wednesday, September 11. It usually took Henry about 15 minutes to commute from the rehearsal location in town back down the hairpin switchbacks that dip into Glen Haven from the west. From there, it is an approximately two-mile drive along North Fork drainage to get to his home at the very end of the road. Henry's wife, Sandy, stayed home that evening and had heard on television that streams in the area were running a little higher than normal. She called Henry on his cell phone before he left rehearsal and told him to be extra careful during his commute — one of the few instances where a cell phone proved useful.

The stream is usually reduced to a trickle this time of year; it has even dried up in the past. Yet Henry noticed something strange as he crossed the nine bridges and culverts that meander up to the couple's wood-framed home, situated on a hill at the end of the winding dirt road. "He came here and said, 'The river is really high.' And that's really when it started," Sandy recalled. They went to bed shortly after he got home, about 8:30 p.m., thinking nothing more than it being a rainstorm to remember. It would pass, the water would recede, and the couple would take their daily walks the following morning, they thought.

Then came the reverse 911 call, urging them to shelter in place and avoid driving down their road, as well as Larimer County Road 43, due to the rising water. "We thought, 'We can't do anything! Okay, thanks for the information, there's not a darn thing we can do'," Sandy Morrison remembered. "…We knew we were helpless." "And we were okay," Henry added.

On Thursday morning, the Morrisons felt thankful they did not try to drive back down their road and venture up to Estes Park — they likely would have become stuck or been injured, they said. Even though there was nobody at the end of phone able to share more details about the evacuation process, the calling system did allow the Morrisons to learn that something more serious was occurring than a usual rainstorm and high runoff. They were told it was imperative to wait. That is exactly what they did in the early days of the disaster.

The automated 911 call was administered through the Larimer Everbridge Telephone Authority, LETA911. At the time of this writing, the program utilizes a step-by-step signup process to provide necessary information to people within a designated proximity to a hazard, typically at the onset of a host of emergencies spanning floods to wildfires to gas leaks or law enforcement activity in their neighborhood. The colloquially known reverse 911 call came early Thursday morning and woke many residents. While it is impossible to measure what might have

happened if the call had not been disseminated when it was, it is reasonable to assume more people would have attempted to drive out of town early in the morning had they not received the call, putting themselves and others at risk. Instead, only one person became stuck in downtown Glen Haven while attempting to negotiate the hazardous roads.

Of the 13 residents I spoke with who were physically in Glen Haven at the time of the flood (either part-time or full-time, not including firefighters), 10 reported receiving the automated 911 call around 5 a.m. on Thursday. The remaining three were already awake and calling neighbors to warn them about the rising creeks or taking steps to try to divert the water's flow near their property. The call was the primary signal to many that the rising waters were more dangerous than hazards caused by high runoff related to a typical summer thunderstorm.

While there was clearly some value in the automated telephone alert system, there were also limitations. Residents wanted more information after they were alerted to stay sheltered, they were somewhat frustrated about not being able to ask questions of a real person in real time, and they had concerns and confusion about how to get more details about the event. In many cases, residents sought visual confirmations of their own, and what they saw shocked them. Despite limitations, however, even these participants were appreciative that the system was in place to alert them of the situation's gravity in the first place.

Keith and Mary Hudson are married and have a home on North Fork River, about one mile downstream from the Morrisons. Keith was 67 years old at the time the flood, and he and his wife owned a photography and printing studio in nearby Estes Park. Fulltime, year-round residents since 1981, they also owned two rental cabins in Glen Haven. Keith recalled receiving the automated call early that morning, and then immediately seeking confirmation and clarification about what was happening.

> I went out and looked out the back door and looked down and I went, "Okay it's too late anyway. Not going anywhere." The bridge was already washing out. That's when I just said, "Okay, we're here for the day. We've got to figure out what's gonna happen." And at that point, you're just starting to reassess your decisions for the day and thinking, "Okay, it's not gonna get much worse." And did it ever.

The Hudsons immediately sought more information by visually surveying the surrounding environment, and they immediately encountered information that corroborated the warning. The Morrisons, likewise, walked down the road once enough daylight was available and quickly learned that they were, in fact, isolated from the rest of the community.

The landline phone system was also useful for residents who were unable to attain their own visual confirmation of the floods, at least initially. Connie McBride, who was 64 years old and recently had hip surgery, received the automated 911 call on Thursday morning. Her vantage point from her home was relatively narrow, limiting her ability to easily see what was happening near the town's three primary waterways. Moreover, her temporary physical handicap prevented her from scouting up the hill to get a better view of the flooding and attain her own visual confirmation. Instead, she spent much of the morning and early afternoon on the telephone with her friends and neighbors across the Glen Haven area, discussing details about their experiences and particularly about how high water was climbing. She learned many important details and found companionship in those beginning hours of the disaster, but that only worked until the telephone system failed that afternoon, leaving residents cut off in terms of communications and accessibility.

Participants overwhelmingly praised the automated 911 system. Many said they found value in it, but not everyone was completely satisfied. The standardized alert spurred information-seeking behavior that quickly became more complicated after telephone systems failed. Aside from participants who were watching television reports early in the disaster before

the flood destroyed infrastructure, that initial telephone warning message was consistent across the community, leaving little room for contradiction about what occurring and where. Environmental learning cues (Drabek and Boggs 1968; Quarantelli 1980; Cutter and Barnes 1982) in the form of torrential rain and rising rivers undoubtedly reinforced the situation's seriousness.

Early warning messages should provide residents with a greater sense of self-efficacy (Mileti 1995; Clifford 1956; Mileti et al. 2011; Veil, Buehner, and Palenchar 2011). Residents who received that call were told they would remain safe as long as they sheltered in place and avoided low-lying areas, including roads downstream. That call, many respondents said, likely deterred some from venturing downstream. Perhaps as a result, no one from Glen Haven was killed during the disaster.

ii. Social Networks and the First-Learning Experience

At the beginning of this chapter I introduced Eliza Elwell; she was the 52-year-old Glen Haven woman who learned about downstream flooding during a telephone conversation with the manager of bussing operations at her son's school. The ways in which she first learned about the dangers posed by the 2013 Colorado Floods speak directly to dynamics in Glen Haven — but are also of value for other rural communities. Interestingly, Eliza was less dependent on the automated 911 system than other respondents, and she instead drew upon pre-existing social ties from her long-established personal networks.

Eliza's case illustrates an important theme in my findings: the central roles played by social ties and networks in providing warning, especially once technologies became compromised. Her case also illustrates other patterns found in various residents' responses, as illustrated through Eliza's actions regarding: how she interacted with the local volunteer fire

department, how she sought additional information about the disaster, and how she was willing and able to help her elderly neighbor take life-saving measures.

Eliza is a talkative woman who has long embraced a lifestyle of minimizing distractions and maximizing time shared with friends and family. She prides herself on never using a cell phone; she said the only time she needed one was while traveling years ago. And she fears the constant connectedness to the digital world that so many people have embraced, to the point where face-to-face interactions with loved ones become hindered by the glow of a screen.

She raised three sons in her brown, wood-paneled home that stands at the end of one of the first dirt driveways motorists pass while driving up Larimer County Road 43 on the way into downtown Glen Haven. She has lived in the home since 1993, a time easy to mark, she said, because it was the same year her middle son was born. Eliza was a stay-at-home mom until her youngest son was about to enter kindergarten, at which time she and her husband separated, and paying the bills became solely Eliza's responsibility. She became an elementary school teacher and worked at the mouth of the Big Thompson Canyon, roughly a 30-minute commute daily. At the time of the flood and at the time of our interview, she was a kindergarten teacher, a job she said she thoroughly enjoyed because "there is no rejection from kids at that age."

Eliza was teaching on Wednesday, September 11, when the rain started increasing. She drove straight home after school and immediately began doing chores with her 16-year-old son. Water was beginning to rush through the horse stable and into the barn, so they took turns until dark using pick axes and shovels to build up a berm in a desperate attempt to divert its flow. It was an effort in futility, she said, as the water kept eroding their work.

Once it was too dark to continue, they went inside and noticed flashing emergency lights at the end of the driveway on the other side of the river. From Eliza's perspective in her living

room, it appeared the Glen Haven Volunteer Fire Department was attempting to evacuate tenants of Eliza's three year-round, low-lying rental cabins across County Road 43. Drawing on past experience from high runoffs and less destructive floods, Eliza knew getting out of her driveway might become "a concern," so she prepared to move one of her vehicles across the bridge before it was inundated with water. That way she could get to work in the morning. Even if the driveway was compromised, getting across by foot might still be possible, she thought.

And then the phone rang. "Before I had a chance to do it, the very first indication I knew that it was more than just the same old, maybe-my-driveway-will-become-difficult, was the dispatcher from Estes Park called me. It was not the reverse 911 call. It was her personally calling me," Eliza said, describing how social networks facilitated creative and connected emergency warning communications within the community. One of the firefighters, who had known Eliza for years, knew she would consider driving in the dangerous situation. Unable to speak to her directly — there was no cell phone reception in Glen Haven, and it was too loud to shout across West Creek and be heard — Tim Howell, a firefighter, used his agency radio to relay the situation to a dispatcher. He asked the emergency dispatcher to call Eliza on her home phone and warn her about the dangerous situation, approximately 12 hours before the aforementioned automated 911 phone call. "I was thinking to myself, 'It sounds like the water is gonna rise. How am I gonna get to work tomorrow?' So my mind was still not taking it like it was a big deal."

Eliza went to bed knowing that her property was likely to be affected by the floodwaters, as she saw water rise near her bridge and after having the brief conversation with the dispatcher. But at that point, she thought it was solely her property that was being affected. That perception motivated Eliza's 5 a.m. phone call to the manager of the bus garage, who advised her of the

situation across the region. Only then did she begin to understand the flood's community-level effects. As she explains:

> The communication that let me know the severity of it was individuals personally [contacting me]. Tim, who personally knew me and was concerned for me,taking the initiative to tell someone to inform me, and me seeking information on my own. So that reverse 911 system came afterwards and was not as informative as people communicating with people.

Eliza, a longtime resident in Glen Haven, cultivated relationships with first responders in the area along with other people with whom she and her family interacted regularly. These ties and communications proved more valuable in first communicating the urgency of flooding than did automated telephone systems.

Similarly, Eliza's relationship with an elderly neighbor allowed Eliza to persuade him that this event was not a typical storm and that he should evacuate his low-lying home. Eventually, Eliza's son rode a zipline to safety, and the elderly man followed suit. His home sustained serious flood damage, and water was climbing the stairs by the time he fled. Eliza stayed in her home for 10 days, during which time she tended to her horse, winterized her house, and lounged in isolation watching helicopters fly overhead and evacuation efforts unfold near the General Store. She later walked out across ladder bridges, and another resident drove her to Estes Park.

Much can be gleaned from Eliza's experiences in the 12 hours leading up to the automated 911 call urging her to shelter in place. Mileti et al. (2011) wrote the key factors that influence the public to take action rely on a) seeing action others have taken — information observed; b) seeing information from multiple sources over multiple channels — information density; and c) receiving information about what preparedness action to take that explains how to cut losses and is consistent across messages —information content. Eliza first knew

circumstances were unusual as she watched the fire department evacuate her vacation rentals across the river. During the next 12 hours, she received information from a personalized phone call at the request of the fire department, gathered information from the employee at the bus garage, and received the automated 911 call. Only after combining the content of these multiple information sources did Eliza fully begin to understand the gravity of the situation unfolding around her, something several additional participants described in making sense of the potential risks.

Moreover, research indicates that a neighbor or friend choosing to evacuate can affect others' decisions and sense of urgency (Drabek and Boggs 1968, 1971; Mileti 1995). Simply having someone to relay information about the dangerous conditions — information gathered through multiple sources — likely influenced her elderly neighbor's decision to evacuate when he did. This, she acknowledged, might have saved his life. Eliza's experience powerfully illustrates the importance of drawing on established social networks throughout a community to gather information about dangerous situations. This is especially valuable for longtime residents with dense social ties and more extensive networks. Her experience also illustrates how neighbors talked to and influenced one another, ultimately persuading many to take life-saving measures.

iii. The Glen Haven Volunteer Fire Department and Rural Disaster Response

Like many rural communities in the United States, Glen Haven's first lines of emergency responders are volunteers. The volunteer fire department's efforts early in the 2013 Colorado Floods were essential in supplying residents with the information they initially needed to take life saving efforts. At the time of the flood, the Glen Haven Volunteer Fire Department was comprised of approximately two dozen residents who donated their time to various training

exercises throughout the year, largely focused on the most typical call types they receive each year: medical emergencies, vehicle crashes, and occasional fires. Some volunteers also were trained in technical rescues and search and rescues that occasionally draw responses to Colorado's foothills to aid injured or exhausted rock climbers or hikers.

This sub-section explores three primary findings that emerged during this research, namely: better understanding the emergency response that occurred throughout the disaster, more clearly understanding volunteers' personal and professional roles during the disaster, and identifying the risks that volunteer firefighters assumed throughout the response in Glen Haven. Moreover, and as is explored more in the second section of this chapter pertaining to evacuations, firefighters were instrumental in facilitating evacuation through ziplines and ladder bridges, leading to the safe evacuation of hundreds of residents.

The Glen Haven Volunteer Fire Department was having its monthly meeting Wednesday night, September 11, at the town hall in the heart of the community, directly across from the wood-framed town landmark simply dubbed the General Store. Days of rain leading up to the meeting left the ground extraordinarily saturated. Tim Howell had been with the agency for more than 20 years at the time and was a captain — at the time of this writing, he is the department's chief. He remembered his wife, a nurse in Estes Park, entering Glen Haven's Town Hall during the meeting and mentioning how high the creeks were flowing. "We knew it had to have been getting close to total saturation. We didn't know how much more we could take before something happened. It was the feeling that it was going to get worse before it got better," Tim said, attempting to make sense of the high water based on past experiences.

That night, after he radioed the dispatcher to call his friend, Eliza, Tim and others monitored stream flows and patrolled parts of the community. In the past, firefighters worked

with residents to lay sandbags in flood-prone, low-lying areas, but as soon as the ground became increasingly waterlogged, rain began to run straight down the hillsides and into the streams. Then it started chipping away at culverts. “Once it happened, it happened fast. It started raining, hit total saturation and everything just washed,” Tim said.

Firefighters were getting reports throughout Wednesday night that more culverts were washing out, water lapping over parts of the road. At about 3:30 a.m., a firefighter was tasked with organizing the LETA911 call, which required conversations with county officials. The call was sent to residents in an approximately five-mile radius from downtown, urging residents to shelter in place until they heard otherwise. Roads were “washed” when the message went out, but they weren’t “scrubbed,” Tim said, meaning the water had not completely destroyed the infrastructure. “We were feeling pretty good going into Thursday.”

That situation was about to change, as was the firefighters’ role from rescuers to flood victims themselves. About 2 p.m. Thursday, water crested the banks in downtown and began flowing down the middle of Larimer County Road 43, Main Street. The firehouse stood next to the town hall, on the other side of the river from the main residential areas of Glen Haven. Water was quickly rising and overwhelming the aged structure, so crews abandoned the building and piled into a still-under-construction building a quarter mile away on slightly higher ground, still across West Creek from the populated areas of Fox Creek and North Fork. Firefighters were able to maneuver engines through approximately two feet of water and then commandeer the newer building that was dry, but without plumbing. They patrolled by vehicle and on foot until dark, and then they rigged lights to keep track of how high the water climbed outside the downtown firehouse. Around that time, debris broke free from upstream and sent a torrent through downtown Glen Haven.

Tim, whose home was uphill behind the new fire station, knew the situation would be more difficult in the morning. He just hoped residents heeded the warning to continue sheltering in place. Tim remembered the harrowing experience of one firefighter, a man named Chase, who was monitoring the water that night and reporting conditions over his two-way agency radio. Tim observed:

> He heard a noise, looked up, and there was a house coming at him. At that point we started getting a surge coming out of the Cow Creek/West Creek drainage with debris from the fire. It would build up and then let loose, build up, let loose, build up. It was a huge surge. And it started taking houses on West Creek. Houses. Cars. Propane tanks. Everything.
>
> Chase went for his truck, it was starting to go in the water, so he turned around, got hit with debris, went in the water. We heard from him, "I'm in the water." It's like, "He's dead." We all, right there, "He's dead. He's dead." I started getting my boots back on. Everybody here at the station watched his truck go by with the lights going and they thought he was still in his truck. There wasn't anything we could do.
>
> He broke his kneecap. He ground down his radio and his flashlight on the pavement. But he crawled up the hill and ended up on my back porch. My daughter said, "Hey there's somebody out back with a flashlight." He's not dead.

Tim's experiences, and that of his department, encapsulate several key findings that emerged during this research related to the early stages of the disaster. First, they demonstrate the behind-the-scenes work that went into determining when to issue the initial shelter in place order that so many participants received and ultimately heeded — just that one person in that one truck mentioned earlier in this chapter was found to have attempted to leave early Thursday morning. Though the department could not have anticipated the extent of damage and danger the high water would pose, volunteer firefighters took life-saving action throughout the warning phase by drawing on personal connections, regional familiarity, and professional training in administering timely warnings.

Second, my research shows the central role played by local volunteer first responders in rural areas, as they make decisions that affect the community more broadly. Monitoring the rising water after abandoning the second station was essential in keeping outside organizations, including law enforcement and emergency managers, updated about the evolving situation, primarily through two-way radios. Essentially the only information being communicated out from Glen Haven was being transmitted through the fire department's radios. That information was being gathered first-hand, underscoring the value in having trained responders on the ground in even the most remote communities.

Third, this evidence highlights the risks that firefighters were willing to take in an effort to keep that information flowing — risks that also become learning moments for departments that might face similar hazards of their own. People volunteering for this department and for the community more generally, took their roles as rescuers seriously, placing themselves in harm's way — something that could happen to other volunteer departments with very different results elsewhere. This observation is further explored in the next section, where I analyze the central roles played by members of this fire department after everything "let loose" and transformed the community forever.

In the rich narratives above, we have witnessed the ways in which Glen Haven residents learned about the evolving dangers stemming from the 2013 Colorado Floods. Most received automated 911 telephone calls to their homes early Thursday alerting them to shelter in place, and this consistent messaging signaled to residents the rainstorm was not a typical summertime weather system. Most heeded those warnings, all the while seeking additional information by looking outside and making assessments of their own that helped guide their behaviors, both in terms of information seeking and information sharing.

Residents and firefighters alike took it upon themselves to communicate what they were seeing and experiencing to friends and neighbors while they could, generally through telephone or brief in-person interactions. These efforts, all sans cell phones, social media, or direct news media attention to the community itself, might relate to the way of life in rural communities. However, challenges mounted when communication systems broke down, leaving residents without evacuation information and essentially cut off from the outside world.

Figure 7: The Glen Haven Volunteer Fire Department emblem is taped to a truck parked along Larimer County Road 43 near the fire station during one of my 2016 site visits.

IV-II. WHAT DID ISOLATED RESIDENTS EXPERIENCE BEFORE EVACUATION?

Residents in Glen Haven experienced unusual circumstances at the time of the flood for several reasons. First, the reliability of the automated 911 system through telephone landlines — in an area with sparse cell phone coverage — likely saved lives. Second, residences were located in varying proximities to a series of waterways — West Creek, North Fork, and Fox Creek. By being physically close to these hazards, residents could visually and audibly

corroborate the warning messages they were receiving via telephone. Third, even before electrical and communications infrastructure became compromised under the flood's force, residents embraced creative approaches to seeking additional information.

As newscasts barely mentioned the flooding in Glen Haven, instead diverting reporting resources elsewhere on the Front Range, the feeling of isolation settled into the community and left residents alone and wondering what would happen next. But Glen Haven's physical design also created myriad challenges — and opportunities — that demonstrated how residents relied on each other, firefighters, and military personnel throughout the days-long disaster.

In what follows, I explore a few important sub-themes that emerged in this context. These include how historical experiences with prior floods and natural disasters affected the way residents perceived the risks to life and property, thus shaping behaviors. Second, I assess how this familiarity with emergency events and the surrounding environment and terrain aided Glen Haven residents in being resourceful and eager to help both neighbors and strangers when possible. Third, the Glen Haven Volunteer Fire Department's efforts after the initial warnings were important in facilitating the evacuation. Likewise, the U.S. Army National Guard was instrumental during the evacuation, yet many respondents expressed concerns about the group's interactions with community members.

i. Roles of Historical and Experiential Knowledge

Jacob Barber's summer residence stood atop one of the highest points in Glen Haven, overlooking the landmark General Store, the firehouse, and Larimer County Road 43. Barber, 66 years old at the time of the flood, is a retired schoolteacher who spends several months each year with his wife in Colorado, taking a reprieve from their life and permanent residence in Tucson, Arizona. His vantage point was better than most in September 2013, and his cell phone service

was, too. Jacob is the only respondent I spoke with who reported first learning about the elevated dangers through a 2:30 a.m. cell phone alert from the National Weather Service — if he placed his phone at certain places around his home, it received minimal network connectivity.

While his cell phone coverage was clearly an anomaly, of significance here is the information he utilized in making the decision to stay. Jacob explained: "My wife and I both decided that the stupidest thing that we could do would be to try to drive somewhere. So we just stayed. Because in the '76 flood, I still picture the bottom of the switchback where it was thick with all the rocks that hit it and everything wiped out. I just thought, 'You know, I'm up on the hill. I'm safe.'" Jacob's connection to the flood 37 years prior, and the experiences from it, likely guided his decision-making more than any instructions might have once receiving that initial weather alert.

The 1976 flood described elsewhere in this thesis was a flash flood event that killed 144 people in the Big Thompson Canyon and carved a path of destruction through rural communities across the region, including Glen Haven. In my sample of resident interviewees and focus groups, eight residents lived through the 1976 event and, in turn, typically used that disaster as a frame of reference for the 2013 flood. Yet, many recognized the significant ways in which these two disasters strayed from one another. The 1976 event was a flash flood, spawned by a stationary storm that dumped more than a foot of rain the afternoon of July 31.

What earned the 1976 disaster a spot in the history books was not simply the meteorological intrigue, however. Many became trapped in their vehicles while trying to outrun the raging Big Thompson River on an especially busy holiday weekend commemorating Colorado's 100th year of statehood. That flood marked a paradigm shift regarding what to do in mountain flash floods. "Climb to safety" signs now dot the highway on the approach to Glen

Haven, and people in 2013 seem to have heeded those warnings or, at the very least, taken precautions to avoid that scenario in the first place.

In addition to acquired knowledge about the risks of driving down the canyon during heavy rains, every participant used past experiences — with flood- and weather-related events or rural isolation — to make sense of and take action during the event. Some discussed preparedness and evacuation related to wildfires, especially given a particularly destructive couple of years in Colorado and elsewhere in Larimer County. Many more described the annual snowmelt or strong downpours that briefly resulted in high runoff, leading some to move their vehicles or sandbag on their property. "We're used to high runoffs. We're used to thunderstorms. Being up here in the mountains, it's swoosh, swoosh, gone," said Keith Hudson (introduced in a previous section). The 2013 Colorado Floods were different, and people recognized that early on. "For two days I remember people started to say, 'When is this gonna stop?'." Even residents in Glen Haven who had not previously experienced a disaster of the same caliber as the 1976 flood were aware of the assumed risks that come with living in this rural mountain environment, largely due to stories they had heard from their Glen Haven neighbors. Many residents seem to have filtered the events through a lens of past experiences to better base their behaviors.

ii. ***Decision-Making During Evacuation***

In this section, I provide an in-depth example of overarching patterns I observed about the ways in which some residents made decisions to flee their homes, and ultimately return and reside in them despite the risks. I focus on Dan and Sarah Gandy (introduced earlier), particularly focusing on their decision-making processes about climbing to safety, their rationale for staying, and the social ties they harnessed afterward.

Dan's grandfather purchased the cabin in the mid-1940s, and his parents inherited it years later. The family lived in Greeley but spent time each year at the log home just a few feet higher than the North Fork River. The foundation was badly damaged during the 1976 flash flood, and Dan repaired it the following year. To reward his efforts, his parents turned the home over to him, and he has lived there full-time since 1977. "We've always felt like to those that much is given, much is asked in return. He's worked really hard," Sarah Gandy said. She married into the ownership of the cabin, the couple raised their son there, and they have always enjoyed coming home to the tranquil flow of the water, feeling as if they are on an island of their own. Sarah retired in May 2013 from her management position at an Estes Park grocery store, 27 years after she was hired. Dan continues to work as a road crewman with the National Parks Service, where each spring he plows Trail Ridge Road in Rocky Mountain National Park, teetering on the edge of the world before throngs of tourists drive along the highest paved road in the country.

By September 2013, Dan had just completed refinishing the cabin's basement, and the couple went into Estes Park that Wednesday night to pick up an area rug. They remembered it was raining hard by the time they returned home, walked across a wooden bridge, and entered the quaint cabin. Like many others, they went to sleep thinking it was a rainstorm to remember, but Dan awoke about 3:30 a.m. Thursday, before any telephone calls, to the sound of a running vehicle. It was a neighbor who was out scouting, and after conversing for a few minutes the two men walked to the General Store as daylight prevailed over downtown Glen Haven. Dan owned a video camera, so he started recording the early stages of the flood, something he would do intermittently in the days before evacuating. He eventually posted the video on YouTube, and it was among the first that captured the flood's destruction in the isolated community.[1]

[1] At the time of this writing the 10-minute video has been viewed more than 57,000 times.

"It was flooding. But it was just a glimpse of things to come," Dan said. After waking the neighbors about 6 a.m. and alerting them to the rising water, the Gandys used a vacuum cleaner in a desperate attempt to suck water from their newly finished basement. It was not pouring in through the windows lining the low-lying room. Instead, pressure differentiations from the water table sent water gurgling up from the couple's well. A watermark on the wooden basement door still denotes how high it climbed. Yet they still hesitated before fleeing.

> I thought, "Man, okay, we're done." We started carrying everything from downstairs up to the upstairs, as much as we could. Then within another hour, hour-and-half, the bridge broke away. The river had crossed over. It was going down the road. From then on, we just sat there and watched everybody else's stuff from up above was just floating right down the road. Unbelievable.

The Gandys' close physical proximity to the water, coupled with the river's ongoing effects on their home early in the disaster, served as the primary ways they monitored the increasing risk and determined it was more serious than high runoff from years past. Additionally, Dan awoke about one hour before the automated 911 telephone call and met with a neighbor to discuss the situation's increasing risk, ultimately seeking further information by scouting downstream and drawing on social ties to share information. Moreover, the Gandys were resourceful and driven to protect their property, but the eventually determined the situation was becoming too dangerous. This further exemplifies how some residents took precautions immediately after being warned while others, for various reasons to be explored in the following pages, waited until their safety was in jeopardy.

Like many Glen Haven residents, the Gandys still had electricity on Thursday afternoon, so they spent much of morning and early afternoon watching for news updates. Much to their frustration, however, news reports focused on areas more than an hour's drive away, primarily population centers including Boulder, Lyons, and to a lesser degree, Estes Park. "I kept thinking,

‘Well God, what about Glen Haven? Surely they know that we’re getting flooded up here.’ But they didn’t,” Dan said. With one eye on the television and another on the rising water, the Gandys began pondering their evacuation plan, recognizing their rural location would hinder any easy evacuation. They had prepared in the past for a disaster in the form of wildfire. Dan used to be the Glen Haven Volunteer Fire Department Board President and chief, and the Gandys discussed what they would do if forced to flee. The couple’s home abutted a steep dirt hill that climbs approximately 100 feet, and a rope traces its way up the hill just in case evacuation upward rather than outward was ever necessary. Earlier that Thursday, Dan met with neighbors at the top of that hill asking for a place to stay if conditions worsened. They obliged, but he did not really believe the situation could get worse.

It was about 9 p.m. when a series of trees uprooted, crashed into the power lines, and caused the nearby electrical transformer to explode, plunging the Gandy home into darkness. Memories of these events make Sarah anxious, even still, and she begins trembling as we talk at the picnic table not far from the creek. “It was horrible,” she said before trailing off. Dan continued. “It was like, ‘Well here we go.’ And then the world went black. Then we lost all of our electricity, we lost television. We lost everything. And then I said, ‘Okay, we’re out of here.’” The Gandys had already loaded irreplaceable valuables into trash bags — the family Bible, some jewelry, some papers, and a teddy bear Sarah made out of her father’s work coat after he died. They enacted the evacuation and packing plan they thought would be used for wildfires long before floods. Living in this area meant being prepared and assuming certain risks, he said. Trudging through the water that was climbing up the stairs, the Gandys made it to the rope and scrabbled their way up the muddy hillside. “It’s like biblical times or something. Armageddon is approaching,” Dan said.

The door they ended up pounding on about 9 p.m. was that of Roxanne Adams, a slight 76 year-old woman who knew the Gandys only as acquaintances. She remembered Sarah was crying hysterically as the couple stood soaking wet with the trash bag of their most important possessions. Roxanne rolled out an extra bed and hosted the Gandys for the night, though Dan could not sleep knowing that water could soon tear through their home, in the family for three generations. He knew the area and recognized the risks, and he had fortified his home with those elements in mind. Still, he had his doubts. "We're sitting up there and I'm just going, 'Well, this is it. Nothing we can do about it.' We've always known if you're gonna live next to a river, be ready. We found that in 1976 and 1995 and again in 2013. It's an assumed risk you take living next to a river or living in a forest or whatever. But you don't ever think it's going to happen."

Daylight came Friday morning, and Dan was eager to inspect his property. He instructed his wife to stay back while he scouted, hopeful but not especially optimistic. First he saw the green roof. And then, surrounded by murky debris-filled water he saw the rest of his home standing intact. The stream that normally trickled by looked like the Mississippi River. He was grateful his home was still there, but for the first time, he realized the magnitude of the flood and that downstream where North Fork converges with Fox Creek and West Creek the destruction would likely be far worse. "I just had a gut feeling. I said, 'Man, we're gonna make it through this somehow or another, we're gonna end up with a house.' And eventually, I think it wasn't until the 14th, that you could actually see that river go down a little bit." After days of focusing on their own wellbeing and that of their property, constantly monitoring the situation at home, they began to more deeply consider the implications for others downstream.

With the worst of the waters receding, and their initial evacuation behind them, they turned to the days ahead, and their social ties within the community benefited them in multiple

ways. First, they had an evacuation plan and a neighbor to go to for the night after having a face-to-face conversation earlier in the day — something residents in other disasters or different communities might not have. Moreover, after learning their home would likely survive the flooding, the Gandys joined a group of about 20 other residents gathered atop the hill behind their home, where residents both talked about the damages and celebrated surviving the worst natural disaster many had ever experienced.

At a time when their town was being ravaged, Glen Haven residents found ways to experience community, strengthening their bonds. Clusters of people across Glen Haven gathered with neighbors for evening cookouts on propane grills, sipping wine, drinking beer, and eating the finest produce and meats they knew would be the first to spoil. "Once we realized that everybody was okay, everybody's accounted for, nobody's hurt and we realized we've got a home still, I said, 'Man, let's make the most of this. What the heck?'" Dan said. Other groups took similar action to pass the time since there was little more to be done and nobody had learned about the evacuation process going forward.

On Saturday, a man returned to the gathering the Gandys were attending and broke the news about what the rest of the community looked like — news about their beloved community that stunned almost everyone:

> Somebody came back and said, "Downtown Glen Haven's gone." And we went, "Really? Are you kidding me?" And they said, "No. The firehouse is gone. The town hall is washed up into the General Store. And the General Store is pretty well gone. And Pony Tracks and Early Conrad Real Estate and Bryan's house down there…I don't just mean damaged. I mean gone." I just went, "Wow. Are you kidding?" He goes, "But everybody's accounted for and they're hanging out down there at the firehouse and they were actually driving to and from Estes Park because County Road 43 had been washed out but there was enough room for vehicles to go up and down."

This demonstrates an important theme that emerged from my research: residents were resourceful and, for a time, self-reliant as they responded to flooding, yet they were eager to help

neighbors and strangers whenever possible. This extends beyond simply hosting a gathering or sharing food and drink. Here, residents who were able-bodied and willing to explore the surrounding rugged hilltops relayed their observations to clusters of community members unable to do so, further illustrating the strong ties and cultivation of community among residents affected by the flood. These social ties show the value of being engaged in one's community and drawing on social cues and collective perceptions in deciding how to act when presented with new information and whether or not to flee (Clifford 1956; Gruntfest 1977; Mileti 1981; Sorensen and Richardson 1984; Dash and Gladwin 2007).

Dan and Sarah's experiences in the aftermath of their harrowing rope scramble up the mud hill illustrate how creative these isolated residents were in utilizing improvised communication and information sharing. Sarah described standing where their yard and bridge used to be as the water started to recede, staring across the water at a neighbor's home that was slightly elevated, a staging area for another group commiserating about the situation, celebrating their safety. The two groups could not call one another by phone since the infrastructure was destroyed. Nor could they shout and be heard because the water was deafening. In order to communicate about health, safety, and evacuation plans going forward, the two islands of people made giant handwritten signs that they waved to one another. "I was taping together paper and making them as big as I could because we realized that we couldn't read them at a certain distance. The signs had to be bigger. So we were busy communicating that way and they were watching all the time to see if we were going to be OK," Sarah said. While stress accompanied the uncertain experience of waiting to learn about rescue plans, there were also moments of levity. Dan's birthday was Sunday, the third day after they scampered up the hillside. The neighbors across the North Fork made a sign with the words "HAPPY BDAY" scrawled in

marker, a bearded man hoisting the sign overhead. Dan waved back in appreciation, fetched his fly-fishing rod and cast a line into the milky water. Though he did not catch any fish that day, both groups joined in laughter.

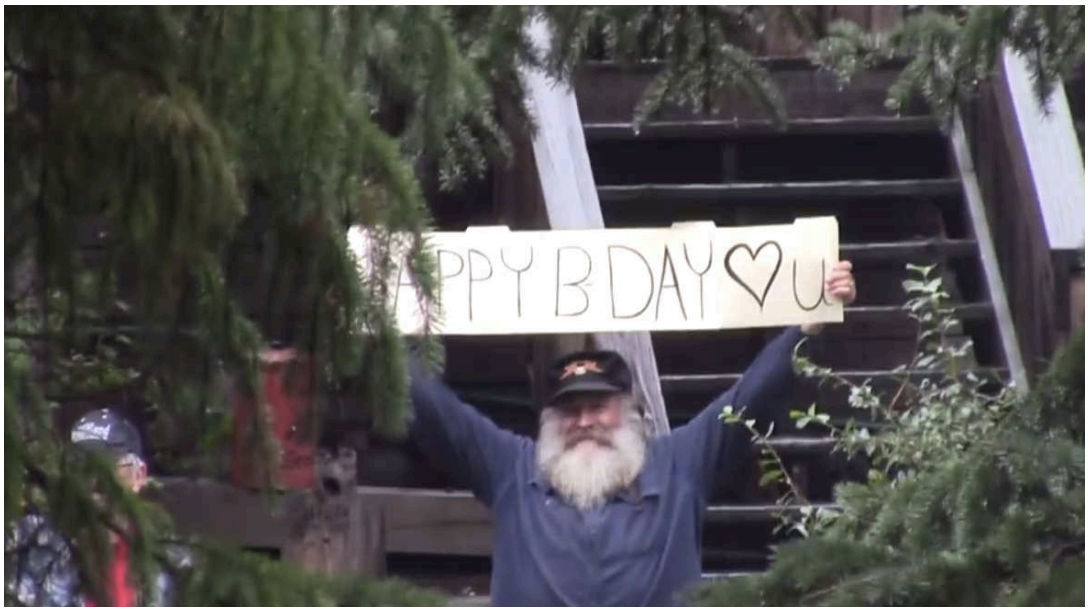

Figure 8: A neighbor made this sign to wish Dan Gandy a happy birthday, as captured in a frame from his widely viewed YouTube video.

This scene, forever captured in a photograph the couple has tucked in a folder in the kitchen, embodies much of what life is in this community. As water isolated segments of the communities, the sentiment gradually transitioned from business-as-usual with high runoff to something more serious. With no other means to find answers or make sense of the situation, residents relied on one another increasingly as the dynamics changed and the days wore on. Stranded residents used their strong social ties to make light of and connect more deeply with their neighbors, using their sense of community to counter the stresses of the flooding and marked uncertainty about what lay ahead for their safety and homes.

The Gandys ultimately stayed in their home for about 10 days before walking out across ladder bridges the fire department negotiated across the rivers. The couple would have stayed

longer, they said, if their well had been functioning properly. But the volume and force of the North Fork changed the water table and affected their well's supply — many residents reported a similar challenge with infrastructure becoming the driving force behind their ultimate decision to evacuate. By Thanksgiving, the Gandys, always resourceful, had an epiphany that if they dammed the river back up they might be able to refill the source of the well, and within 20 minutes of damming it water flowed normally again. For six months, they rented a cabin in Rocky Mountain National Park, where Dan worked, and they commuted occasionally back to Glen Haven to check in on the recovery efforts since the roads were destroyed and tree removal took so much time. "We're stubborn without a doubt. Most people would have said, 'Get the hell out of there' prior to when we did. But I felt totally, totally comfortable with it," Dan said, referring to the 10 days they stayed before evacuating.

Environmental cues such as observing a hazard's ongoing effects can be among the strongest motivators in people's decisions to evacuate. As the Gandys waited before seeking higher ground, they relied most heavily on observing the nearby river climb higher, coupled with lived experiences from previous flood events when deciding to climb up the muddy hill to safety. Additionally, the Gandys relied on the strength of social ties — strong and weak—in designating a safe space for evacuation and commiserating during the following days over food, drink, and camaraderie. The small community of neighbors was able to effectively communicate information about the disaster's effects. The Gandys acknowledged their neighbors' decisions to evacuate influenced their own choice, especially once it became clear the devastated infrastructure might not be easily repaired. Finally, and worth considering among the broader conclusions from this section, is the assumed risk the Gandys acknowledged in living in a remote community near the river. Moreover, and worthy of further consideration, is the admitted risk the

Gandys placed themselves in throughout the 2013 Colorado Floods — and their normalization of that risk.

iii. Organizing Amid Disaster

The high-risk experiences of Dan and Sarah Gandy, who were forced to flee as water lapped against their low-lying home, contrast in significant ways with those of Tom Ferrell, whose home stands near the top of a hill at the end of Fox Creek Road. While the Gandys nearly lost their home, Tom and his wife hosted the impromptu celebrations and were able to create spaces for commiseration. Rather than recapping the element of shared misery, Tom's experiences were unique and further demonstrate key emergent themes: the central role of social ties in countering the stress of the natural disaster; residents' willingness to help neighbors; and the importance of having reliable forms of communication with first responders who have initial access to vital evacuation information.

Tom plays several important roles, acting as a central node linking social ties across the community. Sixty-seven years old at the time of the flood, Tom Ferrell is a retired physician who spent 30 years working at a practice in Greeley, Colorado, about an hour's drive down U.S. Highway 34 from Glen Haven. He and his wife finished building their towering log home from the ground up in 1999. They have lived full-time in the area for the past 10 years, and Tom has become active within the community in several distinct ways. He chairs the Glen Haven Volunteer Fire Department's board of directors, establishing Tom as a civic leader. He has established exceptional rapport and respect among his neighbors. Neighbors trust him with spare keys to their residences, and many of those who only live in the community part of the year trust him to check on their properties and keep them posted about Glen Haven. During our interview

on his wrap-around porch, a couple he had met only once stopped to ask about bear-proofing their property.

Tom knows he is trusted in the community, and he's proud of how these qualities helped facilitate his ability to respond to the flood and even help fellow residents through their evacuation experiences. He does not take those responsibilities, and their importance in strengthening social ties, lightly:

> I've got time. I've got some tools. There's no reason for you to drive from Utah when I'm two blocks away and I'm able to do it, I'll secure it or if not I'll find somebody that can help and we'll go ahead and do it. I think that's one of the great benefits of not only having been raised in a small community but being in a small community like this, it's kind of isolated, people do get to know each other. They do trust each other.

Tom's comments clearly demonstrate how highly he values being connected to others in his community, continually reinforcing and expanding those ties in his multiple roles in the community. Within Glen Haven, these ties are made even more valuable as a result of the community's rural location. The town's isolation and small population makes it all the more important for the people who do live their to have others whom they can trust and rely on, whether for help around the property or information sharing and leadership during events, including natural disasters.

Like many residents highlighted throughout this chapter, Tom — an active retiree with close ties to many of his neighbors — was away from his home Wednesday evening when the rain intensified. He was at the fire board's meeting at the town hall in downtown Glen Haven, and as he drove up Fox Creek to his home at the end of the winding road, he remembered thinking about how this rain seemed a little different than most storms that last an hour or two and then give way to clear skies. Still, he went to sleep, woke the next morning to empty the rain gauge, received the automated 911 call, and looked out the window. "Well that's not a big deal.

That's not a problem," he thought, opting to go hiking down the road to see what was going on. He later telephoned neighbors to alert them of the situation, and once the Ferrells lost electricity mid-afternoon, it was becoming clear this was more serious than just a heavy rain. More able-bodied than some in the aged community, Tom went door-to-door and invited people to share their experiences during dinner at his home on the hill, further showing his desire and ability to create a welcoming and reassuring space amid uncertainty.

> So we gathered. We had an older neighbor here who is 80 and had some friends up and down the way. We were fortunate that we had a lot of candles. We had a propane grill. We had a reasonably larger home, so we told people, "Why don't you come over? We'll congregate at our house and we'll fix dinner and have a glass of wine and talk about our miseries."

Tom facilitated communication among community members and helped separated family members stay connected. For example, a short walk up and along the hillside near Tom's home stands the home of the former fire chief and his wife. As conditions worsened, and the water divided the community into segments, the chief and his wife became separated. He was at the firehouse a mile away in downtown Glen Haven, she was at home along Fox Creek. But they remained connected through a two-way radio at home and at the fire station. The fire chief was able to communicate to his wife via radio what was happening across town regarding firefighters patrolling the area, main roads being destroyed, and the water continuing to rise. She then disseminated those messages to Tom and other neighbors, who found ways to share information among each other. The whole thing was akin to a high-stakes game of telephone. These outcomes illustrate the value in having strong social ties among residents, and the important role in responding to and coping with disaster that make residents like Tom such important nodes in these social networks. Tom played central roles in gleaning information about the disaster, maintaining physical connections among residents, and attempting communication outside Glen

Haven. “We were able to know that there was no way to get in here and no way for us to get out. We just kind of had to ride it out,” Tom said.

Given the risky circumstances, many people opted to continue waiting in Glen Haven as opposed to evacuating the community. People like Tom helped create this sense of community support by providing the space to visit with neighbors and share their flood experience. For instance, when Tom heard via the fire chief’s two-way radio that conditions were worsening everywhere, nearby residents once again congregated at his home for food, drinks, and commiseration. That same night, word circulated through the fire radios that helicopter rescues might be organized for Saturday morning. After weighing the situation on an individual level and considering the decisions to evacuate among others in the group, everyone met about 8 a.m. to wait for the helicopters. They never came, however. “We had no idea at this point. We didn’t want to risk trying to cross the stream that was just way too high. We were safe and dry and no problems here and thought we were just going to wait it out until it goes down or till somebody comes in and rescues us,” he said.

Once it was time to attempt evacuation, Tom led the group of stranded neighbors closer to downtown and closer to safety, with minimal assistance from federal authorities. When a group of about 20 neighbors gathered at Tom’s home that Sunday morning, they learned no helicopters would be flying that day due to weather. The group would have to figure out another plan. As they visited at the fire chief’s home, two National Guard members arrived and confirmed helicopter evacuations would not be possible except for especially sick and injured. Tom was also an active outdoorsman who owned climbing gear, so he hiked down to the river where the National Guard personnel came across and surveyed the terrain. He returned and rigged a rope and harness system to shuttle people across the rushing water:

> One by one we took a whole group down. There were the people from Kansas who had been here all summer and they had suitcases with them. They were carrying suitcases out. And there were people with cats and people with dogs and young kids, 10, 11, 12 years old and a couple people older than 80. I put each one of them in a harness, roped them up, clipped them on here, counterbalanced with myself and took one at a time across this tree.

After multiple interactions and discussions, collective perceptions recognized that immediate evacuation was increasingly necessary (Dash and Gladwin 2007; Stein et al. 2010). They decided it was time to get out of Glen Haven. One woman in particular was fearful of the crossing, but Tom reported he was determined to get her across and confident she would be okay. He described being reassuring, persuasive, and lighthearted in his effort to evacuate her.

> She was kind of having a little anxiety episode and she said, "I can't do this. I can't go across. I can't get across this. I'm not gonna be able to do this." I said, "Yes you are. You can do this. We're gonna do this together. You just keep looking at me." Harnessed her up, tightened her up, and said, "If you're going in the water, I'm going in the water. We're gonna do this together but we've got a perfect clip over the top of this rope. This is not gonna break." And we got 'em across perfectly fine.

Residents' trust in Tom and his multiple leadership roles in the community prior to the flood led residents to prefer his assistance as they evacuated, especially compared to those of extralocal organizations, such as the National Guard. Further, these outsiders have fewer social ties, which I have continually shown were especially important in this natural disaster. Tom, a man with deep connections in this rural area, emerged as a reassuring leader and played an instrumental role during the flood.

After evacuating the group of vacationers and long-time residents of all ages, the group hiked over the mountain and caught their first glimpse of the nearly destroyed Glen Haven they called home. "The entire community was gone," Tom said. "All of Glen Haven was literally gone. That was pretty devastating." Struck by the severity of the situation and the urgency to take life-saving action, Tom led community members to collaborate with the National Guard

personnel, but even then the Glen Haven volunteer firefighters were central to completing evacuation of residents. The fire department primarily, alongside some National Guard personnel, established and operated ziplines that shuttled people across West Creek. The fire department also sent a two-way radio to the other side of West Creek so the two worlds could communicate. One by one, they zipped across the water, were loaded into large military trucks, and then driven up the switchbacks on the west end of town to an evacuee drop-off in Estes Park.

Asked if there was anything he would have changed about the emergency effort, several project participants said they were concerned about responders' actions and messages. The National Guard had a brash way of interacting with residents, forcefully ordering people to leave immediately and not taking into consideration the individual realities and hardships faced by many residents who were reluctant to leave their long-time homes. "One of them actually said, 'This is your only chance to get out. If you don't get out now we're not gonna come back now and get you,'" Tom said, describing a National Guard rescuer's "tough" interaction with an elderly couple. The couple in their 80s had no food or electricity, and they were not willing to leave the only place they knew because they did not believe they had anywhere else to go.

> You can kind of see the attitude of people who are caught of the middle of fires or caught in the middle of floods and saying if nobody of real reassuring authority comes to help them, they're staying. This is their home. We tried to convince them, but it was obvious when I went up to visit with them, I think it was on Sunday morning when it had stopped raining a little bit. He was just pacing on his back deck in his underwear. He was obviously in some kind of shock. He was just pacing back and forth. She was in her nightgown and he was in his underwear. And I said, "Fred, we have to leave. You have to come. We're gonna get you out of here." I don't think they did. They didn't go with that first wave. They decided to stay. That's a little disconcerting, I think. Disheartening.

Several participants corroborated this concern about outsiders taking the helm of evacuation efforts in this rural community and viewed the National Guard as callous, uninformed, and at times ill equipped. Whereas many community members relied on their own

connections with the Glen Haven Volunteer Fire Department, along with friends and neighbors, during the evacuation process, outsiders who were unfamiliar with the area seemed to lack rapport and trust when they arrived. They also struggled to cultivate it during the evacuation.

Scott Gilchrist and Dan Gandy criticized the National Guard's unfamiliarity with the terrain, reliance on digital technology that did not function in this remote community, and a lack of compassion they had with residents. Both men discussed having to lead guardsmen around town or guide them to certain properties, and each said the situation might have been bettered if a local volunteer firefighter were allowed to take the lead in communicating with certain residents — especially elderly men and women who might require additional explanation when it comes to risks. Even having a firefighter who was a familiar face embedded during the National Guard's search could have alleviated some of this tension, they said. In a similar vein, Keith Hudson expressed being frustrated with the "now or never" mentality the guardsmen conveyed.

> Their attitude in terms of "We're not coming back" shook me … In other words, my mind didn't kick in and say "Why now? What the hell's the difference between another day or two? I mean, I've got food and water and the water's receding. Come on. What is this now?"

Ultimately, despite many valiant efforts, the National Guard, and the Glen Haven Volunteer Fire Department, not everyone could be convinced to flee. The elderly gentleman in this passage, among others in the community, had an attachment to his home that was so strong even rational arguments about the risks involved in staying were futile. This suggests that the power of connection to place among certain segments of the population in Glen Haven, and likely in other rural communities affected by disaster, rivals the power of social ties and trust within community leaders, such as volunteer first responders.

In this section, I have explored three important themes that illustrate how residents remained informed about the need to take life-saving measures and evacuate. First, neighbors

helped each other by drawing on social ties and shared experiences, not unlike the Gandys' story, shows how isolated segments of already rural communities still cultivate social ties and create spaces for community. Second, community leaders such as Tom had long-cultivated trust and strong social bonds with evacuees, which led to their trust in him and reliance upon him throughout the effort. His efforts stand in contrast to reportedly more abrasive demeanor from the National Guard personnel who were unfamiliar with the area and less familiar with interpersonal dynamics among certain segments. Third, residents' social ties played key roles in establishing communication between groups with access to life-saving or flood information, expertise in addressing those risks, and the less fortunate or able neighbors who could not access those resources. For example, by being in close proximity to the fire chief's wife, and with her having a two-way radio that connected to the emergency information source, Tom was able to glean details about the helicopter rescue effort as well as learn of the damage to the community in general, all prior to face-to-face interactions with military personnel. That is in contrast with the Gandys' situation where there was no radio communication and the way they learned about the extent of the damage was by a resident traipsing over the hills, getting a view, and reporting back to the group.

Though both the population cluster with the Gandys and the separate group with the Ferrells ultimately evacuated about the same time, the way they remained informed and ultimately made their decisions differed, all the while raising important questions about message consistency, camaraderie, personal initiative and rapport among neighbors and rescuers. My research suggests this is likely attributable to the ways in which the floodwaters segmented Glen Haven. This left some people able to communicate if a two-way radio was in the area, all while others were stranded without connectivity. Having a hillside home above the waterways was a

clear indicator of whether homes would be damaged. It also proved to be an opportunity to host others — close friends and strangers alike — and discuss both the frustrations and lighthearted side of being stranded as well as the very serious and necessary point of when to leave. These ties were likely strengthened as a result of days of commiseration and ultimately helped facilitate their escape.

These experiences illustrate the numerous ways residents relied on one another to both learn about the extent of the flooding and ultimately seek safety and make their evacuations. These experiences also demonstrate occasional moments of levity among residents having parties at neighbors' homes, commiserating because there was nothing else to do, nowhere else to go, and for a while all the time in the world. Finally, it demonstrates the need for continual conversations with certain vulnerable populations who might require special assistance in learning about the ongoing disaster situation.

IV-III. HOW DID DETAILS SPREAD OUTSIDE THE EVACUATION ZONE?

The previous two sections of this findings and analysis chapter have hinged on the immediately affected Glen Haven area, particularly the ways residents learned about the disaster and the ways they drew on social and community ties to work together during the evacuation process. These elements are essential in understanding the lived experiences of those in the immediate flood zone and the unique challenges posed therein, but there are also important components worthy of exploration outside of the immediate impact area. In what follows, I explore the steps taken by public safety officials and journalists to communicate evacuation information to the broader public — dissemination techniques that are at the nexus of much ongoing emergency communication research. I conclude this section with an illustrative case: the experiences of Sean and Laura Jeffs, who were outside of the Glen Haven but knew their

children were at risk as water climbed at the family cabin. With no way to communicate directly, the Jeffs were left to study — in painstaking fashion — photos and reports from both public safety organizations and news outlets. By understanding these experiences, it becomes clearer how people sought information about family members and neighbors when they were stuck outside the community.

Many respondents shared stories of desperately trying to climb mountains in search of a cell phone signal, hoping to communicate their status to loved ones outside of Colorado. This was especially true after the deluge destroyed infrastructure on Thursday, knocking landlines and electricity offline community-wide. While messages on new and old media were inaccessible and irrelevant to residents in Glen Haven, they were instrumental for those outside the area trying to learn about the status of their properties and the safety of their loved ones.

i. Media and Messaging

As was previously mentioned, Nate Carr led public information efforts for the Larimer County Sheriff's Office throughout the 2013 Colorado Floods. This required working directly with members of the news media to communicate disaster details as well as harnessing social media to transmit evacuation information in real time to audiences far beyond the immediate impact zone. The sheriff's office has jurisdiction in Glen Haven and is the primary law enforcement agency for rural areas of the county. Additionally, the sheriff's office is the primary emergency response agency during large-scale natural disasters, including those experienced in Larimer County during major wildfires in 2012 and the floods in 2013. As incidents grow in size and complexity, additional resources assist the emergency effort, and sometimes this means outsiders takeover communication responsibilities. Throughout the 2013 Colorado Floods,

however, Nate remained the executive officer and lead public information officer, tied to incident commanders monitoring the scope of the widespread natural disaster.

Nate was driving to Fort Collins after attending a meeting in Denver Wednesday night when his cell phone and pager began buzzing. As part of the executive team with the agency, he automatically received updates about incidents that warranted public safety messaging. Exhausted, Nate went home to change out of his suit and tie and then bee-lined it to the sheriff's office headquarters in Fort Collins to begin deploying what is known as a joint information center. Referred to as a JIC, these facilities consist of a bank of computers, phones, pull-down screens, bulletin boards and personnel who can help coordinate an agency's communications related to a specific event. That also means managing numerous social media channels such as Facebook and Twitter, as well as providing website updates — reliable information accessible to anyone with access to a device and a connection.

Making these details as widely available as possible has changed over the years, and the agency's use of multiple information pathways provides a glimpse into how that information is collected and then shared. As Nate put it, "You start gathering information" and then work to distribute that information as systematically as possible in as many ways as are available. "Our very first priority is the community itself. The citizens. So we work with the media with the thought of getting word out to them, but we also used social media. We used our 498-5500 number. Our website. Other resources," he said. Basically, every employee is needed to get information out to people, whether they are in danger or they know someone who might be. This is where social media comes into the equation.

> Twitter and Facebook allow us to — between those more formal, structured briefings where we're talking, briefing the media, and fielding questions — provide those quick updates as we go both to the media, which again we view as a way to ripple that information out to the community as a whole and others outside the area that might care

> about it… So social media would allow it to come out more quickly and provide bits of information for all those parties and just keep them abreast of what's going on.

Social media plays a significant, and perhaps equalizing, role in these outcomes for a number of reasons. First, it breaks down the barriers between the public and the responders, empowering residents with the facts in real time without necessarily needing the interpretation of a journalist or news outlet. Second, it facilitates dissemination of the most accurate and timely information. And third, it creates another conduit by which people outside the impact zone can seek information about their loved ones or their property.

Multiple residents reported that their loved ones reached out to the sheriff's office directly during the disaster, pleading for information about certain home addresses or creekside locations. This outreach occurred through almost every channel provided, from following the agency's barrage of tweets, to refreshing the group's internet page, to speaking with workers at the joint information center. While there remain discrepancies in how agencies engage in dialogue with inquiries on this front — character limits might hinder communicating a complex emergency effort, for example — the sheriff's office used these channels to be as accessible as possible. "We're local and we're part of the community and know our citizens better than the outside teams do," Nate said, addressing the importance of establishing and maintaining trust rapport with the broader community.

Much like occurred during the Glen Haven emergency, residents and outside rescuers (i.e. National Guard) experienced tension when working together. Nate acknowledged this and reiterated the value in having local officials at scenes to broker the process because they have the rapport and respect of the people in question. Additionally, setting a precedent of competency, compassion and ability from previous disasters is essential, Nate acknowledged.

Though public safety agencies are now equipped with communication tools that allow a direct connection with the public, organizations still rely on traditional media outlets that cater to a wider, more generalizable audience. News outlets have been where people turn in search of information during disasters. In addition to overseeing direct public communication efforts, the other essential component of Nate's work was addressing members of local, state, and national media outlets and journalists. Among the media members was Christine Buel, a journalist then working as *The Denver Post*'s food editor. Christine lived in Fort Collins, one of the many northern Colorado cities turned into an island because of high water from the Big Thompson River, Poudre River, and tributaries that prompted closure of roads in and out of the community. Her experiences illustrate how traditional journalists have embraced multiple information pathways when communicating information about widespread emergencies.

News conferences tend to be the primary source of information and interaction between journalists and public safety officials during disasters. The 2013 Colorado Floods were no exception. News conferences recorded and stored online depict a team of roughly a dozen reporters meeting outside the Larimer County Sheriff's Office main building, cameras trained on Nate. Christine, and others received updates on evacuation efforts, the affected areas, the next logistical steps, and — importantly — the numbers of residents believed missing or presumed dead. This information was gleaned from sheriff's office personnel stationed throughout mountain communities with radio communications after they performed direct, face-to-face meetings with other individuals and emergency response agencies.

Many newscasts carry these briefings live on television, and reporters in 2013 used social media platforms such as Twitter and Facebook to provide live updates about what was said, how it was said, and what it meant. They would then either call their offices and verbally dictate their

stories to someone who could write for them or, more commonly, find a safe space with connectivity to write, edit, and file their reports to an outlet's website. Christine described working long days, covering multiple briefings, and spending significant amounts of time at evacuation shelters talking to evacuees.

> I sat out there and just watched the helicopters come and go. At one point a dog came running out of one of them, took off running through the field and they were chasing the dog. I was trying to film it but it was just too far away because you couldn't get anywhere near. That was intense. People just whisked out, not knowing when they were going to be able to go back. For the most part I think they all had places to stay but it was like a military operation. Very surreal.

Being at the shelter, Christine had a front-row seat to the evacuation and response. Importantly, she noted that most people had another place to stay, usually with relatives or friends, drawing on pre-established social ties that spanned beyond the borders of their home communities. Christine's experience transmitting messages to a broader audience through social media outlets including Facebook and Twitter were essential to certain audiences working to make sense of the situation.

Sharing what she was seeing, both in written form as well as through photographs and videos posted to social media platforms and the newspaper's website, performed a number of functions beyond just feeding what Christine described as the "bottomless pit of the need for news." The community relied on that information, but more than many breaking news events, they relied on it because so many people were directly affected by what was going on. Unlike some events, the scope of this disaster expanded far beyond the borders of one community, spurring information seeking among multiple different publics. She remembered having direct conversations with family members and friends of people in evacuation zones who were asking if she or other reporters knew any more than what law enforcement was posting. The answer was often yes and no, and journalists were able to personally direct them to stories or outlets that

could better help make sense of the situation. “You just sort of immerse yourself in it and there’s not a whole lot of stopping and thinking about the big picture because the big picture is assembled by all those little pieces that we’re all gathering and then bringing together to make this mosaic,” Christine said.

In relation to the academic research, reliance on social media platforms illustrates the social mediated crisis communication model, whereby there is a difference among media creators, message followers, and social media inactives. With the sheriff’s office placing a high priority on consistently creating updates through social media, it allowed followers, including news organizations, to embed that information into online articles and reports. From there, those messages became part of daily conversation outside of the evacuation area, to the point where even people without ties to the flooded mountain towns were hearing third-hand details about what was going on. This corroborates research on the matter that suggests television news or online news sources might have stronger influence outside the evacuation zone and little influence inside the warned area, thus heightening fear and unease among the broader public (Stein et al. 2010). Additionally, reporters on the ground emerged as content creators by sharing details about the disaster and evacuation through their own social media channels. That information also rippled across followers and ultimately to social media inactives.

At the same time, the rapidity with which social media can report accurate news is matched by its ability to rapidly report inaccurate or incomplete news. Inaccurate reporting resulted as the 2013 Colorado Floods unfolded rapidly. Many residents were briefly listed on the missing list, and those figures are often the most headline-grabbing phrases that emerge from news briefings between law enforcement and journalists. As those messages spread, family members and friends outside of Colorado learned of the disaster and assumed through national

media reports that something awful had happened to their family members. Many, however, were actually safe, dry, and relatively content, commiserating with one another on the hills outside of downtown Glen Haven, unaware that they were listed as missing or presumed dead at all. As the days dragged on, the concerns and pursuit of information heightened among those outside of, but with ties to, Glen Haven. Connie McBride, the woman who recently had surgery and was told to leave a white sheet on her railing if she needed immediate medical help before the evacuation, said she was listed on the missing and presumed dead list. Her family in Oklahoma even received sympathy cards from people assuming she was among the dead, spurring questions about what might be done in future events to minimize this misinformation.

ii. Information-Seeking from the Outside

Many residents tried to make sense of the situation unfolding in the mountains and determine the status of their loved ones, only to find a dearth of information about the Glen Haven Community. This brings us to Sean and Laura Jeffs. Sean is a retired banker, Laura is a retired information technology worker at Hewlett Packard, and they owned property on Fox Creek for about 15 years when the flood struck. Laura had been visiting with a couple of friends in Estes Park on Wednesday, but the relentless rains caused her to begin worrying as the rivers in town crept higher. While driving back to her full-time home in Loveland, Laura continued to watch the water in the Big Thompson River climb. "I remember getting past Drake and the thought occurred to me out of the blue, 'This is the last time I'm going to be on this road,'" she said. She arrived safely at her Loveland home, but those concerns lingered, ultimately to be reinforced as newscasters reported flood watches being issued across Colorado, including the area where she had been driving earlier that day. Their concerns began to ease that evening,

however. Their son and his wife were staying at the Jeffs' Glen Haven cabin. They spoke by phone that evening, went to sleep, and expected the storm to move on by daybreak.

As happened to so many others, the 5 a.m. automated 911 call came, this time to the Jeffs' cell phone they had on record with the system for their Glen Haven property. "I was worried because our phone doesn't ring that early in the morning. So I answered it and it was the reverse call," Laura said. "Fifteen minutes later the kids called and said, 'We need somewhere to go.'" The Jeffs were able to reach a friend who had a vacant vacation cabin next door the kids could hunker down in until the water level dropped. Sean and Laura knew that house was on higher ground, and because there wasn't a lot of news coverage devoted to Glen Haven, they were not particularly concerned about their children's safety for the next couple of days, Laura said. Though the phone was out, she figured they would be fine. By Sunday, images began streaming in of air evacuation efforts, ziplines over the water, crowded evacuation shelters, and destruction. The Jeffs began to panic.

> We watched TV, all the different broadcasts. We even recorded one station, watched another station in hopes of seeing people we knew from Glen Haven. To have those photos come up of the roads completely gone, you know, like, oh my God this is way more serious than just a phone being out. … We figured with the water up to the first step, it was just going through the crawl space. It was probably okay. But this was way more devastation, and to see that on TV, that's when it really started to hit. Some of those really good visuals of flying up the canyon and seeing how much was gone is part of, I think, why we panicked on Sunday.

The location of the Jeffs outside the evacuation zone, in an area that had access to communication tools such as Facebook, Twitter, and television news, facilitated their rapid consumption of news information related to the disaster. To them, it became more than just curiosity about there community. Instead, searching for information about their home and their loved ones in the area became a task that required analyzing media reports — a process that grew

even more stressful as sporadic updates became available. The more they failed to find information about Glen Haven, however, the more stressful the situation became.

By Sunday, some people from Glen Haven who evacuated had started posting messages and photos on social media saying they saw someone who was safe or accounted for, creating messages that then everyone could see and interact with. People were naming names, and that's how the Jeffs started to learn who was accounted for in Glen Haven. Except nobody reported seeing their children. "We couldn't get any information. I think that's why we were so frantic after four-and-a-half days," Laura said.

The phone rang about 4 p.m. Monday. It was Tom Ferrell, the man who helped lead a group of stranded Fox Creek residents over the torrent from earlier in this chapter. "He said, 'Oh my God we got out yesterday and we were calling family and we were supposed to call you and let you know the kids were okay!" Laura recalled. Her son, a volunteer firefighter, and his wife, a 911 dispatcher, had been in the group that was commiserating at Tom's home in the days prior, and at the exact moment while Sean was speaking with Tom, the couple's home phone rang. It was their son. They were out. They were safe.

The Jeffs' experience was not unique to them. It is strikingly similar to the information-seeking patterns that emerged among other residents outside the community who were trying to both verify the status of their property and confirm the safety of their neighbors and loved ones. One property owner, Don Jacobson, was likewise watching multiple newscasts and scrolling through Facebook trying to gather information about the status of his neighbors and the family cabin in Glen Haven. It was not until a neighbor called him days later he learned the damage to his property was extensive, but the structure itself was still standing.

The Jeffs were among several participants in this study who said they wished the communication about the situation in Glen Haven and the ensuing evacuation had been more clearly communicated from the beginning so that people outside the disaster had had a clearer picture and more detailed information of what was happening within the isolated, rural community. That might have alleviated the tension and stress on those removed from the situation, they said, though they recognized the challenges that arise when an event encompasses such a massive geographical area. “I think that’s crucial, a takeway from this and from any disaster. There are people out of the disaster area that want to know what’s happened to their loved ones. When you can’t get information … that’s hard on the people around you,” Laura said.

As evidenced throughout the preceding pages, most residents were clearly attached to their homes and property — some of which had been in families for generations. But many recognized the struggles they would inevitably face if they tried to stay indefinitely. Not only would it take months to get electricity restored and years to get roads rebuilt, there was little to no access to most residences, meaning anyone who needed emergency medical help in this aged community might be left on their own. There were some who prided themselves on staying for the long haul. “Unless you have health issues or something, people could have easily stayed,” said Connie McBride. “They worked so hard to get all these people out. I sat in here at the firehouse for months afterwards, listening to how many people were back in within a week.” Connie was in the minority in this regard, as most evacuated when they recognized the struggle that would accompany trying to navigate destroyed roads and toppled trees.

In sum, the experiences residents faced in Glen Haven bore differences in terms of their individual or collective responses driven by their social ties. Some residents, who decided to stay

individually in their homes, hunkered down for days with their horses or winterized their cabins before departing indefinitely. Others, who relied on social ties and connections with their neighbors coupled with clearly observing the dangerous situation unfold, scrambled up muddy hillsides to a neighbor's home, unsure whether they would have a home of their own to return to the following day. Some residents, who for years worked to attain the trust of neighbors while assuming leadership roles within the community, led evacuation efforts of their own, adding to the efforts being spearheaded by the community's dedicated volunteer fire department and increasing state and federal resources. Others outside the evacuation zones were tasked with communicating the situation to a broader audience, engaging multiple publics and working to provide the information thousands of people sought in hopes of learning whether their loved ones were safe and their properties were secure. Combined, these varying perspectives illuminate much about the community's experiences throughout the 2013 Colorado Floods. They also provide an opportunity for further discussion and analysis, as I explore in the following section.

CHAPTER V: DISCUSSION

This research about the experiences of Glen Haven residents during the 2013 Colorado Floods enhances sociological perspectives about the ways rural residents learn about and respond to natural disasters, particularly in isolated geographical settings. Three important objectives guided this investigation, including: a) gaining a better understanding of the ways residents learned about flood hazards and how these messages spurred action; b) furthering discussion about the ways residents drew on social ties and relied on their community in the days before evacuating; and c) exploring the ways communicators in public safety and news media attempted to bridge gaps between the isolated community and the broader population. Below, I interpret my findings and results in relation to the specific research questions posed in earlier chapters. I then revisit methodological foundations for this report, review the study's limitations, and conclude with broader implications and observations about future research.

I commenced this project with three primary research questions:

- How did residents in Glen Haven learn about the 2013 Colorado Flood and the need to take life-saving measures?
- To what extent did Glen Haven residents rely on social ties to learn of and respond to the 2013 floods?
- How does this compare to residents' consumption of warnings communicated through the media during the same period of time?

Residents overwhelmingly relied on automated 911 systems to learn about the need to shelter in place. This call compelled residents to shift from complacency about a summertime rainstorm toward a greater appreciation of the related dangers. Participants congregated on hilltops and shared information, food, and hardships, all of which demonstrates how isolated and rural communities re-organized and then unified when faced with geographical challenges like waterways splicing a community into segments. Individuals outside the immediate impact zone

relied on public safety agencies, social media, and news outlets to better understand how loved ones were coping with the disaster, whether they were in danger, and the extent of damage to their homes and businesses. I revisit these items in more detail following an in-depth discussion of the key themes that emerged throughout my research.

Bearing in mind the succinct answers to these primary research questions, as well as the information explained in the findings section, key findings emerged that are relevant in terms of academic debates and disaster response practices. They were: a) What role did the Glen Haven Volunteer Fire Department serve during the emergency effort?; b) How did first responders communicate to the community during the disaster?; c) How were community dynamics displayed during the natural disaster?; d) What challenges emerged during the disaster?; e) What was the relationship between residents and leaders during the evacuation?; f) What do leaders and evacuees wish they or others had done differently during the disaster?

Seven major themes emerged from this research on evacuation and information sharing in Glen Haven during the 2013 Colorado Floods. Below, I discuss these themes and link them to broader observations and patterns in the sociological literature on disaster response in rural communities..

I. *Glen Haven residents faced flood-related challenges they had to overcome prior to evacuation due to the community's rural isolation and mountainous geographical features.* The topography of this rural community created challenges for first responders, due to the flow of the three main rivers and arrangement of homes in relation to the downtown hub. This created a series of improvised islands, essentially cutting off residents from most neighbors, from downtown responders, and from communication resources such as cell phone services, news media, and eventually landline telephones.

These challenges resulted in Glen Haven residents utilizing both warning systems (Mileti 1995) and drawing on first-hand observations in the form of environmental learning cues (Drabek and Boggs 1968; Quarantelli 1980; Cutter and Barnes 1982). Moreover, residents relied on social ties (Sorensen and Richardson 1984; Dash and Gladwin 2007) within the community and to first responders — local volunteers and otherwise — in ultimately negotiating these unique challenges and fleeing to safety. This illustrates the importance in recognizing specific barriers across communities when crafting emergency plans and devising communication and evacuation strategies. My research also shows the importance of considering social network dynamics — like those of improvised dinner parties in the early days of the flooding — that emerge in natural disasters. This seems especially important in otherwise tight-knit and rural communities.

II. *Automated 911 landline telephone calls emerged as the key way in which most participants first learned heavy rains posed serious flood risks.* Though many residents saw the rising rivers and awoke to heavy rain on Wednesday night, September 11, it was the Thursday morning shelter in place call coordinated by the Glen Haven Volunteer Fire Department that signaled a more serious hazard. Importantly, residents sought more details amid an information void (Mileti 1995; Urista et al. 2009) almost immediately after receiving this call. They did this both through visually observing the rising water and through using landline telephones to call friends and neighbors to further discuss their observations and determine what action should be taken and when. The destruction of telephone infrastructure earlier in this disaster — 12 hours prior, for example — might have resulted in a radically different outcome. This demonstrates the importance in timely warning systems in rural environments when it comes to learning about the need to take action.

III. *Historical experiences with earlier flood events affected some residents' perceived risks to their life and property, thus guiding their responses to the 2013 Colorado Floods and their life-saving behaviors.* Longtime residents reported living through the 1976 Big Thompson Flood, which decimated parts of Glen Haven. Many said they thought about that tragic event and coinciding dangers related to trying to outrun the disaster when they made decisions about what to do — and what not to do — in 2013. Moreover, residents at first likened the high water in the early days of the 2013 disaster to high runoff from spring snowmelt and other serious thunderstorms that pose hazards in the area before determining this was something much more serious. Accordingly, residents are inclined to view new events through the lens of prior situations and base their current thoughts and actions upon those lived experiences (Slovic 1987; Lindell et al. 2007). In Glen Haven, residents recognized early in the disaster that the situation seemed less serious than the flood in 1976 but was also more significant than high water that occurred annually. This signaled something unusual and serious was unfolding. In areas where historical knowledge abounds, like Glen Haven, understanding these events from the past is essential in considering how certain people will interpret disaster and risk differently in the future.

IV. *The Glen Haven Volunteer Fire Department's efforts early in the disaster were essential in notifying the community of the risks and, later, evacuating them to safety.* For many firefighters, residents hey helped warn and evacuate were friends and neighbors — not just people who owned property. Even while firefighters were forced to evacuate themselves and commandeer a still-under-construction facility, crews worked with their fellow residents, with whom they shared strong social ties prior to the fire. Firefighters patrolled neighborhoods, relayed information via two-radios, and coordinated the automated 911 call that residents relied

on. They laid ladder bridges and rigged ziplines to get people across rivers to waiting trucks for transportation to evacuation centers. This department's ties to the community were essential in signaling the disaster and in facilitating evacuation. This highlights the value in having local first responders — volunteer or otherwise — who have connections, rapport, and trust within a community. Without them, delays can result in both providing timely evacuation information and assisting residents in making informed and reasonable evacuation decisions.

V. *Glen Haven residents were resourceful and determined during the flood and subsequent evacuations, yet they were eager to aid neighbors and strangers when possible and ultimately relied on some outside assistance.* Residents of Glen Haven worked to build a sense of community and neighborliness, even during their most uncertain and trying times. Some opened their doors for neighbors in the middle of the night. Others hosted impromptu cookouts and parties on hilltops while they waited for clearer information about what it would take to leave the community. And others still emerged as leaders and worked with neighbors who were reluctant to flee, taking on roles of reassuring neighbor and physically helping people ford surrounding rivers. This is essential in understanding the experiences that unfold in rural communities when natural disasters strike. It further contributes to the sociology of disaster that hinges specifically on ways residents work together — harnessing strong and weak ties (Granovetter 1973) — when affected by a fire, hurricane, or in this case, the devastating 2013 Colorado Floods. These ranged from first having a close friend advise against driving down a driveway to neighbors hosting acquaintances while their home flooded to having a community member relaying the status of loved ones outside of the affected area. Moreover, as leadership roles emerge, so do important spaces for further socializing that can that can empower people ultimately to evacuate safely.

VI. *Outside agencies including the National Guard and the county sheriff were generally viewed as capable and helpful, but things might have been bettered with more involvement among members of the volunteer fire department.* Many participants expressed concerns about authorities imposing a false sense of urgency, telling residents that immediate evacuation was the only way they would survive. This was problematic for some who did not especially trust what these outside rescuers told them, and many explicitly stated the evacuation process and communication between rescuers and residents might have been enhanced if the Glen Haven Volunteer Fire Department had been more deeply involved. Extralocal responders' lack of familiarity with the community hindered their ability to maintain authority. Further, those seeking information about evacuated loved ones occasionally became frustrated with communication processes at rescue centers across the Front Range. Considering the research on the efforts that go into building trust and the ease with which it can crumble (Johnson and Kaye 2015), it becomes all the more important to understand how trust with emergency workers in rural communities contributes to decisions to evacuate.

VII. *Social and traditional media as well as cell phone alert systems were generally irrelevant to those in the affected areas. Yet these same systems, which are the focus of much disaster research, were essential in bridging the gap to those outside the immediate community.* Because of Glen Haven's mountainous location, cell phone reception was minimal at the time of the disaster. Many targeted alerts and social media notifications that are the focus of ongoing disaster research went unheard by rural residents, even though messages might have been intended for them. Glen Haven's remote location made it impossible for news reporters to access the area. This kept traditional media outlets from reporting from the area, meaning many people did not hear about the situation in Glen Haven for days, and evacuees likely never received that

information before losing connectivity in the disaster's early hours. Disasters in rural areas, such as this mountainous region of Colorado, no doubt create logistical and technical challenges for emergency management officials and media alike. However, recognizing the strengths — and limitations — of multiple avenues of communication (Mileti et al. 2011) is vital, regardless of the scenario.

Taken together, these seven themes, and their explicit links to the three overarching research questions, provide insight into the experiences residents in Glen Haven faced at the time of the 2013 Colorado Flood. All of this helps to fill gaps in the research I identified early in this thesis, namely a suggestion from the After Action Review (2015) of better understanding evacuations in hard-to-reach, mountainous areas. My research also bolsters understanding about emergency evacuation communication in rural communities during flood events, showing that there are multiple ways that people first learn about the dangers, rely on each other, and ultimately take life-saving measures. Not only do the preceding pages provide details about what happened and how people learned about and acted in the context of the disaster, the evidence presented in previous chapters contributes to research about natural disasters, vulnerable communities, and communications during disasters.

Many of the implications I have highlighted throughout this discussion related directly to rural areas, but findings can also be broadened to many more areas that are affected by natural disasters. Even urban centers encounter paralyzing technological and communications-based challenges during major events like floods, fires, and hurricanes, effectively leaving many people in a similar isolated space as the residents of Glen Haven, Colorado.

CHAPTER VI: CONCLUSIONS AND SUGGESTIONS

Throughout this thesis, I have described the dramatic experiences of Glen Haven residents, the goal being to better understand how rural residents in isolated regions learned about the natural disaster's immediacy and to gauge how they communicated throughout the event. Residents learned of the dangers posed by the 2013 Colorado Floods through a two-step process of alert and affirmation — many reported first learning about the storm's danger through an automated 911 telephone call to their telephone landline. They then took steps to corroborate that information by both seeking visual affirmation first-hand and through using landline telephones to talk to neighbors. As the disaster wore on and water isolated segments of the population onto islands, residents worked together to first collect information about the extent of damage and then to coordinate an evacuation effort with each other and with the Glen Haven Volunteer Fire Department. Meanwhile, public safety agencies and media organizations elsewhere struggled to communicate the situation in Glen Haven to a more general audience.

This research offers three particularly important lessons in terms of policy and protocol related to rural flood response and emergency communications more broadly. I argue these findings help our understanding of these issues in ways that extend beyond this one part of the state. These include enhancing the automated 911 warning system, refining the role of volunteer firefighters during complex emergencies, and better understanding the role and purpose of media messages and first responder news briefings inside and outside affected disaster zones.

First, even with significant advances in mobile phone technology, my findings show just how vital landline telephone communication and person-to-person interaction was during emergency situations and evacuations. As my research shows, alerts such as automated 911

systems can have great reach in communicating the immediacy of an event. There is no way to know how many people might have tried to drive down the canyon if that telephone call was never made, but respondents uniformly reported that it was important in shifting perceptions early Thursday morning. Those on the receiving end will almost always seek additional information. Whether drawing on environmental cues by observing the rising water or attempting to glean details by talking with neighbors or friends — in person or otherwise — it is important to recognize that 911 calls are often just the beginning. Without follow-up instructions and without established ways to receive additional information, it can become difficult to maintain a systematic evacuation process. Thus, preparedness cannot be underscored enough, even in rural areas.

Second, volunteer fire departments in many communities represent the front lines of emergency services. The department in Glen Haven was undeniably important in the emergency efforts (and ultimately the rebuilding) related to the 2013 Colorado Floods. Because of firefighters' understanding of the geographical and interpersonal variables in rural communities, these men and women might be better able to physically facilitate the early evacuation efforts and work *with* vulnerable people by explaining risks and further encouraging them to take action when necessary. Rapport and trust between members on the fire department and residents whom they serve played a key role in the successful life-saving actions of residents. In communities, especially rural areas, volunteer firefighters with a similar interest stand to be the ones to facilitate evacuations. When these efforts involve outsiders — the National Guard, for example — it is important those individuals have some familiarity with the community dynamics and personalities. At the very least, it stands to reason that briefings and response planning during the disaster should include a discussion about the local dynamics and special situations or challenges

within a community. It stands to reason if resources allow it, firefighters should be further utilized during this phase of the evacuation effort. Moreover, there might be avenues in which the National Guard, or any other outside agency, can better facilitate information about residents' or a community's wellbeing and the broader public comprised of property owners and loved ones alike. Essentially, it is worth exploring ways in which outside responders can be more outwardly and information-focused, while the local first responders remain internally focused and armed with additional resources.

Third, there is no doubt communications about a disaster becomes more complicated as the event expands geographically. The 2013 Colorado Floods spanned across multiple counties along the Front Range and increased in complexity as more organizations became involved, from local fire departments and sheriff's offices to federal authorities and military personnel. Despite the increasing complexity of this disaster, one thing that remains essential is the ability to clearly communicate, building upon the framework outlined in the social mediated crisis communication model (Austin et al. 2012). The Larimer County Sheriff's Office created content through social media, and residents and news media alike followed that information. Those followers then transmitted information to social media inactives.

Social media, a powerful information dissemination tool during rapidly evolving situations, will only become more important in transmitting critical details about an event. However, it is important to recognize two things. First, information conveyed in certain formats might not reach people in danger (Anderson 1969; Mileti 1995) and, thus, should not be the only means to communicate dangers posed in a situation. As such, multiple pathways for emergency information should be utilized (Mileti et al. 2011). Second, message consistency, clarity, and the role of trust — all things important in the sociology of disaster — should not be neglected

(Clifford 1956; Mileti et al. 2011; Veil, Buehner, and Palenchar 2011), As systems advance — warnings are increasingly directed toward mobile phones, for example —it will be important to recognize through continued investigation what works, what does not, and where practices might be improved (Hughes and Palen 2012; Stewart and Wilson, 2016; Liu et al. 2010).

In sum, the effects of the 2013 Colorado Floods and emergency stretched beyond damaged property, dollar amounts, and an understandable reliance on others in even the most remote communities. One of the first interviews I conducted early in this project demonstrates this point particularly well. It seems only fitting to close as I opened — with Eliza Elwell, the mother and schoolteacher who relied on multiple information channels in deciding not to drive downstream early in the disaster.

As we sat on her couch on an early August evening, storm clouds brewing overhead, I noticed the brightly lit and decoratively adorned artificial Christmas tree a few strides away, standing near the bay window looking onto the bare-wood porch and sleepy downtown Glen Haven. Eliza, who cried multiple times throughout our interview, repeatedly referenced being traumatized by the early days of the flood. It was not until the end of our interview when I asked her about the tree. She said she kept it assembled year-round in the disaster's aftermath because, the holiday décor served as a nightlight and comforting reminder of home, her family, the community she feels a deep sense of connection to, and warm times during simpler days.

With the microphone turned off, we walked out the front door, briefly admiring the view down Main Street and the nearby sounds of the relaxing West Creek. I then noticed a large bell hanging by the door. Audible across Glen Haven, Eliza said she used to ring the bell when it was time for her kids to come home for supper — we joked about it being akin to a television sitcom from an era since passed. But now with her children grown, the bell does not ring as much as it

once did. Others in town still know if they hear it toll, however, there might be an emergency unfolding at Eliza's home. She rang it just a few days before our interview, she said, and two concerned men were at her door within minutes later. There was no emergency at that time. Just "the bear" back in town, leading her to warn others to take care around their properties and make sure their cabins were bear proof. Other neighbors would return the cautionary favor if they heard anything, she hoped. That is life in Glen Haven.

Figure 9: A wooden sign marked my arrival in Glen Haven in August 2016. Though rebuilding continues, signs of the water that roared over the road are few and far between.

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APPENDIX I: RESEARCH PROJECT TIMELINE

TIME FRAME	ACTION
April-December 2015	Initial topic generation; committee outreach/formation; theoretical and methodological considerations; recruitment docs, consent forms; IRB training and protocol submitted
December 2015	IRB approval granted; literature review and writing
January 2016	Began participant outreach
February-May 2016	Interviews with first-wave of leaders; recruitment
May 11, 2016	Submit first iteration literature review and hybrid methods chapter/proposal to Dr. Peek for SOC 610 and to Dr. Malin for general thesis suggestions and edits.
May 19, 2016	Submit revised literature review and methods chapter to Stephanie and committee as an update prior to one-month vacation.
End of June 2016	Return from vacation; continue revisions and review of literature; identify and schedule focus group(s) for second wave (evacuees)
July 2016	Complete second wave of focus groups and follow-up interviews, continue transcription and begin document analysis.
August 2016	Submit draft findings and discussion chapters to Stephanie; make appropriate edits.
December 2016	Defend thesis
February 2017	Complete necessary edits and submit final report
Spring 2017	Prepare sheet on findings and present to GH residents at meeting

APPENDIX II: INTERVIEW RECRUITMENT SCRIPT

Dear _____,

My name is Jason Pohl, and I'm a researcher at CSU in Fort Collins currently pursuing my master's thesis, " Evacuation, resilience, and recovery: A rural community case study of the 2013 Colorado Floods."

The goal of my research is to uncover more information about what worked and what didn't in your community so as to help other communities that might encounter similar emergencies in the future. I'm conducting interviews with community leaders and residents to better understand how things unfolded in and have changed since September 2013.

I'd like for you to be a part of my first round of interviews, to take place **later this month or early in February** in Glen Haven. The interview should take no more than one hour and will be held a community place convenient to you. I've attached additional information to this email that might answer some questions you have about the project, and I am happy to be in touch!

Please be in contact as soon as possible — I'm excited to work with you on a date that can fit in best with your schedule.

Thanks in advance,

Jason Pohl
Master's Student, Department of Sociology, Colorado State University
Personal cell: 619-672-6517
Jason.r.pohl@gmail.com

APPENDIX III: FOCUS GROUP RECRUITMENT FLYER

(Note: Never actually circulated due to recruitment success through other means)

Department of Sociology
Colorado State University

PARTICIPANTS NEEDED FOR
RESEARCH STUDY ON 2013 GLEN HAVEN FLOOD EVACUATIONS AND COMMUNICATION EXPERIENCES

Volunteers' identifying information will remain confidential. Findings will be used to better understand how residents in Glen Haven, Colorado communicated and evacuated in September 2013. Results may be used to better inform evacuation policies more generally for similar events.

As a participant, you would be asked take part in one (1) group interview that lasts no more than two (2) hours. It will be held in or around Glen Haven no later than August 1, 2016.
You may also be asked to participate in a follow-up one-on-one interview that lasts no more than one (1) hour.

For more information about this study, or to volunteer for this study, please contact:

Jason Pohl
Department of Sociology Master's Candidate
619-672-6517
Jason.R.Pohl@gmail.com

Principal Investigator:

Stephanie Malin, Ph.D.
Assistant Professor, Sociology Department

The study has been reviewed and approved by the Colorado State University Institutional Review Board

APPENDIX IV: IRB-APPROVED INDIVIDUAL INTERVIEW GUIDE

Evacuation, information and decision making during the 2013 Colorado Floods: A small-town case study
*VARIABLE. QUESTIONS AS GUIDEPOSTS. Questions should help answer sub-questions.

1. Personal characteristics (10 minutes)

a) Why/when did you move to the Glen Haven area?
b) What field of work were you in when you moved to the area?
c) How has that changed since the flood? Why?
d) In what ways were you involved with your community/neighbors before September 2013?

2. Personal flood experience (15 minutes)

a) Describe how events unfolded for you before and during the flood event.
b) How would you describe your role in helping others during the evacuation process?
c) What physical challenges did you experience or observe during the evacuation?
d) What emotional/psychological challenges did you experience or witness during evacuation?
    i. Where were you evacuated to? What was that like?
e) When were allowed to return to your residence? What do you remember about that?

3. Personal communication experience (15 minutes)

a) How did you remain informed about things happening in your community before flood?
    i. Discuss how, if at all, you communicated with neighbors, residents before the flood.
    ii. Discuss your experience with first responders/decision makers before the flood.
    iii. Discuss your use of social media websites including Facebook and Twitter.
    iv. Discuss your use of cell phone technology at your residence.
    v. Discuss your use of Internet and computers at your residence.
b) At your residence in the lead-up to evacuation
    vi. How did you use newspaper/print media websites?
    vii. How did you use TV news/websites?
    viii. How did you use government agencies website?
    ix. How did you use social media including Facebook/Twitter/Other to learn and connect?
    x. How did word-of-mouth of face-to-face communication contribute?
    xi. What other ways did you learn about and the flood events?

4. Personal post-flood experience (15 minutes)

a) What has happened to you in the years since the flood?
b) What has been the biggest challenge you've experienced or you've seen others experience?
c) Discuss your how, if at all, you communicate with neighbors, residents since the flood.
    i. Discuss your experience with first responders/decision makers since the flood.
    ii. Discuss your use of social media websites including Facebook and Twitter.
    iii. Discuss your use of cell phone technology at your residence.
    iv. Discuss your use of Internet and computers at your residence.
d) At your residence since the flood:
    i. How do you use newspaper/print media websites?
    ii. How do you use TV news/websites?
    iii. How do you use government agencies website?
    iv. How do you use social media including Facebook/Twitter/Other to learn and connect?
    v. How do word-of-mouth of face-to-face communication contribute?

5. Personal reflection (5 minutes)

a) If you could change something about how you acted in the flood, what would you change?
b) If you could change one thing about the way others acted, what would you change?
c) What has been the biggest challenge to you or your family in the years since the flood?

Do you have any other thoughts on the 2013 Colorado Floods that were not already discussed?

APPENDIX V: CONSENT FORM

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: *Evacuation, information and decision making during the 2013 Colorado Floods: A small-town case study*

PRINCIPAL INVESTIGATOR: *Stephanie Malin, Ph.D., Department of Sociology at Colorado State University,* Stephanie.Malin@colostate.edu; *970.491.5414*

CO-PRINCIPAL INVESTIGATOR: *Jason Pohl, Graduate Student, Department of Sociology at Colorado State University, 619.672.6517;* Jason.R.Pohl@gmail.com

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH? You are being asked to participate in a research study on the role of community involvement, social ties, media and the decision to evacuate during the September 2013 flooding in Northern Colorado. We're talking to you today to learn what factors contributed to your decision to stay or leave during the flooding event and examine how small town dynamics in communities like Glen Haven can be addressed for future disaster research in pursuit of public safety. You've been asked to participate in this research study because you were a homeowner or resident in or around Glen Haven during the flooding event.

WHO IS DOING THE STUDY? Dr. Stephanie Malin is leading the study and is a professor of Sociology at Colorado State University. Jason Pohl, a master's student in Sociology at CSU serves as a research assistant on this study in part for his Master's Thesis. *Pohl is also a staff journalist at the Fort Collins, Coloradoan newspaper. To be clear, this study is strictly academic and is in no way related to his newsgathering or journalistic practices.*

WHAT IS THE PURPOSE OF THIS STUDY? This research will help inform community and state policy makers and leaders regarding the challenges that small mountain communities, like your own, faced during the 2013 flood disaster. Results may be used to better craft evacuation and communication policies both in your own community as well as in areas that face similar threats to health and public safety from floods, fires and related events.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? This study is taking place in Glen Haven, a community of Larimer County, Colorado. It will last approximately one year. The focus group interviews will last no more than two hours and will be held at a time and location convenient to you, as will any agreed-upon one-on-one interviews that may follow. The follow-up interview may last about one hour. Your complete participation may total up three hours and will be as inconveniencing as possible.

WHAT WILL I BE ASKED TO DO? The focus group interview will take no more than two hours. You will join about six other community members in a group interview that will include questions about how you monitored the risk and rising waters before and during the mid-September flood. Prior to the group interview, you will be asked to complete a brief, five-part questionnaire with identifying details including name, date of birth, employment status at the time of the flood, degree of disaster impact and whether you still live in Glen Haven. Then, approximately 10 questions will be posed to the group, and participants will discuss answers among themselves in an informal, conversational manner. With your permission, the interview will be audio recorded. The conversation will be moderated by one of the researchers. At the completion of the study, you will be asked whether you are willing to voluntarily participate in a follow-up

one-on-one interview with the researcher to better explore a topic or topics brought up during the focus group.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY? You should only participate in this research if you are at least 18-years-old and you were a homeowner or resident in or around Glen Haven during the September 2013 flooding event.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

- The topics we ask about relate to sensitive issues that may bring back memories from the disaster. We will address this risk by keeping your identity private and confidential.
- It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY? There may be no direct benefit to you associated with this research; however, you will be able to contribute your observations and experiences to a systematic, university-led study. This research will help gain greater understanding of how evacuation and public safety information is relayed in rural communities, adding to research targeting communities like yours across the United States and beyond.

DO I HAVE TO TAKE PART IN THE STUDY? Your participation in this research is completely voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

WHO WILL SEE THE INFORMATION THAT I GIVE? We will keep private and confidential all research records that identify you using a numerical identifier and pseudonym, to the extent allowed by law.

For this study, we will assign a code to your data so that the only place your name will appear in our records is on the consent form and in our data spreadsheet that links you to your code and pseudonym. Only the research team will have access to the link between you, your codes, and your data. This information will be locked in Dr. Malin's office filing cabinet at CSU. The only exceptions to this are if we are asked to share the research files for audit purposes with the CSU Institutional Review Board ethics committee, if necessary. When we write about the study to share with other researchers, we will write about the combined information we have gathered. Pseudonyms not traceable to you may be used in written materials. We may publish the results of this study; however, we will keep your name and other identifying information private, unless specifically requested or allowed by you.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY? *There is no compensation for participating in this study.*

WHAT ELSE DO I NEED TO KNOW? The researchers would like to audio record your interview to be sure that your comments are accurately documented. Only our research team will have access to the recordings, and they will be destroyed when they have been transcribed. Do you give the researchers permission to audiotape your interview? Please initial next to your choice below.

☐ Yes, I agree to be digitally recorded _____ (initials)

☐ No, do not digitally record my interview _____ (initials)

Please let us know if you would like your comments to remain confidential or attributed to you. Please initial next to your choice below.

☐ I give permission for comments I have made to be shared using my exact words and to include my (name/position/title). _____ (initials)

☐ You can use my data for research and publishing, but do NOT associate my (name/position/title) with direct quotes. _____ (initials)

WHAT IF I HAVE QUESTIONS? *Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind. Later, if you have questions about the study, contact the investigator, Dr. Stephanie Malin at Colorado State University. If you have questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553. We will give you a copy of this consent form to take with you.*

Your signature acknowledges you have read the information stated and willingly sign this consent form. Your signature also acknowledges you have received, on the date signed, a copy of this document containing 3 pages.

_____	_____
Signature of person agreeing to take part in the study	Date
_____	_____
Printed name of person agreeing to take part in the study	Date of birth
_____	_____
Name of person providing information to participant	Date
_____	
Signature of Research Staff	